

State of Colorado
Oil and Gas Conservation Commission



1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109

FOR OGCC USE ONLY

RECEIVED
12/6/2013

OGCC Employee:

Spill Complaint
 Inspection NOAV

Tracking No:

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

Spill or Release Plug & Abandon Central Facility Closure Site/Facility Closure Other (describe): _____

OGCC Operator Number: <u>66571</u>	Contact Name and Telephone: <u>Tyson Ertel</u>
Name of Operator: <u>OXY USA WTP LP</u>	No: <u>970-263-3645</u>
Address: <u>760 Horizon Drive Suite 101</u>	Fax: <u>970-263-3694</u>
City: <u>Grand Junction</u> State: <u>CO</u> Zip: <u>81506</u>	

API Number: <u>05-054-10345</u>	County: <u>Garfield</u>
Facility Name: <u>CC 705-22-43 Well Pad</u>	Facility Number: <u>335186</u>
Well Name: <u>NA</u>	Well Number: <u>NA</u>
Location: (QtrQtr, Sec, Twp, Rng, Meridian): <u>SENW, Sec 5, T7S, R97W, 6th PM</u>	Latitude: <u>39.47766</u> Longitude: <u>-108.24353</u>

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): Condensate & Produced Water

Site Conditions: Is location within a sensitive area (according to Rule 901e)? Y N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Rangeland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Happle-Rock outcrop association, 25-65% slopes

Potential receptors (water wells within 1/4 mi, surface waters, etc.): Nearest water well is ~970' southwest, nearest surface water is ~1238' to the west, depth to the shallowest groundwater is ~100'.

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	<u>Please see attached work plan</u>	<u>Please see attached work plan</u>
<input type="checkbox"/> Vegetation	_____	_____
<input type="checkbox"/> Groundwater	_____	_____
<input type="checkbox"/> Surface Water	_____	_____

REMEDATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):
Initial Form 27 and work plan proposing further investigation was approved and assigned REM#7820/ DOC #2145268 by Chris Canfield in reference to Incident #2232966. Please see the attached workplan for proposed Insitu SVE.

Describe how source is to be removed:
Please see the attached workplan for proposed Insitu SVE.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:
Please see the attached workplan for proposed Insitu SVE.



Tracking Number: Name of Operator: OXY USA OGCC Operator No: 166571 Received Date: 12/26/2015 Well Name & No: Facility Name & No: CL 705-22-43 335186

Page 2 REMEDIATION WORKPLAN (Cont.)

OGCC Employee:

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.): Ground water was not impacted.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required. This is not applicable at this point, please see the attached workplan for proposed Insitu SVE.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

is further site investigation required? [X] Y [] N If yes, describe: Please see the attached workplan for proposed Insitu SVE.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.): Please see the attached workplan for proposed Insitu SVE.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: January 11, 2013 Date Site Investigation Completed: July 18, 2013 Date Remediation Plan Submitted: 12-8-2013 Remediation Start Date: Pending Anticipated Completion Date: Pending Actual Completion Date: Pending

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete. Print Name: Tyson Ertel Signed: [Signature] Title: HES Ops Advisor Date: 12-8-2013

OGCC Approved: [Signature] Title: Environmental Protection Specialist Date: 12/31/2013

SOIL VAPOR EXTRACTION PILOT TEST WORK PLAN

**OXY USA WTP LP
CC 705-22-43
API 05-045-10345
Facility Number 335186
Garfield County, Colorado**

Prepared For:



**OXY USA WTP LP, OXY USA Inc.
760 Horizon Drive, Suite 101
Grand Junction, CO 81506**

Prepared by:



**Olsson Associates
4690 Table Mountain Drive, Suite 200
Golden, CO 80403**

December 2013

Olsson Project Number 013-0242

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Appendix A – Olsson Site Health and Safety Plan

1.0 INTRODUCTION

On January 11, 2013, it was discovered by OXY USA WTP LP (Oxy) that a valve failed due to freezing conditions on one of the two production tanks on the Oxy Cascade Creek (CC) 705-22-43 (site) that resulted in the release of approximately 180 barrels (bbls) of production water and condensate mixture into the unlined soil secondary containment area. The Colorado Oil and Gas Conservation Commission (COGCC) was verbally notified of the release on January 12, 2013. Approximately one bbl breached the containment area and flowed to the north along the site access road for approximately 50 feet. The remaining released fluid was adsorbed by the soil within the secondary containment. On January 11, 2013 the impacted soil outside the secondary containment was excavated and temporarily stockpiled within the secondary containment area for future disposal.

1.1 Site Location and Current Usage

The site is an active oil and gas production well site located in the southeast quarter of the northwest quarter of Section 5, Township 7 South, Range 97 West, Sixth Principle Meridian in Garfield County, Colorado (39.47766 latitude and -108.24353 longitude). Conn Creek, at its closest point, is approximately 0.23 miles west of the site. A commercial water well permitted to Oxy is located approximately 0.5 miles south-southwest (down gradient) of the site. The site location is depicted on the Site Map included as Figure 1.

1.2 Previous Site Investigations

On January 15, 2013 Olsson provided environmental oversight for a hydro-excavator to pothole three locations (PH1, PH2, and PH3) adjacent to the secondary containment to depths ranging from 6 feet to 12 feet below ground surface (ft-bgs) to assess the extent of the release, however petroleum-impacted soil was not observed.

On February 8, 2013 Olsson conducted a site investigation to assess potential subsurface soil impacts associated with the release by advancing five borings (BH1, BH2, BH3, BH4, and BH9) using at selected locations on the site. The locations of the potholes and February 2013 are depicted on the Boring Location Map included as Figure 2.

On July 16, 2013 to July 18, 2013 Olsson conducted an additional site investigation to further assess subsurface soil impacts by advancing seven additional borings (BH5, BH6, BH7, BH8, BH10, BH11, and BH12) as indicated on attached Figure 2. The CC 705-22-43 production was shut in and the production tanks and secondary containment were temporarily relocated to allow for additional site characterization. Upon reaching total depth at borings BH5, BH8, BH10, BH11 and BH12, dry wells were constructed to accommodate potential future remediation efforts.

1.3 Areas of Concern

Based on the investigation results for the site it appears petroleum-impacted soil is limited to the area south and west of the above ground storage tanks in the vicinity of the surface spill (Figure 2) at boring locations BH1, BH2, BH3, BH5, BH6 and BH7. The highest TPH concentration was observed in a soil sample observed in the soil sample collected from boring B8 at 15 feet below ground surface (fbgs) to 20 fbgs at 4,860 milligrams per kilogram (mg/kg) located south of the tank containment area. Groundwater was not observed in any of the site borings.

2.0 SITE GEOLOGY

The lithology encountered during the site investigations is unconsolidated colluvium consisting of interbedded clay, sand, gravel, and cobbles overlying bedrock shale and sandstone of the Green River Formation. Bedrock sand and shale were observed at depths ranging from approximately 6 fbgs in boring B5 to approximately 40 ft-bgs at boring B10. Bedrock was not observed in boring B11. Groundwater was not observed in any of the site borings.

3.0 COMPOUNDS OF CONCERN

The compounds of concern (COC) consist of petroleum hydrocarbons from natural gas condensate. Specific COCs in the soil consist of benzene, toluene, total xylenes, and gasoline range organics (GRO) and diesel range organics (DRO) petroleum hydrocarbons. Analysis of soil samples collected during site investigations reported benzene concentrations above the COGCC Table 910-1 soil concentration level of 0.17 mg/kg at three boring locations. Toluene, ethylbenzene, and total xylenes were not reported above their respective COGCC concentration levels. Total petroleum hydrocarbons (TPH – the total of GRO plus DRO) were observed above the COGCC soil concentration level of 500 mg/kg at seven boring locations. In general, the reported TPH concentrations consisted predominantly of GRO hydrocarbons.

4.0 PROPOSED PILOT TEST TECHNOLOGY

Soil vapor extraction (SVE) is a time-proven technology for remediating petroleum-impacted soil and groundwater. SVE technology functions by inducing vapor flow through the soil to an SVE well or set of wells by placing a vacuum on the wells. As the air moves through the subsurface, petroleum constituents in the soil are volatilized and removed from the subsurface.

