

Byrum, Shane

From: flmills@aep.com
Sent: Tuesday, November 29, 2011 11:00 AM
To: Byrum, Shane
Subject: RE: Proposed use of additional Corrosion Inhibitor at Turk

Shane,

The proposed chemical for use in the cooling tower: "GE FLOWGARD MS6201", does not contain any priority pollutant listed in Appendix A of 40 CFR § 423.

Please let me know if you need any additional information. Thanks,

Frank

"Byrum, Shane" <BYRUM@adeq.state.ar.us>

11/29/2011 10:21 AM

To "'flmills@aep.com'" <flmills@aep.com>

cc

Subject RE: Proposed use of additional Corrosion Inhibitor at Turk

Frank,

Please submit written certification that the GE FLOWGARD MS6201 does not contain any priority pollutant in accordance with the last paragraph in Part II.14 of the permit. I have pasted this condition below for your convenience:

If a cooling tower maintenance chemical does not contain any priority pollutant listed in Appendix A of 40 C.F.R. § 423, the permittee shall submit written certification stating that the chemical does not contain any of these priority pollutants, and is not required to submit an engineering calculation for that chemical.

Shane Byrum, Engineer
NPDES Permit Section, Water Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317
501-682-0618 (voice)
501-682-0910 (fax)
byrum@adeq.state.ar.us

From: flmills@aep.com [<mailto:flmills@aep.com>]

Sent: Monday, November 28, 2011 8:32 AM

To: Byrum, Shane

Subject: Proposed use of additional Corrosion Inhibitor at Turk

Shane,

The vendor for Turk has recommended using an additional inhibitor in the cooling tower system at Turk. The product "FLOWGARD MS6201" will be fed initially at a maximum feed rate of 5.84 mg/L, however, the stabilized feed rate will be no more than 2 mg/L once the desired concentration has been attained in the tower basin water.

For purposes of evaluation, I suppose you could assume a "worst case" scenario where none of the product gets consumed and/or degraded so that all of the product (5.84 mg/L) gets routed into the wastewater pond and then subsequently discharged via Outfall 001.

In consideration of the corresponding low toxicity of the product, the concentration of the product in the discharge would still be two full orders of magnitude under the concentration that it would take to be toxic to aquatic life such as *daphnia magna* or *pimephales promelus* (fathead minnow) (see attached MSDS form).

I would appreciate your review and approval for this product as soon as practicable, as the facility intends to begin using it as soon as it can be approved.

Please feel free to contact me via return e-mail or by telephone at (214) 777-1507.

Thanks again for your assistance.

Franklin L. Mills
Senior Environmental Specialist
Water & Ecological Resource Services
American Electric Power

Byrum, Shane

From: Cassat, Dick
Sent: Tuesday, November 29, 2011 9:20 AM
To: Byrum, Shane
Subject: RE: Proposed use of additional Corrosion Inhibitor at Turk

Shane

I'm ok with this. It won't cause any toxicity in the receiving stream, however, if we ever get to a phosphate limit, it may cause violations. I'm curious if the other SWEPCO uses this, since it basically discharges into OK.

From: Byrum, Shane
Sent: Tuesday, November 29, 2011 9:07 AM
To: Cassat, Dick
Cc: Fuller, Kim
Subject: FW: Proposed use of additional Corrosion Inhibitor at Turk

Dick,

Do you have any concerns with this chemical that SWEPCO proposes to use at Turk plant?

Shane Byrum, Engineer
NPDES Permit Section, Water Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317
501-682-0618 (voice)
501-682-0910 (fax)
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Thanks again for your assistance.

