



March 23, 2026

Mr. Duane E. White  
Chief  
Low-Level Waste and Projects Branch  
U.S. Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852-2738

**Subject:** Request for Equivalent Feed Determination, DISA Technologies, Inc., License No. SUA-1605, Docket Number 40-38417

Dear Mr. White:

On March 19, 2026, DISA Technologies, Inc. (“DISA”) and staff from the U.S. Nuclear Regulatory Commission (NRC) met to discuss a request by DISA and the Navajo Nation (see Attachment 1) to determine that the fines concentrates generated from the use of High-Pressure Slurry Ablation (HPSA) for treating uranium mine waste are equivalent feed. During our meeting, the staff provided DISA with a list of questions that it adopted from work performed by the Utah Division of Waste Management and Radiation Control (DWMRC) during a previous equivalent feed determination. This letter provides DISA’s responses to those questions, which are organized by presenting the staff’s question followed by DISA’s response.

1. Provide a schematic of the HPSA process including all physical and chemical steps, demonstrating that the fines concentrates resulting from the process are not chemically changed or altered in any way from the AUM waste in its natural or native state.

**Response:** Attachment 2 is a flow sheet showing the HPSA C-10, 10-tons-per-hour unit. The HPSA process does not use any chemicals to separate the uranium from the waste rock matrix. It is a physical process of crushing and grinding (with a dust suppression agent described in No. 2), creating a slurry (using water), and then shooting the slurry into our collision cell through diametrically opposed nozzles. The high-pressure streams cause particle collisions that liberate minerals along grain boundaries. These collisions provide the separation necessary to classify the fines concentrates via screening. Downstream of the screens, the coarse material is dewatered and used to reclaim the site. The fines are thickened using a flocculant (described in No. 2), dewatered, then placed into containers and transported offsite. As described below, the dust suppressant

and flocculant are innocuous, will not react with the waste rock or fines concentrates, and will not alter the chemical or mineralogical composition.

2. Provide details of the physical separations, including wet processes. Demonstrate that no flocculants, precipitants, surfactants, flotation agents, or chemical additives of any kind are used in the HPSA process and that no reactions or chemical changes occur in the separation steps.

**Response:** The response to Question 1 describes the physical processes. DISA uses no chemicals to accomplish the separation—simply kinetic energy. However, DISA will use two innocuous substances for dust suppression and dewatering. DUSTREAT DC6109 will be sprayed into the dry solids hopper to control dust upstream of the HPSA units. DUSTREAT DC6109 contains 20% to 40% sodium (C14–16) olefin sulfonate. According to Alfa Chemistry ([www.alfa-chemistry.com](http://www.alfa-chemistry.com)), sodium C14–16 olefin sulfonate is a synthetic surfactant commonly used in personal care products such as shampoos, body washes, and facial cleansers. Sodium C14–16 olefin sulfonate has excellent foaming, lathering, and cleansing properties. It is also biodegradable and considered safe for use in cosmetic and personal care products. This product will not react with waste rock or alter the mineralogy. Attachment 3 contains the SDS.

Based on recent laboratory testing, DISA is required to utilize a flocculant called Superfloc A-100 (see SDS in Attachment 4), which consists of an anionic polyacrylamide. This flocculant is necessary to promote dewatering of the fines concentrates; otherwise, fines will mix with the clean coarse material, which is an undesirable result. This material is not hazardous, will not react with the fines concentrates, and will not alter any mineralogical characteristics. The USDA uses anionic polyacrylamide for runoff and soil erosion control, as described in the fact sheet included as Attachment 4.

None of these substances proposed by DISA will be used to process the waste rock or concentrate uranium. The dust suppressant will be used for safety, and the flocculant will be used to promote dewatering of the fines concentrates.

3. Provide a summary of the mineral composition of the range of HPSA fines that are expected based on planned AUM waste piles.

**Response:** DISA used ALS Canada and Eagle Engineering to perform mineralogical analyses on pre-HPSA feed samples and fines concentrates. Direct comparison of the results from these labs is not possible because the analytical methods were different (QEMSCAN vs. Automated Material Identification and Classification System (AMICS)), and the QEMSCAN (fines) samples underwent process testing at another laboratory prior to the QEMSCAN analysis. QEMSCAN

results indicated that uranium oxides and uranium vanadium silicates were the primary uranium-bearing minerals. Uranium oxides appear to contain higher percentages of uranium than the uranium vanadium silicates. The QEMSCAN results did not identify minerals by name; however, DISA assumes that the uranium oxides are carnotite and uraninite/pitchblende. DISA could not determine which mineral was associated with the uranium vanadium silicates.

The AMICS feed materials results indicated that carnotite was found in all samples for a particular site. No other uranium minerals were identified. Based on this information, DISA concludes that the HPSA process does not alter the mineralogical content of the waste rock and fines concentrates.

Based on DISA's lab testing results, we expect that the fines concentrates will comprise between 20% and 40% of the original mass of the waste rock depending on the quality and percent fines in the original waste rock.

4. Provide the chemical form of the fines (e.g., U<sub>3</sub>O<sub>8</sub>) and the range of the expected grade.

**Response:** Uranium in the fines is the same chemical form as that in the waste rock. Uranium occurs as the following minerals:

- Carnotite:  $K_2(UO_2)_2(VO_4)_2 \cdot 3H_2O$
- Uraninite/Pitchblende:  $UO_2$
- Coffinite:  $U(SiO_4) \cdot nH_2O$

U<sub>3</sub>O<sub>8</sub> is not a natural mineral structure, but is considered the final form of uranium milling, which is yellowcake.

