

In-Situ Bioremediation Injections In-Line Mixing and Injections Field Guidance Document Nevada Environmental Response Trust Site Henderson, Nevada

PREPARED FOR

Nevada Environmental Response Trust

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MARCH 23, 2020

CERTIFICATION

**In-Situ Bioremediation Injections
In-Line Mixing and Injections
Field Guidance Document**

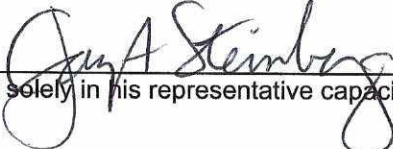
**Nevada Environmental Response Trust Site
(Former Tronox LLC Site)
Henderson, Nevada**

Nevada Environmental Response Trust (NERT) Representative Certification

I certify that this document and all attachments submitted to the Division were prepared at the request of, or under the direction or supervision of NERT. Based on my own involvement and/or my inquiry of the person or persons who manage the systems(s) or those directly responsible for gathering the information or preparing the document, or the immediate supervisor of such person(s), the information submitted and provided herein is, to the best of my knowledge and belief, true, accurate, and complete in all material respects.

Office of the Nevada Environmental Response Trust

Le Petomane XXVII, not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Signature:  _____, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

**Not Individually, but Solely
as President of the Trustee**

Name: Jay A. Steinberg, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

Title: Solely as President and not individually

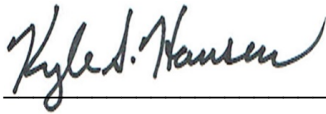
Company: Le Petomane XXVII, Inc., not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Date: 3/23/2026

CERTIFICATION

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been prepared in a manner consistent with the current standards of the profession, and to the best of my knowledge, comply with all applicable federal, state, and local statutes, regulations, and ordinances. I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.

Description of Services Provided: In-Situ Bioremediation Injections, In-Line Mixing and Injections, Field Guidance Document




Kyle Hansen, CEM
Field Operations Manager/Geologist
Tetra Tech, Inc.

March 23, 2020

Date

Nevada CEM Certificate Number: 2167

Nevada CEM Expiration Date: September 18, 2020

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Summary:

This Field Guidance Document (FGD) describes the general equipment and methodology to be used for in-line mixing and injection of carbon substrate, amendments, and distribution water to ensure mixture consistency and appropriate subsurface distribution to promote in-situ bioremediation (ISB). As described in this FGD, water will be batch mixed with low quantities of soluble carbon, phosphate, and sodium sulfite (solid amendment). Because the EVO is the bulk of the chemical injectate and is an oil-based emulsion, it will be in-line mixed with the amended water prior to injection into the subsurface. The mixing and injection processes are described herein.

This FGD has been customized for injections into the alluvium based on previous injection experience conducting ISB programs for the Nevada Environmental Response Trust (NERT). Because this is a treatability study (i.e., not final remedy), this FGD may be periodically updated based on the lessons learned during injections. General procedures and equipment sizing/specifications may require modification depending on the targeted lithology (i.e., alluvium, Upper Muddy Creek formation [UMCf], or UMCf-coarse grained), total injectate quantities, and targeted injection rates. It should be noted that this FGD follows general guidance and concurrence from EOS® Remediation, the inventor and distributor of the emulsified vegetable oil (EVO) product called EOS®, which is currently being used as the primary carbon substrate. Should a different carbon substrate be implemented, different in-line mixing and injection procedures may be required. The merits of in-line mixing are being evaluated for comparison with the batch mixing approach that has previously been used at the site with good success.

Procedure:

1.0 INJECTION PROCEDURES

1.1 PERSONAL PROTECTIVE EQUIPMENT


At a minimum, the following personal protection equipment (PPE) is required for this task:

- Level D PPE consisting of: Hard hat (if overhead hazards are present), safety glasses, high visibility traffic vest, nitrile gloves, steel toe safety boots, and hearing protection (if noise hazards are present); and
- Additional PPE required during mixing operations will consist of long-sleeve shirts, cut proof gloves, face shields, dust masks, and spoggles (combined safety glass and goggle).

1.2 SITE PREPARATION

Before beginning any injection operations, the following preparations must take place:

- All personnel working at or in the immediate vicinity of the injection system

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are fitted with appropriate PPE;

- Combustible materials including (but not limited to) fuels, lubricants, and coated rags are kept away from the work area; and
- All personnel review the safety data sheets (SDSs) for chemicals to be injected provided in Attachment A.

1.3 SYSTEM SPECIFICATIONS

The contractor will mobilize all equipment required for the injection system platform and associated equipment, which includes the following:

- Minimum of two double-walled frac tanks, typically each with a minimum working volume of 16,400 gallons, but may vary depending on tank vendor;
- Generator to power injection trailer, typically two 150kva portable generators (Tier 4 rated);
- Injection/extraction hosing consisting of 1-inch injection hose inserted into 2-inch lay-flat polyvinyl chloride (PVC) hose with watertight couplings securely fitted such that the 2-inch hose serves as secondary containment for the injection lines;
- Manifolds with flow meters for each injection and extraction line (capacity to connect to multiple injection or extraction wells simultaneously, depending on application);
- Flow meters with flow rate and totalizing capabilities placed using cam lock or quick connect fittings to ensure quick and efficient replacement or cleaning, as needed;
- Glycerin-filled pressure gauges to be connected at each injection wellhead with a range of 0 to 60 pounds per square inch (psi) to monitor back pressure during injections;
- Two portable variable speed, high flow, multi-stage centrifugal pumps (typically a 75-horsepower system with up to 240 gallons per minute [gpm] nominal flow capacity) for injection of injectate solution and distribution water at pressures up to the maximum permissible pressure limit per the Underground Injection Control permit (for the SWF Area Bioremediation Treatability Study, the maximum permissible pressure is 35 psi at the injection well head; it should be noted that the maximum permissible pressure may vary for other studies); Note: a third pump shall be mobilized


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so that there are two pumps for in-line mixing and injections and an additional pump as backup;

- Recirculation line from each centrifugal pump to the frac tank(s) or EVO tanker with 100% recirculation capacity;
- Static in-line mixer, typically 24-inches in length and 2.5” in diameter (minimum of three total to provide backup, if required);
- Air operated double diaphragm pump(s) (typically 2-inch pumps with an approximate 140 gpm nominal flow capacity; diesel-powered air compressor with approximately 175 to 195 cubic feet per minute capacity), including a flow meter/totalizer to add chemicals to frac tanks;
- Submersible pump (typically a 6-inch pump with a 70 gpm flow capacity) and recirculation hose to recirculate amendments and water within the frac tank to provide proper mixing;
- Submersible well pumps equipped for placement in 4-inch extraction wells (typically 4-inch pumps with 22 – 35 gpm nominal flow capacity installed with throttling valves and 1.5” Schedule 40 PVC pipe down well and 1.5” hose at surface) for extraction of groundwater;
- Portable generators (typically 7 kilowatts) to power submersible well pumps installed in extraction wells;
- Drip pans for potential seepage collection and containment at hose joints;
- Portable drip containment system with berms for injection system and EVO tankers;
- Spill kits and portable vacuums; and
- 275-gallon plastic totes to containerize rinse water.


1.4 PROCEDURES FOR INJECTIONS OF CARBON SUBSTATE AND AMENDMENTS

This section provides an overview of the injection process and assumes that all injection wells and amendments have been pre-approved by the Nevada Division of Environmental Protection – Underground Injection Control. A process flow diagram detailing the extraction and injection system is provided in Attachment B.