Franklin L. Mills
Senior Environmental Specialist
Water & Ecological Resource Services
American Electric Power



Leah Pearson
Turk Power Plant
Environmental and Lab Supervisor
Fulton, AR

GE Infrastructure Water & Process Technologies

Brett A. Kinnaird
South Central Territory
Account Specialist

103 Bodenhamer Circle
El Dorado, AR 71730

C 870 918 5444
Brett.Kinnaird@ge.com

RE: Cooling Tower Corrosion Inhibitor Recommendation

Leah,

This letter is in response to your request for a cooling tower corrosion inhibitor recommendation from GE Water. We have consulted internally with our Cooling Application Engineers and our local industry experts to develop the following recommendations.

Background

Typical corrosion inhibitors for circulating cooling systems or for makeup water piping consist of ortho-phosphates, poly-phosphates, zinc, and/or silicate. Since we are not allowed to use zinc in the AEP system and silicates aren't very effective in providing corrosion protection in low hardness waters at ambient temperatures, we have a choice between ortho-phosphates and poly-phosphates or a blend of the two actives.

Both ortho-phosphate and poly-phosphates will act as either anodic or cathodic inhibitors, depending on the concentration in the flowing water. However, there can be a potential deposition concern with ortho-phosphates based on the available calcium hardness and pH of the water to be treated. Poly-phosphates, on the other hand, are more soluble, and allow us to develop more concentrated formulations. In particular, we like to use pyro-phosphate because of its ability to resist hydrolysis and its ability to sequester soluble iron and manganese in the makeup. Therefore, we are recommending using a poly-phosphate based inhibitor.

Typical feedrates of poly phosphates (pyro-phosphate) for corrosion protection are 1 ppm to 3 ppm. It takes at least 2 ppm to 4 ppm of pyro-phosphate to sequester every per ppm of iron (same for soluble manganese). Therefore, the simple solution for the concern over the corrosion potential for the unlined carbon steel piping would be to feed around 2 ppm to 3 ppm of pyro-phosphate to the makeup pipe. Corrosion measurements and bulk water iron residuals should be monitored to dial in an effective feedrate.

Recommendation

Our product recommendation for this application is Flogard MS6201. Flogard MS6201 is a liquid polyphosphate product designed to inhibit corrosion to mild steel surfaces in recirculating cooling water systems.



Flogard MS6201 is 34.2% pyro-phosphate. In order to develop 2 ppm of pyro-phosphate you would need to feed 5.85 ppm of product. Since pyro-phosphate can sequester soluble iron and manganese,

we may be able to back off of the more expensive HEDP feed. However, we have to closely monitor the LSI in the cycled cooling tower water to make sure we don't get into a calcium carbonate scaling problem.

Once the pyro-phosphate begins to cycle up in the tower, approximately 50% will revert to ortho-phosphate. Therefore, do not expect to measure exactly what we calculated from the makeup concentration times cycles of concentration. Roughly half of the molecule will revert to ortho-phosphate.

Based on SATEQ and cycle up calculations, we expect to lower the feed rate of the MS6201 down to 2.5-3.0 ppm as product as the tower cycles up. Best practice guidelines suggest that initially we feed the recommended 5.84 ppm of product for the best mild steel protection and closely monitor the system. As we begin to see the phosphate numbers increasing, we can then back off the initial feed rates.

Summary

Our cooling system corrosion inhibitor recommendation is Flogard MS6201. The recommended feed rate will initially be 5.84 ppm, as product, fed to the make-up water line. We can expect to trim this feed based on cycles. Additionally, we can expect to trim the HEDP feed by as much as 1-2 ppm based on cycles.

Please note that this letter of recommendation contains specific and proprietary product information. Its content is intended for internal GE and AEP use only.

Thank you for allowing us to provide this product recommendation. If you have any questions, please feel free to contact us.

