August 31, 2017 Reference No. 088210-32

Ms. Olivia Yu
New Mexico Oil Conservation Division
Energy, Minerals and Natural Resources Department
1625 N. French Dr.
Hobbs, NM 88240

APPROVED
By Olivia Yu at 10:51 am, Sep 22, 2017

Ms. Amber Groves
New Mexico State Land Office
2827 N. Dal Paso, Ste. 117
Hobbs, NM 88260

NMOCD grants closure to 1RP-4649.

Dear Ms. Yu and Ms. Groves:

Re: Closure Request
Bridge State #602H (API #30-025-43584)
1RP-4649

EOG Resources, Inc.
Site Location: Unit O, Sec. 29, T 22-S, R 35-E
(Lat 32.356087°, Long -103.388662°)
Lea County, New Mexico

GHD Services, Inc. (GHD), on behalf of EOG Resources (EOG) is requesting that no further action status be granted for the Bridge State #602H (hereafter referred to as the "Site").

In a revised Assessment Report dated July 13, 2017 (attached) GHD recommended the following scope items be completed following delineation of the soil impacts in order to achieve no further action;

- Backfilling of the scraped area with clean fill material and wheel compacting to grade.
- Fertilizing and reseeding of the disturbed area with a BLM-approved seed mix. Warm Season SSR seed mixture supplied by Bamert Seed Company, Inc. was used.

The work scope was approved by Ms. Olivia Yu with the New Mexico Oil Conservation Division on June 28, 2017. Ms. Amber Groves with the New Mexico State Land Office approved the report on August 16, 2017. As of the date of this letter, the above scope items have been completed and are documented in the attached completion photos and final C-141 for the Site; therefore, No Further Action is being requested.

GHD
6121 Indian School Road NE Suite 200 Albuquerque New Mexico 87110 USA
T 505 884 0672 F 505 884 4932 W www.ghd.com

Your timely response to this requested is greatly appreciated. Should you have any questions, or require additional information regarding this submittal, please feel free to contact myself or Bernie Bockisch at (505) 884-0672 or Bernard.Bockisch@ghd.com.

Sincerely,

GHD

Alan Brandon
Sr. Project Manager

Bernie Bockisch
Senior Project Manager

JW/mc/1

Encl. Figure 1 - 2017 Annual and Quarterly Groundwater Monitoring Sites
Site-Specific Work Scopes and Cost Estimates

Form C-141

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☐ Initial Report ☒ Final Report

Name of Company EOG Resources, Inc.	Contact Zane Kurtz
Address 5509 Champions Drive, Midland, TX 79706	Telephone No. 432-425-2023
Facility Name **Bridge State Unit #602H (1RP-4649)**	Facility Type **Well Pad**

Surface Owner	Mineral Owner	API No. **30-025-43584**

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
O	29	22S	35E					Lea

Latitude 32° 21' 21.60" **Longitude** -103°23' 18.84"

NATURE OF RELEASE

Type of Release Drilling Fluid	Volume of Release **75 bbls**	Volume Recovered **0 bbls**
Source of Release Frac Tanks	Date and Hour of Occurrence 3/16/17, approx. 1 am.	Date and Hour of Discovery 3/16/17, approx. 1 am.
Was Immediate Notice Given? ☐ Yes ☒ No ☐ Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

APPROVED
By Olivia Yu at 10:51 am, Sep 22, 2017

Describe Cause of Problem and Remedial Action Taken.*
Overflow of drilling fluid occurred. The drilling fluid ran off the pad and into the pasture. Soil berms were constructed to contain the fluid.

Describe Area Affected and Cleanup Action Taken.*
Release appears to be very superficial. Third party contractor observed the area following the release and collected soil samples for BTEX, TPH, and chloride. Caliche is present within 6 inches to one foot of depth. The area was scraped and the soil was properly disposed of. A total of approximately 480 cubic yards of impacted soil were removed during the scraping events and transported for landfill disposal. Confirmation samples were collected and analyzed by a laboratory. Results were below the NMOCD RRALs.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: Zane Kurtz	OIL CONSERVATION DIVISION
Printed Name: Zane Kurtz	Approved by Environmental Specialist:
Title: Sr. Safety and Environmental Rep., EOG Resources, Inc.	Approval Date: 9/22/2017 Expiration Date: xx/xx/xxxx
E-mail Address: zane_kurtz@eogresources.com	Conditions of Approval: Attached ☐
Date: 8-29-2017 Phone: 432-425-2023	

* Attach Additional Sheets If Necessary

1RP-4649

Photo Log

Photo 1 - Backfilled area

Site Photographs

Photo 2 - Backfilled area

Assessment Summary Report

July 13, 2017 Reference No. 088210-32

Mr. Zane Kurtz
Sr. Safety and Environmental Representative
5509 Champions Dr.
Midland, TX 79706
VIA E-Mail: zane_kurtz@eogresources.com

Dear Mr. Kurtz:

Re: Revised Assessment Summary Report
Bridge State Unit #602H (API #30-025-43584)
1RP-4649
EOG Resources, Inc.
Site Location: Unit O, Sec. 29, T 22-S, R 35-E
(Lat 32.356087°, Long -103.388662°)
Lea County, New Mexico

GHD Services, Inc. (GHD) is pleased to present this revised report for the above referenced site. We have included the proposed seed mixture and noxious weed plan. Assessment activities were performed at the Bridge State Unit #602H (hereafter referred to as the "Site"), from March 17, 2017 through May 9, 2017 by GHD. The Site is located within Unit O, Section 29, Township 22 South, Range 35 East, in Lea County, New Mexico (Figure 1).

The Site is an active well drilling site located approximately 14 miles west-southwest of Eunice, New Mexico. According to EOG personnel, a release of approximately 75 barrels (bbls) of drilling fluid occurred. None of the drilling fluid was recovered. The release was discovered on March 16, 2017 and a C-141 Form was submitted to the New Mexico Oil Conservation Division (NMOCD) on March 21, 2017. A remediation permit (RP) number 1RP-4649 was assigned to the Site.

GHD obtained a list of the drilling mud constituents from AES Drilling Fluids, LLC that were used for the drilling of the well. GHD reviewed the safety data sheets (SDSs) for the listed materials and prepared a summary of potential contaminants of concern. Based on review of the list and associated safety data sheets for the materials, it appears that the primary contaminants of concern (COCs) are potassium chloride and diesel. Based on this, the soil samples were analyzed for full range total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and xylene (BTEX) and chloride. A copy of the summary of SDSs and the SDSs are included as Appendix A.

Initial soil sampling of the release area was performed by GHD on March 17, 2017. Subsequent soil sampling was performed by GHD on March 28, 2017, April 24, 2017, and May 9, 2017 following excavation of impacted soil in the affected area. Approximately 480 cubic yards (yd3) of impacted soil was removed and disposed of at the Sundance Services - Parabo Facility in Eunice, New Mexico (Sundance).

1. Introduction

There are relatively few groundwater wells in the area of the Site with which to obtain a depth to groundwater. Based on information available from the United States Geological Survey (USGS) website, the closest USGS gauging site, located approximately 1.8 miles north-northeast of the Site (see Appendix B, Water Well Report for depth to water), indicates groundwater at a depth of approximately 78 feet below ground surface (bgs) in 1997.

No wellhead protection areas or surface water bodies were identified within 200 to 1000 ft. of the Site. Therefore, the preliminary total ranking score for the Site is 10 (see table below).

Based on this score, the applicable NMOCD Site-specific Recommended Remediation Action Limits (RRALs) are 10 milligrams per kilogram (mg/kg) for benzene, 50 mg/kg BTEX, 1,000 mg/kg for TPH, and 250 mg/kg for chlorides.

New Mexico Oil Conservation Division Site Assessment	
Ranking Criteria	Score
Depth to Ground Water (> 50-99 ft. bgs)	10
Wellhead Protection Area (> 1000 ft. from water source, > 200 ft. from domestic source)	0
Distance to Surface Body Water (200-1000 ft.)	0
Ranking Criteria Total Score	**10***

1. NMOCD Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993

2. Assessment Activities

Site assessment activities were performed between March 17, 2017 and May 9, 2017 by GHD. The assessment included initial sampling, excavation of the top 6 inches of impacted soil, and re-excavation to 12 inches as needed. Confirmation sampling was performed following final excavation activities. SDR Enterprises, LLC (SDR) of Hobbs, New Mexico, performed the excavation of impacted soil. Hall Environmental Analysis Laboratory (Hall Environmental) of Albuquerque, New Mexico and Xenco Laboratories (Xenco) of Midland, Texas analyzed the soil samples. Laboratory analytical reports are included in Appendix C.

Initial soil sampling consisted of collecting four soil samples from approximately 6 inches below ground surface within the affected area. Because the COCs were calcium chloride and diesel, the samples were submitted to Hall Environmental for analysis of chloride by EPA Method 300, for BTEX by EPA Method 8021, and gasoline, diesel, and motor oil range TPH by EPA Method 8015. The analytical data obtained from the initial soil samples indicated all analyzed constituents were below the laboratory reporting limits. The initial soil sample results are summarized in Table 1.

From March 22 to March 29, 2017 SDR removed the top 6 inches of soil in the affected area. On March 28, 2017, GHD collected four additional soil samples from the excavated area. The samples were submitted to Hall Environmental for analysis of chloride by EPA Method 300, BTEX by EPA Method 8021, and TPH by EPA Method 418.1.

Laboratory analytical results from these events indicated that chloride concentrations in two samples along the southern portion of the scraped area (S-088210-032817-CM-3 and S-088210-032817-CM-4) were above the RRAL for chloride. These samples contained chloride concentrations of 570 mg/kg and 900 mg/kg, respectively. Concentrations of BTEX and TPH constituents for all four samples submitted were below the RRALs (Table 1). Based on these results, additional soil removal was performed in the southern portion of the affected area.

SDR excavated additional soil in the release area on April 18 and 19, 2017. GHD collected six more samples on April 24, 2017 and submitted them to Xenco for chloride analysis by EPA Method 300. Chloride concentrations ranged from less than the laboratory reporting limit to 45.7 mg/kg.

On May 9, 2017, GHD collected two additional samples (SS-088210-05091-CM-1 and SS-088210-05091-CM-2) in the vicinity of previously collected samples S-088210-032817-CM-3 and S-088210-032817-CM-4 (Figure 2). The samples were submitted to Xenco for chloride analysis by EPA Method 300. Chloride concentrations from these samples were either below the laboratory reporting limit or below the RRAL.

A total of approximately 480 cubic yards of impacted soil were removed during the above-mentioned scraping events and transported to Sundance for landfill disposal. Waste manifests are still being collected and will be submitted with the closure request report.

3. Summary and Recommendations

Based on the assessment of the chloride concentrations, GHD recommends the following:

- Backfilling of the scraped area with clean fill material and wheel compacting to grade.

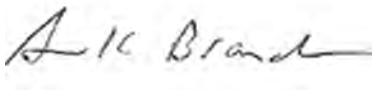
Following completion of the backfilling, revegetation of the site will be performed. Disturbed areas associated with the remediation efforts will be re-seeded. If after one growing season the vegetation has not taken hold, seeding may need to be repeated until revegetation is successful, as determined by the State Land Office. The seed will be planted utilizing a drill. The proposed seed mix will consist of Bureau of Land Management mix #2 with no love grass.

The site will be visited on a quarterly basis to assess the establishment of vegetative growth. Staff personnel performing the site visit will also look for the presence of noxious weeds at the site as indicated on the New Mexico Noxious Weeds List specified on the United States Department of Agriculture website. If a noxious weed is observed at the site, the New Mexico State Land Office will be contacted to determine the most effective manner to eradicate it.

Should you have any questions, or require additional information regarding this submittal, please feel free to contact Bernie Bockisch at (505) 884-0672 or Bernard.Bockisch@ghd.com.

Sincerely,

GHD



Alan Brandon
Senior Project Manager

Bernard Bockisch
New Mexico Operations Manager

AB/mc/1

Figures

SOURCE: USGS 7.5 MINUTE QUAD
"SAN SIMON SINK AND EAST LAKE, NEW MEXICO"

LAT/LONG: 32.355115° NORTH, 103.389177° WEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ZONE - NEW MEXICO EAST

Figure 1

SITE LOCATION MAP
BRIDGE STATE UNIT #602H
LEA COUNTY, NEW MEXICO
EOG Resources

GHD

088210-32(000)GN-DL001 MAY 5, 2017

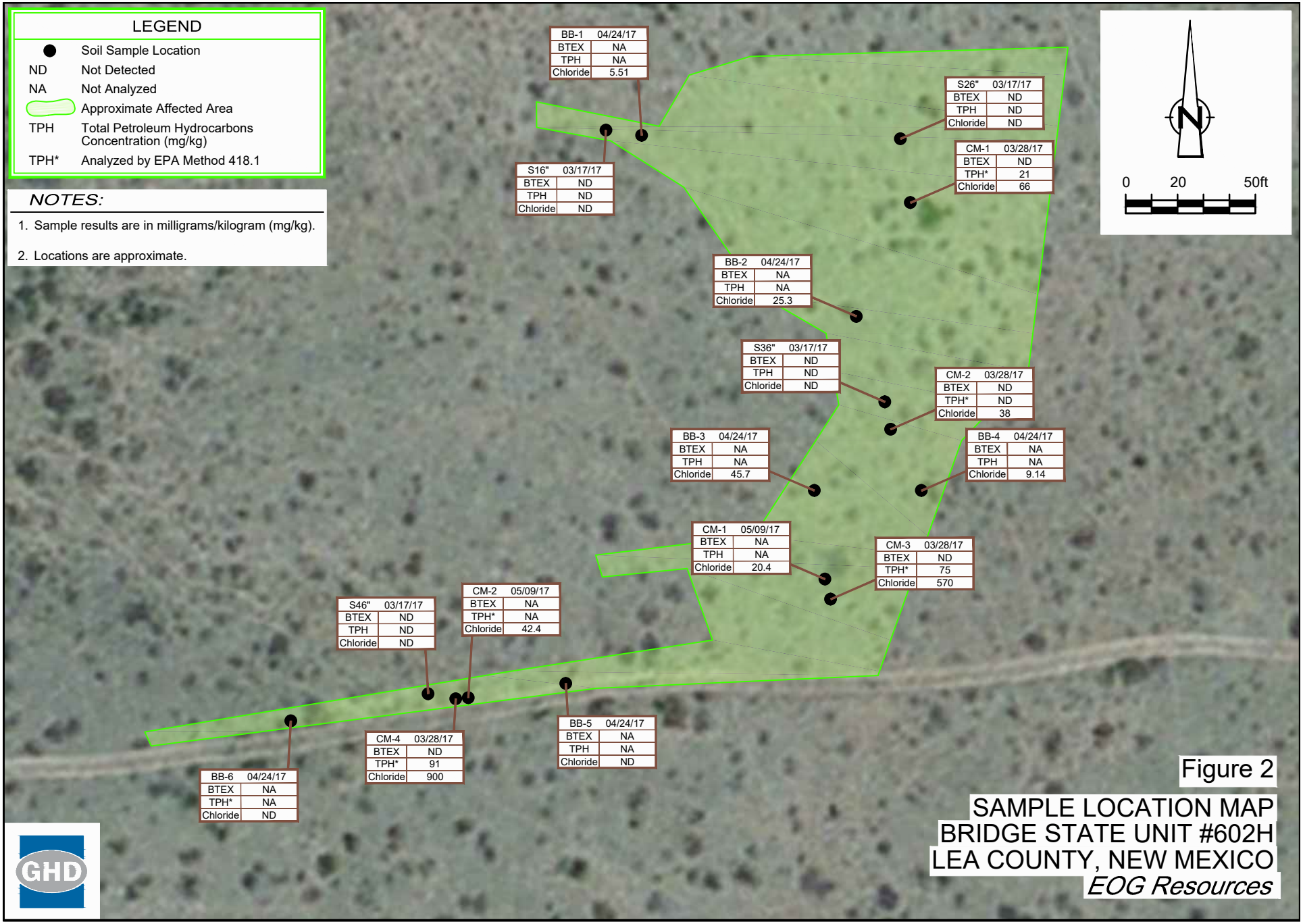


Figure 2

SAMPLE LOCATION MAP
BRIDGE STATE UNIT #602H
LEA COUNTY, NEW MEXICO
EOG Resources

088210-32(000)GN-DL001 MAY 12, 2017

Tables

Table 1

Bridge State Unit #602H - Summary of Soil Analytical Data

Sample ID	Depth (inches)	Date	Benzene	Toluene	Ethylbenzene	Xylenes	BTEX	TPH (GRO)	TPH (DRO)	TPH (MRO)	TPH (418.1)	Total TPH	Chloride
S-031717-CN-S16"	6	03/17/2017	<0.024	<0.049	<0.049	<0.097	<0.219	<4.9	<9.8	<49.0	NA	<63.7	<30
S-031717-CN-S26"	6	03/17/2017	<0.025	<0.050	<0.050	<0.10	<0.225	<5.0	<10.0	<50.0	NA	<65.0	<30
S-031717-CN-S36"	6	03/17/2017	<0.025	<0.050	<0.050	<0.10	<0.225	<5.0	<10.0	<50.0	NA	<65.0	<30
S-031717-CN-S46"	6	03/17/2017	<0.024	<0.048	<0.048	<0.096	<0.216	<4.8	<9.4	<47.0	NA	<61.2	<30
S-088210-032817-CM-1	6	03/28/2017	<0.025	<0.049	<0.049	<0.098	<0.221	NA	NA	NA	21.0	21.0	66
S-088210-032817-CM-2	6	03/28/2017	<0.024	<0.048	<0.048	<0.096	<0.216	NA	NA	NA	<19.0	<19.0	38
S-088210-032817-CM-3	6	03/28/2017	<0.024	<0.048	<0.048	<0.097	<0.217	NA	NA	NA	75.0	75.0	570
S-088210-032817-CM-4	6	03/28/2017	<0.024	<0.048	<0.048	<0.095	<0.215	NA	NA	NA	91.0	91.0	900
S-088210-32-42417-BB-1*	4	04/24/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.51
S-088210-32-42417-BB-2*	5	04/24/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	25.3
S-088210-32-42417-BB-3*	6	04/24/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	45.7
S-088210-32-42417-BB-4*	6	04/24/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.14
S-088210-32-42417-BB-5*	3	04/24/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4.98
S-088210-32-42417-BB-6*	3	04/24/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4.93
SS-088210-050917-CM-1*	12	05/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20.4
SS-088210-050917-CM-2*	12	05/09/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	42.4
NMOCD RRALs (Total Ranking Score = 10)			**10**	**NA**				**Total TPH: 1,000**					**250**

Notes:

All samples are in milligrams per kilogram
* = Sample Analyzed by Xenco Laboratories. All Others Analyzed by Hall Environmental
NA = Not Analyzed
NMOCD = New Mexico Oil Conservation Division
RRALs = Recommended Remediation Action Limits
Highlighted = Exceeds NMOCD RRAL

Appendices

Appendix A
Safety Data Sheets

Bridge State Unit #602H			
Operator: EOG Drilling	**Rig Name and Number: H&P 653**		**Report #36**
Material Used	**Unit**	**Quantity**	**Comments**
ABS MUL	1 GALLON GALLON	260	Distillates Diethanulamine 0.25 - 0.75% (Petroleum) 10 - 50%
AES VERT	1 BBL BBL	2363	Diesel #2 50 - 90%, Barite 5 - 65%
AES VIS III	50 LB SACK	35	Clay
AES VIS LS	50 LB SACK	3	Clay/Silica
AES WA II	1 GALLON GALLON	260	Phospholipids 40 - 60%
B2512	5 GALLON PAIL	21	Glutaraldehyde 20 - <30% Didecyldimethylammonium chlorides 5 - <10% Benzyl - C12 - C16 - alkyldimethyl chlorides 5 - >10% Ethanol 3 - <5%
BARITE SACK 4.05 SG	100 LB SACK	280	
BLUE MAX	1 GALLON GALLON	245	Surfactant Blend
C 2145	1 GALLON GALLON	355	Ethylene Glycol 5 - 10% Methanol 5 - 10%
CALCIUM CHLORIDE	50 LB SACK	46	CAS 10043 - 52 - 4
DEFOAMER	5 GALLON PAIL	32	Ethyl - 1 - Hexanol CAS 104 - 76 - 7
DURATEC	30 LB SACK	17	Trade Secret
ENER PAC REGULAR	50 LB SACK	12	Polyanionic Cellulose
ENERPLUS	5 GALLON PAIL	41	Distillates (Petroleum) 20 - 45%
FIBER SEAL	40 LB SACK	60	Vegetable, Cotton, Cellulose Fibers
FLR	50 LB SACK	50	Proprietary Gilsonite Blend
GEL, REGULAR	100 LB SACK	140	Bentonite, Silica
LIME	50 LB SACK	105	Calcium Hydroxide
MULTI-FIBER F	25 LB SACK	130	Trade Secret, Cellulose Blend
MULTI-FIBER M	25 LB SACK	70	Trade Secret
OIL SORB	50 LB SACK	24	Bentonite, Silica
PERMASEAL	25 LB SACK	120	Trade Secret, Silica
SALT GEL	50 LB SACK	100	Silica
SAPP	50 LB SACK	82	Disodium Pyrophosphate 100% CAS 7758 - 16 - 9
SILVER SEAL	50 LB SACK	88	Graphite, Silica, Trade Secret
SOLTEX	50 LB SACK	130	Acid Midified Petroleum Residum Proprietary
SUPER SWEEP	15 LB SACK	3	Polypropylene
WCI 1013	5 GALLON PAIL	24	Water Soluble Corrosion Inhibitor Ethylene Glycol 30 - 60% Methanol 10 - 30% Alkyl Pyidine Derivs. 5 - 10% Alkyltrimethylene Diamine Acetate 5 - 10%
XG VIS	25 LB SACK	8	Silica, Trade Secret

ABS MUL

SECTION 1. IDENTIFICATION

Product Identifier	ABS MUL
Other Means of Identification	Blended Emulsifier
Recommended Use	Drilling Fluid Additive.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	July 01, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) - Category 4; Acute toxicity (Dermal) - Category 4; Skin corrosion/irritation - Category 3; Serious eye damage/eye irritation - Category 2B; Skin sensitization - Category 1B; Carcinogenicity - Category 2; Specific target organ toxicity (single exposure) - Category 3; Aspiration hazard - Category 2

GHS Label Elements

Signal Word:
Warning
Hazard Statement(s):

H302	Harmful if swallowed.
H305	May be harmful if swallowed and enters airways.
H312	Harmful in contact with skin.
H316	Causes mild skin irritation.
H317	May cause an allergic skin reaction.
H320	Causes eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.

Prevention:

P264	Wash hands and skin thoroughly after handling.
P261	Avoid breathing vapours, mist, spray.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing.

Response:

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
P302 + P352	IF ON SKIN: Wash with plenty of water.
P332 + P313	If skin irritation occurs: Get medical advice/attention.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present

and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P363 Wash contaminated clothing before reuse.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

Other Hazards

Hazardous to the environment.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Mixture of Fatty acids, tall oil	61790-12-3	10-50	
Distillates (petroleum), hydrotreated light	64742-47-8	10-50	
Fatty Amine	61791-26-2	2-3	
Blend of chemically modified tall oil derivative	68154,94-9	2-3	
Diethanolamine	111-42-2	0.25-0.75	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by Poison Centre or doctor. Get medical advice/attention if irritation develops.

Skin Contact

Immediately rinse with lukewarm, gently flowing water for 15-20 minutes. Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Seek medical advice/attention. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. Seek medical advice/attention.

Ingestion

Immediately call a Poison Centre or doctor. Rinse mouth with water. Do not induce vomiting. If vomiting occurs, have victim lean forward to reduce the risk of aspiration.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog.

Specific Hazards Arising from the Chemical

Product can ignite if strongly heated and exposed to open flames. Closed containers may rupture violently when heated releasing contents.
Oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

Use water spray to cool containers/tanks.

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Isolate the hazard area. Keep out unnecessary and unprotected personnel. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas. Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Dike spilled product to prevent runoff. Do not use absorbents. Contain spill using noncombustible material such as vermiculite, earth or sand. Place contaminated vermiculite, earth or sand into suitable, covered, labelled containers for disposal. Store recovered product in suitable containers for disposal according to local regulations.

Other Information

Contact EH&S regarding spill as spills of certain products and certain quantities may require reporting to various authorities.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing in this product. Avoid contact with eyes, skin and clothing. Do not ingest product. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and before going on breaks outside of the work area. Avoid generating vapours or mists. Keep containers tightly closed when not in use or empty. Keep away from heat and open flames. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Store in an area that is: cool, dry, well-ventilated. Away from open flames, excessive heat or sources of ignition. Separate from incompatible materials (see Section 10: Stability and Reactivity). Keep containers tightly closed when not in use.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Mixture of Fatty acids, tall oil	5 mg/m3	10 mg/m3	5 mg/m3	Not established	Not established	Not established
Diethanolamine	1 mg/m3 Skin		Not established		Not established	
Distillates (petroleum), hydrotreated light	5 mg/m3	Not established	5 mg/m3	Not established	Not established	Not established
Fatty Amine	Not established		Not established		Not established	
Blend of chemically modified tall oil derivative	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.
TLV values are for Oil Mist. There is no established TLV or OEL's for petroleum distillates.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with the product an eyewash and safety shower should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Wear safety glasses and if contact is possible wear chemical safety goggles.

Skin Protection

Wear gloves with appropriate chemical resistance, see manufacturers specifications for suitability. Wear long sleeves, long pants and appropriate footwear while working with product. If a splashing hazard exists wear chemical protective clothing e.g. gloves that extend up arms, aprons, boots.

Respiratory Protection

If conditions exist above the OEL wear a NIOSH approved air-purifying respirator with an appropriate cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Dark amber liquid.
Odour	Faint
Odour Threshold	Not available
pH	Not available
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	> 230 ºF (110 ºC)
Evaporation Rate	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	0.97
Solubility	Insoluble in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Liquid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Open flames, sparks, static discharge, heat and other ignition sources.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Carbon oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; skin absorption; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Mixture of Fatty acids, tall oil	Not available	> 10000 mg/kg	Not available
Diethanolamine	Not available	.62 mg/kg (rat)	7.64 mg/kg (rabbit)
Distillates (petroleum), hydrotreated light	Not available	> 5000 mg/kg (rat)	> 2000 mg/kg (rabbit)
Fatty Amine	Not available	620 mg/kg (rat)	> 10,000 mg/kg (rat)
Blend of chemically modified tall oil derivative	Not available	Not available	Not available

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause eye irritation. Symptoms include pain, redness and tearing.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the mucous membranes and upper respiratory tract. May cause depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion.

Skin Absorption

Ingredients of this product can be absorbed through the skin.

Ingestion

May cause irritation of the mouth, throat and stomach. May cause depression of the central nervous system.

Aspiration Hazard

Liquid may be aspirated into the lungs during ingestion or vomiting resulting in lung injury.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Prolonged skin contact may aggravate existing skin conditions such as dermatitis.

Respiratory and/or Skin Sensitization

May cause skin sensitization through skin contact. Not known to be a respiratory sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Mixture of Fatty acids, tall oil	Not Listed	Not Listed	Not Listed	Not Listed
Diethanolamine	Group 2B	A3	Not Listed	Not Listed
Distillates (petroleum), hydrotreated light	Group 3	A3	Not Listed	Not Listed
Fatty Amine	Not Listed	Not Listed	Not Listed	Not Listed
Blend of chemically modified tall oil derivative	Not Listed	Not Listed	Not Listed	Not Listed

May cause cancer based on animal studies.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 2B = Possibly carcinogenic to humans. Group 3 = Not classifiable as to its carcinogenicity to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A3 = Animal carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health

Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Do not allow product to contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Mixture of Fatty acids, tall oil	Not available	Not available	Not available	Not available
Diethanolamine	55 mg/L (Daphnia magna (water flea); 48-hour; fresh water; static)	Not available	Not available	Not available
Distillates (petroleum), hydrotreated light	2.9 mg/L (Oncorhynchus mykiss (rainbow trout); 96-hour)	Not available	Not available	Not available
Fatty Amine	Not available	Not available	Not available	Not available
Blend of chemically modified tall oil derivative	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

Special Precautions for User Not applicable

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

Other Information The shipping descriptions included are for non-bulk shipments only and may not apply to

shipments in bulk packages (see appropriate regulatory definition).

This product contains one or more ingredients as a hazardous substance in Appendix A of 49 CFR 172.101. The product quantity, in one package, which triggers the RQ requirements under 49 CFR for each hazardous substance is shown.

Reportable quantities:

RQ substance: Diethanolamine
RQ limit for substance: 100lb
RQ limit for product: 13200lb

Shipping information for product over in containers larger than 13200lb would be UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (DIETHANOLAMINE), CLASS 9, PG III

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: May contain <0.75% Diethanolamine.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Acute Hazards Chronic Health Hazard.
SARA Title III - Section 313: May contain <1.0% Glycol Ether
May contain <0.75% Diethanolamine.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 2 Flammability - 1 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	July 01, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

AES VERT MUD SYSTEM

SECTION 1. IDENTIFICATION

Product Identifier	AES VERT MUD SYSTEM
Other Means of Identification	Diesel Based Invert Emulsion Drilling Fluid
Recommended Use	Drilling Fluid.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	July 01, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquid - Category 4; Acute toxicity (Oral) - Category 5; Acute toxicity (Dermal) - Category 5; Acute toxicity (Inhalation) - Category 5; Skin corrosion/irritation - Category 2; Serious eye damage/eye irritation - Category 2B; Carcinogenicity - Category 2; Specific target organ toxicity (repeated exposure) - Category 2; Aspiration hazard - Category 2

GHS Label Elements

Signal Word:
Warning
Hazard Statement(s):

H227	Combustible liquid.
H305	May be harmful if swallowed and enters airways.
H315	Causes skin irritation.
H320	Causes eye irritation.
H333	May be harmful if inhaled.
H373	May cause damage to organs through prolonged or repeated exposure.
H351	Suspected of causing cancer.

Precautionary Statement(s):
Prevention:

P210	Keep away from flames and hot surfaces. – No smoking.
P262	Do not get in eyes, on skin, or on clothing.
P260	Do not breathe mist, vapours, spray.
P264	Wash hands and skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTRE/doctor/
P302 + P352	IF ON SKIN: Wash with plenty of water.
P332 + P313	If skin irritation occurs: Get medical advice/attention.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P304 + P341 IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
P304 + P312 IF INHALED: Call a POISON CENTRE/doctor if you feel unwell.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P403 + P235 Store in a well-ventilated place. Keep cool.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Fuels, diesel, No. 2	68476-34-6	50-90	
Barite	7727-43-7	5-65	
Calcium chloride	10043-52-4	2-15	
Silica, quartz	14808-60-7	0.5-6	
Paraffins (petroleum)	64771-72-8	0.5-6	
Quaternary ammonium compounds	68953-58-2	0.5-6	
Calcium hydroxide	1305-62-0	0.5-5	
Gilsonite	12002-43-6	0.5-5	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. Call a Poison Centre or doctor if you feel unwell or are concerned.

Skin Contact

Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. If skin irritation occurs get medical advice/attention. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. Remove contact lenses, if present and easy to do. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Do not induce vomiting without medical advice. If vomiting occurs, have victim lean forward to reduce the risk of aspiration. Immediately call a Poison Centre or doctor.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Carbon Dioxide, Foam, Dry chemical. Water spray or fog, do not use a direct stream as this may spread the fire.