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1.4.1 INJECTION SYSTEM SET-UP

1. Set up portable drip containment for EVO tankers, amendments, and injection system platform and associated equipment.
2. Receive shipments of EVO (periodically delivered via 5,000-gallon tanker trucks as needed to minimize EVO on-site storage), chemical amendments (stored in original containers until use), and frac tanks and place inside containment berms. Ensure all chemical containers are properly labeled. Record chemical name, supplier, delivery date and time, and quantity received for all injectate chemicals received on the Chemical Tracking Log field form provided in Attachment C. If required, provide notification to local fire department based on the quantity of chemicals that are ordered and stored on-site.
3. Place spill kits and portable vacuums within the work area for immediate deployment, if necessary.
4. Install temporary wellheads with pressure gauge and pressure relief valve at each of the selected injection wells.
5. Run injection hose from each injection wellhead to a manifold system. The injection manifolds will be placed to minimize injection hose length required to reach each of the injection wells. Install flow meters and pressure gauges on each outgoing injection line at the manifold system to monitor injection flow rate and total gallons injected at each injection well. Install influent flow meter to monitor overall input into the manifold system.
6. Connect one centrifugal pump to the frac tank discharge, which should include a y-strainer in the plumbing system to minimize clogging, for addition of amendment/water solution (water, glycerin, phosphate solution, and sodium sulfite). Run recirculation line from the centrifugal pump to the frac tank of amendment/water solution. Connect the second centrifugal pump to the EVO tanker. Run recirculation line from the centrifugal pump to the EVO tanker. If slower injection rates are anticipated, off-load the EVO from the EVO tanker to a temporary storage tank to minimize demurrage fees.
7. Connect the outlet of each of the centrifugal pumps to a tee connector and connect the discharge from the tee connector to the static inline mixer. Run 2-inch injection hose from the output of the in-line mixer to the injection manifold system.


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8. Install flow meters at each of the following locations: static in-line mixer outlet, frac tank outlet, EVO tanker outlet, and after each of the centrifugal pumps prior to the tee connector.
9. Keep frac tank outlet closed until the water, glycerin, phosphate solution, and sodium sulfite are properly mixed.
10. Install drip pans as secondary containment at connection points for injection hoses.

1.4.2 EXTRACTION SYSTEM SET-UP

This section provides an overview of the groundwater extraction process, which must be permitted by the Nevada Division of Water Resources and include a permit for each individual well used for extraction prior to extraction activities. This section is not applicable if the water source selected for injections is not extracted groundwater (i.e., City of Henderson municipal water, stabilized Lake Mead water, or other water source).

1. Measure depth to water and total well depth at each extraction well. Deploy submersible well pumps at each extraction point to specified depths. The groundwater is extracted using a submersible pump that is set at an appropriate depth in the required number of extraction wells. Install throttling valves to reduce flow to match yields as needed.
2. Set up portable generators to power extraction pumps. Run dual-walled hose from each extraction point to one of the frac tanks onsite. Install a flow meter on each extraction line to monitor flow rate and total gallons extracted from each extraction well. Mark each extraction point with traffic cones or similar high-visibility demarcation to alert vehicle traffic of uncovered well box and pump equipment.
3. If applicable based on field conditions encountered, install bag filters with basket strainers in parallel arrangement to filter extracted groundwater.
4. Turn on submersible pumps to start groundwater extraction system operation to begin accumulating extracted groundwater for mixing of the amendment/water solution. Monitor and record extraction rates, extraction time periods, total volume extracted for each extraction well, and level of extracted groundwater that has accumulated in the frac tank (using site glasses to avoid elevated work) in the Groundwater Extraction Log field form provided in Attachment C. Adjust throttling valves based on periodic well depth to water measurements to maintain steady and sustainable extraction rates.


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1.4.3 IN-LINE MIXING AND INJECTIONS

The injectate solution is to be mixed in accordance with the formula specified for each injection event. Prior to implementing an injection event, all injectate solution quantities will be reviewed with the Nevada Division of Environmental Protection (NDEP). In general, the injectate solution will consist of EVO diluted with extracted groundwater or other approved water source (likely in a 1:4 [1 part EVO to 4 parts water] ratio, but may vary depending on the study application and objectives). Other amendments, such as glycerin, phosphate solution, and/or sodium sulfite (SDSs provided in Attachment A) will be mixed with the selected water source in accordance with the formula prior to in-line mixing of the amendment/water solution with the EVO. This section assumes extracted groundwater will be the selected water source; however, as previously explained, other water sources (i.e., City of Henderson municipal water, stabilized Lake Mead water, or other water source) may be utilized for injections. If extracted groundwater is used as the water source, the extraction wells will be sampled prior to the injection event to document the chemistry of the extracted groundwater.


The injectate solution will be prepared and injected following a series of steps to ensure consistency in the mixing of the injectate solution.

1. Allow extracted groundwater pumped into the frac tank as described in Section 1.4.2 to accumulate until the desired volume of water is achieved based on the prescribed formula. The volume of extracted groundwater shall be determined based on the data obtained from the flow meters connected to each extraction well and by gauging the height to which the water has filled the frac tank. The height of the water in the frac tank is then compared to a chart provided by the frac tank vendor to confirm the volume in each tank. Record the time and volume of extracted groundwater addition on the Injectate Solution Mixing Log provided in Attachment C.
2. After the required volume of extracted groundwater has accumulated in the first frac tank in which the amendment/water solution (minus the EVO) will be mixed, divert extracted groundwater to second frac tank via manifold adjustments to continue to accumulate groundwater for the next frac tank volume of amendment/water solution to be mixed.
3. After confirmation of the required extracted groundwater volume, all amendments (with the exception of the EVO) will be prepared for transfer into the frac tank. Personnel will don required PPE for chemical mixing (described in Section 1.1) prior to adding amendments to the frac tank.
4. Prior to amendment addition, install a submersible pump (typically a 6-inch pump with a 70 gpm flow capacity) at one end of the tank, slowly

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lowering the pump using a stainless-steel safety wire until the pump rests on the bottom of the tank. The pump will be attached to a 2-inch recirculation hose that runs to the opposite end of the tank and then through a port at the top of the tank, recirculating the contents at a rate of approximately 70 gpm. The return recirculation hose shall be submerged to avoid cascading and aeration of injection solution. Recirculation will continue during the entire preparation process.

5. Continue operation of the submersible pump for continuous recirculation during the mixing process. Add the designed quantity of sodium sulfite, which is the first amendment to be added, directly into the top/front of the frac tank above the recirculation pump. Record the time and mass of sodium sulfite addition on the Injectate Solution Mixing Log provided in Attachment C.
6. Continue operation of the submersible pump for continuous recirculation during the mixing process. Add the required volume of glycerin (second amendment to be added) to the front/top of the mixing frac tank, via an air diaphragm pump complete with flow meter/totalizer to track the volume of glycerin being added to the mixture. Record the time and volume of glycerin addition on the Injectate Solution Mixing Log provided in Attachment C.
7. Repeat the process described in Step 6 to add phosphate solution, which is the third and final amendment) to the mixing frac tank.
8. After all amendments (water, glycerin, phosphate solution, and sodium sulfite) have been added to the mixing frac tank, continue running the submersible recirculation pump during the injection process while ensuring that the submersible recirculation pump remains adequately submerged. As the tank gets close to empty, turn off the submersible recirculation pump before it is no longer adequately submerged.
9. Record total volume, quantities and concentration of amendments, mixing equipment, and mixing time interval on the Injectate Solution Mixing Log field form provided in Attachment C.
10. After the water and amendments (no EVO) have been mixed, connect one of the centrifugal pumps (Pump A) to the EVO delivery tank, with this pump solely dedicated to pumping of the EVO. Connect the second centrifugal pump (Pump B) to the frac tank of amendment/water solution, with this pump solely dedicated to the pumping of the amendment/water solution. The flow from Pump A and Pump B will be tied together via a tee connector and the combined flow will discharge to an in-line static mixer.

