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AUTH.NAME AUTHOR AFFILIATION
FIELDS,J.S. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SWERDON,P.M. Pennsylvania, Commonwealth of

SUBJECT: Notifies that util plan on using Betz Powerline 3625 at plant to control algae in circulating water sys & also in emergency service water sys.

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RIDS/ADDS

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Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101-1179 • 215/774-5151

November 4, 1993

Mr. Paul M. Swerdon
Chief, Facilities and Construction Grants Section
Bureau of Water Quality Management
Pennsylvania Department of Environmental Resources
90 East Union Street, 2nd Floor
Wilkes-Barre, PA 18701-3276

SUSQUEHANNA STEAM ELECTRIC STATION
CHANGE IN CHEMICAL ADDITIVE- POWERLINE 3625
NPDES PERMIT NO. PA0047325
CCN 741326 FILE R9-8A
PLE- 17341

Dear Mr. Swerdon:

In response to the Pennsylvania Department of Environmental Resources (PaDER) "Permitting Guidance on the Conditioned Water Discharges and Use of Chemical Additives, January 30, 1992," the Pennsylvania Power & Light Company is notifying the PaDER that we plan on using Betz Powerline 3625 at the Susquehanna Steam Electric Station (SES). PP&L plans on using this additive beginning in January 1994.

Powerline 3625 is a non-oxidizing biocide similar to BETZ Clam-Trol CT-1 previously approved for use at the Susquehanna SES. Clam-Trol CT-1 contains both Alkyl Dimethyl Benzyl Ammonium Chloride (ADBAC) and Dodecylguanidine Hydrochloride (DGH) while Powerline 3625 contains only ADBAC. Clam-Trol CT-1 replaced gaseous chlorine as a general biocide. See letter PLE-15525, dated April 23, 1992 for additional information on Clam-Trol CT-1.

Powerline 3625 will be used to control algae in the Circulating Water (CW) System (cooling water) and also in the Emergency Service Water (ESW) System. It will be applied in the same way and measured with the same method as Clam-Trol CT-1. It could also be used with or replace Clam-Trol CT-1 as a general biocide.

Enclosed for your review are responses to the 12 questions listed in the permitting guidance document as well as a PaDER table, "Information on Chemical Additives Known or Expected to be Present in the Discharge."



Cool
1/1

If you have any questions please call me at (215) 774-7889.

Sincerely,

Jerome S. Fields
Senior Environmental Scientist-Nuclear

Enclosure

Copy to:
NRC Document Control Desk
NRC Region I
Mr. R. J. Clark, NRC Sr. Project Manager

Information Package BETZ Powerline 3625

## 1. Trade Name of Additive

The proposed additive is BETZ Powerline 3625. It is registered for the control of algae and algal slime growth in water cooling systems.

## 2. Name and Address of Additive Manufacturer

The additive is manufactured by:

BETZ Laboratories, Inc.
4636 Somerton Road
Trevose, PA 19053

Business Phone: (215) 355-3300
Emergency Phone: (800) 877-1940 (24 Hours)

## 3. MSDS & Aquatic Toxicology

A Material Safety Data Sheet and Aquatic Toxicology Data Sheet are provided.

## 4. Bioassay Data (including 96 hr LC50 on whole product)

See attached aquatic toxicology data sheet.

## 5. Proposed Average and Maximum Usage Rate in Lbs/Day

a. Treatment of algae along the Spray Pond edge only is as follows:

| | |
|---|---|
| Average Daily Usage Rate | 55.5 lbs/day |
| Maximum Daily Usage Rate | 80.4 lbs/day |
| Annual Usage Rate | 1,000 lbs/year |

b. Treatment of entire Spray Pond (twice per year):

| | Average | Maximum |
|---|---|---|
| Daily Usage Rate | 1,000 lbs/day | 2,000 lbs/day |
| Annual Usage Rate | 2,000 lbs | 4,000 lbs |

c. Treatment for Circulating Water System:

Because this material can also serve as a direct replacement for the Betz Clam-Trol CT-1 biocide that is currently in use on the cooling towers and its usage will be comparable to the current permitted amounts for CT-1.

| | |
|---|---|
| Average Daily Usage Rate | 750 lb/day |
| Maximum Daily Usage Rate | 1,125 lb/day |
| Annual Usage Rate | 118,000 lb/yr |

**6. Flow Diagram Showing Points of Addition and Affected Outfalls**

See attached flow diagram.

**7. Expected Concentration of the Product at the Final Outfall**

Detoxification will occur due to natural adsorption onto suspended clay and silt already in the cooling systems at Susquehanna. Additionally, whenever measurable levels of the algaecide are found in the cooling systems, a Bentonite clay slurry, BETZ DT-S, will be added to the outfall to assure detoxification of the additive such that the station will be discharging less than the detectable limit of the Powerline 3625. The lower limit of detection is 0.05 mg/l (0.05 ppm).