Specific Hazards Arising from the Chemical

Closed containers may rupture violently when heated releasing contents.
Oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

Use water spray to cool containers/tanks.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Keep out unnecessary and unprotected personnel. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Small spills or leaks: do not use absorbents. Contain spill using noncombustible material such as vermiculite, earth or sand. Large spills or leaks: eliminate all ignition sources. Dike spilled product to prevent runoff. Remove or recover liquid using pumps or vacuum equipment. Contain and soak up spill using noncombustible material such as vermiculite, earth or sand. Place contaminated vermiculite, earth or sand into suitable, covered, labelled containers for disposal. Clean up residual with absorbent material, place in appropriate containers and flush with water. Store recovered product or absorbent material in suitable containers for disposal according to local regulations.

Other Information

Contact EH&S regarding spill as spills of certain products and certain quantities may require reporting to various authorities.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Do not breathe in this product. Do not get in eyes, on skin or on clothing. Only use where there is adequate ventilation. Avoid generating vapours or mists. Keep away from excessive heat, oxidizing agents, and ignition sources. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and before going on breaks outside of the work area. Wear personal protective equipment to avoid direct contact with this chemical. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Store in an area that is: well-ventilated, cool, dry. Separate from incompatible materials away from open flames, excessive heat or sources of ignition. Keep containers tightly closed when not in use.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Calcium chloride	Not established		Not established		Not established	
Calcium hydroxide	5 mg/m3		5 mg/m3		Not established	
Barite	5.0 mg/m3 (I)		5.0 mg/m3 (R)		5.0 mg/m3 (R)	
Gilsonite	3 mg/m3 (R)	Not established	5 mg/m3 (R)	Not established	Not established	Not established
Silica, quartz	0.025 mg/m3 A2		0.1 mg/m3		Not established	
Paraffins (petroleum)	Not established		Not established		Not established	
Quaternary ammonium compounds	Not established		Not established		Not established	
Fuels, diesel, No. 2	100 mg/m3 Skin		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. A suitable eyewash station should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use chemical goggles or a face shield if product could be splashed.

Skin Protection

Wear gloves with appropriate chemical resistance, see manufacturers specifications for suitability. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions exist above the OEL wear a NIOSH approved respirator with an appropriate cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Dark brown - grey liquid.
Odour	Not available
Odour Threshold	Not available
pH	Not available
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	> 170 ºF (77 ºC)
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	Not available
Solubility	Insoluble in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Liquid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Open flames, sparks, static discharge, heat and other ignition sources.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Carbon oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Calcium chloride	> 160 mg/m3 (4-hour exposure)	1000 mg/kg	> 5000 mg/kg
Calcium hydroxide	Not available	7300 mg/kg (mouse)	Not available
Barite	Not available	Not available	Not available
Gilsonite	Not available	Not available	Not available
Silica, quartz	Not available	500 mg/kg (rat)	Not available
Paraffins (petroleum)	Not available	Not available	Not available
Quaternary ammonium compounds	Not available	Not available	Not available
Fuels, diesel, No. 2	Not available	Not available	Not available

Skin Corrosion/Irritation

May cause mild skin irritation.

Serious Eye Damage/Irritation

May cause mild eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the respiratory tract. Prolonged or repeated exposure may cause. depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion.

Ingestion

May cause irritation of the mouth, throat and stomach.

Aspiration Hazard

Liquid may be aspirated into the lungs during ingestion or vomiting resulting in lung injury.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Prolonged exposures to high vapour concentrations can cause headache, dizziness, nausea, blurred vision and depression of central nervous system. Prolonged skin contact may aggravate existing skin conditions such as dermatitis. May cause damage to kidneys. Prolonged skin contact may aggravate existing skin conditions such as dermatitis.

Respiratory and/or Skin Sensitization

Not known to be a skin sensitizer. Not known to be a respiratory sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Calcium chloride	Not Listed	Not Listed	Not Listed	Not Listed
Calcium hydroxide	Not Listed	Not Listed	Not Listed	Not Listed
Barite	Not Listed	Not Listed	Not Listed	Not Listed
Gilsonite	Not Listed	Not Listed	Not Listed	Not Listed

Silica, quartz	Group 1	A2	Known carcinogen	Not Listed
Paraffins (petroleum)	Not Listed	Not Listed	Not Listed	Not Listed
Quaternary ammonium compounds	Not Listed	Not Listed	Not Listed	Not Listed
Fuels, diesel, No. 2	Group 3	A3	Not Listed	Not Listed

May cause cancer based on animal studies.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. Group 3 = Not classifiable as to its carcinogenicity to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. A3 = Animal carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Do not allow product to contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Calcium chloride	8.35 mg/L (Lepomis macrochirus (bluegill); fresh water; static)	.573 mg/L (Daphnia magna (water flea); fresh water; static)	Not available	Not available
Calcium hydroxide	Not available	Not available	Not available	Not available
Barite	Not available	32 mg/L (Daphnia magna (water flea); 48-hour; fresh water; static)	Not available	Not available
Gilsonite	Not available	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available	Not available
Paraffins (petroleum)	Not available	Not available	Not available	Not available
Quaternary ammonium compounds	Not available	Not available	Not available	Not available
Fuels, diesel, No. 2	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

Other Information This material does not sustain combustion when tested by ASTM-4206 and therefore meets the 49 CFR 173.120(b)(3) exemption from DOT hazmat shipping requirements.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Fire Hazard Immediate Health Hazard Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 2 Flammability - 2 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	July 01, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

AES VIS III

SECTION 1. IDENTIFICATION

Product Identifier	AES VIS III
Other Means of Identification	Organic Clay / Quaternary Ammonium Bentonite
Recommended Use	Drilling Fluid Additive.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	March 30, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) - Category 4; Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 1

GHS Label Elements

Signal Word:
Danger
Hazard Statement(s):
H302 Harmful if swallowed.
Dust in eye may result in mechanical irritation.
H332 Harmful if inhaled.
H372 Causes damage to organs through prolonged or repeated exposure.
H350 May cause cancer.
Precautionary Statement(s):
Prevention:
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust.
P271 Use only outdoors or in a well-ventilated area.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response:
P301 + P312 IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell.
P330 Rinse mouth.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
IF IN EYES: Rinse cautiously with water for several minutes.
P337 + P313 If eye irritation persists: Get medical advice/attention.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Treated Clay	CBI*	90-99	
Silica, quartz	14808-60-7	0.1-1.0	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. Get medical advice/attention if irritation develops.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. If irritation persists, get medical advice/attention.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Seek medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Specific Hazards Arising from the Chemical

Does not burn.
In a fire, the following hazardous materials may be generated: oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

Dust is subject to combustion when exposed to ignition sources in heated environments.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment. Do not allow into any sewer, on the ground or into any waterway.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Vacuum or sweep product up, try to minimize dust build-up. Wet sweeping may be used to minimize dust build-up. Store recovered product in suitable containers that are: tightly-covered. Containerize for solid waste disposal.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

It is good practice to: avoid breathing product; avoid skin and eye contact and wash hands after handling. Only use

where there is adequate ventilation. Avoid creating excessive dust while handling the product. See Section 8 for appropriate Personal Protective Equipment (PPE). Eliminate ignition sources in dusty conditions.

Conditions for Safe Storage

Store in an area that is: well-ventilated. Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust. Eliminate nearby ignition sources.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	OSHA PEL		ACGIH® TLV®		AIHA® WEEL™	
Chemical Name	**TWA**	**Ceiling**	**TWA**	**STEL [C]**	**8-hr TWA**	**Short-term TWA [C]**
Silica, quartz	0.1 mg/m3		0.025 mg/m3 A2		Not established	
Treated Clay	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TWA = Time-Weighted Average. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with this product an eyewash should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Work gloves. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Tan powder.
Odour	Faint
pH	Not available
Melting Point/Freezing Point	Not applicable (melting); Not applicable (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	1.6
Solubility	Insoluble in water
Auto-ignition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

None known.

Incompatible Materials

None known.

Hazardous Decomposition Products

Oxides of carbon.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; eye contact; skin contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Silica, quartz	Not available	500 mg/kg (rat)	Not available
Treated Clay	Not available	Not available	Not available

Skin Corrosion/Irritation

Irritating to skin, prolonged contact can de fat the skin and cause dermatitis.

Serious Eye Damage/Irritation

May cause eye irritation. May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the mucous membranes and upper respiratory tract. May aggravate asthma.

Skin Absorption

Not harmful.

Ingestion

May be harmful if ingested may cause. irritation of the gastrointestinal tract, nausea, vomiting, diarrhea.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

This product may contain trace amounts of crystalline silica (quartz). Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. May cause chronic bronchitis (inflammation of the airways leading to the lungs).

Respiratory and/or Skin Sensitization

Not a respiratory sensitizer. Not a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed
Treated Clay	Not Listed	Not Listed	Not Listed	Not Listed

This product may contain trace amounts of crystalline silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

Not known to harm the unborn child.

Sexual Function and Fertility

Not known to cause effects on sexual function or fertility.

Germ Cell Mutagenicity

Not known to be a mutagen.

Interactive Effects

Smoking and being exposed to free silica may cause a greater risk of developing certain pulmonary illnesses.

SECTION 12. ECOLOGICAL INFORMATION

Environmental information was not located.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Silica, quartz	Not available	Not available	Not available	Not available
Treated Clay	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Immediate Health Hazard Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	March 30, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

AES VIS LS

SECTION 1. IDENTIFICATION

Product Identifier	AES VIS LS
Other Means of Identification	Organic Clay / Quaternary Ammonium Bentonite
Recommended Use	Drilling Fluid Additive.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	March 31, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) - Category 4; Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 1

GHS Label Elements

Signal Word:
Danger
Hazard Statement(s):
H302 Harmful if swallowed.
Dust in eye may result in mechanical irritation.
Harmful if inhaled.
H372 Causes damage to organs through prolonged or repeated exposure.
H350 May cause cancer.
Precautionary Statement(s):
Prevention:
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust.
P271 Use only outdoors or in a well-ventilated area.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response:
P301 + P312 IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell.
P330 Rinse mouth.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.

Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Treated Clay	CBI*	90-99	
Silica, quartz	14808-60-7	1-10	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. Get medical advice/attention if irritation develops.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. If irritation persists, get medical advice/attention.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Seek medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Specific Hazards Arising from the Chemical

Does not burn.
In a fire, the following hazardous materials may be generated: oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

Dust is subject to combustion when exposed to ignition sources in heated environments.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment. Do not allow into any sewer, on the ground or into any waterway.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Vacuum or sweep product up, try to minimize dust build-up. Wet sweeping may be used to minimize dust build-up. Store recovered product in suitable containers that are: tightly-covered. Containerize for solid waste disposal.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

It is good practice to: avoid breathing product; avoid skin and eye contact and wash hands after handling. Only use where there is adequate ventilation. Avoid creating excessive dust while handling the product. See Section 8 for appropriate Personal Protective Equipment (PPE). Eliminate ignition sources in dusty conditions.

Conditions for Safe Storage

Store in an area that is: well-ventilated. Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust. Eliminate nearby ignition sources.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Silica, quartz	0.025 mg/m3 A2		0.1 mg/m3		Not established	
Treated Clay	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with this product an eyewash should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Work gloves. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Tan powder.
Odour	Faint
pH	Not available
Melting Point/Freezing Point	Not applicable (melting); Not applicable (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	1.7 - 1.8
Solubility	Insoluble in water

Auto-ignition Temperature Not available

Other Information

Physical State Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

None known.

Incompatible Materials

None known.

Hazardous Decomposition Products

Oxides of carbon.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; eye contact; skin contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Silica, quartz	Not available	500 mg/kg (rat)	Not available
Treated Clay	Not available	Not available	Not available

Skin Corrosion/Irritation

Irritating to skin, prolonged contact can de fat the skin and cause dermatitis.

Serious Eye Damage/Irritation

May cause eye irritation. May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the mucous membranes and upper respiratory tract. May aggravate asthma.

Skin Absorption

Not harmful.

Ingestion

May be harmful if ingested may cause. irritation of the gastrointestinal tract, nausea, vomiting, diarrhea.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

This product contains small amounts of crystalline silica (quartz). long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. May cause chronic bronchitis (inflammation of the airways leading to the lungs).

Respiratory and/or Skin Sensitization

Not a respiratory sensitizer. Not a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA

Silica, quartz	Group 1	A2	Known carcinogen	Not Listed
Treated Clay	Not Listed	Not Listed	Not Listed	Not Listed

This product contains free silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. Group 2A = Probably carcinogenic to humans. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

Not known to harm the unborn child.

Sexual Function and Fertility

Not known to cause effects on sexual function or fertility.

Germ Cell Mutagenicity

Not known to be a mutagen.

Interactive Effects

Smoking and being exposed to free silica may cause a greater risk of developing certain pulmonary illnesses.

SECTION 12. ECOLOGICAL INFORMATION

Environmental information was not located.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Silica, quartz	Not available	Not available	Not available	Not available
Treated Clay	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Acute Hazards Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	March 31, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

AES WA II

SECTION 1. IDENTIFICATION

Product Identifier	AES WA II
Recommended Use	Wetting Agent.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	February 28, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Dermal) - Category 5; Serious eye damage/eye irritation - Category 2A; Carcinogenicity - Category 2; Aspiration hazard - Category 2

GHS Label Elements

Signal Word:
Warning
Hazard Statement(s):
H305 May be harmful if swallowed and enters airways.
H313 May be harmful in contact with skin.
H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
Precautionary Statement(s):
Prevention:
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response:
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
P302 + P352 IF ON SKIN: Wash with plenty of water.
P332 + P313 If skin irritation occurs: Get medical advice/attention.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P401 Store
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers

Blend of Mineral Oil	64742-53-6	40-60	
Phospholipids	8030-76-0	40-60	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by Poison Centre or doctor. Get medical advice/attention if you feel unwell or are concerned.

Skin Contact

Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. If skin irritation occurs get medical advice/attention. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. Remove contact lenses, if present and easy to do. Seek medical advice/attention.

Ingestion

Rinse mouth with water. Do not induce vomiting without medical advice. If vomiting occurs, have victim lean forward to reduce the risk of aspiration. Call a Poison Centre or doctor if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Specific Hazards Arising from the Chemical

Closed containers may rupture violently when heated releasing contents.
Oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

Containers may rupture from gas generation in a fire situation. Use water spray only to cool fully closed containers. When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment. Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Provide adequate ventilation to the spill area. Pump spilled product into suitable containers. Clean up residual with absorbent material, place in appropriate containers and flush with water. Prevent contamination of waterways or sewers.

Other Information

Contact EH&S regarding spill as spills of certain products and certain quantities may require reporting to various authorities.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

It is good practice to: avoid breathing product; avoid skin and eye contact and wash hands after handling. See Section 8 for appropriate Personal Protective Equipment (PPE). Wash hands thoroughly after handling this material. Keep away from sources of ignition, No Smoking while working with this product.

Conditions for Safe Storage

Store in an area that is: well-ventilated, cool, dry, separate from incompatible materials (see Section 10: Stability and Reactivity). Away from open flames, excessive heat or sources of ignition. Keep containers tightly closed when not in use.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Blend of Mineral Oil	5 mg/m3		Not established		Not established	
Phospholipids	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with this product an eyewash should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses with side shields. Wear chemical safety goggles if the product could be splashed.

Skin Protection

Wear gloves with appropriate chemical resistance, see manufacturers specifications for suitability. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions exist above the OEL wear a NIOSH approved air-purifying respirator with an appropriate cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Dark amber liquid.
Odour	Faint
Odour Threshold	Not available
pH	Not available
Melting Point/Freezing Point	Not applicable (melting); Not applicable (freezing)
Initial Boiling Point/Range	Not available
Evaporation Rate	Not applicable
Flammability (solid, gas)	Will not burn.
Upper/Lower Flammability or Explosive Limit	Not applicable (upper); Not applicable (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	0.91
Solubility	Insoluble in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not applicable

Other Information

Physical State Liquid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Open flames, sparks, static discharge, heat and other ignition sources.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Oxides of carbon.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; eye contact; skin contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Blend of Mineral Oil	Not available	> 5000 mg/kg (rat)	> 2000 mg/kg (rabbit)
Phospholipids	Not available	Not available	Not available

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause serious eye irritation or corneal injury.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the respiratory tract. Contains soy, may cause allergic reaction in certain individuals.

Skin Absorption

Not harmful.

Ingestion

May be harmful if ingested may cause. irritation of the gastrointestinal tract, nausea, vomiting, diarrhea.

Aspiration Hazard

Liquid may be aspirated into the lungs during ingestion or vomiting resulting in lung injury.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Prolonged skin contact may aggravate existing skin conditions such as dermatitis.

Respiratory and/or Skin Sensitization

Not a respiratory sensitizer. Not a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Blend of Mineral Oil	Group 3	A4	Known carcinogen	Not Listed
Phospholipids	Not Listed	Not Listed	Not Listed	Not Listed

The National Toxicology Program rates Mineral oils as known to be human carcinogens.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 3 = Not classifiable as to its carcinogenicity to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A4 = Not classifiable as a human carcinogen. NTP = National Toxicology Program. Known carcinogen = Known human carcinogen. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Do not allow product to contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Blend of Mineral Oil	Not available	Not available	Not available	Not available
Phospholipids	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory. All ingredients are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: No listed components.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 0 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	February 28, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

B2512

SAFETY DATA SHEET

SECTION 1 – IDENTIFICATION

Product Identifier: B2512

Manufacturer: Aquaserv, Inc.
61 Keel Avenue
Memphis, TN 38107

24 Hour Emergency Phone: **(901) 525-7701**
CHEMTREC: **(800) 424-9300**

Recommended use: Microbiocide

SECTION 2 – HAZARDS IDENTIFICATION

Physical Hazards: Not classified.

Health Hazards

Acute Toxicity: Oral, Category 4
Skin Corrosion/Irritation: Category 1C
Serious Eye Damage/Eye Irritation: Category 1
Respiratory Sensitization: Category 1

OSHA Defined Hazards: Not classified

Label Elements
Pictograms:

Signal Word: **Danger!**

Hazard Statement(s):
Harmful if swallowed.
Causes severe skin burns and eye damage.
Causes serious eye damage.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Precautionary Statement(s):
Avoid breathing mist or vapor.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/protective clothing/eye protection/face protection.
In case of inadequate ventilation wear respiratory protection.

Response Statement(s):
IF SWALLOWED: Immediately call a poison center/doctor. Rinse mouth. Do NOT induce vomiting.
IF ON SKIN/HAIR: Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Wash contaminated clothing before reuse.

Storage/Disposal Statement: Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.

Environmental Hazards: Hazardous to the aquatic environment, acute hazard (Category 1)
Hazardous to the aquatic environment, long-term hazard (Category 1)

Hazard(s) Not Otherwise Classified (HNOC): Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Supplemental Information: 4% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.13.5% of the mixture consists of component(s) of unknown acute inhalation toxicity. 4% of the mixture consists of component(s) of unknown acute dermal toxicity.

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS No.	% by Wt
Glutaraldehyde	111-30-8	20 - < 30
Didecyldimethylammonium Chloride	7173-51-5	5 - < 10
Quaternary Ammonium Compounds, Benzyl-C12-C16-alkyldimethyl, Chlorides	68424-85-1	5 - < 10
Ethanol	64-17-5	3 - < 5
Other components below reportable levels		50 - < 60

SECTION 4 – FIRST AID MEASURES

Description of First Aid Measures

Inhalation: Move person to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; do not use mouth-to-mouth. Use rescuer protection (pocket mask equipped with a one-way valve or other proper respiratory medical device). If experiencing respiratory symptoms call a poison control center or doctor for treatment advice.

Skin Contact: Take off immediately all contaminated clothing. Wash skin with soap and plenty of water. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye Contact: Wash immediately and continuously with flowing water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion: Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use a mouth-to-

mouth method if victim ingested the substance. Use a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most Important Symptoms/Effects, Acute and Chronic: Burning pain and severe corrosive skin damage. Nausea, vomiting. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Coughing. Difficulty in breathing.

Indication of Immediate Medical Attention and Special Treatment Needed: Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General Advice: Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

SECTION 5 – FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Water fog, foam, carbon dioxide (CO2), or dry chemical.

Unsuitable Extinguishing Media: Do not use water jet as an extinguisher, as this will spread the fire.

Hazardous Combustion Products: Under fire conditions some components of this product may form gases hazardous to health.

Special Protective Equipment for Firefighters: Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Firefighting Procedures: Move containers from fire area if you can do so without risk.

Specific Methods: Use standard firefighting procedures and consider the hazards of other involved materials.

General Fire Hazards: No unusual fire or explosion hazards noted.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures: Evacuate area of unnecessary personnel. Keep upwind of spill. Only trained and properly protected personnel must be involved in clean-up operations. Avoid breathing mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see Section 8 of the SDS.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

Spill or Leak Procedures: This product is miscible in water.

Large spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Prevent product from entering drains. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

SECTION 7 - HANDLING AND STORAGE

Conditions for Safe Handling: Avoid breathing mist or vapor. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Do not taste or swallow. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for Safe Storage: Store locked up. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

U.S. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Ethanol (CAS# 64-17-5)	PEL	1900 mg/m^3 / 1000 ppm

U.S. ACGIH Threshold Limit Values

Components	Type	Value
Ethanol (CAS# 64-17-5)	STEL	1000 ppm
Glutaraldehyde (CAS# 111-30-8)	Ceiling	0.05 ppm

U.S. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Ethanol (CAS# 64-17-5)	TWA	1900 mg/m^3 / 1000 ppm
Glutaraldehyde (CAS# 111-30-8)	Ceiling	0.8 mg/m^3 / 0.2 ppm

Biological Limit Values: No biological exposure limits noted for the ingredient(s).

Engineering Controls: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. General ventilation normally adequate. Eye wash facilities and emergency shower must be available when handling this product.

Personal Protective Equipment

Eye/Face Protection: Wear safety glasses with side shields (or goggles) and a face shield.

Hand Protection: Wear appropriate chemical resistant gloves.

Skin Protection: Wear suitable chemical resistant clothing and shoes.

Respiratory Protection: Chemical respirator with organic vapor cartridge, full face shield, dust and mist filter.

Thermal Hazards: Wear appropriate thermal protective clothing, when necessary.

General Hygiene Considerations: Keep away from food and drink. Always observe good personal hygiene measure, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, colorless to light yellow liquid
Odor	Fruity
Odor Threshold	Not available
pH	4.4 @ 25 °C
Melting Point	Not available
Boiling Point	> 210.74 °F (99.3 °C)
Flash Point	210.7 °F (99.3 °C)
Evaporation Rate	Not available
Flammability (solid, gas)	Not applicable
Lower Explosion Limit	Not available
Upper Explosion Limit	Not available
Vapor Pressure	Not available
Relative Vapor Density	Not available
Relative Density	Not available
Water Solubility	Miscible
Partition Coefficient: n-Octanol/Water	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	9.23 cSt
Viscosity Temperature	69.8 °F (21 °C)
Explosive Properties	Not explosive
Oxidizing Properties	Not oxidizing
Specific Gravity	1.04 – 1.06 @ 20 °C
VOC (Weigh %)	4 % estimated

NOTE: The above represents typical values and should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

SECTION 10 - STABILITY AND REACTIVITY

Reactivity: This product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical Stability: Material is stable under normal conditions.

Possibility of Hazardous Reactions: No dangerous reaction known under conditions of normal use.

Conditions to Avoid: Avoid temperatures exceeding the flash point. Contact with incompatible materials.

Incompatible Materials: Strong oxidizing agents and amines.

Hazardous Decomposition Products: No hazardous decomposition products are known.

SECTION 11 - TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation: May cause irritation to the respiratory system. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Prolonged inhalation may be harmful.

Eye Exposure: Causes serious eye damage.

Skin Exposure: Causes severe skin burns.

Ingestion: Harmful if swallowed. Causes digestive tract burns.

Symptoms Related to the Physical, Chemical and Toxicological Characteristics

Burning pain and severe corrosive skin damage. Nausea, vomiting, serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Coughing. Difficulty in breathing.

Information on Toxicological Effects

Acute Toxicity

Acute Oral Toxicity: Harmful if swallowed.
As product (B2512)
LD50, rat, 550 mg/kg

Didecyldimethylammonium Chloride (CAS# 7173-51-5)
LD50, 238 mg/kg
Rat, 329 mg/kg

Glutaraldehyde (CAS# 111-30-8)
LD50, rat, 316 mg/kg
200 mg/kg

Quaternary Ammonium Compounds, Benzyl-C12 - C16-alkyldimethyl, Chlorides (CAS# 68424-85-1)
LD50, 430 mg/kg

Ethanol (CAS# 64-17-5)
LD50, rat, 10470 mg/kg

Acute Dermal Toxicity
Didecyldimethylammonium Chloride (CAS# 7173-51-5)
LD50, 3342 mg/kg
Rat, > 1000 mg/kg

Glutaraldehyde (CAS# 111-30-8)
LD50, rabbit, >2000 mg/kg

Quaternary Ammonium Compounds, Benzyl-C12 - C16-alkyldimethyl, Chlorides (CAS# 68424-85-1)
LD50, 3560 mg/kg

Acute Inhalation Toxicity
Ethanol (CAS# 64-17-5)
LC50, rat, 117 - 125 mg/l, 4 h

Glutaraldehyde (CAS# 111-30-8)
LC50, rat, 0.52 mg/l, 4 hour

*Estimates for product may be based on additional component data not shown.

Skin Corrosion/Irritation
Causes severe skin burns and eye damage.

Serious Eye Damage/Eye Irritation
Causes serious eye damage.

Sensitization
ACGIH Sensitization (Glutaraldehyde) - Sensitizer
Respiratory Sensitization – May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin Sensitization – This product is not expected to cause skin sensitization.

Mutagenicity: No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity: This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050): Not listed.

Reproductive Toxicity: This product is not expected to cause reproductive or developmental effects.

Specific Target Organ Systemic Toxicity (Single Exposure): Not classified.

Specific Target Organ Systemic Toxicity (Repeated Exposure): Not classified.

Aspiration Hazard: Not an aspiration hazard.

Chronic effects: Prolonged inhalation may be harmful.

SECTION 12 - ECOLOGICAL INFORMATION

Toxicity

Aquatic Toxicity - Very toxic to aquatic life with long lasting effects.
Didecyldimethylammonium Chloride (CAS# 7173-51-5)
Algae, EC50, algae, 0.062mg/l, 72 h

Crustacea, LC50, daphnia, 0.057 mg/l, 48 h
Crustacea, NOEC, daphnia, 0.021 mg/l, 21 d

Fish, LC50, danio rerio, 0.97 mg/l, 96 h

Acute
Fish, LC50, bluegill (lepomis macrochirus), 0.032 mg/l, 96 h

Chronic
Crustacea, NOEC, dapnia, 0.01 mg/l

Ethanol (CAS# 64-17-5)
Acute
Algae, EC50, algae, 675 mg/l, 72 h

Crustacea, EC50, daphnia, 5012 mg/l, 48 h

Fish, LC50, fathead minnow (pimephales promelas), 14200 mg/l, 96 h

Chronic
Crustacea, NOEC, daphnia, 9.6 mg/l, 9 d

Glutaraldehyde (CAS# 111-30-8)
Acute
Algae, EC50, algae, 0.92 mg/l, 72 h

Crustacea, EC50, daphnia, 29.73 mg/l, 48 h

Fish, LC50, bluegill (lepomis macrochirus), 13 mg/l, 96 h

Chronic
Crustacea, NOEC, daphnia, 5 mg/l, 21 d

Fish, NOEC, fish, 3.2 mg/l, 97 d

Quaternary Ammonium Compounds, Benzyl-C12-C16-alkyldimethyl, Chlorides (CAS# 68424-85-1)
Acute
Fish, LC50, bluegill (lepomis macrochirus), 0.515 mg/l

Chronic
Crustacea, NOEL, daphnia, 0.0042 mg/l

*Estimates for product may be based on additional component data not shown.

Persistence and Degradability
This product is expected to be readily biodegradable.

Bioaccumulative Potential
No data available.

Mobility in Soil
No data available.

Other Adverse Effects
No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal Procedure: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Dispose of in accordance with all applicable regulations. The waste code should be assigned in discussion between the user, the producer and the waste disposal company. Dispose of waste from residues/unused products in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner. Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14 - TRANSPORT INFORMATION

DOT

Proper Shipping Name:	Disinfectants, liquid, corrosive n.o.s. (Quaternary Ammonium Compound)
UN Number:	1903
Transport Hazard Classes	
Class:	8
Subsidiary risk:	-
Label(s):	8
Packing Group:	III
Special Precautions for User:	Read safety instructions, SDS and emergency procedures before handling.
Special Provisions:	IB3, T4, TP1
Packaging Exceptions:	154
Packaging Non-Bulk:	203
Packaging Bulk:	241
ERG Number:	153

IATA

Proper Shipping Name:	Disinfectants, liquid, corrosive n.o.s. (Quaternary Ammonium Compound)
UN Number:	1903
Transport Hazard Classes	
Class:	8
Subsidiary risk:	-
Packing Group:	III
Environmental Hazards:	No
ERG Code:	8L
Special Precautions for User:	Read safety instructions, SDS and emergency procedures before handling.
Other Information	
Passenger and cargo aircraft:	Allowed
Cargo aircraft only:	Allowed

IMDG

Proper Shipping Name:	Disinfectants, liquid, corrosive n.o.s. (Quaternary Ammonium Compound)
UN Number:	1903
Transport Hazard Classes	
Class:	8
Subsidiary risk:	-
Packing Group:	III
Environmental Hazards	
Marine pollutant:	No
EmS:	F-A, S-B
Special Precautions for User:	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code: Not established.

DOT

IATA; IMDG

SECTION 15 - REGULATORY INFORMATION

U.S. Federal Regulations
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D) – Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)
Ethanol (CAS# 64-17-5) – Listed.

SARA 304 Emergency Release Notification – Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) – Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)
Hazard Categories
Immediate Hazard – Yes
Delayed Hazard – No
Fire Hazard – No
Pressure Hazard – No
Reactivity Hazard – No

SARA 302 Extremely Hazardous Substance – Not listed.

SARA 311/312 Hazardous Chemical – No

SARA 313 (TRI Reporting) – Not regulated.

Other Federal Regulations
Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List – Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130) – Not regulated.

Safe Drinking Water Act (SDWA) – Not regulated.

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace
Ethanol (CAS# 64-17-5) – Low Priority.

FIFRA Information – This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Listed below is the hazard information as required on the pesticide label.

Signal Word – DANGER
KEEP OUT OF REACH OF CHILDREN

Hazard Statement – Corrosive. Causes irreversible eye damage and skin burns. Harmful if swallowed, absorbed through the skin or inhaled.

EPA Registration Number: 10324-185-72714

International Inventories

Country(s) or Region	Inventory Name	On Inventory (yes/no)
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A “Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s). A “No” indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

SECTION 16 – OTHER INFORMATION

Issue Date:	May 27, 2015
Revision Date:	October 3, 2016
Version:	03
Revision Summary:	None
Prepared By:	Product Stewardship Team
Revision Information:	This document has undergone significant changes and should be reviewed in its entirety.

This Safety Data Sheet was prepared to comply with the OSHA Hazard Communication Standard, 29 CFR 1910.1200. Aquaserv provides no warranties; either expressed or implied and assumes no responsibility for the accuracy or completeness of the data contained herein. The data contained in this Safety Data Sheet reflects the latest information available to us on hazards, properties, and handling of this product under the recommended conditions of use. The information on this Safety Data Sheet relates only to the material as supplied and does not relate to combinations with other materials or processes.