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The in-line static mixer will blend the EVO and amendment/water solution prior to subsurface injection of the injectate solution.

11. The dilution of the EVO will be controlled using the variable speed function on the high-flow centrifugal injection system. Flow meters will be located at the outlet of the frac tank and EVO tanker, as well as the outlet of each of the centrifugal pumps before entering the static mixer. Multiple flow meters will be used to measure flow at different points to ensure mixing accuracy.
12. Reconfirm injection wells selected for injection are properly connected to manifold and injection system with valves closed in accordance with Section 1.4.1.
13. Prepare a sample of the stock injectate solution using the EVO from each tanker truck delivered, extracted groundwater, and associated amendments prior to injections. Measure and record temperature and specific gravity of the sample on the Specific Gravity Log provided in Attachment C. This specific gravity measurement will be used for comparison purposes to the regular measurements collected during the injection process to ensure mixture consistency (described in Section 1.4.3, Step 18).
14. Prior to blending the EVO in-line, prime the injection lines and purge air using the extracted groundwater and amendments. To do this, turn on the centrifugal pump connected to the frac tank that contains extracted water and amendments. At the manifold system, slowly open valves for each injection line, carefully monitoring flow rate and back pressure. Use pressure relief valve at each injection wellhead to purge air from each injection line with pressure relief tubing directing the sputtered injection solution into a bucket. Once the lines are purged and a base flow rate is established, turn on the centrifugal pump from the EVO tanker to begin the in-line mixing process for the targeted mixture rate. Record injection start time, initial pressure, and flow rate data for each injection well on the Daily Injection Log provided in Attachment C. Ensure that the maximum permissible pressure is not exceeded at any injection well-head (maximum permissible pressure for the SWF Area Bioremediation Treatability Study is 35 psi as stated in the Underground Injection Control Permit; this may vary for other studies). If at any point, a pressure reading exceeds the maximum permissible pressure at the injection well-head, immediately close valve to terminate injections at that injection well. Flow rates should be maximized to the extent possible while not exceeding the maximum permissible injection pressure limit at the injection well head.
15. During operation of the injection system, monitor and record data on an hourly basis on the Injection Pressure and Flow Rate Log provided in

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Attachment C. Data to be recorded will include flow rate and pressure readings at each injection well, frac tank solution level/volume, and flow meter readings at each of the following locations: static in-line mixer outlet, frac tank outlet, EVO tanker outlet, and both centrifugal pumps. The collected data will be compared to ensure they match within an acceptable tolerance.

16. Monitor total targeted volume prescribed for each injection well. When total volume injected for an injection well nears the target volume, closely monitor flow rate and volume. Upon reaching the targeted volume of injectate solution for an injection well, terminate injections at that injection well. Record time at which injections were terminated on the Daily Injection Log provided in Attachment C. Connect additional injection wells to manifold (as described in Section 1.4.1) and begin injections, as needed.
17. Monitor level of amendment/water solution in frac tank. Record level and volume remaining in the frac tank during hourly readings on the Injection Pressure and Flow Rate Log provided in Attachment C.
18. Collect periodic samples from the injectate solution sampling port (located after the in-line static mixer) for field analysis of specific gravity and temperature to demonstrate in-line mixing operations are sufficiently mixing the EVO with the amendment/water solution. Sample frequency may vary depending on application (injection rates and quantities). An initial specific gravity sample will be collected at the beginning of injections as well as prior to initiating the injection of a new EVO tanker. In addition, a minimum of three subsequent samples will also be collected throughout injection of each EVO tanker to ensure mixture consistency. Record readings on the Specific Gravity Log provided in Attachment C. Sample of injectate solution will be collected at the injectate solution sampling port (as indicated on the process flow diagram, Attachment B).
19. As extracted groundwater accumulates in additional frac tank(s), mix additional volumes of amendment/water solution as described in Section 1.4.3, Steps 1 through 9. The mixing will be performed concurrently with injecting the previously mixed volume of amendment/water solution in the frac tank from which active injections are occurring to minimize downtime. After the initial frac tank of amendment/water solution and/or EVO from the delivery tank is depleted, connect the centrifugal pump(s) to the next frac tank of amendment/water solution and/or EVO delivery tank. Resume injections as described in Step 14 of this section.
20. Fill 275-gallon tote(s) with potable City of Henderson water from nearby hydrant. As amendment drums are emptied during the mixing and injection process, rinse empty drums with a small amount (approximately

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1 gallon per drum) of potable water in preparation for return to chemical supplier(s). Pour drum rinsate into mixing tank and record addition of drum rinsate on the Injectate Solution Mixing Log provided in Attachment C.

21. During the injection process, flow meters will be visually inspected during hourly field recordings (Section 1.4.3, Step 15). All flow meters will be calibrated by the injection subcontractor by performing a controlled test from one graduated tank to another prior to use. Flow meters will also be periodically recalibrated during off-days to ensure proper operation. Additional calibrated flow meters will be present at the site at all times to replace a malfunctioning flow meter as required. All calibration logs will be maintained by the subcontractor and provided to Tetra Tech.
22. After injection wells have received the target volume of injectate solution, begin injection of distribution water (extracted groundwater or other water source). Continue distribution water injection until injection wells have reached their target distribution water volume. Monitor extraction and injection rates of the system. Depending on extraction rates achieved, injection of distribution water may be temporarily suspended to allow extracted ground water to accumulate. Effort will be made to maximize extraction time each day to increase injection efficiency and maximize injection rates.
23. At the end of each day, record time at which injections are terminated and the total volume injected into each injection well on the Daily Injection Log. After injection system has been shut down, turn off submersible pumps at each extraction well and record the total volume extracted from each well on the Groundwater Extraction Log. At the beginning of each day, turn on submersible pumps at each extraction well and resume injections as described in Section 1.4.3, Step 14.
24. The contractor is to perform daily inspections of all equipment and regular inspections of secondary containment.
25. The site is located in an open, unsecured area so overnight and weekend security will be provided.
26. All pumps and hoses are to be purged at the end of each working day by gravity feeding the injectate solution into the injection wells so that injectate solution does not remain in the lines overnight.


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1.4.4 DEMOBILIZATION

1. Following completion of injection activities, flush injection and extraction lines into the connected injection wells using City of Henderson hydrant water contained in 275-gallon totes.
2. Oversee EVO tanker and amendment drum removal and demobilization of injection and extraction system equipment. Record date and time of amendment drum and EVO tanker pick up on the Chemical Tracking Log field form provided in Attachment C.
3. Contractor shall perform frac tank clean out using high-pressure steam in accordance with an approved Tetra Tech confined space entry permit and oversight.