5. Demonstrate that the fines are similar in radionuclide and chemical content and will have a uranium grade consistent with natural uranium ores routinely received and processed at conventional mills historically operating in the US, Canada, or other countries.

**Response:** Because DISA is treating uranium mine waste rock, the uranium grade will naturally be significantly lower than the ore that a conventional mill would receive in the United States. Due to HPSA treatment, the fines concentrates could contain between 500 and 2,500 mg/kg uranium; the upper end of this range resembles natural ores that conventional mills would receive. Furthermore, comparing United States roll-front ore to hydrothermal/geothermal deposits in Canada, Namibia, and other countries is not useful for this exercise.

United States roll front deposits (most U.S. deposits) are typically lower grade and of different mineralogy than foreign deposits. A grade of 0.2 percent is considered a good uranium deposit in the United States while Canadian ores typically contain at least 0.5% (a few are lower) and can go as high as 16% (<https://world-nuclear.org/information-library/country-profiles/countries-a-f/canada-uranium>). Energy Fuels Pinyon Plain mine exhibits a minimum grade of 0.58% uranium (<https://www.energyfuels.com/pinyon-plain-mine>). However, the primary uranium mineral is uraninite/pitchblende instead of carnotite, and the deposit is known as a Solution-Collapse Breccia Pipe Uranium deposit not a roll front deposit (Technical Report of Pinyon Plain Mine, SLR International Corporation 2023).

6. Provide details demonstrating where the fines would be introduced into the process at a conventional mill (e.g., leaching process) or if a new entry point into the process would need to be created. If no changes are needed, please explain/justify why not.

**Response:** Attachment 5 shows a conventional mill diagram identifying the location where the fines concentrates would be introduced. DISA's fines concentrates would be introduced directly into the leach circuit, or surge tanks upstream of the leach circuit, without any need for additional or new entry points. If a mill operator chose, the fines concentrates could also be introduced into a SAG mill. Doing so would waste energy because DISA's fines concentrates exhibit a smaller grain size than ore after the crushing and grinding circuit. From a regulatory perspective, DISA questions the need for this information because the need for a mill modification to introduce the fines has no bearing on whether or not the fines concentrates should be considered equivalent feed.

7. Demonstrate how the HPSA fines would affect the 11(e)2 tailings from a conventional mill. If no impact, justify why not.

**Response:** Processing DISA's fines concentrates would have no effect on the 11e.(2) byproduct material that is consequently generated. The fines concentrates would be of similar mineralogy to the ore that would be, and has been, processed at United States uranium mills. For example, DISA's fines concentrates are more similar in mineralogy and chemistry than more concentrated ores created through hydrothermal or geothermal processes, such as granitic or breccia pipe deposits. Yet uranium mills are free to process those ores without any further regulatory analysis.

8. Please evaluate the radiological and non-radiological effects of processing HPSA fines. Please include occupational and public exposure and short and long-term effects of processing the fines.

**Response:** DISA's fines concentrates would typically contain 500 to 2,500 mg/kg uranium and approximately 50 to 200 pCi/g radium-226. The upper end of these ranges would be similar to roll-front ore that a conventional mill would process and lower than other types of deposits. The chemical signature would also be similar to roll-front deposits, with selenium and molybdenum possibly present in the fines concentrates. Since the fines concentrates would be transported, processed, and disposed of (as tailings), the radiological and non-radiological effects would be the same as the effects from processing ore that have been evaluated for a conventional mill during the licensing process.

DISA appreciates your assistance in this matter. If you have any questions, please call me.

Sincerely,

Stephen J. Cohen  
Chief Regulatory Affairs Officer  
DISA Technologies, Inc.

cc: P. Yadav, NRC  
J. Marshall, NRC  
A. Kock, NRC  
G. Buckingham, DISA  
K. Walker, DISA

ATTACHMENTS:      1. Letter from Navajo Nation to NRC  
                             2. HPSA C-10 Flow Sheet  
                             3. SDS for DUSTREAT DC6019  
                             4. Superfloc A-100 SDS  
                             5. Conventional Mill Flow Diagram



March 18, 2026

The Honorable Ho K. Nieh  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555  
[Chairman@nrc.gov](mailto:Chairman@nrc.gov)

**Subject: Appreciation for NRC Engagement and Support for Uranium Legacy Remediation Efforts on the Navajo Nation, DISA Technologies, Inc., License No. SUA-1605, Docket No. 40-38417**

Chairman Ho K. Nieh:

On behalf of the Navajo Nation, I would like to express our appreciation for the continued engagement and professionalism of the U.S. Nuclear Regulatory Commission (NRC) in addressing legacy uranium issues affecting our communities. With gratitude, we would like to recognize the work of Ms. Andrea Kock and the staff of the Office of Nuclear Materials Safety and Safeguards for their constructive engagement and their efforts to provide regulatory clarity as we work toward solutions that address historic uranium contamination.

For many decades, the Navajo Nation has carried the burden and the associated environmental and health impacts of abandoned uranium mines (AUMs). Addressing these legacy sites remains a priority for the Navajo Nation as we work to restore lands, protect public health, and ensure that responsible remediation efforts move forward in a timely and transparent manner.

