

OGMCOAL - Crandall Canyon Mine Water Treatment

From: Kevin Lundmark
To: OGMCOAL
Date: 2/9/2011 11:22 AM
Subject: Crandall Canyon Mine Water Treatment
CC: Steve Christensen
Attachments: 122210 UtahAmerican Energy Settling Trial Report.pdf; UPDES Spreadsheet.xls; Mine Flows.xls

Mail from Dana Marrelli re: Crandall Canyon Mine Water Treatment

>>> "Marrelli, Dana" <dmarrelli@coalsource.com> 2/9/2011 11:13 AM >>>

Hello Kevin,

Sorry about that. Here is the attachment. I have also attached the January 2011 sample results, and the mine flows.

Thank you,

Dana

From: Kevin Lundmark [mailto:kevinlundmark@utah.gov]
Sent: Wednesday, February 09, 2011 11:05 AM
To: Marrelli, Dana
Cc: Steve Christensen
Subject: RE: Fwd: Crandall Canyon Mine

Hi Dana,

Thanks for following up on this. There was no attachment to the message I received.... could you please re-send? It looks like you have received the results for January 2011, so if you could also please send those at your earliest convenience.

Kevin

>>> "Marrelli, Dana" <dmarrelli@coalsource.com> 2/9/2011 9:59 AM >>>

Hello Kevin,

- Genwal's plan and schedule for testing the new WaterSolve chemicals:

We would like to test the iron based coagulant beginning next Wednesday, February 16th, 2011. A field sample will be taken at the outlet of the pond prior to the change. The sample will be field tested for total iron. We will begin the new chemical at 8:00 am and will visually monitor the pond throughout the day. Another field sample will be taken approximately 6 hours later. The new chemical will continue to run through the night. Adjustments will be made to increase or decrease application rate accordingly.

- The expected application rates for testing:

We will begin using the same application rate that we are currently using on the 8187 coagulant. After monitoring the pond for 24 hours, we will make any changes to increase or decrease the rate accordingly. We are hopeful that the application rate will be close to the application rate that we are currently using. Current rate 30 – 50 ppm.

- WaterSolve Bench Test Report:

Please see attachment.

I spoke with Randy from WaterSolve yesterday and told him that you would be calling him about your questions on the 1ppm coagulant concentration.

I had both SGS and WaterSolve test for total aluminum in the 1ppm coagulant concentration. The first sheet mailed to you was SGS lab results showing total aluminum to be 0.13 and the second page was WaterSolve's results for total aluminum at 0.116. Our January sample for 002 total aluminum 0.10. These numbers are all comparable.

Randy's phone number is:
Office- (616)575-8693
Direct- (616)292-2666

Please let me know if you need anything else.

Thank you,
Dana

From: Kevin Lundmark [mailto:kevinlundmark@utah.gov]
Sent: Thursday, February 03, 2011 6:51 AM
To: Marrelli, Dana
Cc: Shaver, Dave; Denise Dragoo; Dana Dean; Daron Haddock; Steve Alder; Steve Christensen
Subject: Re: Fwd: Crandall Canyon Mine

Dana,
Thanks for sending this information along. Can you please provide the Division the following:
1. Genwal's plan and schedule for testing these chemicals at the site;
2. the expected application rates for these chemicals based on WaterSolve's bench testing; and
3. the bench test report(s) prepared by WaterSolve.

Also, can you please confirm whether this information about the proposed new chemicals has been provided to the Forest Service and DWQ.

Thanks again,
Kevin

Kevin Lundmark
Environmental Scientist II
Division of Oil, Gas & Mining
kevinlundmark@utah.gov
(801)538-5352

>>> Daron Haddock 1/31/2011 10:34 AM >>>
Forwarded FYI--

>>> "Marrelli, Dana" <dmarrelli@coalsource.com> 1/26/2011 10:04 AM >>>
Hello,

After doing bench tests with multiple chemicals, WaterSolve has recommended the following chemicals to be used at Crandall Canyon, which we intend to try. Please see the enclosed MSDS Sheets for the Iron based WaterSolve Coagulant (Solve 3) and the WaterSolve Flocculant (Solve 151). Both chemicals are NSF60 certified.

WaterSolve offers a coagulant with an NSF60 rating of 250 and a flocculant with an NSF60 rating of 3.5, more

than tripling the Nalco flocculant rating which we are presently using. The WaterSolve Iron based coagulant would also eliminate the Aluminum issue.

