Environmental Protection Agency
Office of Pesticide Programs (TS-767C)
Washington, DC 20460

EPA

Pesticide Fact Sheet

Name of Chemical: Paraquat
Reason for Issuance: Registration Standard
Date Issued:
Fact Sheet Number:

1. Description of Chemical

Generic Name: 1,1'-dimethyl-4-4'-bipyridinium ion

Common Name: Paraquat

Trade Names: Actor Cekuquat, Crisquat, Dextrone, Dexuron, Esgram, Gramanol, Gramoxone, Gramuron, Hebaxon, Herboxone, Goldquat 276, Paracol Paraquat CL, Pillarquat, Pillarxone, Sweep, PP148 (dichloride) and Dextrone X.

EPA Shaughnessy Code: 061601 (dichloride)

Chemical Abstracts Service (CAS) Number: 1910-42-5 (dichloride)

Year of Initial Registration: 1964

Pesticide Type: Herbicide, defoliant, desiccant, and plant growth regulator

Chemical Family: Bipyridylnium or dipyridylnium

U.S. and Foreign Producers: U.S. by Chevron Chemical Company and ICI Americas, Inc.; Taiwan by Comlets Chemical Industrial Company, Ltd., and Shinung Corp., Italy by Visplant-Chrimiasero S.p.I.; Spain by Hightex S.A.; Great Britain by ICI Plant Protection Division.

2. Use Patterns and Formulations

Application Sites: Terrestrial food crops such as (corn, soybeans, fruit and nuts, sunflowers, wheat, barley), terrestrial nonfood crops (ornamentals and turf), terrestrial noncrop, forestry and domestic outdoor sites.

Percent of Pesticide Applied to Particular Crops: Approximately 73 percent is used on field crops (65% on corn and soybeans), approximately 21% is used on fruit and nut crops, approximately 1% on vegetable crops, and the remainder on nonagricultural crops.

Types and Method of Application: Foliarly applied by broadcast, band, or directed spray by ground equipment or broadcast by aircraft. It may be applied preplant, preemergence, or preharvest in relation to the crop.

Application Rates: 0.25 lb active ingredient/A to 1.0 lb active ingredient/A (0.28 to 1.12 kg active ingredient/ha).

Types of Formulation: Aqueous solution containing 2 lbs (0.24 kg) paraquat cation per gal (L).

Usual Carrier: Water.

3. Science Findings

Summary Science Statement:

Paraquat is extremely toxic (Category I) via oral, dermal, and inhalation exposure routes to mammals. It is not teratogenic to mice or rats, not oncogenic to mice, negative for mutagenicity in eight studies, weakly positive in four studies and positive in four studies. The oncogenic potential in rats is not defined at this time. Once a decision is made on oncogenic potential, the significance of the mutagenicity finding will be determined. No reason exists to place paraquat in Special Review at this time.

Paraquat is moderately toxic to birds, slightly toxic to freshwater fish, moderately toxic to aquatic invertebrates, and relatively nontoxic to honeybees. Paraquat is not believed to cause problems with stable wildlife populations but may be hazardous to unstable or endangered populations of plants and animals.

Paraquat dichloride was stable to hydrolysis and photolysis in soil, preliminary data indicate that paraquat has a half-life of greater than 2 weeks in water plus soil, is immobile in silt loam and silty clay loam, and slightly mobile in sandy loam and potentially mobile in sandy soils extremely low in organic matter. The half-life of paraquat in water is approximately 23 weeks. Paraquat is not readily desorbed from the soil and is not likely to contaminate ground water in agricultural soils. Preliminary data indicate that the paraquat degradate ^{14}C-carboxy-1-methyl pyridinium (QINA) chloride is loosely absorbed in the soil and is potentially mobile and has a leaching potential.

Chemical Characteristics:

Analytical grade of paraquat dichloride is a colorless odorless hygroscopic powder, whereas the

technical product is yellow. Paraquat is very soluble in water, slightly soluble in alcohols and insoluble in hydrocarbons. It is nonvolatile, corrosive to metals, stable at room temperature (either as a solid or an aqueous solution at neutral or acidic pH), but is hydrolyzed by alkali, decomposes photochemically, and melts (with decomposition) at 300 °C.

Toxicology Characteristics:

Acute Toxicology

Acute Oral Toxicity - rat = 159 mg/kg for males Toxicity Category II
= 125 mg/kg for females Toxicity Category II

Acute Oral Toxicity - guinea pig = 22 mg/kg for males and females Toxicity Category I

Acute Dermal Toxicity - rabbit = 59.9 mg/kg Toxicity Category I

Acute Inhalation - rat = 0.6 to 1.4 µg paraquat ion/L Toxicity Category I

Eye Irritation - rabbit Severe Eye Irritant Toxicity Category I

Primary Dermal Irritation - rabbit Primary irritation scores of 2.1 Toxicity Category III

Major Routes of Exposure:

Acute Inhalation

Two inhalation studies were submitted. One study had an inhalation toxicity of about 1.0 µg/L (Toxicity Category I) with 90 percent of the particle diameters below 0.3 µm. A second study was performed with particles of median diameter of 21.5 to 23 µm. The inhalation toxicity for this study was 3.5 µg/L (Toxicity Category I). These studies show that inhalation toxicity is highly, if not totally dependent on particle size.

Information received on particle size of paraquat droplets formed during aerial application and during knapsack spraying indicate that virtually no droplets smaller than 15 um were formed during either method of application. No information has been received, describing the particle size actually formed during application, but the Agency believes that it will not exceed 15 um.

Subchronic Dermal Exposure

A 21-day dermal toxicity study in rabbits was submitted with a NOEL of 1.15 mg paraquat cation/kg body weight (bwt) for local skin effects and a NOEL for systemic toxicity of 6 mg paraquat cation/kg bwt. Data are available indicating that a dermal absorption rate for humans is about 0.5 percent. These data are preferable to dermal data from other species, therefore the dermal data in rabbits are not of concern.

Combination of Acute Inhalation and Dermal Exposure

Margins of safety were calculated for combined inhalation and dermal exposure of workers repeatedly exposed to paraquat. Combined inhalation and dermal exposures of several groups of workers were then compared to a NOEL of 5 mg/kg/day derived from a 90-day dog-feeding study. The lowest effect level (LEL) for this study was 15 mg/kg/day, at which dosage level toxic effects in the lung were observed. All but two of the margins of safety are greater than 100.

Based on the above information relating to subchronic toxicity, the inhalation and/or dermal hazard resulting from repeated use of paraquat by workers is not sufficient to warrant placing the chemical in Special Review.

Chronic Toxicology:

Teratology and Reproduction

Paraquat was not teratogenic to mice. The fetotoxic NOEL is 5 mg/kg bwt and the maternal NOEL is 1.0 mg/kg bwt.

Paraquat was not teratogenic to rats. Both the fetotoxic and maternal NOEL are 1.0 mg/kg bwt.

Paraquat had no effect on reproduction in rats. The systemic NOEL for reproduction is 25 parts per million (ppm).

The teratology and reproduction studies are acceptable and show no reason to place paraquat in Special Review status.

Chronic Feeding - Oncogenic Studies

In the rat chronic feeding study, the systemic NOEL is 25 ppm of paraquat cation per kilogram of body weight and the systemic LEL is 75 ppm.

In the 1-year dog study the systemic NOEL is 15 ppm paraquat cation per kilogram of body weight. The systemic LEL is 30 ppm.

Paraquat was not oncogenic to mice. The systemic NOEL is 12.5 ppm of paraquat per kilogram of body weight. This study is acceptable.

The oncogenic potential of paraquat in the rat cannot be resolved at this time. The preliminary review indicated a dose-related increase in the incidence of pulmonary neoplasms (adenomas and carcinomas) in the lungs of male and female rats. Two full pathology reports by two different pathologists on the same lung slides containing two different interpretations were submitted. The Agency requested and received a third independent reading of the slides. The information from the three reports is to be considered and a final determination should be made by July 1986.

Mutagenicity

Twenty-one mutagenicity studies were submitted. Paraquat was negative in eight studies (mostly in gene mutation and chromosomal aberration assays); weakly positive in four studies (two gene mutations, one chromosomal aberration and one DNA damage/repair assays); and positive in four studies (all DNA damage/repair assays). Five studies were not acceptable. Additional mutagenicity studies are not required. The significance of these findings will be considered in a weight of evidence review when the Agency makes a final decision on oncogenicity.

Physiological and Biochemical Behavior Characteristics:

Foliar Absorption: Very rapidly absorbed by the foliage.

Translocation: Can occur via the xylem under certain conditions.

Mechanism of Pesticidal Action: Lipid peroxidation resulting in disruption of cell membrane.

Metabolism and Persistence in Plants and Animals: In sunlight limited photochemical breakdown occurs for paraquat which remains on the outside of treated plants. Since plants are killed rapidly in bright sunlight, significant quantities of the breakdown products are formed only on surfaces of dead tissues and there is no movement of these substances from the dead tissues to other parts of the plant.

Environmental Characteristics:

Absorption and Leaching in Basic Soil Types: Langmuir adsorption maxima values (m) ranged from 17 to 46.8 mg/100 grams on seven clay soils and one silty clay loam soil. Adsorption is positively correlated with soil cation exchange capacity (CEC). Paraquat is not readily desorbed from the soil and is not likely to contaminate ground water in agricultural soils.

Microbial Breakdown: Bound paraquat is degraded with difficulty or not at all.

Loss from Photodecomposition and/or Volatilization: Does not volatilize; limited photodecomposition may occur on sprayed leaf surfaces and dead vegetation.

Contamination of Ground and Surface Water: Paraquat binds tightly to the soil and does not leach in agricultural soils.

Exposure of Humans and Nontarget Organisms to Chemical or Degradates: Margins of safety for humans appear adequate when product is used according to label directions. Use of paraquat may have an effect on a few mammals or groundnesting birds under unusual circumstances. Wildlife populations should not be adversely affected when paraquat is used according to label directions.

Exposure During Reentry: Current precautionary labeling and worker safety rules adequately protect worker, mixer, loader, applicator.

Ecological Characteristics:

Avian Acute Oral Toxicity with Bobwhite quail:	176 mg/kg
Avian Dietary Toxicity with Bobwhite quail:	981 ppm
Ring-neck pheasant:	1468 ppm
Mallard duck:	4048 ppm
Avian Reproduction Studies:	
Bobwhite quail:	100 ppm
Mallard duck:	30 ppm
Acute Toxicology to Freshwater Fish:	
Rainbow trout:	15 to 38.7 ppm
Bluegill sunfish:	13 to 156 ppm
Acute Toxicity on Invertebrates: Daphnia:	1.2 to 4.0 mg/L

Paraquat is moderately toxic to birds and aquatic invertebrates and slightly toxic to freshwater fish.

Endangered Species:

Although paraquat is not believed to cause problems with stable wildlife populations, its acute and subacute toxicity may be hazardous to unstable or endangered populations (primarily plant species). Specific labeling is required.

Tolerance Reassessment:

Tolerances are established for residues of the plant regulator, desiccant, defoliant, and herbicide paraquat (1,1-dimethyl4,4'-bipyridinium ion) derived from application of either the bis(methylsulfate) or dichloride salt (both calculated as the cation) in or on the following raw agricultural commodities (refer to Section 40 CFR 180.205):

Commodities	Parts Per Million
Acerola	0.05
Alfalfa	5.0
Almond hulls	0.5
Apples	0.05
Apricots	0.5
Asparagus	0.05
Avocados	0.05

Commodities	Parts Per Million
Bananas	0.05
Barley, grain	0.05
Beans, forage	0.1
Beans, hay	0.4
Beans, lima (succulent)	0.05
Beans, snap (succulent)	0.05
Beets, sugar	0.5
Beets, sugar (tops)	0.5
Birdsfoot trefoil	5.0
Broccoli	0.05
Cabbage	0.05
Carrots	0.05
Cattle, fat	0.01
Cattle, meat	0.01
Cattle, meat byproducts	0.01
Cauliflower	0.05
Cherries	0.05
Chinese Cabbage	0.05
Citrus fruit	0.05
Clover	5.0
Coffee beans	0.05
Collards	0.05
Corn, fresh, inc. sweet corn (K + CWHR)	0.05
Corn, fodder	0.05
Corn forage	0.05
Corn grain	0.05
Cottonseed	0.5
Cucurbits	0.05
Eggs	0.01
Figs	0.05
Goats, fat	0.01
Goats, meat	0.01
Goats, meat byproducts	0.01
Grass, pasture	5.0
Grass, range	5.0
Guar beans	0.5
Guava	0.05
Hogs, fat	0.01
Hogs, meat	0.01
Hogs, meat byproducts	0.01
Hops, fresh	0.1
Hops vines	0.5
Horses, fat	0.01
Horses, meat	0.01
Horses, meat byproducts	0.01
Kiwifruit	0.05
Lettuce	0.05
Milk	0.01

Commodities	Parts Per Million
Mint, hay	0.5
Nectarines	0.05
Nuts	0.05
Oat grain	0.05
Olives	0.05
Onions, dry bulb	0.05
Onions, green	0.05
Papayas	0.05
Passion fruit	0.2
Peaches	0.05
Pears	0.05
Peas, succulent	0.05
Peas, hay	0.8
Pineapples	0.05
Pistachio nuts	0.05
Plums (fresh prunes)	0.05
Potatoes	0.5
Poultry, fat	0.01
Poultry, meat	0.01
Poultry, meat byproducts	0.01
Rhubarb	0.05
Rye grain	0.05
Safflower seed	0.05
Sheep, fat	0.01
Sheep, meat	0.01
Sheep, meat byproducts	0.01
Small fruit	0.05
Sorghum forage	0.05
Sorghum grain	0.05
Soybeans	0.05
Soybean forage	0.05
Strawberries	0.25
Sugarcane	0.5
Sunflower seeds	2.0
Turnips (roots)	0.05
Turnips (tops)	0.05
Vegetables, fruiting	0.05
Wheat grain	0.05

A food additive tolerance of 0.2 ppm is established for residues of the defoliant, desiccant, and herbicide paraquat (1,1'-dimethyl-4,4'-bipyridinium ion) derived from the application of either the bis(methylsulfate) or dichloride salt (both calculated as the cation) in or on dried hops resulting from application of the pesticide to growing hops (21 CFR 193.331).

Feed additive tolerances are established for residues of the defoliant, desiccant, and herbicide paraquat (1,1'-dimethyl-4-4'-bipyridinium ion) derived from the application of either the bis(methylsulfate) or dichloride salt (both calculated as the cation) in the following processed feeds when present therein as a result of application of paraquat to growing crops.

Feeds	Parts Per Million
Mint, hay, spent	3.0
Sunflower, seed, hulls	6.0

Sufficient data are available to support the present tolerances on the meat and fat of cattle, the meat, fat and meat byproducts of other livestock, and milk. Additional information will be required before the acceptability of the 0.01 ppm tolerance level for the meat byproducts of cattle (liver and kidney), the meat, fat and meat byproducts of poultry and eggs can be determined.

Sufficient data are available to ascertain the adequacy of the established tolerances for residues of paraquat in or on carrots, potatoes, turnips, onions (green and dry bulb), broccoli, cabbage, cauliflower, Chinese cabbage, collards, lettuce, rhubarb, guar, succulent beans (lima and snap), bean forage, pea forage, members of the Fruiting Vegetables (except cucurbits) Group, citrus fruit, apples, pears, apricots, cherries, nectarines, peaches, plums, small fruits, strawberries, nuts, almond hulls, acerola, asparagus, avocados, bananas, coffee beans, cottonseed, guava, hops, kiwifruit, mint hay, papayas, passion fruit, pistachios, safflower, sugarcane, sunflower, oats, sorghum grain, wheat, and sorghum forage.

Insufficient data are available to ascertain the adequacy of the established tolerances for paraquat residues in or on sugar beets, sugar beet tops, turnip tops, soybeans, bean hay, pea hay, soybean forage, figs, pineapple, corn (field and sweet), corn forage and fodder, alfalfa, birdsfoot trefoil, clover, pasture grass, and range grass.

Processing studies are required for residue levels in the following commodities: Potatoes, sugar beets, tomatoes, coffee beans, plums, figs, spent hops, olives, pineapples, and wheat.

In addition to the conclusions stated above regarding established tolerances, we have made the following recommendations: (a) "pea forage" and "bean forage" entries in the 40 CFR should be changed to "pea hay" and "bean hay," respectively, the appropriate commodity definitions for

these commodities; (b) small fruits in the 40 CFR should be changed to "small fruits (except strawberries and cranberries)" since the established tolerance for residues in or on strawberries is 5X the level for residues in or on small fruits and the use directions for cranberries vary significantly from those for other members of the group; (c) "hop vines" should be deleted from 40 CFR since this item is neither a raw agricultural commodity nor a feed item of hops; (d) the tolerance for residues in or on rye grain should be revoked since there is no registered use of paraquat on this crop; (e) tolerance proposals accompanied by residue data or feeding and grazing restrictions must be proposed for soybean hay and straw, cottonseed forage, sugarcane forage, and sorghum silage and hay.

In addition, it has been determined that crop group tolerances of 0.05 ppm would be acceptable for members of the following groups: Brassica Leafy Vegetables Group, Pome Fruits Group, and Stone Fruits Group.

Based on available processing data, it should be noted that the following food/feed additive tolerances are required: 3 ppm, soybean hulls; 2.5 ppm, sugarcane bagasse; 4 ppm, sugarcane juice; 10 ppm, sunflower meal; and 0.5 ppm, corn milled products. Also, existing food/feed additive tolerances must be increased for residues in spent hops (increase from 0.2 ppm to 0.5 ppm) and in sunflower hulls (increase from 6 ppm to 15 ppm).

The above changes in food additive tolerance levels will not result in a significant increase in existing TMRC and thus will not appreciably increase the risk to humans due to dietary exposure.

No tolerances exist for ground-cherry or garlic. These uses will be deleted from labeling of all end-use products.

The acceptable daily intake (ADI) based on the 1-year dog study (NOEL of 0.45 mg/kg/day) and using a safety factor of 100 is calculated to be 0.0045 mg/kg/day. The maximum permitted intake (MPI) for a 60-kg human is calculated to be 0.27 mg/day. The theoretical maximum residue contribution (TMRC) for paraquat, based on published tolerances is 0.1134 mg/day. The TMRC constitutes 42 percent of the MPI.

Reported Pesticide Incidents

The Agency's Pesticide Incident Monitoring Systems (PIMS) indicated that poisoning incidents involving paraquat resulted from accidental ingestion frequently the result of storage of paraquat in unmarked bottles.

4. Summary of Regulatory Position and Rationale

After considering data submitted concerning acute inhalation, subchronic toxicity, and chronic toxicity the risk criteria in Section 154.7 of Title 40 have not been exceeded. The oncogenic and mutagenic potential should be determined by July 1986.

The Agency is continuing to require that an emetic cleared under 40 CFR 180.1001 be incorporated into all manufacturing-use products (MUP's) and end-use products containing paraquat. The emetic is needed in the formulations to induce rapid vomiting thereby reducing absorption of paraquat if swallowed.

The Agency is requiring those agricultural products containing paraquat already classified as "Restricted Use" maintain this classification. Based on submitted acute toxicity and subchronic toxicity data the "Restricted Use" classification and current precautionary statements are necessary to protect mixer-loaders and applicators from effects of dermal toxicity.

The Agency has determined that the homeowner product containing 0.276 percent paraquat presently unrestricted will remain unrestricted. The Agency believes that this formulation, when used according to label directions, is not likely to present a significant health hazard to humans.

The Agency is requiring additional residue data on several crops and processed commodities as well as some changes in the tolerance listings. Refer to tolerance reassessment section of this document for details.

The Agency is requiring that ground-cherry and garlic be deleted from labeling of all end-use products because there are no tolerances for ground-cherry or garlic.

The Agency is requiring that label restrictions for figs be added that prohibit application of paraquat when figs on the ground are to be harvested and prohibit the feeding of cover crops grown on paraquat-treated fig growing areas to livestock because data are not available to support tolerances necessary for grazing or harvesting figs from the ground.

The Agency is requiring statements restricting grazing or feeding crop or cover crop for barley hay and straw, oat

hay and straw, citrus crop grouping (cover crops), tree nut group (cover crops), avocado (cover crops), figs (cover crops), guava (cover crops), and pistachios (cover crops), because no data exist to support tolerances necessary for grazing of listed crops and cover crops.

The Agency is requiring that grazing restrictions be deleted from product labels for use patterns of range grass, pasture grass, alfalfa, birdsfoot trefoil, clover, and field corn. This change will not result in a significant increase in TMRC and thus will not appreciably increase the risk to humans due to dietary exposure.

The Agency is not requiring a reentry interval for currently registered uses of paraquat because the Agency has determined that current precautionary labeling and worker safety rules are adequate to protect the mixer/loader/applicator from exposure.

The Agency is requiring crop rotation restrictions on labels of all end-use products to ensure that crops without tolerances are not exposed to soil residues of paraquat.

The Agency is not requiring a ground water advisory statement for products containing paraquat because available data indicate that paraquat is not readily desorbed from soil and does not leach in agricultural soils. The likelihood of paraquat contaminating ground water is remote. Preliminary data indicate that the degradate (QINA) is very loosely absorbed and has a potential for leaching.

The Agency will require labeling to protect endangered species for all end-use products used for treatment of corn, wheat, soybeans, sorghum, alfalfa, pasture, and rangeland because paraquat's acute and subchronic toxicity may be hazardous to unstable or endangered populations, primarily plant species.

The Agency will issue registrations for substantially similar products while data gaps are being filled. No significant new uses for paraquat will be issued until the oncogenic potential of paraquat is fully understood.

5. Summary of Major Data Gaps	Date due
Environmental fate data	9-50 months
Toxicity to Aquatic and estuarine organisms	12 months
Subchronic inhalation toxicity	15 months
Reevaluation of oncogenicity potential	Reevaluation to be completed by mid-1986
Residue chemistry data	24 months
Product chemistry	6 months

6. Contact Person at EPA

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GUIDANCE FOR THE REREGISTRATION OF PESTICIDE PRODUCTS

CONTAINING PARAQUAT DICHLORIDE

AS THE ACTIVE INGREDIENT

Case Number 262

March 31, 1986

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDE PROGRAMS

WASHINGTON, D.C. 20460

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I. INTRODUCTION

The Registration Standards Program

EPA has established the Registration Standards program in order to provide an orderly mechanism by which pesticide products containing the same active ingredient can be reviewed and standards set for compliance with FIFRA. The standards are applicable to reregistration and future applications for registration of products containing the same active ingredient. Each registrant of a product containing an active ingredient subject to this Standard who wishes to continue to sell or distribute that product must bring his product and labeling into compliance with FIFRA, as instructed by this Standard. Pesticides have been grouped into use clusters and will be reviewed on the basis of a ranking scheme giving higher priority to (1) pesticides in clusters used on food and feed crops; and (2) pesticides produced in large volumes.

The Registration Standards program involves a thorough review of the scientific data base underlying a pesticide's registration. The purpose of the Agency's review is to reassess the potential hazards arising from the currently registered uses of the pesticide; to determine the need for additional data on health and environmental effects; and to determine whether the pesticide meets the "no unreasonable adverse effects" criteria of FIFRA. In its review EPA identifies:

1. Studies that are acceptable to support the data requirements for the currently registered uses of the pesticide.

2. Additional studies necessary to support continued registration. The additional studies may not have been required when the product was initially registered or may be needed to replace studies that are now considered inadequate.