Barite

SECTION 1. IDENTIFICATION

Product Identifier	Barite
Other Means of Identification	Barium Sulfate
Other Identification	Baryte
Recommended Use	Drilling Mud Additive.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
SDS No.	0218
Date of Preparation	February 26, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Skin corrosion/irritation - Category 3; Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 1

GHS Label Elements

Signal Word:
Danger
Hazard Statement(s):
EYE: Dust in eye may result in mechanical irritation.
H350 May cause cancer.
H372 Causes damage to organs through prolonged or repeated exposure.
Precautionary Statement(s):
Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
In case of inadequate ventilation, wear respiratory protection.
Wear safety glasses or goggles where elevated dust concentrations are a concern.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Barium sulfate	7727-43-7	84-98	
Silica, quartz	14808-60-7	1-5	
Calcium carbonate	471-34-1	1-5	
Clay	1332-58-7	0.1-6.0	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. Get medical advice/attention if irritation develops.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. Get medical advice/attention if you feel unwell or are concerned.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Never give anything by mouth to an unconscious person. Do not induce vomiting without medical advice. Get medical advice/attention if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Not combustible. Use extinguishing agent suitable for surrounding fire.

Specific Hazards Arising from the Chemical

Does not burn.
Not known to generate any hazardous decomposition products in a fire.

Special Protective Equipment and Precautions for Fire-fighters

No specific procedures given.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Avoid dry sweeping. If necessary, use a dust suppressant such as water. Do not use compressed air for clean-up. Collect using shovel/scoop or approved HEPA vacuum and place in a suitable container for disposal. Use water fog or spray curtain to reduce amount of dust in air. Store recovered product in suitable containers that are: tightly-covered. Dispose of according to local, state and federal regulations.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Do not breathe in this product. Only use where there is adequate ventilation. Avoid skin and eye contact. Avoid creating

excessive dust while handling the product. See Section 8 for appropriate Personal Protective Equipment (PPE). Immediately remove contaminated clothing using the method that minimizes exposure.

Conditions for Safe Storage

Store in an area that is: well-ventilated. Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Clay	3.0 mg/m3		5.0 mg/m3		Not established	
Silica, quartz	0.025 mg/m3 A2		0.1 mg/m3		Not established	
Barium sulfate	5.0 mg/m3 (I)		5.0 mg/m3 (R)			
Calcium carbonate	5 mg/m3 (R)		5 mg/m3 (R)			

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. Short-term TWA = Time-Weighted Average with specified time limit. R = Respirable fraction. I = Inhalable fraction. Product may cause irritation similar to nuisance dust and meet the criteria of Particulates Not Otherwise Specified inhalable particles, or total particles.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with the product an eyewash and safety shower should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses with side shields are recommended to prevent eye contact. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Wear appropriate gloves while handling product. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	White - tan powder.
Odour	Odourless
pH	Not available
Melting Point/Freezing Point	2876 ºF (1580 ºC) (melting); Not available (freezing)
Initial Boiling Point/Range	2912 ºF (1600 ºC)
Flash Point	Not applicable
Evaporation Rate	Not applicable
Flammability (solid, gas)	Will not burn.

Upper/Lower Flammability or Explosive Limit	Not applicable (upper); Not applicable (lower)
Vapour Pressure	Not applicable
Vapour Density (air = 1)	Not applicable
Relative Density (water = 1)	4.2 - 4.5
Solubility	Insoluble in water
Auto-ignition Temperature	Not applicable
Decomposition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Generation of dust.

Incompatible Materials

None.

Hazardous Decomposition Products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; eye contact; skin contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Clay	Not available	> 5,000 mg/kg (rat)	> 5,000 mg/kg (rat)
Silica, quartz	Not available	500 mg/kg (rat)	Not available
Barium sulfate	Not available	Not available	Not available
Calcium carbonate	Not available	6,450 mg/kg (rat)	Not available

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause eye irritation. May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

High dust levels may cause irritation of the respiratory tract, including sneezing and coughing.

Ingestion

May cause discomfort if swallowed.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

This product contains small amounts of crystalline silica (quartz). long term exposure to respirable crystalline silica dust

over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Clay	Not evaluated	A4	Not Listed	Not Listed
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed
Barium sulfate	Not Listed	Not Listed	Not Listed	Not Listed
Calcium carbonate	Not Listed	Not Listed	Not Listed	Not Listed

This product contains free silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. A4 = Not classifiable as a human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

Not known to harm the unborn child.

Sexual Function and Fertility

Not known to cause effects on sexual function or fertility.

Effects on or via Lactation

Not known to cause effects on or via lactation.

Germ Cell Mutagenicity

Not known to be a mutagen.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Clay	> 1,100 mg/L (Daphnia pulex (water flea); 48-hour)	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available	Not available
Barium sulfate	Not available	32 mg/L (Daphnia magna (water flea); 48-hour; fresh water; static)	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 0 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	February 26, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

Blue Max

SECTION 1. IDENTIFICATION

Product Identifier	Blue Max
Other Means of Identification	Surfactant
Recommended Use	Drilling Fluid Additive.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	March 27, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) - Category 5; Skin corrosion/irritation - Category 2; Serious eye damage/eye irritation - Category 1; Carcinogenicity - Category 2; Specific target organ toxicity (repeated exposure) - Category 2

GHS Label Elements

Signal Word:
Danger
Hazard Statement(s):

H303	May be harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary Statement(s):
Prevention:

P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe vapours, mist, spray.
P264	Wash hands and skin thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P270	Do not eat, drink or smoke when using this product.

Response:

P330	Rinse mouth.
P301 + P312	IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell.
P302 + P352	IF ON SKIN: Wash with plenty of water.
P332 + P313	If skin irritation occurs: Get medical advice/attention.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P315	Get immediate medical advice/attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.

Other Hazards

Hazardous to the environment.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Proprietary Surfactant	CBI*	5-10	
Surfactant Blend	68603-42-9	18	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by Poison Centre or doctor. Call a Poison Centre or doctor.

Skin Contact

Immediately rinse with lukewarm, gently flowing water for 15-20 minutes. Remove contaminated clothing and launder before reuse. Seek medical advice/attention.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. Seek immediate medical attention.

Ingestion

Rinse mouth with water. Never give anything by mouth to an unconscious person. Seek medical attention.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Water, Carbon Dioxide, Dry chemical, Foam.

Unsuitable Extinguishing Media

Do not use direct streams of large volumes of water as this may spread the fire.

Specific Hazards Arising from the Chemical

In the event of a fire this product can release hazardous combustion products such as carbon oxides. Sealed systems of product may over pressurize when heated and rupture or explode.
Oxides of carbon oxides of nitrogen.

Special Protective Equipment and Precautions for Fire-fighters

Use water spray to cool containers/tanks. Do not use a solid stream of foam into hot, burning pools: this may causing frothing and increase fire intensity.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Isolate the hazard area. Keep out unnecessary and unprotected personnel. See Section 8 for appropriate personal protective equipment.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas. Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Dike spilled product to prevent runoff. Contain and soak up spill with absorbent that does not react with spilled product. Do not use absorbents. Contain spill using noncombustible material such as vermiculite, earth or sand. Store recovered product or absorbent material in suitable containers for disposal according to local regulations. Prevent contamination of waterways or sewers. Clean up residual contamination with water and place in appropriate containers for disposal.

Other Information

Contact EH&S regarding spill as spills of certain products and certain quantities may require reporting to various authorities.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Do not breathe in this product. Do not get in eyes, on skin or on clothing. Wear personal protective equipment to avoid direct contact with this chemical. Wash hands thoroughly after handling this product and before eating, using the washroom or leaving work area.

Conditions for Safe Storage

Keep containers tightly closed when not in use. Store in an area that is: well-ventilated, cool, dry. Away from open flames, excessive heat or sources of ignition. Separate from incompatible materials store in the original, labelled, shipping container.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Surfactant Blend	1 mg/m3 Skin A3		Not established		Not established	
Proprietary Surfactant	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with the product an eyewash and safety shower should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses with side shields. Wear chemical safety goggles and a face shield when handling product.

Skin Protection

Wear gloves with appropriate chemical resistance, see manufacturers specifications for suitability. Wear chemical protective clothing e.g. gloves, aprons, boots.

Respiratory Protection

If conditions exist above the OEL wear a NIOSH approved respirator with an appropriate cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Blue liquid.
Odour	Aromatic
pH	7
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	> 400 ºF
Evaporation Rate	Not available
Flammability (solid, gas)	Will not burn.
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	1.02
Solubility	Soluble in water
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Liquid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Open flames, sparks, static discharge, heat and other ignition sources.

Incompatible Materials

Inorganic acids (e.g. hydrofluoric acid), bases. Hypochlorites nitric acid, sulfuric acid, oxidizing agents (e.g. peroxides), oxygen. Permanganates perchlorates, peroxides. Chromates.

Hazardous Decomposition Products

Oxides of carbon. Oxides of nitrogen.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; skin absorption; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Surfactant Blend	Not available	Not available	> 2000 mg/kg (rabbit)
Proprietary Surfactant	Not available	Not available	Not available

Skin Corrosion/Irritation

May cause mild skin irritation.

Serious Eye Damage/Irritation

May cause eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

Spray mists may cause respiratory tract irritation. Symptoms may include headache, nausea, dizziness, drowsiness and confusion.

Skin Absorption

No information was located.

Ingestion

May cause. irritation of the gastrointestinal tract, nausea, vomiting, diarrhea.

Aspiration Hazard

No information was located.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Prolonged skin contact may cause defatting of the skin resulting in irritation and conditions such as dermatitis.

Respiratory and/or Skin Sensitization

No information was located.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Surfactant Blend	Group 2B	A3	Not Listed	Not Listed
Proprietary Surfactant	Not Listed	Not Listed	Not Listed	Not Listed

May cause cancer.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 2B = Possibly carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A4 = Not classifiable as a human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Do not allow product to contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Surfactant Blend	Not available	3.3 mg/L (Daphnia magna (water flea); static)	Not available	Not available
Proprietary Surfactant	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

Studies are not available.

Other Adverse Effects

There is no information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

Other Information

The shipping descriptions included are for non-bulk shipments only and may not apply to shipments in bulk packages (see appropriate regulatory definition).

This product contains one or more ingredients as a hazardous substance in Appendix A of 49 CFR 172.101. The product quantity, in one package, which triggers the RQ requirements under 49 CFR for each hazardous substance is shown.

Reportable quantities:

RQ substance: Diethanolamine
RQ limit for substance: 100lb
RQ limit for product: 8300lb

Shipping information for product over in containers larger than 8300lb would be UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (DIETHANOLAMINE), CLASS 9, PG III

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

CERCLA: May contain <1.1% Diethanolamine.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Acute Hazards Chronic Health Hazard.
SARA Title III - Section 313: May contain 0.75% to 0.25% concentration of Glycol Ethers
May contain <1.1% Diethanolamine.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 2**	**Flammability - 1**	**Instability - 0**
SDS Prepared By	AES Drilling Fluids		
Phone No.	281-556-5628		

Date of Preparation	March 27, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

SAFETY DATA SHEET

C 2145 Air Unit Corrosion Inhibitor W/S

Section 1. Identification

GHS product identifier : **C 2145 Air Unit Corrosion Inhibitor W/S**

Other means of identification : Corrosion Inhibitor

Product use : Not available.

Product type : Liquid.

Manufacturer : **Jacam Manufacturing 2013, L.L.C.**
P.O.Box 208, 1656 Ave. Q.
Sterling, Kansas 67579

Validation date : 5/14/2015.

For Chemical Emergency Spill, Leak Fire, Exposure or Accident: : **Call CHEMTREC Day or Night**
Within USA and Canada 800-424-9300 CCN# 11754
Or +1 703-527-3887 (Collect calls accepted)

Direct all other calls to:
Jacam Chemicals 2013, L.L.C. 620-278-3355
Mon – Fri 8 a.m. to 5 p.m. (Closed on major holidays)

Supplier's details : **Jacam Chemicals 2013, L.L.C.**
P.O. Box 96, 205 S. Broadway
Sterling, Kansas 67579

Section 2. Hazards identification

Classification of the substance or mixture : ACUTE TOXICITY (oral) - Category 4
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A

GHS label elements

Section 2. Hazards identification

Hazard pictograms :

Signal word : Warning

Hazard statements : H302 - Harmful if swallowed.
H319 - Causes serious eye irritation.

Precautionary statements

Prevention : P280 - Wear eye or face protection: Recommended: chemical splash goggles..
P270 - Do not eat, drink or smoke when using this product.
P264 - Wash hands thoroughly after handling.

Response : P301 + P312 + P330 - IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth.
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 - If eye irritation persists: Get medical attention.

Storage : Not applicable.

Disposal : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Routes of entry : Dermal contact. Eye contact. Inhalation.
INGESTION: Although not a normal route of entry, ingestion is expected to be harmful. DO NOT TAKE INTERNALLY. FOR INDUSTRIAL USE ONLY.

Target organs : May cause damage to the following organs: kidneys, liver, gastrointestinal tract, upper respiratory tract, skin, eyes.
Contains material which may cause damage to the following organs: heart, central nervous system (CNS), eye, lens or cornea.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Corrosion Inhibitor

CAS number/other identifiers

CAS number : Not applicable.

Ingredient name	%	CAS number
Ethylene Glycol	5 - 10	107-21-1
Methanol	5 - 10	67-56-1

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Section 3. Composition/information on ingredients

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 15 minutes. If irritation persists, obtain medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. If irritation or symptoms persists, obtain medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. If irritation persists, obtain medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : May be harmful if inhaled.

Skin contact : May cause skin irritation.

Ingestion : Harmful if swallowed. Irritating to mouth, throat and stomach. See notes to physician, below.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Exposure to high concentrations may cause:
nausea or vomiting
Irritation
dizziness/vertigo
drowsiness/fatigue
headache
unconsciousness

Skin contact : Adverse symptoms may include the following:
redness
burning
absorption possible

Section 4. First aid measures

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.This product contains ethylene glycol. Ethanol decreases the metabolism of ethylene glycol to toxic metabolites. Ethanol should be administered as soon as possible in cases of severe poisoning since the elimination of half-life of ethylene glycol is 3 hours. If medical care will be delayed several hours, use three to four ounces oral "shots" of 86-proof or higher whiskey before or during transport to the hospital. Hemodialysis effectively removes ethylene glycol and it's metabolites from the body. Effects of acute ethylene glycol poisoning appear in three fairly distinct stages. The initial stage occurs shortly after exposure, lasts 6-12 hours, and is characterized by central nervous system effects (transient exhilaration nausea, vomiting, and in severe cases coma, convulsions and possible death). The second stage lasts from 12-36 hours after exposure and is initiated by the onset of coma. This phase is characterized by tachypnia, tachycardia, mild hyotension, cyanosis and in severe cases, pulmonary edema, bronchopneumonia, cardiac enlargement and congestive heart failure. The final stage occurs 24-72 hours post-exposure and is characterized by renal failure ranging from a mild increase in blood urea nitorgen and creatinine followed by recovery to complete anuria with acute tubular necrosis that can lead to death. Oxaluria is found in most cases. The most significant laboratory finding in ethylene glycol intoxication is severe metabolic acidosis.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Additional Vapor Statement : Not available.

Not available.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Ethylene Glycol	**OSHA PEL 1989 (United States, 3/1989).** CEIL: 50 ppm CEIL: 125 mg/m³ **ACGIH TLV (United States, 4/2014).** C: 100 mg/m³ Form: Aerosol
Methanol	**ACGIH TLV (United States, 4/2014).** **Absorbed through skin.** TWA: 200 ppm 8 hours. TWA: 262 mg/m³ 8 hours. STEL: 250 ppm 15 minutes. STEL: 328 mg/m³ 15 minutes. **OSHA PEL 1989 (United States, 3/1989).** **Absorbed through skin.** TWA: 200 ppm 8 hours. TWA: 260 mg/m³ 8 hours. STEL: 250 ppm 15 minutes. STEL: 325 mg/m³ 15 minutes. **NIOSH REL (United States, 10/2013).** **Absorbed through skin.** TWA: 200 ppm 10 hours. TWA: 260 mg/m³ 10 hours. STEL: 250 ppm 15 minutes. STEL: 325 mg/m³ 15 minutes. **OSHA PEL (United States, 2/2013).** TWA: 200 ppm 8 hours. TWA: 260 mg/m³ 8 hours.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. Recommended: chemical splash goggles.

Skin protection

Section 8. Exposure controls/personal protection

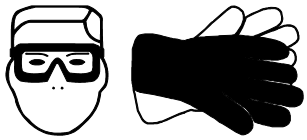
Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. > 8 hours (breakthrough time): nitrile rubber

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Personal protective equipment (Pictograms) :



Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Yellow. [Light]

Odor : Pungent. [Strong]

Odor threshold : Not available.

pH : 6 to 7

Melting point : Not available.

Boiling point : 93.333°C (200°F)

Flash point : Closed cup: 115.56°C (240°F) [Pensky-Martens.] [Product does not sustain combustion.]

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Lower: 3.2%
Upper: 15.3%

Vapor pressure : Not available.

Vapor density : Not available.

Relative density : 1.12 to 1.15

Density : 9.61 to 99.35 (lbs/gal)

Solubility : Easily soluble in the following materials: cold water.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Section 9. Physical and chemical properties

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Ethylene Glycol	LD50 Oral	Rat	4700 mg/kg	-
Methanol	LD50 Dermal	Rabbit	15800 mg/kg	-
	LD50 Oral	Rat	143 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Ethylene Glycol	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Mild irritant	Rabbit	-	1 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	6 hours 1440 milligrams	-
	Skin - Mild irritant	Rabbit	-	555 milligrams	-
Methanol	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	40 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Not available.			

Section 11. Toxicological information

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Not available.			

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Product/ingredient name

Not available.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
Not available.						

Teratogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Not available.			

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Name	Result
Not available.	

Information on the likely ToxKinetics - routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : May be harmful if inhaled.

Skin contact : May cause skin irritation.

Ingestion : Harmful if swallowed. Irritating to mouth, throat and stomach. See notes to physician, below.

Symptoms related to the physical, chemical and toxicological characteristics

Section 11. Toxicological information

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Exposure to high concentrations may cause:
nausea or vomiting
Irritation
dizziness/vertigo
drowsiness/fatigue
headache
unconsciousness

Skin contact : Adverse symptoms may include the following:
redness
burning
absorption possible

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	1401.8 mg/kg

Other information : Adverse symptoms may include the following: nausea or vomiting dizziness/vertigo drowsiness/fatigue headache pulmonary edema
Cyanosis kidney abnormalities liver abnormalities coma death

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Ethylene Glycol	Acute LC50 100000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 10000000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 8050000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
Methanol	Acute EC50 16.912 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Acute LC50 2500000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 3289 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 100 mg/l Fresh water	Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
	Chronic NOEC 9.96 mg/l Marine water	Algae - Ulva pertusa	96 hours

Conclusion/Summary : Not available.

Persistence and degradability

Not available.

Product/ingredient name

Not available.

Product/ingredient name

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Ethylene Glycol	-1.36	-	low
Methanol	-0.77	<10	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Methanol (l); Methyl alcohol (l)	67-56-1	Listed	U154

Section 14. Transport information

Regulatory information	UN/NA Number	Proper shipping name	Hazard Class(es)	PG*

DOT Classification

PG* : Packing group

	Not regulated.	-	-	-

Additional information

-

Label

TDG Classification

	Not regulated.	-	-	-

Additional information

-

Label

IMDG Class

	Not regulated.	-	-	-

Marine pollutant notes: : Not available.

Section 14. Transport information

Additional information

-

Label

IATA-DGR Class

Not regulated.	-	-	-

Additional information

-

Label

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined
All components are listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Ethylene Glycol	5 - 10	No.	No.	No.	Yes.	Yes.
Methanol	5 - 10	Yes.	No.	No.	Yes.	Yes.

Section 15. Regulatory information

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Ethylene Glycol Methanol	107-21-1 67-56-1	5 - 10 5 - 10
Supplier notification	Ethylene Glycol Methanol	107-21-1 67-56-1	5 - 10 5 - 10

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: ETHYLENE GLYCOL; METHANOL

New York : The following components are listed: Ethylene glycol; Methanol

New Jersey : The following components are listed: ETHYLENE GLYCOL; 1,2-ETHANEDIOL; METHYL ALCOHOL; METHANOL

Pennsylvania : The following components are listed: 1,2-ETHANEDIOL; METHANOL

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Methanol	No.	Yes.	No.	23000 µg/day (ingestion) 47000 µg/day (inhalation)

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI (Pollution Release) : The following components are listed: Ethylene glycol; Methanol

CEPA Toxic substances : None of the components are listed.

Canada inventory-DSL / NDSL : All components are listed or exempted.

International lists

National inventory

Section 15. Regulatory information

Australia	:	All components are listed or exempted.
Canada	:	All components are listed or exempted.
China	:	All components are listed or exempted.
Europe	:	All components are listed or exempted.
Japan	:	All components are listed or exempted.
Malaysia	:	All components are listed or exempted.
New Zealand	:	All components are listed or exempted.
Philippines	:	All components are listed or exempted.
Republic of Korea	:	All components are listed or exempted.
Taiwan	:	All components are listed or exempted.

Section 16. Other information

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

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Normal Package Size(s): Ball: 2" Ball 50/Cooler; 4" Ball 12/Cooler
Dry Product: 50 Lbs/Box
Liquid: 5 Gallon/55 Gallon/Bulk
Pellets: 30 Lbs/Cooler; 24 Lbs/Pail
Stix: 1 1/4": 50 Each/Cooler

History

Date of issue/Date of revision	:	**5/14/2015.**
Version	:	**1**
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Previous Validation Date	:	*No previous validation.*
Prepared by	:	Jacam Regulatory Department
(M)SDS Requests:	:	**SDS@jacam.com**

Section 16. Other information

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

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***** END OF SDS *****

Safety Data Sheet

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

1.1 Product identifier

Product Name • **94-97% Calcium Chloride Powder**

SDS Number/Grade • CC-02

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

Relevant identified use(s) • Concrete acceleration, Drilling fluid additive, Dust control

1.3 Details of the supplier of the safety data sheet

Manufacturer • Cal-Chlor Corporation

627 Jefferson Street
Lafayette, LA 70501
United States
www.Cal-Chlor.com
mscelsa@cal-chlor.com

Telephone (General) • 1-800-245-6743

1.4 Emergency telephone number

Manufacturer • 800-424-9300 - CHEMTREC

Section 2: Hazards Identification

EU/EEC

According to Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP • Acute Toxicity Oral 4 - H302
Eye Irritation 2 - H319

DSD/DPD • Harmful (Xn)
Irritant (Xi)

R22, R36

2.2 Label Elements

CLP

WARNING

Hazard statements
- H302 - Harmful if swallowed
  H319 - Causes serious eye irritation

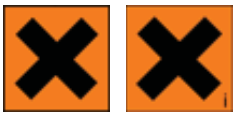
Precautionary statements

Prevention
- P264 - Wash thoroughly after handling.
  P270 - Do not eat, drink or smoke when using this product.
  P280 - Wear eye/face protection , .

Response
- P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P337+P313 - If eye irritation persists: Get medical advice/attention.
  P301+P312 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician if you feel unwell.
  P330 - Rinse mouth.

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

DSD/DPD



Risk phrases
- R22 - Harmful if swallowed.
  R36 - Irritating to eyes.

Safety phrases
- S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

2.3 Other Hazards

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

DSD/DPD
- This product is considered dangerous according to the European Directive 67/548/EEC.

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

OSHA HCS 2012
- Acute Toxicity Oral 4 - H302
  Eye Irritation 2 - H319

2.2 Label elements

OSHA HCS 2012

WARNING

Hazard statements
- Harmful if swallowed - H302
  Causes serious eye irritation - H319

Precautionary statements

Prevention
- Wash thoroughly after handling. - P264
  Do not eat, drink or smoke when using this product. - P270
  Wear eye/face protection , . - P280

Response
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. - P305+P351+P338
  If eye irritation persists: Get medical advice/attention. - P337+P313
  IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician if you feel unwell. - P301+P312
  Rinse mouth. - P330

Storage/Disposal
- Dispose of content and/or container in accordance with local, regional, national, and/or

international regulations. - P501

2.3 Other hazards

OSHA HCS 2012

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

Canada

According to WHMIS

2.1 Classification of the substance or mixture

WHMIS

- Other Toxic Effects - D2B

2.2 Label elements

WHMIS

- Other Toxic Effects - D2B

2.3 Other hazards

WHMIS

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

3.1 Substances

Composition					
Chemical Name	**Identifiers**	**%**	**LD50/LC50**	**Classifications According to Regulation/Directive**	**Comments**
Calcium chloride	**CAS:**10043-52-4 **EC Number:**233-140-8 **EU Index:**017-013-00-2	94% TO 97%	Ingestion/Oral-Rat LD50 • 1 g/kg	**EU DSD/DPD:** Annex VI, Table 3.2: Xi R36; Additional Self Classification: Xn R22 **EU CLP:** Annex VI, Table 3.1: Eye Irrit. 2, H319; Additional Self Classification: Acute Tox. 4, H302 **OSHA HCS 2012:** Eye Irrit. 2; Acute Tox. 4 (orl)	NDA
Potassium chloride	**CAS:**7447-40-7 **EC Number:**231-211-8	2% TO 3%	Ingestion/Oral-Rat LD50 • 2600 mg/kg	**EU DSD/DPD:** Self Classified: Xi R36 **EU CLP:** Self Classified: Eye Irrit. 2, H319 **OSHA HCS 2012:** Eye Irrit. 2	NDA
Sodium chloride	**CAS:**7647-14-5 **EC Number:**231-598-3	1% TO 2%	Ingestion/Oral-Rat LD50 • 3000 mg/kg	**EU DSD/DPD:** Self Classified: Xi R36 **EU CLP:** Self Classified: Eye Irrit. 2, H319 **OSHA HCS 2012:** Eye Irrit. 2	NDA

3.2 Mixtures

- Material does not meet the criteria of a mixture.

Section 4 - First Aid Measures

4.1 Description of first aid measures

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

Skin
- In case of contact with substance, immediately flush skin with running water for at least 20 minutes.

Eye
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. If eye irritation persists: Get medical advice/attention.

Ingestion
- Do NOT induce vomiting. Rinse mouth. Give one cup (8 ounces or 240 mL) of water or milk if available. Do not give anything by mouth to an unconscious person. Get medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

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

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media
- In case of fire use media as appropriate for surrounding fire.

Unsuitable Extinguishing Media
- No data available.

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards
- Material does not burn.

Hazardous Combustion Products
- No data available.

5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA).
Structural firefighters' protective clothing will only provide limited protection.
Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions
- Do not walk through spilled material. Wear appropriate personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Spilled material may cause a slipping hazard.

Emergency Procedures
- Keep unauthorized personnel away. Ventilate closed spaces before entering.

6.2 Environmental precautions

- Avoid release to the environment.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures
- Avoid generating dust.
SMALL DRY SPILLS: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
Flush residue with plenty of water.

6.4 Reference to other sections

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

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Use only with adequate ventilation. Avoid contact with skin, eyes, and clothing. Do not taste or swallow. Heat developed during diluting or dissolving is very high. Use cool water when diluting or dissolving (temperature less than 80ºF, 27ºC). Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Keep container tightly closed. Store in a cool, dry place. Protect from moisture.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines

- No applicable exposure limits available for product or components.

8.2 Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory

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

Eye/Face

- Wear safety goggles.

Skin/Body

- Wear appropriate gloves.

Environmental Exposure Controls

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

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Solid	Appearance/Description	White powder with no odor.
Color	White	Odor	Odorless
Odor Threshold	Not relevant		
General Properties			
Boiling Point	Not relevant	Melting Point	772 C(1421.6 F) (approximately)
Decomposition Temperature	Not relevant	pH	Not relevant
Specific Gravity/Relative Density	Not relevant	Bulk Density	65 lb(s)/ft³ (estimated)
Water Solubility	Soluble	Viscosity	Not relevant
Explosive Properties	Not relevant.	Oxidizing Properties:	Not relevant.

Volatility			
Vapor Pressure	Negligible	Vapor Density	Not relevant
Evaporation Rate	Not relevant		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Flammability (solid, gas)	Not relevant.		
Environmental			
Octanol/Water Partition coefficient	Not relevant		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization not indicated.

10.4 Conditions to avoid

- Avoid moisture.

10.5 Incompatible materials

- Heat is generated when mixed with water. Spattering and boiling can occur. Avoid contact with sulfuric acid. Corrosive when wet. Flammable hydrogen may be generated from contact with metals such as zinc and sodium. Reaction of bromide impurity with oxidizing materials may generate trace levels of impurities such as bromate.

10.6 Hazardous decomposition products

- Does not decompose.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

Components		
Calcium chloride (94% TO 97%)	10043-52-4	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 1 g/kg
Impurities, Stabilizers, etc...		
Potassium chloride (2% TO 3%)	7447-40-7	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 2600 mg/kg; **Irritation:** Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation
Sodium chloride (1% TO 2%)	7647-14-5	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 3000 mg/kg; **Irritation:** Eye-Rabbit • 10 mg • Moderate irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation

GHS Properties	Classification

Acute toxicity	**EU/CLP** • Acute Toxicity - Oral 4 **OSHA HCS 2012** • Acute Toxicity - Oral 4
Aspiration Hazard	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Carcinogenicity	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Germ Cell Mutagenicity	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Skin corrosion/Irritation	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Skin sensitization	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
STOT-RE	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
STOT-SE	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Toxicity for Reproduction	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Respiratory sensitization	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Serious eye damage/Irritation	**EU/CLP** • Eye Irritation 2 **OSHA HCS 2012** • Eye Irritation 2

Route(s) of entry/exposure
- Inhalation, Skin, Eye, Ingestion

Medical Conditions Aggravated by Exposure
- Disorders of the lungs.

Potential Health Effects

Inhalation

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

Chronic (Delayed)
- No data available

Skin

Acute (Immediate)
- Exposure to dust may cause mechanical irritation.

Chronic (Delayed)
- No data available.

Eye

Acute (Immediate)
- Causes serious eye irritation. Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.

Chronic (Delayed)
- No data available.

Ingestion

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

Chronic (Delayed)
- No data available.

Key to abbreviations

LD = Lethal Dose
MLD = Mild
MOD = Moderate

Section 12 - Ecological Information

12.1 Toxicity

94-97% Calcium Chloride Powder					
Dosage	**Species**	**Duration**	**Results**	**Exposure Conditions**	**Comments**
8350 to 10650 mg/L	**Fish:** Bluegill	NDA	LC50	NDA	Data for Calcium Chloride
759 to 3005 mg/L	**Crustacea:** Daphnia magna	NDA	EC50	NDA	Data for Calcium Chloride
= 4236 mg/L	**Fish:** Rainbow Trout	96 Hour(s)	LC50	NDA	Data for Potassium Chloride
= 590 mg/L	**Crustacea:** Daphnia magna	24 Hour(s)	EC50	NDA	Data for Potassium Chloride
= 3470 mg/L	**Water Flea:** Ceriodaphnia Dubia	96 Hour(s)	LC50	NDA	Data for Potassium Chloride
= 10610 mg/L	**Fish:** Fathead minnow	NDA	LC50	NDA	Data for Sodium Chloride
= 4571 mg/L	**Crustacea:** Daphnia magna	NDA	LC50	NDA	Data for Sodium Chloride

12.2 Persistence and degradability

- Biodegradation is not applicable.

12.3 Bioaccumulative potential

- No bioconcentration is expected because of the relatively high water solubility.

12.4 Mobility in Soil

- Potential for mobility in soil is very high (Koc between 0 and 50). Partitioning from water to n-octanol is not applicable.

12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

- Material is practically non-toxic to aquatic organisms on an acute basis. (LC50/EC50/EL50/LL50 >100mg/L in the most sensitive species tested).