Flocculant:	Nalco 7763	1.0 ppm	WaterSolve 151	3.5 ppm
Coagulant:	Nalco 8187	180 ppm	WaterSolve 3	250 ppm

Thank you,

Dana Marretti

Utah American Energy Inc.
PO Box 910
East Carbon, Utah 84520
Work: 435-888-4026
Cell: 435-650-9799

Crandall Canyon Mine Flows

Date	Time	Pressure	GPM	Recorded by:
1/1/2011	9:00	30.10	533	Brenda
1/1/2011	15:00	30.13	516	Brenda
1/2/2011	9:00	30.28	491	Brenda
1/2/2011	15:00	30.23	493	Brenda
1/3/2011	7:00	30.07	479	Bert
1/3/2011	15:00	30.04	488	Bert
1/4/2011	9:00	30.13	487	Bert
1/4/2011	15:00	30.13	475	Bert
1/5/2011	9:00	30.31	414	Bert
1/5/2011	15:00	30.31	423	Bert
1/6/2011	9:00	30.38	481	Brenda
1/6/2011	15:00	30.30	497	Brenda
1/7/2011	9:00	30.15	415	Brenda
1/7/2011	15:00	30.05	387	Brenda
1/8/2011	9:00	29.87	474	Brenda
1/8/2011	15:00	29.77	490	Brenda
1/9/2011	9:00	29.75	522	Brenda
1/9/2011	15:00	29.79	509	Brenda
1/10/2011	9:00	30.08	507	Bert
1/10/2011	15:00	30.13	506	Bert
1/11/2011	9:00	30.40	506	Bert
1/11/2011	15:00	30.36	450	Bert
1/12/2011	9:00	30.45	466	Bert
1/12/2011	15:00	30.41	453	Bert
1/13/2011	9:00	30.43	427	Bert
1/13/2011	15:00	30.41	792	Bert
1/14/2011	9:00	30.14	387	Brenda
1/14/2011	15:00	COMPUTER DOWN	392	Brenda
1/15/2011	9:00	COMPUTER DOWN	411	Brenda
1/15/2011	15:00	COMPUTER DOWN	406	Brenda
1/16/2011	9:00	COMPUTER DOWN	429	Brenda
1/16/2011	15:00	COMPUTER DOWN	380	Brenda
1/17/2011	9:00	30.02	632	Brenda
1/17/2010	15:00	COMPUTER DOWN	542	Brenda
1/18/2010	9:00	COMPUTER DOWN	486	Bert
1/18/2010	15:00	COMPUTER DOWN	476	Bert
1/19/2011	9:00	30.29	517	Bert
1/19/2011	15:00	29.78	523	Bert
1/20/2011	9:00	29.87	496	Bert
1/20/2011	15:00	30.21	492	Bert
1/21/2011	9:00	30.20	488	Bert
1/21/2011	15:00	30.17	478	Bert
1/22/2011	9:00	29.95	491	Brenda
1/22/2011	15:00	29.95	489	Brenda
1/23/2011	9:00	30.22	485	Brenda
1/23/2011	15:00	30.15	473	Brenda
1/24/2011	9:00	30.19	487	Brenda
1/24/2011	15:00	30.16	476	Brenda
1/25/2011	9:00	30.16	486	Brenda
1/25/2011	15:00	30.11	478	Brenda
1/26/2011	9:00	30.30	477	Bert
1/26/2011	15:00	30.29	458	Bert
1/27/2011	9:00	30.34	470	Bert
1/27/2011	15:00	30.29	463	Bert
1/28/2011	9:00	30.23	480	Bert
1/28/2011	15:00	30.26	468	Bert
1/29/2011	9:00	30.08	457	Bert
1/29/2011	15:00	30.03	451	Bert
1/30/2011	9:00	29.95	512	Brenda
1/30/2011	15:00	29.88	503	Brenda
1/31/2011	9:00	29.89	548	Brenda
1/31/2011	15:00	29.87	481	Brenda
			29849	481

Crandall Canyon Mine

Pre-Treatment Mine Water 2010

Parameter	Units	January	February	March	April
		1/24/2011			
Field					
pH	std. units	7.02			
Temperature	deg. C	11			
Conductivity	µmhos/cm ²	926			
Dissolved Oxygen	mg/L	4.27			
Lab					
Iron	total, mg/L	2.930			
Iron	dissolved, mg/L	0.54			
Iron	ferrous, mg/L	0.781			
Aluminum	total, mg/L	<0.03			
Aluminum	dissolved, mg/L	<0.03			
Manganese	total, mg/L	0.108			
Manganese	dissolved, mg/L	0.108			
Alkalinity	Bicarbonate, mg/L	377			
Alkalinity	Carbonate, mg/L	<5			
Alkalinity	Total	377			
Sulfate	mg/L	156			
TDS	mg/L	605			
Suspended Solids	mg/L	8			
Chloride	mg/L	11			
Calcium	Dissolved, mg/L	99.16			
Potassium	Dissolved, mg/L	8.29			
Sodium	Dissolved, mg/L	36.36			
Magnesium	Dissolved, mg/L	55.33			
Silica	Dissolved, mg/L	9.2			
Hot Acidity	mg/L	-374			