Olsson proposes to conduct a pilot test to evaluate the effectiveness of the SVE technology and collect data for full scale system design. The pilot test will be conducted using a portable trailer-mounted SVE system and the five existing wells installed during the July 2013 site investigation near the source area. The pilot test wells will be used as components of the full-scale remediation system, if testing indicates that SVE technology is feasible for this site. It is anticipated the pilot can be performed in two days.

During the SVE pilot test, a positive displacement blower will apply a vacuum to the SVE well resulting in airflow through the screened formation. SVE pilot system operation parameters will be monitored during the design parameter evaluation and SVE performance evaluation phases

of testing, primarily to collect data to develop the design of the full-scale SVE system, and to ensure effective system operation during pilot testing, respectively. The operation parameters will include vapor/air flow rates at individual SVE wells, contaminant removal rates, vacuum/pressure readings at observation wells, and temperature measurements.

4.1 Step-Rate Performance SVE Test

During this test, the vacuum will be incrementally increased and the flow rate will be allowed to stabilize between each increase. The vacuum will be increased to the maximum blower capabilities or until increasing vacuum levels results in decreasing airflow. Based upon the results of this test, a vacuum will be selected for the constant-rate performance test.

4.2 Constant-Rate Performance Test

The constant-rate performance test will be conducted to evaluate SVE well radius of influence, measure longer term flow rates, and sample the SVE air emissions for laboratory analysis of volatile organic compounds (VOC). The test will be terminated when vacuum levels in the monitoring points stabilize. During the constant-rate test, airflow will be measured at the SVE wells and vacuum measured at the nearby monitoring points.

4.3 SVE Well Construction

The wells were constructed during the site investigation (described in Section 1.2) and consist of 2-inch diameter polyvinyl chloride (PVC) 0.010 well screen extending from the base of the boring to within 10 feet of the ground surface. A 10/20 mesh graded sand pack was placed around the well screen to approximately two feet above the well screen. A hydrated bentonite seal was placed above the sand pack and extend to within one foot of the surface. A flush-mount vaulted well protector was set in concrete at the ground surface. The dry wells at boring locations BH5, BH8, BH10 and BH11 were constructed with a 40 foot screened interval and the dry well at BH12 was constructed with a 35 foot screened interval.

4.4 SVE Pilot Well Spacing

The distances between the wells are as follows:

- B11 to B12 ~25 feet
- B8 to B10 ~42 feet
- B8 to B11 ~48 feet
- B8 to B12 ~50 feet
- B8 to B5 ~ 60 feet
- B10 to B5 ~60 feet
- B5 to B12 ~110 feet

4.5 Soil Vapor Sampling

Soil vapor sampling is proposed to assess the changes in soil vapor concentrations in the subsurface over the period of pilot test performance and to estimate the vapor-phase VOC mass removal from the pilot test area vicinity. Prior to the pilot test startup, baseline soil vapor samples will be collected from the well in boring BH8 and BH5 to establish baseline conditions.

During the operation of the SVE pilot test, samples of extracted soil vapors will be collected for field PID screening and laboratory analysis to monitor changes in VOC concentrations over the period of the pilot test performance, and to calculate the total mass of vapor-phase VOCs removed during the pilot.

The soil vapor samples will be collected in one-liter Summa canisters and analyzed using EPA Method TO-3 for benzene, toluene, ethylbenzene, total xylenes (BTEX) and total petroleum hydrocarbons (TPH)-gasoline range organics (GRO).

5.0 SITE SAFETY

Safety concerns associated with the pilot test include:

- Slip and trip hazards
- Muscle strain
- Driving to and from the site
- Site oil and gas production equipment
- Site vehicular traffic
- Adverse weather conditions (snow and cold)
- Use motorized equipment at an operating oil and gas production facility
- Exposure to petroleum compounds
- Operation of the SVE pilot test blower system

A copy of Olsson's Site Specific Health and Safety Plan with Job Safety Analysis Worksheets (JSAs) are included as Appendix A. Olsson will conduct a tailgate safety meeting prior to commencing each day's work activities onsite.

6.0 DATA EVALUATION

After completion of the pilot testing, the data will be analyzed and a report with a proposed remedial action plan will be prepared for submittal to the COGCC and will include:

- Narrative of site activities
- Pilot test results and analysis
- Interpretation of SVE technology feasibility for site remediation
- Proposed conceptual remedial system and cost estimate
- Proposed installation, startup, and operations and maintenance schedules

- Regulatory considerations regarding the SVE system (i.e. extracted hydrocarbon vapors and generator exhaust) and potential Air Pollution Emission Notification (APEN) reporting and permitting with the Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division. The pilot test can be run without obtaining any additional permits or permit modifications.

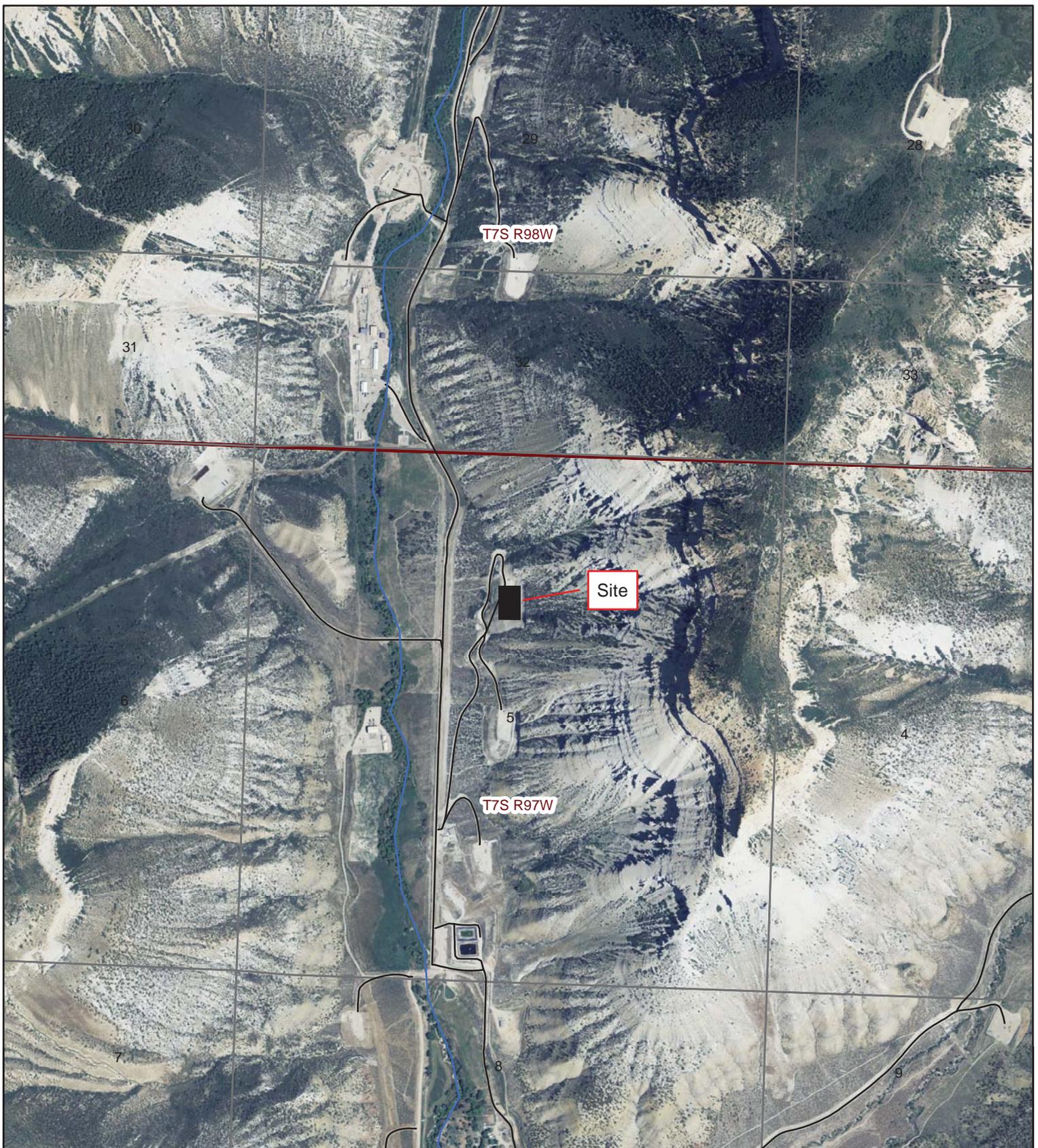
7.0 COST ESTIMATE

The estimated cost to complete conduct the pilot test is **\$13,850** (time and materials). A summary of the proposed pilot test cost estimate is provided below:

Cost Estimate

Olsson field labor, mobilization, H&S plan, equipment	\$4,300
Portable SVE system rental and operator	\$2,500
Laboratory Analysis – Six Soil Vapor Samples	\$900
SVE Pilot Test Data Interpretation, Summary Report Preparation, and Air Permit Analysis	\$5,200
Project management and administration	\$950
TOTAL ESTIMATED PILOT TEST FEES	\$13,850

FIGURES



Conn Creek

Existing Road

705-22-43 well pad



PROJECT NO:	013-0242
DRAWN BY:	BKR
DATE:	04/02/2013

Site Map
 CC 705-22-43 Pad
 OXY USA WTP LP
 Garfield County, Colorado

760 HORIZON DRIVE, SUITE 102
 GRAND JUNCTION, CO 81506
 TEL 970.263.7800
 FAX 970.263.7456

FIGURE	1
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- ▼ Boring locations: February 2013 and July 2013
- ▼ Boring completed with slotted PVC for future potential remediation option
- Locations Hydro-Excavated on 1/15/13
- Boring Impacted with Petroleum Hydrocarbon Above 500 Milligrams per Kilogram (mg/kg)
- Estimated Area of Soil Petroleum Hydrocarbon Impact Above 500 mg/kg

PROJECT NO:	013-0242
DRAWN BY:	BKR
DATE:	8/20/2013

Boring Location Map
 CC 705-22-43 Pad
 OXY USA WTP LP



760 Horizon Drive
 Grand Junction, CO 81506
 TEL 970.263.7800
 FAX 970.263.7456

FIGURE

2

APPENDIX A

OLSSON SITE SAFETY PLAN

SITE SAFETY PLAN

PROJECT NAME OXY CC 705-42-23 SVE Pilot Test

PROJECT NUMBER: 013-0242

A. SITE DESCRIPTION

Date December 5, 2013 Location: 39.47766 latitude and -108.24353, County Road 213, Garfield County, Colorado

Hazards: Driving to and from site, weather, petroleum hydrocarbons, SVE equipment, site and road traffic, buried utilities, cold weather

Area affected Vicinity of on-site above ground storage tanks

Surrounding population Sparsely populated, oil and gas production facilities

Topography Mountainous - local topography slopes to the east.

Weather conditions Variable, cold mornings

Wind Direction Variable – mostly from the west

Additional information _____

B. ENTRY OBJECTIVES: The objective of the initial and following entries to the contaminated area is to:

Soil vapor extraction pilot test

C. ONSITE ORGANIZATION AND COORDINATION: The following personnel are designated to carry out the stated job functions on site. (Note: One person may carry out more than one job function.)

Project Manager Kevin Taylor

Site Safety Officers Kevin Taylor, Bill Monroe, Tim Dobransky

Field Team Leaders Kevin Taylor, Bill Monroe, Tim Dobransky

Field Team Members Kevin Taylor, Bill Monroe, Tim Dobransky

All personnel need to coordinate with Tyson Ertel with OXY USA when they plan to be onsite.

All activities on site must be cleared through the Project Manager or the Site Supervisor.

Client Contact – Tyson Ertel, HES Advisor, OXY USA WTP LP, General Office Number 970-263-3600

Olsson Contacts: Kevin Taylor (cell) 303-478-8124

Tim Dobransky (cell) – 970-270-2986

D. ONSITE CONTROL

OXY USA has been designated to coordinate access control and security onsite.

A safe perimeter has been established at (distance or description of controlled area)

No unauthorized person(s) should be within this area.

The onsite Command Post and staging area have been established at Company vehicle

The prevailing wind conditions are from the west. The Command Post is located upwind from the Exclusion Zone.

Control boundaries have been established and the Exclusion Zone, Contamination Reduction Zone, and Support Zone (clean area).

E. PREVENTION PROGRAMS AND PERSONAL PROTECTIVE EQUIPMENT: No changes to the specified levels of protection shall be made without the approval of the Site Safety Officer and the Project Manager.

F. ONSITE WORK PLANS:

Work Task #	Task Objective and Description	Level of Protection
1	Drive to Site (refer to attached "Driving" Job Safety Analysis [JSA])	Level D
2	Soil vapor sampling – Soil gas sample collection (refer to the attached "Gas Sampling" JSA)	Level D
3	Soil vapor sampling – Confirmation Soil samples (refer to the attached "Environmental Sampling" JSA)	Level D
4	Contractor supervision(refer to attached "Contractor Supervision" JSA)	Level D

G. COMMUNICATION PROCEDURES

Personnel in the Exclusion Zone will be within sight of the Project Team Leader and all personnel will be assigned a cell phone. Personnel will be alerted of an incident that requires evacuation of the work area by verbal command and/or one long air-horn blast . Emergency numbers are as follows:

AGENCY/FACILITY	PHONE #	CONTACT
Police	911	
Fire	911	
Hospital	911	See attached map to Grand River Hospital in Rifle, CO – 501 Airport Road, Rifle, Colorado
Ambulance	911	

Job Safety Analysis Worksheets

Job Safety Analysis Worksheet		Date: 12/5/2013
Title of Job/Operation: Driving to Jobsite		Review Date: 12/5/2013
Employee Name and Job Title: Kevin Taylor, Project MANager		Analyst/ Date: 12/5/2013
Approved By: Kevin Taylor		Approval Date: 12/5/2013
Personal Protective Equipment Recommended or Required: Sun glasses (as needed), seat belt		
Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures
Schedule Vehicle	NA	<ul style="list-style-type: none"> Reserve vehicle and allow time for the trip
Inspect Vehicle	Slip, trips, and falls (FS) (FW)	<ul style="list-style-type: none"> Shoes with non-skid soles
Load Vehicle	Overexertion (O)	<ul style="list-style-type: none"> Lift small loads, take multiple trips Use proper lifting techniques Do not store materials or samples in the driver compartment
Fuel and Maintenance	Fumes, Fire, breakdown (E)	<ul style="list-style-type: none"> Check fuel, oil, tires, lights, breaks, windshield washer fluid Locate emergency shut off switch when fueling No smoking while fueling Adjust seat and mirrors
Determine Route	Lost, Rush to jobsite (O)	<ul style="list-style-type: none"> Map out directions prior to start of trip
Drive to Site	Adverse Weather (E)	<ul style="list-style-type: none"> Check weather conditions Ensure good tread on tires Delay trip during adverse weather conditions if possible Remove frost and snow from the vehicle Listen to local weather broadcasts Adjust speeds for the weather conditions Drive with lights on
	Fatigue (O)	<ul style="list-style-type: none"> Get ample rest prior to the trip Take short breaks At the onset of drowsiness, stop and take a short nap
	Mechanical (CB) (CW)	<ul style="list-style-type: none"> Maintain the mechanical integrity of the vehicle Check for leaks
	Human Factor (CB) (CW)	<ul style="list-style-type: none"> Use defensive driving skills Stay aware of other vehicles Wear seatbelt Follow driving laws Avoid being rushed and allow ample time for the trip Leave proper distance you and the next driver Accessional look 8 vehicles ahead
	Road Emergency/vehicle breakdown (CB) (CW)	<ul style="list-style-type: none"> Keep vehicle maintained and up-to-date Keep tools and spare tire in vehicle Recommended carrying a fire extinguisher, first aid kit, flashlight, jumper cables, first aid kit, cell phone, blanket, water, emergency food, shovel.

*Codes for Potential Hazards:

Struck By (SB)		Caught On (CO)		Fall To Below (FB)
Struck Against (SA)		Caught In (CI)		Overexertion (O)
Contacted By (CB)		Caught Between (CBT)		Exposure (E)
Contact With (CW)		Fall - Same Level (FS)		

	Contamination (E)	<ul style="list-style-type: none"> Wash hands promptly, dispose of contaminated PPE (booties, latex or nitrile gloves, respirator cartridge)
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*Codes for Potential Hazards:

Struck By (SB)		Caught On (CO)		Fall To Below (FB)
Struck Against (SA)		Caught In (CI)		Overexertion (OE)
Contacted By (CB)		Caught Between (CBT)		Exposure (E)
Contact With (CW)		Fall - Same Level (FS)		

Job Safety Analysis Worksheet		Date: 12/5/2013
Title of Job/Operation: Soil Vapor Sampling		Review Date: 12/5/2013
Employee Name and Job Title: Kevin Taylor, Project Manager		Analyst/ Date: 12/5/2013
Approved By: Kevin Taylor		Approval Date: 12/5/2013
Personal Protective Equipment Recommended or Required: Hardhat, safety shoes, eye protection, nitrile or latex gloves, respirator, protective clothing, snow ice/ice cleats, FRC, hearing protection		
Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures
Arrival at site Meet with representative Assess site conditions Review site emergency procedures	Slips, trips and falls (FS) (FW)	<ul style="list-style-type: none"> Avoid muddy, wet, icy, and slippery areas
Commuting onsite	Exposure to vehicles and traffic (SB)	<ul style="list-style-type: none"> Be attentive to vehicle traffic Give vehicles and heavy equipment the right-of-way Avoid standing between vehicles.
Sampling	Exposure to confined spaces (E)	<ul style="list-style-type: none"> <u>Do not enter the confined space</u>. Notify the area Team Leader and the Corporate Safety and Health officer for instruction
	Biological hazards (e.g. Bees, Wasps, Mosquitoes, Rodents, Birds and, Snakes) (E)	<ul style="list-style-type: none"> Identify allergies of co-workers, use mosquitoes repellent on exposed skin surfaces during active mosquito season Avoid areas of accumulated animal and bird droppings Avoid contact with spiders Snakes and insects including areas of habitation
	Environmental (E)	<ul style="list-style-type: none"> Review MSDS if available Identify the hazardous material exposure and determine the level of personal protective equipment necessary for protection Wear the proper personal protective equipment appropriate for exposure conditions before sampling Store chemical samples in appropriate containers.
	Fire (CB) (CW)	<ul style="list-style-type: none"> Locate fire extinguishers, wear FRC on sites where highly flammable materials are present, and store flammables in approved containers Review site emergency action plans and procedures
	Heat Stress and sunburns (E)	<ul style="list-style-type: none"> Drink ample fluids before and during work avoiding caffeinated drinks Wear sunscreen of at least sun protection factor (SPF) of 15 on exposed skin areas Wear loose clothing, and avoid working in the heat of the day
	Cold Stress (E)	<ul style="list-style-type: none"> Wear winter clothing and gloves Dress in loose layers of dry clothing with wool underneath and water proof top layer Avoid getting wet Change clothing immediately if you get wet Take warm-up breaks and avoid consuming caffeine drinks
	Noise	<ul style="list-style-type: none"> Use hearing protection as appropriate

	Contamination (E)	<ul style="list-style-type: none"> Wash hands promptly, dispose of contaminated PPE (booties, latex or nitrile gloves, respirator cartridge)
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*Codes for Potential Hazards:

Struck By (SB)		Caught On (CO)		Fall To Below (FB)
Struck Against (SA)		Caught In (CI)		Overexertion (OE)
Contacted By (CB)		Caught Between (CBT)		Exposure (E)
Contact With (CW)		Fall - Same Level (FS)		

Job Safety Analysis Worksheet		Date: 12/5/2013
Title of Job/Operation: Environmental Sampling		Log Number:
Employee Name and Job Title: Kevin Taylor, Project Manager		Analyst/ Date: 12/5/2013
Division/Bureau/Section: DWM/BWC/Site Investigation		Approved By/ Date: 12/5/2013
Personal Protective Equipment Recommended or Required: Hard hat, safety glasses, steel-toed/shank safety shoes, hearing protection, fire resistance clothing, leather gloves and nitrile/latex gloves, safety cones (as needed).		
Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures
Prepare for site visit Identify site/activity PPE needs; Check contents of PPE equipment bag for complete inventory.	N/A	Obtain and review site HASP from contractor; familiarize self w/site prior to visit; know contaminants of concern and properties, locations of suspected contaminant areas. Have proper training completed, and identify appropriate PPE needs. Provide itinerary to supervisor, or periodically check in w/office. MAP LOCATION OF NEAREST EMERGENCY MEDICAL FACILITY EQUIPPED TO HANDLE CHEMICAL EXPOSURES AND MEDICAL EMERGENCIES.
Carry and load sample coolers and other equipment.	(FS) Trip/fall (OE) back injury from improper lifting	Use a handcart; use the elevator; employ proper ergonomics; get help from a coworker to carry and load coolers and other equipment.
Proceed to vehicle/travel to and from site	(SB) Moving vehicles on road or in parking areas (SB) Traffic hazards	<u>Be attentive</u> when crossing traffic and walking with parking areas. <u>Map route</u> to site; have area map available; follow defensive driving practices; Perform quick vehicle inspection for obvious items such as tire inflation, wind shield wipers, sufficient gas to get to destination; Make certain procedures regarding accidents, injuries, vehicular break downs or roadside emergencies are available in vehicle.
Initial site arrival- Check in at the Williams Main Control Room Assess site conditions Be aware of site security/Secure work area	(E) Weather conditions	<u>Heat</u> - know the signs of heat stroke, have fluids available at site, take frequent rest breaks; <u>Sun</u> - keep body protected, wear sunscreen when not sampling, wide brimmed hat or hardhat;

<p>Walk about site</p>	<p>(SB) Traffic</p> <p>Irritated site owner Dangerous surroundings</p> <p>(BIO) Animals(dogs), snakes, stinging insects</p> <p>(CW) Chemical release areas</p> <p>(E) Vapors</p>	<p><u>Inclement conditions</u>- seek covered, secure shelter; <u>Extreme cold</u>- layered clothing, gloves, hat, etc.</p> <p><u>Be alert</u>, secure area from through traffic w/safety cones, tape and signs; wear site/activity appropriate PPE.</p> <p><u>Be courteous and diplomatic</u>. Do not enter site unless accompanied by another inspector or site personnel.</p> <p>Identify areas where biohazards may lurk, plan escape route in advance.</p> <p>Wear site/action appropriate PPE. Be familiar w/site plan, ID areas of contamination. Survey site for areas of discoloration, puddles, dead or stressed vegetation; Stay reasonably clear of such areas.</p> <p>Identify escape route, position self-upwind, and evacuate immediately if/when strong odors or irritation noted.</p>
<p>Collecting sanitary sewer samples;</p> <p>Open/close manhole covers</p> <p>Lifting heavy objects (covers, pumps, sampling equipment, coolers, etc.)</p>	<p>Explosive environment</p> <p>(CBT) Covers falling on fingers and toes</p> <p>(OE) Muscle strain</p> <p>(E) Noxious odors, chemical vapors</p> <p>(BIO) Noxious or stringing insects, pathological hazards</p>	<p>Explosive conditions require use of intrinsically safe equipment at all times. Identify escape route.</p> <p>Wear site/activity appropriate PPE; Use tools instead of fingers for prying off fingers.</p> <p>Use proper ergonomics when lifting heavy objects; use appropriate mechanical assistance and tools when possible to pry and lift off covers.</p> <p>Identify escape route; evacuate immediately if/when strong odors or irritation noted.</p> <p>Identify areas where biohazards may lurk, plan escape route in advance; maintain tetanus booster and hepatitis series.</p>