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste

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

Packaging waste

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

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	NDA	Not Regulated	NDA	NDA	NDA
TDG	NDA	Not Regulated	NDA	NDA	NDA
IMO/IMDG	NDA	Not Regulated	NDA	NDA	NDA

IATA/ICAO	NDA	Not Regulated	NDA	NDA	NDA

14.6 Special precautions for user
- None specified.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
- Data lacking.

Section 15 - Regulatory Information

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

SARA Hazard Classifications
- Acute

Inventory						
Component	**CAS**	**Australia AICS**	**Canada DSL**	**Canada NDSL**	**China**	**EU EINECS**
Calcium chloride	10043-52-4	Yes	Yes	No	Yes	Yes
Potassium chloride	7447-40-7	Yes	Yes	No	Yes	Yes
Sodium chloride	7647-14-5	Yes	Yes	No	Yes	Yes

Inventory (Con't.)						
Component	**CAS**	**EU ELNICS**	**Japan ENCS**	**Korea KECL**	**New Zealand**	**TSCA**
Calcium chloride	10043-52-4	No	Yes	Yes	Yes	Yes
Potassium chloride	7447-40-7	No	Yes	Yes	Yes	Yes
Sodium chloride	7647-14-5	No	Yes	Yes	Yes	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Calcium chloride	10043-52-4	D2B
• Potassium chloride	7447-40-7	Uncontrolled product according to WHMIS classification criteria (including 23.8%)
• Sodium chloride	7647-14-5	Uncontrolled product according to WHMIS classification criteria

Canada - WHMIS - Ingredient Disclosure List

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

Environment

Canada - CEPA - Priority Substances List

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

Germany

Environment

Germany - Water Classification (VwVwS) - Annex 1

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes

• Calcium chloride	10043-52-4	ID Number 220, hazard class 1 - low hazard to waters
• Potassium chloride	7447-40-7	ID Number 230, hazard class 1 - low hazard to waters
• Sodium chloride	7647-14-5	ID Number 270, hazard class 1 - low hazard to waters

Germany - Water Classification (VwVwS) - Annex 3

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

United States

Labor

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

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

Environment

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

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

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

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

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

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Calcium chloride	10043-52-4	Not Listed

• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - TSCA (Toxic Substances Control Act) - Section 5 - New Chemicals Program (NCP) Chemical Categories

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Calcium chloride	10043-52-4	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Sodium chloride	7647-14-5	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Last Revision Date	• 04/March/2014
Preparation Date	• 04/March/2014
Disclaimer/Statement of Liability	• The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. No warranty of merchantability or fitness for a particular purpose, or warranty or guaranty of any other kind, express or implied, is made regarding performance, safety, suitability, stability or otherwise. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and Cal-Chlor assumes no liability whatsoever for the use of or reliance upon this information. No suggestions for the use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or to violate any federal, state, local or foreign laws. OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Safety Data Sheet available to your employees.

Key to abbreviations

NDA = No data available

Safety Data Sheet dated 27/5/2015, version 1

Printing date:29/5/2015

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name: AES Defoam A
MSDS code: F093619
Chemical description: Alcohols and esters blend

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

Recommended use:
Industrial uses.

1.3. Details of the supplier of the safety data sheet

Supplier:
Lamberti USA Inc. - Highway 59 at County Road 212 - P.O. Box 1000, Hungerford, TX 77448-U.S.A.
Tel. n° 281 342-5675 Fax n° 979 532-3749

Competent person responsible for the safety data sheet:
hse@lamberti.com

1.4. Emergency telephone number

CHEMTREC - Phone n. 800 424-9300

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Following GHS and EC regulation criteria 1272/2008 (CLP)

Warning, Flam. Liq. 4, Combustible liquid.


Warning, Acute Tox. 4, Harmful if inhaled.


Warning, Skin Irrit. 2, Causes skin irritation.


Warning, Eye Irrit. 2A, Causes serious eye irritation.


Warning, STOT SE 3, May cause respiratory irritation.

Adverse physicochemical, human health and environmental effects:
No other hazards

2.2. Label elements

Symbols:

Warning

Hazard statements:
H227 Combustible liquid.
H332 Harmful if inhaled.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary statements:
P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 IF ON SKIN: Wash with plenty of water.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER/doctor if you feel unwell.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P362+P364 Take off contaminated clothing and wash it before reuse.
P370+P378 In case of fire: Use Water and Carbon dioxide (CO2) to extinguish.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P501 Dispose of contents/container in accordance with applicable regulations.

Special Provisions:
None

Special provisions according to Annex XVII of REACH and subsequent amendments:
None

2.3. Other hazards
vPvB Substances: None - PBT Substances: None

Other Hazards:
No other hazards

SECTION 3: Composition/information on ingredients

3.1 Substances
N.A.

3.2 Mixtures
Hazardous substances/components within GHS Classification and the meaning of the EEC directive 67/548 and CLP regulation and related classification

>=30% - <50% 2-Ethyl-1-hexanol
Index number: Not Available, CAS: 104-76-7, EC: 203-234-3

SECTION 4: First aid measures

4.1. Description of first aid measures

In case of skin contact:
Wash with plenty of water and soap.

In case of eyes contact:
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

In case of Ingestion:
Do not under any circumstances induce vomiting. Seek immediately medical advice.

In case of Inhalation:
Remove casualty to fresh air and keep warm and at rest.

4.2. Most important symptoms and effects, both acute and delayed
Not known.

4.3. Indication of any immediate medical attention and special treatment needed
Treatment:
Not known.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media:
Water.
Carbon dioxide (CO2).
Extinguishing media which must not be used for safety reasons:
Not known.

5.2. Special hazards arising from the substance or mixture
Do not inhale explosion and combustion gases.

5.3. Advice for firefighters
Use suitable breathing apparatus .

Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Move undamaged containers from immediate hazard area if it can be done safely.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Wear personal protection equipment.
Remove persons to safety.
See protective measures under point 7 and 8.

6.2. Environmental precautions

Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or drains.
Retain contaminated washing water and dispose it.
In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.

6.3. Methods and material for containment and cleaning up

Suitable material for taking up: absorbing material, organic, sand
Wash with plenty of water.

6.4. Reference to other sections

See also section 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact with skin and eyes, inhalation of vapours and mists.
Do not use empty container before they have been cleaned.
Before making transfer operations, assure that there are not any incompatible material residuals in the containers.
Contamined clothing should be changed before entering eating areas.
Do not eat or drink while working.
See also section 8 for recommended protective equipment.

7.2. Conditions for safe storage, including any incompatibilities

Keep away from food, drink and feed.
Instructions as regards storage premises:
Adequate ventilation in working area.
Packaging suggested:
Plastic drums.

7.3. Specific end use(s)

None in particular

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No occupational exposure limit available
DNEL Exposure Limit Values
N.D.
PNEC Exposure Limit Values
N.D.

8.2. Exposure controls

Eye protection:

Use close fitting safety goggles. (ref. EN 166, EN 140, EN175).

Protection for skin:

Use clothing that provides comprehensive protection to the skin, e.g. cotton, rubber, PVC or viton. (ref. EN 340).

Protection for hands:

Chemical-resistant protective gloves (EN 374). When prolonged or frequently repeated contact may occur, a glove is recommended to prevent contact. Examples of preferred glove barrier materials include: Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). As general indication we suggest as suitable materials for short-term contact or splashes (recommended: at least protection index 2, corresponding to > 30 minutes permeation time as per EN 374): nitrile rubber (NBR; >= 0.4 mm thickness) and suitable

materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): nitrile rubber (NBR; >= 0.4 mm thickness). This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances-mixtures.

Respiratory protection:

Use adequate protective respiratory equipment. (ref. EN 136, EN 140, EN 141, EN 143, EN 149, EN 405).

Thermal Hazards:

None

Environmental exposure controls:

None

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance and colour:	Liquid
Odour:	Slight
Odour threshold:	N.D.
pH:	N.D.
Melting point / freezing point:	<-10C (< 12F)
Initial boiling point and boiling range:	>100C (>212F)
Solid/gas flammability:	N.D.
Upper/lower flammability or explosive limits:	N.D.
Vapour density:	N.D.
Flash point:	>63C (>145F)
Evaporation rate:	N.D.
Vapour pressure:	N.D.
Relative density:	0.900 - 0.950
Solubility in water:	Insoluble
Solubility in oil:	N.D.
Partition coefficient (n-octanol/water):	N.D.
Auto-ignition temperature:	N.D.
Decomposition temperature:	N.D.
Viscosity:	N.D.
Explosive properties:	N.D.
Oxidizing properties:	N.D.

9.2. Other information

Miscibility:	N.D.
Fat Solubility:	N.D.
Conductivity:	N.D.
Substance Groups relevant properties	N.D.
Osha Flammability:	Combustible liquid

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions

10.2. Chemical stability

Stable under normal conditions

10.3. Possibility of hazardous reactions

Stable under normal conditions

10.4. Conditions to avoid

Stable under normal conditions.

10.5. Incompatible materials

Strong acids

Strong oxidizers

10.6. Hazardous decomposition products

Not known.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological information of the substance:

a) acute toxicity:

Toxicity Oral Rat LD50> 2000 mg/kg. By analogy to product with similar composition.

b) skin corrosion/irritation:

Irritation Skin : Causes skin irritation.

c) serious eye damage/irritation:

Irritation Eye : Causes serious eye irritation.

d) respiratory or skin sensitisation:

Irritation Inhalation: May cause respiratory irritation.

If not differently specified, the information required in Regulation 453/2010/EC listed below must be considered as N.D.:

a) acute toxicity;
b) skin corrosion/irritation;
c) serious eye damage/irritation;
d) respiratory or skin sensitisation;
e) germ cell mutagenicity;
f) carcinogenicity;
g) reproductive toxicity;
h) STOT-single exposure;
i) STOT-repeated exposure;
j) aspiration hazard.

Carcinogenic IARC: Not Carcinogenic IARC/NTP/OSHA

SECTION 12: Ecological information

12.1. Toxicity

Ecological information of the substance:

a) Aquatic acute toxicity:

Data not available.

12.2. Persistence and degradability

Ecological information of the substance:

Biodegradability: Data not available.

12.3. Bioaccumulative potential

Ecological information of the substance:

Bioaccumulation: Data not available.

12.4. Mobility in soil

Ecological information of the substance:

Mobility in soil: Data not available.

12.5. Results of PBT and vPvB assessment

vPvB Substances: None - PBT Substances: None

12.6. Other adverse effects

None

Use according to criteria of good industrial practice, avoiding product dispersion in the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

If possible recover the product, otherwise dispose of in authorized landfill or incineration in accordance with local regulation.

SECTION 14: Transport information

14.1. UN number

N.A.

14.2. UN proper shipping name

Proper Shipping Name: N.A.

14.3. Transport hazard class(es)

US DOT (non-bulk): Not Regulated

US DOT (bulk): NA1993, Combustible liquid, n.o.s., (2-Ethyl-1-hexanol), PG-III

Road (ADR):	Not Regulated
Air (ICAO/IATA):	Not Regulated
Sea (IMO/IMDG):	Not Regulated

14.4. Packing group

ADR-Packing Group:	N.A.
IATA-Packing group:	N.A.
IMDG-Packing group:	N.A.

14.5. Environmental hazards

N.A.

14.6. Special precautions for user

N.A.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

N.A.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Dir. 67/548/EEC (Classification, packaging and labelling of dangerous substances). Dir. 99/45/EEC (Classification, packaging and labelling of dangerous preparations). Dir. 98/24/EC (Risks related to chemical agents at work). Dir. 2000/39/EC (Occupational exposure limit values); Dir. 2006/8/CE. Regulation (CE) n. 1907/2006 (REACH).
For non-EU Countries, the Material Safety Data Sheet it is prepared following the main principles of Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which are adopted worldwide.

Refer to other local regulations that may be relevant (i.e. : sanitary control, waste treatment etc.)

15.2. Chemical safety assessment
No
Regulatory information USA:

HMIS INFORMATION		HAZARD INDEX:	4 = SEVERE
HEALTH	1		3 = SERIOUS
FLAMMABILITY	2		2 = MODERATE
REACTIVITY	1		1 = SLIGHT
PERSONAL PROT.	C		0 = MINIMAL

C* Safety glasses, gloves, chemical apron

n	Name	CAS	TSCA	CERCLA	Sara302	Sara313
0	2-Ethyl-1-hexanol	104-76-7	Yes	No	No	No
1	Non Hazardous components	-	Yes	No	No	No

SARA Title III Section 311/312: Immediate (acute) health effects.
State Regulations:
Canadian Regulations: All the ingredients as such or as chemical group are registered in DSL.
Canadian WHMIS Classification: D-2B (Toxic material) B-3 (Combustible liquid)
California Proposition 65: Not cited (all components).

SECTION 16: Other information

N.A. = Not Applicable
N.D. = No Data available
This safety data sheet has been completely updated in compliance to Regulation 453/2010/EU.

This document was prepared by a competent person who has received appropriate training.
Main bibliographic sources:
TOXNET - Databases on toxicology, hazardous chemicals, environmental health, and toxic releases;
NIOSH - Registry of toxic effects of chemical substances (1983) - Occupational Health Guidelines for Chemical Hazards (1995) - Pocket Guide to Chemical Hazards (on line)
European Chemical Bureau - ESIS: European chemical Substances Information System;
CESIO - Classification and labelling of anionic, nonionic surfactants (January 2000).

M.Sittig-Handbook of toxic and Hazardous Chemicals and Carcinogens- III Ed.
E.R. Plunkett - Handbook of Industrial Toxicology - III Ed. 1991.
Samson Chem. Pub.-Chemical Safety Sheet working safely with hazardous chemical.
SAX'S Dangerous Properties of Industrial Materials. VIII (1993)
ACGIH "2013 TLVs and BEIs".
ILV "1998/24/EC Directive and subsequent addition".

The product must be stored, handled and used according to criteria of good industrial practice and to regulations in force. This leaflet is offered for your consideration and guidance only. This leaflet complements the Technical Data Sheet but does not replace it. The information herein contained is given to the best of our knowledge at the time of issue.
Due to the several ways in which the product may be used and the possible interaction with variables not depending on or unknown to the supplier, we also cannot accept any liability whatsoever for any loss or damage however arising from the handling and use of our products.

ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road.
CAS:	Chemical Abstracts Service (division of the American Chemical Society).
CLP:	Classification, Labeling, Packaging.
DNEL:	Derived No Effect Level.
EINECS:	European Inventory of Existing Commercial Chemical Substances.
GefStoffVO:	Ordinance on Hazardous Substances, Germany.
GHS:	Globally Harmonized System of Classification and Labeling of Chemicals.
IATA:	International Air Transport Association.
IATA-DGR:	Dangerous Goods Regulation by the "International Air Transport Association" (IATA).
ICAO:	International Civil Aviation Organization.
ICAO-TI:	Technical Instructions by the "International Civil Aviation Organization" (ICAO).
IMDG:	International Maritime Code for Dangerous Goods.
INCI:	International Nomenclature of Cosmetic Ingredients.
KSt:	Explosion coefficient.
LC50:	Lethal concentration, for 50 percent of test population.
LD50:	Lethal dose, for 50 percent of test population.
LTE:	Long-term exposure.
PNEC:	Predicted No Effect Concentration.
REACH:	Registration Evaluation and Authorization of Chemicals.
RID:	Regulation Concerning the International Transport of Dangerous Goods by Rail.
STE:	Short-term exposure.
STEL:	Short Term Exposure limit.
STOT:	Specific Target Organ Toxicity.
SVHC:	Candidate List of Substances of Very High Concerns.
TLV:	Threshold Limiting Value.
TWATLV:	Threshold Limit Value for the Time Weighted Average 8 hour day. (ACGIH Standard).
WGK:	German Water Hazard Class.
ASTM:	American Society of Testing and Materials.
CBI:	Confidential Business Information
CFR:	Code of Federal Regulations
DOT:	Department of Transportation
EPA:	Environmental Protection Agency
EU:	European Union
FIFRA:	Federal Insecticide, Fungicide and Rodenticide Act
HCS:	Hazard Communication Standard
IARC:	International Agency for Research on Cancer
IUPAC:	International Union of Pure and Applied Chemistry
mg/kg:	Milligram per kilogram

MSDS:	Material Safety Data Sheet
NAFTA:	North American Free Trade Agreement
OSHA:	Occupational Safety and Health Administration
OECD:	The Organization for Economic Cooperation and Development
QSARs:	Quantitative Structure-Activity Relationships
TSCA:	Toxic Substances Control Act
UN:	United Nations
WHMIS:	Workplace Hazardous Materials Information System

Duratec

SECTION 1. IDENTIFICATION

Product Identifier	Duratec
Other Means of Identification	Drilling fluid additive
Recommended Use	Fluid Loss Control.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	February 27, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Skin corrosion/irritation - Category 2; Serious eye damage/eye irritation - Category 2B; Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 2

GHS Label Elements

Signal Word:
Warning
Hazard Statement(s):

H320	Causes eye irritation.
H315	Causes skin irritation.
H373	May cause damage to organs through prolonged or repeated exposure.
H350	May cause cancer.

Precautionary Statement(s):
Prevention:

P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash hands thoroughly after handling.
P280	Wear protective gloves/eye protection/face protection.
P271	Use only outdoors or in a well-ventilated area.

Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337 + P313	If eye irritation persists: Get medical advice/attention.
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P302 + P352	IF ON SKIN: Wash with plenty of water.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313	IF exposed or concerned: Get medical advice/attention.

Storage:

P403 + P233	Store in a well-ventilated place. Keep container tightly closed.

Other Hazards

POTENTIAL HEALTH EFFECTS: EYE: Dust in eye may result in mechanical irritation.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Contains no hazardous ingredients. Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Diatomaceous earth, uncalcined	61790-53-2	11-14	
Silica, quartz	14808-60-7	<1	
Trade Secret	CBI*	Confidential	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. Get medical advice/attention if you feel unwell or are concerned.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. If irritation persists, get medical advice/attention.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Keep respiratory tract clear. Never give anything by mouth to an unconscious person. Get medical advice/attention if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Dry chemical, Carbon Dioxide, Foam. Not combustible. Use extinguishing agent suitable for surrounding fire.

Specific Hazards Arising from the Chemical

This product presents no unusual hazards in a fire situation.
The nature of decomposition products is not known and will be influenced by other products/materials involved in the fire.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Vacuum or sweep product up, try to minimize dust build-up. Containerize for solid waste disposal. Dispose of according to local, state and federal regulations.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

See Section 8 for appropriate Personal Protective Equipment (PPE). Avoid creating excessive dust while handling the product. Ensure adequate ventilation.

Conditions for Safe Storage

STORAGE: Keep in closed containers in cool, dry, well ventilated area.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Diatomaceous earth, uncalcined	0.025 mg/m3 A2		0.1 mg/m3		Not established	
Silica, quartz	0.025 mg/m3 A2		0.1 mg/m3		Not established	
Trade Secret	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with this product an eyewash should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Wear gloves and apron if exposure is expected. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	White - tan powder.
Odour	Faint
pH	Not applicable
Melting Point/Freezing Point	Not available (melting); Not applicable (freezing)
Initial Boiling Point/Range	Not applicable
Flash Point	Not available
Evaporation Rate	Not applicable
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not applicable
Vapour Density (air = 1)	Not applicable

Relative Density (water = 1)	1.03
Solubility	Insoluble in water
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Strong oxidizers.

Incompatible Materials

None known.

Hazardous Decomposition Products

Oxides of carbon.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Diatomaceous earth, uncalcined	Not available	Not available	Not available
Silica, quartz	Not available	500 mg/kg (rat)	Not available
Trade Secret	Not available	Not available	Not available

LC50: No information was located.

LD50 (oral): No information was located.

LD50 (dermal): No information was located.

Skin Corrosion/Irritation

May cause mild skin irritation.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May result in mechanical irritation of the respiratory tract from high dust concentrations. May aggravate asthma.

Ingestion

May cause discomfort if swallowed.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Diatomaceous earth, uncalcined	Not Listed	Not Listed	Not Listed	Not Listed
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed
Trade Secret	Not Listed	Not designated	Not Listed	Not Listed

This product may contain trace amounts of crystalline silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Environmental information was not located.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Diatomaceous earth, uncalcined	Not available	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Immediate Health Hazard Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 0 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	February 27, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

ENERPAC R

SECTION 1. IDENTIFICATION

Product Identifier	ENERPAC R
Recommended Use	Drilling Fluid Additive.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	May 15, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Dermal) - Category 5
OSHA Defined Hazards: Combustible dust

GHS Label Elements

Signal Word:
Warning
Hazard Statement(s):
May form combustible dust concentrations in air
H313 May be harmful in contact with skin.
Precautionary Statement(s):
Prevention:
P264 Wash hands and skin thoroughly after handling.
Response:
P312 Call a POISON CENTRE/doctor if you feel unwell.

Other Hazards

EYE: Dust in eye may result in mechanical irritation.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance:

Chemical Name	CAS No.	%	Other Identifiers
Polyanionic Cellulose (PAC)	9004-32-4	100	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by Poison Centre or doctor. Call a Poison Centre or doctor if you feel unwell or are concerned.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap. Remove contaminated clothing and launder before reuse. Get medical advice/attention if you feel unwell or are concerned.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Do not induce vomiting without medical advice. If vomiting occurs, have victim lean forward to reduce the risk of aspiration. Call a Poison Centre or doctor if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Dry chemical. Alcohol-resistant foams.

Specific Hazards Arising from the Chemical

Product can ignite if strongly heated and exposed to open flames. At very high dust concentrations, product may form combustible dust concentrations or explosive dust-air mixtures.
Thermal decomposition of this product may lead to the release of irritating gases and vapours. oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

Dust explosion hazard. Use water spray or fog to prevent dust formation and minimize risk of explosion.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Keep out unnecessary and unprotected personnel. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. If the product enters drains, soil, ditches, sewers, waterways and/or groundwater inform EH&S and appropriate authorities.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Vacuum or sweep product up, try to minimize dust build-up. Place solid waste in a sealed container for disposal in accordance with local environmental and public health regulations.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing in this product. Only use where there is adequate ventilation. Do not get in eyes, on skin or on clothing. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and before going on breaks outside of the work area. Remove and wash contaminated clothing before re-use. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Store in an area that is: cool, dry, well-ventilated. Away from open flames, excessive heat or sources of ignition. Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Polyanionic Cellulose (PAC)	Not established	3 mg/m3 (R)	5 mg/m3 (R)	Not established	Not established	Not established

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Product may cause irritation similar to nuisance dust and meet the criteria of Particulates Not Otherwise Specified inhalable particles, or total particles.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. A suitable eyewash station should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Wear appropriate gloves while handling product. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Light yellow powder.
Odour	Not available
Odour Threshold	Not available
pH	6.5 - 8.5
Melting Point/Freezing Point	525 ºF (274 ºC) (melting); 525 ºF (274 ºC) (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	Not available
Solubility	Not available in water
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Open flames, sparks, static discharge, heat and other ignition sources.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Carbon oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Polyanionic Cellulose (PAC)	> 5800 mg/m3 (rat) (4-hour exposure)	27000 mg/kg (rat)	> 2000 mg/kg (rabbit)

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation. May be harmful if inhaled.

Skin Absorption

No information was located.

Ingestion

May cause irritation of the digestive tract.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

No information was located.

Respiratory and/or Skin Sensitization

No information was located.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Polyanionic Cellulose (PAC)	Not Listed	Not Listed	Not Listed	Not Listed

No information was located.

Key to Abbreviations

IARC = International Agency for Research on Cancer. ACGIH® = American Conference of Governmental Industrial Hygienists. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Environmental information was not located.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Polyanionic Cellulose (PAC)	100-1000 mg/L (Oncorhynchus mykiss (rainbow trout); 96-hour)	87.26 mg/L (Daphnia magna (water flea); 48-hour)	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: None
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	May 15, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

Ener Pac Regular

SECTION 1. IDENTIFICATION

Product Identifier	Ener Pac Regular
Recommended Use	Drilling Fluid Additive.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	May 15, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Label Elements

Hazard Statement(s):

H402 Harmful to aquatic life.

Precautionary Statement(s):

P273 Avoid release to the environment.

P501 Dispose of contents/container in accordance with local, regional, national and international regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance:

Chemical Name	CAS No.	%	Other Identifiers
Polyanionic Cellulose (PAC)	9004-32-4	100	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by Poison Centre or doctor. Call a Poison Centre or doctor if you feel unwell or are concerned.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap. Remove contaminated clothing and launder before reuse. Get medical advice/attention if you feel unwell or are concerned.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Do not induce vomiting without medical advice. If vomiting occurs, have victim lean forward to reduce the risk of aspiration. Call a Poison Centre or doctor if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Dry chemical. Alcohol-resistant foams.

Specific Hazards Arising from the Chemical

Product can ignite if strongly heated and exposed to open flames.
Thermal decomposition of this product may lead to the release of irritating gases and vapours. oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Keep out unnecessary and unprotected personnel. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. If the product enters drains, soil, ditches, sewers, waterways and/or groundwater inform EH&S and appropriate authorities.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Vacuum or sweep product up, try to minimize dust build-up. Place solid waste in a sealed container for disposal in accordance with local environmental and public health regulations.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing in this product. Only use where there is adequate ventilation. Do not get in eyes, on skin or on clothing. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and before going on breaks outside of the work area. Remove and wash contaminated clothing before re-use. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Store in an area that is: cool, dry, well-ventilated. Away from open flames, excessive heat or sources of ignition. Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	TWA	STEL [C]	TWA	Ceiling	8-hr TWA	Short-term TWA [C]
Polyanionic Cellulose (PAC)	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with the product an eyewash and safety shower should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Wear appropriate gloves while handling product. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or

respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Light yellow powder.
Odour	Not available
Odour Threshold	Not available
pH	6.5 - 8.5
Melting Point/Freezing Point	525 ºF (274 ºC) (melting); 525 ºF (274 ºC) (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	Not available
Solubility	Not available in water
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State: Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Open flames, sparks, static discharge, heat and other ignition sources.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Carbon oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Polyanionic Cellulose (PAC)	> 5800 mg/m3 (rat) (4-hour exposure)	27000 mg/kg (rat)	> 2000 mg/kg (rabbit)

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation. May be harmful if inhaled.

Skin Absorption

No information was located.

Ingestion

May cause irritation of the digestive tract.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

No information was located.

Respiratory and/or Skin Sensitization

No information was located.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Polyanionic Cellulose (PAC)	Not Listed	Not Listed	Not Listed	Not Listed

No information was located.

Key to Abbreviations

IARC = International Agency for Research on Cancer. ACGIH® = American Conference of Governmental Industrial Hygienists. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Environmental information was not located.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Polyanionic Cellulose (PAC)	100-1000 mg/L (Oncorhynchus mykiss (rainbow trout); 96-hour)	87.26 mg/L (Daphnia magna (water flea); 48-hour)	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: None
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	Health - 1 Flammability - 1 Instability - 0
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	May 15, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

Fiber Seal

SECTION 1. IDENTIFICATION

Product Identifier Fiber Seal

Other Means of Identification Fiber Seal

Supplier Bri-Chem Supply Corp, 5151 Bannock Street Unit 5, Denver, CO, 80216, 303-722-1681, www.brichemsupplycorp.com

Emergency Phone No. ChemTrec, (800) 424-9300, 24/7

SDS No. 0823

SECTION 2. HAZARDS IDENTIFICATION

GHS Label Elements

Non-hazardous ingredients. Potential respiratory hazard only to persons with severe obstructive lung disease when exposed to high levels of dust, not fiber as supplied.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	%	Other Identifiers
Blend of vegetable, cotton, and cellulose-based polymer fibers	None	100	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Move to fresh air. Keep at rest in a position comfortable for breathing. Call a Poison Centre or doctor if you feel unwell or are concerned.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. Call a Poison Centre or doctor if you feel unwell or are concerned.

Eye Contact

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Do not induce vomiting. Call a Poison Centre or doctor if you feel unwell or are concerned.

Most Important Symptoms and Effects, Acute and Delayed

If inhaled:
Can irritate the nose and throat.
If in eyes:
May cause slight irritation as a "foreign object". Tearing, blinking and mild temporary pain may occur as particles are rinsed from the eye by tears.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog.

Unsuitable Extinguishing Media

None known.

Specific Hazards Arising from the Chemical

Can ignite if strongly heated.
This product presents no unusual hazards in a fire situation.

Special Protective Equipment and Precautions for Fire-fighters

A full-body encapsulating chemical protective suit with positive pressure SCBA may be necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

No special precautions are necessary.

Methods and Materials for Containment and Cleaning Up

No special clean-up methods are necessary.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid generating dusts. Do not grind to a fine fiber.
It is good practice to: avoid breathing product; avoid skin and eye contact and wash hands after handling.

Conditions for Safe Storage

Store in an area that is: dry, well-ventilated, out of direct sunlight and away from heat and ignition sources.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

(Cotton Dust)
OSHA = US Occupational Safety and Health Administration.
PEL = Permissible Exposure Limits. 1 mg/m3

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. 0.2 mg/m3

(Cellulose Dust)

OSHA = US Occupational Safety and Health Administration.
PEL = Permissible Exposure Limits. 15 mg/m3

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. 10 mg/m3.

Appropriate Engineering Controls

Use a local exhaust ventilation and enclosure, if necessary, to control amount in the air.

Individual Protection Measures

Eye/Face Protection

Wear chemical safety goggles.

Skin Protection

Wear chemical protective clothing e.g. gloves, aprons, boots.

Respiratory Protection

Wear a NIOSH approved air-purifying respirator with an appropriate cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Odour	Earthy
pH	Not available
Evaporation Rate	Not available
Vapour Density (air = 1)	Not available
Solubility	Insoluble in water; Not available (in other liquids)
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Viscosity	Not available (kinematic)

Other Information

Physical State	Solid
Molecular Weight	Not available
Bulk Density	Not available

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

Hazardous polymerization will not occur.

Conditions to Avoid

None known.

Incompatible Materials

None known.

Hazardous Decomposition Products

None known.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Inhalation LC50: Testing not conducted.

Oral LD50: Testing not conducted.

Dermal LD50: Testing not conducted.

Skin Corrosion/Irritation

Not a skin irritant.
Not irritating.

Serious Eye Damage/Irritation

Human experience shows mild irritation.
May cause slight irritation as a "foreign object". Tearing, blinking and mild temporary pain may occur as particles are rinsed from the eye by tears.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

As with any product where dust can be produced, persons with existing severe obstructive lung disease should avoid inhalation of any fine particulate or dust produced.
Can irritate the nose and throat.

Ingestion

Not a likely route of exposure. No adverse effects expected.

Carcinogenicity

IARC: Group 3 – Not classifiable as to its carcinogenicity to humans.
NTP: Not specifically listed.
OSHA: Not specifically listed.

No information was located for: Serious Eye Damage/Irritation, STOT (Specific Target Organ Toxicity) - Repeated Exposure, Respiratory and/or Skin Sensitization, Development of Offspring, Sexual Function and Fertility, Germ Cell Mutagenicity, Interactive Effects

SECTION 12. ECOLOGICAL INFORMATION

Ecological testing has not been conducted on this product.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Recycle and reuse product, if possible. Contact local environmental authorities for approved disposal or recycling methods in your jurisdiction.

SECTION 14. TRANSPORT INFORMATION

Not regulated under Canadian TDG Regulations.

Regulation	UN No.	Proper Shipping Name	Transport Hazard Class(es)	Packing Group
US DOT	NA1365	Cotton	9	III

Special Precautions for User Not applicable

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Not regulated.

SECTION 16. OTHER INFORMATION

NFPA Rating **Health - 1** **Flammability - 0**

SDS Prepared By Bri-Chem Supply Corp

Date of Preparation October 05, 2015

Disclaimer This Health and Safety information is correct to the best of our knowledge and belief at the date of its publication, but we cannot accept liability for any loss, injury or damage which may result from its use. We shall ensure, so far as is reasonably practicable, that any revision of this Data Sheet is sent to all customers to whom we have directly supplied this substance, but must point out that it is the responsibility of any intermediate supplier to ensure that such revision is passed to the ultimate user. The information given in the Data Sheet is designed only as guidance for safe handling, storage, and the use of the substance. It is not a specification nor does it guarantee any specific properties. All chemicals should be handled only by competent personnel, within a controlled environment. Should further information be required, this can be obtained through the sales office whose address is at the top of this data sheet.