Crandall Canyon Mine

Pre-Treatment Mine Water 2010

Parameter	Units	January	February	March	April
		1/24/2011			
Field					
pH	std. units	7.02			
Temperature	deg. C	11			
Conductivity	µmhos/cm2	926			
Dissolved Oxygen	mg/L	4.27			
Lab					
Iron	total, mg/L	2.930			
Iron	dissolved, mg/L	0.54			
Iron	ferrous, mg/L	0.781			
Aluminum	total, mg/L	<0.03			
Aluminum	dissolved, mg/L	<0.03			
Manganese	total, mg/L	0.108			
Manganese	dissolved, mg/L	0.108			
Alkalinity	Bicarbonate, mg/L	377			
Alkalinity	Carbonate, mg/L	<5			
Alkalinity	Total	377			
Sulfate	mg/L	156			
TDS	mg/L	605			
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Chloride	mg/L	11			
Calcium	Dissolved, mg/L	99.16			
Potassium	Dissolved, mg/L	8.29			
Sodium	Dissolved, mg/L	36.36			
Magnesium	Dissolved, mg/L	55.33			
Silica	Dissolved, mg/L	9.2			
Hot Acidity	mg/L	-374			

SETTLING TRIAL PERFORMANCE
MINE DRAINAGE RESIDUAL
CRANDALL CANYON MINE
UTAHAMERICAN ENERGY, INC.

For:
Dana Marrelli
Genwal Resources, Inc.

By:
WaterSolve, LLC
4964 Starr St., SE
Grand Rapids, MI 49546
www.gowatersolve.com
616-575-8693



December 22, 2010

1. Scope of Work

WaterSolve, LLC was tasked to perform a performance trial on a mine drainage residual sample collected at Crandall Canyon Mine. The objectives of these trials were to identify the most effective chemical conditioning program including dosing rate(s) for the existing treatment facility.

2. Materials & Methods

A sample of unconsolidated mine drainage residual was received at WaterSolve's Laboratory (Grand Rapids, MI). Subsamples of residual were homogenized and 100-mL samples were placed in graduated, glass jars.

Several anionic polymers and organic coagulants were "made-down" (200-mL) at a 0.5% concentration for this dewatering trial. Polymer was added to a sample with a 1.0-mL plastic syringe and moderately tumbled five to seven times. Inorganic coagulants were fed neat using a micro-liter pipette. Observations of settling rate, water clarity, and flocculent appearance were recorded on appropriate data sheets (Appendix A). Polymer(s) that flocculated and settled these residuals most effectively were re-evaluated with lower doses in order to isolate the most efficient coagulant and flocculating polymer(s).

3. Results

Chemical conditioning with Solve 3 followed by Solve 151 was determined to flocculate and settle the solids in this residual most effectively compared to the other chemical conditioning programs (Appendix A). Settling rate and flocculent appearance were good to excellent at a 10- μ L (100-ppm) dose of Solve 3 followed by a 0.2-mL (10-ppm) dose of Solve 151.

The sample as provided was 0.06-percent dry weight solids.

4. Recommendations

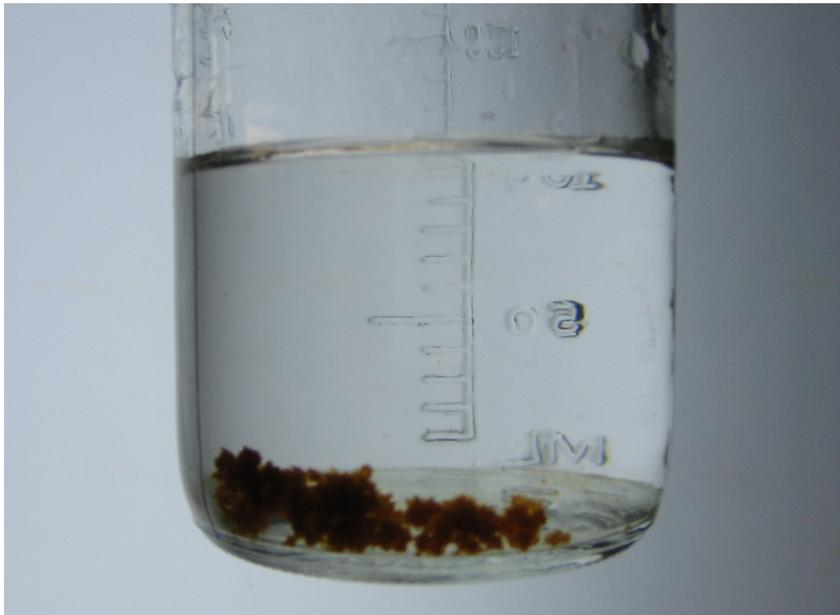
We recommend chemical conditioning with Solve 3 (80 to 100-ppm) followed by Solve 151 (10-ppm) for this treatment application.

Solve 151 is required to be made-down at 0.5% with a polymer make-down unit or aged in batch/feed tanks prior to injection into the residual line. Solve 3 should be fed neat prior to the Solve 151 injection. Moderate mixing energy is required between the injection points and after the final injection point.

Appendix B- Photographs



A comparison of coagulants is shown above. From left to right, current coagulant, Solve 80, and Solve 3 (all 100-ppm coagulant and 10-ppm Solve 151).



One hundred milliliters of mine drainage with 10- μ L (100-ppm) Solve 3 and 0.2-mL (10-ppm) Solve 151.

Inorganic Coagulant Solve 3A

Material Safety Data Sheet

Date Issued: 09/17/09

Date Revised: 09/17/09

I. Product Identification

Product Name: **Solve 3A**
 Chemical Type: Ferric Chloride
 Chemical Family: Inorganic Salts
 Formula: FeCl₃
 Synonym: Iron (III) Chloride

Company: WaterSolve LLC., 4964 Starr St. S.E. Grand Rapids, Michigan 49546, USA
 For product information call 616 575-8693 or visit www.gowatersolve.com

COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component</u>	<u>CAS#</u>	<u>Weight %</u>	<u>ACGIH TWA</u>	<u>OSHA (PEL)</u>
Ferric Chloride	7705-08-0	38-42%	Not established	Not established
Water	7732-18-5	55-63	Not available	
Hydrochloric Acid	7647-01-0	<0.5%	2ppm (Ceiling)	7 mg/m ³ (Ceiling) 5ppm (Ceiling)

II. Hazards Identification

EMERGENCY OVERVIEW:
APPEARANCE AND ODOR:
COLOR: reddish-brown
APPEARANCE: liquid
ODOR: slight pungent

STATEMENT OF HAZARD:

WARNING! CAUSES EYE AND SKIN IRRITATION

DANGER!

Corrosive material. Causes burns. Reacts with metals to release flammable hydrogen gas. May be harmful or fatal if swallowed in large amounts. Effects may be delayed.

POTENTIAL HEALTH EFFECTS

Target organs: Eyes, skin, respiratory system, digestive system.

Signs and symptoms of short-term (acute) exposure:

Inhalation: Vapors and mists may be corrosive or irritating to the nose, throat and respiratory tract. Symptoms may include burning sensation, coughing, shortness of breath, lung inflammation and pulmonary edema (fluid accumulation).

Skin Contact: Vapors, mists and liquids may cause severe irritation and/or corrosive burns to the skin. Symptoms may include dryness, discomfort or rash, deep burns and tissue damage.

Eye contact: Direct eye contact may cause severe irritation, tearing, blurred vision, corrosive burns, severe damage, eye injury and permanent blindness.

Ingestion: Vapors, mists, and liquids are corrosive to the mouth, throat and digestive system. Ingestion may result in abnormal liver and kidney function. Symptoms may include nausea, vomiting, pain, diarrhea, coma and death. Effects may be delayed by up to three days.

Effects of long term (chronic) exposure: Chronic skin contact with low concentrations may cause dermatitis.

Other important hazards: eye contact may cause eye tissue discoloration. For further information on other important hazards, see TOXICOLOGICAL INFORMATION.

III. First Aid

General: If you feel unwell, seek medical attention (show the label or this MSDS if possible). Effects of exposure (inhalation, ingestion, or skin contact) To substance may be delayed. Ensure that medical personnel are aware of the material (s) involved, and take precautions to protect themselves.

- Eye Contact: Do not rub. Immediately flush eyes gently for 30 minutes with plenty of water, occasionally lifting upper and lower lids, until no evidence of chemical remains. Call a physician immediately.
- Skin Contact: Wash immediately with plenty of water for at least 30 minutes while removing contaminated clothing, jewelry and shoes. Do not reuse contaminated clothing without laundering. If irritation or pain is still present, seek medical attention.
- Inhalation: Remove person from exposure area to fresh air. If breathing is difficult, give oxygen. Apply artificial respiration by qualified medical personnel if patient is not breathing. Obtain medical attention immediately.
- Ingestion: If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Have victim rinse mouth with water. Never give anything by mouth to an unconscious person. Give one or two glasses of water to drink and refer to medical personnel or take direction from either a physician or a poison control center.

IV. FIRE-FIGHTING MEASURES

Fire hazards/conditions of flammability: This material is not considered to be flammable. Product may release small amounts of flammable Hydrogen gas on contact with metals. Closed containers may rupture if exposed to excess heat or flame, due to build-up of internal pressure.

Flash point: Not applicable

Auto-ignition temperature: Not applicable

Lower flammable limit (%by volume): Not applicable

Upper flammable limit (%by volume): Not applicable

Explosion data: Sensitivity to mechanical impact/static discharge: Not applicable

Oxidizing properties: Data not available

Suitable extinguishing media: Use water spray, water fog, alcohol resistant foam, dry chemicals, CO² or other agents as appropriate for surrounding fires.

Special fire-fighting procedures/equipment: Firefighters should wear proper protective equipment and a self-contained breathing apparatus. Move containers from fire area if it can be done without risk. Water spray may be useful in cooling equipment and containers exposed to heat and flame.

Hazardous combustion products: May release toxic fumes of Hydrogen chloride gas in a fire.

Suitable Extinguishing Media:

The substance is not combustible. Use extinguishing media appropriate to the surrounding fire.

NOTE: Also see Section Stability and Reactivity.

Protective Equipment:

Wear full firefighting protective clothing. See MSDS Section (Exposure Controls/Personal Protection).

Firefighters, and others exposed, wear self-contained breathing apparatus.

Special Hazards:

Keep containers cool by spraying with water if exposed to fire. During a fire, irritating/toxic hydrogen chloride, and/or phosgene gases may be generated if material is dried and then heated to decomposition.

Mechanical/Static Sensitivity Statements:

None

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Personal precautions:

Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. Where exposure level is not known, wear NIOSH approved, positive pressure, self-contained respirator. Where exposure level is known, wear NIOSH approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8, wear a two piece PVC suit with hood or PVC

overalls with hood, wear impervious boots. Keep all other personnel upwind and away from the spill/release.

Environmental Precautions:

Prevent water contaminated with this product from entering drains, sewers or streams, growing crops/keeping animal areas, and sites of native flora and fauna. Dike far ahead of the spill for later recovery or disposal.

Spill response/Cleanup: Ventilate area of release. Stop leak if you can do so without risk. Neutralize spill with lime or soda ash. Absorb neutralized spill with inert absorbent material, then place absorbent material into a suitable, labeled container for later disposal. Flush spill area with water, in accordance with applicable regulations, to waste treatment system. Notify the appropriate authorities as required.

Reportable Quantity: Spills over 1000 dry pounds (454Kg) must be reported to National Response Center (800)—424-8802

7. **HANDLING AND STORAGE**

Handling

Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling

Special Handling Statements:

Wear appropriate chemically protective equipment. Use in well ventilated area with proper engineering controls. Avoid inhalation of vapors. Keep away from heat and flame. This material will corrode steel or aluminum at a rate greater than 6.25 mm (0.25 inches/year) @ 55°C (130 °F). It is thus considered to be a corrosive material for transportation purposes. Protect container from physical damage. Do not strike containers or fittings with tools or hard objects. Keep container closed and dry. Review the label, this MSDS and any other applicable information before use. Keep separated from incompatible substances. Use appropriate Personal Protective Equipment per Section 8. Handle only with equipment, materials and supplies specified by their manufacturer as being compatible and appropriate for use with this product.

STORAGE:

Bulk storage containers and ancillary fill and feed systems should be constructed out of appropriate materials such as polyethylene, polypropylene, rub-lined steel and FRP designated as appropriate for use with this product. Storage tanks should be vented to scrubber or exterior atmosphere. Storage facilities should have secondary containment as required by law or regulation. Storage tanks, piping and offloading points should be labeled with appropriate signage to avoid accidents. Some concentrations of this product will freeze or crystallize at low temperatures. Insulate and heat-trace storage tanks, pumps, pipes and ancillary equipment as necessary. Product should be used within one (1) year and stored in a cool, dry well ventilated area away from all sources of heat and incompatible material. Material may be stored in tightly closed shipping containers, preferably the supplier containers. Containers of this material may be hazardous when empty, since they retain product residues (vapor, liquid); observe all warnings and precautions listed for the product.

Incompatible materials: Oxidizing agents, metals, strong bases, reducing agents, alcohols, sulfides monomers (e.g. Styrene).

8. **EXPOSURE CONTROLS/PERSONAL PROTECTION**

Permissible exposure levels:

Ingredient name	OSHA PEL	ACGIH TLV
FERRIC CHLORIDE	*1 mg/m ³ (final rule/vacated limit)	*1 mg/m ³

*Note: the OSHA PEL's and ACGIH TLV's listed above for Ferric chloride are for "Iron sales, soluble, as Fe".

Ventilation and engineering controls: Provide good general room ventilation to minimize exposure to vapors or mists. Local exhaust ventilation may be required in order to meet TLV requirements.

Engineering Measures:

Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection:

Respiratory protection is required if the airborne concentrations exceeds the TLV, NIOSH-approved full face respirators are recommended depending on the airborne concentration levels.

Eye Protection:

Wear eye/face protection such as chemical splash proof goggles or face shield. Do not wear contact lenses. Eyewash equipment and safety shower should be provided in areas of potential exposure.

Skin Protection:

Avoid skin contact. Wear impermeable gloves and suitable protective clothing.

Other protective equipment: Wear protective clothing to minimize skin contact. Full-face shield, rubber footwear, acid-resistant hood and full-body suit recommended as appropriate. An eyewash station and safety shower should be made available in immediate working area.

Additional Advice:

Food, beverages and tobacco products should not be carried, stored or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor:	Reddish-brown, liquid; slight pungent odor
Boiling Point:	105-110 °C; 220-230°F
Melting Point/ Freezing point:	-15°F (37% solution)
Vapor Pressure:	Not applicable
Specific Gravity:	1.26-1.48
Vapor Density:	Not applicable
% Volatile (By Wt):	Not available
pH:	<2
Saturation in Air (% by Vol):	Not applicable
Evaporation Rate:	Not applicable
Solubility in Water:	Negligible
Volatile Organic Content:	None
Flash point:	Non flammable
Flammable Limits (% by vol):	Not available
Autoignition temp:	Not available
Decomposition temp:	Not available
Odor Threshold	Not available
Partition coefficient (n-octanol/water)	Not available

10 STABILITY AND REACTIVITY

Stability:	Stable under the recommended storage and handling conditions prescribed.
Conditions to avoid:	Product may release small amounts of flammable hydrogen gas on contact with metals.
Polymerization:	Will not occur
Conditions to Avoid:	Dangerous gases may accumulate in confined spaces. Avoid contact with incompatible materials, heat and flame. Material is acidic and corrodes most metals.
Materials to avoid:	Metals such as iron, or steel which are subject to corrosion.
Hazardous decomposition:	hydrochloric acid vapors (at high temperature)
Products:	Thermal decomposition of dried residues- will produce hydrogen chloride gas.

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3. HAZARDS IDENTIFICATION

Toxicological information on the OSHA regulated components of this product is as follows:

Routes of exposure: Skin contact, eye contact, inhalation and ingestion.

Base on Ferric Chloride Solid (anhydrous)

TOXICOLOGICAL DATA: LD50 (oral, rat) = 450 mg/kg

Mutagenicity: Other mutation test systems: Escherichia coli- 500 nmol/tube;

Phage inhibition capacity: Escherichia coli 41 ng/well

Reproductive Effects: TDLo Rat 1 day(s) intratesticular 12976 mg/kg

TDLo Rat 1 day (s) intravaginal 29 mg/kg pre pregnancy continuous

Teratogenicity and Fetotoxicity: Not available

Synergistic Materials: Not available

Hydrochloric acid has a 4-hour inhalation LC-50 (rat) value of 3124 ppm (4.7mg/L). Contact with hydrochloric acid solutions or mists can cause severe skin and eye irritation. Acute overexposure to hydrochloric acid vapor may cause severe eye and respiratory tract irritation.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

Environmental effects: The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters.

Test: Acute immobilization (OECD 202)

Duration: 48hr

Water Flea (Daphnia magna) 48hr EC 50 27.9 mg/l

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristic. There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, See Section 9 of this MSDS (flash point). For Corrosivity, see sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material to be disposed. The company encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. The company recommends that organic materials classified as RCRA hazardous wastes to be disposed of by thermal treatment or incineration at EPA approved facilities. The company has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

USDOT

Proper Shipping Name: Ferric Chloride Solution
Hazard Class: 8
Packing Group: III
UN/ID Number: UN2582
Transport Label Required: Corrosive
Hazardous Substances:

<u>Component / CAS No.</u>	<u>Reportable Quantity of Product (lbs.)d</u>
Ferric Chloride	2381 (RQ-1000)

TRANSPORT CANADA

Proper Shipping Name: Ferric Chloride Solution
Hazard Class: 8
Packing Group: III
UN/ID Number: UN2582
Transport Label Required: Corrosive

ICAO/IATA

Proper Shipping Name: Ferric Chloride Solution
Hazard Class: 8
Packing Group: III
UN/ID Number: UN2582
Transport Label Required: Corrosive
Packing Instructions/Maximum Net Quantity Per Package
Passenger Aircraft-
Cargo Aircraft-

IMO

Proper Shipping Name: Ferric Chloride Solution
Hazard Class: 8
Packing Group: III
UN/ID Number: UN2582
Transport Label Required: Corrosive

15. **REGULATORY INFORMATION**
INVENTORY INFORMATION

USA : All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical I inventory.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

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OTHER ENVIRONMENTAL INFORMATION

The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product. This product does not contain any components regulated under sections of the EPA.

<u>Component:</u>	<u>CAS#</u>	<u>Weight %</u>	<u>TPQ (lbs)</u>	<u>RQ(lbs)</u>	<u>S313</u>	<u>TSCA 12B</u>
Ferric Chloride	7705-08-0	38-42%	None	1000	No	No
Hydrochloric Acid	7647-01-0	<0.5%	500	5000	Yes	No

Product Classification under section 311 of SARA
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Acute (Y)

16. OTHER INFORMATION

	<u>HEALTH</u>	<u>FLAMMABILITY</u>	<u>REACTIVITY</u>
NFPA	3	0	0
HMIS	3	0	0

REASON FOR ISSUE: New Format

This information is for the specific material described only and may not be valid if the material is used in combination with any other materials or in any process. The user is responsible to determine the completeness of the information and suitability for the user's own particular use. The knowledge and belief of the company, the information is accurate and reliable as of the date indicated but the company makes no express or implied warranty of merchantability for the material or the information. The company makes no express or implied warranty of fitness for a purpose for the material or for the information. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendations to practice any patented invention without a license. Before using any product, read its label.