The usage of the BETZ DT-S has already been addressed by a previous correspondence with the PaDER. (Letter #PLE-15525, April 23, 1992)

**8. Product Density**

As stated on the MSDS the specific gravity of the product is 0.965 at 70F. This is equivalent to a product density of 8.04 lb/gal. Use the following equation to convert daily usage (gpd) to concentration (mg/l):

$$Conc(mg/l) = \frac{Powerline\ 3625\ Added\ (gal/day) \times 8.04 lb/gal \times 10^6}{Daily\ Blowdown\ (gal/day) \times 8.33 lb/gal}$$

OR

$$Conc\ (mg/l) = \frac{Powerline\ 3625\ Added\ (gal/day) \times 0.965 \times 10^6}{Daily\ Blowdown\ (gal/day)}$$

## 9. Analytical Test Method

The analytical procedure used for Betz Clam-Trol CT-1 will also be utilized for Powerline 3625. Quality control procedures will be adhered to in performance of this test method. The lower limit of detection for Powerline 3625 using this method will be 0.05 mg/l.

## 10. Conditioned Water Discharge Rate and Duration

The conditioned water discharge blowdown from either of the cooling towers or the spray pond is diluted with water from the untreated systems of the plant prior to Outfall 071. The average conditioned water flow from a treated cooling tower will be 3,500 gpm with a maximum of 6,000 gpm. The conditioned water discharge flow from the Emergency Spray Pond is generally 200 gpm. The duration of treatment will range from 12-24 hours and discharge will be isolated when possible to minimize detoxification.

## 11. Degradation/Decomposition Data

An Environmental Package containing Degradation and Decomposition Data is provided on the following pages.

## 12. Other Data

Product Label - Attached

jsf/msj3334c(26)

NDPES Number PA 0047325

# INFORMATION ON CHEMICAL ADDITIVES KNOWN OR EXPECTED TO BE PRESENT IN THE DISCHARGE

| OUTFALL | CHEMICAL SUBSTANCE OR COMPOUND | MANUFACTURER | USAGE RATE lbs/day | CONCENTRATION | | | Lowest Possible Analytical Detection Level (ug/l) | Whole Product 96 Hr LC50 (mg/l) or species | Whole Product 48 Hr LC50 (mg/l) or species |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In-System | Effluent | Units | | | |
| 071 | Powerline 3625<br><br>Alkyl<br>Dimethyl<br>Benzl<br>Ammonium<br>Chloride<br>(ADBAC) | Betz Laboratories, Inc. | 55.5 (av)<br>80.4 (max)<br>See Footnote #2 | 0.26(av)<br><br>0.39 (max) | <0.05 | mg/l | 50 as product | Fathead minnow LC50:0.27 | Daphnia magna LC50:0.04 |
| | | | 1000 (av)<br>2000 (max)<br>See Footnote #3 | 5 (av)<br><br>10 (max) | <0.05 | | | | |
| | | | 750 (av)<br>1,125 (max)<br>See Footnote #4 | 10 (av)<br><br>15 (max) | <0.05 | | | | |

(1) This is the same date requirement as NPDES Permit application
(2) Treatment for Spray Pond edge only - one or two applications per month
(3) Treatment for entire Spray Pond, twice a year
(4) Powerline 3625 to augment use of Clam-Trol CT-1; the usage rate of both products will be between 750 and 1,125 lbs/day per unit (Treatment for the Circulating Water System)

jsf/frk3362o(26)

BETZ INDUSTRIAL DIV.
1 QUALITY WAY, TREVOSE, PA.19053 (215) 953-2463
BETZ MATERIAL SAFETY DATA SHEET (PAGE 1 OF 3)
EMERGENCY TELEPHONE (HEALTH/ACCIDENT) (800)877-1940
EFFECTIVE DATE:05-14-93

Product: POWERLINE 3625 PRINTED: 07-14-93
REVISIONS TO SECTIONS: 1

PRODUCT APPLICATION:BIOCIDE
-----SECTION 1----------HAZARDOUS INGREDIENTS----------

INFORMATION ON PHYSICAL HAZARDS,HEALTH HAZARDS, PEL'S AND TLV'S FOR SPECIFIC PRODUCT INGREDIENTS AS REQUIRED BY THE OSHA HAZARD COMMUNICATIONS STANDARD IS LISTED. REFER TO SECTION 4 (PAGE 2) FOR OUR ASSESSMENT OF THE POTENTIAL ACUTE AND CHRONIC HAZARDS OF THIS FORMULATION.THIS PRODUCT IS SUBJECT TO THE PENNSYLVANIA AND NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW LAW.

