



Farzie Shelton, chE; REM

Manager of Environmental Affairs

July 29, 2003

Ms. Trina Vielhauer, Chief  
Bureau of Air Regulation  
Florida Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

RECEIVED

JUL 31 2003

BUREAU OF AIR REGULATION

RE: C.D. McIntosh, Jr. Power Plant – DEP File No. 105004-011-AV Units No. 1 & 2  
Larsen Power Plant – DEP File No. 105003-004-AV Units No. 6 & 7  
Application of Fuel Additive

Dear Ms. Vielhauer:

The City of Lakeland is considering the use of fuel additive for Units 1 and 2 at McIntosh Power Plant and units 6 and 7 at Larsen Power Plant to minimize fouling from deposits formed in the combustion process. This fuel additive will enhance the combustion process and therefore, will reduce the inefficiency caused by fuel impurities. The additive under consideration is manufactured by Bell Additives, Inc. (AXT 1004-D) and appears to be very similar to magnesium oxide additives which have been used for many years in these units and other electric utility units to minimize boiler tube deposits when firing residual oil. We have obtained the MSDS information from manufacturer and have requested Mr. Ken Kosky P.E. of Golder Associates to evaluate the use and its effect on the emission from these units. Therefore, enclosed please find Mr. Kosky's signed and sealed

As you will note, Mr. Kosky statement that "The use of the additive should be allowed under the existing Title V permit Pursuant to Rule 62-213.410(3) and Condition 32 of Appendix TV-3 of the Title V Permit. The Rule 62-213.410(3) provides for Changes Without Permit Revision however, requires that 7 days written notice be given to the Department and EPA concerning the use of the additive and any changes resulting from its use. Based on the emission estimates, the use of the additive will not change any of the applicable requirements for Units 1, 2, 6, and 7".

Therefore, we are writing to request the necessary changes to the Title V permits for these units to allow the use of AXT 1004-D. Additionally we are providing you with a copy of the manufacturer's MSDS for this fuel additive. If you should have a question, please do not hesitate to contact me.

Sincerely,

Farzie Shelton

Enclosure

Cc: Gracy Danois  
Title V Permitting  
EPA Region IV

City of Lakeland • Department of Electric Utilities

501 East Lemon Street • Lakeland, FL 33801-5050 • (863) 834-6603 • Fax (863) 834-8187 • Message System 834-6592

farzie.shelton@lakelandelectric.com

**Golder Associates Inc.**

6241 NW 23rd Street, Suite 500  
Gainesville, FL 32653-1500  
Telephone (352) 336-5600  
Fax (352) 336-6603



July 24, 2003

0237637

Ms. Farzie Shelton, Manager of Environmental Affairs  
Lakeland Electric  
501 East Lemon Street  
Lakeland, Florida 33801

**RECEIVED**

**JUL 31 2003**

RE: DEP FILE NO. 105004-011-AV  
CITY OF LAKELAND, C. D. MCINTOSH POWER PLANT  
UNITS 1 AND 2 FUEL ADDITIVE

**BUREAU OF AIR REGULATION**

Dear Farzie:

This correspondence provides emissions and permitting implications regarding the use of a fuel additive for Units 1 and 2 to minimize fouling from deposits formed in the combustion process. The emissions and regulatory information is based on the manufacturer supplied MSDS sheet and literature on usage.

The additive being considered is manufactured by Bell Additives, Inc. (AXT 1004-D) and appears to be very similar to magnesium oxide additives used for many years to minimize boiler tube deposits when firing residual oil. The additive produced by Bell Additives, Inc. appears to be oil-based rather than water-based. The reported amount of additive in the proprietary mixture is 75 parts per million (ppm) with the remaining material being solvents and other volatile material. The maximum usage would be one (1) gallon of additive per 1,000 gallons of residual oil. Given the small amount of additive it is my opinion that there would be no increase in emissions other than a very small increase in particulate matter resulting from the amount of magnesium and other non-volatile materials present in the additive. Based on the MSDS sheet, the maximum usage and authorized production rate for Units 1 and 2 the maximum potential increase in annual particulate emissions would be 0.06 and 0.07 tons/year, respectively. The calculation are as follows:

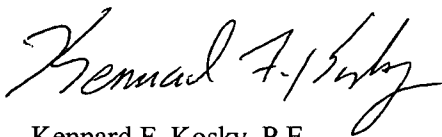
- Unit 1 Fuel Usage:  $950 \text{ MMBtu/hr} \times \text{gal fuel oil}/152,000 \text{ Btu} = 6,250 \text{ gal fuel oil/hr}$
- Unit 2 Fuel Usage:  $1,115 \text{ MMBtu/hr} \times \text{gal fuel oil}/152,000 \text{ Btu} = 7,336 \text{ gal fuel oil/hr}$
- Unit 1 Additive Usage:  $6,250 \text{ gal fuel oil/hr} \times 1 \text{ gal additive}/1,000 \text{ gal fuel oil} = 6.25 \text{ gal/hr}$
- Unit 2 Additive Usage:  $7,336 \text{ gal fuel oil/hr} \times 1 \text{ gal additive}/1,000 \text{ gal fuel oil} = 7.34 \text{ gal/hr}$
- Unit 1 Non-Volatile additives:  $6.25 \text{ gal/hr} \times 75 \text{ ppm additives}/10 \times 0.86 \text{ (S.G.)} \times 8.34 \text{ lb/gal} = 0.0034 \text{ lb additive/hour}$
- Unit 2 Non-Volatile additives:  $7.34 \text{ gal/hr} \times 75 \text{ ppm additives}/10 \times 0.86 \text{ (S.G.)} \times 8.34 \text{ lb/gal} = 0.0039 \text{ lb additive/hour}$
- Unit 1 PM Emissions:  $= 0.0034 \text{ lb additive/hr} \times 96 \text{ (MW of MgSO}_4\text{)}/24 \text{ (MW of Mg)} = 0.0136 \text{ lb/hr and } 0.0596 \text{ tons/year}$
- Unit 2 PM Emissions:  $= 0.0039 \text{ lb additive/hr} \times 96 \text{ (MW of MgSO}_4\text{)}/24 \text{ (MW of Mg)} = 0.0156 \text{ lb/hr and } 0.0683 \text{ tons/year}$
- Note: that this calculation assumes that the additive is all magnesium which is conservative. Typically these compounds are hydroxides. The calculation also assumes no credit for the conversion of  $\text{SO}_3$ , which would otherwise be emitted as either sulfuric acid mist or another type of particulate matter.

The use of the additive should be allowed under the existing Title V Permit Pursuant to Rule 62-213.410(3) and Condition 32 of Appendix TV-3 of the Title V Permit. The rule provision, Changes Without Permit Revision, requires that 7 days written notice be given to the Department and EPA concerning the use of the additive and any changes resulting from its use. Based on the emission estimates, the use of the additive will not change any of the applicable requirements for Units 1 and 2.

It is recommended that a letter be sent to the Department and EPA including a copy of the material on the additive (literature and MSDS) and my letter to obtain concurrence on the use of the additive.

Please call me if there are any questions on the information contained herein.

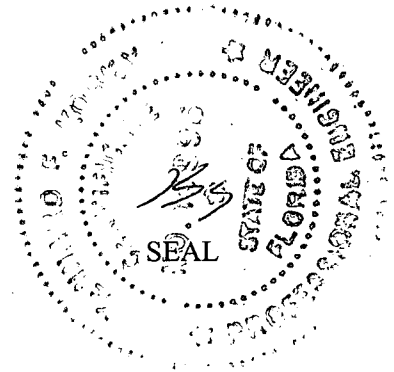
Sincerely,



Kennard F. Kosky, P.E.  
Principal  
Professional Engineer Registration No. 14996

KFK/jkw

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6241 NW 23rd Street, Suite 500  
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July 24, 2003

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Ms. Farzie Shelton, Manager of Environmental Affairs  
Lakeland Electric  
501 East Lemon Street  
Lakeland, Florida 33801

RECEIVED

JUL 31 2003

RE: DEP FILE NO. 105003-004-AV  
CITY OF LAKELAND, LARSEN POWER PLANT  
UNITS 6 AND 7 FUEL ADDITIVE

BUREAU OF AIR REGULATION

Dear Farzie:

This correspondence provides emissions and permitting implications regarding the use of a fuel additive for Units 6 and 7 to minimize fouling from deposits formed in the combustion process. The emissions and regulatory information is based on the manufacturer supplied MSDS sheet and literature on usage.

The additive being considered is manufactured by Bell Additives, Inc. (AXT 1004-D) and appears to be very similar to magnesium oxide additives used for many years to minimize boiler tube deposits when firing residual oil. The additive produced by Bell Additives, Inc. appears to be oil based rather than water based. The reported amount of additive in the proprietary mixture is 75 parts per million (ppm) with the remaining material being solvents and other volatile material. The maximum usage would be one (1) gallon of additive per 1,000 gallons of residual oil. Given the small amount of additive, it is my opinion that there would be no increase in emissions other than a very small increase in particulate matter resulting from the amount of magnesium and other non-volatile materials present in the additive. Based on the MSDS sheet, the maximum usage and authorized production rate for Units 6 and 7 the maximum potential increase in annual particulate emissions would be 0.023 and 0.046 tons per year (TPY), respectively. The calculations are as follows:

- Unit 6 Fuel Usage:  $372.4 \text{ MMBtu/hr} \times \text{gal fuel oil}/152,000 \text{ Btu} = 2,450 \text{ gal fuel oil/hr}$
- Unit 7 Fuel Usage:  $728 \text{ MMBtu/hr} \times \text{gal fuel oil}/152,000 \text{ Btu} = 4,790 \text{ gal fuel oil/hr}$
- Unit 6 Additive Usage:  $2,450 \text{ gal fuel oil/hr} \times 1 \text{ gal additive}/1,000 \text{ gal fuel oil} = 2.45 \text{ gal/hr}$
- Unit 7 Additive Usage:  $4,790 \text{ gal fuel oil/hr} \times 1 \text{ gal additive}/1,000 \text{ gal fuel oil} = 4.79 \text{ gal/hr}$
- Unit 6 Non-Volatile additives:  $2.45 \text{ gal/hr} \times 75 \text{ ppm additives}/10 \times 0.86 \text{ (S.G.)} \times 8.34 \text{ lb/gal} = 0.0013 \text{ lb additive/hour}$
- Unit 7 Non-Volatile additives:  $4.79 \text{ gal/hr} \times 75 \text{ ppm additives}/10 \times 0.86 \text{ (S.G.)} \times 8.34 \text{ lb/gal} = 0.0026 \text{ lb additive/hour}$
- Unit 6 PM Emissions:  $= 0.0013 \text{ lb additive/hr} \times 96 \text{ (MW of MgSO}_4\text{)}/24 \text{ (MW of Mg)} = 0.0052 \text{ lb/hr and } 0.0228 \text{ tons/year}$
- Unit 7 PM Emissions:  $= 0.0026 \text{ lb additive/hr} \times 96 \text{ (MW of MgSO}_4\text{)}/24 \text{ (MW of Mg)} = 0.0104 \text{ lb/hr and } 0.0456 \text{ tons/year}$
- Note: that this calculation assumes that the additive is all magnesium which is conservative. Typically these compounds are hydroxides. The calculation also assumes no credit for the conversion of  $\text{SO}_3$ , which would otherwise be emitted as either sulfuric acid mist or another type of particulate matter.

The use of the additive should be allowed under the existing Title V Permit Pursuant to Rule 62-213.410(3) F.A.C. The rule provision, Changes Without Permit Revision, requires that 7 days written notice be given to the Department and EPA concerning the use of the additive and any changes resulting from its use. Based on the emission estimates, the use of the additive will not change any of the applicable requirements for Units 6 and 7.

It is recommended that a letter be sent to the Department and EPA including a copy of the material on the additive (literature and MSDS) and my letter to obtain concurrence on the use of the additive.

Please call me if there are any questions on the information contained herein.

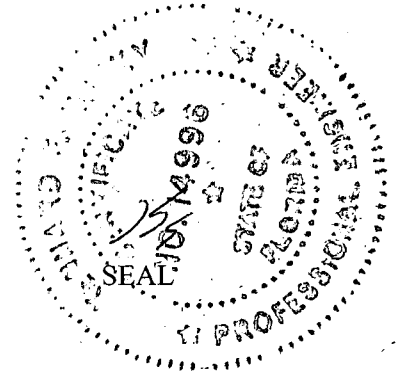
Sincerely,



Kennard F. Kosky, P.E.  
Principal  
Professional Engineer Registration No. 14996

KFK/jkw

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1340 Bennett Drive, Longwood, FL 32750  
Telephone: 407/831-5021  
www.belladditives.com



# Fax

<b>To:</b>	Jay Chesser	<b>From:</b>	Dick Wolfe, VP/Sales & Marketing
<b>Fax:</b>	863/834-5670	<b>Pages:</b>	1 Including cover sheet
<b>Phone:</b>		<b>Date:</b>	February 8, 2002
<b>Re:</b>	Constituents to ATX 1004-D	<b>Fax:</b>	407/767-8685

If you do not receive all of these pages, please call our office as soon as possible.

● **Message:**

Bell Additives manufactures a proprietary formula for use in power generation equipment that has been used extensively since the 1950s in power boilers as found in paper and pulp mills, power generation, boilers for production of hot water and steam, asphalt plants, cement plants, large kilns, waste oil incinerators, etc.

Our products consist of predominantly petroleum distillates and proprietary organo-metallic compounds (to include magnesium) designed to improve the performance and efficiency of the equipment in which they are used. During combustion, the organics are reduced to carbon dioxide and water. The metallic constituents are reduced to the oxide of the metal.

Possible treat ratios of the additive in fuel oil are as follows:

	<u>Treat Ratio</u>	<u>Additive Concentration in fuel</u>
Worst Case	1 gallon to 1000 gallons	0.1%
Start-up ratio	1 gallon to 3000 gallons	0.033%
Best Case	1 gallon to 7000 gallons	0.014%

Therefore, by virtue of the De Minimis exemption provision of the Toxic Release Inventory (TRI), which exempts any of the TRI substances relevant to electric utilities that appear in concentrations at or below 0.1%, the use of our total additive in electric utilities is not reportable. Our products have been approved for use in electric utilities within major population centers with no problems.

From a health and safety perspective, storage, use and handling of the additive is similar to the precautions associated with the handling of diesel fuel.

I hope this will serve your purpose. I look forward to working with you in the near future.

God bless you and all that you do.

RECEIVED

JUL 31 2003

BUREAU OF AIR REGULATION

# **ATX-1004-D FOR RESIDUAL AND HEAVY FUEL OILS**

## **FOR FUEL OILS CONTAINING VERY HIGH SULFUR AND HIGH VANADIUM**

### **COMPOSITION**

Bell's ATX-1004-D is a multipurpose fuel oil treatment for residual and distillate fuel oils. It is a carefully blended formula that provides all of the storage and fireside benefits of ATOM-IX 950. Additionally, it was specifically designed to combat the problems associated with both low and high temperature corrosion when using fuel oil containing very high amounts of sulfur and vanadium. As a multipurpose treatment, it stabilizes the fuel in storage and keeps the pre-flame system clean, preventing formation of sludge, gum and other deposits. ATX-1004-D has a powerful combustion catalyst and gives more complete combustion, reduces smoke, soot and fuel oil consumption. ATX-1004-D helps neutralize the acidic nature of the flue gas, reducing the harmful effects in a low temperature environment.

### **BENEFITS**

#### **Pre-Flame:**

- Prevents buildup of tank bottom sludge.
- Converts sludge already present into burnable fuel.
- Ensures cleaner tanks, lines, strainers, preheaters and burners.
- Provides more uniform flow of fuel oil to burner for best possible combustion.
- Inhibits corrosion in fuel system.
- Emulsifies water into the fuel, which recovers lost tank capacity with no interruption of plant operations.

#### **Fireside:**

- Improves combustion in burner and increases efficiency.
- Reduces air pollution by minimizing the discharge of unburned hydrocarbons and  $\text{SO}_3$ .
- Prevents slag formation.
- Removes old, buildup formations.
- Reduces fouling.
- Prevents corrosion of metal surfaces when using fuels with very high vanadium and sulfur.
- Keeps equipment in service over longer periods without shutdowns for cleaning.
- Combats low temperature corrosion in the backend.
- Lowers stack temperatures.

ATX-1004-D is a liquid solution containing highly effective organo-metallic combustion catalysts, dispersants, stabilizing, and emulsifying agents dissolved in a pure hydrocarbon solvent. It is completely soluble in fuel oil, so no plugging or abrasion (of pumps, burners or nozzles) can occur. The emulsifiers prevent the formation of viscous sludge and disperse water into fine particles. This action improves fuel atomization at burner nozzles by controlling the surface tension of the oil, reducing the stratification that can occur in blended fuel oils and by maintaining the preflame system free from sludge and deposits.

During combustion, the active catalyst causes a more rapid and complete burning of the oil, allowing the excess air to be reduced. Reducing excess air slows down the velocity of the gas path, provides better heat transfer in the firebox, lowers exit gas temperatures and  $\text{NO}_x$ .

### **CONTROL OF DEPOSITS**

The metallic combustion catalyst in ATX-1004-D changes the nature of the vanadium oxides formed during the combustion process. The main cause of slag formation is vanadium pentoxide, which has a relatively low melting point. In a liquid or molten form, it acts as a binder and a powerful corrosive agent. The catalyst reacts with the vanadium to form high melting point vanadates that deposit in dry form. Thus, by inhibiting the formation of molten vanadium slag and changing it to a new dry friable chemical form, ATX-1004-D can remove the deposits throughout the system.

Existing deposits containing vanadium will usually be leached by the action of the ATX-1004-D catalyst vapors. The deposits will begin to crack and will finally drop off in particles over a period of a few weeks of use.

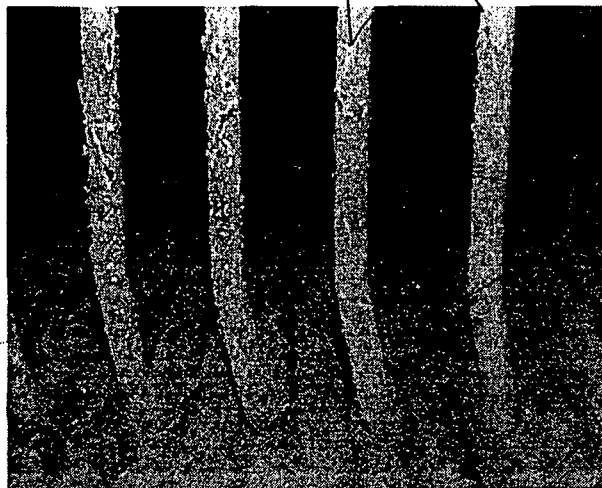


## REDUCTION OF SO<sub>3</sub>

Sulfur in fuel oil is normally oxidized to sulfur dioxide (SO<sub>2</sub>). When molten vanadium pentoxide is present, it catalyzes SO<sub>2</sub> in the presence of excess air to sulfur trioxide (SO<sub>3</sub>), which can combine with moisture to form sulfuric acid. This has a very corrosive effect on metal surfaces in the low temperature areas of the boiler. Because of its SO<sub>3</sub> absorption and combustion improving properties, ATX-1004-D not only inhibits the reaction, but can lower the SO<sub>2</sub>/SO<sub>3</sub> ratio even more by reducing excess air.

## COMBUSTION IMPROVEMENT

By increasing the rate of oxidation, a more complete combustion results which allows for the reduction of excess air, this slows down the gas path allowing hot gases to remain in the firebox longer, providing a more efficient heat transfer.



600 hours with magnesium oxide

## ENVIRONMENTALLY FRIENDLY

During combustion, the oxides of the metallic catalyst are formed in minute sizes and become part of the fly ash in the unit. Some of the oxides will fall to the bottom, and some will be captured in backend treatment programs such as, dust collectors, hoppers, scrubbers or precipitators. The total concentration of metals in the formula is less than specified by the U.S. EPA; therefore, ATX-1004-D complies with the "De Minimis" exemption of less than 1% as published under the guidelines for the "Toxic Release Inventory Program". The organics in ATX-1004-D are reduced to carbon dioxide and water as part of the combustion process.



4000 hours with ATOM-IX

## SOLUTION TO AIR POLLUTION

**BLENDING QUALITY ADDITIVES  
SINCE 1909**

### ***BELL ADDITIVES, INC.***

1340 Bennett Drive, Longwood, Florida 32750 U.S.A.

(407) 831-5021 FAX (407) 767-8685

Website: [WWW.BELLADDITIVES.COM](http://WWW.BELLADDITIVES.COM)

Email: [BAI@BELLADDITIVES.COM](mailto:BAI@BELLADDITIVES.COM)



MATERIAL SAFETY DATA SHEET  
May be used to comply with  
OSHA's Hazard Communication Standard,  
29 CFR 1910.1200. Standard must be  
consulted for specific requirements.

U.S. DEPARTMENT OF LABOR  
Occupational Safety and Health Administration  
(Non-Mandatory Form)  
Form Approved  
OMB. No. 1218-0072

IDENTITY (As used on Label and List)

ATX -1004-D ADDITIVE FOR BOILER FUEL

## SECTION I

Manufacturer's Name: Bell Additives, Inc.

Emergency Telephone Number: CHEMTREC:  
USA: 800-424-9300; INT'L: 703-527-3887

Address  
1340 Bennett Drive, Longwood, FL 32750

Telephone Number for information: (407) 831-5021

Date prepared (optional)

Signature of Preparer (optional)

## SECTION II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name (s))	OSHA PEL	ACGIH TLV	%(optional)
--------------------------------------------------------------------	----------	-----------	-------------

Catalyst	N/A		
Solvents	CAS #64741-44-2	100PPM	
Additives		75PPM	
A common diesel fuel base containing as proprietary properties a surfactant, and metallic combustion catalysts.			

## SECTION III - Physical/Chemical Characteristics

Boiling Point:	320-650°F	Specific Gravity (H2O = 1):	.86
Vapor Pressure:	1mmHg @ 20°C	Melting Point:	
Vapor Density(AIR = 1)	4.9	Evaporation Rate: (Ether=1)	70
Solubility in Water:	Negligible		
Percent Volatile by Volume (%):	99.7%		

Appearance and Odor: Black color solution which may contain a small sediment under certain atmospheric conditions. Light odor.

## SECTION IV - Fire and Explosion Hazard Data

Flash Point (Method Used):	Pensky-Martens	160°F
Flammable Limits -	LEL: 1.0	UEL: 6

Extinguishing Media: Foam, Co2, dry chemical. Water may be unsuitable except as a cooling agent.

Special Fire Fighting Procedures: Self-contained breathing apparatus with a full face piece operated in pressure-demand or other positive pressure mode.

Unusual Fire and Explosion Hazards: Vapors are heavier than air and may travel along the ground or be moved by ventilation and ignited by heat, pilot light, other flames, and ignitions sources distant from material handling point. Never use welding or cutting torch on or near drum (even empty) because product (even residue) can ignite explosively.

OSHA 174, Sept. 1985

NFPA (NATIONAL FIRE PROTECTION ASSOCIATE STANDARD)  
Health Hazard: 1      Flammability: 2      Reactivity: 0

**SECTION V - Reactivity Data**

Stability:      Unstable:      Stable: X      Conditions to Avoid

Incompatibility (materials to avoid): This product is incompatible with strong oxidizing agents, strong acids or bases and selected amines.

Hazardous Decomposition or Byproducts: Thermal decomposition in the presence of air may yield carbon monoxide and/or CO<sub>2</sub>. Hazardous Polymerization: May Occur: Will not occur: X Conditions to Avoid :

**SECTION VI - Health Hazard Data**

Route(s) of Entry: Inhalation? Yes      Skin? Yes      Ingestion? Yes      Hazards (Acute and Chronic):  
Carcinogenicity: NTP? No      IARC Monographs? No      OSHA Regulated? No  
Signs and Symptoms of Exposure:

Medical Conditions Generally Aggravated by Exposure: EYES: This product may be an eye irritant. SKIN: May cause skin irritation upon prolonged or repeated contacts. SYSTEMIC EFFECTS: Prolonged exposure may contribute to respiratory tract irritation or central nervous system depression in high concentration.

Emergency and First Aid Procedures: HEALTH EMERGENCY: FLORIDA POISON CONTROL CENTER (800) 282-3171; EYES: Flush with water for at least 15 minutes and seek immediate medical attention. SKIN: Wash with soap and large quantities of water. Seek medical attention if irritation from contact persists. INHALATION: If breathing difficulties, dizziness, or lightheadedness occur when working in areas with high vapor concentrations, victim should seek air free of vapors. If breathing stops, begin artificial respiration and seek immediate medical advice and/or attention. SWALLOWING: DO NOT INDUCE VOMITING. Seek immediate medical advice and/or attention.

**SECTION VII - Precautions for Safe Handling and Use**

Steps to be taken in Case Material is Released or Spilled: Keep sources of ignition and hot metal surfaces isolated from the spill. Flush spilled material into suitable retaining areas or containers with large quantities of water. Small amounts of spilled material may be absorbed into an appropriate absorbent.

Waste Disposal Method: Dispose of product in accordance with local, county, state and federal regulations.

Precautions to be Taken in Handling and Storing: Keep product container cool, dry and away from sources of ignition. Store in an area with adequate ventilation.

Other Precautions: Personnel should avoid inhalation of vapors, and should product splash on a person remove saturated clothing and flush contaminated areas. Launder clothing before reuse.

**SECTION VIII - Control Measures**

Respiratory Protection (Specify Type) : The use of respiratory protection depends on vapor concentration above the time-weighted TLV; Use a NIOSH approved cartridge respirator or gas mask.

Ventilation      Local Exhaust: Provide sufficient ventilation mechanical and/or local exhaust to maintain exposure below TLV's  
Mechanical (General):      Other:      Special:

Protective Gloves : The use of Nitrile rubber gloves is advised to prevent skin irritation in sensitive individuals.

Eye Protection: Use goggles or face shields to safeguard against potential eye contact.

Other Protective Clothing or Equipment:

Work/Hygienic Practices:

BA(08/25/98).

# MESSAGE CONFIRMATION

DATE : JUN-6-2003 FRI 09:06 AM

NAME :

TEL. :

PHONE : 913523366603883922

PAGES : 7

START TIME : 06-06 09:02AM

ELAPSED TIME : 03'43"

MODE : ECM

RESULTS : OK