Documentation: Attachment A – Chemical Safety Data Sheets
Attachment B – Process Flow Diagram
Attachment C – Injection Field Forms

Notes:

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Summary:	Attachment A – Chemical Safety Data Sheets
Documentation:	<ol style="list-style-type: none"> 1. Emulsified Vegetable Oil – EOS PRO 2. Phosphate Solution – AQUAPURE® 3601 NSF 3. Glycerin – GLYCERINE 99.7% USP KOSH MUSIM GSO 4. Sodium Sulfite Technical Grade

Section 1: Identification	
Product Name:	EOS Pro
Chemical Description:	Mixture; vegetable oil emulsion
Manufacturer:	EOS Remediation PO Box 14266 Research Triangle Park NC 27709 (P): 919-873-2204 www.eosremediation.com
Recommended Use:	Groundwater bioremediation (environmental applications)
Restricted Use:	Not for human consumption.
24-Hour Emergency Contact:	ChemTel: United States (P): 800-255-3924 ChemTel: International (P): 813-248-0585

Section 2: Hazard(s) Identification	
Hazard Classification:	Irritant (skin and eye)
Signal Word:	Warning
Hazard Statement(s):	Potential eye and skin irritant.
Pictograms:	
Precautionary Statement(s):	Not for human consumption. Do not store near excessive heat or oxidizers. Avoid contact with eyes and skin. Wear protective gloves and eye protection.

Section 3: Composition/Information on Ingredients		
Common Name(s)	CAS NO.	% by Weight
Soybean Oil	8001-22-7	60
Food Grade Emulsifiers Trade Secret ^{1,2}	111-03-5	10
Soluble Substrates (glycerol) Trade Secret ^{1,2}	56-81-5	4
Water	7732-18-5	26

1 – The precise composition of this product is proprietary information. A more complete disclosure will be provided to a physician in the event of a medical emergency.

2 – The soluble substrates and emulsifiers are generally recognized as safe for food contact.

Section 4: First-Aid Measures

Routes of Exposure	Emergency First-Aid Procedures
Inhalation	Remove to fresh air.
Eye Contact	Flush with water for 15 minutes; if irritation persists see a physician.
Skin Contact	Wash with mild soap and water.
Ingestion	Product is non-toxic. If nausea occurs, induce vomiting and seek medical attention.

Section 5: Fire-Fighting Measures

Extinguishing Media:	CO ₂ , foam, dry chemical Note: Water, fog and foam may cause frothing and spattering.
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus and chemical resistant clothing. Use water spray to cool fire exposed containers.
Fire Hazard(s):	Burning will cause oxides of carbon.

Section 6: Accidental Release Measures

Personal Precautions:	Avoid contact with eyes and skin. Do not consume.
Emergency Procedures:	N/A
Methods & Materials used for Containment:	Compatible granular absorbent
Cleanup Procedures:	Spread compatible granular absorbent over spill area and sweep using broom and pan; dispose in appropriate receptacle. Clean area with water.

Section 7: Handling and Storage

Safe Handling & Storage:	Do not store near excessive heat or oxidizers.
Other Precautions:	Consumption of food and beverages should be prevented in work area where product is being used. After handling product, always wash hands and face thoroughly with soap and water before eating, drinking, or smoking.

Section 8: Exposure Controls/Personal Protection

Exposure Limits	
OSHA PEL:	NE
ACGIH TLV:	NE
NIOSH REL:	NE
Personal Protective Measures	
Respiratory Protection:	Not normally required. P95 respirator if aerosols might be generated.
Hand Protection:	Protective gloves are recommended
Eye Protection:	Recommended
Engineering Measures:	Local exhaust ventilation if aerosols are generated
Hygiene Measures:	Wash promptly with soap & water if skin becomes irritated from contact.
Other Protection:	Wear appropriate clothing to prevent skin contact.

Section 9: Physical and Chemical Properties

Appearance:	White Liquid	Explosive Limits:	NE
Odor:	Vegetable Oil	Vapor Pressure:	NE
Odor Threshold:	NE	Vapor Density:	Heavier than air
pH:	6.0-7.0 (su)	Relative Density:	0.96-0.98
Melting Point/Freezing Point:	Liquid at room temperature	Solubility:	Dispersible
Boiling Point:	212°F (100°C)	Partition coefficient:	NE
Flash Point:	>300°F (149°C)	Auto-ignition Temperature:	NE
Evaporation Rate:	NE	Decomposition Temperature:	N/A
Flammability (solid, gas):	NE	Viscosity:	500-1500 cP

NE – Not Established

Section 10: Stability and Reactivity

Stability:	Stable
Incompatibility:	Strong acids and oxidizers
Hazardous Decomposition Products:	Thermal decomposition may produce oxides of carbon
Hazardous Reactions/Polymerization:	Will not occur
Conditions to Avoid:	None known

Section 11: Toxicological Information

Likely Routes of Exposure:	Ingestion, dermal and eye contact
Signs and Symptoms of Exposure:	None known
Health Hazards	
Acute:	Potential eye and skin irritant
Chronic:	None known
Carcinogenicity	
NTP:	No
IARC:	No
OSHA:	No

Section 12: Ecological Information (non-mandatory)

There is no data on the ecotoxicity of this product.

Section 13: Disposal Considerations (non-mandatory)

Waste Disposal Methods:	Dispose of according to Federal and local regulations for non-hazardous waste. Recycle, if practical.
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Section 14: Transport Information (non-mandatory)

The product is not covered by international regulation on the transport of dangerous goods.

No transport warning required.

Section 15: Regulatory Information (non-mandatory)

N/A

Section 16: Other Information

Date of Preparation:	29 May 2014
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Last Modified Date:	27 June 2019
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The information contained herein is based on available data and is believed to be correct. However, EOS Remediation, LLC makes no warranty, expressed or implied, regarding the accuracy of this data or the results to be obtained thereof. This information and product are furnished on the condition that the person receiving them shall make his/her own determination as to the suitability of the product for his/her particular purpose.



SAFETY DATA SHEET

1. Identification

Product identifier AQUAPURE® 3601 NSF (25 MG/L MAX)
Other means of identification None.
Recommended use ALL PROPER AND LEGAL PURPOSES
Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name Brenntag Pacific Inc.
Address 10747 Patterson Place
 Santa Fe Springs, CA 90670
Telephone 562-903-9626
E-mail Not available.
Emergency phone number 800-424-9300 CHEMTREC

2. Hazard(s) identification

Physical hazards Not classified.
Health hazards Acute toxicity, dermal Category 4
 Skin corrosion/irritation Category 1A
 Serious eye damage/eye irritation Category 1

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement Harmful in contact with skin. Causes severe skin burns and eye damage. Causes serious eye damage.

Precautionary statement

Prevention Do not breathe mist or vapor. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep 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/doctor. Take off contaminated clothing and wash before reuse.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information 100% of the mixture consists of component(s) of unknown acute oral toxicity. 86.67% of the mixture consists of component(s) of unknown acute inhalation toxicity.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
PHOSPHORIC ACID		7664-38-2	32.67
SODIUM HYDROXIDE (NA(OH))		1310-73-2	13.335
Other components below reportable levels			53.995

Material name: AQUAPURE® 3601 NSF (25 MG/L MAX)

919638 Version #: 02 Revision date: 08-22-2017 Issue date: 06-12-2017

SDS US

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*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of 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.
Most important symptoms/effects, acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.
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 information	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.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	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.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe 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.
Methods and materials for containment and cleaning up	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. 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. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. When using, do not eat, drink or smoke. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices. Wash contaminated clothing before reuse.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

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

Components	Type	Value
PHOSPHORIC ACID (CAS 7664-38-2)	PEL	1 mg/m ³
SODIUM HYDROXIDE (NA(OH)) (CAS 1310-73-2)	PEL	2 mg/m ³

US. ACGIH Threshold Limit Values

Components	Type	Value
PHOSPHORIC ACID (CAS 7664-38-2)	STEL	3 mg/m ³
SODIUM HYDROXIDE (NA(OH)) (CAS 1310-73-2)	TWA Ceiling	1 mg/m ³ 2 mg/m ³

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
PHOSPHORIC ACID (CAS 7664-38-2)	STEL	3 mg/m ³
SODIUM HYDROXIDE (NA(OH)) (CAS 1310-73-2)	TWA Ceiling	1 mg/m ³ 2 mg/m ³

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate 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. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

The following are recommendations for Personnel Protective Equipment (PPE). The employer/user of this product must perform a Hazard Assessment of the workplace according to OSHA regulations 29 CFR 1910.132 to determine the appropriate PPE for use while performing any task involving potential exposure to this product.

