



PHOTOGRAPHERS'
FORMULARY INC.

FORMULARY REDUCER IV FOR NEGATIVES

1-liter kit

Formulary Reducer IV is similar to Ansco 311. It is not a true reducer; rather it is only a bleach. The chemicals in this kit are used to convert the silver metal in the negative back to a silver halide, which then can be reconverted to silver metal in a redevelopment step. Any standard developer (not included in this kit) can be used for the redevelopment.

The reduction of the negative is accomplished in the redevelopment step. Redevelopment can be stopped at any stage desired, then the negative can be fixed to remove the residual silver halide in the negative. The removal of the silver halide, in effect, is equivalent to removing silver density from the original negative. Within reason, the process of bleach-redevelopment can be repeated any number of times to achieve the degree of negative reduction desired.

Reducer IV is a proportional reducer. Silver metal is converted to silver halide in approximately the same amount as it exists in the negative. The final result of bleaching and redevelopment is as if the film has less original development. In this respect, the action of Reducer IV followed by redevelopment can be thought of as film development in reverse.

Using a reducer correctly is an art and requires experience. We strongly urge you to practice using this reducer with scrap negatives before attempting reduction of a negative of value.

CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. Please read the chemical warnings on each package of chemical.

The chemicals used in Reducer IV are reasonably safe. Although potassium ferricyanide contains cyanides, they are chemically bound to the iron atom in the compound and not free to act as a poison. Potassium ferricyanide is not the insidious poison that sodium cyanide is.

The user assumes all risks upon accepting these chemicals. IF FOR ANY REASON YOU DO NOT WISH TO ASSUME ALL RISKS, PLEASE RETURN THE CHEMICALS FOR A FULL REFUND.

Please consult with local sewer and water authorities regarding the proper disposal of darkroom chemicals in your area.

MIXING THE SOLUTION

You will need one bottle of a 1-liter capacity. A dark brown bottle is desirable but not required.

Chemical	Amount
Distilled Water (20° C/68° F)	750 ml
Potassium ferricyanide	35 g
Potassium bromide	10 g
Distilled water to make	1000 ml

Place about 750 ml of cool water in the storage container and add the potassium ferricyanide. Stir the solution (or cap and shake the container) to dissolve the solid. Add the potassium bromide and again stir the solution (or cap and shake the container) to dissolve the solid. Finally add cool water to bring the total volume in the container up to 1000 ml. Cap and shake the solution to ensure the final solution is homogenous.

USING THE REDUCER

There are two steps in using Reducer IV (1) bleaching and (2) redevelopment. Both steps should be carried out in subdued light.

(1) **Bleaching.** The negative to be reduced must be free of hypo before bleaching otherwise permanent reduction will result. Soak the negative in water for a few minutes then transfer it to a tray (or other convenient container) containing undiluted Reducer IV solution. In a minute or two, the image will be converted to a straw color. Leave the negative in the Reducer IV solution for another minute or so after the image has been completely bleached, then wash it in running water for 3 to 4 minutes.

PORT NUMBER: 703
DS NO: P1866
EFFECTIVE DATE: 01/15/90

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 001
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PRODUCT: POTASSIUM BROMIDE

10-0930

ORDER NO: 149578
PROD NO : 614395

PHOTOGRAPHERS FORMULARY
CALL IN ADVANCE TO MEET
C/O UNITED FRT. TERMINAL

MISSOULA ,MT 59801

VAN WATERS & ROGERS INC. , SUBSIDIARY OF UNIVAR (206)889-3400
100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

-----PRODUCT IDENTIFICATION-----

PRODUCT NAME: POTASSIUM BROMIDE CAS NO.: 7758-02-3
COMMON NAMES/SYNONYMS: POTASSIUM SALT VW&R CODE: P1866
BROMIDE

FORMULA: K BR DATE ISSUED: 08/89
HAZARD RATING (NFPA 704 CRITERIA) SUPERCEDES: 07/87
HEALTH: 0 HAZARD RATING SCALE:
FIRE: 0 0=MINIMAL 3=SERIOUS
REACTIVITY: 0 1=SLIGHT 4=SEVERE
SPECIAL: NONE 2=MODERATE

-----HAZARDOUS INGREDIENTS-----

COMPONENT	EXPOSURE LIMITS, MG/M3				HAZARD
	%	OSHA PEL	ACGIH TLV	OTHER LIMIT	
POTASSIUM BROMIDE	>99	NONE	NONE	10(DOW)	NONE

-----PHYSICAL PROPERTIES-----

MELTING POINT, DEG F: 2516 VAPOR PRESSURE, MM HG/20 DEG C: N/A
BOILING POINT, DEG F: 1346 VAPOR DENSITY (AIR=1): N/A
SPECIFIC GRAVITY (WATER=1): 2.75 WATER SOLUBILITY, %: 70
APPEARANCE AND ODOR: EVAPORATION RATE (BUTYL ACETATE=1): N/A
WHITE CRYSTALLINE SOLID; ODORLESS

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-----FIRST AID MEASURES-----

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: IMMEDIATELY WASH SKIN WITH LOTS OF SOAP AND WATER. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. GET MEDICAL ATTENTION IF IRRITATION PERSISTS AFTER WASHING.

IF SWALLOWED: IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING BY GIVING 2 GLASSES OF WATER AND STICKING A FINGER DOWN THE THROAT. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

-----HEALTH HAZARD INFORMATION-----

PRIMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT

SIGNS AND SYMPTOMS OF EXPOSURE

INHALATION: BREATHING DUST MAY IRRITATE THE NOSE AND THROAT AND CAUSE COUGHING AND CHEST DISCOMFORT.

EYE CONTACT: DUSTS MAY IRRITATE THE EYES AND CAUSE SLIGHT TRANSIENT CORNEAL INJURY.

SKIN CONTACT: NO IRRITATION IS LIKELY AFTER BRIEF CONTACT BUT MAY BE IRRITATING OR CAUSE A BURN AFTER PROLONGED CONTACT WITH WET OR ABRADED SKIN.

SWALLOWED: LOW SINGLE DOSE TOXICITY.

CHRONIC EFFECTS OF EXPOSURE: REPEATED EXCESSIVE OVEREXPOSURE MAY CAUSE NAUSEA, VOMITING, MUSCULAR WEAKNESS, INCOORDINATION, DEPRESSION, PSYCHOSIS, ENDOCRINE EFFECTS, DEPRESSION OF THE HEART, ACNEFORM DERMATITIS. BROMISM HAS BEEN REPORTED IN OFFSPRING OF MOTHERS WHO ALSO HAD BROMIDE POISONING AS A RESULT OF INGESTION OF BROMIDES DURING PRENANCY.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE REPORTED.

-----TOXICITY DATA-----

ORAL: NO DATA FOUND

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FORMAL: NO DATA FOUND

INHALATION: NO DATA FOUND

MUTAGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN BY THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

REPRODUCTIVE DATA: BROMIDE ION HAS BEEN SHOWN TO INTERFERE WITH FERTILITY IN ANIMAL STUDIES.

-----PERSONAL PROTECTION-----

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MINIMIZING DUST EMISSIONS AT THE POINT OF USE.

RESPIRATORY PROTECTION: IF USE CONDITIONS GENERATE DUSTS, WEAR A NIOSH-APPROVED RESPIRATOR APPROPRIATE FOR THOSE EMISSION LEVELS. APPROPRIATE RESPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR WITH PARTICULATE FILTERS, A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR. IN THE ABSENCE OF ADEQUATE ENVIRONMENTAL CONTROLS AT THE POINT OF USE.

EYE PROTECTION: SAFETY GLASSES WITH SIDE SHIELDS. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE TO THE SEVERITY OF AN EYE INJURY.

PROTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES, AND GLOVES.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY AND READY FOR USE.

-----FIRE AND EXPLOSION INFORMATION-----

FLASH POINT, DEG F: N/A

FLAMMABLE LIMITS IN AIR, %

METHOD USED: N/A

LOWER: N/A UPPER: N/A

EXTINGUISHING MEDIA: THIS MATERIAL IS NOT COMBUSTIBLE. USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE FIGHTING PROCEDURES: FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. USE WATER SPRAY TO COOL NEARBY CONTAINERS AND STRUCTURES EXPOSED TO FIRE. SELF-CONTAINED BREATHING APPARATUS.

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE.

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-----HAZARDOUS REACTIVITY-----

STABILITY: STABLE POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE

MATERIALS TO AVOID: ACIDS, OXIDIZING MATERIALS.

HAZARDOUS DECOMPOSITION PRODUCTS: WILL LIBERATE TOXIC FUMES OF HYDROGEN BROMIDE AND/OR BROMINE.

-----SPILL, LEAK, AND DISPOSAL PROCEDURES-----

ACTION TO TAKE FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING RUBBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR WITH PARTICULATE FILTERS. WEAR CHEMICAL GOGGLES IF A HALF MASK IS WORN. FOR SMALL SPILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS. KEEP OUT OF SEWERS, STORM DRAINS, SURFACE WATERS, AND SOIL.

COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE.

RUBBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND CHEMICAL GOGGLES. FOR SMALL SPILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS.

COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE.

DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.

NOTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE SUBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

-----SPECIAL PRECAUTIONS-----

STORAGE AND HANDLING PRECAUTIONS: STORE IN A COOL, DRY, WELL-VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. KEEP BAGS OR FIBER DRUMS DRY AT ALL TIMES. WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

CONTAINERS DRY AT ALL TIMES. WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

REPAIR AND MAINTENANCE PRECAUTIONS: NONE.

OTHER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL

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RETAIN PRODUCT RESIDUE. ALWAYS OBEY HAZARD WARNINGS AND HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL.

-----REVISION-----

07/87: CORRECTED NFPA REFERENCE AND PHYSICAL DATA. REVISED SKIN CONTACT FIRST AID, PERSONAL PROTECTION, FIRE FIGHTING INFORMATION, DECOMPOSITION PRODUCTS, SPILL AND LEAK PROCEDURES, AND HANDLING ADVICE.

08/89: CHANGED HEADING AND CONTACT INFORMATION.

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, PACIFIC TIME (206)889-3400

11/06/95 12:59 PRODUCT: 614395 CUST NO: 113365 ORDER NO: 149578

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*** END OF MSDS ***

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VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

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JAN 24 1996

PRODUCT: POTASSIUM FERRICYANIDE

10-1010

ORDER NO: 149581
PROD NO : 502373

PHOTOGRAPHERS FORMULARY
CALL IN ADVANCE TO MEET
C/O ROADWAY TERMINAL

MISSOULA ,MT 59801

VAN WATERS & ROGERS INC. , SUBSIDIARY OF UNIVAR (206)889-3400
6100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

PRODUCT IDENTIFICATION

PRODUCT NAME: POTASSIUM FERRICYANIDE

MSDS #: P1420VS

DATE ISSUED: 01/28/92

ISSUED BY: 005443

MANUFACTURER'S MSDS

FOR EMERGENCY CALL:
CHEMTREC
1-800-424-9300

HMIS
HEALTH: 1 FLAMMABILITY: 0
REACTIVITY: 1 PROTECTION: B

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PRODUCT: POTASSIUM FERRICYANIDE

ORDER NO: 149581
PROD NO : 502373

TRADE NAME: POTASSIUM FERRICYANIDE
CAS NUMBER: 13746-66-2
SYNONYMS: POTASSIUM FERRICYANATE, YELLOW PRUSSATE OF POTASH
CHEMICAL FAMILY: IRON COMPOUNDS
FORMULA: $K_3Fe(CN)_6$

SECTION B - HAZARDOUS COMPONENTS

COMPONENT	CAS NO.	%	PEL/TLV
POTASSIUM FERRICYANIDE	13746-66-2	>/-99	NOT ESTABLISHED

SECTION C - PHYSICAL PROPERTIES

BOILING POINT (Deg.): DECOMPOSES
SPECIFIC GRAVITY: 1.85
MELTING POINT (Deg.): DECOMPOSES
FREEZING POINT (Deg.): NOT AVAILABLE
VAPOR PRESSURE (mm Hg): N/A
PERCENT VOLATILE (BY WT.): NOT AVAILABLE
VAPOR DENSITY (AIR=1): N/A
EVAPORATION RATE: NOT AVAILABLE
SOLUBILITY IN WATER: 40g/cc @ 20 Deg.
pH (% IN WATER): NOT AVAILABLE
ODOR THRESHOLD: NOT AVAILABLE

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PRODUCT: POTASSIUM FERRICYANIDE

ORDER NO: 149581
PROD NO : 502373

SECTION D - FIRE & EXPLOSION DATA

FLASH POINT (Deg.): N/A

FLAMMABLE LIMITS: LEL: (UNKNOWN) UEL: (UNKNOWN)

AUTO IGNITION TEMP (Deg. F): (UNKNOWN)

EXTINGUISHING MEDIA: WATER: (X) FOAM : () CO2: (X)
DRY CHEMICAL: (X)

SPECIAL FIRE

FIGHTING PROCEDURES: NORMAL FIRE FIGHTING PROCEDURES MAY BE USED ON FIRES IN PROXIMITY TO POTASSIUM FERRICYANIDE. KEEP PRODUCT COOL. FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

UNUSUAL FIRE &

EXPLOSION HAZARDS: UNDER CONDITIONS OF EXTREME HEAT AND FIRE POTASSIUM FERRICYANIDE MAY EMIT TOXIC CYANIDE FUMES. FIRE FIGHTERS SHOULD USE PRESSURE-DEMAND, SELF CONTAINED BREATHING APPARATUS.

SECTION E - REACTIVITY DATA

STABILITY: STABLE

INCOMPATIBILITY: AVOID STRONG MINERAL ACIDS AND OXIDIZERS WHICH MAY CAUSE FORMATION OF HIGHLY TOXIC HYDROCYANIC GAS. SODIUM NITRITE, AMMONIA, CHROMIUM TRIOXIDE.

HAZARDOUS DECOMPOSITION PRODUCTS: HIGHLY TOXIC HYDROCYANIC GAS.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

CONDITIONS TO AVOID: NONE KNOWN.

SECTION F - PERSONAL PROTECTIVE EQUIPMENT INFO

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PRODUCT: POTASSIUM FERRICYANIDE

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RESPIRATORY EQUIPMENT: NIOSH APPROVED DUST MASK.
PROTECTIVE GLOVES: RUBBER/PVC.
EYE PROTECTION: DUST GOGGLES.
VENTILATION: LOCAL EXHAUST.
OTHER PROTECTIVE EQUIPMENT: PROTECTIVE CLOTHING.

SECTION G - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: NOT ESTABLISHED.
PRIMARY ROUTES OF EXPOSURE: INGESTION, INHALATION, SKIN, EYES.
ORAL LD50: NOT KNOWN.
DERMAL IRRITATION-RABBIT: NOT KNOWN.
EYE IRRITATION-RABBIT: NOT KNOWN.
OSHA PEL: NOT ESTABLISHED.
ACGIH TLV: NOT ESTABLISHED.
EFFECTS OF OVEREXPOSURE: NONE KNOWN.
KNOWN EFFECTS ON OTHER ILLNESSES: NONE KNOWN.
LISTED CARCINOGEN: NONE (X) OSHA () NTP ()
IARC () OTHER ()

SECTION H - EMERGENCY & FIRST AID DATA

SKIN: ESSENTIALLY NON-HAZARDOUS. WASH WITH SOAP & WATER FOR 15 MINUTES.
EYES: MILD IRRITANT. FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SEEK MEDICAL ATTENTION.
INHALATION: ESSENTIALLY NON-HAZARDOUS. MOVE TO FRESH AIR.

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INGESTION: LOW-MODERATE. GIVE LARGE AMOUNTS OF WATER. SEEK MEDICAL ATTENTION.

NOTE TO PHYSICIAN: REMOVE FROM CONTAMINATED AREA. IN CASE OF INGESTION INDUCE VOMITING BY GIVING TWO GLASSES OF WATER AND STICKING FINGER DOWN THROAT. NEVER INDUCE VOMITING IN AN UNCONSCIOUS PERSON. CALL PHYSICIAN.

SECTION I - SPILL & DISPOSAL INFORMATION

STEPS TO BE TAKEN IN CASE OF SPILL OR LEAK:

DO NOT RELEASE TO ENVIRONMENT. 1 - 2 PPM IN LAKES AND STREAMS COULD RELEASE CYANIDES LETHAL TO AQUATIC LIFE UNDER CONDITIONS OF NATURAL IRRADIATION BY SUN. SWEEP UP AND RETAIN FOR DISPOSAL IN APPROVED LANDFILLS.

WASTE DISPOSAL INFORMATION:

USE LICENSED WASTE HAULER TO DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE, & LOCAL REGULATIONS.

RCRA HAZARDOUS WASTE: NO () YES (X) RCRA #: () P030
CERCLA: NO () YES (X) RQ (10)
FOLLOW ALL LOCAL, STATE AND FEDERAL INFORMATION AND REGULATIONS

ITEM J - OTHER REGULATORY INFORMATION

TSCA: WE CERTIFY THAT ALL COMPONENTS OF THIS PRODUCT ARE REGISTERED UNDER THE REGULATIONS OF THE TOXIC SUBSTANCES CONTROL ACT.

SARA TITLE III, SECT 313: LISTED (X) NOT LISTED () AS CYANIDE COMPOUND

DOT REGULATED : YES: () NO: (X) RQ: () UN/NA NO.: ()

EMERGENCY RESPONSE GUIDE NO.: N/A HAZARD CLASSIFICATION: N/A

SECTION K - SPECIAL PRECAUTIONS

HANDLING & STORAGE INFORMATION:

STORE IN COOL, DRY AREA, IN TIGHTLY CLOSED CONTAINERS. STORE IN LIGHT-

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OTHER PRECAUTIONS:
NONE KNOWN

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, PACIFIC TIME (206)889-3400

11/02/95 11:54 PRODUCT: 502373 CUST NO: 113365 ORDER NO: 149581

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