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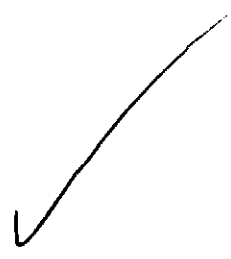
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Boliden Intertrade Inc.
c/o Alice Walker, Ph.D.
Regulatory Consulting
47 Country Club Drive
Senatobia, MS 38668

Gentlemen:

Subject: Revised Labeling
Copper Sulfate Superfine Crystals
EPA Registration No. 1109-32
Your Submission Dated January 5, 1994



The amendment referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended is acceptable provided that you submit one (1) copy of your final printed labeling before you release the product for shipment.

A stamped copy of the labeling is enclosed for your records.

The additional brand name "Copper Sulfate Instant" is acceptable and has been included in the files for this product.

Sincerely yours,

Cynthia Giles-Parker
Product Manager (22)
Fungicide Herbicide Branch
Registration Division (7505C)

Enclosure

✓
T. C. ...

COPPER SULFATE INSTANT

ACTIVE INGREDIENT:	
Copper Sulfate (Pentahydrate)*.....	99.0%
INERT INGREDIENTS:	1.0%
TOTAL	100.0%

*Metallic copper equivalent 25.2%

For use as an algacide, fungicide, and for formulating into end use products for the commodities listed below:**

- Terrestrial, non-domestic food uses on fruit and nut crops, vegetable crops, and wheat seed treatment.
- Terrestrial, non-domestic, non-food uses on ornamentals, tree wounds, and for wood treatment.
- Aquatic, food uses on rice.
- Aquatic, non-food uses in sewer lines to control roots, industrial cooling towers, industrial ponds, and sewer and animal feedlot lagoons and pits, control of algae and molluscs in lakes, ponds, and irrigation conveyance systems.
- Use as a trace mineral in mixing animal feeds in accordance with good manufacturing procedures as prescribed by FDA and at levels consistent with good feeding practices.

**Each formulator using this product to formulate an end use pesticide product is responsible for obtaining an EPA registration for his end use product.

KEEP OUT OF REACH OF CHILDREN

DANGER - PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

STATEMENT OF PRACTICAL TREATMENT

If in Eyes: Flush with plenty of water. Call a physician. If on Skin: Wash with plenty of soap and water. Get medical attention. If Swallowed: Drink promptly a large quantity of milk, egg white, gelatin solution, or, if these are not available, large quantities of water. Avoid alcohol. **NOTE TO PHYSICIAN:** Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

See back panel for additional Precautionary Statements.

Manufactured for:
BOLIDEN INTERTRADE INC.
3379 Peachtree Rd. NE, Suite 300
Atlanta, GA 30326

EPA Reg. No. 1109-32
EPA Est. No. 65204-TN-1
Form No. 9-32A2-94
WPS 4-94

NET WEIGHT: 50 LBS (22.7 KG)

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER: Causes severe eye and skin irritation. Harmful if absorbed through skin or inhaled. May cause skin sensitization reactions in certain individuals. Avoid contact with the skin, eyes, or clothing. Avoid breathing dust.

PERSONAL PROTECTIVE EQUIPMENT

Applicators and other handlers must wear: Long-sleeved shirt and long pants, shoes plus socks, and protective eyewear.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users should: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic organisms. Do not contaminate water when disposing of equipment washwaters. For terrestrial uses, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of

agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 24 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is: coveralls, waterproof gloves, shoes plus socks, and protective eyewear.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

STORAGE:

Store product in a secure dry place. Keep product dry as product is water soluble. Spilled product should be swept up, used if clean, or disposed in accord with the disposal procedures below. Store product only in original container. During storage, store pesticide separately to prevent cross-contamination of other pesticides, fertilizers, food and feed.

DISPOSAL:

CONTAINER DISPOSAL: Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by 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.