As part of this effort, the Navajo Nation Environmental Protection Agency has entered into an agreement with DISA Technologies, Inc. to conduct a Time Critical Removal Action (TCRA) at the Old Church Rock Mine. This project is intended to demonstrate and verify an innovative remediation approach using High-Pressure Slurry Ablation (HPSA) technology to treat uranium mine waste and safely recover uranium-bearing materials while leaving clean material onsite. HPSA treatment technology is critical to my Safer, Sooner strategy which will improve on USEPA's current AUM cleanup remedies by facilitating the reduction of toxicity, waste volumes and long-term threats to groundwater from radioactive waste and heavy metals.

Pending resolution of certain regulatory questions, the Navajo Nation hopes to commence operations immediately and complete the TCRA in 2026. The Phase II verification effort at Old Church Rock Mine represents an important step toward addressing legacy mine waste across the Navajo Nation and could provide a pathway for accelerating cleanup activities at other sites.

We appreciate the NRC staff's efforts in resolving outstanding technical and regulatory questions associated with the project, including providing clarity regarding the classification of materials

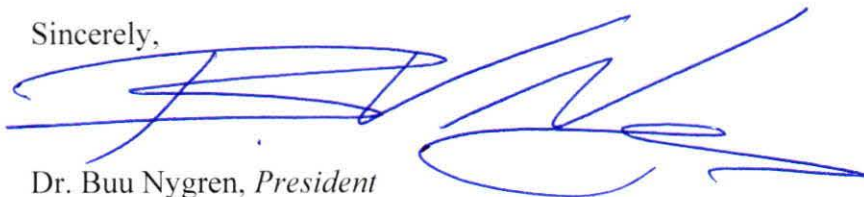
produced through the HPSA process. The lingering question is whether the fine concentrates generated during treatment may be considered equivalent feed for purposes of further processing at licensed uranium recovery facilities. The timely resolution of this question is critical to our efforts to prove that the HPSA technology can reduce the volume of radioactive waste that poses a danger to human health, while enabling the recycling of uranium to increase U.S. domestic production and continue reducing carbon emissions. The amount of waste requiring removal can be reduced by up to 80%, and up to 98% of the uranium can be recovered and hauled offsite for recycling. Unfortunately, our verification study cannot proceed without the ability to remove the fines concentrates from the study site, and the probability that the potentially recoverable uranium will be capped in place and lost to the fuel cycle increases with time.

Timely guidance on these issues is important to maintaining the project schedule and ensuring that remediation activities can proceed as planned. The Navajo Nation is grateful for the thoughtful attention that the NRC staff has given to these matters and for their willingness to work collaboratively with our technical teams.

Assuming the outstanding regulatory issues can be resolved and the project proceeds as planned, we would welcome the opportunity to invite the Commission and NRC staff to visit the Old Church Rock Mine later this year to observe the Phase II verification operations firsthand and to see how innovative technologies may contribute to addressing legacy uranium sites across the Navajo Nation.

Thank you again for the NRC's continued engagement and for the efforts of Director Kock and the NMSS staff in supporting these important initiatives.