FLR

SECTION 1. IDENTIFICATION

Product Identifier	FLR
Other Means of Identification	Gilsonite blend
Recommended Use	Drilling Fluid Additive.
Manufacturer/Supplier Identifier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	AES Drilling Fluids, LLC, 1-888-556-4533
Date of Preparation	April 21, 2016

SECTION 2. HAZARD IDENTIFICATION

Classification

Combustible dust - Category 1; Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 1

Label Elements

Signal Word:
Danger

Hazard Statement(s):

H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.

Precautionary Statement(s):

Prevention:

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash hands and skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P314	Get medical advice or attention if you feel unwell.

Storage:

P405	Store locked up.

Disposal:
P501 Dispose of contents and container in accordance with local, regional, national and international regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Proprietary Gilsonite blend	CBI*	97 - 99	
Silica, quartz	14808-60-7	0.1 - 3.0	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Move to fresh air. Get medical advice or attention if you feel unwell or are concerned.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap. If irritation persists, get medical advice/attention.

Eye Contact

Flush eyes with large quantities of water for 15 minutes. Obtain medical assistance if irritation persists.

Ingestion

Rinse mouth with water. Get medical advice or attention if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon Dioxide, Foam, Dry chemical, Water.

Specific Hazards Arising from the Product

At very high dust concentrations, product may form combustible dust concentrations or explosive dust-air mixtures. Oxides of carbon. Oxides of nitrogen.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas.

Methods and Materials for Containment and Cleaning Up

Collect using shovel/scoop or approved HEPA vacuum and place in a suitable container for disposal. Avoid dry sweeping. If necessary, use a dust suppressant such as water. Do not use compressed air for clean-up. Containerize

for solid waste disposal. Clean up residual contamination with water and place in appropriate containers for disposal. Dispose of according to local, state and federal regulations.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing in this product. Avoid skin and eye contact. Only use where there is adequate ventilation. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and before going on breaks outside of the work area. See Section 8 for appropriate Personal Protective Equipment (PPE). Avoid generating dusts. Dust may form an explosive mixture with air at high concentrations. Eliminate heat and ignition sources such as sparks, open flames, hot surfaces and static discharge. Post "No Smoking" signs.

Conditions for Safe Storage

Store in an area that is: cool, well-ventilated. Away from open flames, excessive heat or sources of ignition. Separate from incompatible materials. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL®	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Proprietary Gilsonite blend	3 mg/m3 (R)	Not established	5 mg/m3 (R)	Not established	Not established	Not established
Silica, quartz	0.025 mg/m3 A2	Not established	0.1 mg/m3	Not established	Not established	Not established

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. R = Respirable fraction. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL® = Workplace Environmental Exposure Limit. Control parameter values for respirable dust.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. A suitable eyewash station should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Wear appropriate gloves while handling product. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions exist above the OEL if conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Dark powder.
pH	Not available
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available

Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapor Pressure	Not available
Vapor Density (air = 1)	Not available
Relative Density (water = 1)	1.1 - 1.6
Solubility	Slightly soluble in water
Auto-ignition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Strong Oxidizing Agents. Sparks. Heat. Open flames.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Oxides of carbon. Oxides of nitrogen.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Proprietary Gilsonite blend	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available

Skin Corrosion/Irritation

May aggravate dermatitis.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

High dust levels may cause irritation of the respiratory tract.

Skin Absorption

No information was located.

Ingestion

May cause. irritation of the gastrointestinal tract.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Prolonged exposure to high dust concentrations may cause difficulty breathing. Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Proprietary Gilsonite blend	Not Listed	Not Listed	Not Listed	Not Listed
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed

This product contains free silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans. Data gathered from studies suggest that gilsonite is not carcinogenic and has a low order of toxicity. Though evidently not a carcinogen in its normal state, the complex hydrocarbon structure of gilsonite may be altered by extremely high temperatures, possibly producing carcinogenic substances. Inhalation of vapor or mists produced in high-temperature processes using this product should be avoided. Skin should be covered when these vapors or mists are present.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Do not allow product to contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

Ecotoxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Proprietary Gilsonite blend	Not available	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

Studies are not available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Chronic Health Hazard.
SARA Title III - Section 313: None.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	HSE Department
Phone No.	403-269-2800
Date of Preparation	April 21, 2016
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

GEL

SECTION 1. IDENTIFICATION

Product Identifier	GEL
Other Means of Identification	Viscosifier
Recommended Use	Drilling Fluid Additive.
Manufacturer/Supplier Identifier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	AES Drilling Fluids, LLC, 1-888-556-4533
Date of Preparation	August 17, 2015

SECTION 2. HAZARD IDENTIFICATION

Classification

Not classified under any hazard class.

Label Elements

Not applicable

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	%	Other Identifiers
BENTONITE	1302-78-9	100	
Christalline silica; cristobalite	14464-46-1	<1	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. Get medical advice or attention if you feel unwell or are concerned.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. Get medical advice or attention if you feel unwell or are concerned.

Eye Contact

Rinse the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes, while holding the eyelid(s) open. If eye irritation persists, get medical advice or attention.

Ingestion

Rinse mouth with water. Get medical advice or attention if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Not combustible. Use extinguishing agent suitable for surrounding fire.

Specific Hazards Arising from the Product

This product presents no unusual hazards in a fire situation. Does not burn.
Not known to generate any hazardous decomposition products in a fire.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Keep out unnecessary and unprotected personnel. Ensure adequate ventilation in area. Use the personal protective equipment recommended in Section 8 of this safety data sheet. Remove or isolate incompatible materials as well as other hazardous materials.

Environmental Precautions

It is good practice to prevent releases into the environment.

Methods and Materials for Containment and Cleaning Up

Avoid generating dust. Avoid dry sweeping. If necessary, use a dust suppressant such as water. Do not use compressed air for clean-up. Collect using shovel/scoop or approved HEPA vacuum and place in a suitable container for disposal. Store recovered product or absorbent material in suitable containers for disposal according to local regulations.

Other Information

Contact EH&S regarding spill as spills of certain products and certain quantities may require reporting to various authorities.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing in this product. Avoid contact with eyes, skin and clothing. Avoid creating excessive dust while handling the product. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and before going on breaks outside of the work area.

Conditions for Safe Storage

Store in an area that is: dry, cool, well-ventilated. Separate from incompatible materials keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		Alberta		SASK	
Chemical Name	**TWA**	**STEL [C]**	**OEL**	**STEL**	**OEL**	**STEL**
BENTONITE	3 mg/m3 (R)	Not established	3 mg/m3 (R)	Not established	3 mg/m3	6 mg/m3
Christalline silica; cristobalite	0.025 mg/m3 A2	Not established	0.025 mg/m3	Not established	0.05 mg/m3	Not established

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. STEL = Short-term Exposure Limit. C = Ceiling limit. OEL = Occupational Exposure Limit r = Respirable fraction. Product may cause irritation similar to nuisance dust and meet the criteria of Particulates Not Otherwise Specified,respirable particles. or inhalable particles.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air.

Individual Protection Measures

Eye/Face Protection

Safety glasses with side shields are recommended to prevent eye contact. Use goggles or face shield when there is

risk of eye contact or visible dust produced.

Skin Protection

Wear gloves with appropriate chemical resistance, see manufacturers specifications for suitability. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	fine powder.
Odour	Odourless
Odour Threshold	Not available
pH	8.5 - 11.0
Melting Point/Freezing Point	> 842 ºF (450 ºC) (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Will not burn.
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	0 kPa at 25 ºC
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	2.6
Solubility	< 0.9 mg/L in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	> 932 ºF (500 ºC)
Viscosity	Not available (kinematic); Not available (dynamic)

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Exposure to moisture may affect product quality.

Incompatible Materials

None known.

Hazardous Decomposition Products

No decomposition if stored and applied as directed.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; eye contact; skin contact; ingestion. dust may result in irritation of skin, eye or respiratory system.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
BENTONITE	> 5.27 mg/L (rat) (4-hour exposure)	> 2000 mg/kg (rat)	Not available
Christalline silica; cristobalite	Not available	500 mg/kg (rat)	Not available

Skin Corrosion/Irritation

Not a skin irritant.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

High dust levels may cause irritation of the respiratory tract.

Skin Absorption

No information was located.

Ingestion

No effects anticipated.

Aspiration Hazard

No information was located.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

This product may contain trace amounts of crystalline silica (quartz). Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.

Respiratory and/or Skin Sensitization

Not a skin sensitizer. May cause respiratory irritation, not classified.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
BENTONITE	Not Listed	Not designated	Not Listed	Not Listed
Christalline silica; cristobalite	Group 1	A2	Known carcinogen	Not Listed

This product may contain trace amounts of crystalline silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

Not known to be a mutagen.

SECTION 12. ECOLOGICAL INFORMATION

Environmental information was not located.

Ecotoxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
BENTONITE	19000 mg/L (Oncorhynchus mykiss (rainbow trout); 96-hour; fresh water)	> 100 mg/L (Daphnia magna (water flea); 48-hour)	Not available	Not available
Christalline silica; cristobalite	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

This product and its degradation products are not known to bioaccumulate.

Mobility in Soil

If released into the environment, this product can move slowly through the soil.

Other Adverse Effects

No known significant effects.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of unused product in accordance with local environmental and public health regulations.

SECTION 14. TRANSPORT INFORMATION

Not regulated under Canadian TDG regulations. Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

All ingredients are listed on the DSL or are not required to be listed.

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.

Additional USA Regulatory Lists

Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: No listed components.
SARA Title III - Section 313: No listed components.

SECTION 16. OTHER INFORMATION

NFPA Rating **Health - 0** **Flammability - 0** **Instability - 0**

SDS Prepared By HSE Department

Phone No.	403-269-2800
Date of Preparation	August 17, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

Lime

SECTION 1. IDENTIFICATION

Product Identifier	Lime
Recommended Use	Drilling Fluid Additive.
Manufacturer/Supplier Identifier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	AES Drilling Fluids, LLC, 1-888-556-4533
Date of Preparation	August 20, 2015

SECTION 2. HAZARD IDENTIFICATION

Classified according to the US Hazard Communication Standard (HCS 2012).

Classification

Skin irritation - Category 2; Serious eye damage - Category 1; Specific target organ toxicity (single exposure) - Category 3

Label Elements

Signal Word:
Danger
Hazard Statement(s):
H315 Causes skin irritation.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
Precautionary Statement(s):
Prevention:
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash hands and skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P302 + P352 IF ON SKIN: Wash with plenty of water/
P280 Wear protective gloves, eye protection.
Response:
P302 + P352 IF ON SKIN: Wash with plenty of water.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTRE or doctor if you feel unwell.
P332 + P313 If skin irritation occurs: Get medical advice or attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
Disposal:
P501 Dispose of contents and container in accordance with local, regional, national and international

regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Calcium hydroxide	1305-62-0	>85	
Silica, quartz	14808-60-7	<0.1	

Notes

Concentrations are expressed in % weight/weight.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. If breathing has stopped, trained personnel should begin rescue breathing. Give artificial respiration only with the aid of a pocket mask equipped with a one way valve or other proper respiratory medical device. Immediately call a Poison Centre or doctor.

Skin Contact

Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately rinse with lukewarm, gently flowing water for 15-20 minutes. Seek medical advice/attention.

Eye Contact

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open. Immediately call a Poison Centre or doctor.

Ingestion

Do not induce vomiting without medical advice. Get medical advice or attention if you feel unwell or are concerned. Never give anything by mouth to an unconscious person.

First-aid Comments

Due to irritant properties, swallowing may result in burns/ulceration of the mouth, stomach and lower GI tract.

Most Important Symptoms and Effects, Acute and Delayed

Irritation of skin, eyes, gastrointestinal tract or respiratory tract.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Dry chemical. Use flooding quantities of water or other suitable extinguishing agent.

Specific Hazards Arising from the Product

Bulk powder calcium oxide may heat spontaneously when damp. Humidity or contact with water may generate sufficient heat to ignite flammable and combustible materials.
Not known to generate any hazardous decomposition products in a fire.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus. Firefighters should wear appropriate breathing apparatus and protective clothing.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Do not use water on bulk spills. Lime reacts violently with water. Use the personal protective equipment recommended in Section 8 of this safety data sheet. Avoid dust formation. Do not clean up materials with compressed air. Evacuate

the area immediately. Evacuate downwind locations.

Environmental Precautions

Minimize dust during clean up. Do not allow into any sewer, on the ground or into any waterway.

Methods and Materials for Containment and Cleaning Up

Avoid generating dust. Prevent contamination of waterways or sewers. Clean up residual contamination with water and place in appropriate containers for disposal. Wash equipment with either a mild vinegar solution, or detergent and water.

Other Information

Contact EH&S regarding spill as spills of certain products and certain quantities may require reporting to various authorities.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Keep containers tightly closed when not in use or empty. Protect containers from physical damage. Avoid contact with eyes, skin and clothing.

Conditions for Safe Storage

Store in an area that is: cool, dry, well-ventilated, separate from incompatible materials (see Section 10: Stability and Reactivity). Keep away from moisture long term storage in aluminum containers is not recommended, as calcium oxide may corrode aluminum over long periods of time.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		Alberta		SASK	
Chemical Name	**TWA**	**STEL [C]**	**OEL**	**STEL**	**OEL**	**STEL**
Calcium hydroxide	5 mg/m3		5 mg/m3		5 mg/m3	10 mg/m3
Silica, quartz	0.025 mg/m3 A2	Not established	0.025 mg/m3	Not established	0.05 mg/m3	Not established

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OEL = Occupational Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. An eyewash and safety shower should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Wear chemical safety goggles and face shield when contact is possible. It is not recommended to wear contact lenses while working with product.

Skin Protection

Wear gloves with appropriate chemical resistance, see manufacturers specifications for suitability. Wear long sleeves, long pants and appropriate footwear while working with product. Wear chemical protective clothing e.g. gloves, aprons, boots.

Respiratory Protection

If conditions exist above the OEL if conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	White - grey fine powder.
Odour	Odourless
Odour Threshold	Not available

pH	12.45 (saturated solution)
Melting Point/Freezing Point	1076 ºF (580 ºC) (melting); Not available (freezing)
Initial Boiling Point/Range	5162 ºF (2850 ºC)
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	2.2 - 2.4
Solubility	0.070 - 0.185 g/100 mL (Slightly soluble) in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Solid
Bulk Density	720 - 1200 kg/m3 (45 - 75 lb/ft3)

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Reacts with water to form calcium hydroxide. The heat generated when mixed with water or moist air is sufficient enough to ignite surrounding materials such as paper, wood or cloth.

Chemical Stability

Unstable under certain conditions - see Conditions to Avoid.

Possibility of Hazardous Reactions

Humidity or contact with water may generate sufficient heat to ignite flammable and combustible materials.

Conditions to Avoid

Water, moisture or humidity.

Incompatible Materials

Strong acids. Water. Avoid contact with: boron trifluoride, chlorine trifluoride, ethanol, fluorine. Powdered metals aluminum, acid anhydrides (e.g. acetic anhydride), hydrogen fluoride, phosphorus pentoxide.

Hazardous Decomposition Products

Reacts with water to form calcium hydroxide and generates heat.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Calcium hydroxide	Not available	7300 mg/kg (mouse)	Not available
Silica, quartz	Not available	500 mg/kg (rat)	Not available

Skin Corrosion/Irritation

Corrosive. May cause severe skin irritation. Contact can cause pain, redness, burns, and blistering. Permanent scarring can result.

Serious Eye Damage/Irritation

Contact causes severe burns with redness, swelling, pain and blurred vision. Permanent damage including blindness can result.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

Material is irritating to mucous membranes and upper respiratory tract. May cause coughing, sneezing, inflammation of respiratory tract, ulceration and perforation of nasal septum, bronchitis, possible pneumonia.

Skin Absorption

No information was located.

Ingestion

Product is harmful if ingested. May cause burning and edema of the digestive tract. Symptoms may include abundant salivation, difficulties in swallowing and breathing, vomiting blood, drop in blood pressure which would be an indication of the esophagus or stomach.

Aspiration Hazard

Not known to be an aspiration hazard.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.
Prolonged skin contact may cause defatting of the skin resulting in irritation and conditions such as dermatitis.
Prolonged or repeated skin contact may cause skin corrosion.

Respiratory and/or Skin Sensitization

No information was located.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Calcium hydroxide	Not Listed	Not Listed	Not Listed	Not Listed
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed

This product contains free silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Do not allow product to contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

Ecotoxicity

Expected to be toxic to aquatic organisms.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Calcium hydroxide	Not available	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

This product and its degradation products are not known to bioaccumulate.

Mobility in Soil

If released into the environment, this product can move slowly through the soil. Contamination of groundwater could occur.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. If this product as supplied, and unmixed, becomes a waste, it will not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

All ingredients are listed on the DSL or are not required to be listed.

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Immediate Health Hazard
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 3 Flammability - 0 Instability - 0**
SDS Prepared By	HSE Department
Phone No.	403-269-2800
Date of Preparation	August 20, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

MULTI FIBER FINE

SECTION 1. IDENTIFICATION

Product Identifier	MULTI FIBER FINE
Other Means of Identification	Cellulose, fiber blend
Recommended Use	Fluid Loss Control.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	April 09, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

OSHA Defined Hazards: Combustible dust

GHS Label Elements

Signal Word:
Warning
Hazard Statement(s):
Dust in eye may result in mechanical irritation.
May form combustible dust concentrations in air
Prevention:
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/eye protection/face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Contains no hazardous ingredients. Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Trade Secret	CBI*	Trade Secret	
Cellulose Blend	9004-34-6	Trade Secret	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. Get medical advice/attention if you feel unwell or are concerned.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap.

Eye Contact

Flush eyes with large quantities of water for 15 minutes. Obtain medical assistance if irritation persists.

Ingestion

Rinse mouth with water. If large amounts are ingested, give water to drink and get medical advice. Do not induce vomiting without medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Specific Hazards Arising from the Chemical

At very high dust concentrations, product may form combustible dust concentrations or explosive dust-air mixtures. Oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet. Keep out unnecessary and unprotected personnel.

Environmental Precautions

Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Avoid generating dust. Collect using shovel/scoop or approved HEPA vacuum and place in a suitable container for disposal. Vacuum or sweep product up, try to minimize dust build-up. Wet sweeping may be used to minimize dust build-up. Containerize for solid waste disposal.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing in dust. Avoid contact with eyes, skin and clothing. Do not ingest product. See Section 8 for appropriate Personal Protective Equipment (PPE). Keep away from sources of ignition, No Smoking while working with this product. Avoid creating excessive dust while handling the product. Dust may form an explosive mixture with air at high concentrations.

Conditions for Safe Storage

Store in an area that is: ventilated. Away from open flames, excessive heat or sources of ignition. Separate from incompatible materials (see Section 10: Stability and Reactivity). Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Trade Secret	10 mg/m3 (R)	Not established	5 mg/m3 (R)	Not established	Not established	Not established
Cellulose Blend	10 mg/m3		5 mg/m3 (R)		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. R = Respirable fraction. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.
Control parameter values for respirable dust.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. A suitable eyewash station should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses with side shields. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Work gloves. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Grey powder.
Odour	Odourless
pH	6.0 (5% solution)
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	0.8 - 0.9
Solubility	Insoluble in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Generation of dust.

Incompatible Materials

None known.

Hazardous Decomposition Products

Carbon Monoxide and Carbon Dioxide may form on combustion.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Trade Secret	> 5800 mg/m3 (rat) (4-hour exposure)	> 5000 mg/kg (rat)	> 2000 mg/kg (rabbit)
Cellulose Blend	> 5800 mg/m3 (rat) (4-hour exposure)	> 5000 mg/kg (rat)	> 2000 mg/kg (rabbit)

Skin Corrosion/Irritation

Not a skin irritant.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the mucous membranes and upper respiratory tract.

Ingestion

No effects anticipated.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

No known significant effects.

Respiratory and/or Skin Sensitization

Not a respiratory sensitizer. Not a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed
Cellulose Blend	Not Listed	Not Listed	Not Listed	Not Listed

Not known to cause cancer.

Key to Abbreviations

IARC = International Agency for Research on Cancer. ACGIH® = American Conference of Governmental Industrial Hygienists. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Germ Cell Mutagenicity

Not known to be a mutagen.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Trade Secret	Not available	Not available	Not available	Not available
Cellulose Blend	Not available	Not available		Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: None
SARA Title III - Section 313: None.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	April 09, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our

products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

MULTI FIBER MEDIUM

SECTION 1. IDENTIFICATION

Product Identifier	MULTI FIBER MEDIUM
Other Means of Identification	Cellulose, fiber blend
Recommended Use	Fluid Loss Control.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	April 10, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

OSHA Defined Hazards: Combustible dust

GHS Label Elements

Signal Word:
Warning
Hazard Statement(s):
Dust in eye may result in mechanical irritation.
May form combustible dust concentrations in air
Prevention:
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/eye protection/face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Cellulose Blend	9004-34-6	60 - 80	
Trade Secret	CBI*	Trade Secret	
Trade Secret	CBI*	Trade Secret	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. Get medical advice/attention if you feel unwell or are concerned.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap.

Eye Contact

Flush eyes with large quantities of water for 15 minutes. Obtain medical assistance if irritation persists.

Ingestion

Rinse mouth with water. If large amounts are ingested, give water to drink and get medical advice. Do not induce vomiting without medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Specific Hazards Arising from the Chemical

At very high dust concentrations, product may form combustible dust concentrations or explosive dust-air mixtures. Oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet. Keep out unnecessary and unprotected personnel.

Environmental Precautions

Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Avoid generating dust. Collect using shovel/scoop or approved HEPA vacuum and place in a suitable container for disposal. Vacuum or sweep product up, try to minimize dust build-up. Wet sweeping may be used to minimize dust build-up. Containerize for solid waste disposal.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing in dust. Avoid contact with eyes, skin and clothing. Do not ingest product. See Section 8 for appropriate Personal Protective Equipment (PPE). Keep away from sources of ignition, No Smoking while working with this product. Avoid creating excessive dust while handling the product. Dust may form an explosive mixture with air at high concentrations.

Conditions for Safe Storage

Store in an area that is: ventilated. Away from open flames, excessive heat or sources of ignition. Separate from incompatible materials keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Cellulose Blend	10 mg/m3 (R)	Not established	5 mg/m3 (R)	Not established	Not established	Not established
Trade Secret	0.025 mg/m3 A2		0.1 mg/m3		Not established	
Trade Secret	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. R = Respirable fraction. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. A suitable eyewash station should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses with side shields. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Work gloves. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Light brown powder.
Odour	Odourless
Odour Threshold	Not available
pH	6.0 (5% solution)
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	0.8 - 0.9
Solubility	Insoluble in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	Not available (kinematic); Not available (dynamic)

Other Information

Physical State Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Generation of dust.

Incompatible Materials

None known.

Hazardous Decomposition Products

Carbon Monoxide and Carbon Dioxide may form on combustion.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Cellulose Blend	> 5800 mg/m3 (rat) (4-hour exposure)	> 5000 mg/kg (rat)	> 2000 mg/kg (rabbit)
Trade Secret	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available

Skin Corrosion/Irritation

Not a skin irritant.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the mucous membranes and upper respiratory tract.

Ingestion

No effects anticipated.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

No known significant effects.

Respiratory and/or Skin Sensitization

Not a respiratory sensitizer. Not a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Cellulose Blend	Not Listed	Not Listed	Not Listed	Not Listed
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed

This product may contain trace amounts of crystalline silica which the International Agency for Research on Cancer

(IARC) has listed as Group 1 - Carcinogenic to humans.
Key to Abbreviations

IARC = International Agency for Research on Cancer. ACGIH® = American Conference of Governmental Industrial Hygienists. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Germ Cell Mutagenicity

Not known to be a mutagen.

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Environmental information was not located.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Cellulose Blend	Not available	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.

SARA Title III - Section 311/312: None
SARA Title III - Section 313: None.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	April 10, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

OIL SORB

SECTION 1. IDENTIFICATION

Product Identifier	OIL SORB
Other Means of Identification	Absorbent Clay
Recommended Use	Absorbent.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	May 15, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Inhalation) - Category 5; Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 1

GHS Label Elements

Signal Word:
Danger
Hazard Statement(s):
Dust in eye may result in mechanical irritation.
H332 Harmful if inhaled.
H372 Causes damage to organs through prolonged or repeated exposure.
H350 May cause cancer.
Precautionary Statement(s):
Prevention:
P260 Do not breathe dust.
P264 Wash hands and skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P401 Store
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	%	Other Identifiers
Fuller's earth	8031-18-3	45-50	
BENTONITE	1302-78-9	45-50	
Silica, quartz	14808-60-7	<0.1	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms (e.g. coughing, shortness of breath, wheezing), call a Poison Centre or doctor.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. If irritation develops, seek medical attention.

Eye Contact

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. If eye irritation persists, get medical advice/attention.

Ingestion

Rinse mouth with water. Get medical advice/attention if you feel unwell or are concerned.

First-aid Comments

Inhalation of product may aggravate existing respiratory illness.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Specific Hazards Arising from the Chemical

Does not burn.
Oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Keep out unnecessary and unprotected personnel. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Collect using shovel/scoop or approved HEPA vacuum and place in a suitable container for disposal. Avoid dry sweeping. If necessary, use a dust suppressant such as water. Do not use compressed air for clean-up. Store recovered product in suitable containers for disposal according to local regulations. Avoid generating dust.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Do not breathe in this product. Avoid skin and eye contact. Ensure adequate ventilation. Avoid generating dusts. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and

before going on breaks outside of the work area. Wear personal protective equipment to avoid direct contact with this chemical. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Store in an area that is: cool, dry, well-ventilated. Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Fuller's earth	Not established	Not established	Not established	Not established	Not established	Not established
Silica, quartz	0.025 mg/m3 A2		0.1 mg/m3		Not established	
BENTONITE	Not established	Not established	Not established	Not established	Not established	Not established

ACGIH® = American Conference of Governmental Industrial Hygienists. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit. Short-term TWA = Time-Weighted Average with specified time limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with the product an eyewash and safety shower should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Wear appropriate gloves while handling product. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions exist above the OEL if conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Tan - white.
Odour	Odourless
pH	~ 7
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Will not burn.
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	1.5
Solubility	Insoluble in water

Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

When mixed with highly oxidizable liquids, heat build up may occur. Allow time to cool before packaging or storing in sealable containers.

Incompatible Materials

Strong acids. Inorganic acids (e.g. hydrofluoric acid), unsaturated hydrocarbons (e.g. turpentine), vegetable oils. Unsaturated organic compounds.

Hazardous Decomposition Products

Carbon oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Fuller's earth	Not available	Not available	Not available
Silica, quartz	Not available	500 mg/kg (rat)	Not available
BENTONITE	Not available	Not available	Not available

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May be harmful if inhaled.

Skin Absorption

No information was located.

Ingestion

Low ingestion hazard in normal use. If large amounts are swallowed may cause. irritation of the gastrointestinal tract.

Aspiration Hazard

Not known to be an aspiration hazard.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

This product may contain trace amounts of crystalline silica (quartz). Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Fuller's earth	Not Listed	Not Listed	Not Listed	Not Listed
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed
BENTONITE	Not Listed	Not designated	Not Listed	Not Listed

This product contains free silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

Interactive Effects

Smoking and being exposed to free silica may cause a greater risk of developing certain pulmonary illnesses.

SECTION 12. ECOLOGICAL INFORMATION

No known significant effects or critical hazards.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Silica, quartz	Not available	Not available	Not available	Not available
BENTONITE	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA

WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Acute Hazards Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 0 Instability - 0**
SDS Prepared By	AES Drilling Fluids
Phone No.	281-556-5628
Date of Preparation	May 15, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

PERMASEAL

SECTION 1. IDENTIFICATION

Product Identifier	PERMASEAL
Other Means of Identification	Fiber Blend
Recommended Use	Drilling Fluid Additive.
Manufacturer/Supplier Identifier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	AES Drilling Fluids, LLC, 1-888-556-4533
Date of Preparation	April 21, 2016

SECTION 2. HAZARD IDENTIFICATION

Classification

Combustible dust - Category 1; Carcinogenicity - Category 1A

Label Elements

Signal Word:
Danger

Hazard Statement(s):
May form combustible dust concentrations in air.
H350 May cause cancer.

Precautionary Statement(s):
Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P280 Wear protective gloves, protective clothing, eye protection.

Response:
P308 + P313 IF exposed or concerned: Get medical advice or attention.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents and container in accordance with local, regional, national and international regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Contains no hazardous ingredients.

Chemical Name	CAS No.	%	Other Identifiers
Trade Secret	CBI*	30 - 60	
Trade Secret	CBI*	Proprietary	
Silica, quartz	14808-60-7	<1	
Proprietary Fiber Blend	CBI*	Proprietary	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. Get medical advice/attention if irritation develops.

Skin Contact

Rinse with lukewarm, gently flowing water for 5 minutes. If irritation develops, seek medical attention.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. If eye irritation persists, get medical advice or attention.

Ingestion

Rinse mouth with water. Do not induce vomiting without medical advice. If vomiting occurs, have victim lean forward to reduce the risk of aspiration. Seek medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog.

Specific Hazards Arising from the Product

Does not burn.
Oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment. Do not allow into any sewer, on the ground or into any waterway.

Methods and Materials for Containment and Cleaning Up

Collect using shovel/scoop or approved HEPA vacuum and place in a suitable container for disposal. Avoid dry sweeping. If necessary, use a dust suppressant such as water. Do not use compressed air for clean-up. Containerize for solid waste disposal. Clean up residual contamination with water and place in appropriate containers for disposal. Dispose of according to local, state and federal regulations.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing in dust. Avoid skin and eye contact. Wash hands thoroughly after handling this material. Only use where there is adequate ventilation. See Section 8 for appropriate Personal Protective Equipment (PPE). Avoid creating excessive dust while handling the product. Dust may form an explosive mixture with air at high concentrations.

Conditions for Safe Storage

STORAGE: Keep in closed containers in cool, dry, well ventilated area. Separate from incompatible materials (see Section 10: Stability and Reactivity). Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL®	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Trade Secret	2 mg/m3 (R)		3 mg/m3 (R)		Not established	
Silica, quartz	0.025 mg/m3 A2	Not established	0.1 mg/m3	Not established	Not established	Not established
Trade Secret	Not established		Not established		Not established	
Proprietary Fiber Blend	Not established	Not established	Not established	Not established	Not established	Not established

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. R = Respirable fraction. F = Respirable fibers. STEL = Short-term Exposure Limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL® = Workplace Environmental Exposure Limit. Short-term TWA = Time-Weighted Average with specified time limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. A suitable eyewash station should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Work gloves. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Dark powder.
Odor	Odorless
pH	Not available
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)

Vapor Pressure	Not available
Vapor Density (air = 1)	Not available
Relative Density (water = 1)	0.4 - 0.8
Solubility	Not available in water
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

None known.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Oxides of carbon.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; eye contact; skin contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Trade Secret	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available
Proprietary Fiber Blend	Not available	Not available	Not available

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

Material is irritating to mucous membranes and upper respiratory tract.

Skin Absorption

No information was located.

Ingestion

No effects anticipated.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced

pulmonary function.

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed
Proprietary Fiber Blend	Not Listed	Not Listed	Not Listed	Not Listed

May cause cancer. This product may contain trace amounts of crystalline silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. Group 2B = Possibly carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. A3 = Animal carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Do not allow product to contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

Ecotoxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Trade Secret	Not available	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available	Not available
Proprietary Fiber Blend	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Chronic Health Hazard.
SARA Title III - Section 313: None.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	HSE Department
Phone No.	403-269-2800
Date of Preparation	April 21, 2016
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

SALT GEL

SECTION 1. IDENTIFICATION

Product Identifier	SALT GEL
Other Means of Identification	Drilling fluid additive
Recommended Use	Viscosifier.
Manufacturer/Supplier Identifier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	AES Drilling Fluids, LLC, 1-888-556-4533
Date of Preparation	October 23, 2015

SECTION 2. HAZARD IDENTIFICATION

Classified according to the US Hazard Communication Standard (HCS 2012).

