

LANL

Groundwater

ENTERED

TA-16

R-25c

**Cobrain, Dave, NMENV**

**From:** Mark Everett [meverett@lanl.gov]  
**Sent:** Wednesday, September 24, 2008 11:59 AM  
**To:** Cobrain, Dave, NMENV  
**Cc:** Young, John, NMENV; katzman@lanl.gov  
**Subject:** Request to use well development chemicals at R-25c  
**Attachments:** AQUACLEAR\_PFD.pdf; aquaclear msds.pdf

Dave,

As we discussed today, LANL requests permission to use well development chemicals, specifically AQUA-CLEAR PFD (data sheet and MSDS are attached), at R-25c. The well is currently not yielding water. The objective is to disperse any potential bentonite grout that may be inhibiting flow of groundwater into the well. To date we have made several observations that support our request to use the PFD.

On 9/15 the well annulus was backfilled up to 299 feet below ground surface (bgs). We ran a video log that showed the well screen was clean and that there was 2 feet of water standing at the bottom of the screen.

On 9/18, after backfilling up to 80 feet bgs, the deployed transducer measured a sharp increase in pressure. We pulled out the transducer which was coated with bentonite. After bailing out approximately 20 gallons of bentonite grout-rich fluid we ran another video log revealing that bentonite grout was visible through the entire screen interval with open slots visible in the lower 3 feet. A small amount of fluid (2-3 inches) was observed in the bottom of the sump.

On 9/24 we added a measured volume of potable water and swabbed the well. A volume of water equal to that introduced was then bailed out.

On 9/25 we ran another video log which revealed that no visible bentonite remained in the screen and that no groundwater had entered the well overnight.

LANL recognizes that using PFD may produce undesirable chemical conditions around the well. AQUA-CLEAR PFD consists of anionic polyacrylamide and could potentially impact groundwater chemistry if it and its degradation products are not removed from the formation. However the fact that no water appears to be passing either into or out of the screen drives us to take the next logical step and introduce well development chemicals. Once the PFD has been introduced and allowed to react with the bentonite every effort will be made to remove all traces of it and continue development beyond the typical durations employed here at LANL. Samples will be collected during pumping to evaluate the effectiveness of development.

Please respond to this e-mail with your approval to use AQUA-CLEAR PFD at R-25c. If you have additional questions, please contact me.

Sincerely,

Mark Everett, PG  
Drilling Project Lead  
EP-WSP  
LANL  
(505) 667-5931 (o)  
(505) 231-6002 (c)

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9/24/2008

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# AQUA-CLEAR® PFD

Phosphate-Free Dispersant

**Description** AQUA-CLEAR® PFD concentrated liquid polymer dispersant provides superior mud and sediment removal from the producing formation and gravel pack. This product is also a highly effective mud thinner. AQUA-CLEAR PFD dispersant contains no phosphates.

**Applications/Functions**

- Can disperse mud, sediment and clay from the producing formation and gravel pack in the screened interval.
- Can reduce viscosity and gel strength of drilling fluids

**Advantages**

- NSF/ANSI Standard 60 certified
- Helps reduce development time
- Helps increase well yield and capacity
- Safe to use on most plastics, rubber and metals
- Non-fermenting
- Helps reduce pumping costs

**Typical Properties**

• Appearance	straw colored liquid
• Specific gravity	1.2 to 1.4
• pH (neat)	6.5 to 7.5

**Recommended As a Well Development Aid**

**Treatment**

- Determine volume of water in screen area and double the calculated volume to account for water in gravel pack and formation interface or determine the static volume of water and add 50% excess.
- Once the water volume is determined, calculate the required treatment volume of AQUA-CLEAR PFD dispersant by the following formula:  
**AQUA-CLEAR PFD dispersant (gal or L) = 0.002 x Water Volume (gal or L)**

*This equates to one gallon of AQUA-CLEAR PFD dispersant for every 500 gallons of water (0.2% by volume) or 2.0 liters of AQUA-CLEAR PFD dispersant for every cubic meter of water.*

- Mix thoroughly before introducing into well.
- The preferable application method utilizes a tremie line with the product applied into the screened area.
- If necessary, the AQUA-CLEAR PFD water solution may be poured into the well.
- Mixture should be thoroughly blended in well, then agitated using a surge

**Recommended Treatment (continued)**

and swab, jetting, or other developmental technique repeatedly every two hours for a period of up to 24 hours.

- Pump to waste until turbidity clears up and then connect well to distribution system.

**As a Mud Thinner**

- Start by adding one pint of AQUA-CLEAR PFD dispersant to 500 gallons of mud. Increase concentration until desired viscosity is achieved.

<b>Well Capacity Chart (Gallons per Foot)</b>					
<b>Well Diameter (Inches)</b>	<b>Well Capacity in Gallons/ft</b>	<b>Well Diameter (Inches)</b>	<b>Well Capacity in Gallons/ft</b>	<b>Well Diameter (Inches)</b>	<b>Well Capacity in Gallons/ft</b>
2	0.2	12	5.9	24	23.5
4	0.7	14	8.0	26	27.6
6	1.5	18	13.2	30	36.7
8	2.6	20	16.3	36	52.9
10	4.1	22	19.7	48	94.0

<b>Well Capacity Chart (Liters per Meter)</b>					
<b>Well Diameter (millimeters)</b>	<b>Well Capacity Liters/meter</b>	<b>Well Diameter (millimeters)</b>	<b>Well Capacity Liters/meter</b>	<b>Well Diameter (millimeters)</b>	<b>Well Capacity Liters/meter</b>
51	2.0	305	73.0	610	292.0
102	8.1	356	99.3	660	342.6
152	18.3	457	164.2	762	456.1
203	32.4	508	202.7	914	656.8
254	50.7	559	245.3	1219	1167.7

*Note: The volumes in these tables show only the volume of water in a 1 foot or 1 meter section of a given size of screen. Excess volume must be included to account for water present in the formation interface and gravel pack.*

**Packaging** AQUA-CLEAR PFD dispersant is packaged in a 5-gal (19-liters) plastic pail or 1-gal (3.8-liter) plastic container.

**Availability** AQUA-CLEAR PFD dispersant can be purchased through any Baroid Industrial Drilling Products Retailer. To locate the Baroid IDP retailer nearest you, contact the Customer Service Department in Houston or your area IDP Sales Representative.

**Baroid Industrial Drilling Products  
Product Service Line, Halliburton**

3000 N. Sam Houston Pkwy E.  
Houston, TX 77032

**Customer Service** (800) 735-6075 Toll Free (281) 871-4612  
**Technical Service** (877) 379-7412 Toll Free (281) 871-4613

# HALLIBURTON

## MATERIAL SAFETY DATA SHEET

Product Trade Name: **AQUA-CLEAR® PFD**

Revision Date: 02-Jun-2007

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: AQUA-CLEAR® PFD  
Synonyms: None  
Chemical Family: Blend  
Application: Surfactant  
Manufacturer/Supplier: Baroid Fluid Services  
Product Service Line of Halliburton  
P.O. Box 1675  
Houston, TX 77251  
Telephone: (281) 871-4000  
Emergency Telephone: (281) 575-5000

Prepared By: Chemical Compliance  
Telephone: 1-580-251-4335  
e-mail: fdunexchem@halliburton.com

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Anionic polyacrylamide		30 - 60%	Not applicable	Not applicable

### 3. HAZARDS IDENTIFICATION

Hazard Overview: May cause eye, skin, and respiratory irritation.

### 4. FIRST AID MEASURES

**Inhalation**: If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Skin**: Wash with soap and water. Get medical attention if irritation persists.

**Eyes**: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Ingestion**: Under normal conditions, first aid procedures are not required.

**Notes to Physician**: Not Applicable

## 5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined	Min: > 212
Flash Point/Range (C):	Not Determined	Min: > 100
Flash Point Method:	COC	
Autoignition Temperature (F):	Not Determined	
Autoignition Temperature (C):	Not Determined	
Flammability Limits in Air - Lower (%):	Not Determined	
Flammability Limits in Air - Upper (%):	Not Determined	

**Fire Extinguishing Media** Water fog, carbon dioxide, foam, dry chemical.

**Special Exposure Hazards** Decomposition in fire may produce toxic gases.

**Special Protective Equipment for Fire-Fighters** Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

**NFPA Ratings:** Health 1, Flammability 1, Reactivity 0  
**HMIS Ratings:** Flammability 1, Reactivity 0, Health 1

## 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautionary Measures** Use appropriate protective equipment. Spills of this product are very slippery.

**Environmental Precautionary Measures** Prevent from entering sewers, waterways, or low areas.

**Procedure for Cleaning / Absorption** Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. HANDLING AND STORAGE

**Handling Precautions** Avoid contact with eyes, skin, or clothing.

**Storage Information** Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 36 months.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls** Use in a well ventilated area.

**Respiratory Protection** Not normally necessary.

**Hand Protection** Impervious rubber gloves.

**Skin Protection** Normal work coveralls.

**Eye Protection** Safety glasses.

**Other Precautions** None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Yellowish
Odor:	Ammonia
pH:	6.5-7.5
Specific Gravity @ 20 C (Water=1):	1.3

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Density @ 20 C (lbs./gallon):	10.84
Bulk Density @ 20 C (lbs/ft3):	81.16
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	50
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Partially soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

## 10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

## 11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	Prolonged or repeated contact may cause slight skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	Swallowing a relatively large amount of this material is unlikely to produce serious illness or death.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	LD50: > 10000 mg/kg (Rat)
Dermal Toxicity:	LD50: > 10000 mg/kg (Rabbit)
Inhalation Toxicity:	Not determined

**Primary Irritation Effect:** Not determined  
**Carcinogenicity** Not determined  
**Genotoxicity:** Not determined  
**Reproductive /  
Developmental Toxicity:** Not determined

## 12. ECOLOGICAL INFORMATION

**Mobility (Water/Soil/Air)** Not determined  
**Persistence/Degradability** Biodegradable  
**Bio-accumulation** Not Determined

### Ecotoxicological Information

**Acute Fish Toxicity:** Not determined  
**Acute Crustaceans Toxicity:** Not determined  
**Acute Algae Toxicity:** EC50: > 1000 mg/l (Skeletonema costatum)

**Chemical Fate Information** Not determined  
**Other Information** Not applicable

## 13. DISPOSAL CONSIDERATIONS

**Disposal Method** Disposal should be made in accordance with federal, state, and local regulations.  
**Contaminated Packaging** Follow all applicable national or local regulations.

## 14. TRANSPORT INFORMATION

### Land Transportation

**DOT**  
Not restricted

**Canadian TDG**  
Not restricted

**ADR** Not restricted

### Air Transportation

**ICAO/IATA** Not restricted

### Sea Transportation

**IMDG** Not restricted

### Other Shipping Information

**Labels:** None

## 15. REGULATORY INFORMATION

### US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

### Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

## 16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS  
Not applicable

**Additional Information** For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

### Disclaimer Statement

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\*\*\*END OF MSDS\*\*\*