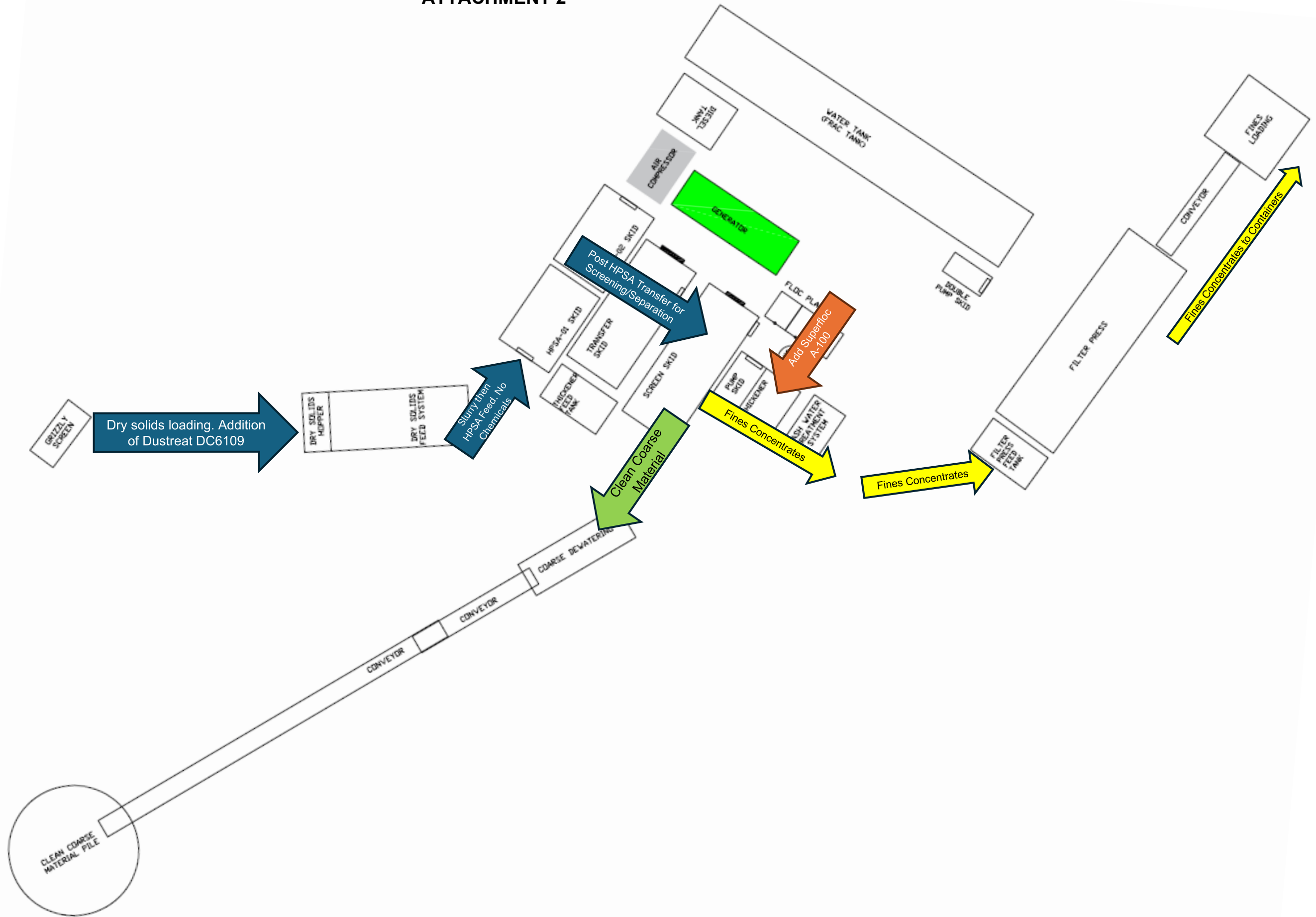
Sincerely,



Dr. Buu Nygren, *President*  
**THE NAVAJO NATION**

cc: Commissioner David A. Wright, [David.Wright@nrc.gov](mailto:David.Wright@nrc.gov)  
Commissioner Bradley R. Crowell, [Bradley.Crowell@nrc.gov](mailto:Bradley.Crowell@nrc.gov)  
Commissioner Matthew J. Marzano, [Matthew.Marzano@nrc.gov](mailto:Matthew.Marzano@nrc.gov)  
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ATTACHMENT 2





## ATTACHMENT 3

# SAFETY DATA SHEET

## DUSTREAT\* DC6109

### 1. Identification

<b>Product identifier</b>	<b>DUSTREAT DC6109</b>
<b>Other means of identification</b>	None.
<b>Recommended use</b>	Dust control agent.
<b>Recommended restrictions</b>	None known.

#### Company/undertaking identification

Veolia WTS USA, Inc.  
 3600 Horizon Blvd.  
 Treose, PA 19053  
 T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

### 2. Hazard(s) identification

<b>Physical hazards</b>	Not classified.	
<b>Health hazards</b>	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
<b>OSHA defined hazards</b>	Not classified.	

#### Label elements



<b>Signal word</b>	Danger
<b>Hazard statement</b>	Causes skin irritation. Causes serious eye damage.
<b>Precautionary statement</b>	
<b>Prevention</b>	Wash thoroughly after handling. Wear eye protection/face protection. Wear protective gloves.
<b>Response</b>	If on skin: Wash with plenty of water. 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. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
<b>Storage</b>	Store away from incompatible materials.
<b>Disposal</b>	Dispose of waste and residues in accordance with local authority requirements.
<b>Hazard(s) not otherwise classified (HNOC)</b>	None known.
<b>Supplemental information</b>	None.

### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
Sodium (C14-16) olefin sulfonate	68439-57-6	20 - 40

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

#### 4. First-aid measures

<b>Inhalation</b>	If breathing stops, provide artificial respiration. For breathing difficulties, oxygen may be necessary. Call a physician if symptoms develop or persist.
<b>Skin contact</b>	Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Rinse mouth. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting. Get medical attention if symptoms occur.
<b>Most important symptoms/effects, acute and delayed</b>	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

#### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
<b>Fire fighting equipment/instructions</b>	In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

#### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Local authorities should be advised if significant spillages cannot be contained.
<b>Methods and materials for containment and cleaning up</b>	Stop the flow of material, if this is without risk. Following product recovery, flush area with water. Never return spills to original containers for re-use.
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

#### 7. Handling and storage

<b>Precautions for safe handling</b>	Alkaline. Do not mix with acidic material. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Do not get this material in contact with eyes. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
<b>Conditions for safe storage, including any incompatibilities</b>	Store in original tightly closed container. Warming and mixing required if stored below 50F. Store in cool, well ventilated area. Store containers closed when not in use. Store away from oxidizers. Protect from freezing. If frozen, thaw and mix completely prior to use.

#### 8. Exposure controls/personal protection

<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
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<b>Appropriate engineering controls</b>	Eye wash fountain and emergency showers are recommended. 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.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Wear safety glasses with side shields (or goggles) and a face shield.
<b>Skin protection</b>	
<b>Hand protection</b>	Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear appropriate chemical resistant clothing.
<b>Respiratory protection</b>	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. A respiratory protection program that meets OSHA's 29 CFR 1910.34 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary. Not applicable.

## 9. Physical and chemical properties

<b>Appearance</b>	Liquid
<b>Physical state</b>	Liquid.
<b>Form</b>	Liquid.
<b>Color</b>	Light yellow to amber
<b>Odor</b>	Sweet
<b>Odor threshold</b>	Not available.
<b>pH (concentrated product)</b>	Not available.
<b>Melting point/freezing point</b>	19 °F (-7 °C)
<b>Initial boiling point and boiling range</b>	210 °F (99 °C)
<b>Flash point</b>	> 212 °F (> 100 °C) P-M(CC)
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	18 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	< 1 (Air = 1)
<b>Relative density</b>	1.06
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	100 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	72 cps
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
<b>Explosive properties</b>	Not explosive.
<b>Oxidizing properties</b>	Not oxidizing.
<b>pH in aqueous solution</b>	8.1 (5% SOL.)
<b>Pour point</b>	50 °F (10 °C)

VOC 0 % (ASTM 3960-93)

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Contact with incompatible materials.
<b>Incompatible materials</b>	Strong oxidizing agents.
<b>Hazardous decomposition products</b>	Oxides of carbon and sulphur evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Inhalation</b>	No adverse effects due to inhalation are expected.
<b>Skin contact</b>	Causes skin irritation.
<b>Eye contact</b>	Causes serious eye damage.
<b>Ingestion</b>	Expected to be a low ingestion hazard.