CHEMIGATION

Special Use Directions for Chemigation Applications

Apply this product only through sprinkler systems including center pivot, lateral move, end tow, side (wheel) roll, solid set, or hand move. Do not apply this product through any other type of irrigation system. Do not use this product in sprinkler systems connected directly to public water systems. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from nonuniform distribution of treated water. If you have questions about calibration, you should contact State Extension Service Specialists, equipment manufacturers or other experts. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label prescribed safety devices for public water systems are in place. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible

person, shall shut the system down and make necessary adjustments should the need arise.

The system must contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock. Do not apply when wind speed favors drift beyond the area intended for treatment.

To mix this product for application, add it to the supply tank containing sufficient water to maintain a pumpable fluid for your equipment with continuous agitation. Continued agitation is required in the pesticide supply tank when this product is present until it is completely empty.

If other known compatible pesticides or products are tank-mixed, add this product and other wettable powders first to the water, followed by flowables, liquids, and last emulsifiable products. In lateral move, end tow, side (wheel) roll, solid set, or hand move, inject product in the last 15 to 30 minutes of each set allowing sufficient time for all of the required pesticide to be applied by all sprinkler heads. In continuous moving systems, inject this product-water mixture continuously applying the labelled rate per acre for that crop. In continuous moving systems, best disease control results when water applications are low, but do not exceed one inch per acre.

GENERAL INSTRUCTIONS FOR USE

Copper sulfate effectively controls many species of both filamentous (mat forming green) and planktonic (single cell blue-green) algae. The dose of copper sulfate and control are affected by algae species, water hardness, water temperature, and concentration as well as whether water is clear, turbid, flowing, or static. Preferably water should be clear and above 60° F with treatment made in late morning on a sunny day. Static water usually requires less copper sulfate than flowing water. The harder the water or the greater the algae concentration, the higher the required dose of copper sulfate. If floating mats of green algae are present, it is advisable to especially treat at the surface of these mats for best control. Algae will absorb the copper sulfate within hours after treatment, and death should be evident within 3 to 5 days. If there is some doubt about the concentration to apply, it is generally preferable to begin with a lower dose and increase the dose until algae are killed. (A few algae species are resistant to copper sulfate and may not be killed.) Repeat treatments within a season may be needed to keep algae under control to the desired level.

SPECIAL PRECAUTIONS when applying this product directly to water as an algicide or herbicide: This pesticide is toxic to fish. Direct application of copper sulfate to water may cause a significant reduction in population of aquatic invertebrates, plants and fish. Do not treat more than one-half of a lake or pond at one time in order to avoid depletion of oxygen from decaying vegetation. Depletion of oxygen can cause fish suffocation. To minimize this hazard, treat 1/3 to 1/2 of water area in a single operation and wait 10 to 14 days between treatments. Begin treatments along the shore and proceed outwards in bands to allow fish to move into untreated water. Allow 1 to 2 weeks between treatment for oxygen levels to recover. Trout and other species of fish may be killed at application rates recommended on this label, especially in soft or acid waters. However, fish toxicity generally decreases when the hardness of water increases.

NOTE: If treated water is to be used as potable water, the residual copper content must not exceed 1 ppm (4 ppm copper sulfate pentahydrate).

When a water solution of copper sulfate is prepared, preferably mix in a plastic or glass container. When using a metal container use one that is painted, enameled, or copper lined. Copper sulfate solutions will slowly react or corrode galvanized containers and brass parts.

SPECIFIC DIRECTIONS FOR USE

1. **To control Tadpole Shrimp in rice fields:** Make application to the flooded fields any time the pest appears and repeat treatment as needed to provide adequate control. Apply 5 to 15 pounds of **superfine or snow crystals** per acre. Treatment rate depends on the water depth and flow. Use a lower rate when water depth is shallow and flow is slow and increase dose as water depth increases and/or under higher flow rates.

2. **To control algae in rice fields:** Apply 10-15 pounds of **superfine or snow crystals** per acre as needed to control algae in flooded rice fields or dissolve in water and make a surface spray. Repeat treatment if needed. Control is best obtained if application is made when algae are still growing on flooded soil surface before they begin to float. Use higher rate in deeper water (6 inches or greater).

3. **To control algae in impounded waters, lakes, ponds, and reservoirs:** **When to Apply:** Early treatment is essential for most satisfactory algae control at the lowest dosage levels. Early growth is usually confined to shallower shore areas. Begin treatment when not over 5 to 10% of the water surface area is covered with algae growths which is usually nearest the shoreline. Delaying treatment until heavy algae growths are present usually requires a higher dose and may result in fish distress or death since rapid decomposition of heavy growths greatly reduces the oxygen content of the water. Several repeat treatments are usually necessary to control algae each season.

Dosage Rates to Control Algae: Accurately determine the surface acres of water to be treated at one time and multiply this by the average depth in feet of this water area to determine the acre feet of water to be treated. One acre foot = one surface acre (43,560 sq. ft.) X one foot of depth. Each acre foot of water contains 326,000 gallons, or 2,720,000 pounds of water. If the problem algae genera is known, use the table below and its

equivalence to determine the approximate dosage of this product needed to control that genera. (A dose of 1 ppm equals 1 pound of this product for each million pounds of water). If the genera of either filamentous or planktonic algae is not known, apply 0.8 to 1.75 pounds of this product per acre foot of water, using the lower rate in soft water and the higher rate in hard water. For control of bottom-attached algae Chara and Nitella use 1.75 to 2.3 pounds per acre foot of water to be treated. If control is not achieved or in very adverse waters, a higher rate may be needed, but consider the fish caution. Dose should not exceed 4 ppm of this product (1 ppm of copper as metallic) when water is used for drinking.

COPPER SULFATE REQUIRED FOR TREATMENT OF DIFFERENT GENERA OF ALGAE

The genera of algae listed below are commonly found in waters of the United States. Use the lower recommended rate in soft waters (less than 50 ppm methyl orange alkalinity) and the higher concentration in hard water (above 50 ppm alkalinity). Always consult State Fish and Game Agency before applying this product to public waters.

<u>Organism</u>	<u>Dose</u>	<u>Algae Species</u>
Cyanophyceae (Blue-green)	1/4 to 1/2 ppm*	Anabaena, Anacystis, Aphanizomenon, Gloeotrichia, Gomphosphaeria, Polycystis, Rivularia
	1/2 to 1 ppm*	Cylindrospermum, Oscillatoria, Plectonema
	1 to 1-1/2 ppm*	Nostoc, Phormidium
	1-1/2 to 2 ppm*	Calothrix, Symploca
Chlorophyceae (Green)	1/4 to 1/2 ppm*	Closterium, Hydrodictyon, Spirogyra, Ulothrix
	1/2 to 1 ppm*	Botryococcus, Cladophora, Coelastrum, Droparnaldia, Enteromorpha, Gloeocystis, Microspora, Tribonema, Zygnema
	1 to 1-1/2 ppm*	Chlorella, Crucigenia, Desmidium, Galenkinia, Oocystis, Palmelia, Pithophora, Staurastrum, Tetraedron
	1-1/2 to 2 ppm*	Ankistrodesmus, Chara, Nitella, Scenedesmus

Diatomaceae (Diatoms)	1/4 to 1/2 ppm*	Asterionella, Fragilaria, Melosira, Navicula
	1/2 to 1 ppm*	Gomphonema, Nitzschia, Stephanodiscus, Synedra, Tabellaria
	1 to 1-1/2 ppm*	Achnanthes, Cymbella, Neidium
Protozoa (Flagellates)	1/4 to 1/2 ppm*	Dinobryon, Synura, Uroglena, Volvox
	1/2 to 1 ppm*	Ceratium, Cryptomonas, Euglena, Glenodinium, Mallomonas
	1 to 1-1/2 ppm*	Chlamydomonas, Haematococcus, Peridinium
	1-1/2 to 2 ppm*	Eudorina, Pandorina

*1/4 to 1/2 ppm=0.67-1.3 lbs/acre ft
 *1/2 to 1 ppm=1.3-2.6 lbs/acre ft

*1 to 1-1/2 ppm=2.6 to 3.9 lbs/acre ft
 *1-1/2 to 2 ppm=3.9-5.32 lbs/acre ft

How to Apply: Copper sulfate can be applied to impounded water by several methods to control algae. Fine crystals are usually broadcast on the water surface using a properly equipped boat, or a water solution may be prepared and sprayed on the water surface. Mix copper sulfate in sufficient water to thoroughly spray the water surface. While the volume per surface acre depends on the type of spray equipment being used, spray volume should be approximately 20 to 500 or more gallons per acre of surface water. Broadcast applicators for Copper Sulfate Instant may include, but are not limited to, use of a cyclone type spreader attached to a boat for small ponds or a specially equipped air blower to spread the fine crystals at the desired rate over the surface of the water.