(C12-16)ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE***CAS# 68424-85-1; CORROSIVE(SKIN AND EYES); PEL:NOT DETERMINED;TLV:NOT DETERMINED

ETHYL ALCOHOL(ETHANOL)***CAS# 64-17-5;FLAMMABLE;EYE IRRITANT;MAY CAUSE DEFATTING DERMATITIS,DIZZINESS AND HEADACHE;PEL:1000PPM;TLV:1000PPM

NONHAZARD INGREDIENTS: WATER(CAS# 7732-18-5)
-----SECTION 2----------TYPICAL PHYSICAL DATA----------

| | | | |
|---|---|---|---|
| PH: AS IS(APPROX.) | 8.9 | ODOR: MILD | |
| FL.PT.(DEG.F): | 130 P-M(CC) | SP.GR.(70F): | 0.965 |
| VAPOR PRESSURE(mmHG): | 44.0 | VAPOR DENSITY(AIR=1): | 1.00 |
| VISC cps70F: | 73 | %SOLUBILITY(WATER): | 100.0 |
| EVAP RATE: | 1.00(ETHER=1) | APPEARANCE: | COLORLESS TO YELLOW |
| PHYSICAL STATE:LIQUID | | FREEZE POINT(DEG.F): | -7.00 |

-----SECTION 3----------REACTIVITY DATA----------

STABLE.MAY REACT WITH STRONG OXIDIZERS.DO NOT CONTAMINATE.BETZ TANK CLEAN-OUT CATEGORY 'B'

THERMAL DECOMPOSITION (DESTRUCTIVE FIRES) YIELDS ELEMENTAL OXIDES.

Product: POWERLINE 3625

------SECTION 4---------HEALTH HAZARD EFFECTS----------

ACUTE SKIN EFFECTS *** PRIMARY ROUTE OF EXPOSURE
SEVERE IRRITANT TO THE SKIN.POTENTIAL SKIN SENSITIZER

ACUTE EYE EFFECTS ***
CORROSIVE TO THE EYES

ACUTE RESPIRATORY EFFECTS ***
VAPORS,GASES,MISTS AND/OR AEROSOLS MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.

CHRONIC EFFECTS OF OVEREXPOSURE***
REPEATED SKIN CONTACT MAY CAUSE SENSITIZATION.

MEDICAL CONDITIONS AGGRAVATED ***
NOT KNOWN

SYMPTOMS OF EXPOSURE ***
INHALATION OF VAPORS/MISTS/AEROSOLS MAY CAUSE EYE,NOSE,THROAT AND LUNG IRRITATION;SKIN CONTACT MAY CAUSE SEVERE IRRITATION OR BURNS.

PRECAUTIONARY STATEMENT BASED ON TESTING RESULTS ***
MAY BE TOXIC IF ORALLY INGESTED.

-----SECTION 5----------FIRST AID INSTRUCTIONS----------

SKIN CONTACT ***
REMOVE CLOTHING.WASH AREA WITH LARGE AMOUNTS OF SOAP SOLUTION OR WATER FOR 15 MIN.IMMEDIATELY CONTACT PHYSICIAN

EYE CONTACT***
IMMEDIATELY FLUSH EYES WITH WATER FOR 15 MINUTES.IMMEDIATELY CONTACT A PHYSICIAN FOR ADDITIONAL TREATMENT

INHALATION EXPOSURE***
REMOVE VICTIM FROM CONTAMINATED AREA.APPLY NECESSARY FIRST AID TREATMENT.IMMEDIATELY CONTACT A PHYSICIAN.

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 3-4 GLASSES MILK OR WATER

----SECTION 6----------SPILL,DISPOSAL AND FIRE INSTRUCTIONS----------

SPILL INSTRUCTIONS***
VENTILATE AREA,USE SPECIFIED PROTECTIVE EQUIPMENT.CONTAIN AND ABSORB ON ABSORBANT MATERIAL.PLACE IN WASTE DISPOSAL CONTAINER.THE CONTAMINATED ABSORBANT SHOULD BE CONSIDERED A PESTICIDE AND DISPOSED OF IN AN APPROVED PESTICIDE LANDFILL.SEE PRODUCT LABEL STORAGE AND DISPOSAL INSTRUCTIONS.
REMOVE IGNITION SOURCES.FLUSH AREA WITH WATER.SPREAD SAND/GRIT.