**Symptoms related to the physical, chemical and toxicological characteristics** Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain.

### Information on toxicological effects

**Acute toxicity** Not known.

Product	Species	Test Results
DUSTREAT DC6109		
<b>Acute</b>		
<b>Dermal</b>		
LD50	Rabbit	> 5000 mg/kg (Calculated according to GHS additivity formula)
<b>Inhalation</b>		
LC50	Rat	> 5 mg/l, 4 hours (Calculated according to GHS additivity formula)
<b>Oral</b>		
LD50	Rat	> 5000 mg/kg (Calculated according to GHS additivity formula)

Components	Species	Test Results
Sodium (C14-16) olefin sulfonate (CAS 68439-57-6)		
<b>Acute</b>		
<b>Dermal</b>		
LD50	Rabbit	> 6000 mg/kg
<b>Inhalation</b>		
LC50	Rat	> 52 mg/l/4h
<b>Oral</b>		
LD50	Rat	2079 mg/kg

**Skin corrosion/irritation** Causes skin irritation.

**Serious eye damage/eye irritation** Causes serious eye damage.

### Respiratory or skin sensitization

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

**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** This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

## IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

## OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

## US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met. Not an aspiration hazard.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

### Ecotoxicity

Product		Species	Test Results
<b>Aquatic</b>			
Crustacea	LC50	Daphnia magna	16 mg/L, 48 hour
	NOEL	Daphnia magna	6.3 mg/L, 48 hour
Fish	10% Mortality	Fathead Minnow	0.78 mg/L, 96 hour
	LC50	Fathead Minnow	4 mg/L, 96 hour
		Rainbow Trout	7.1 mg/L, 96 hour
	NOEL	Rainbow Trout	5 mg/L, 96 hour

### Persistence and degradability

- COD (mgO <sub>2</sub> /g)	860
- BOD 5 (mgO <sub>2</sub> /g)	7
- BOD 28 (mgO <sub>2</sub> /g)	303
- Closed Bottle Test (% Degradation in 28 days)	37
- Zahn-Wellens Test (% Degradation in 28 days)	45
- TOC (mg C/g)	200

### Bioaccumulative potential

**Mobility in soil** No data available.

**Other adverse effects** Not available.

## 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).  
Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

**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.

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

### 15. Regulatory information

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

#### Toxic Substances Control Act (TSCA)

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 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical

Yes

Classified hazard

Skin corrosion or irritation

Serious eye damage or eye irritation

SARA 313 (TRI reporting)

Not regulated.

#### Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Formaldehyde (CAS 50-00-0)

Methanol (CAS 67-56-1)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Formaldehyde (CAS 50-00-0)

Safe Drinking Water Act

Not regulated.

(SDWA)

#### Inventory status

Country(s) or region

Inventory name

Canada	Domestic Substances List (DSL)	Canada	On inventory (yes/no)*
Canada	Non-Domestic Substances List (NDSL)	United States & Puerto Rico	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	United States & Puerto Rico	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).	

#### US state regulations

California Proposition 65



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

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Formaldehyde (CAS 50-00-0)

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Methanol (CAS 67-56-1)

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

Material name: DUSTREAT\* DC6109

Version number: 5.1

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

**Issue date** Oct-10-2014  
**Revision date** Feb-17-2023  
**Version #** 5.1  
**NFPA ratings** Health: 3  
Flammability: 0  
Instability: 0

**NFPA ratings**



**List of abbreviations**

CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
ACGIH: American Conference of Governmental Industrial Hygienists

**References:**

No data available

**Disclaimer**

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.

**Revision information**

This document has undergone significant changes and should be reviewed in its entirety.

**Prepared by**

This SDS has been prepared by Veolia Water Technologies & Solutions' Regulatory Department (1-215-355-3300).

\* Trademark of Veolia. May be registered in one or more countries.

Ref. /US/EN

Revision Date: 02/12/2015

Previous date: 00/00/0000

Print Date:11/05/2015

**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING****Product information****Product name**  
**SUPERFLOC A-100****Recommended use of the chemical and restrictions on use****Use of the Substance/Mixture**

Water treatment chemical

**Recommended restrictions on use**

-

**Supplier's details**Kemira Chemicals, Inc.  
1000 Parkwood Circle, Suite 500  
30339 Atlanta USA  
Telephone+17704361542, Telefax. +17704363432  
ProductSafety.US.Kennesaw@kemira.comHEAD OFFICE  
Kemira Oyj  
P.O. Box 330  
00101 HELSINKI  
FINLAND  
Telephone +358108611 Telefax +358108621124**Emergency telephone number**

CHEMTREC: 1-800-424-9300

**2. HAZARDS IDENTIFICATION****Classification of the substance or mixture**

The material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard's (29CFR 1910.1200) implementation of the Globally Harmonized System (GHS), i.e., material is not a dangerous substance or mixture requiring GHS classification according to the US GHS regulations.;

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#### GHS-Labeling

Product is not hazardous under US GHS.