Respectfully,

Brett A. Kinnaird
GE Power and Water
870-918-5444
Brett.kinnaird@ge.com

Cc: R. Fitzgerald, P. Harizal, T. Refi, E. Horton, P. Nelms, P. Difranco



Material Safety Data Sheet

Issue Date: 22-JUL-2009
Supersedes: 29-FEB-2008

FLOGARD MS6201

1 Identification

Identification of substance or preparation
FLOGARD MS6201

Product Application Area
Water-based corrosion inhibitor.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 22-JUL-2009

2 Hazard(s) identification

EMERGENCY OVERVIEW

WARNING

May cause moderate irritation to the skin. Severe irritant to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard: Corrosive to aluminum
Odor: Slight; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; May cause moderate irritation to the skin.

ACUTE EYE EFFECTS:

Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:

Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:

May cause slight gastrointestinal irritation.

TARGET ORGANS:

No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin.

3 Composition / information on ingredients

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

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
7320-34-5	TETRAPOTASSIUM PYROPHOSPHATE Corrosive to aluminum; severe eye irritant; skin irritant	40-70

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of phosphorus

FLASH POINT:

> 200F > 93C SETA(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Contaminated area may be washed down with water.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Alkaline. Do not mix with acidic material.

STORAGE:

Keep containers closed when not in use. Reasonable and safe chemical storage.

8 Exposure controls / personal protection

EXPOSURE LIMITS**CHEMICAL NAME**

TETRAPOTASSIUM PYROPHOSPHATE

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:

adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, viton or neoprene gloves -- Wash off after each use.

Replace as necessary.
EYE PROTECTION:
splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav.(70F,21C)	1.729	Vapor Pressure (mmHG)	~ 15.0
Freeze Point (F)	< -30	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	78	% Solubility (water)	100.0

Odor	Slight
Appearance	Colorless To Yellow
Physical State	Liquid
Flash Point	SETA(CC) > 200F > 93C
pH As Is (approx.)	13.0
Evaporation Rate (Ether=1)	< 1.00
Percent VOC:	0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with strong bases may cause a violent reaction releasing heat.

INCOMPATIBILITIES:

May react with strong oxides.

DECOMPOSITION PRODUCTS:

oxides of phosphorus

11 Toxicological information

Oral LD50 RAT:	2,980 mg/kg
Dermal LD50 RABBIT:	>7,940 mg/kg
Skin Irritation Score RABBIT:	0.5

12 Ecological information

AQUATIC TOXICOLOGY

Bluegill Sunfish 48 Hour Static Screen
0% Mortality= 500 mg/L
Daphnia magna 48 Hour Static Renewal Bioassay (pH adjusted)
LC50= 660; No Effect Level= 268 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
LC50= 785; No Effect Level= 423 mg/L

BIODEGRADATION

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

DOT HAZARD: Corrosive to aluminum
PROPER SHIPPING NAME: CORROSIVE LIQUID, BASIC, INORGANIC,
N.O.S.(POTASSIUM HYDROXIDE SOLUTION)
8, UN 3266, PG III
DOT EMERGENCY RESPONSE GUIDE #: 154
Note: Some containers may be DOT exempt, please check BOL for exact container classification

15 Regulatory information

TSCA:

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

FOOD AND DRUG ADMINISTRATION:

21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

NSF Registered and/or meets USDA (according to 1998 Guidelines):

Registration number: Not Registered
SEC.G2,G5,G7

SARA SECTION 312 HAZARD CLASS:

Immediate(acute)

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC

ENFORCEMENT ACT (PROPOSITION 65):

No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII

CODE TRANSLATION

Health	2	Moderate Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
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MSDS status:	28-JAN-1997		** NEW **
	12-MAY-1997	15	28-JAN-1997
	29-MAY-1998	15	12-MAY-1997
	15-JUN-1998	15	29-MAY-1998
	31-MAY-2001	15	15-JUN-1998
	15-JAN-2002	4	31-MAY-2001
	29-NOV-2006	4	15-JAN-2002
	23-JAN-2007	3, 5, 14	29-NOV-2006
	29-FEB-2008	2, 3, 4, 8, 16	23-JAN-2007
	22-JUL-2009	10	29-FEB-2008