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield. Face shield is recommended.

Skin protection

Hand protection For prolonged or repeated skin contact use suitable protective gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Liquid.
Form Liquid.
Color CLEAR COLORLESS

Odor NONE

Odor threshold Not available.

pH Not available.

Melting point/freezing point Not available.

Initial boiling point and boiling range 587.61 °F (308.67 °C) estimated

Flash point Not available.

Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	11.76 lbs/gal
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Percent volatile	54 % estimated
Specific gravity	1.41

10. Stability and reactivity

Reactivity	The 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	Contact with incompatible materials.
Incompatible materials	Strong acids.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns. Harmful in contact with skin.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.

Symptoms related to the physical, chemical and toxicological characteristics Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity	Harmful in contact with skin.
Skin corrosion/irritation	Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity
Not listed.

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

US. National Toxicology Program (NTP) Report on Carcinogens
Not listed.

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

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components	Species	Test Results
SODIUM HYDROXIDE (NA(OH)) (CAS 1310-73-2)		
Aquatic		
Crustacea	EC50	Water flea (Ceriodaphnia dubia) 34.59 - 47.13 mg/l, 48 hours
Fish	LC50	Western mosquitofish (Gambusia affinis) 125 mg/l, 96 hours

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

Persistence and degradability No data is available on the degradability of this product.

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.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of 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 (see: Disposal instructions).

Contaminated packaging 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.

14. Transport information

DOT
Not regulated as dangerous goods.
DOT information on packaging may be different from that listed.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

CERCLA Hazardous Substance List (40 CFR 302.4)

PHOSPHORIC ACID (CAS 7664-38-2) Listed.
 SODIUM HYDROXIDE (NA(OH)) (CAS 1310-73-2) 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 Yes

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

PHOSPHORIC ACID (CAS 7664-38-2) High priority

US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

PHOSPHORIC ACID (CAS 7664-38-2)
 SODIUM HYDROXIDE (NA(OH)) (CAS 1310-73-2)

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
Taiwan	Taiwan Toxic Chemical Substances (TCS)	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).

16. Other information, including date of preparation or last revision

Issue date 06-12-2017

Revision date 08-22-2017
Version # 02
HMS® ratings Health: 3
Flammability: 0
Physical hazard: 0
NFPA ratings Health: 3
Flammability: 0
Instability: 1
Disclaimer While Brenntag believes the information contained herein to be accurate, Brenntag makes no representation or warranty, express or implied, regarding, and assumes no liability for, the accuracy or completeness of the information. The Buyer assumes all responsibility for handling, using and/or reselling the Product in accordance with applicable federal, state, and local law. This SDS shall not in any way limit or preclude the operation and effect of any of the provisions of Brenntag's terms and conditions of sale.
Revision information Hazard(s) identification: Response
Hazard(s) identification: Supplemental information
Accidental release measures: Personal precautions, protective equipment and emergency procedures
Accidental release measures: Methods and materials for containment and cleaning up
Handling and storage: Conditions for safe storage, including any incompatibilities
Exposure controls/personal protection: Eye/face protection
Exposure controls/personal protection: Hand protection
Exposure controls/personal protection: Other
Exposure controls/personal protection: PPE Symbols
Toxicological information: Carcinogenicity
Ecological information: Persistence / degradability



SAFETY DATA SHEET

1. Identification

Product identifier GLYCERINE 99.7% USP KOSH MUSIM RSPO (FIBER) GSO

Other means of identification

CAS number 56-81-5

Recommended use ALL PROPER AND LEGAL PURPOSES

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name Brenntag Pacific Inc.
Address 10747 Patterson Place
 Santa Fe Springs, CA 90670
Telephone 562-903-9626
E-mail Not available.

Emergency phone number 800-424-9300 CHEMTREC

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The substance does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information 100% of the mixture consists of component(s) of unknown acute oral toxicity. 100% of the mixture consists of component(s) of unknown acute dermal toxicity. 100% of the mixture consists of component(s) of unknown acute inhalation toxicity.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
GLYCEROL		56-81-5	100

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact Rinse with water. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed Headache. Nausea, vomiting.

Indication of immediate medical attention and special treatment needed Treat symptomatically.

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Alcohol resistant foam. Dry powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions 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.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Use water spray to reduce vapors or divert vapor cloud drift. 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. 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. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits No exposure limits noted for ingredient(s).

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate 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.

Individual protection measures, such as personal protective equipment

The following are recommendations for Personnel Protective Equipment (PPE). The employer/user of this product must perform a Hazard Assessment of the workplace according to OSHA regulations 29 CFR 1910.132 to determine the appropriate PPE for use while performing any task involving potential exposure to this product.

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other Wear appropriate chemical resistant clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties**Appearance**

Physical state Liquid.

Form Liquid.

Color CLEAR

Odor ODORLESS

Odor threshold Not available.

pH Not available.

Melting point/freezing point 65 °F (18.33 °C)

Initial boiling point and boiling range 554 °F (290 °C) 101.325 kPa

Flash point 390.0 °F (198.9 °C)

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%) Not available.

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure Not available.

Vapor density 3.17

Relative density Not available.

Solubility(ies)

Solubility (water) Miscible

Partition coefficient (n-octanol/water) -1.76

Auto-ignition temperature 739 °F (392.78 °C)

Decomposition temperature Not available.

Viscosity Not available.

Other information

Density 10.51 lbs/gal
1.26 g/ml

Dynamic viscosity 17 mPa.s (77 °F (25 °C))

Explosive properties Not explosive.

Flammability class Combustible III B estimated

Molecular formula C3-H8-O3

Molecular weight 92.09 g/mol

Oxidizing properties Not oxidizing.

Percent volatile 100 %

Specific gravity 1.26

VOC 100 %
100 % EPA estimated

10. Stability and reactivity

Reactivity The 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 Contact with incompatible materials.
Incompatible materials Strong oxidizing agents.
Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation No adverse effects due to inhalation are expected.
Skin contact No adverse effects due to skin contact are expected.
Eye contact Direct contact with eyes may cause temporary irritation.
Ingestion Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics Headache. Nausea, vomiting.

Information on toxicological effects

Acute toxicity Not known.
Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.
Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

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

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product	Species	Test Results
GLYCEROL (CAS 56-81-5)		
Aquatic		
Fish	LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss)	51000 - 57000 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of this substance.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

-1.76

Mobility in soil No data available.

Other adverse effects The product contains volatile organic compounds which have a photochemical ozone creation potential.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of 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 (see: Disposal instructions).
Contaminated packaging	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.