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 NPDES PERMIT
PRODUCT(AS IS)-
DISPOSE OF IN APPROVED PESTICIDE FACILITY OR ACCORDING TO LABEL INSTRUCTIONS

FIRE EXTINGUISHING INSTRUCTIONS***
FIREFIGHTERS SHOULD WEAR POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS(FULL FACE-PIECE TYPE).PROPER FIRE EXTINGUISHING MEDIA:
DRY CHEMICAL,CARBON DIOXIDE,FOAM OR WATER

Product: POWERLINE 3625

-----SECTION 7----------SPECIAL PROTECTIVE EQUIPMENT----------

USE PROTECTIVE EQUIPMENT IN ACCORDANCE WITH 29CFR SECTION 1910.132-134.USE RESPIRATORS WITHIN USE LIMITATIONS OR ELSE USE SUPPLIED AIR RESPIRATORS.

VENTILATION PROTECTION***

ADEQUATE VENTILATION TO MAINTAIN AIR CONTAMINANTS BELOW EXPOSURE LIMITS

RECOMMENDED RESPIRATORY PROTECTION***

IF VENTILATION IS INADEQUATE OR SIGNIFICANT PRODUCT EXPOSURE IS LIKELY, USE A RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE & DUST/MIST PREFILTER

RECOMMENDED SKIN PROTECTION***

RUBBER GLOVES

WASH OFF AFTER EACH USE REPLACE AS NECESSARY.

RECOMMENDED EYE PROTECTION***

SPLASH PROOF CHEMICAL GOGGLES

-----SECTION 8----------STORAGE AND HANDLING PRECAUTIONS----------

STORAGE INSTRUCTIONS***

KEEP CONTAINERS CLOSED WHEN NOT IN USE.

KEEP AWAY FROM FLAMES OR SPARKS. BOND CONTAINERS DURING FILLING OR DISCHARGE WHEN PERFORMED AT TEMPERATURES AT OR ABOVE THE PRODUCT FLASH POINT.

HANDLING INSTRUCTIONS***

COMBUSTIBLE. DO NOT USE AROUND SPARKS OR FLAMES. BOND CONTAINERS DURING FILLING OR DISCHARGE WHEN PERFORMED AT TEMPERATURES AT OR ABOVE THE PRODUCT FLASH POINT.

**********

THIS MSDS WAS WRITTEN TO COMPLY WITH THE OSHA HAZARD COMMUNICATION STANDARD

**********

APPENDIX: REGULATORY INFORMATION

THE CONTENT OF THIS APPENDIX REPRESENTS INFORMATION KNOWN TO BETZ ON THE EFFECTIVE DATE OF THIS MSDS. THIS INFORMATION IS BELIEVED TO BE ACCURATE. ANY CHANGES IN REGULATIONS WILL RESULT IN UPDATED VERSIONS OF THIS DOCUMENT.

...TSCA: THIS IS AN EPA REGISTERED BIOCIDE AND IS EXEMPT FROM TSCA INVENTORY REQUIREMENTS

...FIFRA(40CFR):EPA REG.NO.: 10324-42-3876

...REPORTABLE QUANTITY(RQ) FOR UNDILUTED PRODUCT:

NOT APPLICABLE

...RCRA: IF THIS PRODUCT IS DISCARDED AS A WASTE,THE RCRA HAZARDOUS WASTE IDENTIFICATION NUMBER IS:D001=IGNITABLE

...DOT HAZARD/UN#/ER GUIDE# IS :COMBUSTIBLE LIQUID/NA1993/#27

...CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) MATERIALS:NONE

...SARA SECTION 302 CHEMICALS:NONE

...SARA SECTION 313 CHEMICALS:NONE

...SARA SECTION 312 HAZARD CLASS:IMMEDIATE(ACUTE);DELAYED(CHRONIC);FIRE

...MICHIGAN CRITICAL MATERIALS: NONE

NFPA/HMIS : HEALTH - 3; FIRE - 2; REACTIVITY - 0; SPECIAL - NONE; PE - B

BETZ LABORATORIES
4636 SOMERTON ROAD, TREVOSE, PA 19053

PRODUCT: POWERLINE 3625

AQUATIC TOXICOLOGY

Fathead Minnow

96 Hour Flow-Thru Bioassay
LC50: 0.27 MG/L
No effect level: 0.05 MG/L

Daphnia magna

48 Hour Flow-Thru Bioassay
LC50: 0.04 MG/L

MAMMALIAN TOXICOLOGY

ORAL LD50 RAT: 445 MG/KG

DERMAL LD50 RABBIT: >1800 MG/KG

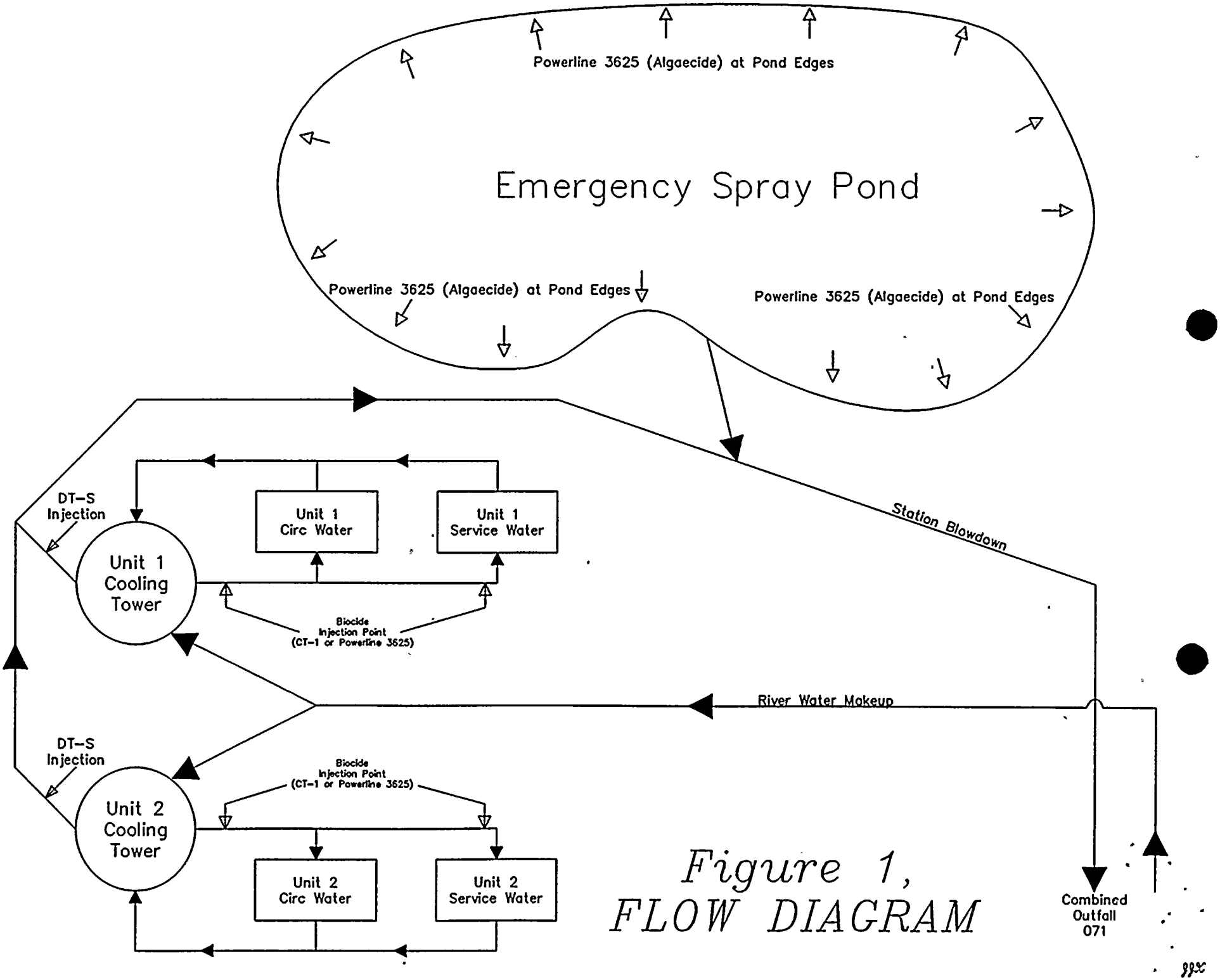



*Figure 1, FLOW DIAGRAM*

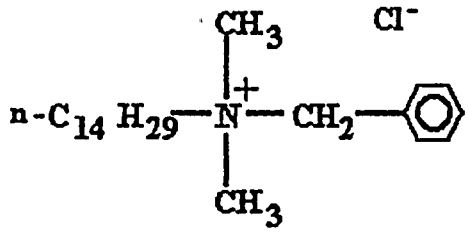
BETZ *Industrial*

# BETZ POWERLINE 3625
# ENVIRONMENTAL INFORMATION PACKAGE

## Description

Powerline 3625 is an effective broad-spectrum non-oxidizing biocide used for the control of bacterial, fungal, and algal slime growth in both once-through and recirculating cooling water systems.

Powerline 3625 contains 50% active ingredient of a cationic surfactant and 50% inert materials. The cationic surfactant is n-alkyl dimethyl benzyl ammonium chloride (ADBAC). The specific molecule is:




This hydrocarbon molecule is referred to as a surface active agent and possesses a hydrophobic tail and positively charged moiety that readily attaches to cell membranes to produce biocidal action. The inert materials of this formulation - water and alcohol - are relatively non-toxic to aquatic organisms once the materials are discharged into the environment.

Research into the adsorptive characteristics, aquatic toxicity, biodegradation, bioaccumulation and detoxification processes have been conducted for the materials in this product. The results of these studies are summarized herein.

**Adsorption: Biocidal Mechanism and Adsorption Rates**

The toxic properties of cationic surfactants result from a strong interaction with membrane proteins. Membrane proteins are essential for many transport mechanisms including various specific ion transport channels. The alkyl portion of this active becomes imbedded in these membranes. In effect, this cationic surfactant is a good biocidal performer but it is short-lived once its positive charge is neutralized upon adsorption to various surfaces.

This material has an extremely strong affinity for many kinds of suspended material and substrates. A series of laboratory and field studies conducted by Rohm and Haas Company (Krezemski, SF, et. al., 1977) evaluated the degree and rate that the Quaternary Amine is electrostatically bound to suspended matter and other substrates.

Radioactively labeled ADBAC solutions at concentrations of 0.01 ppm to 0.10 ppm were used for studies to determine adsorptive characteristics to different types of material. In these studies, adsorption was measured by the loss of radioactivity from the labeled solutions exposed to three different types of adsorbent material - river silt, aquatic plant, and alum floc. The results were as follows:

***Table 1***
***Adsorptive Characteristics of ADBAC***
***(Betz Powerline 3625 = 50% Active ADBAC)***

| Adsorbent | Contact Time (Hr) | Initial Level (ppm) | Final Level (ppm) | Adsorption (%) |
|---|---|---|---|---|
| River Silt | 1/60 | 0.070 | 0.006 | 91% |
| Aquatic Plant *(azolla Carolinana)* | 24 | 0.056 | 0.008 | 86% |
| Alum Floc[a] | 1/2 | 0.094 | 0.000 | 100% |

*Notes:* a) *Turbidity = 400 ppm*
*Alum Concentration = 30 ppm*

Field studies conducted by Rohm and Haas have determined the residual ADBAC concentrations in cooling tower blowdown water at various intervals following biocide application. The adsorptive nature of the ADBAC to surfaces of the cooling tower system and to particulate material caused a substantial loss.

***Table 2***
***ADBAC in Cooling Tower Blowdown Water as a Function of Time after Dosing[a]***

***(Powerline 3625 = 50% Active ADBAC)***

| Time After Injection (Hours) | Dose 1 (60 ppm) | Dose 2 (30 ppm) | Dose 3 (30 ppm) |
|---|---|---|---|
| 1.0 | 60.0 | 26.8 | 31.6 |
| 2.5 | 52.2 | 21.1 | 21.0 |
| 5.0 | 44.8 | 14.8 | 14.2 |
| 8.0 | 26.5 | 10.6 | 9.9 |
| 72. | 5.18 | 0.25 | 0.041 |
| 120. | 2.50 | 0.011 | NDR[b] |
| 168. | 1.16 | 0.008 | NDR[b] |

*Notes:* a) *Test Conditions*
*3 Consecutive Dosings (60, 30, 30 ppm Product)*
*One week interval between dosings*
*Cooling System Capacity = 40,000 gallons*
*Blowdown Rate = 30 gpm*
b) *NDR = No Detectable Residue (<0.005 ppm)*

**Biodegradation**

The rate of biodegradation of the Quat active was evaluated in both acclimated and unacclimated microbial cultures (Gawel, L.J. 2 Huddlestown, R.L., Continental Oil Company, 1972). The micro-organisms used for the biodegradation tests were derived from both soil and raw city sewage, and which grew on a defined medium. Rates of biodegradation were determined analytically using an extraction procedure to remove all undegraded Quat. The results reported below present biodegradation data from cultures acclimated for different time intervals to the Quat (100% active).

***Table 3***
***Effect of Culture Acclimation on ADBAC Biodegradation***

| Acclimation: | NONE | 20 Hours | 48 Hours | 9 Days |
|---|---|---|---|---|
| Incubation Period | 24 hr / 48 hr | 24 hr / 48 hr | 24 hr / 48 hr | 24 hr / 48 hr |
| Percent Degradation | 37% / 95% | 60% / 97% | 60% / 97% | 15% / 50% |

The reduced rate of biodegradation at 9 days was attributed to the additional transfers of Quat causing an increased biocidal affect upon the cultures.