Classification

Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 1

Label Elements

Signal Word:
Danger
Hazard Statement(s):
H350 May cause cancer.
H372 Causes damage to organs (lungs) through prolonged or repeated exposure if inhaled.
Precautionary Statement(s):
Prevention:
P260 Do not breathe dust.
P264 Wash hands and skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents and container in accordance with local, regional, national and international regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	%	Other Identifiers
Fuller's earth	8031-18-3	90 - 100	
Silica, quartz	14808-60-7	0 - 10	

Notes

Concentrations are expressed in % weight/weight.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms (e.g. coughing, shortness of breath, wheezing), call a Poison Centre or doctor.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. If irritation develops, seek medical attention.

Eye Contact

Rinse the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes, while holding the eyelid(s) open. If eye irritation persists, get medical advice or attention.

Ingestion

Rinse mouth with water. Get medical advice or attention if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Unsuitable Extinguishing Media

Do not use direct streams of large volumes of water as this may spread the fire.

Specific Hazards Arising from the Product

Does not burn.
Not known to generate any hazardous decomposition products in a fire.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Keep out unnecessary and unprotected personnel. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Collect using shovel/scoop or approved HEPA vacuum and place in a suitable container for disposal. Avoid dry sweeping. If necessary, use a dust suppressant such as water. Do not use compressed air for clean-up. Store recovered product in suitable containers for disposal according to local regulations. Avoid generating dust.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Do not breathe in this product. Avoid skin and eye contact. Ensure adequate ventilation. Avoid generating dusts. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and before going on breaks outside of the work area. Wear personal protective equipment to avoid direct contact with this chemical. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Store in an area that is: cool, dry, well-ventilated. Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust. Separate from incompatible materials.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL®	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Fuller's earth	Not established	Not established	Not established	Not established	Not established	Not established
Silica, quartz	0.025 mg/m3 A2	Not established	0.1 mg/m3	Not established	Not established	Not established

ACGIH® = American Conference of Governmental Industrial Hygienists. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL® = Workplace Environmental Exposure Limit. Short-term TWA = Time-Weighted Average with specified time limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. An eyewash and safety shower should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Wear appropriate gloves while handling product. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

Wear a NIOSH approved air-purifying respirator with N100, R100, or P100 filter(s).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Yellow - grey powder.
Odour	Not available
Odour Threshold	Not available
pH	7.0 - 10.5
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Will not burn.
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available

Vapour Density (air = 1)	Not available
Relative Density (water = 1)	2.4
Solubility	Insoluble in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	Not available (kinematic); Not available (dynamic)

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Generation of dust. Incompatible materials.

Incompatible Materials

Inorganic acids (e.g. hydrofluoric acid).

Hazardous Decomposition Products

None known.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Fuller's earth	Not available	Not available	Not available
Silica, quartz	Not available	500 mg/kg (rat)	Not available

Skin Corrosion/Irritation

Direct skin contact may cause slight or mild, transient irritation.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Skin Absorption

No information was located.

Aspiration Hazard

Not known to be an aspiration hazard.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

This product may contain trace amounts of crystalline silica (quartz). Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.

Respiratory and/or Skin Sensitization

No information was located.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Fuller's earth	Not Listed	Not Listed	Not Listed	Not Listed
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed

This product contains free silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

Interactive Effects

Smoking and being exposed to free silica may cause a greater risk of developing certain pulmonary illnesses.

SECTION 12. ECOLOGICAL INFORMATION

No known significant effects or critical hazards.

Ecotoxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Silica, quartz	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

This product and its container must be disposed of as hazardous waste. Do NOT dump into any sewers, on the ground or into any body of water. Dispose of unused product in accordance with local environmental and public health regulations. Empty containers retain product residue. Follow label warnings even if container appears to be empty. The container for this product can present explosion or fire hazards, even when emptied. Do not cut, puncture, or weld on or near this container. Dispose of or recycle empty containers through an approved waste management facility. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

All ingredients are listed on the DSL/NDSL.

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 0 Instability - 0**
SDS Prepared By	HSE Department
Phone No.	403-269-2800
Date of Preparation	October 23, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

SAPP

SECTION 1. IDENTIFICATION

Product Identifier	SAPP
Other Means of Identification	Drilling fluid additive
Recommended Use	Drilling Fluid Additive.
Manufacturer/Supplier Identifier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	AES Drilling Fluids, LLC, 1-888-556-4533
Date of Preparation	October 27, 2015

SECTION 2. HAZARD IDENTIFICATION

Classification

Skin irritation - Category 2; Eye irritation - Category 2A; Specific target organ toxicity (single exposure) - Category 3

Label Elements

Signal Word:
Warning
Hazard Statement(s):
H315 + H320 Causes skin and eye irritation.
H335 May cause respiratory irritation.
Precautionary Statement(s):
Prevention:
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash hands and skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves, eye protection.
P302 + P352 IF ON SKIN: Wash with plenty of water.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTRE or doctor if you feel unwell.
P332 + P313 If skin irritation occurs: Get medical advice or attention.
P337 + P313 If eye irritation persists: Get medical advice or attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
Disposal:
P501 Dispose of contents and container in accordance with local, regional, national and international regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
DISODIUM PYROPHOSPHATE	7758-16-9	100	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. Call a Poison Centre or doctor if you feel unwell.

Skin Contact

Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 15-20 minutes. If skin irritation occurs, get medical advice or attention. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. Remove contact lenses, if present and easy to do. If eye irritation persists, get medical advice or attention.

Ingestion

Rinse mouth with water. Never give anything by mouth if person is rapidly losing consciousness, or is unconscious or convulsing. Do not induce vomiting. If vomiting occurs, have victim lean forward to reduce the risk of aspiration. Immediately call a Poison Centre or doctor.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Not combustible. Use extinguishing agent suitable for surrounding fire.

Unsuitable Extinguishing Media

None known.

Specific Hazards Arising from the Product

Corrosive phosphorous oxides.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Keep out unnecessary and unprotected personnel. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. Prevent product from entering drains, soil, ditches, sewers, waterways and/or groundwater.

Methods and Materials for Containment and Cleaning Up

Dike spilled product to prevent runoff. Vacuum or sweep product up, try to minimize dust build-up. Clean up residual with absorbent material, place in appropriate containers and flush with water. Store recovered product or absorbent material in suitable containers for disposal according to local regulations. Dispose of according to local, state and federal regulations.

Other Information

Contact EH&S regarding spill as spills of certain products and certain quantities may require reporting to various authorities.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Keep containers tightly closed when not in use or empty. Do not breathe in this product. Do not get in eyes, on skin or on clothing. Only use where there is adequate ventilation. Avoid generating vapours or mists. Do not eat, drink or smoke in areas where product is handled. Employees should wash hands after working with product and before going on breaks outside of the work area. Wear personal protective equipment to avoid direct contact with this chemical. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Store in an area that is: well-ventilated, cool, dry. Separate from incompatible materials away from open flames, excessive heat or sources of ignition. Keep containers tightly closed when not in use.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL®	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
DISODIUM PYROPHOSPHATE	3 mg/m3	Not established	5 mg/m3	Not established	Not established	Not established

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL® = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. A suitable eyewash station should be within acceptable distance to the work area. Provide safety shower in work area, if contact or splash hazard exists.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles. Use chemical goggles or a face shield if product could be splashed.

Skin Protection

Wear gloves with appropriate chemical resistance, see manufacturers specifications for suitability. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

Wear a NIOSH approved particulate respiratory equipped with an N95, R95, or P95 filter.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	White crystalline powder.
Odour	Odourless
Odour Threshold	Not available
pH	3.8 - 4.5
Melting Point/Freezing Point	1652 ºC (3006 ºF) (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not available
Evaporation Rate	Not available
Flammability (solid, gas)	Will not burn.

Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	0.61
Solubility	Soluble in water; Not available (in other liquids)
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	Not available (kinematic); Not available (dynamic)

Other Information

Physical State Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

No reactivity test data was located.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

Product will not undergo hazardous polymerization.

Conditions to Avoid

Generation of dust.

Incompatible Materials

Strong bases. Strong Oxidizing Agents.

Hazardous Decomposition Products

Oxides of phosphorus.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
DISODIUM PYROPHOSPHATE	Not available	2650 mg/kg (mouse)	> 300 mg/kg (rabbit)

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause serious eye irritation or corneal injury.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the respiratory tract.

Skin Absorption

No information was located.

Aspiration Hazard

No information was located.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

No information was located.

Respiratory and/or Skin Sensitization

No information was located.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
DISODIUM PYROPHOSPHATE	Not Listed	Not Listed	Not Listed	Not Listed

Not listed.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. Group 3 = Not classifiable as to its carcinogenicity to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. A3 = Animal carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
DISODIUM PYROPHOSPHATE	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

Other Adverse Effects

There is no information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of unused product in accordance with local environmental and public health regulations. Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by the Controlled Products Regulations.

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

All ingredients are listed on the DSL/NDSL or are not required to be listed
Listed on the DSL.

CEPA - National Pollutant Release Inventory (NPRI)

Not Listed.

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 313: No chemicals are reportable under Section 313.
SARA Title III - Section 311/312: Immediate Health Hazard.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 0 Instability - 0**
SDS Prepared By	HSE Department
Phone No.	403-269-2800
Date of Preparation	October 27, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

SILVERSEAL

SECTION 1. IDENTIFICATION

Product Identifier	SILVERSEAL
Other Means of Identification	Blended Powder
Recommended Use	Drilling Fluid Additive.
Manufacturer/Supplier Identifier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	AES Drilling Fluids, LLC, 1-888-556-4533
Date of Preparation	April 21, 2016

SECTION 2. HAZARD IDENTIFICATION

Classification

Combustible dust - Category 1; Acute toxicity (Oral) - Category 4; Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 1

Label Elements

Signal Word:
Danger
Hazard Statement(s):
May form combustible dust concentrations in air.

H302	Harmful if swallowed.
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.

Precautionary Statement(s):
Prevention:

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
P330	Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice or attention.

Storage:
P405 Store locked up.

Disposal:
P501 Dispose of contents and container in accordance with local, regional, national and international regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Graphite (natural)	7782-42-5	<16	
Silica, quartz	14808-60-7	<1	
Trade Secret	CBI*	Confidential	
Trade Secret	CBI*	Confidential	
Trade Secret	CBI*	Confidential	
Trade Secret	CBI*	Confidential	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air. Get medical advice/attention if irritation develops.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap. If irritation persists, get medical advice/attention.

Eye Contact

Flush eyes thoroughly with lukewarm water for 15 minutes. If eye irritation persists, get medical advice or attention.

Ingestion

Rinse mouth with water. Do not induce vomiting without medical advice. Seek medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Specific Hazards Arising from the Product

At very high dust concentrations, product may form combustible dust concentrations or explosive dust-air mixtures. Oxides of carbon.

Special Protective Equipment and Precautions for Fire-fighters

When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Isolate the hazard area. Keep out unnecessary and unprotected personnel. Use the personal protective equipment

recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment. Do not allow into any sewer, on the ground or into any waterway.

Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources. Vacuum or sweep product up, try to minimize dust build-up. Wet sweeping may be used to minimize dust build-up. Store recovered product in suitable containers that are: tightly-covered. Containerize for solid waste disposal.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

It is good practice to: avoid breathing product; avoid skin and eye contact and wash hands after handling. Only use where there is adequate ventilation. Avoid creating excessive dust while handling the product. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Store in an area that is: well-ventilated. Away from open flames, excessive heat or sources of ignition. Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL®	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Silica, quartz	0.025 mg/m3 A2	Not established	0.1 mg/m3	Not established	Not established	Not established
Graphite (natural)	2 mg/m3 (R)		3 mg/m3 (R)		Not established	
Trade Secret	5 mg/m3 (R)		5 mg/m3 (R)		Not established	
Trade Secret	2 mg/m3 (R) A4	Not established	2 mg/m3 (R)		Not established	
Trade Secret	0.025 mg/m3 A2		0.1 mg/m3		Not established	
Trade Secret	Not established		Not established		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TLV® = Threshold Limit Value. TWA = Time-Weighted Average. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL® = Workplace Environmental Exposure Limit. R = Respirable fraction.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with this product an eyewash should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Use goggles or face shield when there is risk of eye contact or visible dust produced.

Skin Protection

Work gloves. Wear long sleeves, long pants and appropriate footwear while working with product.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Grey powder.
Odor Threshold	Not available
pH	Not available
Melting Point/Freezing Point	Not applicable (melting); Not applicable (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not applicable
Evaporation Rate	Not applicable
Flammability (solid, gas)	Not available
Upper/Lower Flammability or Explosive Limit	Not applicable (upper); Not applicable (lower)
Vapor Pressure	Not available
Vapor Density (air = 1)	Not available
Relative Density (water = 1)	1.5 - 2.0
Solubility	Insoluble in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Generation of dust.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Oxides of carbon.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; eye contact; skin contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Silica, quartz	Not available	Not available	Not available
Graphite (natural)	Not available	Not available	Not available
Trade Secret	Not available	6450 mg/kg (rat)	Not available

Trade Secret	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available

Skin Corrosion/Irritation

May cause skin irritation.

Serious Eye Damage/Irritation

May cause eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause irritation of the mucous membranes and upper respiratory tract.

Skin Absorption

Not harmful.

Ingestion

May be harmful if ingested. May cause. irritation of the gastrointestinal tract, nausea, vomiting, diarrhea.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

This product contains crystalline silica (quartz). Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. Chronic inhalation exposure to natural graphite is associated with the development of pneumoconiosis, a disease of the lungs.

Respiratory and/or Skin Sensitization

Not a respiratory sensitizer. Not a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed
Graphite (natural)	Not Listed	Not Listed	Not Listed	Not Listed
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed
Trade Secret	Group 3	A4	Not Listed	Not Listed
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed

This product contains free silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. Group 1 = Carcinogenic to humans. Group 3 = Not classifiable as to its carcinogenicity to humans. ACGIH® = American Conference of Governmental Industrial Hygienists. A2 = Suspected human carcinogen. A4 = Not classifiable as a human carcinogen. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

Not known to harm the unborn child.

Sexual Function and Fertility

Not known to cause effects on sexual function or fertility.

Germ Cell Mutagenicity

Not known to be a mutagen.

Interactive Effects

Smoking and being exposed to free silica may cause a greater risk of developing certain pulmonary illnesses.

SECTION 12. ECOLOGICAL INFORMATION

Do not allow product to contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

Ecotoxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Silica, quartz	Not available	Not available	Not available	Not available
Graphite (natural)	Not available	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available	Not available
Trade Secret	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or exempt from the TSCA.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Immediate Health Hazard Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	HSE Department
Phone No.	403-269-2800
Date of Preparation	April 21, 2016
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or

guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

SAFETY DATA SHEET

Soltex® Additive

Version 3.0 Revision Date 2015-11-25

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product information

Product Name : Soltex® Additive
Material : 1079530, 1016807

Use : Drilling Mud Additive

Company : Chevron Phillips Chemical Company LP
Drilling Specialties Company LLC
10001 Six Pines Drive
The Woodlands, TX 77380

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 1.800.424.9300 (within USA and Canada) or 703.527.3887 (outside USA and Canada)
Asia: +800 CHEMCALL (+800 2436 2255) China:+86-21-22157316
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Responsible Department : Product Safety and Toxicology Group
E-mail address : SDS@CPChem.com
Website : www.CPChem.com

SECTION 2: Hazards identification

Classification of the substance or mixture

This product has been classified in accordance with the hazard communication standard 29 CFR 1910.1200; the SDS and labels contain all the information as required by the standard.

Emergency Overview

Danger

Form: Powder **Physical state**: Solid **Color**: Black **Odor**: No odor

OSHA Hazards : Combustible dust, Carcinogen

Classification

: Combustible dust
Carcinogenicity , Category 1A

Labeling

Symbol(s) :

Signal Word : Danger

Hazard Statements : May form combustible dust concentrations in air.
H350: May cause cancer.

Precautionary Statements : **Prevention:**
P261 Avoid breathing dust.
P281 Use personal protective equipment as required.

Potential Health Effects

Physical Hazards : Mechanical processing may form combustible dust concentrations in air and thermal processing at elevated temperatures may generate simple hydrocarbons and carbon oxides.

Carcinogenicity:

IARC	Group 1: Carcinogenic to humans	
	Crystalline Silica	14808-60-7
NTP	Known to be human carcinogen	
	Crystalline Silica	14808-60-7
ACGIH	Suspected human carcinogen	
	Crystalline Silica	14808-60-7

SECTION 3: Composition/information on ingredients

Synonyms : Drilling Mud Additive

Molecular formula : Mixture

Component	CAS-No.	Weight %
Acid modified petroleum residuum	Proprietary	60 - 70
Crystalline Silica	14808-60-7	0.1 - 1

SECTION 4: First aid measures

General advice : Move out of dangerous area. Show this material safety data

sheet to the doctor in attendance.

If inhaled	:	If unconscious place in recovery position and seek medical advice. If symptoms persist, call a physician.
In case of eye contact	:	Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
If swallowed	:	Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point	:	Not applicable
Autoignition temperature	:	Not applicable
Unsuitable extinguishing media	:	High volume water jet.
Specific hazards during fire fighting	:	Risks of ignition followed by flame propagation or secondary explosions can be caused by the accumulation of dust, e.g. on floors and ledges.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	Standard procedure for chemical fires. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Fire and explosion protection	:	Avoid dust formation. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Provide appropriate exhaust ventilation at places where dust is formed.
Hazardous decomposition products	:	Carbon oxides. Sulfur oxides.

SECTION 6: Accidental release measures

Personal precautions	:	Use personal protective equipment. Avoid dust formation. Avoid breathing dust.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods for cleaning up	:	Pick up and arrange disposal without creating dust. Clean up promptly by sweeping or vacuum. Keep in suitable, closed containers for disposal.

Additional advice : Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air).

SECTION 7: Handling and storage

Handling

Advice on safe handling : Avoid formation of respirable particles. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Dispose of rinse water in accordance with local and national regulations.
Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary, but may not by themselves be sufficient.

Advice on protection against fire and explosion : Avoid dust formation. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Provide appropriate exhaust ventilation at places where dust is formed.

Storage

Requirements for storage areas and containers : Keep container tightly closed in a dry and well-ventilated place. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

US

Ingredients	Basis	Value	Control parameters	Note
Crystalline Silica	ACGIH	TWA	0.025 mg/m3	A2, Respirable fraction
	OSHA Z-3	TWA	30mg/m3 / %SiO2+2	total dust
	OSHA Z-3	TWA	250mppcf / %SiO2+5	a, b, respirable
	OSHA Z-3	TWA	10mg/m3 / %SiO2+2	e, respirable
	OSHA Z-1-A	TWA	0.1 mg/m3	Respirable fraction
	OSHA Z-3	TWA	0.1 mg/m3	Respirable fraction
	OSHA Z-1-A	TWA	0.1 mg/m3	respirable dust fraction
	ACGIH	TWA	0.025 mg/m3	A2, Respirable fraction

a Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.
A2 Suspected human carcinogen
b The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.
e Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics: Aerodynamic diameter (unit density sphere): 2; Percent passing selector: 90 Aerodynamic diameter (unit density sphere): 2,5; Percent passing selector: 75 Aerodynamic diameter (unit density sphere): 3,5; Percent passing selector: 50 Aerodynamic diameter (unit density sphere): 5,0; Percent passing selector: 25 Aerodynamic diameter (unit density sphere): 10; Percent passing selector: 0 The measurements under this note refer to the use of an AEC (now NRC) instrument. The respirable fraction of coal dust is determined with an MRE; the figure corresponding to that of 2.4 mg/m3 in the table for coal dust is 4.5 mg/m3.

Hazardous components without workplace control parameters

Immediately Dangerous to Life or Health Concentrations (IDLH)

Substance name	CAS-No.	Control parameters	Update
Crystalline Silica	14808-60-7	Immediately Dangerous to Life or Health Concentration Value 50 mg/m³	1995-03-01
		Immediately Dangerous to Life or Health Concentration Value 50 mg/m³	1995-03-01

Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection : Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as:. Air-Purifying Respirator for Dusts and Mists / P100. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection : The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection : Eye wash bottle with pure water. Safety glasses.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Protective suit. Safety shoes.

Hygiene measures : When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday. When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Form : Powder

Physical state	:	Solid
Color	:	Black
Odor	:	No odor
Odor Threshold	:	Not applicable

Safety data

Flash point	:	Not applicable
Lower explosion limit	:	No data available
Upper explosion limit	:	No data available
Oxidizing properties	:	No
Autoignition temperature	:	Not applicable
Molecular formula	:	Mixture
Molecular weight	:	No data available
pH	:	7 - 10
Pour point	:	Not applicable
Boiling point/boiling range	:	Not applicable
Vapor pressure	:	Not applicable
Relative density	:	Not applicable
Density	:	1.54 g/cm3
Water solubility	:	Partly soluble
Partition coefficient: n-octanol/water	:	No data available
Viscosity, kinematic	:	Not applicable
Relative vapor density	:	Not applicable
Evaporation rate	:	Not applicable

SECTION 10: Stability and reactivity

Chemical stability	:	This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions

Conditions to avoid	:	Generation of Dusts.

Hazardous decomposition products	:	Carbon oxides Sulfur oxides
Other data	:	No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Acute oral toxicity

Acid modified petroleum residuum	:	LD50: > 5,000 mg/kg

Acute inhalation toxicity

Acid modified petroleum residuum	:	LC50: > 5.3 mg/l Exposure time: 4 h Species: Rat Sex: male and female Test atmosphere: dust/mist Method: OECD Test Guideline 403 Rats exposed to a 5.3 mg/L dust aerosol for 4-hr resulted in effects generally expected with high concentrations of dust aerosols made of relatively dense particles. Higher lung weight and atelectasis persisted after the 14-day recovery period. There were no reports of lethality or any significant clinical observations. There was however an acute inflammatory response with evidence of recovery after 14-days. The presence of particulate matter with indication of partial clearance from the lung after the 14-day recovery period was noted. These effects would not be expected during normal operating conditions when using this substance.

Acute dermal toxicity

Acid modified petroleum residuum	:	No data available

Skin irritation

Acid modified petroleum residuum	:	No skin irritation

Eye irritation

Acid modified petroleum residuum	:	No eye irritation

Sensitization

Acid modified petroleum residuum	:	Did not cause sensitization on laboratory animals.

Repeated dose toxicity

Acid modified petroleum residuum	:	Species: Rat, Male and female Sex: Male and female Application Route: Oral

Dose: 0, 250, 500, 1000 mg/kg
Exposure time: 43 - 54 D
Number of exposures: daily
NOEL: 1,000 mg/kg
Method: OECD Guideline 422

Reproductive toxicity

Acid modified petroleum residuum : Species: Rat
Sex: male and female
Application Route: oral gavage
Dose: 0, 250, 500, 1000 mg/kg
Exposure time: 43-54 D
Number of exposures: daily
Method: OECD Guideline 422
NOAEL Parent: 1,000 mg/kg
NOAEL F1: 1,000 mg/kg

Developmental Toxicity

Acid modified petroleum residuum : Species: Rat
Application Route: oral gavage
Dose: 0, 250, 500, 1000 mg/kg
Number of exposures: daily
Test period: 54 D
NOAEL Teratogenicity: 1,000 mg/kg
NOAEL Maternal: 1,000 mg/kg

CMR effects

Acid modified petroleum residuum : Carcinogenicity: Not available
Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: Animal testing did not show any effects on fertility.

Crystalline Silica Carcinogenicity: Human carcinogen.

Soltex® Additive
Further information : Chronic Health Hazard.

SECTION 12: Ecological information

Toxicity to fish

Acid modified petroleum residuum : LC50: > 240 mg/l
Exposure time: 96 h
Species: Scophthalmus maximus (Flatfish, Flounder)
semi-static test Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

Acid modified petroleum : LC50: 380 mg/l

residuum	Exposure time: 48 h Species: Acartia tonsa (Marine Copepod) static test Method: ISO TC147/SC5/WG2

Toxicity to algae

Acid modified petroleum residuum	:	EC50: 240 mg/l Exposure time: 72 h Species: Skeletonema costatum (Marine Algae) static test Method: ISO 10253

Elimination information (persistence and degradability)

Biodegradability	:	This material is not expected to be readily biodegradable.

Ecotoxicology Assessment

Results of PBT assessment

Acid modified petroleum residuum	:	Non-classified PBT substance, Non-classified vPvB substance
Additional ecological information	:	This material is not expected to be harmful to aquatic organisms.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product	:	Do not dispose of waste into sewer. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR

TRANSPORTATION BY THIS AGENCY.

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

National legislation

SARA 311/312 Hazards	:	Chronic Health Hazard Fire Hazard
CERCLA Reportable Quantity	:	This material does not contain any components with a CERCLA RQ.
SARA 302 Reportable Quantity	:	This material does not contain any components with a SARA 302 RQ.
SARA 302 Threshold Planning Quantity	:	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 304 Reportable Quantity	:	This material does not contain any components with a section 304 EHS RQ.

SARA 313 Ingredients : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

Ozone-Depletion Potential : This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 12 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

US State Regulations

Pennsylvania Right To Know : Crystalline Silica - 14808-60-7

New Jersey Right To Know : Crystalline Silica - 14808-60-7

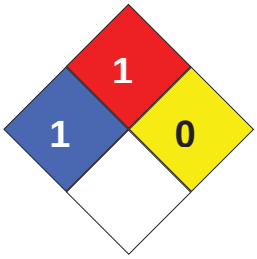
California Prop. 65 Ingredients : WARNING! This product contains a chemical known in the State of California to cause cancer.

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
United States of America TSCA	:	On the inventory, or in compliance with the inventory
Canada DSL	:	On the inventory, or in compliance with the inventory
Australia AICS	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	On the inventory, or in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	On the inventory, or in compliance with the inventory
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 1
Fire Hazard: 1
Reactivity Hazard: 0



Further information

Legacy SDS Number : 59370

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

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

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical	TWA	Time Weighted Average

	Substances in China		
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Safety Data Sheet

Super-Sweep

Version 4 Revision Date 1/27/16

1. ***Product and Company Identification***

Name of Product:

Super-Sweep

Recommended use:

Hole Cleaning Agent

Producer:

Forta Corporation
100 Forta Drive
Grove City, PA 16127
1-800-245-0306

Emergency Number:

1-800-245-0306
724-458-5221

2. ***Hazard(s) Identification:***

Hazard Classification:

Not Classified

Label Elements:

Hazard Symbol:	No Symbol
Signal Word:	No Signal Word
Hazard Statement:	NONE
Precautionary Statement:	NONE

HMIS (United States)	
Health	***1***
Flammability	***0***
Reactivity	***0***
PPE	

3. ***Composition/Information on Ingredients***

Name	*CAS#*	*% by Weight*
Polypropylene	9003-07-0	> 60.0

4. First Aid Measures

Inhalation:

Leave area to breathe fresh air.

Skin Contact:

No known applicable information.

Eye Contact:

Flush with water for 15 minutes. If irritation persists, get medical attention.

Ingestion:

Not applicable under normal conditions of use.

5. Fire Fighting Measures

Flash Point:

600°F, 316°C

Flash Point Method:

NONE

Autoignition Temperature:

NONE

Burning Rate:

NONE

Fire and Explosion Hazard:

None

Firefighting Equipment:

Use dry chemicals, CO^2, foam.

Hazardous Products of Combustion:

Carbon monoxide and other organics when burning.

6. Accidental Release Measures

Small Spill or Leak:

NONE

Large Spill or Leak:

NONE

7. Handling and Storage

Handling Precautions:

NONE

Storage Requirements:

No specific storage is required, use any dry container.

8. Exposure Controls/Personal Protection

Engineering Measures:

Not required under normal conditions of use.

Protective Equipment

Respirators-Wear NIOSH/MSHA approved dust respirator when the fiber concentration exceeds the exposure limits indicated on the MSDS. Wear a type C full face supplied air respirator when the fiber concentration exceeds 50 fibers/cc.

Protective Gloves- Impervious gloves.

Eye Protection- Glasses or Goggles

Protective Clothing-NONE

Exposure Guidelines/Other

Chemical Name	CAS Number	Regulation	Limit	Form
Polyproptlyene	9003-07-0	ACGIH TWA ACGIH TWA OSHA PEL OSHA PEL OSHA TWA OSHA TWA	3mg/m^3 10mg/m^3 15mg/m^3 5mg/m^3 15mg/m^3 5mg/m^3	Respirable particles Inhalable particles Total dust Respirable fraction Total dust Respirable fraction

9. Physical and Chemical Properties

Appearance:

White Fiber

Physical State:

Solid

Boiling Point:

NONE

Odor:

Odorless

Freezing/Melting Point:

NONE

pH:

NONE

Solubility:

NONE

Specific Gravity:

1.3

10. Stability and Reactivity

Stability:

This product is stable

Conditions to avoid:

None

Materials to avoid (Incompatibility):

Strong acids. Oxidizing agents.

11. Toxicological Information

Toxicity to Animals:

This product has not been tested for animal effects. This product is not expected to be toxic to animals.

Toxicity to Humans:

This product has not been tested for human effects. This product is not expected to be toxic to humans.

12. Ecological Information

Ecotoxicity:

Not expected to be ecotoxic.

BOD5 and COD:

NONE

Biodegradable / OECD:

NONE

Mobility:

NONE

Toxicity of the Products of Biodegradation:

NONE

Special Remarks on the Products of Biodegradation:

NONE

13. ***Disposal Considerations***

Not classified as hazardous waste. Dispose of in accordance with Federal, State and local regulations.

14. ***Transport Information***

Restrictions:

NONE

DOT Requirements:

Not a DOT controlled material. (USA)

ADR Requirements:

Not an ADR controlled material. (Europe)

IMDG Requirements:

Not an IMDG controlled material.

IATA requirements:

Not an IATA controlled material.

Marine Pollutant:

Not a marine pollutant.

15. ***Regulatory Information***

U.S. Federal Regulations

Chemical (& CAS Number)	SARA 302 (EHS) Rq	SARA 304 (EHS) Rq	SARA 313 de minimis	CERCLA Rq	CAA 112(r) TQ	RCRA Code
NONE						

All quantities in pounds

State Regulations

Chemical (& CAS Number)	CA Prop 65	MA RTK	MN RTK	NJ RTK	PA RTK RI RTK	
9003-07-0				**x**		
9003-07-0					**x**	

International Regulations

Water Hazard Class (WGK)

NWG

DSL (Canada):

None

EINECS:

None

WHMIS:

Not classified as hazardous.

HTS/Schedule B

5503.40.0000

16. Other Information

Prepared by:

Forta Corporation.

Telephone:

1-800-245-0306

Website:

www. Super-Sweep.com

Super-Sweep

Version 4 Revision Date 1/27/16

The information and recommendations contained in this Material Safety Data sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guarantee or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

SAFETY DATA SHEET

WCI 1013 Water Soluble Corrosion Inhibitor

Section 1. Identification

GHS product identifier : **WCI 1013 Water Soluble Corrosion Inhibitor**

Other means of identification : Water Soluble Corrosion Inhibitor

Product use : Not available.

Product type : Liquid.

Manufacturer : **Jacam Manufacturing 2013, L.L.C.**
P.O.Box 208, 1656 Ave. Q.
Sterling, Kansas 67579

Validation date : 5/28/2015.