14. Transport information

DOT

Not regulated as dangerous goods.
 Transportation information on packaging may be different from that listed.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

GLYCEROL (CAS 56-81-5) Other Flavoring Substances with OSHA PEL's

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

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

Country(s) or region	Inventory name	On inventory (yes/no)*
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
Taiwan	Taiwan Toxic Chemical Substances (TCS)	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).

16. Other information, including date of preparation or last revision

Issue date	09-23-2019
Revision date	09-23-2019
Version #	02
HMIS® ratings	Health: 0 Flammability: 0 Physical hazard: 0
NFPA ratings	Health: 1 Flammability: 1 Instability: 0

Disclaimer While Brenntag believes the information contained herein to be accurate, Brenntag makes no representation or warranty, express or implied, regarding, and assumes no liability for, the accuracy or completeness of the information. The Buyer assumes all responsibility for handling, using and/or reselling the Product in accordance with applicable federal, state, and local law. This SDS shall not in any way limit or preclude the operation and effect of any of the provisions of Brenntag's terms and conditions of sale.

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

1.1 Product identifier

- Trade name SODIUM SULFITE Technical Grade

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

Uses of the Substance / Mixture

- Manufacture of pulp, paper and paper products
- photographic chemical
- Water treatment
- Reducing agents
- Dyes
- Bleaching agents

- Food additive

1.3 Details of the supplier of the safety data sheet

Company

SOLVAY CHEMICALS, INC.
3333 RICHMOND AVENUE
77098-3099, HOUSTON
USA
Tel: +1-800-7658292; +1-713-5256800
Fax: +1-713-5257804

1.4 Emergency telephone

FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CONTACT: CHEMTREC 800-424-9300 within the United States and Canada, or 703-527-3887 for international collect calls.

SECTION 2: Hazards identification

Although OSHA has not adopted the environmental portion of the GHS regulations, this document may include information on environmental effects.

2.1 Classification of the substance or mixture

HCS 2012 (29 CFR 1910.1200)

Eye irritation, Category 2A

H319: Causes serious eye irritation.

2.2 Label elements

HCS 2012 (29 CFR 1910.1200)

Pictogram



Signal Word

- Warning

Hazard Statements

- H319 Causes serious eye irritation.

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Precautionary StatementsPrevention

- P264 Wash skin thoroughly after handling.
- P280 Wear 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.

2.3 Other hazards which do not result in classification

- H402: Harmful to aquatic life.
- Harmful if swallowed.
- Irritating to eyes.
- Hazardous decomposition products formed under fire conditions.
- May cause sensitization by inhalation.

SECTION 3: Composition/information on ingredients**3.1 Substance**

- Not applicable, this product is a mixture.

3.2 Mixture**Hazardous Ingredients and Impurities**

- No ingredients are hazardous.

Non Hazardous Ingredients and Impurities

Chemical Name	Identification number CAS-No.	Concentration [%]
Sulfurous acid, sodium salt (1:2)	7757-83-7	>= 98.5

SECTION 4: First aid measures**4.1 Description of first-aid measures****In case of inhalation**

- Call a doctor immediately if allergic signs, particularly in the respiratory tract, are observed.
- Oxygen or artificial respiration if needed.
- Remove to fresh air.

Exposure to decomposition products

- If inhaled
- Remove to fresh air.
- Immediate medical attention is required.

In case of eye contact

- Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
- In the case of difficulty of opening the lids, administer an analgesic eye wash (oxybuprocaine).
- Immediate medical attention is required.

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In case of ingestion

- If victim is unconscious:
- Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

In case of inhalation

Symptoms

- Headache
- Breathing difficulties
- Cardiac irregularities
- loss of consciousness and cardiopulmonary arrest

Effects

- Mild respiratory irritant
- May cause severe allergic respiratory reaction.
- Breathing of dust may aggravate asthma or other pulmonary diseases.

In case of eye contact

Effects

- Moderate eye irritation

4.3 Indication of any immediate medical attention and special treatment needed

- no data available

SECTION 5: Firefighting measures

Flash point

Not applicable

Autoignition temperature

no data available

Flammability / Explosive limit

no data available

5.1 Extinguishing media

Suitable extinguishing media

- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

- Water may be ineffective.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire fighting

- Not combustible.
- Contact with water liberates hazardous gas.
- Sulphur dioxide

Hazardous combustion products:

- Sulphur dioxide
- Sulfur oxides

5.3 Advice for firefighters

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Special protective equipment for fire-fighters

- Wear self-contained breathing apparatus and protective suit.
- Use NIOSH approved respiratory protection.

Further information

- Approach from upwind.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel

- Avoid dust formation.

Advice for emergency responders

- Keep away from water.

6.2 Environmental precautions

- The product should not be allowed to enter drains, water courses or the soil.
- In case of accidental release or spill, immediately notify the appropriate authorities if required by Federal, State/Provincial and local laws and regulations.
- Should not be released into the environment.
- Do not flush into surface water or sanitary sewer system.

6.3 Methods and materials for containment and cleaning up

- Collect the product with suitable means.
- Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

- no data available

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Persons with a history of skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
- Use only in well-ventilated areas.
- Avoid dust formation.
- Protect from moisture.
- Avoid prolonged or repeated contact with skin.

Hygiene measures

- Wash contaminated clothing before re-use.
- Eye wash bottle with pure water
- Use only in an area equipped with a safety shower.
- Handle in accordance with good industrial hygiene and safety practice.
- When using do not eat, drink or smoke.

7.2 Conditions for safe storage, including any incompatibilities

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Technical measures/Storage conditions

- Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- For personal protection see section 8.

7.3 Specific end use(s)

- Sulfite-sensitive individuals may experience a severe allergic reaction. This product in contact with heat, water, ice, acids, or oxidizing agents releases sulfur dioxide gas which may be harmful or deadly when inhaled. Do not use in a dry form in the holds of fishing boats or walk-in coolers.
- Contact your supplier for additional information

SECTION 8: Exposure controls/personal protection

Introductory Remarks: These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

8.1 Control parameters

- Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Control measures

Engineering measures

- Ensure adequate ventilation.
- Provide appropriate exhaust ventilation at machinery and at places where dust can be generated.

Individual protection measures

Respiratory protection

- When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
- In the case of vapor formation use a respirator with an approved filter.
- Use NIOSH approved respiratory protection.
- In the case of dust or aerosol formation use respirator with an approved filter.

Hand protection

- Protective gloves

Eye protection

- Chemical resistant goggles must be worn.

Skin and body protection

- Preventive skin protection
- Wear suitable protective clothing.

Hygiene measures

- Wash contaminated clothing before re-use.
- Eye wash bottle with pure water
- Use only in an area equipped with a safety shower.
- Handle in accordance with good industrial hygiene and safety practice.
- When using do not eat, drink or smoke.

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SECTION 9: Physical and chemical properties

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product information phone number in Section 1 for its exact specifications.