#### Other hazards which do not result in classification

**Advice;** Spills are very slippery when wet.

**Skin;** Repeated or prolonged exposure may cause: May cause skin irritation.

**Eyes;** Dust contact with the eyes can lead to mechanical irritation.

**Ingestion;** Essentially non-toxic.

**Chronic exposure;** No known carcinogenic or other chronic effects.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### Substances /Mixtures

Chemical nature

Anionic polyacrylamide.

#### Further information

This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

### 4. FIRST AID MEASURES

#### Description of first aid measures

##### Inhalation

No hazards which require special first aid measures. Remove to fresh air.

##### Skin contact

Wash off with soap and water.

##### Eye contact

Rinse thoroughly with plenty of water, also under the eyelids. If possible use lukewarm water.

##### Ingestion

Rinse mouth with water. Material is not expected to be harmful by ingestion. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Consult a physician if necessary.

#### Most important symptoms and effects, both acute and delayed

**5. FIREFIGHTING MEASURES****Suitable extinguishing media**

Water spray  
Carbon dioxide (CO<sub>2</sub>)  
Dry chemical  
Water mist

**Special hazards arising from the substance or mixture**

Dust may be explosive if mixed with air in critical proportions and in the presence of a source of ignition.

**Special protective actions for fire-fighters**

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

**Further information**

Avoid dust accumulation.

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions, protective equipment and emergency procedures**

For personal protection see section 8.

**Environmental precautions**

Should not be released into the environment.

**Methods and materials for containment and cleaning up**

Product becomes slippery when it is wet. Shovel into suitable container for disposal. After cleaning, flush away traces with water.

**7. HANDLING AND STORAGE****Precautions for safe handling**

For personal protection see section 8. Avoid dust formation during handling.

**Conditions for safe storage, including any incompatibilities**

Store in original container.

**Materials to avoid:**

Strong oxidizing agents

Storage stability:

Storage temperature

40 - 90 °F

Other data

Stable under recommended storage conditions.

Reason:

integrity

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Form of exposure	Control parameters	Update	Basis
------------	---------	-------	------------------	--------------------	--------	-------

Contains no substances with occupational exposure limit values.

### Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands and face before breaks and immediately after handling the product. Avoid contact with skin, eyes and clothing. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation.

### Individual protection measures, such as personal protective equipment

#### Respiratory protection

When there is potential for airborne exposures in excess of applicable limits, wear NIOSH/MSHA approved respiratory protection.

#### Hand protection

Glove material: Impervious gloves, Avoid contact with skin.

#### Skin and body protection

Protective clothing.

#### Eye protection

Safety goggles

#### Environmental exposure controls

No data available

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

<b>Physical state</b>	solid, powder
<b>Colour</b>	white
<b>Odour</b>	odourless
<b>pH</b>	6 - 8 ( 0.5 %) Aqueous solution
<b>Melting point/range</b>	not determined
<b>Freezing point :</b>	Not applicable.
<b>Initial boiling point and boiling range</b>	
<b>Flash point</b>	Not applicable
<b>Explosive properties:</b>	
<b>Lower explosion limit</b>	No data available
<b>Upper explosion limit</b>	No data available
<b>Vapour pressure</b>	Not applicable
<b>Bulk density</b>	650 - 850 kg/m <sup>3</sup>
<b>Solubility(ies):</b>	
<b>Water solubility</b>	Limited by viscosity.
<b>Partition coefficient: n-octanol/water</b>	Not applicable
<b>Decomposition temperature</b>	392 °F
<b>Oxidising potential</b>	The substance or mixture is not classified as oxidizing.
<b>Surface tension</b>	Not applicable

## 10. STABILITY AND REACTIVITY

### Reactivity

### Chemical stability

### Possibility of hazardous reactions

Hazardous reactions:

Hazardous polymerisation does not occur.

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#### Conditions to avoid

Conditions to avoid: None known.  
Stable under normal conditions.

#### Incompatible materials

Materials to avoid: Strong oxidizing agents

#### Hazardous decomposition products

Hazardous decomposition products: Ammonia  
Carbon oxides (COx)  
Nitrogen oxides (NOx)

Thermal decomposition: 392 °F

## 11. TOXICOLOGICAL INFORMATION

#### Information on toxicological effects

**Acute oral toxicity** Conclusion: The acute toxicological results displayed may not be the results of actual testing of this material but based on a similar tested material.

Remarks: estimated  
/Rat/> 5,000 mg/kg/LD50

**Acute inhalation toxicity** LC50/Rat/4 h/> 20 mg/l  
Remarks: estimated

**Acute dermal toxicity** LD50/Rabbit  
/> 10,000 mg/kg

Remarks: estimated

#### Skin corrosion/irritation

Conclusion: No skin irritation

#### Serious eye damage/eye irritation

Conclusion: No eye irritation

#### Respiratory or skin sensitisation

**Skin sensitisation**

Conclusion: Not sensitizing.

**Germ cell mutagenicity****Genotoxicity in vitro**AMES test  
Remarks: No data available**Carcinogenicity****Carcinogenicity**

Based on available data, the classification criteria are not met.

**Reproductive toxicity****12. ECOLOGICAL INFORMATION****Ecotoxicity effects****Aquatic toxicity**

Remarks: Ecotoxicological information provided is based on a structurally or compositionally similar product.