The Rohm and Haas investigation, previously cited, reported biodegradation studies of Quat conducted by exposing the $^{14}C$ labeled active to activated sludge. Fresh synthetic sewage (nutrients) and labeled Quat were renewed daily except weekends to a closed culture system during a 24 day study period. Biological activity was determined by measuring the $^{14}C0_2$ that was generated from the labeled Quat. In order to allow for acclimation and any toxic effect, dosing of the labeled active started at 1 ppm and increased gradually over a period of days to 10 ppm.

During the first two weeks, 80% of all labeled Quat added to the culture unit was converted to $^{14}C0_2$. This activity increased to a 92% conversion after a two week accumulation period. It was concluded from this study that biodegradation of the Quat was, after a short period of microbial acclimation, quite rapid and complete.

**Bioaccumulation**

Bioaccumulation studies (Rohm and Haas) with bluegill sunfish determined the steady state interval, which is the time when Adsorption equals elimination using $^{14}C$ labeled Quat. The steady state interval occurred in the fish after 2 weeks of continuous exposure at sublethal levels at which time the carbon-14 residues in the carcass and the viscera reached a plateau. The concentration of the biocide in the carcass of the fish at the steady state was 42 times that of the concentration of water. It was also found that the biological half-life of the accumulated residues was short, about 7 days, which was determined by the elimination of the carbon-14 residues when the fish were placed in a biocide-free aquarium.

**Analytical Testing Information**

A procedure has been developed to measure the concentration of Powerline 3625 in cooling water systems. This test procedure is capable of detecting levels of Powerline 3625 as low as 0.05 mg/l (0.026 mg/l as Active ADBAC). This analytical procedure was developed from the Standard Method for anionic surfactants, the Methyl Blue Active Substance (MBAS) method. The Betz procedure follows the Standard Methods Procedure utilizing Methyl Orange to tie-up the cationic surfactant. This method is the same method used to determine BETZ Clam-Trol CT-1. The lower limit of detection for CT-1 is 0.2 mg/l which corresponds to 0.026 mg/l as the active ingredients. The following is a summary of the test method.

*Summary of Method*

In this test the dye in the CT-1 Buffer Reagent complexes with the active ingredient in Powerline 3625. This complex is extracted into 1,2-dichloroethane. The organic layer containing the complex is separated from the aqueous layer and dried with a drying reagent containing anhydrous sodium sulfate. The color intensity of the 1,2-dichloroethane layer is then measured in a spectrophotometer at 415 nm.

This method is customized to each application. Generally, the volumes of sample, CT-1 Buffer Reagent and 1,2-dichloroethane is adjusted according to the test range. If a higher absorbance is needed, the volume of sample is increased or the volume of 1,2-dichloroethane is decreased. When increasing the sample volume it may be necessary to increase the volume of CT-1 Buffer Reagent used. Caution must be taken to ensure that enough 1,2-dichloroethane is used to 1) leave a small plug of solvent in the separatory funnel when the bottom layer of solvent is removed and 2) fill the optical cell properly.

**Summary**

The biocidal activity of Powerline 3625 results from the cationic surface active agent in this formulation (Quat). The product's efficacy is based on its ability to alter or disrupt various membrane systems of the biofouling organisms. This same inherent property of this agent which provides biocidal efficacy is rapidly neutralized upon adsorption to many types of naturally occurring materials thus reducing or eliminating acute toxicity to non-target organisms.

Several key characteristics of Powerline 3625 will minimize its environmental impact following its application to cooling systems. These include:

1. Adsorption rates of the active ingredient is rapid and thus biocidal activity is short lived. The active ingredient readily adsorbs onto suspended material, sediments, and other surfaces within a cooling system.

2. The formulation is readily biodegradable. Solutions of the Quat have been shown to biodegrade by more than 90% in two days.

3. Powerline 3625 provides an alternative to chlorine or a number of halogenated organic or metal-containing biocides that are considerably less environmentally desirable.

4. Bioaccumulation of the Quat active has been determined by continuous exposure of low levels of free actives to fish, as reaching a steady state after 2 weeks. The half-life of this accumulated material is short once exposure ceases.

5. An analytical field method is available for determining the presence of the actives in a treated cooling system. The method is also used for monitoring discharges.

Biofouling treatment programs for cooling systems need to employ innovative technology that will direct applications in a most effective manner to the target organisms. Applications of Powerline 3625 can serve to protect cooling systems from bacterial, fungal, and algae slimes that cause fouling problems. This treatment program is non-corrosive to system metallurgies and has additional surfactant properties that can help to minimize fouling of cooling tower fill materials, system piping and condenser tubes.

# BETZ POWERLINE® 3625

BETZ LABORATORIES, INC.

FOR CONTROL OF ALGAE AND ALGAL SLIME GROWTH IN WATER COOLING SYSTEMS

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

**DANGER**

CORROSIVE. CAUSES SEVERE EYE & SKIN DAMAGE. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. WEAR GOGGLES OR FACE SHIELD & RUBBER GLOVES WHEN HANDLING. HARMFUL OR FATAL IF SWALLOWED. AVOID CONTAMINATION OF FOOD. WASH THOROUGHLY WITH SOAP AND WATER AFTER HANDLING, BEFORE CONTAMINATED CLOTHING AND WASH BEFORE REUSE.

ENVIRONMENTAL HAZARDS

THIS PESTICIDE IS TOXIC TO FISH. DO NOT DISCHARGE INTO LAKES, PONDS, STREAMS, ESTUARIES, OCEANS OR PUBLIC WATER UNLESS THIS PRODUCT IS SPECIFICALLY IDENTIFIED AND ADDRESSED IN AN NPDES PERMIT. DO NOT DISCHARGE EFFLUENT CONTAINING THIS PRODUCT INTO SEWER SYSTEMS WITHOUT PREVIOUSLY NOTIFYING THE SEWAGE TREATMENT PLANT AUTHORITY. FOR GUIDANCE CONTACT YOUR STATE DIRECTOR OR REGIONAL OFFICE OF THE EPA.

PHYSICAL OR CHEMICAL HAZARDS

DO NOT USE OR STORE NEAR HEAT OR OPEN FLAME.

NET WT.: LBS.

LOT NO.

FOR INDUSTRIAL USE. Technical advice regarding specific site problems is available from BETZ.

3625SOP 9234

| ACTIVE INGREDIENT: | |
|---|---|
| n-Alkyl (50% C14, 40% C12, 10% C16) dimethylbenzylammonium chloride | 50.0% |
| INERT INGREDIENTS: | 50.0% |
| TOTAL | 100.0% |

CONTENTS: LIQUID
POUNDS PER GALLON: 8.8
EPA REG NO. 10324-42-3876
EPA EST. NO. 10324-NJ-1

**DANGER** KEEP OUT OF REACH OF CHILDREN

STATEMENT OF PRACTICAL TREATMENT

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse.

If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution; or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, as well as oxygen and measures to support breathing manually or mechanically may be needed.

See left panel for additional precautionary statements.

**DIRECTIONS FOR USE:** It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

1. PROHIBITIONS: Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.
2. STORAGE INSTRUCTIONS: Store in original container. Keep from freezing.
3. SPILL OR LEAK PROCEDURE: Small spills may be mopped up or flushed away with water or absorbed on some absorbent material and incinerated.
4. PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation Federal Law. If these wastes cannot be disposed of by the use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.
5. CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

FOR RECIRCULATING WATER COOLING TOWERS

Do not use water containing residue from use of this product to irrigate crops used for food or feed.

(To clean a system)

The dose should be poured into the sump of a system which is clean or in which growth is first noticed.

INITIAL APPLICATION: 9.25 to 18.25 fluid ounces (20 to 40 ppm as an active quaternary basis) per 1000 gallons of contained water. When heavy algae growth is present, system will have to be cleaned manually.
SUBSEQUENT APPLICATION: 1.33 to 2.85 fluid ounces (3 to 15 ppm as an active quaternary basis) per 1000 gallons of contained water.

The above directions are to be followed twice weekly or as needed. If algae growth is noticeable, apply the initial dose.

When used as directed, this product will help improve the appearance and cleanliness of the cooling system water.

This product helps inhibit the growth of unsightly algae.

When properly stored for prolonged periods of time, this product will not lose its effectiveness or strength.

Manufactured for: BETZ LABORATORIES, INC.

TREVOSE, PA 19053 BUSINESS PHONE: 215-355-3300 EMERGENCY (HEALTH OR ACCIDENT): 1-800-877-1940

POWERLINE ® 3625

BB366250

POWERLINE ® 3625
NET WT.: LBS.
LOT NO.
CUSTOMER PART NO.

POWERLINE ® 3625
PROPER SHIPPING NAME:
COMBUSTIBLE LIQUID, N. O. S.
NA 1993
DRUMS & PAILS EXEMPT FROM DOT REGS.

| SPECIFIC HAZARD— 4—Severe 3—Serious 2—Moderate 1—Slight 0—Minimal | POWERLINE ® 3625 | |
|---|---|---|
| | HEALTH | 3 |
| | FLAMMABILITY | 2 |
| | REACTIVITY | 0 |
| PERSONAL PROTECTION Σ ASK SUPERVISOR A-SAFETY GLASSES B-GOGGLES, GLOVES C-GOGGLES, GLOVES, APRON D-GOGGLES, GLOVES, APRON, FACESHIELD | PERSONAL PROTECTION | D |