9.1 Information on basic physical and chemical properties

<u>Appearance</u>	<u>Form:</u> granular <u>Physical state:</u> solid <u>Color:</u> white white
<u>Odor</u>	odorless
<u>Odor Threshold</u>	no data available
<u>pH</u>	9.6 - 9.8 (10 g/l)
<u>Boiling point/boiling range</u>	Not applicable
<u>Flash point</u>	Not applicable
<u>Evaporation rate (Butylacetate = 1)</u>	no data available
<u>Flammability (solid, gas)</u>	The product is not flammable.
<u>Flammability / Explosive limit</u>	<u>Explosiveness:</u> Not applicable
<u>Autoignition temperature</u>	no data available
<u>Vapor pressure</u>	no data available
<u>Vapor density</u>	no data available
<u>Density</u>	<u>Bulk density:</u> 1.5 - 1.6 kg/m ³
<u>Solubility</u>	<u>Water solubility :</u> 250 g/l (68 °F (20 °C))
<u>Partition coefficient: n-octanol/water</u>	log Pow: -4 (77 °F (25 °C))
<u>Thermal decomposition</u>	>= 1112 °F (>= 600 °C)
<u>Viscosity</u>	no data available
<u>Explosive properties</u>	no data available
<u>Oxidizing properties</u>	Not considered as oxidizing., oxygen scavenger

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9.2 Other information**Molecular weight** 126.04 g/mol**SECTION 10: Stability and reactivity****10.1 Reactivity**

- no data available

10.2 Chemical stability

- Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

- no data available

10.4 Conditions to avoid

- Heat.
- Exposure to moisture.

10.5 Incompatible materials

- Water
- Acids
- Oxidizing agents

10.6 Hazardous decomposition products

- Sulphur dioxide
- Sulfur oxides

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity**

Acute oral toxicity LD50 : 820 mg/kg - Mouse
LD50 : > 2,000 mg/kg - Rat

Acute inhalation toxicity no data available

Acute dermal toxicity no data available

Acute toxicity (other routes of administration) no data available

Skin corrosion/irritation Rabbit
No skin irritation

Serious eye damage/eye irritation Rabbit
Eye irritation

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<u>Respiratory or skin sensitization</u>	no data available
<u>Mutagenicity</u>	
Genotoxicity in vitro	In vitro tests showed mutagenic effects
Genotoxicity in vivo	no data available
<u>Carcinogenicity</u>	no data available

This product does not contain any ingredient designated as probable or suspected human carcinogens by:

- NTP
- IARC
- OSHA
- ACGIH

Toxicity for reproduction and development

Toxicity to reproduction / fertility	no data available
Developmental Toxicity/Teratogenicity	no data available

STOT

STOT-single exposure	no data available
STOT-repeated exposure	no data available

Aspiration toxicity no data available

Further information Harmful if swallowed.
Moderate eye irritation
May cause sensitization of susceptible persons by inhalation of aerosol or dust.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic Compartment

Acute toxicity to fish LC50 - 96 h : 100 mg/l - Carassius auratus (goldfish)

12.2 Persistence and degradability

Biodegradation

Biodegradability Method: Biochemical Oxygen Demand (BOD)
instantaneous reaction



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12.3 Bioaccumulative potential

Bioconcentration factor (BCF) Bioaccumulative potential

12.4 Mobility in soil no data available

12.5 Results of PBT and vPvB assessment no data available

12.6 Other adverse effects no data available

Remarks oxygen scavenger, Ecological injuries are not known or expected under normal use.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product Disposal

- Respect local/federal and national regulations for:
- Hazardous waste
- Contact waste disposal services.

Advice on cleaning and disposal of packaging

- To avoid treatments, as far as possible, use dedicated containers.
- Containers that cannot be cleaned must be treated as waste.
- In accordance with local and national regulations.

SECTION 14: Transport information

DOT

not regulated

TDG

not regulated

NOM

no data available

IMDG

not regulated

IATA

not regulated

Note: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transportation regulations for hazardous materials, it would be advisable to check their validity with your sales office.



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SECTION 15: Regulatory information**15.1 Notification status**

Inventory Information	Status
United States TSCA Inventory	Listed on Inventory
New Zealand. Inventory of Chemical Substances	In compliance with the inventory
Canadian Domestic Substances List (DSL)	Listed on Inventory
Australia Inventory of Chemical Substances (AICS)	Listed on Inventory
Japan. CSCL - Inventory of Existing and New Chemical Substances	Listed on Inventory
Korea. Korean Existing Chemicals Inventory (KECI)	Listed on Inventory
China. Inventory of Existing Chemical Substances in China (IECSC)	Listed on Inventory
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	Listed on Inventory

15.2 Federal Regulations**US. EPA EPCRA SARA Title III****SARA HAZARD DESIGNATION SECTIONS 311/312 (40 CFR 370)**

Fire Hazard	no
Reactivity Hazard	no
Sudden Release of Pressure Hazard	no
Acute Health Hazard	yes
Chronic Health Hazard	yes

Section 313 Toxic Chemicals (40 CFR 372.65)

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.

Section 302 Emergency Planning Extremely Hazardous Substance Threshold Planning Quantity (40 CFR 355)

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

Section 302 Emergency Planning Extremely Hazardous Substance Reportable Quantity (40 CFR 355)

This material does not contain any components with a SARA 302 RQ.

Section 304 Emergency Release Notification Reportable Quantity (40 CFR 355)

This material does not contain any components with a section 304 EHS RQ.

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)

This material does not contain any components with a CERCLA RQ.

15.3 State Regulations**US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)**

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

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SECTION 16: Other information**NFPA (National Fire Protection Association) - Classification**

Health	2 moderate
Flammability	0 minimal
Instability or Reactivity	1 slight
Special Notices	None

HMIS (Hazardous Materials Identification System (Paint & Coating)) - Classification

Health	2 moderate
Flammability	0 minimal
Reactivity	1 slight
PPE	Determined by User; dependent on local conditions


Further information

- Product evaluated under the US GHS format.