LC50/96 h/Lepomis macrochirus (Bluegill sunfish)/Acute toxicity/OECD Test Guideline 203: &gt; 100 mg/l

Remarks: fresh water

LC50/96 h/Oncorhynchus mykiss (rainbow trout)/Acute toxicity/OECD Test Guideline 203: &gt; 100 mg/l

Remarks: fresh water

EC50/48 h/Daphnia magna (Water flea)/Immobilization/OECD Test Guideline 202: &gt; 100 mg/l

Remarks: Ecotoxicological information provided is based on a structurally or compositionally similar product.

IC50/72 h/Green algae (Selenastrum capricornutum)/Growth inhibition/OECD Test Guideline 201: &gt; 100 mg/l

Remarks: Ecotoxicological information provided is based on a structurally or compositionally similar product.

**Toxicity to other organisms**

No data available

**Persistence and degradability**

Biological degradability:

Remarks: Ecotoxicological information provided is based on a structurally or compositionally similar product.

CO2 Evolution Test/OECD Test Guideline 301B/28 d: &lt; 70 %

The polymeric ingredient is not readily biodegradable.

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#### Bioaccumulative potential

Bioaccumulation is unlikely. Because of the high molecular weight of the polymer diffusion through biological membranes is very small.

Partition coefficient: n-octanol/water: Not applicable

#### Mobility in soil

Water solubility: Limited by viscosity.

Surface tension: Not applicable

#### Other adverse effects

No data available

Additional ecological information: Ecotoxicological information provided is based on a structurally or compositionally similar product. This material is not classified as dangerous for the environment. The effects on aquatic organisms are due to an external (non-systemic) mode of action and are significantly reduced (by a factor of 7-20) within 30 minutes due to the binding of the product to dissolved organic carbon and inorganic sorbents such as clays and silts.

### 13. DISPOSAL CONSIDERATIONS

#### Product

If recycling is not practicable, dispose of in compliance with local regulations. Incineration is recommended.

EPA Hazardous Waste - NO

#### Contaminated packaging

Packages must be disposed of according to local and national regulations.

### 14. TRANSPORT INFORMATION

#### Land transport

Not classified as dangerous in the meaning of transport regulations.

#### Sea transport

Not classified as dangerous in the meaning of transport regulations.

#### Air transport

Not classified as dangerous in the meaning of transport regulations.

#### Special precautions for user

None known.

## 15. REGULATORY INFORMATION

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

#### SARA Title III Section 311 Categories

Immediate (Acute) Health Effects: No;  
Delayed (Chronic) Health Effects: No;  
Fire Hazard: No;  
Sudden Release Of Pressure Hazard: No;  
Reactivity Hazard: No;

#### US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)

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

None Present ()

#### US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

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.

None Present ()

#### California Proposition 65

Acrylamide (79-06-1) < 0.05 %

Remarks: This product contains a chemical or chemicals known to the state of California to cause cancer, birth defects or other reproduction harm.

#### Notification status

- :
- : All components of this product are included in the United States TSCA Chemical Inventory or are not required to be listed on the United States TSCA Chemical Inventory.
- : All components of this product are included in the European Inventory of Existing Chemical Substances (EINECS) or are not required to be listed on EINECS.
- : All components of this product are included in the Canada

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- Domestic Substance List (DSL) or are not required to be listed on the Canada Domestic Substance List (DSL).
- : All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese (ENCS) inventory.
  - : All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or are not required to be listed on the Australian Inventory of Chemical Substances (AICS).
  - : All components of this product are included in the Korean (ECL) inventory or are not required to be listed on the Korean (ECL) inventory.
  - : All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine (PICCS) inventory.
  - : All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.
  - : All components of this product are included on the Taiwan Toxic Chemical Substances Control Act Inventory.
  - : All components of this product are included in the New Zealand inventory (NZIoC) or are not required to be listed on the New Zealand inventory(NZIoC).

**16. OTHER INFORMATION****HMIS Rating**

Health: 0  
Flammability: 1  
Reactivity: 0

**NFPA Rating**

Health: 0  
Fire: 1  
Reactivity: 0

**Training advice**

Read the safety data sheet before using the product.

**Further information**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as

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.

This MSDS is prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by Kemira.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

**Sources of key data used to compile the Safety Data Sheet**

Regulations, databases, literature, own tests.

**Additions, Deletions, Revisions**

Relevant changes have been marked with vertical lines.



## PAM (anionic Polyacrylamide) for Runoff and Soil Erosion Control

PAM, or anionic Polyacrylamide, is a very long chain, high molecular weight organic polymer produced from natural gas, with characteristics which make it useful as a soil amendment to control runoff and soil loss. The chemical when applied as a liquid solution to a freshly-tilled soil surface will strongly bond to the soil aggregates, strengthening them and greatly reducing aggregate breakdown and slaking. PAM is also a flocculating agent, so it also helps to prevent dispersion of soil by rain water into fine clays and silts that can clog soil pores and cause sealing and crusting. Often PAM is applied along with an electrolyte source such as a gypsiferous material (gypsum or power plant byproducts), which enhances its performance.



Soil treated with PAM, before rainfall.



Soil without PAM, after rainfall.