3. Labeling revisions needed to ensure that the product is not misbranded and that the labeling is adequate to protect man and the environment.

The detailed scientific review, which is not contained in this document, but is available upon request[1], focuses on the pesticide active ingredient. The scientific review primarily discusses the Agency's evaluation of and conclusions from available data in its files pertaining to the pesticide

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[1]The scientific reviews may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield Virginia 22161 approximately 90 days after issuance.

active ingredient. However, during the review of these data the Agency is also looking for potential hazards that may be associated with the end use products that contain the active ingredient. The Agency will apply the provisions of this Registration Standard to end use products if necessary to protect man and the environment.

EPA's reassessment results in the development of a regulatory position, contained in this Registration Standard, on the pesticide and each of its registered uses. See Section IV - Regulatory Position and Rationale. Based on its regulatory position, the Agency may prescribe a variety of steps to be taken by registrants to maintain their registrations in compliance with FIFRA. These steps may include:

1. Submission of data in support of product registration;

2. Modification of product labels;

3. Modifications to the manufacturing process of the pesticide to reduce the levels of impurities or contaminants;

4. Restriction of the use of the pesticide to certified applicators or other specially trained individuals;

5. Modification of uses or formulation types; or

6. Specification of packaging limitations.

Failure to comply with these requirements may result in the issuance of a Notice of Intent to Cancel or a Notice of Intent to Suspend (in the case of failure to submit data).

In addition, in cases in which hazards to man or the environment are identified, the Agency may initiate a special review of the pesticide in accordance with 40 CFR Part 154 to examine in depth the risks and benefits of use of the pesticide. If the Agency determines that the risks of the pesticide's use outweigh the benefits of use, the Agency may propose additional regulatory actions, such as proposed cancellation of uses of the pesticide which have been determined to cause unreasonable adverse effects on the environment.

EPA has authority under the Data Call-In (DCI) provisions of FIFRA sec. 3(c)(2)(B) to require that registrants submit data to answer our questions regarding the chemical, toxicological, and environmental characteristics and fate of a pesticide. This Registration Standard lists the data EPA believes are necessary to resolve our concerns about this pesticide. These data are listed in Section V - Requirement for Submission of Generic Data, and Section VI - Requirement for Submission of Product-Specific data. Failure to comply with the DCI requirements enumerated in this Registration Standard may result in issuance by EPA of a Notice of Intent to Suspend the affected product registrations.

Registrants are reminded that FIFRA sec. 6(a)(2) requires them to submit factual information concerning possible unreasonable adverse effects of a pesticide at any time that they become aware of such information. You should notify the Agency of any information, including interim or preliminary results of studies, if those results suggest possible adverse effects on man or the environment. This requirement continues as long as your products are registered by the Agency.

II. REGULATORY ASSESSMENT

The Agency has conducted a thorough review of the scientific data base on paraquat. This part of the Standard sets forth the results of that review beginning with a description of the chemical and its uses, followed by a discussion of the data base and the Agency's regulatory position. A summary of the Agency's review and position precedes the discussion.

A. DESCRIPTION OF CHEMICAL

1. Description

Common Name	:	Paraquat dichloride
Chemical Name	:	1, 1'-dimethyl-4,4'-bipyridinium ion
Empirical Formula	:	$C_{12}H_{14}Cl_2N_2$(dichloride)
Trade Name	:	Cekuquat, Crisquat, Herboxone, Gramuron, Dextrone, Dexuron, Esgram, Gramaxone, Gramanol, Herbaxon, Goldquat 276, Pillaquat, Paracol, Paraquat Cl, Pillarxene, Sweep, Actor, PP148 (dichloride) and Dextrone X.
OPP/Shaugnessy No.	:	061601 (dichloride)
CAS Registry No.	:	1910-42-5 (dichloride)

2. Use Profile

Type of Pesticide	:	Contact herbicide, desiccant, defoliant, or plant growth regulator
Pest Controlled	:	Weeds or other vegetation
Registered Uses	:	Cropland, noncropland, forestry ornamentals, and turf
Predominant Use	:	Field crops (corn and soybeans)
Method of Application	:	Broadcast, band, or directed spray by ground equipment, or aircraft
Mode of Activity	:	lipid peroxidation resulting in disruption of cell membrane

Formulation
Manufacturing-Use Product : 29.1% and 43.5% active ingredient
End-Use Product : Soluble concentrates, pressurized liquids

3. History

Paraquat was discovered in 1882 and has been used as an oxidation-reduction indicator under the name of methyl virologen since 1932. The first commercial paraquat formulation for agricultural use was produced by Imperial Chemical Industries, Ltd. in England and was registered there in 1962. It was registered in the United States in 1964. At the present time, Chevron Chemical Company is the sole registrant of products containing paraquat.

Paraquat was accepted as a candidate for the Rebuttable Presumption Against Registration (RPAR) process in 1978 and an intense scientific reviewing of the paraquat data base was initiated. The Agency identified the following areas where paraquat was believed to exceed the risk criteria under 40 CFR 162.11: teratogenicity, lack of emergency treatment, chronic effects, reproductive effects, oncogenicity (data gap), mutagenicity (data gap), and acute effects. Other areas of concern include mammalian toxicity and avian reproductive effects.

A Paraquat Decision Document was issued in October 1982 (43 FR 30613) in which the Agency concluded that available data did not support an RPAR in relation to the criteria identified in 1978. To date, with the exception of a final decision on oncogencity, all other areas of concern have been evaluated and none of the risk criteria have been exceeded. (Note: under the current Special Review criteria the risk criteria for acute inhalation has not been exceeded. Paraquat has the potential to cause adverse effects but the Agency believes it does not because the generated droplets are not respirable.

After the RPAR review, the Agency believed that the acute effects level was very close to estimated applicator exposures. However, the significance of this could not be interpreted without acute data by the oral, dermal, and inhalation routes and more precise information relating to applicator exposure. These data have since been called in and have been evaluated for this document. A list of studies called in by Data Call-In (DCI) since the 1982 Decision Document is included.

The following data have been required under 3(c)(2)(B) since the 1982 Decision Document:

Groundwater DCI	DCI from Decision Document
Degradation studies - Lab	Nondietary exposure
hydrolysis	worker/applicator exposure
photodegradation	face-mask filtration capacity
water	Spray particle size for field application techniques
soil	Acute inhalation
Soil metabolism study - Lab	
aerobic soil	21-Day subchronic dermal study
	Mutagenicity studies
anaerobic soil	Chronic feeding study in rats (new study or additional information for an earlier study)
Mobility studies	Oncogenciity study in rats (new study or additional information for an old study)
leaching	
adsorption	
desorption	Reproduction study (new study or additional information for an old study)
Field dissipation study	
soil	
forestry areas	
Water solubility	
Vapor pressure	
Octanol water partition coefficient	

The regulatory conclusions regarding these data and the relationship to the concerns of 1982 Decision Document are discussed in Part C (Agency Assessments).

One significant result of the Decision Document was that the registrant voluntarily cancelled certain noncrop uses including rights of way. These use patterns had the potential to cause problems with birds and mammals. Currently, the only anticipated wildlife problems are with endangered species and the Agency believes that required label statements will be adequate to protect endangered plants and animals.

B. SUMMARY OF ASSESSMENTS

The Agency has reviewed all available data submitted to support the registration of paraquat. Based on the review of these data, the Agency has reached the following conclusions. See section C of this part for a discussion of this review.

1. Tolerance Reassessment

The ADI (acceptable daily intake) has been set using a recent more sensitive study. The ADI is based on a 1-year dog feeding study (MRID 00132474) with a NOEL (no-observed-effect level) of 0.45 mg/kg/day. Applying a safety factor of 100 results in an ADI of 0.0045 mg/kg/day and a maximum permissible intake (MPI) of 0.27 mg/kg/day (for a 60 kg person). The theoretical maximum residue contribution (TMRC), the total of all published tolerances, is 0.1134 mg/day. The TMRC constitutes 42% of the MPI.

2. Toxicological Assessment

With the exception of four studies (two of which are partially completed) the toxicology data base is complete. Paraquat is extremely toxic to mammals (Category I) by all routes of exposure; however, it is noted that inhalation toxicity is dependent on particle size. The oncogenic potential in animals (rat) is currently being assessed and should be resolved by mid 1986.

3. Worker Exposure Analysis

Quantitative exposures to workers (mixers, loaders, and applicators) were estimated using recently acquired data called in after the Decision Document.

4. Worker Safety Calculations

The margins of safety (NOEL/exposure) appear adequate for all workers.

5. Hazard Assessment for Terrestrial and Aquatic Organisms

With the exception of toxicity data to marine and estuarine organisms the data base for identifying effects to nontarget organisms (wildlife, both aquatic and terrestrial) is complete. The use of paraquat for registered use sites may have an effect on a few mammals or ground-nesting birds under unusual circumstances. However, it is anticipated that wildlife populations (not endangered species) will not be adversely affected when paraquat is used according to label directions.

6. Endangered Species Hazard Assessment

Because paraquat is a nonselective herbicide and is potentially lethal to plants, mammals, and birds, and because the use sites overlap with ranges of some endangered plants, birds, and mammals, the Agency consulted with the Department of the Interior, Office of Endangered Species (OES) for an opinion. OES determined that certain plants and animals are in jeopardy when paraquat is used on crops, pasture, and rangeland. Labeling to protect endangered species is required for all end-use products used for treatment of crops, rangeland and pastures.

7. Environmental Fate Assessment

Environmental Fate data were evaluated for compliance with current data requirements. The available data indicate that paraquat will not leach in agricultural soils. The major degradate (QINA) has a potential for leaching. The data deficiencies were identified and additional data are required to fill the data gaps.

8. Review of Product Chemistry Data

Product chemistry data were evaluated for compliance with current data requirements. The data deficiencies were identified and additional data required to fill the data gaps.

9. Analysis of Paraquat's Restricted-Use Classification

All agricultural products will retain the restricted-use classification. One homeowner end-use product containing 0.276 percent paraquat cation available to the public on a unrestricted basis will continue to be unrestricted.

10. Analysis of Current Label Statements

The warning statements that currently appear on paraquat labels were evaluated to determine if they were appropriate and adequately protected workers and the environment. In addition to label statements required by Part 162.10, statements in the following areas have been added.

- o rotational crop restriction
- o grazing and feeding restrictions
- o endangered species warnings

Section D contains a discussion of the Agency's review of these assessments and Section C of Part II contains the required wording for label revisions.

SUMMARY OF DATA GAPS

As a result of this review, the Agency has identified missing data which are necessary to evaluate risks associated with the use of paraquat. These data must be developed in order to maintain registrations of products or register new products containing paraquat. The following table summarizes the data gaps. Please note that this is only a summary, and more details can be obtained by referring to Data Tables A and B and in Sections D and E of Part II.

SUMMARY OF DATA GAPS - PARAQUAT

Environmental Fate

Photodegradation (water)

Aerobic and Anaerobic soil metabolism

Anaerobic aquatic metabolism study

Leaching

Adsorption/desorption

Terrestrial and conditionally long-term field dissipation studies

Forestry field dissipation studies

rotational crops

Fish and Wildlife

Aquatic Organism Testing

Estuarine and Marine Organisms

Toxicology

Dermal sensitization

90-Day inhalation

Oncogenicity (reevaluation of pathology of rat study)

Residue Chemistry

Storage stability of paraquat in stored animal tissues

Support data for various commodities

Product chemistry data

New Methodology required

III. AGENCY ASSESSMENTS AND REGULATORY POSITIONS

The Agency has conducted a thorough review of the scientific data base for paraquat. The conclusions and requirements to be imposed as a result of this review are summarized above. The following is a discussion of the results of the review.

A. Tolerance Reassessment

Tolerances have been established for residues of paraquat on a wide variety of raw agricultural commodities, in meat, fat, and meat byproducts of animals (40 CFR 180.205), in processed food (21 CFR 193.331), and feed (21 CFR 561.289) derived from raw agricultural commodities.

1. Residue Data

The residue data reviewed in support of these tolerances include:

a. Data on the nature of the residues in both plants and animals, including identification of major metabolites and degradates of paraquat. The terminal residue of concern is paraquat per se. Tolerances are set on the parent compound only.

b. Radiolabeled studies on the uptake, translocation, and metabolism of paraquat in plants show that paraquat is not measurably metabolized by plants.

c. Radiolabeled studies on the metabolism and translocation of paraquat in pigs, goats, cattle, poultry, and rats.

d. Analytical methodology for determining the levels of residues of paraquat in plants and animals. Such methods have been determined to be suitable for residue determinations but not for enforcement purposes.

e. Storage stability data demonstrating that residues of paraquat are stable in plant samples for up to 5 months. Similar data on animal products have not been submitted.

f. Data on the magnitude and levels of residues in individual raw agricultural commodities, animal products, and processed food and feed items.

At the same time that the Agency evaluated the data supporting tolerances, EPA also determined:

- Whether all use patterns (including those registered under FIFRA section 24(c) and intrastate uses) and methods of application are supported by existing tolerances;
- Whether the existing uses of paraquat require the establishment of tolerances in animal products because of residues that may transfer to animals from feed items derived from raw agricultural commodities'
- Whether food additive tolerances are necessary because residues in the raw agricultural commodities concentrate in processing;
- Whether group tolerances could be established in accordance with 40 CFR 180.34(f);
- Whether, in the absence of tolerances, restrictions on use, grazing or feeding are necessary; and
- Whether the tolerances are expressed accurately and in current terminology.

2. Dietary Assessment

The toxicity data considered to establish an ADI include:

a. A 1-year feeding study in dogs, with a NOEL of 0.45 mg/kg/day, has been selected as the new basis for the ADI. A safety factor of 100 results in an ADI of 0.0045 mg/kg/day and a MPI of 0.27 mg/day (for a 60 kg individual).

b. A chronic feeding/oncogenicity study in rats, with a NOEL of slightly below 25 ppm or 1.25 mg/kg/day, was also considered but rejected as the basis for the ADI for two reasons.

(1) The NOEL of the dog study is slightly lower.

b. The lowest dose (25 ppm) approximates the systemic NOEL. Twenty-five ppm is an approximate NOEL because some minor lenticular changes at or near the end of ths study were observed at that level. If this study were used for the ADI calculation, a higher safety factor would have to be used to compensate for these effects. If a safety factor as high as 300 were to be used with this rat study, it would approximate the ADI resulting from the dog study. Thus, the dog study yields a more conservative ADI.

The TMRC for paraquat based on published tolerances is 0.1134 mg/day. The TMRC constitutes 42 percent of the MPI. Daily dietary exposure to paraquat therefore, is less than the calculated acceptable daily intake for humans.

B. Toxicological Assessments.

1. Acute Oral and Dermal Toxicity

Acute toxicity studies show that via the oral and dermal routes, paraquat is extremely toxic (Category I). Symptoms of toxicity associated with oral and dermal acute exposure include lethargy, weakness, diarrhea, wheezing, bloody nose, anorexia, adipsia, anoxia, hyperpnea, tachycardia, cyanosis, and pulmonary changes.

2. Acute Inhalation Toxicity

The 1982 Decision Document determined the acute inhalation toxicity data available at that time to be inadequate and insufficient to provide a definitive conclusion with respect to acute inhalation toxicity. Additional data were required.

In 1985, two new acute inhalation toxicity studies on rats were received. One was performed using aerosolized paraquat with more than 90 percent of the particle diameters below 0.3 um. The LC_{50} for this study was about 1.0 mg/L (Toxicity Category I). The second study was performed using aerosolized paraquat particles with a median diameter of 21.5 to 23 um, with about 0.2 percent less than 2.5 um. The LC_{50} for this study was approximately 3.5 ug/L (Toxicity Category I). The difference in LC_{50} values between these two studies is explained by the difference in particle sizes reaching the alveolar region of the lung.

In the first study, virtually all the particles were small enough to reach the lung alveoli and be absorbed. In the second study, only a small percentage of the total particles were small enough to reach the alveoli. The inverse relationship between inhalation toxicity and particle size, within limits, is a well known toxicological phenomenon (The topic of pulmonary disposition is discussed in Toxicology, the Basic Science of Poisons, edited by L. Casarett and J. Doull, published by McMillan Publishing Company, Inc., New York, 1975.)

Also in 1985, the Agency received some laboratory information on the particle size of paraquat droplets that might be formed during aerial application and knapsack spraying. Virtually no droplets smaller than 15 um were formed for either method of application. The Agency does not expect that the field application droplet spectrum will significantly differ from the droplet spectrum found in the laboratory studies. Therefore, EPA believes that the two acute inhalation studies described above overestimate the potential acute inhalation hazard to workers.

3. Irritation and Sensitization (Eye and Dermal)

Paraquat causes severe eye irritation (Category I) in male rabbits. Symptoms reported after exposure to 0.1 ml of test material included complete opacity in 3 of 6 rabbits tested: purulent discharge ran from the eyes into the mouth, causing severe burning of the mucosa and inability to eat. A severe burning of the nasal mucosa was also seen in most rabbits. Other studies show paraquat to be a moderate dermal irritant (Category III). Signs of toxicity included: slight to severe erythema and very slight to slight edema in most rabbits; hemorrhaging edematous lungs, discolored grainy livers, soft vascularized kidneys and decreased body fat in some rabbits. Dermal sensitization studies were not adequate and are required.

4. Subchronic Toxicity

In the 1982 Decision Document, margins of safety for workers repeatedly exposed to paraquat were calculated based upon the results of two subchronic inhalation studies, each with a NOEL of 0.01 ug/L. The particle size of aerosolized paraquat in one of the studies was 2 um. Although not specifically stated, it is assumed that the particle size in the other study was also about 2 um. The 1982 Decision Document also noted, however, that such small particle sizes were an unlikely occurrence in the field and that realistic margins of safety would probably be greater. Data available at that time did not allow establishment of margins of safety consistent with actual use. Furthermore, margins of safety relating to repeated dermal exposure of workers were not presented in the 1982 Decision Document because the available subchronic dermal data were inadequate and dermal absorption rate studies were not available.

Additional inhalation and dermal data on worker exposures were required to be submitted to the Agency. Determinations of particle sizes of paraquat droplets formed during application were also required to be submitted. In addition, subchronic dermal data and dermal absorption rate data were also required.

All the required information has now been submitted to and evaluated by the Agency.

The available subchronic toxicity data for paraquat include a 90-day feeding study with dogs, a 21-day dermal study with rabbits, and two 3-week inhalation studies with rats. Dermal absorption data on humans are also available.

The 90-day dog feeding study is adequate. The NOEL in that study is 20 ppm (0.5 mg paraquat cation/kg bwt) and the LEL (lowest effect level) is 60 ppm (1.5 mg of paraquat cation/kg bwt). The toxic signs at the 60 ppm level were alveolitis, increased lung weight, and alveolar collapse.

The 21-day dermal study with rabbits demonstrated a NOEL of 1.15 mg paraquat cation/kg bwt with respect to localized skin effects at the sites of application (inflammation; ulceration, scabbing and acanthosis). No evidence of systemic toxicity was observed in

this study at dosage levels up to and including 6.0 mg paraquat cation/kg bwt, the highest dosage level tested.

The two 3-week inhalation studies, previously used in the 1982 Decision Document to calculate margins of safety for workers used aerosolized paraquat particles of about 2 um. The Agency now has information generated in the laboratory indicating that during aerial application or knapsack spraying virtually no paraquat particles $\leq$ 15 um are formed. Since particles > 15 um are not inhalable, the Agency has now decided that it would be inappropriate to use these studies to calculate margins of safety for workers. The results of recently submitted acute inhalation studies with paraquat, in which toxicity was observed to be inversely related to particle size, also support the decision.

The two old 3-week inhalation studies were also deficient in that attention was focused primarily on effects on the respiratory organs/tissues and inadequate evaluation of systemic toxicity in other organs/tissues was performed. To more fully assess the potential inhalation hazard to workers repeatedly exposed to paraquat, the Agency is requiring submission of a 90-day inhalation study which will assess not only respiratory but also other systemic toxicities in test animals exposed to paraquat aerosols. The final protocol for this study is to be determined in consultation with the Agency when the results of particle size studies under field conditions are available. A 90-day study, rather than a 3-week study, is required in order to fully evaluate the potential long-term toxicity of paraquat exposure to workers repeatedly exposed to paraquat over extended periods of time.

The Agency now has acceptable dermal absorption data derived, in part, from studies on humans. These data indicate that about 0.5% of paraquat is absorbed through the skin over a 24-hour exposure period. Inasmuch as dermal data from humans is preferable to dermal data from other species, the Agency has used the dermal absorption rate of 0.5 percent together with recently submitted dermal exposure data to determine dermal absorption of paraquat by workers regularly exposed to paraquat by the dermal route of exposure. Inhalation exposure was also determined for these same groups of workers based on recently submitted inhalation exposure data and an assumed inhalation absorption rate of 100 percent. Finally, absorption for combined

dermal and inhalation exposures were also determined. Margins of safety for workers regularly exposed to paraquat were then calculated by relating dermal absorption and inhalation absorption separately and then combined to the NOEL of 0.5 mg paraquat cation/ kg bwt/day derived from the 90-day dog feeding study described previously. The results are presented in Table 1.

In all cases except two, the combined dermal and inhalation margins of safety are greater than 100 and are considered by the Agency as adequate for protection of workers. In two instances, margins of safety for combined dermal and inhalation exposures were below 100. For individual farmers who mix and load and apply paraquat by ground boom to field crops, the margins of safety was 80. These margins of safety were calculated assuming that workers wore protective gloves only during mixing or loading. Workers who wear the protective clothing required by the label will have margins of safety exceeding those presented in this document. Current labeling requires that mixer/loaders wear face sheld, rubber gloves, apron and waterproof footwear when handling or mixing paraquat concentrate. Data available to the the Agency demonstrate that these protective clothing will reduce exposure to mixer/loader/applicators. Therefore, the Agency believes that the MOS of 80 is a conservative estimate, and that actual MOS is higher.

For flaggers with no respiratory protection working in field crops being aerially sprayed, the margin of safety is 60. However, current labels require that workers not reenter treated fields without protective clothing until sprays have dried. Moreover, if working in an area where spray mist exposure is possible, workers are required to wear goggles and face mask for protection. The MOS for workers wearing such protective clothing is 320.

5. Teratology and Reproduction

The available teratology studies on paraquat include a mouse and a rat study. A three-generation study in rats is also available.

Table 1. Margins of Safety for Subchronic Hazard to Workers
(Combined Dermal and Inhalation Exposure)

Use/Worker	Daily Dermal From Lunchick EAB (11/22/85) (ug/kg/day)	Exposure Adjusted for dermal absorp. (ug/kg/day)	Margin of Safety†	Daily Inhalation Exposure (from Lunchick ug/kg/day)	Margin of Safety†	Daily Dermal Plus Inhalation Exposure (ug/kg/day)	Margin of Safety†
Directed sprays in Orchards, Vineyards, Windbreaks, Shade and Ornamental Trees							
Ground Boom							
Low Acreage*	63	0.32	1600	0.69	720	1.01	500
High Acreage*	290	1.45	340	3.10	160	4.55	110
Hand-Held Spray Gun							
Low Acreage*	57	0.29	1700	0.04	13000	0.33	1500
High Acreage*	260	1.30	380	0.16	3100	1.46	340
Ground Boom Application to Field Crops (Corn, Soybeans, Sorghum, Wheat)							
Individual Farmers*	820	4.10	120	2.50	200	6.60	80
Commercial Contractors							
Mixer/Loader (only)	750	3.75	130	0.30	1700	4.05	120
Applicator (only)	69	0.35	1400	2.20	230	2.55	200
Aerial Application to Field Crops (Corn, Soybeans Sorghum, Wheat)							
Mixer/Loader (only)	79	0.40	1300	0.26	1900	0.66	760
Pilot (only)	29	0.15	3300	0.77	650	0.92	540
Flagger - with resp. prot.	160	0.80	630	0.77	650	1.57	320
Flagger - no resp. prot.	160	0.80	630	7.70	65	8.50	60
Aerial application to Cotton (Defoliant Use)							
Mixer/Loader (only)	20	0.10	5000	0.05	10000	0.15	3300
Pilot (only)	7	0.04	13000	0.18	2800	0.22	2300
Flagger-with resp. prot.	38	0.19	2600	0.18	2800	0.37	1400
Flagger-no resp. prot.	38	0.19	2600	1.80	280	1.99	250
Work Exposure During Noncrop Uses							
Large Sites*	290	1.45	340	3.10	160	4.55	110
Small Sites*	200	1.40	360	0.14	3600	1.54	330

Table 1. Margins of Safety for Subchronic Hazard to Workers
Dermal and Inhalation Exposure (cont'd).

Use/Worker	Daily Dermal Exposure From Lunchick EAB (11/22/85) (ug/kg/day)	Daily Dermal Exposure Adjusted for dermal absorp. (ug/kg/day)	Margin of Safety†	Daily Inhalation Exposure (from Lunchick ug/kg/day)	Margin of Safety†	Daily Dermal Plus Inhalation Exposure (ug/kg/day)	Margin of Safety†
Ground Boom Application to Cotton (Defoliant Use)††							
Mixer/Loader (early season)	34	0.17	2900	0.01	50000	0.18	2800
Mixer/Loader (late season)	250	1.25	400	0.07	7100	1.32	380
Applicator (early season)	9	0.05	10000	0.30	1700	0.35	1400
Applicator (late season)	35	0.18	2800	1.10	450	1.28	390
Ground Boom Application to Cotton (Dessication Use)††							
Mixer/Loader (Minimum)	270	1.35	370	0.08	6300	1.43	350
Mixer/Loader (Maximum	810	4.05	120	0.13	3800	4.18	120
Applicator (Minimum)	46	0.23	2200	1.50	330	1.73	290
Applicator (Maximum)	74	0.37	1400	2.40	210	2.77	180
Worker Exposure During Use on Range, Pasture and Forage Crops	Not Greater than Use on Field Crops						
Worker Exposure During Resin Soaking	Not Greater than "Backpack" use in Orchards, etc.						
Worker Exposure During Tree Injection						0.06**	8300

*Mixer/Loader plus applicator.
†Calculated by dividing NOEL of 500 ug/kg/day (from a 90-day feeding study in dogs) by the daily combined dermal and inhalation exposures of workers.
**From Lunchick, EAB (February 10, 1986).
††From Lunchick, EAB (January 28, 1986).

The 1982 Decision Document determined that the available teratology data were adequate and that paraquat was not teratogenic. This determination is based on the two studies discussed below. No additional data were required.

Paraquat was not teratogenic to the Alderley Park strain of mice under the conditions of this study. The levels of paraquat cation administered were 0, 1, 5, and 10 mg/kg of body weight. Reductions in maternal body weight gain occurred at the 5 and 10 mg/kg levels. Fetotoxicity (partically ossified sternebrae) was also observed at the 10 mg/kg level. The maternal NOEL was 1 mg/kg and the fetotoxic NOEL was 5 mg/kg.

Paraquat was not teratogenic to the Alderley Park strain of rats under the conditions of this study. The levels of paraquat cation fed were 1, 5, and 10 mg/kg of body weight. Maternal toxicity (pilo-erection, hunched appearance, weight loss, and respiratory distress in some rats) and fetotoxicity (slight reduction in weight and slight retardation in ossification) were observed at the 5 mg/kg level. The maternal and fetotoxic NOEL was 1 mg/kg.

In both the mouse and rat teratology studies, the observed fetotoxic effects occurred only at dosage levels which are of no toxicological concern because they are much lower than those to which humans are exposed.

The 1982 Decision document determined that the available reproductive data were inadequate. A two generation reproduction study was required. An adequate study has now been submitted. Technical paraquat dichloride had no effect on reproduction in the Wistar-derived Alderly Park strain of rats in a three-generation study. The levels of paraquat cation fed were 25, 75, and 150 ppm. An increased incidence of alveolar histio-cytosis in the lungs of male and female parents was noted at the 75 ppm level resulting in a systemic NOEL of 25 ppm. Since the NOEL for this study is higher than that from the dog study used to calculate the ADI an adequate margin of safety (> 100) exists with respect to human exposure.

6. Chronic Toxicity

The 1982 Decision Document determined that the available chronic feeding-oncogenic data were inadequate. Chronic toxicity studies consisting of two oral feeding studies (dog and rat) and two oncogenic studies (rat and mouse) were requested and subsequently submitted to the Agency. The new data are summarized below.

The 1-year dog study is adequate. The levels of cation fed to Alderley Park beagle dogs were 0, 15, 30, and 50 ppm. The systemic NOEL is 15 ppm (0.45 mg of paraquat cation/kg bwt). The systemic LEL is 30 ppm (moderately increased severity and extent of chronic pneumonitis). The NOEL from this study was used to calculate the ADI for human dietary exposure to paraquat.

In the mouse oncogenic study paraquat was not oncogenic to male or female Alderly Park strain mice under the conditions of this study. The levels of paraquat cation fed for 97 to 99 weeks were 12.5, 37.5, and 100/125 ppm of paraquat cation. (Initially, the highest level fed was 100 ppm, but it was changed to 125 ppm in the 36th week of testing because no toxic signs appeared at that level.) The systemic NOEL for non-oncogenic effects was 12.5 ppm (1.87 mg paraquat cation/kg bwt). This study is adequate.

The rat chronic feeding study (113 to 126 weeks) is adequate. The levels of paraquat cation fed in that study to the Fischer 344 strain of rats were 25, 75, and 150 ppm. Although very slight effects (mostly lenticular changes) were observed at the 25 ppm level in both sexes, they occurred mostly after 104 weeks of treatment. Until that time, or through most of the life span of the animals, a NOEL was in fact 25 ppm. Toxic symptoms observed at the 75 ppm level included an increased incidence of opacities, cataracts, and nonneoplastic lung lesions (alveolar macrophages and epithelialization, and slight peribronchilar lymphoid hyperplasia). The Agency considers the NOEL for this study to be slightly below 25 ppm (1.25 mg paraquat cation/kg bwt). Although very slight toxicity was observed in this study at the lowest dosage level tested, the effect was not considered by the Agency to be serious enough to warrant requiring a new study, particularly since the dog study described has a NOEL of about one-half that observed in the study.

The oncogenic potential of paraquat in the rat cannot be resolved without further evaluation of the rat histopathology. The Agency received two different interpretations of the histopathology of the rat study within the past six months. Review of the submitted study by one pathologist indicated an increase in the incidence of pulmonary neoplasms (adenomas and carcinomas, but especially adenomas) in lungs of male and female rats. However, a more recently submitted histopathology report by a second pathologist, who reexamined the same lung slides, did not indicate an oncogenic effect attributable to the administration of paraquat. The latter report was received by the Agency in late 1985. To assist in the pathological interpretation of the lung slides, the Agency requested and received a third independent reading of the slides. The information from the three reports is being considered and a final evaluation should be completed by July 1986.

7. Mutagenicity

The 1982 Decision Document determined the available mutagenicity data were inadequate. Additional data were required and have been submitted to the Agency. The evaluation of mutagenic properties of paraquat is based on 21 studies as follows:

a. Nine gene mutation assays: S. typhimurium TA 92, 98, 10, 1535, 1537, 1538 and G 46 his-strains; A. nidulans strains 35 and P_3; and L5178Y mouse lymphoma cells in culture.

b. Five structural chromosome aberration assays: dominant lethal (Charles River CDI mice and Swiss-Webster mice); cytogenic (human lymphocytes and bone marrow of Wistar rats); and micronucleus test in mice.

c. Seven DNA damage/repair assays: S. typhimurium TA 1978 and 1538 strains; Sacch. cerevisiae D4, JDI and "other" strains; human embryo epithelial cells; rat hepatocytes in culture; and sister chromatid exchange in Chinese hamster lung fibroblasts.

According to these data, paraquat was negative in eight studies (mostly in gene mutation and chromosomal aberration assays); weakly positive in four studies (two gene mutations, one chromosomal aberration and one DNA damage/repair assays); and positive in four studies (all DNA damage/repair assays). Five studies

(three gene mutation, one chromosomal aberration and one DNA damage/repair) were not acceptable.

Additional mutagenicity studies are not required. The significance of these studies will be considered in a weight-of-evidence review when the Agency makes the final decision on oncogenicity.

8. Metabolism

Paraquat dichloride or paraquat dimethyl sulfate (radiochemical purity: 99.3-99.8%), labeled with ^{14}C, in either methyl groups or in the ring, was poorly absorbed from the gastrointestinal tract of mammals and was excreted in feces mostly as unchanged paraquat. However, after an oral dose, there was microbial degradation of paraquat in the gut. (In one study with rats, 30% of a dose of paraquat appeared in feces in a degraded form.) A portion of these microbial degradation products can be absorbed and be excreted in urine, whereas the remainder is excreted in feces.

In studies with cows and rats, about 96 percent and 70 to 96 percent, respectively, of the administered radioactivity (single oral doses) was excreted in feces within 2 to 3 days as unchanged paraquat. In studies with a goat and pigs, in which ^{14}C-labeled paraquat was administered orally for 7 consecutive days, 50 percent and 70 percent, respectively, of the total radioactivity was recovered in feces, also as unchanged paraquat. In a study with a goat, 33 percent of the radioactive dose was also present in the contents of the digestive tract, but these determinations were not performed for pigs after the animals were killed.

However, in studies in which ^{14}C-methyl labeled paraquat was administered subcutaneously to rats or was injected intramuscularly into monkeys, 70 to 80% and 59%, respectively, of the radioactivity was recovered in urine as unchanged paraquat. Most of this radioactivity was eliminated in 24 hours after dosing.

The distribution of radioactivity was studied in the heart, brain, liver, kidneys, muscle (forequarter and hindquarter), blood, fat (peritioneal and subcutaneous), and lungs of goats and pigs. Expressed as ug (micrograms) of paraquat ion/g of tissue, most of the radioactivity was found in lungs, kidneys and liver. With the exception of liver and peritoneal fat, the radioactivity in all tissues studied was

associated with unchanged paraquat. In the liver, about 3 percent of the radioactivity was associated with 4-(1,2-dihydro-1-methyl-2-oxo-4-pyridyl)-1-methyl-pyridinium ion (compound I or monopyridone) and about 3 to 4 percent of the radioactivity was associated with 1-methyl-4-(4-pyridyl) pyridinium ion (compound II or monoquat). Peritoneal fat contained about 6.5 percent of the radioactivity in that tissue as monoquat. Similar findings were observed in studies with rats. Paraquat accumulated in the lungs of goats and rats, but not pigs. Additional metabolism studies are not required.

9. Miscellaneous studies

Three studies contribute significantly to an overall assessment of paraquat toxicity. These are: 1) acute dermal absorption studies with humans; 2) urinary excretion study in monkeys; and 3) oral corrosion potential studies with rabbits.

In the first study, single doses of ^{14}C-methyl-labeled paraquat (99.8% pure) were applied on the forearms, hands and legs of six adult male volunteers (age 30 to 74), and absorption was measured by determining total ^{14}C in urine. Absorption was very slow from all application sites (0.23 to 0.29% of the dose during 5 days after dosing).

In the second study, monkeys injected intramuscalarly with paraquat, eliminated 58.6 percent of the dose in the urine within 7 days. Applying a correction factor derived from the monkey study (58.6% urinary excretion) to the urinary excretion data in the human study (0.29%) results in a calculated dermal absorption rate of 0.49% (0.29 x 100/58.6). The dermal absorption rate of 0.50% is being used in the margin-of-safety calculations.

In the third study, 1 ml aliquots of paraquat dichloride (28.6% a. i.) and its aqueous dilutions ranging from 1:2 to 1:200 were applied to the tongue of New Zealand strain rabbits. Dilutions as small as 1:100 were corrosive to the tongue. Other affected tissues were larynx, lungs, liver, and kidneys. In the case of lungs, necrotizing pneumonia, congestion/edema, and pulmonary hemorrhage were reported. Laryngeal lesions were also observed at the 1:200 dilutions.

10. Lack of Emergency Treatment

The 1982 Decision Document indicated that both the oral administration and skin absorption of paraquat have been responsible for poisoning incidents. The Agency believed at that time that the therapeutic approach to treatment of acute oral exposure is only partially effective. The 81 percent survival rate occurring in case histories available to the Agency in combination with rapid availability of treatment information (provided by placement of a 24-hour emergency treatment telephone number on all labeling) suggests an adequate emergency treatment for accidental oral ingestion. On April 14, 1982, the Agency established an exemption from the requirement of tolerance for an emetic which is incorporated into paraquat formulations. The emetic is intended to induce rapid vomiting thereby reducing the absorption of paraquat. The Agency is continuing to require the emetic to be incorporated into all formulations of paraquat.

The Agency's 1982 Decision Document noted that relatively few dermal exposure cases have resulted in fatalities from paraquat products. With the exception of a homeowner use product containing a very low concentration of active ingredient, all products bear Restricted-Use Classification. Applicators of such products are required to undergo training in the safe handling of pesticides and receive instruction in product labeling and labeling interpretation. Current paraquat product labeling bears instructions for mixers and applicators in exposure reduction techniques. Mixers are instructed to "wear a full face shield, rubber gloves and apron" while applicators facing a risk of exposure are instructed to "wear goggles and approved face mask capable of filtering spray droplets." They are also instructed to "wear waterproof footwear and clothing when spraying or when contacting vegetation wet with spray." The Agency believes that the precautionary measures dictated by current labeling are adequate for prevention of dermal acute toxicity.

C. Worker Exposure Analysis

An assessment of worker exposure to paraquat which estimated worker exposure during different application techniques was conducted. The exposure estimates were derived from surrogate data, corrected for paraquat's use rates, and additional data submitted by the registrant(s). Three different application techniques were initially evaluated: aerial, ground boom, and hand spraying. A fourth technique, tree injection, was subsequently evaluated. The application techniques and usage scenarios have large ranges in exposure rates or hours of exposure, which is normal for a herbicide with numerous use patterns. Therefore, many of the exposure estimates are presented as a mean with its corresponding range. All of the exposure estimates were unadjusted for dermal or respiratory absorption rates, however this adjustment was made during the process of estimating margins of safety.

Specific exposure information and a discussion of the studies used are available in the science support document, Exposure Estimates for Registered Uses of Paraquat and its addendum.

D. Margins of Safety

Margins of Safety (MOS) were calculated for workers using paraquat. The calculation involves division of an appropriate NOEL by a worker's estimated exposure. The result is a unitless figure which gives an indication of how close a worker's internal dose is in relation to the NOEL for laboratory animals.

Daily dermal exposures were adjusted for a dermal absorption rate of 0.5% by dividing the exposure by 200. Daily inhalation exposures were not adjusted, i.e., a 100 percent absorption rate was assumed. Margins of safety were calculated for dermal and inhalation exposure separately and then for combined dermal and inhalation exposures by relating these values to a NOEL of 0.5 mg/kg/day (500 ug/kg/day) derived from a 90-day subchronic feeding study in dogs. The LEL in this study was 1.5 mg/kg/day at which dosage level toxic effects in the lung were observed.

All MOS's are considered adequate. Only two worker groups have an MOS < 100. Individual farmers who mix/load and apply paraquat by ground boom application to field crops have an MOS of 80. Flaggers with no respiratory protection working in field crops

being aerially sprayed with paraquat have an MOS of 60. All other workers have an MOS > 100. More detailed information is available in the discussion of subchronic toxicity in Part D of Section III (Toxicological Assessments).

E. Hazard Assessment for Terrestrial and Aquatic Organisms

Aquatic: Paraquat would not normally be expected to present a hazard to fish or aquatic invertebrates at expected rates up to 1.0 lb ai/A. Available acute toxicity data indicate that paraquat is slightly toxic to certain species of fish and moderately toxic to daphnid. This is based on a 96-hour LC_{50} of 13 ppm for bluegill and a 48-hour LC_{50} values for daphni a ranging from 1.2 ppm to 8.0 ppm. Initial exposure of aquatic organisms to paraquat, based on direct application to water 6 inches deep at rates ranging from 0.25 to 1.0 lb ai/A would be expected to range from 0.184 to 0.734 ppm. This results in at least at twofold margin of safety for fish (based on 1/10 the LC_{50}) and approximates the LC_{50} for aquatic invertebrates. Paraquat, however, is not applied directly to water. Terrestrial use of paraquat would result in less contamination of water and a greater margin of safety. Paraquat appears to tightly bind to most soils and is not expected to runoff.

Terrestrial: There is no evidence to suggest that the use of paraquat has either resulted in kills or has affected mammalian or avian populations. Data suggests that mammals, especially lagomorphs, feeding on freshly sprayed vegetation and eggs of ground-nesting birds sprayed with paraquat would be affected most. The Agency does not expect either of these to occur with high frequency. Mammals are unlikely to feed on a site immediately after spraying. With respect to the potential for paraquat to have toxic effects on birds' eggs; some embryo mortality could result when paraquat replaces cultivation and ground-nesting birds are allowed to continue to brood and eggs receive a direct hit. However, most, if not all, uses of paraquat are either not applied during avian egg laying season; are applied under conditions not conducive to laying eggs on the ground; or would not allow ground-nesting birds to continue their brooding.

F. Endangered Species Hazard Assessment

Because paraquat is potentially lethal to mammals and birds, and because the use sites overlap with the ranges of some endangered birds, mammals, and plants, the Agency consulted with the Office of Endangered Species (OES) for an opinion. The OES determined that certain plants and animals are in jeopardy when paraquat is used on crops, pasture, and rangeland.

The following endangered animal species are considered in jeopardy: California condor, Valley elderberry longhorn beetle, Attwater's Greater Prairie Chicken, and Houston toad.

The following endangered plant species are considered in jeopardy: green pitcher plant, Arizona agave, Nichol's Turks head cactus, Arizona hedgehog cactus, brady pincushion cactus, Peebles Navajo cactus, Arizona cliffrose, Carex specuicola, Thornber's fishhook cactus, large-flowered fiddleneck, San Benito evening-primrose, salt march birds-beak, Eureka dunegrass, Solano grass, Antioch Dunes evening primrose, San Diego mesa mint, Presidio manzanita, pedate checker mallow, slender petaled mustard, Contra Costra wallflower, McDonald's rockcress, truckers barberry, Uinta Basin hookless cactus, Mesa Verda cactus, North Park phacelia, clay-loving wild buckwheat, purple spined hedgehog cactus, knowlton cactus, spineless hedgehog cactus, Harper's beauty, Miccosukee gooseberry, hairy rattleweed, Gouaria hillebrandii, Stenogyne angustifolia var Haplostachys haplostachya var angustifolia, "Ewa Plains" akoka, Diamond Head schiedea, Liochaeta venosa, Cuneate bidens, Mac Farlane's four-o'clock, Short's goldenrod, Robbins cinquefoil, Lee pincushion cactus, sneed pincushion cactus, Kuenzler hedgehog cactus, McKittrick pennyroyal, Todsen's pennyroyal, Gypsum wild-buckwheat, Rhizome fleabane, Cirsium vinaceum, Bunched arrowhead, Malheur wine-lettuce, Tennesse purple cornflower, Ashy dogweed, Tobusch fishhook cactus, Nellie cory cactus, bunched cory cactus, Lloyd's hedhehog cactus, blacklace cactus, Davis' green pitaya, Lloyd's Mariposa cactus, Johnston's frankenia, Texas poppy-mallow, Texas snowbells, Novasota ladies' tresses, Texas wild-rice, Siler pincushion cactus, Maguire daisy, Wright fishhook cactus, Rydberg milk-vetch, clay phacelia, dwarf bear-poppy, and Last Chance townsendia.

Labeling to protect endangered species is required for all end-use products used for treatment of crops, rangeland, and pastures.

G. Environmental Fate

A review of the data indicate that only the hydrolysis and photodegradation in soil requirements are fulfilled. Paraquat dichloride was stable to hydrolysis at 25 °C and 40 °C at pH 5, 7, and 9 for up to 30 days. Other data indicate that paraquat has a half life of > 2 weeks in water, plus soil, is immobile in silt loam and silty clay loam and slightly mobile in sandy loam soils. Adsorption of paraquat is positively correlated with soil cation exchange capacity and is not readily desorbed from soil organic matter and clay. Paraquat does not leach except in sand and does not volatilize. Based on the information available paraquat should not reach groundwater. The paraquat degradate (QINA) is very loosely absorbed on the organic matter/clay complex and, therefore, has a potential for groundwater contamination. The additional data required include photodegradation in water, aerobic and anaerobic soil metabolism studies, anaerobic aquatic metabolism studies, leaching and adsorption/desorption studies, terrestrial and conditionally long-term field dissipation studies, forestry, rotational crops and spray droplet spectrum (field) studies. Once this data is received the potential for groundwater contamination will be reevaluated.

In response to the groundwater Data Call In, the Agency was referred to a number of existing studies. Recently additional references were received and reviewed by the Agency. The additional data, however, resulted in the filling of only one additional data requirement--photodegradation on soil.

H. Product Chemistry Evaluation

The available data have been evaluated which identify the ingredients, identify the matarials and manufacturing process and discuss the physical and chemical properties of the technical grade of the active ingredient and the manufacturing-use product. Specific data requirements have been identified and are listed in the data table.

I. Use Classification

Ortho Paraquat CL (29.1% of paraquat dichloride, active ingredient, EPA Registration No. 239-2186), Ortho Gramoxone CL (29.1%) of paraquat dichloride, active ingredient, EPA Registration No. 239-2286) and Ortho Spot Weed and Grass Killer (0.276% of paraquat cation active ingredient, EPA Registration

No. 239-2454) are the most widely used paraquat products in the United States. Based on acute oral, dermal, inhalation, and ocular effects in animals and people (in this case, due to purposeful or inadvertent exposures), Ortho Paraquat CL and Ortho Gramoxone CL have already been classified as restricted-use pesticides based upon their acute and subacute toxicity. This classification will be retained.

Ortho Spot Weed and Grass Killer has been available to the general public on an unrestricted basis. When used according to the label directions, it is not likely to present a health hazard to humans (Toxicity Category IV in acute studies with rats and Toxicity Category II in acute dermal and inhalation studies with rabbits). This product will continue to be unrestricted.

REGULATORY POSITION AND RATIONALE

Based on review and evaluation of all available data and other relevant information on paraquat, the Agency has made the following determinations:

1. None of the risk criteria listed in 40 CFR 154.7 for initiating a special review have been met. Therefore paraquat is not being placed in Special Review at this time.

   Rationale: After considering data submitted concerning acute inhalation, subchronic toxicity, and chronic toxicity, the Agency has determined that no reason exists for placement of paraquat into Special Review status. The oncogenicity and mutagenicity potential will be determined by mid-1986.

2. The Agency is continuing to require that an emetic cleared under 40 CFR 180.1001(b) and (c) be incorporated into all manufacturing use and end use products containing paraquat.

   Rationale: Based on the previous history of poisoning by accidental ingestion of paraquat and partial effectiveness of therapeutic treatment after exposure, the Agency determined that an emetic is needed in the formulations to induce rapid vomiting thereby reducing absorption of paraquat.

3. The Agency is requiring that those products or formulations already classified as "Restricted Use" and labeled with worker safety rules maintain these label statements and "Restricted Use Classification."

   Rationale: The available acute oral, dermal, inhalation, and ocular data indicate that the Toxicity Category for these formulations is I. Based on the high acute toxicity to animals and people from intentional or inadvertent exposure, those formulations were classified as "Restricted Use." The Agency believes that the "Restricted Use" Classification and current precautionary labeling are necessary to continue to protect mixer/loaders and applicators from effects of dermal and inhalation toxicity.

4. The Agency has determined that the 0.276% paraquat formulation available to the public on an unrestricted basis will continue to be unrestricted.

   Rationale: This formulation is Toxicity Category IV in acute studies with rats and Toxicity Category III in acute dermal and inhalation studies with rabbits. When used according to the label directions, the formulation is not likely to present a significant health hazard to humans.

5. The Agency will not require additional residue data on the following raw agricultural commodities: carrots, potatoes, turnips, onions, broccoli, cabbage, cauliflower, apricots, peaches, strawberries, acerola, bananas, guava, mint hay, safflower, oats, chinese cabbage, collards, lettuce, rhubarb, guar, lima beans, snap beans, cherries, plums, wheat, asparagus, coffee beans, hops, papayas, sorghum grain, bean forage, pea forage, apples, pears, nectarines, small fruits, almond hulls, avocados, cottonseed, kiwifruit, passion fruit, sugarcane, sorghum forage, pistachios, and sunflower; the following animal products: meat and fat of cattle, meat, fat and meat by products of other livestock and milk; and the following crop grouping: fruiting vegetables (except cucurbits,) citrus fruits, and tree nut.

   Rationale: The Agency has determined that the available residue data adequately support the established tolerances for these raw agricultural commodities and animal products.

6. The Agency is requiring additional residue data on the following raw agricultural commodities: sugar beets, bean hay, sweet corn, alfalfa, pineapple, range grass, rye, sugar beet tops, pea hay, field corn, clover, figs, pasture grass, turnip tops, cucurbit vegetables, corn forage and fodder, trefoil, soybean forage, hay, and straw, sorghum silage and hay, wheat hay and straw; meat byproducts of poultry, and eggs; and on processed foods derived from the following raw agricultural commodities: potatoes, sugar beets, tomatoes, wheat, coffee beans, plums, figs, alfalfa, spent hops, olives, pineapples, and sugarcane. Refer to table A for details on type of data required.

Rationale: A review of the available data indicate that the Agency does not have sufficient residue data to support the established tolerances for paraquat on the above commodities.

7. The Agency requires residue data together with a petition for establishing tolerances, if necessary, for cotton forage and sugarcane forage. Alternatively, a statement may be placed on the label restricting the grazing or feeding of treated commodities. Each registrant will have 6 months to notify the Agency which alternative he chooses. Refer to table A for details of residue data required.

   Rationale: Review of the available data indicate that the residue data are required to cover the possible transfer of residue to animals from the feed items.

8. The Agency will require an increased tolerance of 0.1 ppm for olives. Alternatively, a statement may be placed on the label prohibiting application when olives on the ground are to be harvested. Each registrant will have 6 months to notify the Agency as to which alternative he has selected.

   Rationale: The available residue data indicate that the 0.05 ppm tolerance level is too low because higher residues occurred in fruit which come in contact with the ground after treatment. Increasing the tolerance for olives from 0.05 to 0.1 ppm would increase the TMRC by only 0.04 percent which represents a negligible increase in risk due to dietary exposure.

9. The Agency will propose the following changes in food/feed additive regulations and technical changes in the listing of paraquat tolerance.

   a. New food additive regulations for sorghum fodder at 0.05 ppm, sorghum-milled products (except flour) at 0.5 ppm, soybean hulls at 3.0 ppm, sugarcane bagasse at 2.5 ppm, sugarcane juice at 2.5 ppm, sugarcane juice at 4 ppm, sunflower meat at 10 ppm, and corn-milled products at 0.5 ppm.

   b. The following existing food additive tolerances will be increased: spent hops from 0.2 ppm to 0.5 ppm and sunflower hulls from 6 ppm to 15 ppm.

c. The listings for "pea forage" and bean forage will be changed to "pea hay" and "bean hay".

d. The listing for "small fruits" will be changed to read "small fruits (excluding strawberries and cranberries)."

e. The listing for "hop vines" will be deleted.

Rationale: The above changes are required because:

a. New food additive levels are required to cover residues resulting from concentration of paraquat in the processed food or feed items.

b. The available data support the increased tolerance level for spent hops and sunflower hulls.

Changes in food additive levels will not result in a significant increase in existing TMRC and thus will not appreciably increase the risk to humans due to dietary exposure.

c. The terms bean hay and pea hay are currently used instead of bean forage and pea forage.

d. The existing tolerance for strawberries is 5 times that for other small fruits and will be listed separately. The use directions for cranberries vary significantly from the use directions for the remaining small fruits.

e. The listing for "hop vines" is unecessary because the Agency has determined that hop vines are neither a raw agricultural commodity nor an animal feed item.

10. The Agency will establish the following group tolerances if requested by the registrants: Brassica leafy vegetables, pome fruits, and stone fruits.

Rationale: Available residue data on existing members of the groups are adequate to support such group tolerances, and the uses and tolerances are significantly similar as required by 40 CFR 180.34 (f).

11. The Agency has determined that the following group tolerances cannot be set: root and tuber group, leaves of root and tuber group, bulb vegetables, leafy vegetables (except Brassica), legume vegetables, foliage of legume vegetables, cereal grains, forage, fodder, hay and straw of cereal grains and nongrass animal feeds.

    Rationale: The reasons why group tolerances are not appropriate are described for each group in table A, but include the following: residue data are not available for designated representative crops, use patterns are not sufficiently similar, or maximum residues vary by a factor of more than 5.

12. The Agency is requiring that uses for paraquat on ground cherry and garlic be deleted from the labeling of all end-use products.

    Rationale: The uses on ground cherry and garlic are not supported by tolerances.

13. The Agency will require a label restriction for figs prohibiting application when figs on the ground are to be harvested. Refer to Section C of Part II for wording of label statements.

    Rationale: The available data do not support the established tolerance level of 0.05 ppm on figs because higher residues were found in figs harvested from the ground.

14. The following crops require label statements restricting grazing or feeding of the treated crop or cover crop: barley hay and straw, oat hay and straw, citrus crop grouping (cover crop), tree nuts group (cover crop), avocado (cover crops), figs (cover crops), guava (cover crops), and pistachios (cover crop). Refer to Section C of Part II for wording of such label statement.

    Rationale: A review of Agency files indicates that no data exists to support tolerances necessary for grazing of listed crops and cover crops.

15. The Agency is requiring that grazing restrictions be deleted from product labels for the use patterns of range grass, pasture grass, alfalfa, birdsfoot trefoil, clover, and field corn.

Rationale: The Agency has determined that a grazing restriction for these treated commodities is not practicable. This change will not result in a significant increase in the existing TMRC and thus will not appreciable increase the risk to humans due to dietary exposure.

16. The Agency is not requiring a reentry interval for currently registered uses of paraquat. The current reentry label statements will continue to be required on all end-use formulations. Refer to Section C of Part II for wording of statements.

    Rationale: The Agency has reviewed the available information on the registered uses of paraquat and the cropping practices in those crops. The potential for fieldworker exposure to paraquat residues appears to be very low. That is, for the current registered uses; agricultural practices in those crops do not involve fieldworkers in prolonged, substantial contact with pesticide treated surfaces. Therefore, the Agency does not require submission of reentry data as detailed in 40 CFR 158.140. The Agency reserves the right to require such data in the future if a change in registration or agricultural practices would cause substantial exposure for field workers. The Agency has also determined that current precautionary labeling and worker safety rules are adequate to protect the mixer/loader/applicator from exposure.

17. The Agency is requiring crop rotation restrictions on labels of all end-use products. Refer to Section C of Part II for wording of the statement.

    Rationale: This statement is required to ensure that crops without tolerances are not exposed to soil residues of paraquat.

18. The Agency is not requiring a ground-water advisory statement for products containing paraquat.

    Rationale: Available data indicate that paraquat is immobile in silt loam and silty clay loam and slightly mobile in sandy loam soils. Paraquat is not readily desorbed from soil and does not leach in agricultural soils. There is a potential for the QINA degradate to leach in soils because it is loosely absorbed to organic matter and clay. Additional data is requested to further determine this potential.

19. The Agency will require labeling to protect endangered species for all end-use products used for treatment of crops, rangeland, and pasture. Refer to Section C of Part II for wording of label statements.

Rationale: Although available data and information on habits of various species of animals indicate that paraquat will not cause problems with stable wildlife populations, its acute and subchronic toxicity may be hazardous to unstable or endangered populations. Refer to Section C for a list of species whose habitats overlap with crops, pastures, and rangeland sites that could be potentially treated with paraquat. Consultation with the Office of Endangered Species (OES) indicated that these populations may be in jeopardy in areas treated with paraquat.

20. While the data gaps are being filled, currently registered manufacturing-use products and end-use products containing paraquat as the sole active ingredient may be sold, distributed, formulated, and used in the United States, subject to the terms and conditions specified in this Standard. Registrants must provide or agree to develop additional data, as specified in Table A of Section D, Part II in order to maintain existing registrations.

The Agency will issue registrations for substantially similar products. However no significant* new uses will be issued until the oncogenicity potential of paraquat is fully understood.

Rationale: Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Agency does not normally cancel or withhold registration simply because data are missing or are inadequate (see FIFRA sections 3(c)(2)(B) and 3(c)(7)).

Issuance of this Standard, provides a mechanism for identifying data needs. These data will be reviewed and evaluated and the Agency will determine if the data will affect the registration of paraquat.

*Significant new use is defined in 44 FR 27934, May 11, 1979. In case of a new food or feed use, the Agency will consider as significant an increase in the Theoretical Maximum Residue Contribution of greater than 1 percent.

IV. REQUIREMENTS FOR REGISTRATION

This part of the Registration Standard discusses what data and information are required to maintain existing registrations or register new products containing paraquat. It also contains the instructions for submitting the necessary data and information to the Agency.

A. CRITERIA FOR REGISTRATION UNDER THIS STANDARD

To be covered by this Standard, MPs must contain paraquat as the sole active ingredient, bear required labeling and conform to the product composition, acute toxicity limits, and use pattern requirements listed in section B.

The applicant for registration or reregistration of products subject to this Standard must comply with all terms and conditions described in it. This includes making a commitment to fill data gaps on a schedule specified by the Agency. Applicants for registration under this Standard must follow the instructions contained herein and complete and submit the appropriate forms within the time specified.

B. ACCEPTABLE RANGES AND LIMITS

1. Product Composition Standard: Technical grade products must contain at least 99.0 percent paraquat as the sole active ingredient. Each MP formulation proposed for registration must be fully described with appropriate certification of limits. In addition, the active ingredient must be substantially similar to that in currently registered technical products. Any MP not meeting these requirements will be considered a new product and will not be registered under this Standard.

2. Acute Toxicity Limits: The Agency will consider registration of technical grade MPs containing paraquat with an acute toxicity category of I. The labeling of any registered products must bear the appropriate precautionary statements.

3. Use Patterns: To be registered under this Standard MPs containing paraquat must be labeled for formulation into end use products that are to be used as a contact herbicide, desiccant, defoliant or plant growth regulator in cropland, noncropland, forestry, ornamentals, or turf. The attached index entry lists all registered uses, as well as approved maximum application rates and frequencies of application.

C. REQUIRED LABELING:

The required label statements listed below must appear on all MP's and EP's in the channels of trade within 2 years of issuance of this document. After review of data to be submitted under the Standard, the Agency may impose additional label requirements.

1. All Products. All products must bear appropriate labeling as specified in 40 CFR 162.10. See Appendix II for specific information regarding label requirements.

   The labels of all products must bear the appropriate container disposal statement. See Appendix II.

2. Manufacturing-Use Products. Labels of all MP's must bear the statement:

   > This pesticide is toxic to wildlife. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public waters unless this product is specifically identified and addressed in an NPDES* permit. 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 EPA.

3. End-Use Products: Labels of all formulated EP's must bear the following statements:

   a. "This pesticide is toxic to wildlife. Do not apply directly to water or wetlands (swamps, bogs, marshes and potholes). Do not contaminate water by cleaning of equipment or disposal of wastes."

*National Pollutant Discharge Elimination System

b. "Do not graze treated oats and barley to livestock. Do not feed treated oats and barley to livestock."

c. The following statement must be added to the Directions for Use for citrus, tree nuts, avocados, guava, and pistachios.

"Do not graze treated areas. Do not feed cover crops grown in treated areas to livestock."

d. The following statements must be added to the Directions of Use for figs.

"Do not graze treated areas or feed cover crops grown in treated areas to livestock."

"Do not apply paraquat when figs to be harvested are on the ground."

e. Restrictions on Rotational Crops

"Do not plant food or feed crops other than those which are registered for paraquat, on paraquat treated soils for 18 months.

f. Endangered Species - Pasture and Rangeland Use

"The use of any pesticide in a manner that may kill or otherwise harm an endangered or threatened species or adversely modify their habitat is a violation of Federal law. The use of this product is controlled to prevent death or harm to endangered or threatened species that occur in the following counties or elsewhere in their range.

"Before using this pesticide in the following counties you must obtain and review the EPA Rangeland Endangered Species Bulletin (Bulletin EPA/ES-RANGE). The use of this pesticide is prohibited in these counties unless specified otherwise in the Bulletin. The Rangeland Bulletin is available from your County Agricultural Extension Agent, the Endangered Species Specialist in your State Wildlife Agency Headquarters or the appropriate Regional Office of the Wildlife Agency Headquarters or the appropriate Regional Office of the U.S. Fish and Wildlife Service (FWS) or the U.S. Environmental Protection Agency (EPA) indicated below. THIS BULLETIN MUST BE REVIEWED PRIOR TO PESTICIDE USE."

Contact FWS in Portland, Oregon or EPA in San Francisco, California

CALIFORNIA: counties of San Benito, Monterey, San Luis Obispo, Fresno, Kings, Kern, Santa Barbara, Ventura, Tulare, San Joaquin, San Diego, Los Angeles, Inyo, Solano, San Francisco, San Bernardino, Contra Costa, Mendocino, and Nevada.

HAWAII: Island of Maui, District of Lahaina, Island of Hawaii and Island of Oahu.

Contact FWS in Portland, Oregon or EPA in Seattle, Washington

IDAHO: Idaho County.
OREGON: counties of Harney and Wallowa.

Contact FWS in Albuquerque, New Mexico or EPA in San Francisco, California

ARIZONA: counties of Yavapai, Maricopa, Pianl, Pima, Gila, Navajo, Mohave, and Graham.

Contact FWS in Albuquerque, New Mexico or EPA in Dallas, Texas

NEW MEXICO: counties of Eddy, Dona Ana, Otero, Chaves, Lincoln, San Juan, Sierra, McKinley, and Catron.

TEXAS: counties of El Paso, Calberson, Zapata, Bandera, Kerr, Brewster, Terrell, Pecos, Jim Wells, Kleburg, Refugio, Starr, Runnels, Edwards, Real, Kimble, Val Verde, Brazos, and Hays.

Contact FWS or EPA in Atlanta, Georgia

ALABAMA: counties of Cherokee, De Kalb, Jackson, and Marshall.

FLORIDA: counties of Franklin, Liberty, and Jefferson

GEORGIA: counties of Towns, Wayne, and Brantley.

KENTUCKY: counties of Nicholas, Fleming, and Robertson.

NORTH CAROLINA: Henderson County.

SOUTH CAROLINA: counties of McCormick and Greenville.

TENNESSEE: counties of Rutherford, Wilson, and Davidson

Contact FWS or EPA in Boston, Massachusetts

NEW HAMPSHIRE: Coos County

Contact FWS or EPA in Denver, Colorado

COLORADO: counties of Delta, Mesa, Montrose, Montezuma, Jackson, Washington, La Plata, and Duray.

UTAH: counties of Washington, San Juan, Duchesne, Summit, Emery, Wayne, Piute, Garfield, Utah, and Sevier

g. Endangered Species - Field Crop Use of Corn, Soybeans, Sorghum, Small grains, Alfalfa, Apples, and Pears

"The use of any pesticide in a manner that may kill or otherwise harm an endangered or threatened species or adversely modify their habitat is a violation of federal laws. The use of this product is controlled to prevent death or harm to endangered or threatened species that occur in the following counties or elsewhere in their range.

Before using this pesticide in the following counties you must obtain and review the EPA Cropland Endangered Species Bulletin (EPA/ES-CROP). The use of this pesticide is prohibited in these counties unless specified otherwise in the Bulletin. The Cropland Bulletin is available from your County Agricultural Extension Agency, the Endangered Species Specialist in your State Wildlife Agency Headquarters or the appropriate Regional Office of the U.S. Fish and Wildlife Servie (FWS) or the U.S. Environmental Protection Agency (EPA) indicated below. THIS BULLETIN MUST BE REVIEWED PRIOR TO PESTICIDE USE."

	COUNTY				
REGIONAL OFFICE OF FWS/EPA STATE Species	CORN WHEAT	SOYBEANS	SORGHUM	ALFALFA	APPLES PEARS
PORTLAND, OR./SAN FRANCISCO, CA.					
CALIFORNIA					
Solano grass	SOLANO				
Valley elderberry longhorn beetle	MERCED SACRAMENTO				SACRAMENTO
ALBUQUERQUE, N.M./DALLAS, TX.	ARANSAS	ARANSAS	ARANSAS		
TEXAS	AUSTIN	AUSTIN	AUSTIN		
Attwater's Greater Prairie Chicken	COLORADO FORT BEND GOLIAD REFUGIO VICTORIA	COLORADO FORT BEND GOLIAD REFUGIO VICTORIA	COLORADO FORT BEND GOLIAD REFUGIO VICTORIA		
Houston Toad				BASTROP BURLESON HARRIS	

h. The following must be deleted from the product labels:

1. Use for ground-cherry and garlic.
2. Grazing and feeding restriction for the use patterns of range grass, pasture grass, alfalfa, birdsfoot trefoil, clover, and field corn.

i. The following label statements are required for all end-use products labeled for use on agricultural crops.

Worker Safety Rules/Reentry Statements

USE STRICTLY IN ACCORDANCE WITH DANGER STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
DO NOT get on skin, eyes or clothing.
DO NOT inhale spray mist
WASH SPLASHES from skin and eyes immediately.
REMOVE and wash contaminated clothing.
WASH before eating, smoking and drinking.
WEAR full face shield, rubber gloves, apron and waterproof footwear when handling or mixing concentrate.

WEAR waterproof footwear and clothing when spraying or when contacting vegetation wet with spray.
DO NOT enter treated areas without protective clothing until sprays have dried.
AVOID working in spray mist. If there is risk of exposure wear goggles and approved face mask capable of filtering spray droplets.
KEEP all unprotected persons out of operating areas or vicinity where there may be danger of drift.
Certain states may require more restrictive reentry intervals; consult your State Department of Agriculture for further information.
Written or oral warnings regarding use of protective clothing and accidential exposure must be given to workers who are expected to be in treated areas or in areas about to be treated.

IMPORTANT: The effect of swallowing Paraquat is more severe than the effect from skin contact or from inhaling spray mist. This product should not cause injury if used according to label instructions. Follow the label as if your life depends on it.

V. PRODUCTS SUBJECT TO THIS STANDARD

All products containing one or more of the pesticides identified in Section II.A. are subject to certain requirements for data submission or changes in composition, labeling or packaging of the product. The applicable requirements depend on whether the product is a manufacturing or end use product and whether the pesticide is the sole active ingredient or one of multiple active ingredients.

Products are subject to this Registration Standard as follows:

A. Manufacturing use products containing this pesticide as the sole active ingredient are subject to:

1. The restrictions (if any) upon use, composition, or packaging listed in Section IV, if they pertain to the manufacturing use product.

2. The data requirements listed in Tables A and B[2]

3. The labeling requirements specified for manufacturing use products in Section IV.

4. Administrative requirements (application forms, Confidential Statement of Formula, data compensation provisions) associated with reregistration.

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[2] Data requirements are listed in the three Tables in Appendix I of this Registration Standard. The Guide to Tables in that Appendix explains how to read the Tables.

Table A lists generic data requirements applicable to all products containing the pesticide subject to this Registration Standard. Table B lists product-specific data applicable to manufacturing use products. The data in Tables A and B need not be submitted by a producer who is eligible for the formulator's exemption for that active ingredient.

Table C lists product-specific data applicable to end use products. The Agency has decided that, in most cases, it will not require the submission of product-specific data for end use products at this time. Therefore most Registration Standards do not contain a Table C.

B. Manufacturing use products containing this pesticide as one of multiple active ingredients are subject to:

The data requirements listed in Table A.

C. End use products containing this pesticide as the sole active ingredient are subject to:

1. The restrictions (if any) upon use, composition, or packaging listed in Section IV if they pertain to the end use product.

2. If eligible for the formulator's exemption[3], the data requirements listed in Table C.

3. If not eligible for the formulator's exemption, the data requirements listed in Table A and the data requirements listed in Table C.

4. The labeling requirements specified for end use products in Section IV.

D. End use products containing this pesticide as one of multiple active ingredients are subject to:

a. If not eligible for the formulator's exemption, the date requirements listed in Tables A and C.

b. If eligible for the formulator's exemption, the data requirements listed in Table C.

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[3] If you purchase from another producer and use as the source of your active ingredient only EPA-registered products, you are eligible for the formulator's exemption for generic data concerning that active ingredient (Table A) and product-specific data for the registered manufacturing use product you purchase (Table B).

Two circumstances nullify this exemption:

1) If you change sources of active ingredient to an unregistered product, formulate your own active ingredient, or acquire your active ingredient from a firm with ownership in common with yours, you individually lose the exemption and become subject to the data requirements in Table A.

2) If no producer subject to the generic data requirements in Table A agrees to submit the required data, all end use producers lose the exemption, and become subject to those data requirements.

VI. REQUIREMENT FOR SUBMISSION OF GENERIC DATA

This portion of the Registration Standard is a notice issued under the authority of FIFRA sec. 3(c)(2)(B). It refers to the data listed in Table A, which are required to be submitted by registrants to maintain in effect the registration of products containing this active ingredient.[4]

A. What are generic data?

Generic data pertain to the properties or effects of a particular active ingredient. Such data are relevant to an evaluation of all products containing that active ingredient regardless of whether the product contains other ingredients. (unless the product bears labeling that would make the data requirement inapplicable).

Generic data may also be data on a "typical formulation" of a product. "Typical formulation" testing is often required for ecological effects studies and applies to all products having that formulation type. These are classed as generic data, and are contained in Table A.

B. Who must submit generic data?

All current registrants are responsible for submitting generic data in response to a data request under FIFRA sec. 3(c)(2)(B) (DCI Notice). EPA has decided, however, not to require a registrant who qualifies for the formulator's exemption (FIFRA sec. 3(c)(2)(D) and § 152.85) to submit generic data in response to a DCI notice if the registrant who supplies the active ingredient in his product is complying with the data request.

If you are not now eligible for a formulator's exemption, you may qualify for one if you change your source of supply to a registered source that does not share ownership in common with your firm. If you choose to change sources of supply, the Confidential Statement of Formula must identify the new source(s) and you must submit a Formulator's Exemption Statement form.

If you apply for a new registration for products containing this active ingredient after the issuance of this Registration Standard, you will be required to submit or cite generic data relevant to the uses of your product if, at the time

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[4] Registrations granted after issuance of this Standard will be conditioned upon submission or citation of the data listed in this Registration Standard.

the application is submitted, the data have been submitted to the Agency by current registrants. If the required data have not yet been submitted, any new registration will be conditioned upon the new registrant's submission or citation of the required data not later than the date upon which current registrants of similar products are required to provide such data. See FIFRA sec. 3(c)(7)(A). If you thereafter fail to comply with the condition of that registration to provide data, the registration may be cancelled (FIFRA sec. 6(e)).

C. What generic data must be submitted?

You may determine which generic data you must submit by consulting Table A. That table lists the generic data needed to evaluate current uses of all products containing this active ingredient, the uses for which such data are required, and the dates by which the data must be submitted to the Agency.

D. How to comply with DCI requirements.

Within 90 days of your receipt of this Registration Standard, you must submit to EPA a completed copy of the form entitled "FIFRA Section 3(c)(2)(B) Summary Sheet" (EPA Form 8580-1, enclosed) for each of your products. On that form you must state which of the following six methods you will use to comply with the DCI requirements:

1. You will submit the data, and either--

(a) Submit the existing data that you believe will satisfy the data requirements, or

(b) State that you will secure the data or have made a contract to have any necessary studies completed within the applicable time period.

2. You have entered into an agreement with one or more registrants to jointly develop (or share in the cost of developing) the data, but will not be submitting the data yourself. If you use this method, you must state who will submit the data on which you will rely. You must also provide EPA with documentary evidence that an agreement has been formed which allows you to rely upon the data to be submitted. Such evidence may be: (1) your letter offering to join in an agreement and the other registrant's acceptance of your offer, (2) a written statement by the parties that an agreement exists, or (3) a written statement by the person who will be submitting the data that you may rely upon its submission. The Agency will also require adequate assurance that the person whom you state will provide the data is taking appropriate steps to secure it. The agreement to produce the data need not specify all of the terms of the final arrangement between the parties or a mechanism to resolve the terms.

3. You have attempted to enter into an agreement to jointly develop data, but no other registrant has accepted your offer. You request that EPA not suspend your registration for non-compliance with the DCI. EPA has determined that, as a general policy, it will not suspend the registration of a product when the registrant has in good faith sought and continues to seek to enter into a data development/cost sharing program, but the other registrants developing the data have refused to accept its offer. [If your offer is accepted, you may qualify for Option 2 above by entering into an agreement to supply the data.]

In order to qualify for this method, you must:

1. File with EPA a completed "Certification of Attempt to Enter into an Agreement with other Registrants for Development of Data" (EPA Form 8580-6, enclosed).

2. Provide us with a copy of your offer to the other registrant and proof of the other registrant's receipt of your offer (such as a certified mail receipt). Your offer must, at a minimum, contain the following language or its equivalent:

> [Your company name] offers to share in the burden of producing the data required pursuant to FIFRA sec. 3(c)(2)(B) in the [name of active ingredient] Registration Standard upon terms to be agreed or failing agreement to be bound by binding arbitration as provided by FIFRA section 3(c)(2)(B)(iii).

The remainder of your offer may not in any way attempt to limit this commitment. If the other registrant to whom your offer is made does not accept your offer, and if the other registrant informs us on a DCI Summary Sheet that he will develop and submit the data required under the DCI, then you may qualify for this option. In order for you to avoid suspension under this method, you may not later withdraw or limit your offer to share in the burden of developing the data. In addition, the other registrant must fulfill its commitment to develop and submit the data.

4. You request a waiver of the data requirement. If you believe that a data requirement does not (or should not) apply to your product or its uses, you must provide EPA with a statement of the reasons why you believe this is so. Your statement must address the specific composition or use factors that lead you to believe that a requirement does not apply. Since the Agency has carefully considered the composition and uses of pesticide products in determining that a data requirement applies, EPA does not anticipate that many waivers will be granted. A request for waiver does not automatically extend the timeframes for developing required data, and if your waiver request is denied, your registration may be suspended if you fail to submit the data.

5. You request that EPA amend your registration by deleting the uses for which the data are needed. You are not required to submit data for uses which are no longer on your label.

6. You request voluntary cancellation of the registration of your product(s) for which the data are needed.

E. Procedures for requesting a change in testing protocol.

If you will generate the required data and plan to use test procedures which deviate from (or are not specified in) either EPA's Pesticide Assessment Guidelines or the Reports of Expert Groups to the Chemicals Group, Organization for Economic Cooperation and Development (OECD) Chemicals Testing Programme, you must submit for EPA approval the protocols you propose to use.

You should submit your protocols before beginning testing and await EPA approval, because the Agency will not ordinarily accept as sufficient studies using unapproved protocols. A request for protocol approval will not automatically extend the timeframe for submission of the data, nor will extensions generally be given to conduct studies due to submittal of inappropriate protocols.

F. Procedures for requesting extensions of time.

If you plan to submit the data, and think that you will need more time to generate the data than is allowed by EPA's schedule, you may submit a request for an extension of time. The extension request must be submitted in writing to the Product Manager listed at the end of this section and must be made before the deadline for response. EPA will view failure to request an extension before the response deadline as a waiver of any future claim that there was insufficient time to submit the data. While EPA considers your request, you must strive to meet the deadline for submitting the data.

The extension request should state the reasons why you believe that an extension is necessary and the steps you have taken to meet the testing deadline. Time extensions normally will not be granted due to problems with laboratory capacity or adequacy of funding, since the Agency believes that with proper planning these can be overcome. Time extensions may be considered when joint data development is planned, or when the Agency must approve a new or modified protocol before the study can be begun.

A request for an extension does not automatically extend the timeframe for submission of the data. If EPA denies your request for a time extension and you do not submit the data as requested, EPA may begin proceedings to suspend the registrations of your products.

G. Existing stocks provision upon suspension or cancellation.

EPA will permit continued sale and distribution of existing stocks of a pesticide product which has been suspended or cancelled if doing so would be consistent with the purposes of the Act. However, the Agency has determined that if a registration is suspended for failure to respond to a DCI request under FIFRA sec. 3(c)(2)(B), an existing stocks provision is not consistent with the Act. Accordingly, the Agency does not anticipate granting permission to sell or distribute existing stocks of suspended product except in rare circumstances. If you believe that your product will be suspended or cancelled and that an existing stocks provision should be granted, you have the burden of clearly demonstrating to EPA that granting such permission would be consistent with the Act. The following information must be included in any request for an existing stocks provision:

1. Explanation of why an existing stocks provision is necessary, including a statement of the quantity of existing stocks and your estimate of the time required for their sale or distribution; and

2. Demonstration that such a provision would be consistent with the provisions of FIFRA.

VII. REQUIREMENT FOR SUBMISSION OF PRODUCT-SPECIFIC DATA

Under its DCI authority, EPA has determined that certain product-specific data are required to maintain your registrations in effect. Product-specific data are derived from testing using a specific formulated product, and, unlike generic data, generally support only the registration of that product. All such data must be submitted by the dates specified in this Registration Standard.

If you have a manufacturing use product, these data are listed in Table B. If you have an end use product, the data are listed in Table C. As noted earlier, the Agency has decided that it will not routinely require product-specific data for end use products at this time. Therefore, Table C may not be contained in this Registration Standard; if there is no Table C, you are not required to submit the data at this time.

In order to comply with the product specific data requirements, you must follow the same procedures as for generic data. See Section IV.D, E, F, and G. You should note, however, that product chemistry data are required for every product, and the only acceptable responses are options IV.D.1. (submit data) or IV.D.6.(cancellation of registration).

Failure to comply with the product-specific data requirements for your products will result in suspension of the product's registration.

VIII. REQUIREMENT FOR SUBMISSION OF REVISED LABELING

FIFRA requires each product to be labeled with accurate, complete and sufficient instructions and precautions, reflecting the Agency's assessment of the data supporting the product and its uses. General labeling requirements are set out in 40 CFR 162.10 (see Appendix II - LABELING and SUMMARY). In addition, labeling requirements specific to products containing this pesticide are specified in Section IV.D of this Registration Standard. Applications submitted in response to this notice must include draft labeling for Agency review.

If you fail to submit revised labeling as required, which complies with 40 CFR 162.10 and the specific instructions in Section IV.D., EPA may issue a Notice of Intent to Cancel the registration of your product under FIFRA sec. 6(b)(1).

IX. INSTRUCTIONS FOR SUBMISSION

A. Manufacturing Products (MUPs) containing Paraquat Dichloride as sole active ingredient.

1. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division for each product subject to this Registration Standard:

a. The "FIFRA Section 3(c)(2)(B) Summary Sheet" (EPA Form 8580-1), with appropriate attachments.[5]

b. Confidential Statement of Formula (EPA Form 8570-4).

c. Formulator's Exemption Statement (EPA Form).

d. Product Specific Data Report (EPA Form 8580-4).

e. Evidence of compliance with data compensation requirements of FIFRA sec. 3(c)(1)(D). Refer to 40 CFR 152.80-152.99.

2. Within 12 months from receipt of this document you must submit to the Product Manager:

a. Two copies of any required product-specific data (See Table B or C).

b. Three copies of draft labeling, including the container label and any associated supplemental labeling. Labeling should be either typewritten text on 8-1/2 x 11 inch paper or a mockup of the labeling suitable for storage in 8-1/2 x 11 files. The draft label must indicate the intended colors of the final label, clear indication of the front panel of the label, and the intended type sizes of the text.

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[5] If on the Summary Sheet, you commit to develop the data, present arguments that a data requirement is not applicable or should be waived, or submit protocols or modified protocols for Agency review, you must submit a copy of the Summary Sheet (and any supporting information) to the Office of Compliance Monitoring, which will be monitoring the data generated in response to this notice. This submission is in addition to responding to the Product Manager, and should be submitted to the Office of Compliance Monitoring at the address given at the end of this section. (Actual studies are not to be submitted to the Office of Compliance Monitoring.)

3. Within the times set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. If for any reason any test is delayed or aborted so that the agreed schedule cannot be met, immediately notify the Product Manager and the Office of Compliance Monitoring of the problem, the reasons for the problem, and your proposed course of action.

B. Manufacturing Use Products containing Paraquat Dichloride in combination with other active ingredients.

1. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division:

a. FIFRA sec. 3(c)(2)(B) Summary Sheet, with appropriate attachments[5] (EPA Form 8580-1).

b. Confidential Statement of Formula (EPA Form 8570-4)

c. Formulator's Exemption Statement (EPA Form), if applicable.

2. Within the time frames set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. If for any reason any test is delayed or aborted so that the agreed schedule cannot be met, immediately notify the Product Manager and the Office of Compliance Monitoring of the problem, the reasons for the problem, and your proposed course of action.

C. End Use Products containing Paraquat Dichloride alone or in combination with other active ingredients.

1. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division:

a. FIFRA Section 3(c)(2)(B) Summary Sheet, with appropriate attachments[5] (EPA Form 8580-1).

b. Confidential Statement of Formula (EPA Form 8570-4).

c. Formulator's Exemption Statement (EPA Form), if applicable.

d. Product Specific Data Report (EPA Form 8580-4), if Table C lists required product-specific data.

2. Within 12 months from receipt of this document you must submit to the Product Manager:

a. Two copies of any product-specific data, if required by Table C.

b. Three copies of draft labeling, including the container label and any associated supplemental labeling. Labeling should be either typewritten text on 8-1/2 x 11 inch paper or a mockup of the labeling suitable for storage in 8-1/2 x 11 files. The draft labeling must indicate the intended colors of the final label, clear indication of the front panel of the label, and the intended type sizes of the text. End use product labeling must comply specifically with the instructions in Section IV (Regulatory Position and Rationale).

D. Intrastate Products containing (~~name of pesticide~~ paraquat dichloride) either as sole active ingredient or in combination with other active ingredients.

These products are being called in for full Federal registration. Producers of these products are being sent a letter instructing them how to submit an application for registration.

E. Addresses

The required information must be submitted to the following address:

Robert J. Taylor (PM-25)
Registration Division (TS-767C)
Office of Pesticide Programs
Environmental Protection Agency
401 M St., SW
Washington, D.C. 20460

The address for submissions to the Office of Compliance Monitoring is:

Laboratory Data Integrity Program
Office of Compliance Monitoring (EN-342)
Environmental Protection Agency
401 M St., SW
Washington, D.C. 20460.

I. DATA APPENDICES

Guide to Tables

Table A

Table B

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE TECHNICAL

Guideline Citation and Name of Test	Test Substance[1/]	Guidelines Status[1/]	Are Data Required Yes	Are Data Required No	Footnote Number	Data Must Be Submitted Within Timeframe Listed Below[2/]
§158.120 Product Chemistry						
Product Identity						
61-1 - Product Identity and Disclosure of Ingredients	TGAI	R	[ ]	[X]		
61-2 - Description of Beginning Materials and Manufacturing Process	TGAI	R	[X]	[ ]	3, 4	6 Months
61-3 - Discussion of Formation of Impurities	TGAI	R	[X]	[ ]	5	6 Months
Analysis and Certification of Product Ingredients						
62-1 - Preliminary Analysis	TGAI	CR	[X]	[ ]	6	12 Months
Physical and Chemical Characteristics						
63-2 - Color	TGAI	R	[X]	[ ]		6 Months
63-3 - Physical State	TGAI	R	[X]	[ ]		6 Months
63-4 - Odor	TGAI	R	[X]	[ ]		6 Months
63-5 - Melting Point	TGAI	R	[X]	[ ]		6 Months
63-6 - Boiling Point	TGAI	R	[X]	[ ]		6 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE TECHNICAL

Guideline Citation and Name of Test	Test Substance[1]/	Guidelines Status[1]/	Are Data Required Yes	Are Data Required No	Footnote Number	Data Must Be Submitted Within Timeframe Listed Below 2/
§158.120 Product Chemistry (cont'd)						
Physical and Chemical Characteristics (cont'd)						
63-7 - Density, Bulk Density, or Specific Gravity	TGAI	R	[X]	[ ]		6 Months
63-8 - Solubility	TGAI or PAI	R	[X]	[ ]		6 Months
63-9 - Vapor Pressure	PAI	R	[ ]	[X]		
63-10 - Dissociation Constant	PAI	R	[ ]	[X]		
63-11 - Octanol/Water Partition Coefficient	PAI	R	[ ]	[X]		
63-12 - pH	TGAI	R	[X]	[ ]		6 Months
63-13 - Stability	TGAI	R	[X]	[ ]		6 Months
Other Requirements						
64-1 - Submittal of Samples	TGAI, PAI	CR	[ ]	[X]		

1/ TGAI = Technical Grade of the Active Ingredient; PAI = Pure Active Ingredient; R = Required; CR = Conditionally Required.

2/ Data must be submitted within the indicated timeframe based on the date of the Guidance Document.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE TECHNICAL

158.120 Product Chemistry (cont'd)

/ Details of the manufacturing process including the relative amounts of beginning materials; a description of the equipment used to produce the product reaction conditions; the duration of each step of the process; purification procedures; and quality control measures are needed.

/ The name and address of the manufacturer, producer, and supplier of each beginning material used to manufacture technical are needed. Also, a copy of all available technical specifications, data sheets, and other documents in which the manufacturer, producer, or supplier of the beginning material describes its composition and properties must be submitted.

/ A discussion of each impurity believed to be present at $\geq$ 0.1%, based on knowledge of beginning materials, possible chemical reactions, and any contamination present.

/ Five or more representive samples must be analyzed for the amount of active ingredient and each impurity present at $\geq$ 0.1% (w/w) using valid analytical methods.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§150.125 Residue Chemistry				
171-2 - Chemical Identity	TGAI	Yes	00113684 00113715	No
171-3 - Directions for Use	--	Yes	Registered Label	No
171-4 - Nature of Residue (Metabolism)				
- Plants	PAIRA	Yes	00065602 00091378 00065604 00114411 00091365 00114414 00091366	No
- Livestock	PAIRA and Plant Metabolites	Yes	00028596 00089748 00028597 00114414 00028598 00114422 00028599 00117783	No[3/]
171-4 - Residue Analytical Method				
- Plant residues	TGAI and Metabolites	Partially	00025269 00114421 00030476 00114446 00032141 00114453 00032240 00114465 00037058 00114466 00090400 00138258 00112663 GS0262-01 00114411 GS0262-02	Yes[4/] 24 Months
- Animal residues	TGAI and Metabolites	Partially	00036306 00114421 00037058 00114422 00112663	Yes[5/] 24 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

a Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation		Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
8.125 Residue Chemistry (cont'd)					
71-4 - Storage Stability Data	PAI	Partially	00037057	00113702	Yes[6/] 15 Months
171-4 - Magnitude of Residue--Residue Studies for Each Food Use					
- Root and Tuber Vegetables Group[7/]					
- Carrots	TEP	Yes	00030476		No
- Potatoes	TEP	Yes	00033612 00091376 00105060		No
- Potato chips	EP	No			Yes[8/] 24 Months
- Potato granules	EP	No			Yes[8/] 24 Months
- Potato (dried)	EP	No			Yes[8/] 24 Months
- Sugar beet roots	TEP	Partially	00113709		Yes[9/] 24 Months
- Processed sugar beets (dehydrated pulp, molasses, and sugar)	EP	No			Yes[10/] 24 Months
- Turnip roots	TEP	Yes	00030476		No
- Leaves of Root and Tuber Vegetables Group[11/]					
- Sugar beet tops	TEP	Partially	00113709		Yes[12/] 24 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)				
- Turnip tops	TEP	Partially	00030476	Yes[13/] 24 Months
- Bulb Vegetables Group[14/]				
- Onions	TEP	Yes	00113600 00136330	No
- Leafy Vegetables (except Brassica vegetables) Group[15/]				
- Lettuce	TEP	Yes	00114474 00139741	No
- Rhubarb	TEP	Yes	00031863	No
- Brassica Leafy Vegetables Group[16/]				
- Broccoli	TEP	Yes	00103245	No
- Cabbage	TEP	Yes	00030476	No
- Cauliflower	TEP	Yes	00030476	No
- Chinese Cabbage	TEP	Yes	00030476	No
- Collards	TEP	Yes	00030476	No
- Legume Vegetables Group[17/]				
- Beans (succulent, lima, and snap)	TEP	Yes	00030476 00033223	No

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation		Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)					
- Guar	TEP	Yes	00114420		No
- Peas (succulent)	TEP	Yes	00030476		No
- Soybeans	TEP	Yes	00015768	00025268	No[18/]
			00015769	00030676	
			00015770	00031742	
			00015771	00032427	
			00015772	00033530	
			00015773	00034112	
			00015774	00098579	
			00015775	00109728	
				00114446	
- Soybean hulls	EP	Yes	00015768	00030676	No[19/]
			00015769	00031742	
			00015770	00032427	
			00015771	00033530	
			00015772	00034112	
			00015773	00098579	
			00015774	00109728	
			00015775	00114446	
			00025268		
- Foliage of Legume Vegetable Group[20/]					
- Bean vines and hay	TEP	Partially	00030476		Yes[21/] 24 Months
			00033223		
- Pea vines and hay	TEP	Partially	00030476		Yes[22/] 24 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation		Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
158.125 Residue Chemistry (cont'd)					
- Soybean forage and hay	TEP	Partially	00015768 00015769 00015770 00015771 00015772 00015773 00015774 00015775	00025268 00030676 00032427 00033530 00034112 00098579 00109728	Yes[23/] 24 Months
- Fruiting Vegetables (except cucurbits) Group[24/]	TEP	Yes	00030476 00033223 00059596		No
- Processed tomatoes (wet and dry pomace, puree, catsup, and juice)	EP	No			Yes[25/] 24 Months
- Cucurbit Vegetables Group	TEP	Partially	00027988 00030476 00033223		Yes[26/] 24 Months
- Citrus Fruits Group	TEP	Yes	00023329 00027298 00033695 00035665	00070779 00070780 00113821	No[27/]
- Pome Fruits Group[28/]					
- Apples	TEP	Yes	00033695 00035664 00070779 00113821		No

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation		Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
150.125 Residue Chemistry (cont'd)					
- Pears	TEP	Yes	00033695 00035664 00113821		No
- Stone Fruits Group[29/]					
- Apricots	TEP	Yes	00035663 00113821		No
- Cherries	TEP	Yes	00023329 00027965	00033695 00113821	No
- Nectarines	TEP	Yes	00035663 00113821		No
- Peaches	TEP	Yes	00023329 00023883 00027695 00033035 00033694 00033695	00035663 00070780 00070784 00113709 00113821	No
- Plums	TEP	Yes	00023329 00033035 00033695	00035663 00113709 00114436	No
- Dried prunes	EP	No			Yes[30/] 24 Months
- Small Fruits and Berries Group[31/]	TEP	Yes	00023329 00023883 00027968 00033695 00070780	00113709 00113821 00114411 00138258	No

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation		Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)					
- Tree Nuts Group[32/]	TEP	Yes	00023329	00035666	No
			00023883	00070780	
			00027971	00113821	
			00030929	GS0262-004	
			00033695		
- Cereal Grains Group[33/]					
- Barley grain	TEP	Yes	00114411		No
- Corn, field and fresh (including sweet kernels, plus cob with husks removed)	TEP	Partially	00015751	00023512	Yes[34/] 24 Months
			00015752	00030647	
			00015955	00030683	
			00016441	00031744	
			00016442	00033223	
			00016444	00093182	
			00016445	00114426	
			00023131		
- Corn milled products	EP	Partially	00015751	00023512	Yes[35/] 24 Months
			00015752	00030647	
			00015955	00030683	
			00016441	00031744	
			00016442	00033233	
			00016444	00093182	
			00016445	00114426	
			00023131		
- Oat Grain	TEP	Yes	00114411		No
- Oat milled products	EP	No			No[36/]

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation		Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)					
- Rice Grain[37/]					
- Rye Grain	TEP	No			Yes[38/] 24 Months
- Sorghum Grain	TEP	Yes	00023131 00026963 00027178 00033223	00070872 00113709 00114421	No
- Sorghum milling fractions (except flour)	EP	Partially	00114421		Yes[39/] 24 Months
- Wheat Grain	TEP	Yes	00027311 00113693 00114411 00140828		No
- Wheat milled fractions	EP	No			Yes[40/] 24 Months
- Forage, Fodder, Hay, and Straw of Ceral Grains Group[41/]					
- Barley hay and straw	TEP	Partially	00114411		No[42/]
- Corn forage, silage, and fodder	TEP	Partially	00015751 00015752 00015955 00016441 00016442 00016444 00016445 00023131 00023512	00027972 00027973 00030647 00030683 00031519 00031744 00033208 00033223 00093182	Yes[43/] 24 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation		Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)					
- Oat hay and straw	TEP	Partially	00114411		No[44/]
- Rice straw[45/]					
- Sorghum forage, fodder, silage, and hay	TEP	Partially	00026963 00027178 00070872		Yes[46/] 24 Months
- Wheat hay, and straw	TEP	Partially	00027311 00114411		Yes[47/] 24 Months
- Grass Forage, Fodder, and Hay Group	TEP	Partially	00033233 00058773 00114424	00114466 00117783	Yes[48/] 24 Months
- Nongrass Animal Feeds (Forage, Fodder, Straw, and Hay) Group[19/]					
- Alfalfa	TEP	Partially	00032140 00058774 00105061 00114405 00114421 00114424	00114464 00114465 00114467 00126671 00128624	Yes[50/] 24 Months
- Alfalfa meal	EP	No			Yes[51/] 24 Months
- Birdsfoot Trefoil	TEP	Partially	00114424		Yes[52/] 24 Months
- Clover	TEP	Partially	00114424 00117783		Yes[53/] 24 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)				
- Crown Vetch[54/]				
- Miscellaneous Commodities				
- Acerola	TEP	Yes	00128221	No
- Asparagus	TEP	Yes	00033532 00113675	No
- Avocados	TEP	Yes	GS0262-006	No[55/]
- Bananas	TEP	Yes	00113709 00139733	No
- Coffee beans	TEP	Yes	00139734	No
- Processed products (roasted beans and instant coffee)	EP	No		Yes[56/] 24 Months
- Cottonseed	TEP	Yes	00031739 00033612 00091372	No
- Cotton forage	TEP	No		Yes[57/] 24 Months
- Figs	TEP	Partially	00139735	Yes[58/] 24 Months
- Dried figs	EP	No		Yes[59/] 24 Months
- Guava	TEP	Yes	00114419	No[60/]

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)				
- Hops	TEP	Yes	00113606	No
- Hop Vines	TEP	Yes	00113606	No[61/]
- Spent Hops	EP	No		Yes[62/] 24 Months
- Hops (dried)	EP	Yes	00113606	No[63/]
- Kiwifruit	TEP	Yes	00088195	No
- Mint hay	TEP	Yes	00137859	No
- Spent Mint Hay	EP	Yes	00137859	No
- Olives	TEP	Yes	00139737	No[64/]
- Olive Oil	EP	No		Yes[65/] 24 Months
- Papaya	TEP	Yes	00033695	No
- Passion Fruit	TEP	Yes	00037056	No
- Pineapple	TEP	Yes	00114411	No[66/]
- Pineapple Forage	TEP	Yes	00114411	No[67/]
- Pineapple Juice	EP	No		Yes[68/]
- Pineapple Bran	EP	No		Yes[68/]

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)				
- Pistachios	TEP	Yes	00027550 00113699 00035660	No[69/]
- Safflower Seed	TEP	Yes	00114411	No
- Sugarcane	TEP	Yes	00114411 00114469	No
- Sugarcane Forage	TEP	No		Yes[70/] 24 Months
- Sugarcane bagasse	EP	Yes	00114411 00114469	No[71/]
- Sugarcane juice	EP	Yes	00114411 00114469	No[71/]
- Sugarcane molasses refined sugar	EP	No		Yes[72/] 24 Months
- Sunflower Seed	TEP	Yes	00106570 00114422	No
- Sunflower meal	EP	Yes	00106570	No[73/]
- Sunflower seed hulls	EP	Yes	00106570	No[74/]
171-4 - Magnitude of Residues in Meat, Milk, Poultry, and Eggs				
- Milk	TGAI or Plant Metabolites	Yes	00090978 00114414 00114422 00117783	No

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.125 Residue Chemistry (cont'd)				
- Meat, Fat, and Meat Byproducts of Pigs	TGAI or Plant Metabolites	Yes	00036305 00114414 00114422 00117783	No
- Meat and Fat of Cattle	TGAI or Plant Metabolites	Yes	00090978 00114414 00114422 00117783	No
- Meat Byproducts of Cattle		No		Yes[75/] 18 Months
- Meat, Fat, and Meat Byproducts of Poultry	TGAI or Plant Metabolites	No		Yes[76/] 18 Months
- Eggs	TGAI or Plant Metabolites	Partially	00038503	Yes[76/] 18 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§158.125 Residue Chemistry - (cont'd)

1/ Composition: TGAI = Technical grade of the active ingredient; PAIRA = Pure active ingredient, radiolabeled; TEP = Typical end-use product; EP = End-use product.

2/ Data must be submitted within the indicated timeframe, based on the date of the Guidance Document.

3/ If the toxicology review concludes that any of the metabolites, occurring in animals along with paraquat, are of concern, additional methodology as well as revision of the tolerance regulation for meat, milk, poultry, and eggs will be required.

4/ Current methodology is acceptable for obtaining residue data but is only minimally adequate for enforcement/monitoring purposes due to the fact that it is too long and cumbersome. The length of procedure is caused by long digestion times, use of ion-exchange columns, and the fact that the determination step is colorimetric. New methodology is required which allows faster determination of paraquat in RAC's and food.

5/ If review of the toxicology information conclude that metabolites occurring in animals are of toxicological significance, then additional methodology including validation data and sample chromatograms, as well as completion of a successful method trial for the metabolites of concern, will be needed.

6/ No data are available concerning the storage stability of paraquat residues in animal commodities. The following data are required:

- o Data reflecting the stability of paraquat residues of concern in animal tissues stored at freezing temperatures for time intervals approximately those of the samples of animal tissues and products from treated animals used to determine the magnitude of the residue.
- o All residue data requested in this Standard must be accompanied by data regarding storage length and conditions of storage of samples analyzed. This data must be accompanied by depicting the stability of residues under the conditions and for the time intervals specified.

7/ A crop group tolerance is not appropriate at the present time for the following reasons:

- o No data were submitted for radishes, a representative commodity of this group.
- o The established tolerances for commodities of this group differ by a factor of more than 5X, the tolerances on carrots and turnip roots are 0.05 ppm, and the tolerances on sugar beet roots and potato tubers are 0.5 ppm.
- o The registered uses for the representative commodities differ significantly, preharvest desiccation applications are permitted on potatoes but not in carrots or sugar beets or turnips; the maximum rate of treatment for the preplant/preemergence application on potatoes is 0.5 cation/A while on carrots and sugar beets it is 1 lb cation/A.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§150.125 Residue Chemistry - (cont'd)

3/ Data is required depicting residues in granules, chips, and dried potatoes processed from tubers bearing measurable weathered residues. If residues are found to concentrate upon processing, appropriate food/feed additive tolerances must be proposed.

)/ Data is required depicting residues in or on sugar beet roots resulting from a preemergence application at 1 lb cation/A. Tests must be conducted in CA, ID, MN, ND.

)/ Data is required depicting residues in the processed products of sugar beets (dehydrated pulp, molasses, and sugar) from beets bearing measurable weathered residues. An exaggerated rate of application may be necessary to obtain measurable residues in the raw agricultural commodity. If residues are found to concentrate in the processed products, then appropriate food/feed additive tolerances must be proposed.

/ A crop group tolerance is inappropriate at the present time for the following reasons:
- o The established tolerances for the representative commodities of this group differ by more than a factor of 5, the tolerance for sugar beet tops is 0.5 ppm, and the tolerance for turnip tops is 0.05 ppm.
- o Additional data are required to support existing tolerances for paraquat residues in or on sugar beet tops.

/ Data is required depicting residues in or on sugar beet tops resulting from a preemergence application a 1 lb cation/A. Tests must be conducted in MN, CA, ID, and ND.

)/ Data is required depicting residues in or on turnip tops resulting from a preemergence application of the 2 lb/gal soluble concentrate (SC/L) formulation at 1 lb cation/A. Test must be conducted in AL or GA, AZ or CA, FL, TN, and TX.

)/ A group tolerance is not appropriate at the present time because data on representative commodities other than onions are not available.

)/ A group tolerance is not appropriate at the present time because data on representative commodities other than lettuce are not available.

5/ Adequate data are available for the representative commodities broccoli and cabbage. Adequate data are also available for collards, a commodity considered a suitable substitute for the representative commodity mustard greens. Since the registered usage on these crops is identical, a crop group tolerance of 0.05 ppm would be acceptable.

7/ A crop group tolerance is not appropriate at the present time for the following reasons:
- o There are no established tolerances for dry beans and peas, a tolerance is pending for dry beans.
- o The use directions differ significantly among commodities: preplant/preemergence applications are not permitted on greens, postemergence directed spray applications are permitted only on guar and soybeans, but the registered rate on guar is 2X the registered rate on soybeans.
- o Data in support of a proposed tolerance on pigeon peas are currently under review.

)/ The available data do not support the established 0.05 ppm tolerance for paraquat residues in or on soybeans following registered preharvest desiccation use of the paraquat formulations. Based on the submitted data it is recommended that the tolerance for paraquat residues be increased to 0.25 ppm.

)/ The available data demonstrate that residues may concentrate in the processed commodity hulls by a factor 11.2X, therefore, based on a recommended tolerance of 0.25 ppm, a food/feed additive tolerance of 3.0 ppm must be proposed for residues in hulls.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§158.125 Residue Chemistry - (cont'd)

20/ A crop group tolerance is inappropriate at the present time for the following reasons:
- o Additional data are required to support existing tolerances for paraquat residues in or on bean hay, pea hay, and soybean forage.
- o Use directions differ significantly among commodities; postemergence directed spray and harvested aid applications are permitted only on soybeans.

21/ Data are sufficient to ascertain the adequacy of the estabished tolerance of residues of paraquat cation in or on bean forage, but not the established tolerances for residues in or on bean hay because no data were submitted concerning bean hay. The 40 CFR entry "bean forage" must be amended to "bean vines." The following data on bean hay are required.
- o Data depicting residues of paraquat cation in or on bean hay resulting from a single preemergence ground application of the 2 lb/gal SC/L formulation at 1 lb cation/A. Tests must be conducted in WI, NY, OR, and FL.

22/ The available data are adequate to support the established tolerance for residues of paraquat in or on pea forage. The 40 CFR entry of "pea forage" should be amended to the appropriate commodity definition "pea vines." No data were submitted concerning in or on pea hay.
- o Data depicting residues in or on pea hay resulting from a single preemergence application of the 2 lb/gal SC/L formulations at 1 lb cation/A. Test must be conducted in WI, WA, and MN.

23/ The following data are required:
- o Data depicting residue in or on soybean forage and hay treated preemergence with the 2 lb/gal SC/L formulation at 1 lb cation/A. Tests must reflect both ground and aerial applications. Forage and hay must contain ~75% and 20% moisture, respectively, at the time of analysis. Tests must be conducted in IL, IA, IN, MO, MN, OH, and MS.
- o Data depicting residues of concern in or on soybean forage (harvested from both indeterminate and determinate varieties) collected on the day of and 5, 10, and 15 days following a preharvest desiccation with the 2 lb/gal SC/L formulation at 2 lb cation/A using ground and aerial equipment. Determinate varieties must be treated when soybeans are fully developed and indeterminate varieties must be treated when seed moisture is < 30%. Tests must be conducted in the major soybean production areas identified above.
- o Appropriate tolerances for paraquat residues in or on soybean hay and straw must be proposed and the existing tolerances for residues in or on soybean forage must be revised based on the above-requested data.

24/ The data are sufficient to support the established tolerance for residues in or on the members of the fruiting vegetables (except cucurbits) group.

25/ Data is required depicting residues in the commodities wet and dry pomace, puree, catsup, and juice processed from tomatoes bearing measurable weathered residues. If residues are found to concentrate in any of the processed commodities, appropriate food/feed additive tolerances must be proposed.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

158.125 Residue Chemistry - (cont'd)

5/ Data is required depicting residues in or on the representative commodities of the cucurbit vegetables group; cucumbers, melons (cantaloupe or muskmelon), and summer squash treated with 2 lb/gal SL/C formulation preplant at 1 lb cation/A; preemergence at 1 lb cation/A; and with multiple postemergence directed spray applications at 0.5 lb cation/A up to a day prior to harvest. Samples must be harvested 24 hours after the last postemergence directed spray application. Tests must be conducted in CA. Alternatively, the registrant may request cancellation of the SLN registration held by CA (CA-830054).

7/ The data are adequate to support the established tolerances for residues of paraquat in or on citrus fruits group. No additional data are required. However, the grazing restrictions must be expanded to prohibit the feeding of cover crops grown in treated areas to livestock.

8/ The data for apples and pears are adequate to support the established 0.05 ppm tolerances for residues of paraquat cation in or on these commodities. Since the registered uses for paraquat formulations on apples and pears are identical, the crop group tolerance of 0.05 ppm would be acceptable for all members of the pome fruits group provided that the grazing restriction for all pome fruits is expanded to prohibit the feeding of cover crops grown in treated areas to livestock.

9/ The data are adequate to support the established tolerances for paraquat on the representative commodities peaches, cherries, and plums. Since registered usage on these crops is identical, a crop group tolerance of 0.05 ppm would be acceptable provided the grazing restriction for all stone fruits is expanded to prohibit the feeding of cover crops grown in treated areas to livestock.

10/ Residue data must be submitted for dried prunes processed from fresh plums bearing measurable weathered residues. If residues are found to concentrate in dried prunes, an appropriate food additive tolerance must be proposed.

11/ The 40 CFR 180.205 entry "small fruit" is to be amended to read "small fruit (except strawberries and cranberries)." The specific use directions and limitations for cranberries should be established on cranberries and be specifically use directions and limitations for cranberries should be established on cranberries and be specifically excluded from the tolerance (for residues in or on small fruit and use directions. In the original petition, the use directions were different than for other berries.

12/ The grazing restriction for nuts must be expanded to prohibit the feeding of cover crops grown in treated areas to livestock.

13/ A group tolerance is not appropriate at the present time because additional data are required to support existing tolerances for paraquat residues in or on field corn and sweet corn (kernels plus cob with husks removed).

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§158.125 Residue Chemistry - (cont'd)

34/ The following data are required to support the tolerances on field corn and sweet corn:
- o Residue data for field corn grain harvested at normal maturity (~70-89% dry matter) following two postemergence, directed spray applications, the first in early July, and the second in August, with the 2 lb/gal SC/L formulation at 0.05 lb cation/A application. These data will satisfy requirements for postemergence use of paraquat for witchweed eradication and the postmergence use for control of annual broadleaf weeds and grasses. Tests must be conducted in IA, IL, NE, and OH.
- o Residue data for sweet corn (kernels plus cob with husks removed) harvested 60 to 80 days after a single preemergence broadcast spray application with the 2 lb/gal SC/L formulation at 1 lb cation/A and, in separate tests, after a single postemergence, directed spray application with the SC/L at 0.5 lb cation/A. Tests must be conducted in CA (11%), FL (34%), NY, MN, WI, and OR or WA.

35/ An additional processing study is required in which field corn grain bearing detectable weathered residues of paraquat is processed into oil (crude and refined) and milled products. Exaggerated rates may be necessary to obtain detectable residues in or on grain.

36/ No data depicting residues in processed products were submitted, however, data requested for wheat milled products will be translated to oats.

37/ The available data for rice grain is currently under review, therefore, the adequacy of the proposed tolerance cannot be made at the present time.

38/ There are no data to assess the adequacy of the tolerance for paraquat residues in or on rye grains. A use for paraquat on rye and supporting data must be submitted. Alternatively, the tolerance for paraquat residues in or on rye grain will be deleted from the 40 CFR.

39/ An additional processing study is required in which grain sorghum bearing detectable, weathered residues resulting from presently registered uses of paraquat is processed into milled products and flour. Exaggerated rates may be necessary to obtain detectable residues in or on grain.

40/ The following data on wheat processed products are required:
- o Wheat grain bearing measurable weathered residues of paraquat must be processed into milled products. Exaggerated rates may be necessary to obtain residues in or on grain.

41/ A crop group tolerance is not appropriate at the present time for the following reasons:
- o Additional residue data are required to support currently established tolerances for corn forage and fodder.
- o Data and tolerance proposals must be submitted for residues in or on barley hay and straw, corn silage, and hay and straw, sorghum silage and hay, and wheat hay and straw.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§150.125 Residue Chemistry - (cont'd)

42/ No additional data are needed for barley hay and straw because the requested data for wheat hay and straw (when received) will be translated to barley.

43/ The following data are required:
- o Residue data for field corn forage, fodder, and silage treated preplant/preemergence with the 2 lb/gal SC/L formulation at 1 lb cation/A and postemergence by directed spray (once in July and once in August) with the same formulation at 0.5 lb cation/A/application. Samples must be collected on the day of final treatment and at regular intervals thereafter to determine the necessity of the PHI following postemergence directed spray treatments. Tests must be conducted in IA, MI, MN, NE, NY, or PA and WI, An approximate tolerance for paraquat residues in or on corn silage must be proposed and the existing tolerance on fodder and forage revised.
- o Residue data for sweet corn forage treated preplant/preemergence with the 2 lb/gal SC/L formulation at 1 lb cation/A. Tests must be conducted in CA, FL, and NE, MN, WI, and OR or WA.
- o The label directions for postemergence directed spray treatment of field corn must be modified by deleting the currently posted feeding and grazing restrictions.

44/ No additional data are needed for oat hay and straw because the requested data on wheat hay and straw (when received) will be translated to oats.

45/ A conclusion regarding the adequacy of the proposed tolerance cannot be made at the present time: the available data are currently under review.

46/ Data supporting the proposed preharvest aid use and tolerance for paraquat residues on sorghum fodder are currently under review and will not be assessed at this time. A tolerance of 0.05 ppm exists for paraquat residues in or on sorghum fodder. Tolerances for residues in or on silage and hay must be proposed based on the following required data:
- o Data reflecting residues in or on sorghum silage and hay harvested at normal maturity after a single preplant or preemergence application with the 2 lb/gal SC/L formulation at 1 lb cation/A and a postemergence directed spray treatment with the same formulation at 0.5 lb cation/A. Tests must be conducted in GA, KS, SD and NM, or TX.

47/ The following additional data are required:
- o Residues in or on wheat hay and straw harvested at normal maturity following a single preemergence broadcast spray application with the 2 lb/gal SC/L formulation at 1 lb cation/A. Tests must be conducted in KS, ND, and OK.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§158.125 Residue Chemistry - (cont'd)

48/ The following additional data are required:
- o Data depicting residues in or on forage and hay from pastures treated broadcast with the 2 lb/gal SC/L formulation at 0.5 lb cation/A. In areas east of the Rocky Mountains, tests conducted in TX, KY, NY, TN, AL and SD, and samples must be harvested 30 days posttreatment. In areas west of Cascade and Sierra Nevada Mountains, tests must be conducted in CA and OR or WA, and samples must be taken when growth has reached 3-6" height. A tolerance must be proposed for hay based on the results of the requested data, or a label restriction against the cutting treated grass must be proposed. (Note: the pending 60 ppm tolerance level may be acceptable.)
- o Data depicting residues in or on forage and hay from rangeland treated broadcast with 2 lb/gal SC/L formulation at 0.5 lb cation/A. Samples must be harvested the day of application. Tests must be conducted in the States cited above for areas west of the Rocky Mountains and areas west of the Sierra Nevada and Cascade Mountains. Tolerances must be proposed for grass forage and hay based on the requested studies.

49/ A crop group tolerance is inappropriate at the present time for the following reasons:
- o Additional data are needed for alfalfa and clover, the representative commodities of this group.

50/ The following additional data are needed:
- o Residues in or on alfalfa forage, seed and hay from pasture and rangeland treated broadcast with the 2 lb/gal SC/L formulation at 0.5 lb cation/A. Samples must be harvested the day of application. Tests must be conducted in the major alfalfa growing regions of the country, including WI, CA, NE, PA and NC.
  Tolerances must be proposed for alfalfa forage, seed and hay, based on the results of the requested studies. (Note: the pending 60 ppm tolerance level may be acceptable.)

51/ The following data are needed for alfalfa meal:
- o Residue data with meal processed from alfalfa bearing measurable weathered residues. If residues are found to concentrate in meal, an appropriate food/feed additive tolerance must be proposed.

52/ The following data are required:
- o Data depicting residues in or on birdsfoot trefoil from pasture and rangeland treated with the 2 lb/gal SC/L formulation at 0.5 lb cation/A. Samples must be harvested the day of application. Tests must be conducted in MI and WI. Tolerances must be proposed for forage and hay based on the results of the requested studies. (Note: the pending 60 ppm tolerance level may be acceptable.)

53/ The following data are required:
- o Data depicting residues in or on clover from rangeland treated with the 2 lb/gal SC/L formulation at 0.5 lb cation/A. Samples must be harvested the day of application. Tests must be conducted in TX (13%), MO (11%), KY, NY, and OR.
  tolerances must be proposed for residues in or on clover forage and hay based on the required data. (Note: the pending 60 ppm tolerance level may be acceptable.)

54/ Since the tolerance for crown vetch is pending, no conclusions will be made at this time.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§158.125 Residue Chemistry - (cont'd)

55/ No further data are needed for avocados provided that the grazing restriction is expanded to prohibit the feeding of cover crops grown in treated areas to livestock.

56/ The following data are needed for processed coffee products:
o Residues of concern must be determined in roasted beans and instant coffee from beans bearing measurable weathered residues. If residues concentrate in either of these processed products, appropriate food additive tolerances must be proposed.

57/ Data is required depicting residues in or on cotton forage harvested 15 days after preharvest desiccation application of 2 lb/gal SC/L formulation at 0.5 lb cation/A. Tests may be conducted in AZ, CA, MS, and TX. Alternatively, a label restriction may be proposed against the foraging of livestock in treated areas.

58/ Based on available data a tolerance of 0.3 ppm must be proposed for figs or the following data are required:
o Data reflecting paraquat residues on figs caught in ground nets or picked from trees after the last of several directed spray applications with the 2 lb/gal formulation at 1 lb cation/A application. Also, the label restriction "Do not apply when figs to be harvested are on the ground" must be proposed. The grazing restriction must be expanded to prohibit the feeding of cover crops grown in treated areas to livestock.

59/ The following data are needed on processed figs:
o Data from processing studies reflecting residues of concern in or on dried figs must be submitted. Fresh figs used for drying must exhibit measurable weathered residues. If residues are found to concentrate following processing, an appropriate food additive tolerance must be proposed.

60/ The grazing restriction must be expanded to prohibit the feeding of cover crops grown in treated areas to livestock.

61/ The tolerance on hop vines will be revoked because hop vines are not a raw agricultural commodity of hops nor are they a feed item.

62/ The following data are needed on spent hops:
o Residues of concern in or on spent hops harvested after the last of three directed spray applications with the 2 lb/gal SC/L formulation at 0.5 lb cation/A/application. If residues are found to concentrate upon processing, an appropriate food/feed additive tolerance must be proposed.

63/ The data indicate that residues in dried hops processed from green hops may concentrate up to 5.3X. Therefore, the tolerance on dried hops must be increased from 0.2 ppm to 0.5 ppm.

64/ An increased tolerance of 0.1 ppm must be proposed for olives. Alternatively, a label restriction prohibiting application when olives to be harvested are on the ground must be proposed.

65/ Residue data are needed for olive oil processed from olives bearing measurable residues (exaggerated rates may be necessary) demonstrating whether residues concentrate in olive oil. If residues are found to be concentrate an appropriate food additive tolerance for olive oil must be proposed.

TABLE A.
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§158.125 Residue Chemistry - (cont'd)

66/ The available data will be adequate to support the established tolerance on pineapple provided a label restriction is added limiting the number of applications to three a season.

67/ A feed additive tolerance for residues of paraquat cation in or on pineapple forage must be proposed. Available data suggested that a tolerance of 0.05 ppm may be appropriate.

68/ Residues must be determined in pineapple juice and bran processed from pineapple bearing measurable residues. If residues are found to concentrate in either of the processed products, an appropriate food/feed additive tolerance must be proposed.

69/ No further data will be required provided that the grazing restriction is expanded to prohibit the feeding of cover crops grown in treated areas to livestock.

70/ The following additional data are needed:

- Data depicting paraquat residues in and on sugarcane forage from tests reflecting the following treatment schedule: 1) Two early season applications of the 2 lb/gal SC/L at rates of a least 0.5 ai/A, applied in 100 to 200 gallons of water per acre; 2) A single preharvest desiccation treatment of the 2 lb/gal SC/L at 0.25 ai/A applied by air in no more than 10 gal of water per acre. Cane and forage must be harvested no more than 3 days after desiccant application, and no more than 30 days following the final postemergence weed-control treatment. An adequate residue analytical method must be used in these studies. The test must be performed in FL and HI. Alternatively, a label restriction prohibiting the feeding or grazing of livestock on treated forage may be proposed rather than submitting forage residue data.

71/ A food additive tolerance of 2.5 ppm in bagasse and 4 ppm in sugarcane juice must be proposed. These tolerance levels are based on the results of processing studies submitted under the currently registered weed control and desiccant use of paraquat on sugarcane.

72/ Residues must be determined in molasses and refined sugar processed from sugarcane bearing measurable residues. If residues are found to concentrate in either of these processed products, appropriate feed additive tolerances must be proposed.

73/ A food/feed additive tolerance of 10 ppm must be proposed for residues in sunflower meal.

74/ The established tolerances of 6 ppm in sunflower hulls must be increased to 15 ppm.

75/ The following data are needed:

- A validated analytical method capable of detecting residues in cattle liver at or below the established 0.01 ppm tolerance. We recommend that the registrant try the method used for pig liver, which has the required sensitivity.
- A feeding study depicting residues in liver of cattle fed paraquat cation at no less than 11.2 ppm in the diet over a 28-day period and killed within 24 hours after the feeding period. Residues must be determined by the validated method requested above.
- As an alternative to the above, a proposed higher tolerance level in liver and kidney may be acceptable.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§158.125 Residue Chemistry - (cont'd)

76/ A feeding study is required depicting residues in the fat, meat, and meat byproducts of poultry fed paraquat cation at no less than 1.4 ppm in the diet for 28 days and killed within 24 hours after the feeding period. Eggs must be collected and analyzed for residues of paraquat at intervals throughout the feeding period. A validated analytical method capable of detecting residues of paraquat cation at 0.01 ppm must be used.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

ata Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
158.130 Environmental Fate					
DEGRADATION STUDIES-LAB:					
161-1 - Hydrolysis	TGAI or PAIRA	A,B,G,H	Yes	00148506	No
Photodegradation					
161-2 - In Water	TGAI or PAIRA	A,B,G	No		Yes 9 Months
161-3 - On Soil	TGAI or PAIRA	A,G	Yes	000146806 000146807	No
161-4 - In Air	TGAI or PAIRA	A	No		No
METABOLISM STUDIES-LAB:					
162-1 - Aerobic Soil	TGAI or PAIRA	A,B,G,H	No		Yes 27 Months
162-2 - Anaerobic Soil	TGAI or PAIRA	A	No		Conditional[4/]
162-3 - Anaerobic Aquatic	TGAI or PAIRA	G	No		Yes 27 Months
162-4 - Aerobic Aquatic	TGAI or PAIRA	N/A[5/]	N/A[5/]		No
MOBILITY STUDIES:					
163-1 - Leaching and Adsorption/Desorption	TGAI or PAIRA	A,B,G,H	No		Yes 12 Months
163-2 - Volatility (Lab)	TEP	A	No		No
163-3 - Volatility (Field)	TEP	A	No		No

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
§158.130 Environmental Fate - (cont'd)					
DISSIPATION STUDIES-FIELD:					
164-1 - Soil	TEP	A,B,H	No		Yes 27 Months
164-2 - Aquatic (Sediment)	TEP	None	N/A[5/]		No
164-3 - Forestry	TEP	G	No		Yes 27 Months
164-4 - Combination and Tank Mixes		N/A[5/]	N/A[5/]		No
164-5 - Soil, Long-term	TEP	A	No		Conditional[6/] 50 Months
ACCUMULATION STUDIES:					
165-1 - Rotational Crops (Confined)	PAIRA	A	No		Yes 39 Months
165-2 - Rotational Crops (Field)	TEP	A	No		Conditional[7/] 50 Months
165-3 - Irrigated Crops	TEP	N/A[5/]	N/A[5/]		No
165-4 - In Fish	TGAI or PAIRA	A,B,G	No		No
165-5 - In Aquatic Nontarget Organisms	TEP	G	No		Yes 12 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

158.130 Environmental Fate - (cont'd)

/ Composition: TGAI = Technical grade of the active ingredient; PAIRA = Pure active ingredient, radiolabeled; TEP = Typical end-use product.
/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.
/ Data must be submitted within the indicated timeframe, based on the date of the Guidance Document.
/ An acceptable anaerobic aquatic study will satisfy the requirement for an anaerobic soil study. Consult with Agency upon completion of field study
/ N/A = Not applicable for the purposes of this Standard.
/ Conditionally required; depends upon dissipation rate in the field dissipation study.
/ Conditionally required--if significant residues of concern are found in the confined study. Consult with Agency upon completion of confined study.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
§158.140 Reentry Protection					
132-1 - Foliar Dissipation	TEP	N/A[4/]			No
132-1 - Soil Dissipation	TEP	N/A[4/]			No
133-3 - Dermal Exposure	TEP	N/A[4/]			No
133-4 - Inhalation Exposure	TEP	N/A[4/]			No
§158.142 Spray Drift					
201-1 - Droplet Size Spectrum	TEP	A,B	Yes	000153437 000153438	No
201-1 - Drift Field Evaluation	TEP	A,B	Yes	000153437 000153438	No

[1/] Composition: TEP = Typical end-use product.
[2/] The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.
[3/] Data must be submitted within the indicated timeframe, based on the date of the Guidance Document.
[4/] N/A = Not applicable for the purpose of this Standard.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
§158.135 Toxicology					
ACUTE TESTING:					
81-1 - Acute Oral Toxicity - Rat	TGAI	A,B,H	Yes	00054573 GS0262-013 00081825 GS0262-014	No
81-2 - Acute Dermal Toxicity - Rabbit	TGAI	A,B,H	Yes	00054574 GS0262-014	No
81-7 - Delayed Neurotoxicity - Hen	TGAI	A,B,H	No		No[4/]
SUBCHRONIC TESTING:					
82-1 - 90-Day Feeding: - Rodent, and	TGAI	A	No		No[5/]
- Nonrodent (Dog)		A	Yes	00072416	No
82-2 - 21-Day Dermal - Rabbit	TGAI	A,B,H	Yes	GS0262-018	No
82-3 - 90-Day Dermal - Rabbit	TGAI	A,B,H	No		No[6/]
82-4 - 90-Day Inhalation: - Rat	TGAI	A,B,H	Partially	00030788 00113718	Yes[7/] 15 Months
82-5 - 90-Day Neurotoxicity: - Hen	TGAI	A,B,H	No		No[6/]
- Mammal		A,B,H	No		No[6/]

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
58.135 Toxicology - (cont'd)					
CHRONIC TESTING:					
83-1 - Chronic Toxicity - 2 species:	TGAI	A,B	Yes	00138637	No
- Rodent, and					
- Nonrodent (Dog)		A,B	Yes	00132474	No
83-2 - Oncogenicity - 2 species:	TGAI				
- Rat (preferred), and		A,B	Partially	00138637	Yes[8/]
- Mouse (preferred)		A,B	Yes	00087924	No
83-3 - Teratogenicity - 2 species:	TGAI				
- Rat		A,B,H	Yes	00113714	No
- Mouse		A,B,H	Yes	00096338	No
83-4 - Reproduction - Rat 2-generation	TGAI	A,B,H	Yes	00126783	No
MUTAGENICITY TESTING:					
84-2 - Gene Mutation (Ames Test)	TGAI	A,B,H	Yes	00152690 00152691 GS0262-012	No
84-2 - Structural Chromosomal Aberration	TGAI	A,B,H	Yes	00073487 00152692 00152694 GS0262-012	No
84-4 - Other Genotoxic Effects	TGAI	A,B,H	Yes	00152693 00152695 GS0262-012	No

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

1a Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation		Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
58.135 Toxicology - (cont'd)						
SPECIAL TESTING:						
85-1 - General Metabolism	PAI or PAIRA	A,B,H	Yes	00028597 00028598 00028599	00036297 00055107 00126096	No
85-2 - Dermal Penetration	Choice	A,B,H	Yes	00012677 00012698 00012699		No
86-1 - Domestic Animal Safety	Choice	A,B,H	No			No

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

§158.135 Toxicology - (cont'd)

1/ Composition: PAI = Pure active ingredient; PAIRA = Pure active ingredient, radiolabeled; Choice = Choice of several test substances determined on a case-by-case basis.
2/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.
3/ Data must be submitted within the indicated timeframe, based on the date of the Guidance Document.
4/ This study is not required because paraquat is not a carbamate or an organophosphate and is not chemically related to these compounds.
5/ The acceptable 2-year rat study available fulfills this requirement.
6/ The registered use of the product does not involve purposeful application to human skin and its pesticidal use does not result in comparable human exposure.
7/ The submitted studies were classified as supplemental data because several important parameters were either not tested or were inadequately tested. Because of very low LC_{50} values and very low NOEL, a 90-day study with coarse particles (and with complete histopathology, organ weights, hematology, and clinical chemistry) should be performed.
8/ Two full pathology reports by different pathologists on the same lung slides have been submitted. Since the report contains two different interpretations, the Agency has requested and is awaiting a third independent reading of the slides. The information is to be submitted in March 1986.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
158.145 Wildlife and Aquatic Organisms					
AVIAN AND MAMMALIAN TESTING					
71-1 - Acute Avian Oral Toxicity	TGAI	A,B,G,H	Yes	00102038 05008363 00029001	No
71-2 - Avian Subacute Dietary Toxicity	TGAI	A,B,G,H			
- Upland Game Bird, and			Yes	00088881	No
- Waterfowl			Yes	00088881	No
71-3 - Wild Mammal Toxicity	TGAI	A,B,G,H	Yes	GS0262-021	No
71-4 - Avian Reproduction	TGAI				
- Upland Game Bird, and		A	Yes	00110453 00110455 00110454 GS0262-022	No
- Waterfowl		A	Yes	00110453 00110455 00110454 GS0262-022	No
71-5 - Simulated Field Testing	TEP	A	Yes	GS0262-023 GS0262-024	No
- Mammals, and					
- Birds		A	Yes	GS0262-023 GS0262-024	No
- Actual Field Testing	TEP				
- Mammals, and		A	Yes	GS0262-023 GS0262-024	No
- Birds		A	Yes	GS0262-023 GS0262-024	No

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

ıta Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
50.145 Wildlife and Aquatic Organisms - (cont'd)					
AVIAN ORGANISM TESTING					
72-1 - Freshwater Fish Toxicity - Cold-water Fish Species, and	TGAI	A,B,G,H	Yes	GS0262-025 GS0262-027 GS0262-026 00116622	No
- Warmwater Fish Species		A,B,G,H	Yes	GS0262-025 GS0262-028 GS0262-026 00116622	No
72-2 - Acute Toxicity to Freshwater Invertebrates	TGAI	A,B,G,H	Yes	00114473 00116622 GS0262-028	No
72-3 - Acute Toxicity to Estuarine and Marine Organisms	TGAI				
- Fish		A	No		Yes[4/] 12 Months
- Mollusk		A	No		Yes[4/] 12 Months
- Shrimp		A	No		Yes[4/] 12 Months
72-4 - Fish Early Life Stage, and	TGAI	A	No		No[5/]
- Aquatic Invertebrates Life Cycle		A	No		No[5/]

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

ata Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[3/]
158.145 Wildlife and Aquatic Organisms - (cont'd)					
72-5 - Fish - Life Cycle	TGAI	A	No		No[5/]
72-6 - Aquatic Organism Accumulation	TGAI, PAI or Degradation Product	A			
- Crustacean			No		No
- Fish			No		No
- Insect Nymph			No		No
- Mollusk			No		No
72-7 - Simulated Field Testing - Aquatic Organisms	TEP	A	No		No[6/]
- Actual Field Testing - Aquatic Organisms		A	No		No[6/]

TABLE A

GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

158.145 Wildlife and Aquatic Organisms - (cont'd)

Composition: TGAI = Technical grade of the active ingredient; PAI = Pure active ingredient; TEP = Typical end-use product;

The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood Crop; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.

Data must be submitted within the indicated timeframe, based on the date of the Guidance Document.

These studies are required to support such uses as corn, cotton, soybeans, and sorghum which are grown extensively in coastal counties.

These studies required for pesticides that may have continuous or recurrent exposure to fish. There are no aquatic uses for paraquat and paraquat is not likely to transport to water in sufficient quantities from runoff.

These studies are required for pesticides intended for application to water or for pesticides that may translocate to aquatic habitat and will occur at potentially toxic levels; neither of these situations is likely to occur.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

ıta Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission
58.155 Nontarget Insect					
NONTARGET INSECT TESTING - POLLINATORS:					
141-1 - Honeybee acute contact toxicity	TGAI	A,B	Yes	00020772 05001991	No
141-2 - Honeybee - toxicity of residues on foliage	TEP	A,B	No		No[3/]
141-4 - Honeybee subacute feeding study	(Reserved)[4/]				
141-5 - Field testing for pollinators	TEP	A,B	No		No[3/]

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission
§158.150 Plant Protection					
121-1 - TARGET AREA PHYTOTOXICITY	EP		3/		
NONTARGET AREA PHYTOTOXICITY					
TIER I					
122-1 - Seed Germination/ Seedling Emergence	TGAI		3/		
122-1 - Vegetative Vigor	TGAI		3/		
122-2 - Aquatic Plant Growth	TGAI		3/		
TIER II					
123-1 - Seed Germination/ Seedling Emergence	TGAI		3/		
123-1 - Vegetative Vigor	TGAI		3/		
123-2 - Aquatic Plant Growth	TGAI		3/		
TIER III					
124-1 - Terrestrial Field	TEP		3/		
124-2 - Aquatic Field	TEP		3/		

1/ Composition: TGAI = Technical grade of the active ingredient; TEP = Typical end-use product; EP = End-use product.
2/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood Crop; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.
3/ These data are not required in accordance with §158.150.

TABLE A
GENERIC DATA REQUIREMENTS FOR PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Use Pattern[2/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission
§158.155 Nontarget Insect - (cont'd)					
NONTARGET INSECT TESTING - AQUATIC INSECTS:					
142-1 - Acute toxicity to aquatic insects	(Reserved)[5/]				
142-1 - Aquatic insect life-cycle study	(Reserved)[5/]				
142-3 - Simulated or actual field testing for aquatic insects	(Reserved)[5/]				
143-1 - NONTARGET INSECT TESTING - PREDATORS AND PARASITES thru 143-3	(Reserved)[5/]				

/ Composition: TGAI = Technical grade of the active ingredient; TEP = Typical end-use product.
/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.
/ As data from the acute study indicate low toxicity to honeybee, no further testing is required.
/ Reserved, pending development of test methodology.
/ Reserved, pending Agency discussion as to whether the data requirement should be established.

TABLE B

PRODUCT-SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING PARAQUAT DICHLORIDE

Guideline Citation and Name of Test	Test Substance[1/]	Guidelines Status[1/]	Are Data Required Yes	Are Data Required No	Footnote Number	Data Must Be Submitted Within Timeframe Listed Below[2/]	
§158.120 Product Chemistry							
Product Identity							
61-1 - Product Identity and Disclosure of Ingredients	MP	R	[ ]	[X]		No	
61-2 - Description of Beginning Materials and Manufacturing Process	MP	R	[X]	[ ]	3,4	Yes	6 Months
61-3 - Discussion of Formation of Impurities	MP	R	[X]	[ ]	5	Yes	6 Months
Analysis and Certificatin of Product Ingredients							
62-1 - Preliminary Analysis	MP	CR	[X]	[ ]	6	Yes	12 Months
62-2 - Certification of Limits	MP	R	[X]	[ ]	7	Yes	12 Months
62-3 - Analytical Methods to Verify Certified Limit	MP	R	[X]	[ ]	8	Yes	12 Months
Physical and Chemical Characteristics							
63-2 - Color	MP	R	[X]	[ ]		Yes	6 Months
63-3 - Physical State	MP	R	[X]	[ ]		Yes	6 Months
63-4 - Odor	MP	R	[X]	[ ]		Yes	6 Months

TABLE B

PRODUCT-SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING PARAQUAT DICHLORIDE

idelline Citation and Name of Test	Test Substance	Guidelines Status	Are Data Required Yes	Are Data Required No	Footnote Number	Data Must Be Submitted Within Timeframe Listed Below[1]/
58.120 Product Chemistry (cont'd)						
ysical and Chemical Characteristics ont'd)						
63-7 - Density, Bulk, Density, or Specific Gravity	MP	R	[X]	[ ]		6 Months
63-12 - pH	MP	CR	[X]	[ ]		6 Months
63-14 - Oxidizing or Reducing Action	MP	CR	[X]	[ ]		6 Months
63-15 - Flammability	MP	CR	[X]	[ ]		6 Months
63-16 - Explodability	MP	R	[X]	[ ]		6 Months
63-17 - Storage Stability	MP	R	[X]	[ ]		15 Months
63-18 - Viscosity	MP	CR	[X]	[ ]		6 Months
63-19 - Miscibility	MP	CR	[X]	[ ]		6 Months
63-20 - Corrosion Characteristics	MP	R	[X]	[ ]		15 Months
)ther Requirements						
64-1 - Submittal of samples	MP	CR	[ ]	[X]		

1/ MP = Manufacturing-use Product; R = Required; CR = Conditionally Required

2/ Data must be submitted within the indicated timeframe, based on the date of the Guidance Document.

TABLE B

PRODUCT-SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING PARAQUAT DICHLORIDE

§158.120 Product Chemistry - (cont'd)

3/ Details of the manufacturing process including the relative amounts of beginning material; a description of the equipment used to produce the product, reaction conditions, the duration of the process; purification procedures, and quality control measures are required.

4/ The name and address of the manufacturer, producer, and supplier of each beginning material used to manufacture the product are needed. Also, a copy of all available technical specifications, data sheets, and other documents in which the manufacturer, producer, or supplier of the beginning materials describes its composition and properties must be submitted.

5/ The following data are required for the MUP's:
- o A discussion of each impurity believed to be present at $\geq$ 0.1% based on the knowledge of beginning materials, possible chemical reactions, and any contamination present.

6/ Five or more representative samples must be analyzed for the amount of active ingredient and each impurity present at $\geq$ 0.1% (w/w) using valid analytical methods.

7/ The following additional data are required:
- o Upper and lower limits must be provided, validated, and certified for each intentionally added inert in the MUP.
- o Upper limits must be provided, validated, and certified for each impurity present at $\geq$ 0.1% (w/w).
- o Upper and lower limits must be provided, validated, and certified for paraquat dichloride in the MUP.

8/ None of the methods for quantification of paraquat dichloride and manufacturing impurities in paraquat dichloride have been validated. Therefore, the following additional information is required:
- o Quantitiative methods are required to determine paraquat and all impurities and intentionally added inerts for which a certified limit is required. Each method must be accompanied by validation studies of the precision and accuracy of this method.

TABLE B

PRODUCT-SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING PARAQUAT DICHLORIDE

Data Requirements	Composition[1/]	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA §3(c)(2)(B)? Timeframe for Data Submission[2/]
§158.135 Toxicology				
ACUTE TESTING				
81-1 - Acute Oral Toxicity - Rat	MP	Yes	00054573 GS0262-013 00081825 GS0262-014	No
81-2 - Acute Dermal Toxicity - Rabbit	MP	Yes	00054574 GS0262-014	No
81-3 - Acute Inhalation Toxicity - Rat	MP	Yes	00046105 00153733 GS0262-012 00153748	No
81-4 - Primary Eye Irritation - Rabbit	MP	Yes	00054575	No
81-5 - Primary Dermal Irritation - Rabbit	MP	Yes	00054576 00153733 00153748	No
81-6 - Dermal Sensitization Guinea Pig	MP	Partially	GS0262-017	Yes[3/] 9 Months

TABLE B
PRODUCT-SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING PARAQUAT DICHLORIDE

§158.135 Toxicology - Continued

1/ Composition: MP = Manufacturing-use product.
2/ Data must be submitted within the indicated timeframe, based on the date of the Guidance Document.
3/ This study is required by the Guidelines for all formulations.

II. LABELING APPENDICES

Summary of label requirements and table

40 CFR 162.10 Labeling Statements

Physical/Chemical Hazards Labeling Statements

Storage Instructions

Pesticide Disposal Statements

Container Disposal Instructions

LABEL CONTENTS

40 CFR 162.10 requires that certain specific labeling statements appear at certain locations on the label. This is referred to as format labeling. Specific label items listed below are keyed to the table at the end of this Appendix.

Item 1. PRODUCT NAME - The name, brand or trademark is required to be located on the front panel, preferably centered in the upper part of the panel. The name of a product will not be accepted if it is false or misleading.

Item 2. COMPANY NAME AND ADDRESS - The name and address of the registrant or distributor is required on the label. The name and address should preferably be located at the bottom of the front panel or at the end of the label text.

Item 3. NET CONTENTS - A net contents statement is required on all labels or on the container of the pesticide. The preferred location is the bottom of the front panel immediately above the company name and address, or at the end of the label text. The net contents must be expressed in the largest suitable unit, e.g., "1 pound 10 ounces" rather than "26 ounces." In addition to English units, net contents may be expressed in metric units. [40 CFR 162.10(d)]

Item 4. EPA REGISTRATION NUMBER - The registration number assigned to the pesticide product must appear on the label, preceded by the phrase "EPA Registration No.," or "EPA Reg. No." The registration number must be set in type of a size and style similar to other print on that part of the label on which it appears and must run parallel to it. The registration number and the required identifying phrase must not appear in such a manner as to suggest or imply recommendation or endorsement of the product by the Agency. [40 CFR 162.10(e)]

Item 5. EPA ESTABLISHMENT NUMBER - The EPA establishment number, preceded by the phrase "EPA Est." is the final establishment at which the product was produced, and may appear in any suitable location on the label or immediate container. It must also appear on the wrapper or outside container of the package if the EPA establishment number on the immediate container cannot be clearly read through such wrapper or container. [40 CFR 162.10(f)]

Item 6A. INGREDIENTS STATEMENT - An ingredients statement is required on the front panel. The ingredients statement must contain the name and percentage by weight of each active ingredient and the total percentage by weight of all inert ingredients. The preferred location is immediately below the product name. The ingredients statement must run parallel with, and be clearly distinguished from, other text on the panel. It must not be placed in the body of other text. [40 CFR 162.10(g)]

Item 6B. POUNDS PER GALLON STATEMENT - For liquid agricultural formulations, the pounds per gallon of active ingredient must be indicated on the label.

Item 7. FRONT LABEL PRECAUTIONARY STATEMENTS - Front panel precautionary statements must be grouped together, preferably within a block outline. The table below shows the minimum type size requirements for various size labels.