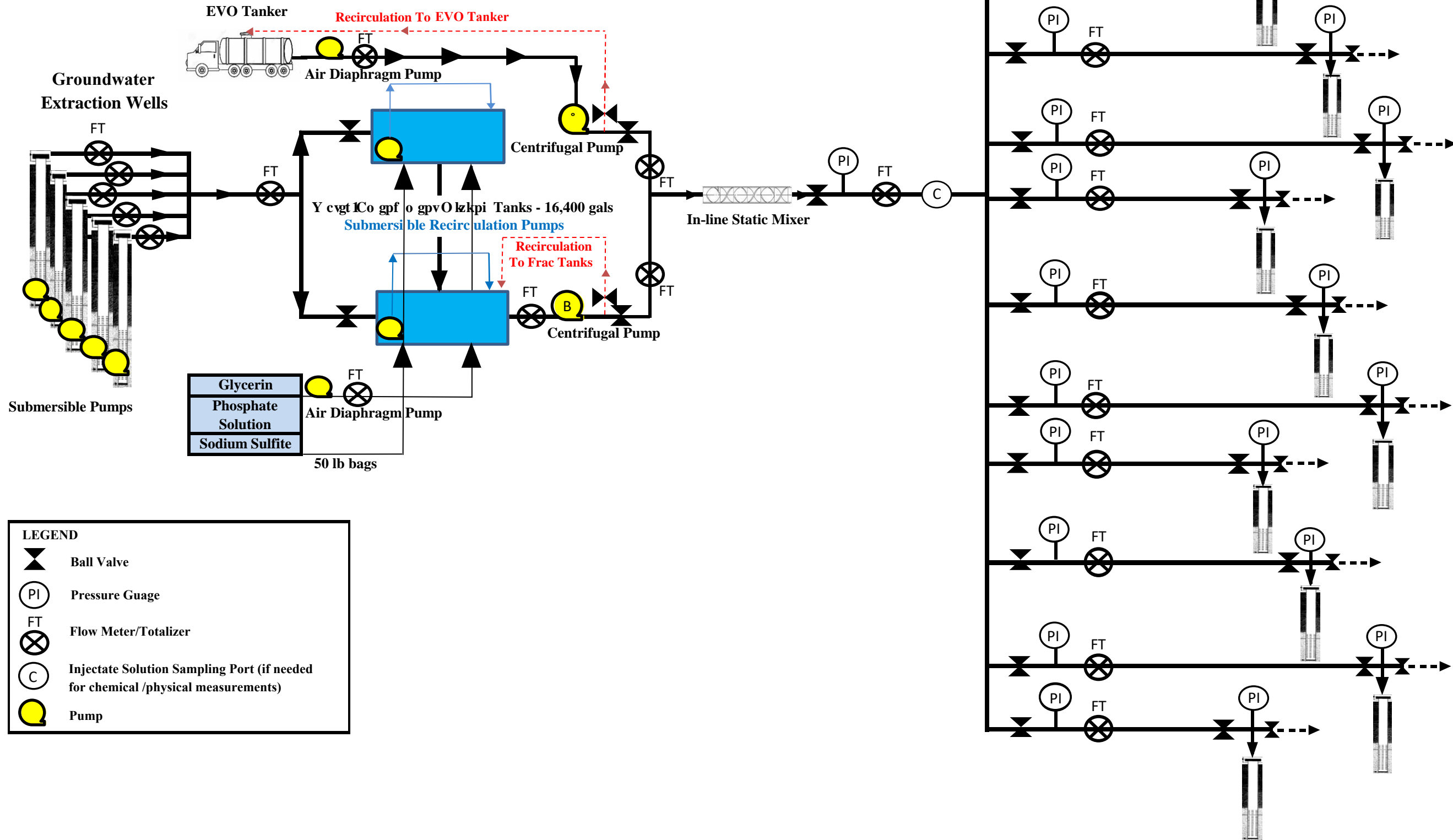
Date Prepared: 04/02/2015

- ACGIH American Conference of Governmental Industrial Hygienists
- OSHA Occupational Safety and Health Administration
- NTP National Toxicology Program
- IARC International Agency for Research on Cancer
- NIOSH National Institute for Occupational Safety and Health

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. Such information is only given as a guidance to help the user handle, use, process, store, transport, dispose, and release the product in satisfactory safety conditions and is not to be considered as a warranty or quality specification. It should be used in conjunction with technical sheets but do not replace them. Thus, the information only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in another manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.


 TETRA TECH	IN-SITU BIOREMEDIATION INJECTIONS IN-LINE MIXING AND INJECTIONS FIELD GUIDANCE DOCUMENT	
Seep Well Field Area Bioremediation Treatability Study	Nevada Environmental Response Trust	Rev. 0.0
		Date: March 2020
		Reviewed/Approved

Summary: Attachment B – Process Flow Diagram
Documentation: 1. Process Flow Diagram



LEGEND	
	Ball Valve
	Pressure Gauge
	Flow Meter/Totalizer
	Injectate Solution Sampling Port (if needed for chemical /physical measurements)
	Pump

Note: Because this Field Guidance Document process flow diagram is for a treatability study, it may be periodically updated based on lessons learned during injections.

	IN-SITU BIOREMEDIATION INJECTIONS IN-LINE MIXING AND INJECTIONS FIELD GUIDANCE DOCUMENT	Rev. 0.0
		Date: March 2020 Reviewed/Approved
Seep Well Field Area Bioremediation Treatability Study	Nevada Environmental Response Trust	

Summary:	Attachment C – Injection Field Forms
Documentation:	<ol style="list-style-type: none"> 1. Chemical Tracking Log 2. Groundwater Extraction Log 3. Injectate Solution Mixing Log 4. Daily Injection Log 5. Injection Pressure and Flow Rate Log 6. Specific Gravity Log

Task Name:	Task No:	Date:
Injection Event:	Task Manager:	Recorded by:

Chemical	Supplier	Date Received	Time Received	Quantity	Date of Container Pick-up	Time of Container Pick-Up	Comments

gpm - gallons per minute psi- pounds per square inch



Task Name: Task No: Date:

Task Manager: Injection Event: Recorded by:

Date	Start Time	Stop Time	Extraction Well ID	Current Flow Rate	Total Volume Extracted (Totalizer)	Average Flow Rate (Total/Time)	Cumulative Event Total Volume	Comments
				gpm	gal	gpm	gal	

Summary

Summary

Summary

Date	Time	Tank Number	Current Tank Level	Current Tank Volume	Comments
			feet	gal	

Notes/Comments:



Task Name:	Task No:	Date:
Task Manager:	Injection Event:	Recorded by:

Date: _____ Tank Number: _____ Solution Mixture Number: _____

Injectate Solution Formula					
Chemical Name	Density	Mass	Volume	Concentration	Comments
	lbs/gal	lbs	gal	wt.%	
TOTAL					

Addition of Amendments				
Chemical Name	Addition Start Time	Addition Stop Time	Addition Method and Equipment	Comments

Injectate Solution Mixing			
Method	Equipment	Start Time	Stop Time

Notes/Comments:



Task Name:	Task No:	Date:
Injection Event:	Task Manager:	Recorded by:

Injectate: _____ **Tank Number:** _____ **Solution Mixture Number:** _____ **EVO Tanker Number:** _____

Comments:

Injection Well ID	Initial	1	2	3	4	5	6	7	8	9	10	Comments	
													Time Start Recording
													Time Finish Recording:
	Pressure (psi):												
	Flow Rate (gpm):												
	Pressure (psi):												
	Flow Rate (gpm):												
	Pressure (psi):												
	Flow Rate (gpm):												
	Pressure (psi):												
	Flow Rate (gpm):												
	Pressure (psi):												
	Flow Rate (gpm):												
	Pressure (psi):												
	Flow Rate (gpm):												
	Pressure (psi):												
	Flow Rate (gpm):												

SYSTEM TOTAL	A. Total Flow Rate @ Injection Wells (gpm):												
	B. Flow Rate @ Static In-Line Mixer Outlet (gpm):												
	C. Frac Tank Solution Level (feet):												
	D. Frac Tank Solution Volume (gal):												
	E. Flow Rate @ Frac Tank Outlet (gpm):												
	F. Flow Rate @ Pump 1 - Frac Tank Solution (gpm):												
	G. Flow Rate @ EVO Tanker Outlet (gpm):												
	H. Flow Rate @ Pump 2 - EVO Tanker (gpm):												

gpm - gallons per minute psi- pounds per square inch



SPECIFIC GRAVITY LOG

Task Name:	Task No:	Date:
Sample Collection Method:	Field Parameters Equipment and SN:	Task Manager:
Specific Gravity Test Equipment SN:	Recorded by:	

Date	Time	EVO Tanker Volume (Active Injections)				Frac Tank Volume (Active Injections)				Atmospheric Temperature (°C)	Hydrometer Calibration Temperature (°C)	Sample Duplicate ID	Sample Temperature (°C)	Specific Gravity	Comments
		Tanker ID	Initial EVO Volume (gal)	Totalizer Reading (gal)	Volume EVO Remaining at Sample Time	Tank Number	Initial Solution Volume (gal)	Volume of Solution Remaining at Sample Time	Totalizer Reading (gal)						
						Tank Level:	Tank Level:					a			
												b			
						Volume:	Volume:					c			
												d			
												e			
						Tank Level:	Tank Level:					a			
												b			
						Volume:	Volume:					c			
												d			
												e			
						Tank Level:	Tank Level:					a			
												b			
						Volume:	Volume:					c			
												d			
												e			

Notes/Comments: