



## Department of Energy

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JUL 12 2001

Mr. James A. Saric, Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard  
Chicago, IL 60604-3590

DOE-0645-01

Mr. Tom Schneider, Project Manager  
Ohio Environmental Protection Agency  
401 East 5<sup>th</sup> Street  
Dayton, OH 45402-2911

Ms. Val Orr  
Division of Drinking and Ground Waters – UIC Unit  
Ohio Environmental Protection Agency  
P.O. Box 1049  
Columbus, OH 45316-1049

Dear Mr. Saric, Mr. Schneider, and Ms. Orr:

### **REQUEST FOR CONCURRENCE ON THE USE OF NEW CHEMICALS TO TREAT PLUGGING IN THE RE-INJECTION WELLS**

The Fernald Environmental Management Project (FEMP), in consultation with two industry experts, has developed a plan for hopefully rehabilitating the re-injection wells at the FEMP. The purpose of this letter is to outline the plan and obtain the United States Environmental Protection Agency (USEPA) and Ohio Environmental Protection Agency (OEPA) concurrence on the use of the new chemicals which will be used in the rehabilitation process. The new chemicals are discussed below. Like the previous treatment procedure used, the new procedure will include both an acid treatment and a chlorination treatment. The new procedure will be implemented to hopefully address two areas of needed improvement; namely,

- 1) acid reaction time,
- 2) suspension and removal of bacterial slime from the well following acid and chlorination steps.

Mr. James A. Saric  
Mr. Tom Schneider  
Ms. Val Orr

The FEMP has in the past tried the use of large doses of concentrated hydrochloric acid to rehabilitate or remove the material plugging the re-injection wells. As you are aware, these larger doses of acid alone have not been successful. Quite possibly, the acid reacted too quickly due to the high carbonate content of the aquifer, thus not effectively fighting the bacterial slime. Additionally, the bacterial slime and the materials produced from the acid treatment were not held in suspension and adequately removed from the well.

At the recommendation of experts in the field of water well rehabilitation (Water Systems Engineering, Inc. and United States Army Corps of Engineers), the FEMP has developed a well-treatment procedure that will use a mixture of a strong and weak acid in combination with and a dispersant polymer. Hydrochloric acid will again be used as the strong acid, however, now with the addition of phosphoric acid to provide buffering capabilities at the desired low pH level throughout the treatment process. The idea is to slow down the reaction time of the hydrochloric acid by mixing it with phosphoric acid. If phosphoric acid does not provide the desired pH control, hydroxyacetic acid may be used instead as the buffering acid. The acid mixture currently being planned is approximately 75 percent hydrochloric and 25 percent phosphoric to form a 10 percent acid solution. Additionally, a dispersant polymer, NW-310, 3 percent solution, (see enclosed material safety data sheet) will be added to the acid solution to help suspend the bacterial slime for easier removal from the well. NW-310 is reportedly also very effective against calcium carbonate in addition to suspending and removing bacterial slime.

Following acid treatment, the FEMP will chlorinate the well. In the recent past, the FEMP has used both sodium and calcium hypochlorite in the re-injection wells. In the future, at the advice of our experts, DOE plans to only use sodium hypochlorite. The use of calcium hypochlorite could result in the precipitation of calcium carbonate. Such a precipitate would be counter-productive to the treatment process. DOE is also planning on adding NW-310 to the sodium hypochlorite. NW-310 has also been reported to substantially improve well chlorination, by improving dispersancy and the penetration of the active chlorine.

As in the past, any well treatment work conducted at the FEMP will be protective of the aquifer, the environment, and the safety of the workers. A minimum of five times the volume of all chemicals added to the well will be removed from the well. This new procedure will actually be even more protective of the aquifer than the old procedure in that it will call for the removal of a much larger quantity of water (15 to 20 well volumes) from the well, with pumping much more vigorous, and a lower concentration of hydrochloric acid.

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Mr. Tom Schneider  
Ms. Val Orr

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If you have any questions or concerns, please contact Robert Janke at (513) 648-3124.

Sincerely,



Johnny W. Reising  
Fernald Remedial Action  
Project Manager

FEMP:R.J. Janke

Enclosure: As Stated

cc w/enclosure:

J. Kappa, OH/FEMP  
K. Nickel, OH/FEMP  
R.J. Janke, OH/FEMP  
G. Jablonowski, USEPA  
T. Schneider, OEPA-Dayton (three copies of enclosure)  
F. Bell, ATSDR  
F. Hodge, Tetra Tech  
M. Schupe, HSI GeoTrans  
R. Vandegrift, ODH  
AR Coordinator, Fluor Fernald, Inc./MS78

cc w/o enclosure:

K. Chaney, EM-31/CLOV  
N. Hallein, EM-31/CLOV  
A. Tanner, OH/FEMP  
D. Brettschneider, Fluor Fernald, Inc./MS52-5  
D. Carr, Fluor Fernald, Inc./MS2  
M. Frank, Fluor Fernald, Inc./MS90  
T. Hagen, Fluor Fernald, Inc./MS65-2  
W. Hertel, Fluor Fernald, Inc./MS52-5  
S. Hinnefeld, Fluor Fernald, Inc./MS52-2  
M. Jewett, Fluor Fernald, Inc./MS52-2  
T. Walsh, Fluor Fernald, Inc./MS46  
ECDC, Fluor Fernald, Inc./MS52-7

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## MATERIAL SAFETY DATA SHEET

### SECTION I - GENERAL INFORMATION

**Product Name:** NW-310 Acid Enhancer  
**Date:** 01/05/99  
**Product Use:** Acidic dispersant properties used to enhance acid cleaning activity.  
**Formula:** Polymeric Acid solution  
**DOT Class:** Not regulated as a hazardous material by DOT or IMO  
**Manufacturer:** US FILTER/ Johnson Screens For Emergencies phone: 800-228-5635  
 P.O. Box 64118  
 St. Paul, Minnesota 55164 For Information phone: 612 636 3900

### SECTION II - COMPONENT INFORMATION

**COMPONENTS:** The components of this product are not listed or considered hazardous in 29CFR 1910.1200 or other pertinent sections of OSHA Regulations and comprise proprietary information.

### SECTION III - EMERGENCY RESPONSE INFORMATION

**First Aid Procedures:** This product is an acid. Causes eye burns. Immediately flush eyes with water for at least 15 minutes and get medical attention. Causes skin irritation or burns. Wash skin surface with mild soap and water.

**Fire Fighting Information:**

Use self-contained breathing apparatus.  
 As with any acid, contact with metals may produce flammable hydrogen gas.  
 Use extinguishing media appropriate for surrounding fire.

**Spill or Leak Handling Information:**

Personal Protection: must be appropriate to handle a spill. See Personal Protection Measures Section. Neutralize spills with lime or soda ash; flush spill area with plenty of water. Procedures: Keep spectators away. Treat as an acid material. Contain spill with inert material (e.g., sand, earth, absorbable material). Transfer diking material to suitable container for recovery or disposal. Material may be diluted and rinsed down a sanitary sewer system to a municipal wastewater plant. If quantities in excess of 500 gallons are rinsed to a sewer, the district should be notified of possible pH upset to the wastewater plant.

### SECTION IV - HAZARD INFORMATION

**Health Effects:** The formulation is corrosive to skin and eyes and is not known to be a skin sensitizer. Toxic effects described in animals from exposure by inhalation or ingestion include corrosion of mucosal surfaces, kidneys effects, liver effects, and increased oxybate production. Tests of individual constituents in bacterial or mammalian cell cultures gave no mutagenic activity.

Human health effects of overexposure by skin or eye contact may initially include: skin irritation with discomfort or rash; or eye irritation with discomfort, tearing, or blurring of vision. Higher exposures may lead to these effects: skin burns or ulceration; or eye corrosion with corneal or conjunctival ulceration.

Human health effects of overexposure by inhalation may include irritation or corrosion of mucous membranes with upper and lower respiratory irritation. Human health effects of overexposure by ingestion may include corrosion of mucous membranes with stomach discomfort, nausea, and prostration. Significant skin permeation after contacts appears unlikely. There are no reports of human sensitization.

**Reactivity Information:**

**Stability:** Stable  Unstable   
**Incompatibility:** Metals, oxidizing agents such as nitric acid, cyanide, sulfides.  
**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide, phosphorus oxides (extremely small)  
**Hazardous Polymerization:** May occur  Will not occur

**SECTION V - ACCIDENT PREVENTION INFORMATION****Personal Protective Measures:**

Eye Protection: Wear chemical splash goggles (ANSI Z871) or approved equivalent.  
 Hand Protection: Wear neoprene gloves or approved chemical protective gloves suitable for use in acid material.

**Facility Control Measures:**

Ventilation: Keep in well ventilated area. Keep package tightly closed. Store above 32°F. (0°C.)  
 Storage: Product should not be stored with or near strong caustic or oxidizing agents.

Other Protective Equipment: Eye wash facility should be present where product is stored or utilized.

**SECTION VI - SUPPLEMENTAL INFORMATION****Physical Properties:**

Appearance	Clear	Color:	Yellow
State:	Liquid	Vapor Pressure:	Vapor is water
Vapor Density:	1.0 (vapor is water)	Solubility in Water	Complete
Evaporation Rate:	N/A	pH:	2.3
Specific Gravity:	1.19	Boiling Point:	250°F
Freezing Point:	26°F	Flash Point:	Will not flash

**Waste Disposal:** Comply with Federal, State, and local regulations. If approved, may be neutralized and flushed to wastewater treatment plant. While product is not biodegradable, no discharge limitations are required. Fish toxicity is extremely limited: Bluegill, LC50 96H: > 5,000 ppm. Rainbow trout LC50 96H: > 5,000 ppm. Invertebrate Toxicity: daphnia magna, LC50 48H: > 2,000 ppm and brown shrimp, LC50 96H: > 5,000 ppm. Non bioaccumulating.

**SECTION VII - REGULATORY INFORMATION**

**DOT Proper Shipping:** Not regulated as a hazardous material by the US Dept. of Transportation (DOT) 49CFR 172.101 Hazardous Materials Table.

**RCRA Status:** Not a hazardous waste under RCRA 40 CFR 261. No reportable quantities.

**SARA/Title III-CERCLA List:** This product does not contain a "CERCLA" listed hazardous substance for emergency release notification under Sec. 304 (40CFR 302).

**SARA/Title III-Toxic Chemicals List:** This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Sec. 313 (40CFR 372).

**TSCA Inventory Status:** Chemical components listed on TSCA Inventory.

**California Proposition 65:** This product does not contain any chemicals currently on the California list of known carcinogens and roductive toxins.

US Filter/ Johnson Screens supplies this data sheet for your information, consideration and investigation. The information and recommendations contained herein have been compiled from sources believed to be reliable. No warranty, guarantee or representation is made by US Filter/ Johnson Screens as to the absolute correctness or efficiency of any representation contained in this and other Safety Data Sheets nor assumes any responsibility in connection therewith; nor can it be assumed that all acceptable safety measures are contained in this and other Safety Data Sheets, or that other or additional measures may not be required under particular or exceptional conditions or circumstances. You should satisfy yourself that you have all current data relevant to your particular use.