For Chemical Emergency Spill, Leak Fire, Exposure or Accident: : **Call CHEMTREC Day or Night**
Within USA and Canada 800-424-9300 CCN# 11754
Or +1 703-527-3887 (Collect calls accepted)

Direct all other calls to:
Jacam Chemicals 2013, L.L.C. 620-278-3355
Mon – Fri 8 a.m. to 5 p.m. (Closed on major holidays)

Supplier's details : **Jacam Chemicals 2013, L.L.C.**
P.O. Box 96, 205 S. Broadway
Sterling, Kansas 67579

Section 2. Hazards identification

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 4
ACUTE TOXICITY (oral) - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A

Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 48.4%

Section 2. Hazards identification

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : H227 - Combustible liquid.
H302 - Harmful if swallowed.
H319 - Causes serious eye irritation.
H315 - Causes skin irritation.

Precautionary statements

Prevention : P280 - Wear protective gloves: > 8 hours (breakthrough time): nitrile rubber. Wear eye or face protection: Recommended: face shield , splash goggles , Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts..
P210 - Keep away from flames and hot surfaces. - No smoking.
P270 - Do not eat, drink or smoke when using this product.
P264 - Wash hands thoroughly after handling.

Response : P301 + P312 + P330 - IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth.
P302 + P352 + P362-2 + P363 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse.
P332 + P313 - If skin irritation occurs: Get medical attention.
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 - If eye irritation persists: Get medical attention.

Storage : P403 - Store in a well-ventilated place.
P235 - Keep cool.
Store in accordance with all local, regional, national and international regulations.

Disposal : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Routes of entry : Dermal contact. Eye contact. Inhalation.

INGESTION: Although not a normal route of entry, ingestion is expected to be harmful. DO NOT TAKE INTERNALLY. FOR INDUSTRIAL USE ONLY.

Target organs : Contains material which may cause damage to the following organs: kidneys, liver, heart, gastrointestinal tract, upper respiratory tract, immune system, skin, central nervous system (CNS), eye, lens or cornea.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Water Soluble Corrosion Inhibitor

CAS number/other identifiers

CAS number : Not applicable.

Section 3. Composition/information on ingredients

Ingredient name	%	CAS number
Ethylene Glycol	30 - 60	107-21-1
Methanol	10 - 30	67-56-1
Alkyl Pyridine Derivs.	5 - 10	68391-11-7
Alkyltrimethylene Diamine Acetate	5 - 10	61791-63-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.
Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 15 minutes. If irritation persists, obtain medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 15 minutes. If irritation persists, obtain medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. If irritation persists, obtain medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation.

Ingestion : Harmful if swallowed. Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

Section 4. First aid measures

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Additional Vapor Statement : Not available.

Not available.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Ethylene Glycol	**ACGIH TLV (United States, 4/2014).** C: 100 mg/m³ Form: Aerosol **OSHA PEL 1989 (United States, 3/1989).** CEIL: 50 ppm CEIL: 125 mg/m³
Methanol	**ACGIH TLV (United States, 4/2014).** **Absorbed through skin.** TWA: 200 ppm 8 hours. TWA: 262 mg/m³ 8 hours. STEL: 250 ppm 15 minutes. STEL: 328 mg/m³ 15 minutes. **OSHA PEL 1989 (United States, 3/1989).** **Absorbed through skin.** TWA: 200 ppm 8 hours. TWA: 260 mg/m³ 8 hours. STEL: 250 ppm 15 minutes. STEL: 325 mg/m³ 15 minutes. **NIOSH REL (United States, 10/2013).** **Absorbed through skin.** TWA: 200 ppm 10 hours. TWA: 260 mg/m³ 10 hours. STEL: 250 ppm 15 minutes. STEL: 325 mg/m³ 15 minutes. **OSHA PEL (United States, 2/2013).** TWA: 200 ppm 8 hours. TWA: 260 mg/m³ 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Section 8. Exposure controls/personal protection

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. Recommended: face shield , splash goggles , Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. > 8 hours (breakthrough time): nitrile rubber

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary.

Personal protective equipment (Pictograms) :

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Clear.]

Color : Amber. Brown. [Dark]

Odor : Unpleasant.

Odor threshold : Not available.

pH : 4 to 5

Melting point : Not available.

Boiling point : Not available.

Flash point : Closed cup: 63.889°C (147°F) [Pensky-Martens.]

Evaporation rate : Not available.

Section 9. Physical and chemical properties

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Not available.

Relative density : 1.02 to 1.06

Density : 8.51 to 8.85 (lbs/gal)

Solubility : Easily soluble in the following materials: cold water.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Pyridine, alkyl derivs.	LD50 Oral	Rat	2.5 g/kg	-
Ethylene Glycol	LD50 Oral	Rat	4700 mg/kg	-
Methanol	LD50 Dermal	Rabbit	15800 mg/kg	-

Section 11. Toxicological information

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Ethylene Glycol	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Mild irritant	Rabbit	-	1 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	6 hours 1440 milligrams	-
	Skin - Mild irritant	Rabbit	-	555 milligrams	-
Methanol	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	40 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Not available.			

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Not available.			

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Product/ingredient name

Not available.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
Not available.						

Teratogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Not available.			

Specific target organ toxicity (repeated exposure)

Not available.

Section 11. Toxicological information

Aspiration hazard

Name	Result
Not available.	

Information on the likely ToxKinetics - routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation.

Ingestion : Harmful if swallowed. Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Section 11. Toxicological information

Acute toxicity estimates

Route	ATE value
Oral	651.2 mg/kg

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Alkyltrimethylene Diamine	Acute LC50 1300 ppm Fresh water	Fish - Oncorhynchus mykiss	96 hours
Ethylene Glycol	Acute LC50 100000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 10000000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 8050000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
Methanol	Acute EC50 16.912 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Acute LC50 2500000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 3289 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 100 mg/l Fresh water	Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
	Chronic NOEC 9.96 mg/l Marine water	Algae - Ulva pertusa	96 hours

Conclusion/Summary : Not available.

Persistence and degradability

Not available.

Product/ingredient name

Not available.

Product/ingredient name

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Ethylene Glycol	-1.36	-	low
Methanol	-0.77	<10	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Methanol (l); Methyl alcohol (l)	67-56-1	Listed	U154

Section 14. Transport information

Regulatory information	UN/NA Number	Proper shipping name	Hazard Class(es)	PG*

DOT Classification **PG* : Packing group**

	NA1993	**Combustible liquid, n.o.s. (Methanol) RQ (Ethylene Glycol, Methanol)**	**Combustible liquid.**	**III**

Additional information

Emergency Response Guide (ERG): **128**

Non-bulk packages (less than or equal to 119 gal) of combustible liquids are not regulated as hazardous materials in package sizes less than the product reportable quantity.

Reportable quantity

13257.7 lbs / 6019 kg [1528.9 gal / 5787.5 L]

Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

Label

TDG Classification

Section 14. Transport information

UN3082	**Environmentally Hazardous Substance, Liquid, N.O.S. (Ethylene Glycol)**	**9**	**III**

Additional information

Remarks

For Bulk Shipment ONLY. Not Regulated in less than (<119 gallons) bulk quantity.

Label

IMDG Class

UN3082	**Environmentally Hazardous Substance, Liquid, N.O.S. (Ethylene Glycol)**	**9**	**III**

Marine pollutant notes: : Not available.

Additional information

Remarks

For Bulk Shipment ONLY. Not Regulated in less than (<119 gallons) bulk quantity.

Label

IATA-DGR Class

UN3082	**Environmentally Hazardous Substance, Liquid, N.O.S. (Ethylene Glycol)**	**9**	**III**

Additional information

The environmentally hazardous substance mark may appear if required by other transportation regulations.

Remarks

For Bulk Shipment ONLY. Not Regulated in less than (<119 gallons) bulk quantity.

Label

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) PAIR**: Oxyalkylated Resins
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
All components are listed or exempted.
Clean Water Act (CWA) 311: Bisulfites

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Ethylene Glycol	30 - 60	No.	No.	No.	Yes.	No.
Methanol	10 - 30	Yes.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Ethylene Glycol Methanol	107-21-1 67-56-1	30 - 60 10 - 30
Supplier notification	Ethylene Glycol Methanol	107-21-1 67-56-1	30 - 60 10 - 30

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: ETHYLENE GLYCOL; METHANOL

New York : The following components are listed: Ethylene glycol; Methanol

New Jersey : The following components are listed: ETHYLENE GLYCOL; 1,2-ETHANEDIOL; METHYL ALCOHOL; METHANOL

Section 15. Regulatory information

Pennsylvania : The following components are listed: 1,2-ETHANEDIOL; METHANOL

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Methanol	No.	Yes.	No.	23000 µg/day (ingestion) 47000 µg/day (inhalation)

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI (Pollution Release) : The following components are listed: Ethylene glycol; Methanol; Oxyalkylated Resins

CEPA Toxic substances : The following components are listed: Oxyalkylated Resins

Canada inventory-DSL / NDSL : All components are listed or exempted.

International lists

National inventory

Australia : All components are listed or exempted.
Canada : All components are listed or exempted.
China : All components are listed or exempted.
Europe : All components are listed or exempted.
Japan : Not determined.
Malaysia : Not determined.
New Zealand : All components are listed or exempted.
Philippines : Not determined.
Republic of Korea : All components are listed or exempted.
Taiwan : All components are listed or exempted.

Section 16. Other information

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

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Normal Package Size(s): Ball: 2" Ball 50/Cooler; 4" Ball 12/Cooler
Dry Product: 50 Lbs/Box
Liquid: 5 Gallon/55 Gallon/Bulk
Pellets: 30 Lbs/Cooler; 24 Lbs/Pail
Stix: 1 1/4": 50 Each/Cooler

History

Date of issue/Date of revision : **5/28/2015.**

Version : **1.01**

Date of previous issue : 5/28/2015.

Previous Validation Date : *5/28/2015.*

Prepared by : Jacam Regulatory Department

(M)SDS Requests: : **SDS@jacam.com**

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

Section 16. Other information

This Safety Data Sheet ("SDS") is a mandatory disclosure pursuant to 29 CFR § 1910.1200 and related rules and regulations. Therefore, it is not intended, nor shall it serve to create, any rights, obligations, liabilities, and remedies, of any kind whatsoever, between Jacam Chemicals 2013, LLC and related entities ("Jacam") and any users of this SDS ("Users").

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***** END OF SDS *****

XG-VIS

SECTION 1. IDENTIFICATION

Product Identifier	XG-VIS
Recommended Use	Drilling Fluid Additive.
Manufacturer / Supplier	AES Drilling Fluids, LLC, 11767 Katy Freeway, Suite 230, Houston, TX, 77079, Sales & Information, 281-556-5628
Emergency Phone No.	CHEMTREC, 1-800-424-9300, 24-hour Emergency
Date of Preparation	February 25, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Carcinogenicity - Category 1A; Specific target organ toxicity (repeated exposure) - Category 2

GHS Label Elements

Signal Word:
Danger
Hazard Statement(s):
Dust in eye may result in mechanical irritation.
May cause irritation of mucous membranes.
H373 May cause damage to organs through prolonged or repeated exposure.
H350 May cause cancer.
Precautionary Statement(s):
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash hands and skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Contains no hazardous ingredients. Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Xanthan gum	11138-66-2	100	

Silica, quartz	14808-60-7	<1	
Trade Secret	CBI*	Trade Secret	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.
CBI = Confidential Business Information.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of contaminant or move to fresh air.

Skin Contact

Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. If irritation persists, get medical advice/attention.

Eye Contact

Rinse the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes, while holding the eyelid(s) open. If eye irritation persists, get medical advice/attention.

Ingestion

First aid is generally not required.

First-aid Comments

Get medical advice/attention if you feel unwell or are concerned.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, Carbon Dioxide, Foam, Dry chemical.

Specific Hazards Arising from the Chemical

Does not burn.
Not known to generate any hazardous decomposition products in a fire.

Special Protective Equipment and Precautions for Fire-fighters

No special precautions are necessary.
When fighting chemical fires, emergency responders should wear NIOSH approved self contained breathing apparatus and appropriate protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

No special precautions are necessary.

Methods and Materials for Containment and Cleaning Up

Vacuum or sweep product up, try to minimize dust build-up. Spill material may cause floors and contact surfaces to become slippery, flush slowly with water, collect and store in suitable containers. Store recovered product or absorbent material in suitable containers for disposal according to local regulations.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

It is good practice to: avoid breathing product; avoid skin and eye contact and wash hands after handling. Avoid creating excessive dust while handling the product. See Section 8 for appropriate Personal Protective Equipment (PPE).

Conditions for Safe Storage

Keep containers tightly closed when not in use. Use good housekeeping to prevent accumulation of dust.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH® TLV®		OSHA PEL		AIHA® WEEL™	
Chemical Name	**TWA**	**STEL [C]**	**TWA**	**Ceiling**	**8-hr TWA**	**Short-term TWA [C]**
Trade Secret	0.025 mg/m3 A2		0.1 mg/m3		Not established	
Xanthan gum	15 mg/m3		10 mg/m3		Not established	
Silica, quartz	0.025 mg/m3 A2		0.1 mg/m3		Not established	

ACGIH® = American Conference of Governmental Industrial Hygienists. TWA = Time-Weighted Average. OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits. AIHA® = AIHA® Guideline Foundation. WEEL™ = Workplace Environmental Exposure Limit.

Appropriate Engineering Controls

Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. While working with this product an eyewash should be within acceptable distance to the work area.

Individual Protection Measures

Eye/Face Protection

Safety glasses or goggles.

Skin Protection

Not required, if used as directed.

Respiratory Protection

If conditions of use promote large amounts of dust to gather in the work area, wear NIOSH approved dust mask or respirator.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Light powder.
Odour	Faint
pH	7.0
Melting Point/Freezing Point	Not applicable (melting); Not applicable (freezing)
Initial Boiling Point/Range	Not available
Flash Point	Not applicable
Evaporation Rate	Not applicable
Flammability (solid, gas)	Will not burn.
Upper/Lower Flammability or Explosive Limit	Not applicable (upper); Not applicable (lower)
Vapour Pressure	Not applicable
Relative Density (water = 1)	Not available
Solubility	Soluble in water
Auto-ignition Temperature	Not applicable

Other Information

Physical State	Solid

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Strong Oxidizing Agents.

Incompatible Materials

Strong Oxidizing Agents.

Hazardous Decomposition Products

Oxides of carbon.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Trade Secret	Not available	Not available	Not available
Xanthan gum	Not available	> 1,000 mg/kg (mouse)	Not available
Silica, quartz	Not available	500 mg/kg (rat)	Not available

Skin Corrosion/Irritation

Not a skin irritant.

Serious Eye Damage/Irritation

May cause mechanical irritation to eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May result in mechanical irritation of the respiratory tract from high dust concentrations.

Skin Absorption

Not harmful.

Ingestion

Not harmful.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

This product may contain trace amounts of crystalline silica (quartz). Long term exposure to respirable crystalline silica dust over the TLV may lead to the development of silicosis or other respiratory problems. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.

Respiratory and/or Skin Sensitization

Not a respiratory sensitizer. Not a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Trade Secret	Not Listed	Not Listed	Not Listed	Not Listed
Xanthan gum	Not Listed	Not Listed	Not Listed	Not Listed
Silica, quartz	Group 1	A2	Known carcinogen	Not Listed

This product may contain trace amounts of crystalline silica which the International Agency for Research on Cancer (IARC) has listed as causing cancer in humans.

Key to Abbreviations

IARC = International Agency for Research on Cancer. ACGIH® = American Conference of Governmental Industrial Hygienists. NTP = National Toxicology Program. OSHA = US Occupational Safety and Health Administration.

Reproductive Toxicity

Development of Offspring

Not known to harm the unborn child.

Sexual Function and Fertility

Not known to cause effects on sexual function or fertility.

Germ Cell Mutagenicity

Not known to be a mutagen.

SECTION 12. ECOLOGICAL INFORMATION

Environmental information was not located.

Toxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Trade Secret	Not available	Not available	Not available	Not available
Xanthan gum	Not available	Not available	Not available	Not available
Silica, quartz	Not available	Not available	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of in accordance with all local, state and federal regulations. Not classified as RCRA Hazardous. RCRA WASTE NUMBER: Not Applicable.

SECTION 14. TRANSPORT INFORMATION

Not regulated under US DOT Regulations.

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.

Additional USA Regulatory Lists

CERCLA: Product does not contain any chemicals subject to the reporting requirement of CERCLA.
SARA Title III - Section 302: No listed components.
SARA Title III - Section 311/312: Chronic Health Hazard.
SARA Title III - Section 313: No chemicals are reportable under Section 313.

SECTION 16. OTHER INFORMATION

NFPA Rating **Health - 1** **Flammability - 0** **Instability - 0**

SDS Prepared By AES Drilling Fluids

Phone No. 281-556-5628

Date of Preparation	February 25, 2015
Disclaimer	Do not handle or use until precautions on MSDS are read and understood. The information on this form is furnished solely for the purpose of enabling those who transport, handle or use our products to ensure the safety and health of their employees and to comply with various laws and regulations (federal, state and local). We believe the statements, technical information and recommendations contained herein are reliable but, they are given without warranty or guarantee of any kind, express or implied and we assume no responsibility for any loss, damage, direct or consequential, arising out of their use.

Appendix B
Water Well Reports

Click to hideNews Bulletins

Please see news on new formats
- Full News

Groundwater levels for the Nation

Search Results -- 1 sites found

Agency code = usgs
site_no list =
- 322238103225201

Minimum number of levels = 1
Save file of selected sites to local disk for future upload

USGS 322238103225201 22S.35E.20.22442

Lea County, New Mexico
Latitude 32°22'38", Longitude 103°22'52" NAD27
Land-surface elevation 3,539 feet above NAVD88
This well is completed in the Ogallala Formation (121OGLL) local aquifer.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period

Date	Time	? Water-level date-time accuracy	Water level, feet below land surface	Water level, feet above specific vertical datum	Referenced vertical datum	? Water-level accuracy	? Status	? Method of measurement	? Measuring agency	? Source of measurem
1965-11-02		D	77.57			2		U		
1968-06-10		D	75.64			2	S	U		
1970-12-04		D	77.17			2	S	U		
1996-02-16		D	78.75			2		S		

Explanation

Section	Code	Description
Water-level date-time accuracy	D	Date is accurate to the Day
Water-level accuracy	2	Water level accuracy to nearest hundredth of a foot
Status		The reported water-level measurement represents a static level
Status	S	Nearby site that taps the same aquifer was being pumped.
Method of measurement	S	Steel-tape measurement.
Method of measurement	U	Unknown
Measuring agency		Not determined
Source of measurement	U	Source is unknown.
Water-level approval status	A	Approved for publication -- Processing and review completed.

Questions about sites/data?
Feedback on this web site

Automated retrievals
Help
Data Tips
Explanation of terms
Subscribe for system changes
News

Accessibility Plug-Ins FOIA Privacy Policies and Notices
U.S. Department of the Interior | U.S. Geological Survey
Title: Groundwater for USA: Water Levels
URL: https://nwis.waterdata.usgs.gov/nwis/gwlevels?

Page Contact Information: USGS Water Data Support Team
Page Last Modified: 2017-04-27 11:06:24 EDT
0.44 0.4 nadww01

Appendix C
Laboratory Analytical Reports

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 22, 2017

Bernie Bockish
GHD
6121 Indian School Road, NE #200
Albuquerque, NM 87110
TEL: (505) 884-0672
FAX

RE: EOG Frac Rig OrderNo.: 1703999

Dear Bernie Bockish:

Hall Environmental Analysis Laboratory received 4 sample(s) on 3/20/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: GHD
Client Sample ID: S-031717-CN-S16"
Project: EOG Frac Rig
Collection Date: 3/17/2017 1:43:00 PM
Lab ID: 1703999-001 **Matrix:** SOIL **Received Date:** 3/20/2017 12:04:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	ND	30		mg/Kg	20	3/21/2017 11:02:57 AM	30827
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	3/21/2017 9:53:13 AM	30802
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	3/21/2017 9:53:13 AM	30802
Surr: DNOP	102	70-130		%Rec	1	3/21/2017 9:53:13 AM	30802
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	3/21/2017 9:03:00 AM	30800
Surr: BFB	75.6	54-150		%Rec	1	3/21/2017 9:03:00 AM	30800
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	3/21/2017 9:03:00 AM	30800
Toluene	ND	0.049		mg/Kg	1	3/21/2017 9:03:00 AM	30800
Ethylbenzene	ND	0.049		mg/Kg	1	3/21/2017 9:03:00 AM	30800
Xylenes, Total	ND	0.097		mg/Kg	1	3/21/2017 9:03:00 AM	30800
Surr: 4-Bromofluorobenzene	83.1	66.6-132		%Rec	1	3/21/2017 9:03:00 AM	30800

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: GHD
Client Sample ID: S-031717-CN-S26"
Project: EOG Frac Rig
Collection Date: 3/17/2017 2:05:00 PM
Lab ID: 1703999-002 **Matrix:** SOIL **Received Date:** 3/20/2017 12:04:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	ND	30		mg/Kg	20	3/21/2017 11:15:22 AM	30827
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	3/21/2017 10:15:16 AM	30802
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	3/21/2017 10:15:16 AM	30802
Surr: DNOP	112	70-130		%Rec	1	3/21/2017 10:15:16 AM	30802
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	3/21/2017 9:29:24 AM	30800
Surr: BFB	74.3	54-150		%Rec	1	3/21/2017 9:29:24 AM	30800
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	3/21/2017 9:29:24 AM	30800
Toluene	ND	0.050		mg/Kg	1	3/21/2017 9:29:24 AM	30800
Ethylbenzene	ND	0.050		mg/Kg	1	3/21/2017 9:29:24 AM	30800
Xylenes, Total	ND	0.10		mg/Kg	1	3/21/2017 9:29:24 AM	30800
Surr: 4-Bromofluorobenzene	80.6	66.6-132		%Rec	1	3/21/2017 9:29:24 AM	30800

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: GHD
Client Sample ID: S-031717-CN-S36"
Project: EOG Frac Rig
Collection Date: 3/17/2017 2:21:00 PM
Lab ID: 1703999-003
Matrix: SOIL
Received Date: 3/20/2017 12:04:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	ND	30		mg/Kg	20	3/21/2017 11:27:46 AM	30827
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	3/21/2017 10:37:14 AM	30802
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	3/21/2017 10:37:14 AM	30802
Surr: DNOP	113	70-130		%Rec	1	3/21/2017 10:37:14 AM	30802
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	3/21/2017 12:59:55 PM	30800
Surr: BFB	75.2	54-150		%Rec	1	3/21/2017 12:59:55 PM	30800
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	3/21/2017 12:59:55 PM	30800
Toluene	ND	0.048		mg/Kg	1	3/21/2017 12:59:55 PM	30800
Ethylbenzene	ND	0.048		mg/Kg	1	3/21/2017 12:59:55 PM	30800
Xylenes, Total	ND	0.097		mg/Kg	1	3/21/2017 12:59:55 PM	30800
Surr: 4-Bromofluorobenzene	82.5	66.6-132		%Rec	1	3/21/2017 12:59:55 PM	30800

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: GHD
Client Sample ID: S-031717-CN-S46"
Project: EOG Frac Rig
Collection Date: 3/17/2017 2:37:00 PM
Lab ID: 1703999-004 **Matrix:** SOIL **Received Date:** 3/20/2017 12:04:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	ND	30		mg/Kg	20	3/21/2017 11:40:11 AM	30827
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	3/21/2017 10:59:38 AM	30802
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	3/21/2017 10:59:38 AM	30802
Surr: DNOP	134	70-130	S	%Rec	1	3/21/2017 10:59:38 AM	30802
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	3/21/2017 1:26:14 PM	30800
Surr: BFB	69.2	54-150		%Rec	1	3/21/2017 1:26:14 PM	30800
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	3/21/2017 1:26:14 PM	30800
Toluene	ND	0.048		mg/Kg	1	3/21/2017 1:26:14 PM	30800
Ethylbenzene	ND	0.048		mg/Kg	1	3/21/2017 1:26:14 PM	30800
Xylenes, Total	ND	0.096		mg/Kg	1	3/21/2017 1:26:14 PM	30800
Surr: 4-Bromofluorobenzene	77.4	66.6-132		%Rec	1	3/21/2017 1:26:14 PM	30800

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1703999**

22-Mar-17

Client: GHD

Project: EOG Frac Rig

Sample ID	**MB-30827**	SampType:	**mblk**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**PBS**	Batch ID:	**30827**	RunNo:	**41545**					
Prep Date:	**3/21/2017**	Analysis Date:	**3/21/2017**	SeqNo:	**1302689**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-30827**	SampType:	**lcs**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**LCSS**	Batch ID:	**30827**	RunNo:	**41545**					
Prep Date:	**3/21/2017**	Analysis Date:	**3/21/2017**	SeqNo:	**1302690**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	96.8	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1703999**

22-Mar-17

Client: GHD

Project: EOG Frac Rig

Sample ID	**LCS-30802**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**30802**		RunNo:	**41527**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1302356**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	49	10	50.00	0	98.9	63.8	116			
Surr: DNOP	5.2		5.000		104	70	130			

Sample ID	**MB-30802**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**30802**		RunNo:	**41527**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1302360**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	11		10.00		105	70	130			

Sample ID	**MB-30783**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**30783**		RunNo:	**41527**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1302594**	Units:	**%Rec**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	10		10.00		104	70	130			

Sample ID	**LCS-30783**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**30783**		RunNo:	**41527**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1302630**	Units:	**%Rec**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	5.2		5.000		103	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1703999**

22-Mar-17

Client: GHD

Project: EOG Frac Rig

Sample ID	**MB-30800**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**30800**		RunNo:	**41546**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1303061**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	780		1000		78.3	54	150			

Sample ID	**LCS-30800**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**30800**		RunNo:	**41546**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1303062**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	113	76.4	125			
Surr: BFB	900		1000		90.0	54	150			

Sample ID	**1703999-002AMS**	SampType:	**MS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**S-031717-CN-S26"**	Batch ID:	**30800**		RunNo:	**41546**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1303071**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	4.7	23.28	0	120	61.3	150			
Surr: BFB	790		931.1		85.1	54	150			

Sample ID	**1703999-002AMSD**	SampType:	**MSD**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**S-031717-CN-S26"**	Batch ID:	**30800**		RunNo:	**41546**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1303072**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	29	4.8	24.20	0	118	61.3	150	2.38	20	
Surr: BFB	880		968.1		90.4	54	150	0	0	

Sample ID	**MB-30782**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**30782**		RunNo:	**41546**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1303073**	Units:	**%Rec**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	740		1000		73.8	54	150			

Sample ID	**LCS-30782**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**30782**		RunNo:	**41546**				
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**		SeqNo:	**1303076**	Units:	**%Rec**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	870		1000		87.4	54	150			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1703999**

22-Mar-17

Client: GHD

Project: EOG Frac Rig

Sample ID	**MB-30800**	SampType: **MBLK**		TestCode: **EPA Method 8021B: Volatiles**					
Client ID:	**PBS**	Batch ID: **30800**		RunNo: **41546**					
Prep Date:	**3/20/2017**	Analysis Date: **3/21/2017**		SeqNo: **1303104**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.85		1.000		85.4	66.6	132			

Sample ID	**LCS-30800**	SampType: **LCS**		TestCode: **EPA Method 8021B: Volatiles**					
Client ID:	**LCSS**	Batch ID: **30800**		RunNo: **41546**					
Prep Date:	**3/20/2017**	Analysis Date: **3/21/2017**		SeqNo: **1303105**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.95	0.025	1.000	0	95.1	80	120			
Toluene	0.97	0.050	1.000	0	96.8	80	120			
Ethylbenzene	0.97	0.050	1.000	0	96.8	80	120			
Xylenes, Total	3.0	0.10	3.000	0	99.3	80	120			
Surr: 4-Bromofluorobenzene	0.84		1.000		83.6	66.6	132			

Sample ID	**1703999-001AMS**	SampType: **MS**		TestCode: **EPA Method 8021B: Volatiles**					
Client ID:	**S-031717-CN-S16"**	Batch ID: **30800**		RunNo: **41546**					
Prep Date:	**3/20/2017**	Analysis Date: **3/21/2017**		SeqNo: **1303106**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.024	0.9407	0	109	61.5	138			
Toluene	1.1	0.047	0.9407	0.005631	111	71.4	127			
Ethylbenzene	1.1	0.047	0.9407	0	115	70.9	132			
Xylenes, Total	3.3	0.094	2.822	0	117	76.2	123			
Surr: 4-Bromofluorobenzene	0.82		0.9407		87.7	66.6	132			

Sample ID	**1703999-001AMSD**	SampType: **MSD**		TestCode: **EPA Method 8021B: Volatiles**					
Client ID:	**S-031717-CN-S16"**	Batch ID: **30800**		RunNo: **41546**					
Prep Date:	**3/20/2017**	Analysis Date: **3/21/2017**		SeqNo: **1303107**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.024	0.9662	0	106	61.5	138	0.528	20	
Toluene	1.1	0.048	0.9662	0.005631	109	71.4	127	0.499	20	
Ethylbenzene	1.1	0.048	0.9662	0	109	70.9	132	2.84	20	
Xylenes, Total	3.2	0.097	2.899	0	111	76.2	123	2.18	20	
Surr: 4-Bromofluorobenzene	0.77		0.9662		80.1	66.6	132	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1703999**

22-Mar-17

Client: GHD

Project: EOG Frac Rig

Sample ID	**MB-30782**	SampType:	**MBLK**	TestCode:	**EPA Method 8021B: Volatiles**					
Client ID:	**PBS**	Batch ID:	**30782**	RunNo:	**41546**					
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**	SeqNo:	**1303108**	Units:	**%Rec**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.82		1.000		81.5	66.6	132			

Sample ID	**LCS-30782**	SampType:	**LCS**	TestCode:	**EPA Method 8021B: Volatiles**					
Client ID:	**LCSS**	Batch ID:	**30782**	RunNo:	**41546**					
Prep Date:	**3/20/2017**	Analysis Date:	**3/21/2017**	SeqNo:	**1303109**	Units:	**%Rec**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.74		1.000		74.4	66.6	132			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: GHD | Work Order Number: 1703999 | RcptNo: 1

Received by/date: 03/20/17

Logged By: Lindsay Mangin 3/20/2017 12:04:00 PM

Completed By: Lindsay Mangin 3/20/2017 12:40:15 PM

Reviewed By: 03/20/17

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Client		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: ____ (<2 or >12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted? ____
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by: ____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date ____

By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: ____

Client Instructions: ____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.4	Good	Not Present			

Chain-of-Custody Record

Client: GHD

Mailing Address: 6121 Indian School Rd NE #200
Albuquerque, NM, 87110

Phone #: 505 884 0672

email or Fax#: Bernard.Bocksch@ghd.com

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other ______

☐ EDD (Type) ______

Turn-Around Time:
☐ Standard ☑ Rush 24 hour

Project Name: EOG Frac Rig

Project #: 088210

Project Manager: Bernard Bocksch

Sampler: C. Nelig L

On Ice: ☑ Yes ☐ No

Sample Temperature: 3.4

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1703999	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	BTEX 8021	Full Range TPH 8015	Chlorides 300.1		Air Bubbles (Y or N)
3-17-17	1343	S	S-031717-CN-516"	2(4oz) Jar	N/A	-001												✓	✓	✓		
3-17-17	1405	S	S-031717-CN-526"	2(4oz) Jar	N/A	-002												✓	✓	✓		
3-17-17	1421	S	S-031717-CN-536"	2(4oz) Jar	N/A	-003												✓	✓	✓		
3-17-17	1437	S	S-031717-CN-546"	2(4oz) Jar	N/A	-004												✓	✓	✓		

Date	Time	Relinquished by	Received by	Date	Time
3-20-17	0840	[signature]	Melissa Cummings	3.20.17	840
3.20.17	1204	Melissa Cummings	[signature]	03/20/17	1204

Remarks: Hold second Jar of each sample for possible future analysis.

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

April 05, 2017

Angela Bown
GHD
6121 Indian School Road, NE #200
Albuquerque, NM 87110
TEL: (505) 884-0672
FAX

RE: Bridge State #604 OrderNo.: 1704034

Dear Angela Bown:

Hall Environmental Analysis Laboratory received 4 sample(s) on 4/3/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1704034**
Date Reported: **4/5/2017**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: GHD
Client Sample ID: S-088210-032817-CM-1
Project: Bridge State #604
Collection Date: 3/28/2017 5:00:00 PM
Lab ID: 1704034-001
Matrix: SOIL
Received Date: 4/3/2017 1:55:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 418.1: TPH						Analyst: **MAB**	
Petroleum Hydrocarbons, TR	21	19		mg/Kg	1	4/5/2017	31061
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	66	30		mg/Kg	20	4/4/2017 1:07:26 PM	31062
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	4/4/2017 2:54:00 PM	31034
Toluene	ND	0.049		mg/Kg	1	4/4/2017 2:54:00 PM	31034
Ethylbenzene	ND	0.049		mg/Kg	1	4/4/2017 2:54:00 PM	31034
Xylenes, Total	ND	0.098		mg/Kg	1	4/4/2017 2:54:00 PM	31034
Surr: 4-Bromofluorobenzene	77.7	66.6-132		%Rec	1	4/4/2017 2:54:00 PM	31034

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: GHD
Client Sample ID: S-088210-032817-CM-2
Project: Bridge State #604
Collection Date: 3/28/2017 5:05:00 PM
Lab ID: 1704034-002
Matrix: SOIL
Received Date: 4/3/2017 1:55:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 418.1: TPH						Analyst: **MAB**	
Petroleum Hydrocarbons, TR	ND	19		mg/Kg	1	4/5/2017	31061
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	38	30		mg/Kg	20	4/4/2017 1:19:50 PM	31062
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	4/4/2017 3:20:29 PM	31034
Toluene	ND	0.048		mg/Kg	1	4/4/2017 3:20:29 PM	31034
Ethylbenzene	ND	0.048		mg/Kg	1	4/4/2017 3:20:29 PM	31034
Xylenes, Total	ND	0.096		mg/Kg	1	4/4/2017 3:20:29 PM	31034
Surr: 4-Bromofluorobenzene	74.6	66.6-132		%Rec	1	4/4/2017 3:20:29 PM	31034

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: GHD
Client Sample ID: S-088210-032817-CM-3
Project: Bridge State #604
Collection Date: 3/28/2017 5:10:00 PM
Lab ID: 1704034-003
Matrix: SOIL
Received Date: 4/3/2017 1:55:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 418.1: TPH						Analyst: **MAB**	
Petroleum Hydrocarbons, TR	75	19		mg/Kg	1	4/5/2017	31061
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	570	30		mg/Kg	20	4/4/2017 1:32:14 PM	31062
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	4/4/2017 3:46:54 PM	31034
Toluene	ND	0.048		mg/Kg	1	4/4/2017 3:46:54 PM	31034
Ethylbenzene	ND	0.048		mg/Kg	1	4/4/2017 3:46:54 PM	31034
Xylenes, Total	ND	0.097		mg/Kg	1	4/4/2017 3:46:54 PM	31034
Surr: 4-Bromofluorobenzene	78.8	66.6-132		%Rec	1	4/4/2017 3:46:54 PM	31034

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: GHD
Client Sample ID: S-088210-032817-CM-4
Project: Bridge State #604
Collection Date: 3/28/2017 5:15:00 PM
Lab ID: 1704034-004
Matrix: SOIL
Received Date: 4/3/2017 1:55:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 418.1: TPH						Analyst: **MAB**	
Petroleum Hydrocarbons, TR	91	19		mg/Kg	1	4/5/2017	31061
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	900	30		mg/Kg	20	4/4/2017 1:44:39 PM	31062
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	4/4/2017 4:13:19 PM	31034
Toluene	ND	0.048		mg/Kg	1	4/4/2017 4:13:19 PM	31034
Ethylbenzene	ND	0.048		mg/Kg	1	4/4/2017 4:13:19 PM	31034
Xylenes, Total	ND	0.095		mg/Kg	1	4/4/2017 4:13:19 PM	31034
Surr: 4-Bromofluorobenzene	75.1	66.6-132		%Rec	1	4/4/2017 4:13:19 PM	31034

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704034**

05-Apr-17

Client: GHD

Project: Bridge State #604

Sample ID	**MB-31062**	SampType:	**mblk**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**PBS**	Batch ID:	**31062**	RunNo:	**41868**					
Prep Date:	**4/4/2017**	Analysis Date:	**4/4/2017**	SeqNo:	**1315672**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-31062**	SampType:	**lcs**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**LCSS**	Batch ID:	**31062**	RunNo:	**41868**					
Prep Date:	**4/4/2017**	Analysis Date:	**4/4/2017**	SeqNo:	**1315673**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	96.9	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704034**

05-Apr-17

Client: GHD

Project: Bridge State #604

Sample ID	**MB-31061**	SampType:	**MBLK**	TestCode:	**EPA Method 418.1: TPH**					
Client ID:	**PBS**	Batch ID:	**31061**	RunNo:	**41899**					
Prep Date:	**4/4/2017**	Analysis Date:	**4/5/2017**	SeqNo:	**1315985**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	ND	20								

Sample ID	**LCS-31061**	SampType:	**LCS**	TestCode:	**EPA Method 418.1: TPH**					
Client ID:	**LCSS**	Batch ID:	**31061**	RunNo:	**41899**					
Prep Date:	**4/4/2017**	Analysis Date:	**4/5/2017**	SeqNo:	**1315986**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	110	20	100.0	0	110	61.7	138			

Sample ID	**LCSD-31061**	SampType:	**LCSD**	TestCode:	**EPA Method 418.1: TPH**					
Client ID:	**LCSS02**	Batch ID:	**31061**	RunNo:	**41899**					
Prep Date:	**4/4/2017**	Analysis Date:	**4/5/2017**	SeqNo:	**1315987**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	100	20	100.0	0	104	61.7	138	5.88	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704034**

05-Apr-17

Client: GHD

Project: Bridge State #604

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **B41869**	RunNo: **41869**
Prep Date:	Analysis Date: **4/4/2017**	SeqNo: **1315328** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.98		1.000		98.1	66.6	132			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **B41869**	RunNo: **41869**
Prep Date:	Analysis Date: **4/4/2017**	SeqNo: **1315329** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.90		1.000		89.7	66.6	132			

Sample ID **MB-31034**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **31034**	RunNo: **41869**
Prep Date: **4/3/2017**	Analysis Date: **4/4/2017**	SeqNo: **1315332** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.78		1.000		77.6	66.6	132			

Sample ID **LCS-31034**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **31034**	RunNo: **41869**
Prep Date: **4/3/2017**	Analysis Date: **4/4/2017**	SeqNo: **1315333** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	103	80	120			
Toluene	1.0	0.050	1.000	0	104	80	120			
Ethylbenzene	1.1	0.050	1.000	0	106	80	120			
Xylenes, Total	3.2	0.10	3.000	0	108	80	120			
Surr: 4-Bromofluorobenzene	0.79		1.000		79.0	66.6	132			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: GHD | Work Order Number: 1704034 | RcptNo: 1

Received By: **Andy Jansson** 4/3/2017 1:55:00 PM

Completed By: **Andy Jansson** 4/3/2017 2:27:37 PM

Reviewed By: 04/03/17

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Client		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☐	No ☑	NA ☐
	Approved by client.		
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted? _____
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	8.6	Good	Not Present			

CHAIN OF CUSTODY RECORD

COC NO.: 55566

PAGE 1 OF 1

Address: 6121 Indian Schoo #200 ABQ, NM 87110

Phone: 505-884-0672 Fax:

PO/ Phase/Task Code: 098210/32	Laboratory Name: Hall	Lab Location: ABQ, NM	SSOW ID:
Project Name: Bridge State #604	Lab Contact: Andy Freeman		Cooler No:
Project Location: Jal, NM			Carrier: Hand Delivered
GHD Chemistry Contact: Angela Bown/Chris Knight			Airbill No:
Sampler(s): C. Matthews			Total # of Containers: 8.6°C

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Filtered (Y/N)	TPH	BTEX	Chloride	Total Containers/sample	MS/MSD Request	Comments/ Special Instructions:
	PRESERVATION - (SEE BACK OF COC FOR ABBREVIATIONS)											1704034
1	S-098210-032917-CM-1	3/29/17	1700	SO	G		X	X	X			-001
2	S-098210-032917-CM-2	3/29/17	1705	SO	G		X	X	X			-002
3	S-098210-032917-CM-3	3/29/17	1710	SO	G		X	X	X			-003
4	S-098210-032917-CM-4	3/29/17	1715	SO	G		X	X	X			-004
5												
6												
7												
8												
9												
10												
11												
12												

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☒ 2 Days ☐ 3 Days ☐ 1 Week ☐ 2 Week ☐ Other:

Notes/ Special Requirements: 48 HR TAT

	Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1.		GHD	4/3/17	1250	1. Melissa Cummings	GHD	4/3/17	1250
2.	Melissa Cummings	GHD	4/3/17	155	2.	HEAL	4/3/17	1355
3.					3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

GHD Form: COC-10B (20110804)

Analytical Report 551745

for

GHD-Albuquerque, NM

Project Manager: Bernie Bockisch

Bridge State

088210-32

28-APR-17

Collected By: Client

1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215), Arizona (AZ0765), Florida (E871002), Louisiana (03054)
Oklahoma (9218)

Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400)
Xenco-San Antonio: Texas (T104704534)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)

28-APR-17

Project Manager: **Bernie Bockisch**
GHD-Albuquerque, NM
6121 Indian School Rd. NE Suite 200

Albuquerque, NM 87110

Reference: XENCO Report No(s): **551745**
Bridge State
Project Address:

Bernie Bockisch:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 551745. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 551745 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Kelsey Brooks
Project Manager

Sample Cross Reference 551745

GHD-Albuquerque, NM, Albuquerque, NM

Bridge State

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
S-088210-32-42417-BB-1	S	04-24-17 15:20	- 4 In	551745-001
S-088210-32-42417-BB-2	S	04-24-17 15:24	- 5 In	551745-002
S-088210-32-42417-BB-3	S	04-24-17 15:33	- 6 In	551745-003
S-088210-32-42417-BB-4	S	04-24-17 15:37	- 6 In	551745-004
S-088210-32-42417-BB-5	S	04-24-17 15:43	- 3 In	551745-005
S-088210-32-42417-BB-6	S	04-24-17 15:50	- 3 In	551745-006

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3015995 Inorganic Anions by EPA 300/300.1

Lab Sample ID 551820-001 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 551745-001, -002, -003, -004, -005, -006.

The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.

Certificate of Analytical Results 551745

GHD-Albuquerque, NM, Albuquerque, NM

Bridge State

Sample Id:	**S-088210-32-42417-BB-1**	Matrix:	Soil	Date Received:	04.26.17 10.02
Lab Sample Id:	551745-001	Date Collected:	04.24.17 15.20	Sample Depth:	4 In
Analytical Method:	Inorganic Anions by EPA 300/300.1			Prep Method:	E300P
Tech:	MGO			% Moisture:	
Analyst:	MGO	Date Prep:	04.27.17 19.00	Basis:	Wet Weight
Seq Number:	3015995				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**5.51**	4.99	mg/kg	04.28.17 02.17		1

Certificate of Analytical Results 551745

GHD-Albuquerque, NM, Albuquerque, NM

Bridge State

Sample Id:	**S-088210-32-42417-BB-2**	Matrix:	Soil	Date Received:	04.26.17 10.02
Lab Sample Id:	551745-002	Date Collected:	04.24.17 15.24	Sample Depth:	5 In
Analytical Method:	Inorganic Anions by EPA 300/300.1			Prep Method:	E300P
Tech:	MGO			% Moisture:	
Analyst:	MGO	Date Prep:	04.27.17 19.00	Basis:	Wet Weight
Seq Number:	3015995				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**25.3**	4.97	mg/kg	04.28.17 02.25		1

Certificate of Analytical Results 551745

GHD-Albuquerque, NM, Albuquerque, NM

Bridge State

Sample Id:	**S-088210-32-42417-BB-3**	Matrix:	Soil	Date Received:	04.26.17 10.02
Lab Sample Id:	551745-003	Date Collected:	04.24.17 15.33	Sample Depth:	6 In
Analytical Method:	Inorganic Anions by EPA 300/300.1			Prep Method:	E300P
Tech:	MGO			% Moisture:	
Analyst:	MGO	Date Prep:	04.27.17 19.00	Basis:	Wet Weight
Seq Number:	3015995				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**45.7**	4.92	mg/kg	04.28.17 02.32		1

Certificate of Analytical Results 551745

GHD-Albuquerque, NM, Albuquerque, NM

Bridge State

Sample Id:	**S-088210-32-42417-BB-4**	Matrix:	Soil	Date Received:	04.26.17 10.02
Lab Sample Id:	551745-004	Date Collected:	04.24.17 15.37	Sample Depth:	6 In
Analytical Method:	Inorganic Anions by EPA 300/300.1			Prep Method:	E300P
Tech:	MGO			% Moisture:	
Analyst:	MGO	Date Prep:	04.27.17 19.00	Basis:	Wet Weight
Seq Number:	3015995				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**9.14**	4.93	mg/kg	04.28.17 02.40		1

Certificate of Analytical Results 551745

GHD-Albuquerque, NM, Albuquerque, NM

Bridge State

Sample Id:	**S-088210-32-42417-BB-5**	Matrix:	Soil	Date Received:	04.26.17 10.02
Lab Sample Id:	551745-005	Date Collected:	04.24.17 15.43	Sample Depth:	3 In
Analytical Method:	Inorganic Anions by EPA 300/300.1			Prep Method:	E300P
Tech:	MGO			% Moisture:	
Analyst:	MGO	Date Prep:	04.27.17 19.00	Basis:	Wet Weight
Seq Number:	3015995				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	ND	4.98	mg/kg	04.28.17 02.48	U	1

Certificate of Analytical Results 551745

GHD-Albuquerque, NM, Albuquerque, NM

Bridge State

Sample Id:	**S-088210-32-42417-BB-6**	Matrix:	Soil	Date Received:	04.26.17 10.02
Lab Sample Id:	551745-006	Date Collected:	04.24.17 15.50	Sample Depth:	3 In
Analytical Method:	Inorganic Anions by EPA 300/300.1			Prep Method:	E300P
Tech:	MGO			% Moisture:	
Analyst:	MGO	Date Prep:	04.27.17 19.00	Basis:	Wet Weight
Seq Number:	3015995				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	ND	4.93	mg/kg	04.28.17 03.10	U	1

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the quantitation limit and above the detection limit.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

	Phone	Fax
4147 Greenbriar Dr, Stafford, TX 77477	(281) 240-4200	(281) 240-4280
9701 Harry Hines Blvd , Dallas, TX 75220	(214) 902 0300	(214) 351-9139
5332 Blackberry Drive, San Antonio TX 78238	(210) 509-3334	(210) 509-3335
1211 W Florida Ave, Midland, TX 79701	(432) 563-1800	(432) 563-1713
2525 W. Huntington Dr. - Suite 102, Tempe AZ 85282	(602) 437-0330	

QC Summary 551745

GHD-Albuquerque, NM

Bridge State

Analytical Method: **Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 3015995 Matrix: Solid Date Prep: 04.27.17

MB Sample Id: 723751-1-BLK LCS Sample Id: 723751-1-BKS LCSD Sample Id: 723751-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	258	103	258	103	90-110	0	20	mg/kg	04.28.17 00:46	

Analytical Method: **Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 3015995 Matrix: Soil Date Prep: 04.27.17

Parent Sample Id: 551745-005 MS Sample Id: 551745-005 S MSD Sample Id: 551745-005 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<4.98	249	329	132	325	131	90-110	1	20	mg/kg	04.28.17 02:55	X

Analytical Method: **Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 3015995 Matrix: Soil Date Prep: 04.27.17

Parent Sample Id: 551820-001 MS Sample Id: 551820-001 S MSD Sample Id: 551820-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	58.6	245	390	135	383	132	90-110	2	20	mg/kg	04.28.17 01:09	X

ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

XENCO Laboratories

☐ 4143 Greenbriar Drive, Stafford, TX 77477 **281-240-4200**
☐ 5332, Blackberry Drive, San Antonio, TX 78238 **210-509-3334**
☐ 9701 Harry Hines Blvd., Dallas, TX 75220 **214-902-0300**
☐ 12600 West I-20 East, Odessa, TX 79765 **432-563-1800**

Serial #: 330912 Page of

Company-City GHD SERVICES - ALBUQUERQUE **Phone** 505-884-0672	**Lab Only:** 551715
Project Name-Location BRIDGE STATE ☑ Previously done at XENCO **Project ID** 088210-32	**TAT:** ASAP 5h 12h 24h 48h 3d 5d 7d 10d 21d Standard TAT is project specific. It is typically 5-7 Working Days for level II and 10+ Working days for level III and IV data.
Proj. State: TX, AL, FL, GA, LA, MS, NC, NJ, PA, SC, TN, UT Other **Proj. Manager (PM)** BERNARD BOCKISCH	
E-mail Results to ☑ PM and **Fax No:**	
Invoice to ☐ Accounting ☐ Inc. Invoice with Final Report ☐ Invoice must have a P.O. Bill to: EOG RESOURCES, INC.	
Quote/Pricing: **P.O. No:** ☐ Call for P.O.	
Reg Program: UST DRY-CLEAN Land-Fill Waste-Disp NPDES DW **TRRP** QAPP Per-Contract CLP AGCEE NAVY DOE DOD USACE OTHER:	
Special DLs (GW DW QAPP MDLs RLs See Lab PM Included Call PM)	
Sampler Name BERNARD BOCKISCH **Signature** [signature]	

Analysis columns: VOA: Full-List BTEX-MTBE EtOH Oxyg VOHs VOAs; VOA: PP TCL DW Appdx-1 Appdx-2 CALL Other:; PAHs SIM 8310 8270; TX-1005 DRO GRO MA EPH MA VPH; SVOCs: Full-List DW BN&AE TCLP PP Appdx-2 CALL; OC Pesticides PCBs Herbicides OP Pesticides; Metals: RCRA-8 RCRA-4 Pb 13PP 23TAL Appdx 1 Appdx2; SPLP - TCLP (Metals VOCs SVOCs Pest. Herb. PCBs); EDB / DBCP; CHLORIDES BY EPA 300.0; TATASAP 5h 12h 24h (48h) 3d 5d 7d 10d 21d; Addn: PAH above mg/L W, mg/Kg S Highest Hit; Hold Samples (Surcharges will apply and are pre-approved); Sample Clean-ups are pre-approved as needed; Remarks: Addn: Date Rcv. by: From:

	Sample ID	Sampling Date	Time	Depth ft/in/m	Matrix	Composite	Grab	# Containers	Container Size	Container Type	Preservatives	CHLORIDES BY EPA 300.0	TAT 48h	
1	S-088210-32-42417-BB-1	4/24/17	1520	4"	S		X	1	4oz	C	NA	X	X	1
2	S-088210-32-42417-BB-2	4/24/17	1524	5"	S		X	1	4oz	C	NA	X	X	2
3	S-088210-32-42417-BB-3	4/24/17	1533	6"	S		X	1	4oz	C	NA	X	X	3
4	S-088210-32-42417-BB-4	4/24/17	1537	6"	S		X	1	4oz	C	NA	X	X	4
5	S-088210-32-42417-BB-5	4/24/17	1543	3"	S		X	1	4oz	C	NA	X	X	5
6	S-088210-32-42417-BB-6	4/24/17	1550	3"	S		X	1	4oz	C	NA	X	X	6
7														7
8														8
9														9
10														10

Temp: 1.2 IR ID:R-9
CF:(0-6: 0.0°C) (6-23: +0.1°C)
Corrected Temp: 1.2

	Relinquished by (Initials and Sign)	Date & Time	Relinquished to (Initials and Sign)	Date & Time	
1	1) BB [signature]	4/25/17 / 10:25	2) [signature]	4/25/17 / 10:25	Total Containers per COC: Cooler Temp: 0.7 °C
2	3)		4) [signature]	4-26-17 1002	Otherwise agreed on writing. Reports are the Intellectual Property of XENCO until paid. Samples will be held 30 days after final report is e-mailed unless
3	5)		6)		hereby requested. Rush Charges and Collection Fees are pre-approved if needed.

Preservatives: Various (**V**), HCl pH<2 (**H**), H2SO4 pH<2 (**S**), HNO3 pH<2 (**N**), Asbc Acid&NaOH (**A**), ZnAc&NaOH (**Z**), (Cool, <4C) (**C**), None (**NA**), See Label (**L**), Other (**O**)
Cont. Size: 4oz (**4**), 8oz (**8**), 32oz (**32**), 40ml VOA (**40**), 1L (**1**), 500ml (**5**), Tedlar Bag (**B**), Various (**V**), Other **Cont. Type:** Glass Amb (**A**), Glass Clear (**C**), Plastic (**P**), Various (**V**)
Matrix: Air (**A**), Product (**P**), Solid (**S**), Water (**W**), Liquid (**L**)

Committed to Excellence in Service and Quality www.xenco.com

Final 1.000

XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In

Client: GHD-Albuquerque, NM

Date/ Time Received: 04/26/2017 10:02:00 AM

Work Order #: 551745

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : r9

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	1.2
#2 *Shipping container in good condition?	**Yes**
#3 *Samples received on ice?	**Yes**
#4 *Custody Seal present on shipping container/ cooler?	**Yes**
#5 *Custody Seals intact on shipping container/ cooler?	**Yes**
#6 Custody Seals intact on sample bottles?	**No**
#7 *Custody Seals Signed and dated?	**No**
#8 *Chain of Custody present?	**Yes**
#9 Sample instructions complete on Chain of Custody?	**Yes**
#10 Any missing/extra samples?	**No**
#11 Chain of Custody signed when relinquished/ received?	**Yes**
#12 Chain of Custody agrees with sample label(s)?	**Yes**
#13 Container label(s) legible and intact?	**Yes**
#14 Sample matrix/ properties agree with Chain of Custody?	**Yes**
#15 Samples in proper container/ bottle?	**Yes**
#16 Samples properly preserved?	**Yes**
#17 Sample container(s) intact?	**Yes**
#18 Sufficient sample amount for indicated test(s)?	**Yes**
#19 All samples received within hold time?	**Yes**
#20 Subcontract of sample(s)?	**No**
#21 VOC samples have zero headspace?	**N/A**
#22 <2 for all samples preserved with HNO3,HCL, H2SO4? Except for samples for the analysis of HEM or HEM-SGT which are verified by the analysts.	**N/A**
#23 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH?	**N/A**

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: PH Device/Lot#:

Checklist completed by: Jessica Kramer Date: 04/26/2017
Jessica Kramer

Checklist reviewed by: Kelsey Brooks Date: 04/27/2017
Kelsey Brooks

Analytical Report 552757

for

GHD-Albuquerque, NM

Project Manager: Christine Mathews

BRIDGE STATE

088210-32

12-MAY-17

Collected By: Client

1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215), Arizona (AZ0765), Florida (E871002), Louisiana (03054)
Oklahoma (9218)

Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400)
Xenco-San Antonio: Texas (T104704534)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)

Table of Contents

12-MAY-17

Project Manager: **Christine Mathews**
GHD-Albuquerque, NM
6121 Indian School Rd. NE Suite 200

Albuquerque, NM 87110

Reference: XENCO Report No(s): **552757**
BRIDGE STATE
Project Address: LEA COUNTY,NM

Christine Mathews:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 552757. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 552757 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Kelsey Brooks
Project Manager

Sample Cross Reference 552757

GHD-Albuquerque, NM, Albuquerque, NM

BRIDGE STATE

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SS-088210-050917-CM-1	S	05-09-17 11:47		552757-001
SS-088210-050917-CM-2	S	05-09-17 11:55		552757-002

CASE NARRATIVE

Client Name: GHD-Albuquerque, NM
Project Name: BRIDGE STATE

Project ID: *088210-32*
Work Order Number(s): *552757*

Report Date: *12-MAY-17*
Date Received: *05/10/2017*

This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory.

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Certificate of Analytical Results
552757
GHD-Albuquerque, NM, Albuquerque, NM
BRIDGE STATE

Sample Id: **SS-088210-050917-CM-1** Matrix: Soil Sample Depth:

Lab Sample Id: 552757-001 Date Collected: 05.09.17 11.47 Date Received: 05.10.17 10.25

Analytical Method: Inorganic Anions by EPA 300/300.1 Prep Method: E300P

Analyst: MGO % Moist: Tech: MGO

Seq Number: 3017050 Date Prep: 05.11.17 08.00

Prep seq: 724436

Parameter	CAS Number	Result	MQL	SDL	Units	Analysis Date	Flag	Dil Factor
Chloride	16887-00-6	**20.4**	5.00	0.858	mg/kg	05.11.17 13:53		1

Sample Id: **SS-088210-050917-CM-2** Matrix: Soil Sample Depth:

Lab Sample Id: 552757-002 Date Collected: 05.09.17 11.55 Date Received: 05.10.17 10.25

Analytical Method: Inorganic Anions by EPA 300/300.1 Prep Method: E300P

Analyst: MGO % Moist: Tech: MGO

Seq Number: 3017050 Date Prep: 05.11.17 08.00

Prep seq: 724436

Parameter	CAS Number	Result	MQL	SDL	Units	Analysis Date	Flag	Dil Factor
Chloride	16887-00-6	**42.4**	5.00	0.858	mg/kg	05.11.17 14:00		1

Certificate of Analytical Results

552757

GHD-Albuquerque, NM, Albuquerque, NM

BRIDGE STATE

Sample Id:	**724436-1-BLK**	Matrix:	Solid	Sample Depth:	
Lab Sample Id:	724436-1-BLK	Date Collected:		Date Received:	
Analytical Method:	Inorganic Anions by EPA 300/300.1			Prep Method:	E300P
Analyst:	MGO	% Moist:		Tech:	MGO
Seq Number:	3017050	Date Prep:	05.11.17 08.00		
		Prep seq:	724436		

Parameter	CAS Number	Result	MQL	SDL	Units	Analysis Date	Flag	Dil Factor
Chloride	16887-00-6	<0.858	5.00	0.858	mg/kg	05.11.17 09:34	U	1

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the quantitation limit and above the detection limit.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

	Phone	Fax
4147 Greenbriar Dr, Stafford, TX 77477	(281) 240-4200	(281) 240-4280
9701 Harry Hines Blvd , Dallas, TX 75220	(214) 902 0300	(214) 351-9139
5332 Blackberry Drive, San Antonio TX 78238	(210) 509-3334	(210) 509-3335
1211 W Florida Ave, Midland, TX 79701	(432) 563-1800	(432) 563-1713
2525 W. Huntington Dr. - Suite 102, Tempe AZ 85282	(602) 437-0330	

BS / BSD Recoveries

Project Name: BRIDGE STATE

Work Order #: 552757 **Project ID:** 088210-32

Analyst: MGO **Date Prepared:** 05/11/2017 **Date Analyzed:** 05/11/2017

Lab Batch ID: 3017050 **Sample:** 724436-1-BKS **Batch #:** 1 **Matrix:** Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	<0.858	250	267	107	250	270	108	1	90-110	20	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

Form 3 - MS / MSD Recoveries

Project Name: BRIDGE STATE

Work Order # : 552757 **Project ID:** 088210-32

Lab Batch ID: 3017050 **QC- Sample ID:** 552867-001 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 05/11/2017 **Date Prepared:** 05/11/2017 **Analyst:** MGO

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	8.54	247	260	102	247	269	105	3	90-110	20	

Lab Batch ID: 3017050 **QC- Sample ID:** 552868-001 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 05/11/2017 **Date Prepared:** 05/11/2017 **Analyst:** MGO

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	7190	248	7040	0	248	7080	0	1	90-110	20	X

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable
N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.

CHAIN OF CUSTODY RECORD

552757

COC NO.: 55530

Address: 6121 Indian School #200 ABQ, NM 87110 PAGE 1 OF 1

Phone: 505-884-0672 Fax:

Project No/ Phase/Task Code: 089210-32	Laboratory Name: Xenco	Lab Location: Midland, TX	SSOW ID:
Project Name: Bridge, State	Lab Contact:		Cooler No:
Project Location: Lea County, NM			Carrier:
GHD Chemistry Contact: Chris Knight			Airbill No:
Sampler(s): C. Mathews			Total # of Containers: 2

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Filtered (Y/N)	Analysis Requested (See Back of COC for Definitions): Chloride 300.1	Total Containers/sample	MS/MSD Request	Comments/ Special Instructions:
	PRESERVATION - (SEE BACK OF COC FOR ABBREVIATIONS)									
1	SS-089210-050917-CM-1	05/09/17	1147	SO	G		X			
2	SS-089210-050917-CM-2	05/09/17	1155	SO	G		X			
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☒ 2 Days ☐ 3 Days ☐ 1 Week ☐ 2 Week ☐ Other:

Notes/ Special Requirements: Temp 2.4°C

	Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1.		GHD	5/9/17	1635	1.		5/9/17	16:35
2.					2.	Xenco	5/10/17	10:25
3.					3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

GHD Form: COC-10B (20110804)

ORIGIN ID:HOBA (575) 392-7550
**
MAIL SERVICES ETC, LLC
4008 N GRIMES

HOBBS, NM 88240
UNITED STATES US

SHIP DATE: 09MAY17
ACTWGT: 4.00 LB MAN
CAD: 0909328/CAFE3012
DIMS: 11x11x10 IN

BILL RECIPIENT

TO XENCO LABORATORIES
XENCO LABORATORIES
1211 W FLORIDA AVE

MIDLAND TX 79701
(432) 563-1800 REF:
INV:
PO: DEPT:

54KC1/8734/727F

FedEx Express

J161216101001uv

TRK# 0201 6606 3914 2420

WED - 10 MAY 10:30A
PRIORITY OVERNIGHT

41 MAFA

79701
TX-US LBB

Part # 156148-434 RRD 04/16

RT 778 1 A 2420 10:30 05.10 FZ

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: GHD-Albuquerque, NM

Date/ Time Received: 05/10/2017 10:25:00 AM

Work Order #: 552757

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : R9

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	2.4
#2 *Shipping container in good condition?	**Yes**
#3 *Samples received on ice?	**Yes**
#4 *Custody Seal present on shipping container/ cooler?	**Yes**
#5 *Custody Seals intact on shipping container/ cooler?	**Yes**
#6 Custody Seals intact on sample bottles?	**N/A**
#7 *Custody Seals Signed and dated?	**N/A**
#8 *Chain of Custody present?	**Yes**
#9 Sample instructions complete on Chain of Custody?	**Yes**
#10 Any missing/extra samples?	**No**
#11 Chain of Custody signed when relinquished/ received?	**Yes**
#12 Chain of Custody agrees with sample label(s)?	**Yes**
#13 Container label(s) legible and intact?	**Yes**
#14 Sample matrix/ properties agree with Chain of Custody?	**Yes**
#15 Samples in proper container/ bottle?	**Yes**
#16 Samples properly preserved?	**Yes**
#17 Sample container(s) intact?	**Yes**
#18 Sufficient sample amount for indicated test(s)?	**Yes**
#19 All samples received within hold time?	**Yes**
#20 Subcontract of sample(s)?	**N/A**
#21 VOC samples have zero headspace?	**N/A**
#22 <2 for all samples preserved with HNO3,HCL, H2SO4? Except for samples for the analysis of HEM or HEM-SGT which are verified by the analysts.	**N/A**
#23 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH?	**N/A**

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst:

PH Device/Lot#:

Checklist completed by: Marithza Anaya Date: 05/10/2017

Checklist reviewed by: Kelsey Brooks Date: 05/10/2017