	(CI) Confined Spaces	Wear site/activity appropriate PPE; use appropriate sample equipment to avoid entering confined spaces- DO NOT ENTER CONFINED SPACE UNLESS PROPERLY TRAINED.
Collecting soil gas samples	(E) Encountering electric and gas utility lines, chemical vapors (E) Loud noise (OE) Muscle and soft tissue injury (SB) Flying debris while probing	Before probing, have all utilities located; Identify escape route, position self upwind, evacuate immediately if/when strong odors or irritation noted. Wear site/activity appropriate PPE; use proper ergonomics if driving probes into ground by hand.
Collecting soil samples	(E) Encountering electric and gas utility lines, chemical vapors, contaminated media (E) Loud noise (BIO) Stinging insects (FS) Slip/trip hazards (OE) Muscle and soft tissue injury	Have all utilities located; Identify escape route, position self upwind, evacuate immediately if/when strong odors or irritation noted; Wear site/activity appropriate PPE/ wear site/activity appropriate PPE; monitor atmosphere with applicable equipment. Use caution when opening monitor well protective covers, watch for biting insects. BE ALERT; position pumps and other sampling equipment in an orderly and safe fashion. Use proper ergonomics when positioning and lifting pumps and bailers.
Icing (reicing) sample coolers, transporting coolers and other equipment back to laboratory	(FS) Slip hazard (OE) Muscle and back injury	Use due care when draining water from coolers, use proper ergonomics when lifting and moving coolers and other equipment.
Site exit	(CW) Contaminated vehicle	Wash hands promptly. Contaminated PPE (Booties, tyvek, and latex gloves) should be disposed on-site. Remove boots and soiled clothing for secure storage in trunk; decontaminate as soon as possible. Update exposure log
Drive home or to next site	(SB) Traffic hazards	FOLLOW "TRAVEL TO SITE" PROCEDURES.

*Codes for Potential Hazards:

Struck By (SB)		Caught On (CO)		Fall To Below (FB)
Struck Against (SA)		Caught In (CI)		Overexertion
Contacted By (CB)		Caught Between (CBT)		Exposure (E)
Contact With (CW)		Fall - Same Level (FS)		

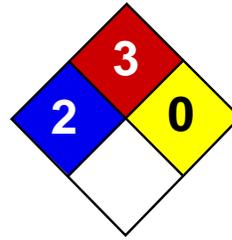
Job Safety Analysis Worksheet		Date: 12/5/2013
Title of Job/Operation: Contractor Supervision		Log Number:
Employee Name and Job Title: Kevin Taylor, Project Manager		Analyst/ Date: 12/5/2013
Division/Bureau/Section:		Approved By/ Date: 12/5/2013
Personal Protective Equipment Recommended or Required: Hard hat, safety glasses, safety shoes, fire resistant clothing hearing protection, sunscreen, bug repellent, protective gloves.		
Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures
Prepare for site visitation	STF	Prepare listing of emergency phone numbers, both on and offsite; complete appropriate training before going on site. Provide appropriate person in district office you itinerary. Familiarize yourself with site prior to visit.
Calibrate Equip.	Exposure to Calgas	Review Equipment manuals. Follow OSHA guidance.
Load Vehicle	Lifting injury	Follow OSHA guidance
Fuel Vehicle	Exposure to Fumes	Employ safe fueling standards. Avoid contact with fuel and fumes.
Drive to/from site	Traffic accidents	Buckle up; Use defensive driving tactics, Obey traffic laws, and keep vehicle in safe operating condition. Observe General Order 7 (EVOC).
Assess the Site	STF	Be alert, watch where you make your steps, wear safety shoes.
Ground Proof Incident	Chemical contact (liquid and vapor), Fire/Explosion/Reactivity, Heat and Severe Weather.	Wear proper PPE, Snake Boots, Insect Repellent, Seek Shelter from Storms, Take Breaks, Monitor conditions, Engineer safeguards apply foam ventilate.
Establish RP action	Hostile RP	Use communication Skills/Buddy System Task contractor if no RP action.
Contractor Oversight Supervise container Removal Enforce Site Safety Plan	Chemical exposure (liquid and vapor), Fire/Explosion/Reactivity, Heat and Weather, Heavy Equipment/Objects	Avoid chemical exposure, wear proper PPE, snake Boots, Insect repellent, Take breaks, Wear hat, Seek shelter from storms, Engineer safeguards, monitor worker safety, proceed/cease operation.
Supervise soil or spill excavation	Chemical exposure (liquid and vapor), Heavy Equipment, STF at open excavations, Overhead/underground Utilities (water, sewer, electric), Heat and Weather.	Avoid chemical exposure, Wear proper PPE, Sunscreen, and Bug repellent, Be alert, Stay safe distance, Wear hard hat/steel toed boots, Drink fluids, Take breaks.

Supervise Operation	Sampling	Chemical exposure, Heat and Weather	Avoid chemical exposure, Wear proper PPE, sunscreen, wear hat seek shelter from storms.
Secure Waste/Package for Transport		Chemical exposure and Cleaning Solvents	Avoid chemical exposure, Wear proper PPE.
Exit site			
Supervise labeling and securing of containers. Follow DOT Guide for labels and placards. Complete DEP documentation.		Shifting containers can leak	Block all containers

*Codes for Potential Hazards:

Struck By (SB)		Caught On (CO)		Fall To Below (FB)
Struck Against (SA)		Caught In (CI)		Overexertion
Contacted By (CB)		Caught Between (CBT)		Exposure (E)
Contact With (CW)		Fall - Same Level (FS)		

MATERIAL SAFETY DATA SHEETS
(MSDS)



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

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
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

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

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

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. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

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. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Vigorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. 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 locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

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. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m³) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m³) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m³) [Canada] TWA: 0.5 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:

Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; $\log(\text{oil/water}) = 2.1$

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism, and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

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 products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 11/01/2010 12:00 PM

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CountryMark®

CRUDE OIL

Material Safety Data Sheet

SECTION I

PRODUCT IDENTIFICATION

Manufacturer's Name: Countrymark Cooperative, LLP.
Address: 1200 Refinery Road
Mt. Vernon, Indiana 47620

Emergency Telephone Number: 812-838-8165 (Refinery Control Room)
800-424-9300 (CHEMTREC)

Trade Names: Petroleum; Crude Oil; Mineral Oil; Rock Oil; Coal Oil; Seneca Oil; Earth Oil; Lima Oil

Chemical Name: Petroleum, Crude Oil
Chemical Family: Hydrocarbon
CAS Registry Number: 8002-05-9

SECTION II

HAZARDOUS INGREDIENTS

Petroleum (Crude Oil) consists of a mixture of hydrocarbons from methane and up - chiefly of the paraffins, cycloparaffins, or of cyclic aromatic hydrocarbons, with small amounts of benzene hydrocarbons, sulfur, nitrogen and oxygenated compounds. The terms paraffin base crude, naphthene or asphalt base crude, and aromatic base crude are used to indicate the most prevalent constituents of crudes from various localities.

SARA TITLE III SECTION 313

HAZARD AND TOXIC MATERIALS NOTIFICATION (This may not be a complete list of components.)

<u>Hazardous Component</u>	<u>CAS Number</u>	<u>Volume Range</u>
Toluene (Benzene, methyl)	108-88-3	0 to 1 %
Xylenes (Dimethyl Benzene)	1330-20-7	0 to 1 %
Benzene	71-43-2	0 to 1 %
Ethylbenzene	100-41-4	0 to 1 %
Cyclohexane (Benzene, hexahydro)	110-82-7	0 to 1 %
Hydrogen Sulfide (H ₂ S)	7783-06-4	0 to 10 PPM

CERCLA INFORMATION

Under EPA-CWA, this product is considered an oil under Section 311. Spills into or leading to surface waters that cause a sheen must be reported to the National Response Center, 800-424-8802

RCRA INFORMATION

Under EPA-RCRA (40 CFR 261.21), if this product becomes a waste material, it would be an Ignitable Hazardous Waste., Hazardous Waste Number D001. Refer to the latest EPA or State Regulations regarding proper disposal.