Organic Anionic Emulsion Solve 151

Material Safety Data Sheet

Date Issued: 10/01/2006

Date Revised: 09/26/2006

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **SOLVE 151**
CHEMICAL FAMILY: Polyacrylamide copolymer
SYNONYMS: Nonionic polyacrylamide in water in oil emulsion
Molecular Formula: Mixture
Molecular Weight: Mixture

COMPANY: **WaterSolve, LLC, 4964 Starr ST. SE, Grand Rapids, MI 49546, USA**
For Product information call 616-575-8693.

EMERGENCY PHONE: For emergency involving spill, leak, fire, exposure or accident call
CHEMTREC: 1-800-424-9300. Outside the USA and Canada call 703-527-3887.

2. COMPOSITION/INFORMATION ON INGREDIENTS

OSHA Regulated Components

Component	CAS NO.	%	OSHA (peI)	AGGIH (TLV)
Petroleum distillate	064742-47-8	25	500 ppm 1200mg/m3	(skin)
Hydrotreated light			165ppm (Supplier)	
Nonylphenol ethoxylated	9016-45-9	~2.1	N/Established	N/Established
Ammonium sulfate	7783-20-2	~2.00	N/Established	N/Established

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and odor: white, viscous liquid; slight hydrocarbon odor

Statement of Hazard: **WARNING!** Causes Skin Irritation; May cause Eye Irritation

Potential Health effects

Effects of exposure:

The estimated acute oral (rat) LD50, acute dermal (rabbit) LD50 and 4-hour inhalation (rat) LC50 values for this material are >5000mg/kg, >2000 mg/kg and >20 mg/L respectively. Direct contact with this material may cause moderate skin and mild eye irritation. Refer to Section 11 for toxicology information on the regulated components of this product.

4. **FIRST AID MEASURES**

Ingestion:

If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

Skin Contact:

Remove contaminated clothing and shoes without delay. Wash immediately with plenty of water. Do not reuse contaminated clothing without laundering. Get medical attention if pain or irritation persists after washing or if signs and symptoms of overexposure appear.

Eye Contact:

Rinse immediately with plenty of water for at least 15 minutes.

Inhalation:

Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms

5. **FIRE FIGHTING MEASURES**

Suitable Extinguishing Media:

Use water spray, carbon dioxide or dry chemical.

Protective Equipment:

Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. See MSDS Section 8 (exposure Controls/Personal Protection)

Special Hazards:

Keep containers cool by spraying with water if exposed to fire.

6. **ACCIDENTAL RELEASE MEASURES**

Personal precautions:

Where exposure level is not known, wear NIOSH approved, positive pressure, self-contained respirator. Where exposure level is known, wear NIOSH approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8, wear impervious boots.

Methods For Cleaning Up:

Products may cause a slip hazard. Spilled material should be absorbed onto an inert material and scooped up. Flush spill area with water. If slipperiness remains apply more dry-sweeping compound.

7. **HANDLING AND STORAGE**

Handling

Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Special Handling Statements: None

STORAGE

To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment. This material reacts slowly with iron, copper and aluminum, resulting in corrosion and product degradation.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:

Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection:

Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure.

Eye Protection:

Wear eye/face protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure.

Skin Protection:

Avoid skin contact. Wear impermeable gloves and suitable protective clothing.

Additional Advice:

Food, beverages and tobacco products should not be carried, stored or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor:	white viscous liquid; hydrocarbon odor
Boiling Point:	~175°C ; Oil phase~347°F
Melting Point:	-18°C 0°F
Vapor Pressure:	Not available
Specific Gravity:	~1.0
Vapor Density:	Not available
% Volatile (By Wt):	~70
pH:	~4-6
Saturation in Air (% by Vol):	Not applicable
Evaporation Rate:	<1(Butyl acetate=1)
Solubility in Water:	Appreciable
Volatile Organic Content:	16% (g/g)
Flash point:	>100°C 212°F closed cup
Flammable Limits (% by vol):	Not available
Autoignition temp:	Not available
Decomposition temp:	Not available
Odor Threshold	Not available
Partition coefficient (n-octanol/water)	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to avoid:	None known
Polymerization:	Will not occur
Conditions to Avoid:	None known
Materials to avoid:	Strong oxidizing agents This material reacts slowly with iron, copper and aluminum resulting in corrosion and product degradation.
Hazardous Decomposition Products:	carbon monoxide Carbon dioxide Ammonia Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3.

Toxicological information on the OSHA regulated components of this product is as follows:

Ammonium sulfate has acute oral (rat) and dermal (rabbit) LD50 values of 3000mg/kg and >2000mg/kg, respectively. Direct contact with this material may cause moderate to severe eye and moderate skin irritation. Inhalation overexposure to the vapors can cause irritation to the eyes, nose and throat.

Nonylphenol ethoxylated has an acute oral LD50 (rat) value ranging from 1310 mg/kg to 3000mg/kg. The acute dermal (rabbit) LD50 value ranges from equal to or greater than 2,000mg/kg. Application of 5 mg to rabbit eyes produced severe irritation and application of 500 mg to open skin, rabbit produced mild irritation. Inhalation exposure to vapor is no likely to occur due to the low volatility of this material.

Petroleum distillates, hydrotreated light(CAS#64742-47-8) has acute oral (rat) and dermal (rabbit) LD50 values of >5 g/kg and >3.16 g/kg, respectively. Prolonged or repeated skin contact tends to remove skin oils, possibly leading to irritation and dermatitis. Direct contact may cause eye irritation. Overexposure to high vapor concentrations, >~700PPM, are irritating to the eyes and respiratory tract and may cause headaches, dizziness, drowsiness, and other central nervous system effects, including death. In a 90-day oral gavage (rats) study at 100, 500 and 1000 mg/kg, no treatment related mortalities were observed. There were no significant changes in body weights or food consumption in any dose groups. Increased liver weights were observed in male and female rats a 500 and 1000 mg/kg. Increased kidney weights were observed only in male rats at 500 and 1000mg/kg. Testes weights were significantly elevated in male rats at 1000 mg/kg. Kidney effects indicative of light hydrocarbon nephropathy, occurred in male rat kidneys at all dose levels. Histological findings of hepatocellular hypertrophy were seen in the livers of male rats at 1000mg/kg and in female rats at 500 and 1000 mg/kg. All treatment-related effects were reversible within the 4- week recovery period. Observed kidney effects (including light hydrocarbon nephropathy and increased kidney weight) are a unique response by male rats to chronic hydrocarbon exposure, which the U> S >EPA has declared no relevant to humans. High-dose liver effects (including hepatocellular, or enlarged liver cells) are a direct consequence of the sustained high-fat hydrocarbon diet. The No observed Adverse Effect Level (NOAEL) for this study was 1000mg/kg.

California Proposition 65 Warning (applicable in California only)- This product contains (a) chemical(s) known to the State of California to cause cancer .

12. **ECOLOGICAL INFORMATION LC 50**

This is not classified as dangerous for the environment. All ecological information provided was conducted on a structurally similar product.

Green Algae (*Selenastrum capricornutum*), 72 hr IC50 >100 mg/l

Water Flea (*Daphnia magna*) 48hr EC 50 >10-100 mg/l

Bluegill Sunfish (*Lepomis macrochirus*) 96hr LC50 >100.0mg/l

Rainbow Trout (*Oncorhynchus mykiss*) 96hr LC 50 >100.0 mg/l

DEGRADATION

Test: CO2 Evolution: Modified Sturm (OECD 301B)

The polymeric ingredient is not readily biodegradable, but degradable by hydrolysis. The large polymer size is incompatible with transport across biological membranes and diffusion; the bioconcentration factor is therefore considered to be zero.

13. **DISPOSAL CONSIDERATIONS**

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as applied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristic. There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, See Section 5 of this MSDS (flash point). For Corrosivity, see sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations, may also apply to the classification of the material to be disposed. WaterSolve encourages the recycle, recovery and reuse of materials classified as RCRA hazardous wastes to be disposed of by thermal treatment or incineration at EPA approved facilities. WaterSolve has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. **TRANSPORT INFORMATION**

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

USDOT

Proper Shipping Name: Not applicable/Not regulated

Hazardous Substances: Not applicable

TRANSPORT CANADA

Proper Shipping Name: Not applicable/Not regulated

ICAO/IATA

Proper Shipping name: Not applicable/Not regulated
Packing instructions/maximum net quantity per package:
Passenger Aircraft:
Cargo Aircraft:

IMO

Proper shipping name: Not applicable/Not regulated

15. **REGULATORY INFORMATION**

INVENTORY INFORMATION

USA : All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical I inventory.

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OTHER ENVIRONMENTAL INFORMATION

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Component / CAS No.	%	TPQ(lbs)	RQ(lbs)	S313	TSCA 12B
Ammonium sulfate 7783-20-2	~2.00	None	0	Yes	No

Product Classification under section 311 of SARA
Acute (Y)

16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)

Health 2- Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire 1 – Materials that must be preheated before ignition can occur.

Reactivity 0 –Materials that in themselves are normally stable, even under fire exposure conditions.

REASON FOR ISSUE: New Format

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