4. **To Control Algae and the Potamogeton Pondweeds**, leafy and sago, in irrigation conveyance systems, use the continuous application method selecting proper equipment to supply Copper Sulfate Instant as follows: **For Algae Control:** Begin continuous addition of Copper Sulfate Instant when water is first turned into the system and continue throughout the irrigation season applying 0.1 to 0.2 lbs. per cubic foot per second per day. **For Leafy and Sago Pondweed Control:** Use the same continuous feed applying 1.6 to 2.4 lbs. per cubic foot per second per day. Note: For best control of leafy and sago pondweed, it is essential to begin copper sulfate additions when water is first turned into the system or ditch to be treated and continued throughout the irrigation season. Copper sulfate becomes less effective as the bicarbonate alkalinity increases. Its effectiveness is significantly reduced when the

bicarbonate alkalinity exceeds about 150 ppm as CaCO_3 . Should copper sulfate fail to control pondweeds satisfactorily, it may be necessary to treat the ditch with either a suitable approved herbicide or use mechanical means to remove excess growth. In either case resume copper sulfate addition as soon as possible.

5. To Control Plant Diseases:

A. Apply Copper Sulfate Instant alone as directed on the crops below. **Superfine or powdered crystals are recommended for these uses.**

APPLES: Fireblight - Mix 5 lbs. of Copper Sulfate Instant in 100 gallons of water and spray uniformly to the point of runoff. Apply in dormant only at silver tip stage. After silver tip severe burn will occur on any exposed green tissue. Do not mix lime to make a Bordeaux spray for this treatment.

GRAPES (DORMANT): Powdery mildew - Apply in spring before bud-swell and before any green tissue is present. Use 4 to 8 lbs. of Copper Sulfate Instant per 100 gallons of water. Apply in a high volume spray of 300 gallons water per acre. Direct spray to thoroughly wet the dormant vine, especially the bark of the trunk, head, or cordons.

B. Apply Copper Sulfate Instant in a Bordeaux spray on the crops below. **Superfine or powdered crystals are recommended in Bordeaux applications.**

Understanding a Bordeaux Formulation: As an example, if a Bordeaux spray recommendation reads 10-10-100, the first figure means the number of pounds of copper sulfate pentahydrate; the second figure means the pounds of hydrated spray grade lime, $\text{Ca}(\text{OH})_2$; and the third figure is the gallons of water into which both ingredients are mixed when a dilute ground sprayer is used for application. For concentrated sprayers, decrease the amount of water and dosage in accord with recommendations of your Extension Service and/or sprayer manufacturer. Various Bordeaux formulations including 8-8-100, 5-5-100, and 2-6-100 are commonly used on various crops.

To Formulate a Bordeaux Spray: For a 10-10-100, mix 10 lbs. of this Copper Sulfate Instant in the spray water; then add the pounds of spray grade hydrated lime and remaining water given in the next section on **Mixing a Bordeaux Spray**. For a 3-2-6-100 Bordeaux spray, mix 3 lbs. of zinc sulfate (36% zinc), 2 lbs. of Copper Sulfate Instant, and 6 lbs. of spray grade hydrated lime into 100 gallons of water for conventional dilute spray.

Mixing a Bordeaux Spray: Fill spray tank 1/2 full with water. Then, with agitation running, add Copper Sulfate Instant by washing it through a brass, stainless steel, or plastic screen until all the copper sulfate is dissolved (and also the zinc sulfate when required). Then add the hydrated lime by washing it through this screen and finish filling tank with water. Continue agitation until all spray has been applied.

Choosing a Formulation For Use: The following Bordeaux formulas are examples of formulas that are known to be used on these crops for disease control. However, in some areas due to local situations and use experience, other formulations proven to be

useful locally may be substituted. Consult and follow recommendations of your local State Agricultural Experiment Station or Extension Service.

Coverage Intended: For crops to be treated with Bordeaux mixture, apply as a uniform spray to the point of runoff.

ALMONDS, APRICOTS, PEACHES, NECTARINES: Coryneum blight (Shot hole) - Prepare a 10-10-100 Bordeaux and apply as a dormant spray in late fall and early spring before buds begin to swell.

PEACHES: Leaf curl - Prepare a 10-10-100 Bordeaux and apply at leaf fall or as a dormant spray in late fall or early spring before buds begin to swell. If above sprays for Coryneum blight are made, peach leaf curl also will be controlled.

ALMONDS, APRICOTS, CHERRIES, PEACHES, NECTARINES, PLUMS, PRUNES: Brown rot blossom blight - Prepare a 10-10-100 Bordeaux and apply at early pink bud on almonds and at red bud stage on other listed fruits except cherries. On cherries make spray at popcorn to full bloom.

BULBS (EASTER LILY, TULIP, GLADIOLUS) - Botrytis blight - Prepare a 10-10-100 Bordeaux and apply as a foliar spray to one acre. Apply for thorough coverage beginning at the first sign of disease and repeat as needed to control disease at 3 to 10 day intervals. Use the shorter intervals during periods of frequent rains or when severe disease conditions persist. Avoid spray just before flower cutting season if residues are a problem.

CHERRIES (SOUR): Leaf spot - Prepare a 10-10-100 Bordeaux. Apply as a full coverage spray after petal fall or as recommended by the State Extension Service.

CHERRIES (SWEET): Dead bud, Bacterial canker (Pseudomonas syringae) - Prepare a 12-12-100 Bordeaux. Apply at leaf fall and again in late winter before buds begin to swell. In wet cool Northwest U.S. winters, a third spray may be needed between above sprays.

CITRUS: Bacterial blast - Prepare a 10-10-100 Bordeaux spray and apply a spray in late October to early November or before fall rains begin. Make a complete coverage spray using 10 to 25 gallons per mature tree.

GRAPES (EXCEPT CALIFORNIA): Downy Mildew - Prepare and apply a 2-6-100 Bordeaux spray beginning when downy mildew is detected. Repeat as needed to achieve and maintain control. This mixture and its use will exhibit some phytotoxicity on most varieties.

LEMONS, ORANGES, GRAPEFRUIT: Phytophthora brown rot - Prepare a 3-2-6-100 Bordeaux and apply 10-25 gallons per tree to tree skirt, trunk and ground under tree. Apply in Nov.-Dec. just before or just after first rains. In severe brown rot season, make a second application in Jan.-Feb.

LEMONS, ORANGES, GRAPEFRUIT: Septoria fruit and leaf spot, Brown rot, and zinc and copper deficiency - Make a 3-2-6-100 Bordeaux and spray in Oct., Nov. or Dec. before or just after first rains.

OLIVES: Olive leaf spot (Peacock spot), Olive knot - Prepare a 10-10-100 Bordeaux spray and apply up to 500 gallons per acre. Apply before fall rains begin, usually late October or early November in California. In wet winters, a repeat spray may be needed in mid-winter. In areas with less than 10 inches of annual rainfall, a 5-5-100 Bordeaux spray applied in up to 500 gallons per acre may be used.

WALNUTS: Walnut Blight - Prepare a 15-10-100 plus one-half gallon summer oil emulsion. Apply in early prebloom, 10-20% pistillate (not catkin blooms) are showing, before or after rains. Repeat treatments after rains may be made. Use only if Bordeaux mixture has been shown to be non-phytotoxic in your area. To apply by aircraft, pre-mix not more than 16 lbs. of Copper Sulfate Instant and not more than 10 lbs. of hydrated lime per acre, applied in not less than 30 gallons of spray per acre. Repeat as needed.

NOTICE TO BUYER: Seller warrants that this product conforms to the chemical description on this label and is reasonably fit for purposes stated on this label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of this product contrary to label directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, either expressed or implied.

APPROVED
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