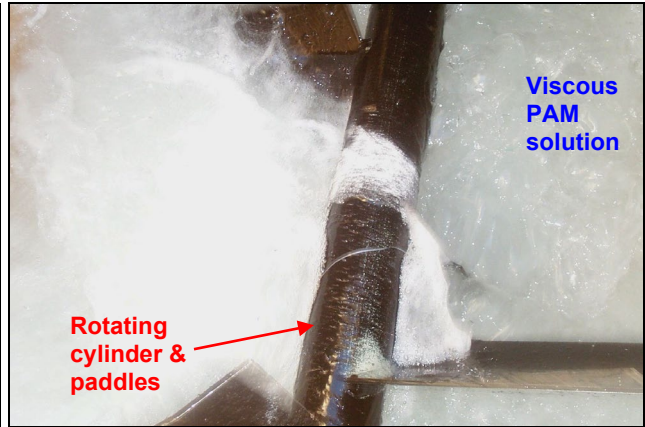
Soil treated with PAM, after rainfall.

Rates of PAM application range from 10 to 100 pounds/Acre, depending upon the type of flow expected and the severity of the slope's erosion potential. For common agricultural fields, a rate of about 18 lbs/A is typically recommended. For a very steep highway or landfill embankment, rates over 100 lbs/A may be used. The dry powdered PAM material can be made into a water solution by using a hydroseeder to obtain sufficient mixing and agitation (usually a maximum 0.05% to 0.2% solution). If applied in conjunction with a separate dry gypsiferous material soil surface application, the rate for the gypsum can range from 0.5 to 3 tons/Acre. PAM can be effective up to several months if there is no subsequent soil disturbance.

Anionic Polyacrylamide is produced by a number of manufacturers. These include Applied Polymer Systems (Woodstock, GA), Cytec Industries Inc. (West Paterson, NJ), Ciba Specialty Chemical Corp. (Suffolk, VA), Hercules Environmental (Doraville, GA), Stockhausen, Inc. (Greensboro, NC), and SNF Floerger (Riceboro, GA; Pearl River, LA; Bay St. Louis, MS). Current cost of PAM ranges from \$1 to \$5 per pound, and is sold under a variety of trade names (APS series, SoilFix, Percol, Soiloc-PAM, HydroPAM, etc.), as either a dry powder or emulsion. (Please note – mention of companies or trade names does not constitute endorsement by USDA-ARS).



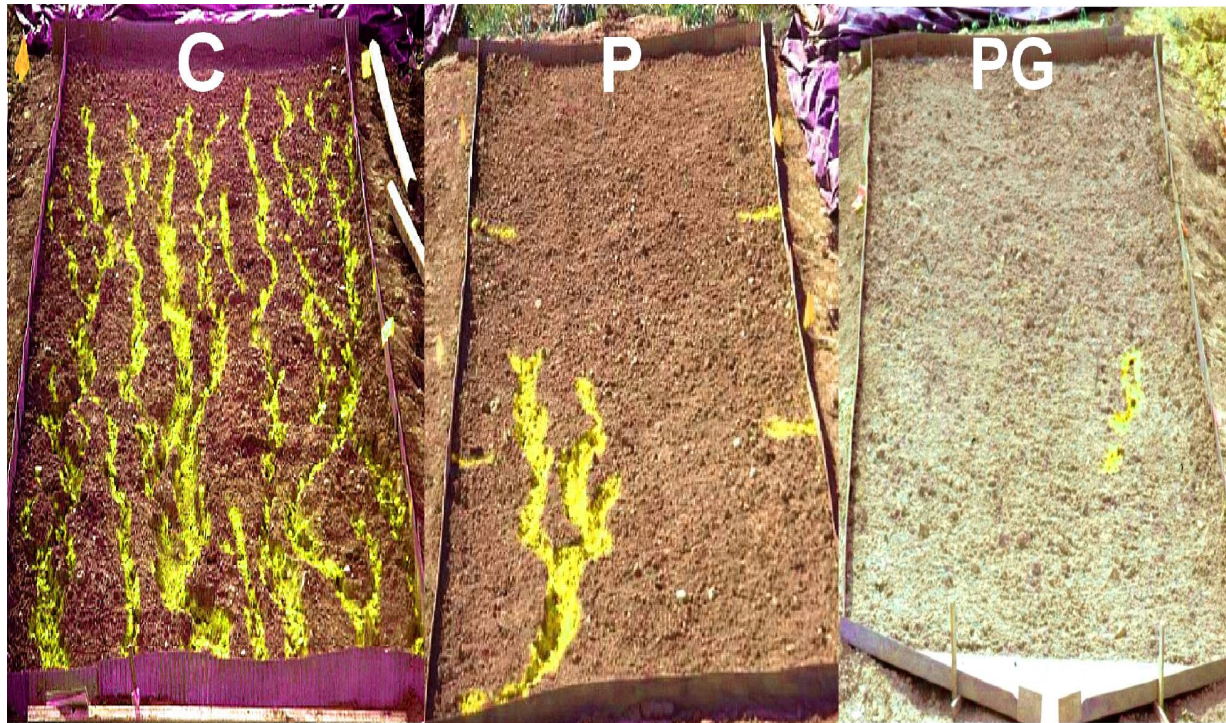
Adding PAM dry powder to a hydroseeder tank.



PAM solution mixing in hydroseeder tank.



Applying PAM solution with a hydroseeder to a newly constructed grass waterway channel.



Rilling and erosion resulting from a total of about 7 inches of simulated rainfall applied to a 3:1 embankment with a silt loam soil cap. Rills highlighted with fluorescent paint to improve visibility. From left to right is an untreated control (C), PAM (P), and PAM plus Gypsum (PG). PAM rate used here was 72 lbs/Acre and gypsum rate was 2.6 tons/Acre. Research was conducted by the USDA-ARS National Soil Erosion Research Laboratory in West Lafayette, Indiana, just south of the Purdue University campus.

ATTACHMENT 5