SECTION III

PHYSICAL DATA

Boiling Point (°F)	<32 to 760+
Specific Gravity (H ₂ O = 1) at 60° F	0.80 to 0.90
Vapor Pressure (mm. Hg) @ 60° F	< 500
Percent Volatile by Volume (%)	Varies with different Crudes
Solubility in Water	Insoluble
Viscosity	<50 SUS @ 100° F

Appearance and Odor:

Petroleum (Crude Oil) is a dark brown, greenish-brown, greenish fluorescent, or black-colored oily liquid depending upon its origin. It has a peculiar distinct heavy petroleum odor also varying with its place of origin and composition. Crude Oil may also have an odor of "rotten eggs" caused by hydrogen sulfide contamination.

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Flash Point (TCC)	< 80° F (The Flash Point is dependent upon the individual Crude Oil.)
Classification:	Flammable Liquid UN 1267
Flammable Limits:	LEL <u>N/A</u> UEL <u>N/A</u>

Extinguishing Media:

Small Fires: Dry Chemical, Carbon Dioxide, water spray, or foam.
Large Fires: Water spray, fog, or foam

Hazardous Decomposition Products:

WARNING: Hydrogen Sulfide (H₂S) and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. Hydrogen sulfide is an extremely flammable and highly toxic gas. Incomplete combustion may form toxic materials: Carbon Dioxide and Carbon Monoxide, plus various unidentified organic hydrocarbons may be formed.

Special Fire Fighting Procedures:

Cool containers with water spray to prevent re-ignition.

Unusual Fire and Explosion Hazards:

Avoid heat, open flames, and oxidizing agents such as Chlorine, Permanganates, and Dichromates.

SECTION V

HEALTH HAZARD

Threshold Limit Value:

No applicable information was found.

Effects of Overexposure:

None expected under normal conditions of use.

Emergency and First Aid Procedures:

IF IN EYES - Flush with large amounts of water, lifting upper and lower lids occasionally. Get medical attention.

IF ON SKIN - Thoroughly wash exposed area with soap and water. Remove contaminated clothing. Launder contaminated clothing before wearing.

IF INHALED - Remove individual to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, quiet, and get medical attention.

IF SWALLOWED - Do not induce vomiting. Keep person warm, quiet and get medical attention.

SECTION VI

REACTIVITY DATA

Stable X Unstable _____

Incompatibility (Materials to avoid): Avoid contact with strong oxidizing agents like Chlorine, Permanganates, and Dichromates.

Hazardous Decomposition Products:

May form toxic materials of Carbon Dioxide, Carbon Monoxide, various hydrocarbons, etc. as combustion byproducts.

Hazardous Polymerization: May Occur ___ Will Not Occur X

SECTION VII

SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released:

Small Spill: Eliminate all ignition sources (smoking, flares, flames, including pilot lights, electrical sparks, and etc.). Absorb liquid on paper, vermiculite, floor absorbent, or other absorbent material and place in non-leaking container for proper disposal.

Large Spill: Eliminate all ignition sources (smoking, flares, flames, including pilot lights, electrical sparks, and etc.). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area of spill to prevent spreading, pump liquid to salvage tank or truck. Remaining liquid may be taken up on sand, clay, earth, floor absorbent or other absorbent material and shoveled into non-leaking containers for proper disposal. Prevent run-off to sewers, streams or other bodies of water. If run-off occurs, notify proper authorities as required, that a spill has occurred.

Waste Disposal Method:

Small Spill: Contaminated absorbent may be deposited in a landfill in accordance with local, state and federal regulations.

Large Spill: Reclaim as much as possible for reprocessing or salvage. Destroy by liquid incineration. Contaminated absorbent may be deposited in a landfill in accordance with local, state and federal regulations.

SECTION VIII

SPECIAL PROTECTION INFORMATION

Respiratory Protection:

Not needed for normal exposure. A NIOSH/MSHA jointly approved air supplied respirator is advised in absence of proper environmental control. Firefighters require SCBA Positive Pressure Breathing Apparatus when involved in petroleum fires.

Ventilation:

Ventilation is not required for normal conditions of use. If ventilation is needed, explosion-proof motors and fans are required to provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(S).

Personal Protective Equipment and Apparel:

Gloves: Wear petroleum resistant gloves such as: Neoprene, Nitrile, rubber gloves, etc.

Eye Protection: Safety goggles or face shield for protection from splashing in eyes.

Other Protective Equipment: Wear impervious protective clothing and boots appropriate for work situations to prevent repeated or prolonged skin contact. Launder contaminated clothing before wearing.

SECTION IX

SPECIAL PRECAUTIONS

Precautions to be taken when handling and storing:

Keep all containers in upright position with storage in cool, dry, well ventilated area away from heat, ignition, and strong oxidizers. Do not allow smoking in areas of use or dispensing. Motors, fans, switches, etc. in area of use or dispensing should be explosion proof. Ground containers when filling. Prevent all static and electric sparks.

Other Precautions:

Have written confined space and tank entry procedures. Never allow tank entry without checking OXYGEN AND VAPOR levels.

WARNING: Hydrogen Sulfide (H₂S) and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. Hydrogen sulfide is an extremely flammable and highly toxic gas. Use safety harness and safety line on person entering a tank. Stand-by person required with protective equipment available.

SECTION X

TOXICOLOGICAL INFORMATION

No applicable information was found.

SECTION XI

DOT LABELING INFORMATION

Proper Shipping Name:	Petroleum Crude Oil
Hazardous Classification:	Flammable Liquid, 3, UN 1267, PG I (DOT ERG No. 27)
Identification Number:	UN 1267
Label(s) Required:	Flammable Liquid

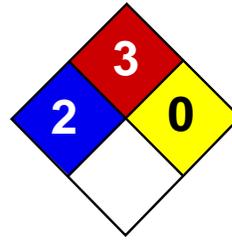
DISCLAIMER OF LIABILITY

The information in this MSDS was obtained from sources which we believe are reliable; however, the information is provided without any warranty, expressed or implied, regarding its correctness.

The conditions or methods of handling, storage, use and disposal of this product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This MSDS was prepared and is to be used only for this product. If this product is used as a component in another product or mixed with another product, this MSDS information may not be applicable.

Date of Preparation or Last Change: June 2009



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C₈H₁₀

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
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get 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 medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:

CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

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. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. 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 away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

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. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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:

TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m³) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; $\log(\text{oil/water}) = 3.1$

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:

Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:

Can react vigorously with oxidizing materials. Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:

Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Can cause mild skin irritation. It can be absorbed through intact skin. Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm, it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS) Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include

headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and consciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987). Ingestion: Do not drink, pipet or siphon by mouth. May cause gastrointestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

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 products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethylbenzene Massachusetts RTK: Ethylbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information**References:**

-Manufacturer's Material Safety Data Sheet. -Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA) -Registry of Toxic Effects of Chemical Substances (RTECS) -Chemical Hazard Response Information System (CHRIS) -Hazardous Substance Data Bank (HSDB) -New Jersey Hazardous Substance Fact Sheet -Ariel Global View -Reprotext System

Other Special Considerations: Not available.

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Last Updated: 11/01/2010 12:00 PM

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Material Safety Data Sheet

NATURAL GAS CONDENSATE

April 28, 1995

PHILLIPS PETROLEUM COMPANY
Bartlesville, Oklahoma 74004

PHONE NUMBERS

Emergency: (918) 661-8118
General MSDS Information:
(918) 661-8327
For Additional MSDSs: (918) 661-5952

A. Product Identification

Synonyms: Drip; Hydrocarbon gas drip; Gas drip
Chemical Name: Natural gas condensate
Chemical Family: Mixture
Chemical Formula: Mixture
CAS Reg. No.: 68919-39-1
Product No.: Not Established

Product and/or Components Entered on EPA's TSCA Inventory: YES

This product is in U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals; hence, it may be subject to applicable TSCA provisions and restrictions.

B. Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
-------------	---------------	-------------	-------------	--------------

Hydrogen sulfide	7783-06-4	0-20	10 ppm	10 ppm
C2 Hydrocarbons (As ethane)	Various	0-5	NE	Simple
Asphyxiant				
C3 Hydrocarbons (As propane)	Various	0-15	1000 ppm	Simple
Asphyxiant				
C4 Hydrocarbons (As butane)	Various	0-45	800 ppm	800 ppm
C5 Hydrocarbons (As pentane)	Various	5-70	600 ppm	600 ppm
C6 Hydrocarbons (As n-hexane)	Various	25-95	50 ppm(1)	50 ppm(1)
may include: Cyclohexane	110-82-7	NE	300 ppm	300 ppm
C7 Hydrocarbons (As heptane)	Various	25-95	400 ppm	400 ppm
C8 Hydrocarbons (As octane)	Various	25-95	300 ppm	300 ppm
Aromatic Hydrocarbons	Various	0-10	NE	NE
may include: Benzene	71-43-2	NE	1 ppm(2)	10 ppm
Toluene	108-88-3	NE	100 ppm	100 ppm
Mixed xylene	1330-20-7	NE	100 ppm	100 ppm
Ethylbenzene	100-41-4	NE	100 ppm	100 ppm

(1) As n-Hexane. As Hexane isomers 500 ppm.

(2) Areas exempted by the Benzene Standard, 29 CFR 1910.1028, will have a 10 ppm 8 hour TWA.

C. Personal Protection Information

Ventilation: Use adequate ventilation to control exposure below recommended levels.

Respiratory Protection: For concentrations exceeding the recommended exposure level, use NIOSH/MSHA approved air supplied respirator. In case of spill or leak resulting in unknown concentrations, use NIOSH/MSHA approved supplied air respirator.

Eye Protection: Use chemical goggles.

Skin Protection: Use full-body, long-sleeved garments. Use polyvinyl alcohol or Buna-N gloves.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Do not get in eyes, on skin or on clothing. Do not breathe vapor, mist, fume or dust. May be harmful. Proper personal protective equipment must be used when handling this chemical. Launder contaminated clothing before reuse. Wash thoroughly after handling. Use only with adequate ventilation. Do not swallow. May be aspirated into lungs.

Store in a well-ventilated area. Store in tightly closed container. Keep away from heat, sparks, and flames. Bond and ground during transfer.

E. Reactivity Data

Stability:	Stable
Conditions to Avoid:	Not Applicable
Incompatibility (Materials to Avoid):	Oxygen and strong oxidizing materials
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid:	Not Applicable
Hazardous Decomposition Products:	Carbon oxides and various hydrocarbons formed when burned. Sulfur oxides may be formed if hydrogen sulfide is present.

F. Health Hazard Data

Recommended Exposure Limits:

See Section B.

Acute Effects of Overexposure:

Eye: May cause irritation including pain, blurred vision, redness, tearing and superficial corneal turbidity.

Skin: May cause slight irritation. Extreme exposure may produce discoloration, muscle weakness, breathing difficulties and other central nervous system effects.

Inhalation: Toxic by this route of exposure. May cause nausea, diarrhea, loss of appetite, dizziness, disorientation, headache, excitation, rapid respiration, drowsiness, labored breathing, anesthesia and other central nervous system effects. Hydrogen sulfide may cause lung paralysis and asphyxiation. Extreme overexposure may cause rapid unconsciousness and respiratory arrest.

Ingestion: May be mildly irritating to intestines. If swallowed, may be aspirated resulting in inflammation and possible fluid accumulation in the lungs.

Subchronic and Chronic Effects of Overexposure:

Benzene has been designated as a carcinogen by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), and the Occupational Safety and Health Administration (OSHA). Benzene may produce blood changes which include reduced platelets, reduced red blood cells, reduced white blood cells, aplastic anemia, and acute nonlymphocytic leukemia. Benzene has produced fetal death in laboratory animals and caused chromosome changes in humans and mutation changes in cells of other organisms.

Chronic high level n-hexane exposure damages the nervous system initially producing a lack of feeling in the extremities and possibly progressing to a more severe nerve damage.

Inhalation of high levels (1000 and 5000 ppm) of n-hexane has produced testicular damage in rats. Mice exposed to the same dose levels showed no testicular effects.

Other Health Effects:

The odor of hydrogen sulfide may not be recognized after prolonged inhalation due to paralysis of the sense of smell. Effects from inhaling the fume may lead to chronic bronchitis, respiratory irritation, increased loss of pulmonary function, and tearing of the eyes.

Some isoparaffins have produced kidney damage in male rats only. No comparable kidney disease is known to occur in humans.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Toxic	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Suspect Carcinogen	<input type="checkbox"/>	<input type="checkbox"/>	Corrosive	<input type="checkbox"/>	<input type="checkbox"/>
Mutagen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Irritant	<input type="checkbox"/>	<input type="checkbox"/>
Teratogen	<input type="checkbox"/>	<input type="checkbox"/>	Target Organ Toxin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Allergic Sensitizer	<input type="checkbox"/>	<input type="checkbox"/>	Specify - Nerve Toxin; Liver and Kidney		
Highly Toxic	<input type="checkbox"/>	<input type="checkbox"/>	Toxin; Lung-Aspiration Hazard		

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Skin: Wash skin with soap and water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Inhalation: Immediately remove from exposure. If breathing is difficult, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek immediate medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical attention.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

G. Physical Data

Appearance: Colorless to dark liquid
Odor: Rotten egg odor if hydrogen sulfide is present.
Boiling Point: Not Established
Vapor Pressure: < 40 psia @ 70F (21C) (Estimated)
Vapor Density (Air = 1): >1
Solubility in Water: Negligible
Specific Gravity (H2O = 1): 0.5-0.7 (Estimated)
Percent Volatile by Volume: 100
Evaporation Rate (Butyl Acetate = 1): >1
Viscosity: < 40 SUS @ 68F (20C)

H. Fire and Explosion Data

Flash Point (Method Used): <-100F (<-73C)(Estimated)
Flammable Limits (% by Volume in Air): LEL - Not Established
UEL - Not Established

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

Special Fire Fighting Procedures: Evacuate area of all unnecessary personnel. Use NIOSH/MSHA approved self-contained breathing apparatus and other protective equipment and/or garments described in Section C if conditions warrant. Shut off source, if possible. Water fog or spray may be used to cool exposed equipment and containers. Allow fire to burn until gas flow is shut off, if possible.

Fire and Explosion Hazards: Carbon oxides and possibly sulfur oxides formed when burned. Highly flammable vapors which are heavier than air may accumulate in low areas and/or spread along

ground away from handling site.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:

Evacuate area of all unnecessary personnel. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Shut off source, if possible. Protect from ignition. Ventilate area thoroughly.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or otherwise manage at a RCRA permitted waste management facility.

J. DOT Transportation

For Natural Gas Condensate with an IBP < 68F

Shipping Name: Hydrocarbon gases mixtures, liquefied, n.o.s.
(contains Propanes and Butanes)

Hazard Class: 2.1 (Flammable gas)

ID Number: UN 1965

Packing Group: Not applicable

Marking: Hydrocarbon gases mixtures, liquefied,, n.o.s.
(contains Propanes and Butanes), UN 1965, RQ*

Label: Flammable gas

Placard: Flammable gas/1965

Hazardous Substance/RQ: Benzene/1000#; Toluene/1000#; Cyclohexane/1000#;
Xylene/1000#; Ethylbenzene/1000#

Shipping Description: Hydrocarbon gases mixtures, liquefied, n.o.s.
(contains Propanes and Butanes), 2.1
(Flammable gas), UN 1965, RQ*

Packaging References: 49 CFR 173.304, 173.306, 173.314, 173.315

*Enter the letters "RQ" and the name of the hazardous substance as shown only if the hazardous substance is present in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) shown for the hazardous substance.

For Natural Gas Condensate with an IBP > 68F

Shipping Name: Natural gasoline

Hazard Class: 3 (Flammable liquid)
ID Number: UN 1257
Packing Group: I (if IBP < 95F) or II (if IBP > 95F)
Marking: Natural gasoline, Un 1257, RQ*
Label: Flammable liquid
Placard: Flammable liquid/1257
Hazardous Substance/RQ: Benzene/10#; Toluene/1000#; Cyclohexane/1000#;
Xylene/1000#; Ethylbenzene/1000#
Shipping Description: Natural gasoline, 3 (Flammable liquid),
UN 1257, PG I or II, RQ*
Packaging References: 49 CFR 173.150, 173.201, 173.202, 173.242, 173.243

*Enter the letters "RQ" and the name of the hazardous substance as shown only if the hazardous substance is present in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) shown for the hazardous substance.

K. RCRA Classification - Unadulterated Product as a Waste

Ignitable (D001)

Prior to disposal, consult your environmental contact to determine if TCLP (Toxicity Characteristic Leaching Procedure, EPA Test Method 1311) is required. Reference 40 CFR Part 261.

L. Protection Required for Work on Contaminated Equipment

Contact immediate supervisor for specific instructions before work is initiated. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

M. Hazard Classification

X This product meets the following hazard definition(s) as defined by

the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

<input type="checkbox"/> Combustible Liquid	<input type="checkbox"/> Flammable Aerosol	<input type="checkbox"/> Oxidizer
<input type="checkbox"/> Compressed Gas	<input type="checkbox"/> Explosive	<input type="checkbox"/> Pyrophoric
<input type="checkbox"/> Flammable Gas	<input checked="" type="checkbox"/> Health Hazard (Section F)	<input type="checkbox"/> Unstable
<input checked="" type="checkbox"/> Flammable Liquid	<input type="checkbox"/> Organic Peroxide	<input type="checkbox"/> Water Reactive
<input type="checkbox"/> Flammable Solid		

Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

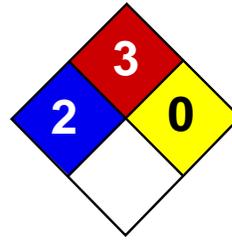
N. Additional Comments

SARA 313

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

Hexane
Benzene
Toluene
Mixed xylene
Ethylbenzene
Cyclohexane

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

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
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

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

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get 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 medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

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:

Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:

Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetroxide; concentrated nitric acid, sulfuric acid + nitric acid; N₂O₄; AgClO₄; BrF₃; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. 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. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. 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 away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

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. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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:

TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m³) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:

Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Causes mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abrasions. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophosphatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

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 products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

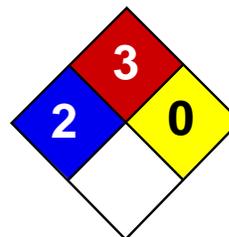
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:30 PM

Last Updated: 11/01/2010 12:00 PM

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Xylenes MSDS

Section 1: Chemical Product and Company Identification

Product Name: Xylenes

Catalog Codes: SLX1075, SLX1129, SLX1042, SLX1096

CAS#: 1330-20-7

RTECS: ZE2100000

TSCA: TSCA 8(b) inventory: Xylenes

CI#: Not available.

Synonym: Xylenes; Dimethylbenzene; xylol; methyltoluene

Chemical Name: Xylenes (o-, m-, p- isomers)

Chemical Formula: C₆H₄(CH₃)₂

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
Xylenes	1330-20-7	100

Toxicological Data on Ingredients: Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

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

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

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. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

Flammable Limits: LOWER: 1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Vapors may travel to source of ignition and flash back.

Special Remarks on Explosion Hazards:

Vapors may form explosive mixtures with air. Containers may explode when heated. May polymerize explosively when heated. An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. 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 away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

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. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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:

TWA: 100 (ppm) [Canada] TWA: 435 (mg/m³) [Canada] TWA: 434 STEL: 651 (mg/m³) from ACGIH (TLV) [United States]
TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 138.5°C (281.3°F)

Melting Point: -47.4°C (-53.3°F)

Critical Temperature: Not available.

Specific Gravity: 0.864 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 1 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; $\log(\text{oil/water}) = 3.1$

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Insoluble in cold water, hot water. Miscible with absolute alcohol, ether, and many other organic liquids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2119 mg/kg [Mouse]. Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:

Lowest Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

Special Remarks on Chronic Effects on Humans:

Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects (male and female fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation. Can be absorbed through skin. Eyes: Causes eye irritation. Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves. Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/kidneys. May cause effects similar to those of acute inhalation. Chronic Potential Health Effects: Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may also cause mucosal bleeding. Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

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 products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification : Xylenes UNNA: 1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Xylenes Illinois chemical safety act: Xylenes New York acutely hazardous substances: Xylenes Rhode Island RTK hazardous substances: Xylenes Pennsylvania RTK: Xylenes Minnesota: Xylenes Michigan critical material: Xylenes Massachusetts RTK: Xylenes Massachusetts spill list: Xylenes New Jersey: Xylenes New Jersey spill list: Xylenes Louisiana spill reporting: Xylenes California Director's List of Hazardous Substances: Xylenes TSCA 8(b) inventory: Xylenes SARA 302/304/311/312 hazardous chemicals: Xylenes SARA 313 toxic chemical notification and release reporting: Xylenes CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R10- Flammable. R21- Harmful in contact with skin. R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 12:54 PM

Last Updated: 11/01/2010 12:00 PM

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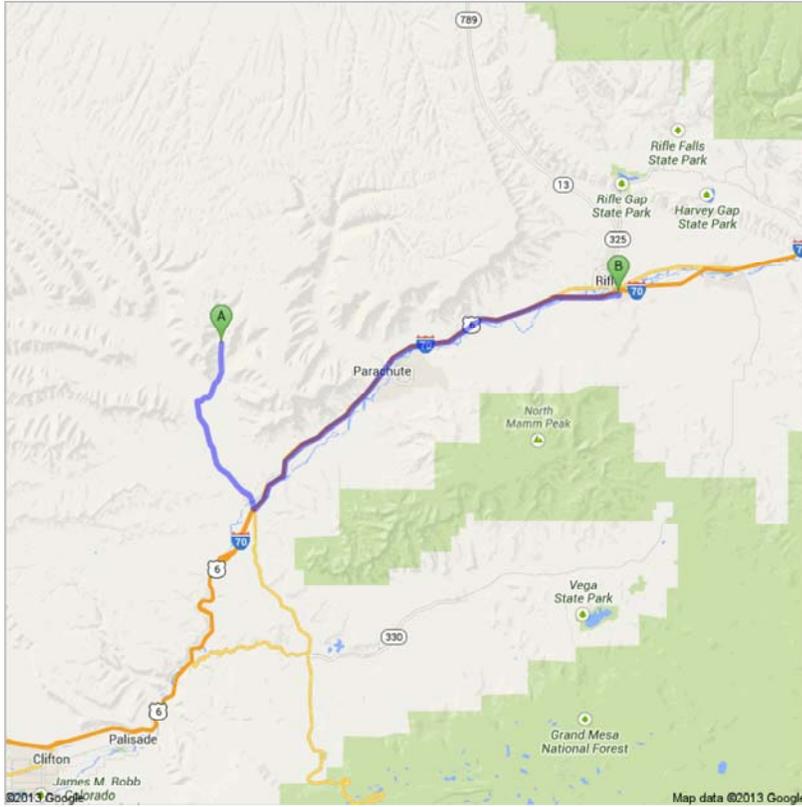
DIRECTIONS TO HOSPITAL

Grand River Hospital

Rifle, Colorado



Directions to 501 Airport Rd, Rifle, CO 81650
42.1 mi – about 1 hour 0 mins



 Co Hwy 213

-  1. Head **south** on **Co Hwy 213** toward **Conn Creek Rd**
About 13 mins go 3.4 mi
total 3.4 mi
-  2. Keep right to continue on **Conn Creek Rd**
About 5 mins go 1.2 mi
total 4.6 mi
-  3. Turn left onto **Co Rd 204**
About 8 mins go 4.0 mi
total 8.6 mi
4. Continue onto **Roan Creek Rd**
About 9 mins go 4.3 mi
total 12.9 mi
-  5. Turn left to merge onto **I-70 E**
About 24 mins go 28.5 mi
total 41.4 mi
-  6. Take exit **90** toward **Colorado 13 N/Rifle/Meeker**
go 0.2 mi
total 41.6 mi
-  7. At the traffic circle, take the **1st** exit onto **Taugenbaugh Blvd**
go 249 ft
total 41.7 mi
-  8. At the traffic circle, take the **2nd** exit onto **Airport Rd**
Destination will be on the right
About 1 min go 0.4 mi
total 42.1 mi

 501 Airport Rd, Rifle, CO 81650