Size of Label on Front Panel in Square Inches	Signal Word Minimum Type Size All Capitals	"Keep Out of Reach of Children" Minimum Type Size
5 and under	6 point	6 point
above 5 to 10	10 point	6 point
above 10 to 15	12 point	8 point
above 15 to 30	14 point	10 point
over 30	18 point	12 point

Item 7A. CHILD HAZARD WARNING STATEMENT - The statement "Keep Out of Reach of Children" must be located on the front panel above the signal word except where contact with children during distribution or use is unlikely. [40 CFR 162.10(h)(1)(ii)]

Item 7B. SIGNAL WORD - The signal word (DANGER, WARNING, or CAUTION) is required on the front panel immediately below the child hazard warning statement. [40 CFR 162.10 (h)(1)(i)]

Item 7C. SKULL & CROSSBONES AND WORD "POISON" - On products assigned a toxicity Category I on the basis of oral, dermal, or inhalation toxicity, the word "Poison" shall appear on the label in red on a background of distinctly contrasting color and the skull and crossbones shall appear in immediate proximity to the word POISON. [40 CFR 162.10(h)(1)(i)]

Item 7D. STATEMENT OF PRACTICAL TREATMENT - A statement of practical treatment (first aid or other) shall appear on the label of pesticide products in toxicity Categories I, II, and III. [40 CFR 162.10(h)(1)(iii)]

Item 7E. REFERRAL STATEMENT - The statement "See Side (or Back) Panel for Additional Precautionary Statements" is required on the front panel for all products, unless all required precautionary statements appear on the front panel. [40 CFR 162.10(h)(1)(iii)]

Item 8. SIDE/BACK PANEL PRECAUTIONARY LABELING - The precautionary statements listed below must appear together on the label under the heading "PRECAUTIONARY STATEMENTS." The preferred location is at the top of the side or back panel preceding the directions for use, and it is preferred that these statements be surrounded by a block outline. Each of the three hazard warning statements must be headed by the appropriate hazard title. [40 CFR 162.10(h)(2)].

Item 8A. HAZARD TO HUMANS AND DOMESTIC ANIMALS - Where a hazard exists to humans or domestic animals, precautionary statements are required indicating the particular hazard, the route(s) of exposure and the precautions to be taken to avoid accident, injury or damage. [40 CFR 162.10(h)(2)(i)]

Item 8B. ENVIRONMENTAL HAZARD - Where a hazard exists to non-target organisms excluding humans and domestic animals, precautionary statements are required stating the nature of the hazard and the appropriate precautions to avoid potential accident, injury, or damage. [40 CFR 162.10(h)(2)(ii)]

Item 8C. PHYSICAL OR CHEMICAL HAZARD - FLAMMABILITY Precautionary statements relating to flammability of a product are required to appear on the label if it meets the criteria in the PHYS/CHEM Labeling Appendix. The requirement is based on the results of the flashpoint determinations and flame extension tests required to be submitted for all products. These statements are to be located in the side/back panel precautionary statements section, preceded by the heading "Physical/Chemical Hazards." Note that no signal word is used in conjunction with the flammability statements.

Item 9A. RESTRICTED USE CLASSIFICATION - FIFRA sec. 3(d) requires that all pesticide formulations/uses be classified for either general or restricted use. Products classified for restricted use may be limited to use by certified applicators or persons under their direct supervision (or may be subject to other restrictions that may be imposed by regulation).

In the Registration Standard, the Agency has (1) indicated certain formulations/uses are to be restricted (Section III indicates why the product has been classified for restricted use); or (2) reserved any classification decision until appropriate data are submitted.

The Regulatory Position and Rationale states whether products containing this active ingredient are classified for restricted use. If they are restricted the draft label(s) submitted to the Agency as part of your application must reflect this determination (see below).

If you do not believe that your product should be classified for restricted use, you must submit any information and rationale with your application for reregistration. During the Agency's review of your application, your proposed classification determination will be evaluated in accordance with the provisions of 40 CFR 162.11(c). You will be notified of the Agency's classification decision.

Classification Labeling Requirements

If your product has been classified for restricted use, the following label requirements apply:

1. All uses restricted.

a. The statement "Restricted Use Pesticide" must appear at the top of the front panel of the label. The statement must be set in type of the same minimum size as required for human hazard signal word (see table in 40 CFR 162.10(h)(1)(iv)

b. Directly below this statement on the front panel, a summary statement of the terms of restriction must appear (including the reasons for restriction if specified in Section I). If use is restricted to certified applicators, the following statement is required: "For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's Certification."

2. Some but not all uses restricted. If the Regulatory Position and Rationale states that some uses are classified for restricted use, and some are unclassified, several courses of action are available:

a. You may label the product for Restricted use. If you do so, you may include on the label uses that are unrestricted, but you may not distinguish them on the label as being unrestricted.

b. You may delete all restricted uses from your label and submit draft labeling bearing only unrestricted uses.

c. You may "split" your registration, i.e., register two separate products with identical formulations, one bearing only unrestricted uses, and the other bearing restricted uses. To do so, submit two applications for reregistration, each containing all forms and necessary labels. Both applications should be submitted simultaneously. Note that the products will be assigned separate registration numbers.

Item 9B [There is no Item 9B].

Item 9C. MISUSE STATEMENT - All products must bear the misuse statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling." This statement appears at the beginning of the directions for use, directly beneath the heading of that section.

Item 10A. REENTRY STATEMENT - If a reentry interval has been established by the Agency, it must be included on the label. Additional worker protection statements may be required in accordance with PR Notice 83-2, March 29, 1983.

Item 10B [There is no Item 10B].

Item 10C. STORAGE AND DISPOSAL BLOCK - All labels are required to bear storage and disposal statements. These statements are developed for specific containers, sizes, and chemical content. These instructions must be grouped and appear under the heading "Storage and Disposal" in the directions for use. This heading must be set in the same type sizes as required for the child hazard warning. Refer to Appendix II, STOR, PEST/DIS, and CONT/DIS to determine the storage and disposal instructions appropriate for your products.

Item 10D. DIRECTIONS FOR USE - Directions for use must be stated in terms which can be easily read and understood by the average person likely to use or to supervise the use of the pesticide. When followed, directions must be adequate to protect the public from fraud and from personal injury and to prevent unreasonable adverse effects on the environment. [40 CFR 162.10]

COLLATERAL LABELING

Bulletins, leaflets, circulars, brochures, data sheets, flyers, or other written or graphic printed matter which is referred to on the label or which is to accompany the product are termed collateral labeling. Such labeling may not bear claims or representations that differ in substance from those accepted in connection with registration of the product. It should be made part of the response to this notice and submitted for review.

LABELING REQUIREMENTS OF THE FIFRA, AS AMENDED

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
1	Product name	All products	Front panel	Center front panel	
2	Company name and address	All products	None	Bottom front panel or end of label text	If registrant is not the producer, must be qualified by "Packed for . . .," "Distributed by. . .," etc.
3	Net contents	All products	None	Bottom front panel or end of label text	May be in metric units in addition to U.S. units
4	EPA Reg. No.	All products	None	Front panel	Must be in similar type size and run parallel to other type.
5	EPA Est. No.	All products	None	Front panel, immediately before or following Reg. No.	May appear on the container instead of the label.
6A	Ingredients statement	All products	Front panel	Immediately following product name	Text must run parallel with other text on the panel.
6B	Pounds/gallon statement	Liquid products where dosage given as lbs. ai/unit area	Front panel	Directly below the main ingredients statement	
7	Front panel precautionary statements	All products	Front panel		All front panel precautionary statements must be grouped together, preferably blocked.
7A	Keep Out of Reach of Children (Child hazard warning)	All products	Front panel	Above signal word	Note type size requirements.
7B	Signal word	All products	Front panel	Immediately below child hazard warning	Note type size requirements.

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
7C	Skull & cross-bones and word POISON (in red)	All products which are Category I based on oral, dermal, or inhalation toxicity	Front panel	Both in close proximity to signal word	
7D	Statement of practical treatment	All products in Categories I, II, and III	Category I: Front panel unless referral statement is used. Others: Grouped with side panel precautionary statements.	Front panel for all.	
7E	Referral statement	All products where precautionary labeling appears on other than front panel.	Front panel		
8	Side/back panel precautionary statements	All products	None	Top or side of back panel preceding directions for use	Must be grouped under the headings in 8A, 8B, and 8C; preferably blocked.
8A	Hazards to humans and domestic animals	All products in Categories I, II, and III	None	Same as above	Must be preceded by appropriate signal word.
8B	Environmental hazards	All products	None	Same as above	Environmental hazards include bee caution where applicable.

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
8C	Physical or chemical hazards	All pressurized products, others with flash points under 150°F	None	Same as above	
9A	Restricted block	All restricted products	Top center of front panel	Preferably blocked	Includes a statement of the terms of restriction. The words "RESTRICTED USE PESTICIDE" must be same type size as signal word.
9C	Misuse statement	All products	Immediately following heading of directions for use		
10A	Reentry statement	All cholinesterase inhibitors	In the directions for use	Immediately after misuse statement	
10C	Storage and disposal block	All products	In the directions for use	Immediately before specific directions for use or at the end of directions for use	Must be set apart and clearly distinguishable from from other directions for use.
10D	Directions for use	All products	None	None	May be in metric as well as U.S. units

PHYS/CHEM-1

PHYSICAL/CHEMICAL HAZARDS

Criteria	Required Label Statement
I. Pressurized Containers	
A. Flashpoint at or below 20°F; or if there is a flashback at any valve opening.	Extremely flammable. Contents under pressure. Keep away from fire, sparks, and heated surfaces. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
B. Flashpoint above 20°F and not over 80°F; or if the flame extension is more than 18 inches long at a distance of 6 inches from the valve opening.	Flammable. Contents under pressure. Keep away from heat, sparks, and flame. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
C. All Other Pressurized Containers	Contents under pressure. Do not use or store near heat or open flame. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
II. Non-Pressurized Containers	
A. Flashpoint at or below 20°F.	Extremely flammable. Keep away from fire, sparks, and heated surfaces.
B. Flashpoint above 20°F and not over 80°F.	Flammable. Keep away from heat and open flame.
C. Flashpoint over 80°F and not over 150°F.	Do not use or store near heat and open flame.
D. Flashpoint above 150°F.	None required.

STOR-1

STORAGE INSTRUCTIONS FOR PESTICIDES

Heading:

All products are required to bear specific label instructions about storage and disposal. Storage and disposal instructions must be grouped together in the directions for use portion of the label under the heading STORAGE AND DISPOSAL. Products intended solely for domestic use need not include the heading "STORAGE AND DISPOSAL."

Storage Instructions:

All product labels are required to have appropriate storage instructions. Specific storage instructions are not prescribed. Each registrant must develop his own storage instructions, considering, when applicable, the following factors:

1. Conditions of storage that might alter the composition or usefulness of the pesticide. Examples could be temperature extremes, excessive moisture or humidity, heat, sunlight, friction, or contaminating substances or media.

2. Physical requirements of storage which might adversely affect the container of the product and its ability to continue to function properly. Requirements might include positioning of the container in storage, storage or damage due to stacking, penetration of moisture, and ability to withstand shock or friction.

3. Specifications for handling the pesticide container, including movement of container within the storage area, proper opening and closing procedures (particularly for opened containers), and measures to minimize exposure while opening or closing container.

4. Instructions on what to do if the container is damaged in any way, or if the pesticide is leaking or has been spilled, and precautions to minimize exposure if damage occurs.

5. General precautions concerning locked storage, storage in original container only, and separation of pesticides during storage to prevent cross-contamination of other pesticides, fertilizer, food, and feed.

6. General storage instructions for household products should emphasize storage in original container and placement in locked storage areas.

CONT/DIS-1

CONTAINER DISPOSAL INSTRUCTIONS

The label of each product must bear container disposal instructions appropriate to the type of container.

1. Domestic use products must bear one of the following container disposal statements:

Container Type	Statement
Non-aerosol products (bottles, cans, jars)	Do not reuse container (bottle, can, jar). Rinse thoroughly before discarding in trash.
Non-aerosol products (bags)	Do not reuse bag. Discard bag in trash.
Aerosol products	Replace cap and discard containers in trash. Do not incinerate or puncture.

2. All other products must bear container disposal instructions, based on container type, listed below:

Container Type	Statement
Metal containers (non-aerosol)	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.
Plastic containers	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.
Glass containers	Triple rinse (or equivalent). Then dispose of in a sanitary landfill or by other approved state and local procedures.
Fiber drums with liners	Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by state and local authorities. If drum is contaminated and cannot be reused[1], dispose of in the same manner.
Paper and plastic bags	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.
Compressed gas cylinders	Return empty cylinder for reuse (or similar wording)

1/ Manufacturer may replace this phrase with one indicating whether and how fiber drum may be reused.

PESTICIDE DISPOSAL INSTRUCTIONS

The label of all products, except those intended solely for domestic use, must bear explicit instructions about pesticide disposal. The statements listed below contain the exact wording that must appear on the label of these products:

1. The labels of all products, except domestic use, must contain the statement, "Do not contaminate water, food, or feed by storage or disposal."

2. Except those products intended solely for domestic use, the labels of all products that contain active ingredients that are Acute Hazardous Wastes (see list in this Appendix) or are assigned to Toxicity Category I on the basis of oral or dermal toxicity, skin or eye irritation potential, or Toxicity Category I or II on the basis of acute inhalation toxicity must bear the following pesticide disposal statement:

> "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."

3. The labels of all products, except those intended for domestic use, containing active or inert ingredients that are Toxic Hazardous Wastes (see list in this Appendix) or meet any of the criteria in 40 CFR 261, Subpart C for a hazardous waste must bear the following pesticide disposal statement:

> "Pesticide wastes are toxic. 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."

4. Labels for all other products, except those intended for domestic use, must bear the following pesticide disposal statement:

> "Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility."

5. Products intended for domestic use only must bear the following disposal statement: "Securely wrap original container in several layers of newspaper and discard in trash."

PESTICIDE ACTIVE INGREDIENTS THAT ARE ACUTE HAZARDOUS WASTES

I. PESTICIDES ON THE "E" LIST (with RCRA # and CAS #)

[40 CFR 261.33(e)]

Acrolein	P003	107-13-1
Aldicarb	P070	116-06-3
Aldrin	P004	309-00-2
Allyl alcohol	P005	107-18-6
Aluminum phosphide	P006	1302-45-0
4-Aminopyridine (Avitrol)	P008	504-24-5
Arsenic acid	P010	7778-39-4
Arsenic pentoxide	P011	1303-28-2
Arsenic trioxide	P012	1327-53-3
Calcium cyanide	P021	592-01-8
Carbon disulfide	P022	75-15-0
p-Chloroaniline	P024	106-47-8
Cyanides (soluble cyanide salts not otherwise specified)	P030	
Cyanogen chloride	P031	506-77-4
Dieldrin	P037	60-57-1
O,O-Diethyl S-[2-ethylthio)ethyl] phosphorodithioate (disulfoton)	P039	298-04-4
O,O-Diethyl O-pyrazinyl phosphorothioate (Zinophos®)	P040	297-97-2
Dimethoate	P044	60-51-5
O,O-Dimethyl O-p-nitrophenyl phosphorothioate (methyl parathion)	P071	298-00-0
4,6-Dinitro-o-cresol and salts	P047	534-52-1
4,6-Dinitro-o-cyclohexylphenol	P034	131-89-5
Dinoseb	P020	88-85-7
Endosulfan	P050	115-29-7
Endothall	P088	129-67-9
Endrin	P051	72-20-8
Famphur	P097	52-85-7
Fluoroacetamide	P057	640-19-7
Heptachlor	P059	76-48-8
Hexachlorohexahydro-exo,exo-dimethanonaphthalene (Isodrin)	P069	465-73-6
Hydrocyanic acid	P063	74-90-8
Methomyl	P066	16752-77-5
alpha-Naphthylthiourea (ANTU)	P072	86-88-41
Nicotine and salts	P075	54-11-5
Octamethylpyrophosphoramide (OMPA, schradan)	P085	152-16-9
Parathion	P089	56-38-2
Phenylmercuric acetate (PMA)	P092	62-38-4
Phorate	P094	298-02-2
Potassium cyanide	P098	151-50-8
Propargyl alcohol	P102	107-19-7
Sodium azide	P105	26628-22-8
Sodium cyanide	P106	143-33-9
Sodium fluoroacetate	P058	62-74-3

Strychnine and salts	P108	57-24-9 60-41-3
O,O,O,O-Tetraethyl dithiopyrophosphate (sulfotepp)	P109	3689-24-5
Tetraethyl pyrophosphate	P111	107-49-3
Thallium sulfate	P115	7446-18-6
Thiofanox	P045	39196-18-4
Toxaphene	P123	8001-35-2
Warfarin (>0.3%)	P001	81-81-2
Zinc phosphide (>10%)	P122	1314-84-7

50 ACTIVES

II. PESTICIDES DERIVED FROM TRI-, TETRA-, AND PENTACHLOROPHENOLS [40 CFR 261.31]

2-Chloroethyl 2-(2,4,6-trichlorophenoxy) ethyl ether	F027	5324-22-1
Dehydroabietylammonium pentachlorophenoxide	F027	35109-57-0
Erbon	F027	136-25-4
O-ethyl O-(2,4,5-trichlorophenyl) ethylphosphonothioate	F027	327-98-0
2,2'-Methylenebis (3,4,6-trichlorophenol) (Hexachlorophene)	F027	70-30-4
--Potassium salt of	F027	67923-62-0
--Sodium salt of	F027	3247-34-5
--Disodium salt of	F027	5736-15-2
Pentachlorophenol	F027	87-86-5
--Potassium salt of	F027	7778-73-6
--Sodium salt of	F027	131-52-2
--Zinc salt of	F027	2917-32-0
--Zinc salt of N-alkyl (C_{16}-C_{18})-1,3-propanediamine	F027	
--Pentachlorophenyl laurate	F027	3772-94-9
Potassium trichlorophenate (2,4,6)	F027	2591-21-1
Potassium trichlorophenate (2,4,5)	F027	35471-43-3
Silvex	F027	93-72-1
--2-Butoxyethyl ester	F027	19398-13-1
--Butoxypolypropoxypropyl ester	F027	53404-07-2
--Butoxypropyl ester	F027	25537-26-2
--Diethanolamine salt	F027	51170-59-3
--Diisopropanolamine salt	F027	53404-09-4
--Dimethylamine salt	F027	55617-85-1
--Dipropylene glycol isobutyl ether ester	F027	53535-26-5
--Ethanolamine salt	F027	7374-47-2
--2-Ethylhexyl ester	F027	53404-76-5
--Isooctyl ester	F027	53404-14-1

—Isopropanolamine salt	F027	53404-13-0
—Monohydroxylaluminum salt	F027	69622-82-8
--Polypropoxypropyl ester	F027	83562-66-7
—Potassium salt	F027	2818-16-8
—Propylene glycol isobutyl ether ester	F027	53466-84-5
--Sodium salt	F027	37913-89-6
—Triethanolamine salt	F027	17369-89-0
—Triethylamine salt	F027	53404-74-3
--Triisopropanolamine salt	F027	53404-75-4
—Tripropylene glycol isobutyl ether ester	F027	53535-30-1
Sodium 2-(2,4,5-trichlorophenoxy) ethyl sulfate	F027	3570-61-4
Tetrachlorophenols	F027	25167-83-3
—Alkylamine*amine salt (as in fatty acids of coconut oil)	F027	
--Potassium salt	F027	53535-27-6
—Sodium salt	F027	25567-55-9
2,4,5-Trichlorophenol	F027	95-95-4
2,4,6-Trichlorophenol	F027	88-06-2
2,4,5-Trichlorophenol salt of 2,6-bis[(dimethylamino)methyl] cyclohexanone	F027	53404-83-4
2,4,5-Trichlorophenol, sodium salt	F027	136-32-3
2,4,6-Trichlorophenol, sodium salt	F027	3784-03-0
2,4,5-Trichlorophenoxyacetic acid	F027	93-79-8
—Alkyl C-12 amine salt	F027	53404-84-5
--Alkyl C-13 amine salt	F027	53404-85-6
--Alkyl C-14 amine salt	F027	53535-37-8
--N,N-diethylethanolamine salt	F027	53404-86-7
--Dimethylamine salt	F027	6369-97-7
—N,N-dimethyllinoleylamine salt	F027	53404-88-9
—N,N-dimethyloleylamine salt	F027	53404-89-0
--N-oleyl-1,3-propylene diamine salt	F027	53404-87-8
--Sodium salt	F027	13560-99-1
—Triethanolamine salt	F027	3813-14-7
--Triethylamine salt	F027	2008-46-0
—Alkyl (C3H7 - C7H9) ester	F027	
—Amyl ester	F027	120-39-8
--Butoxyethoxypropyl ester	F027	1928-58-1
--2-Butoxyethyl ester	F027	2545-59-7
--Butoxypropyl ester	F027	1928-48-9
--Butyl ester	F027	93-79-8
--Dipropylene glycol isobutyl ether ester	F027	53535-31-2
--2-Ethylhexyl ester	F027	1928-47-8
—Isobutyl ester	F027	4938-72-1

—Isopropyl ester	F027	93-78-7
—Propylene glycol isobutyl ether ester	F027	53466-86-7
—Tripropylene glycol isobutyl ether ester	F027	53535-32-3
4-(2,4,5-Trichlorophenoxy)butyric acid [2,4,5-TB]	F027	93-80-1
2-(2,4,5-Trichlorophenoxy)ethyl hydrogen sulfate [2,4,5-TES]	F027	69633-04-1
1,4',5'-Trichloro-2'-(2,4,5-trichlorophenoxy) methanesulfonanilide [Edolan U]	F027	69462-14-2

PESTICIDES THAT ARE TOXIC HAZARDOUS WASTES

PESTICIDES ON THE "F" LIST [40 CFR 261.33(f)]	RCRA #	CAS #
Acetone	U002	67-64-1
Acrylonitrile*	U009	107-13-1
Amitrole	U011	61-82-5
Benzene*	U019	71-43-2
Bis(2-ethylhexyl)phthalate	U028	117-81-7
Cacodylic acid	U136	75-60-5
Carbon tetrachloride*	U211	56-23-5
Chloral (hydrate) (chloroacetaldehyde)	U034	302-17-0
Chlordane, technical*	U036	57-74-9
Chlorobenzene*	U037	108-90-7
4-Chloro-m-cresol	U039	59-50-7
Chloroform*	U044	67-66-3
o-Chlorophenol	U048	95-57-8
Creosote	U051	8021-39-4
Cresylic acid (cresols)*	U052	1319-77-3
Cyclohexane	U056	110-82-7
Cyclohexanone	U057	108-94-1
Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]-pentalen-2-one (Kepone, chlordecone)	U142	143-50-0
1,2-Dibromo-3-chloropropane (DBCP)	U066	96-12-8
Dibutyl phthalate	U069	84-74-2
S-2,3-(Dichloroallyl diisopropyl-thiocarbamate) (diallate,Avadex)	U062	2303-16-4
o-Dichlorobenzene*	U070	95-50-1
p-Dichlorobenzene*	U072	106-46-7
Dichlorodifluoromethane (Freon 12®)	U075	75-71-8
3,5-Dichloro-N-(1,1-dimethyl-2-propynyl) benzamide (pronamide, Kerb®)	U192	23950-58-5
Dichloro diphenyl dichloroethane (DDD)	U060	72-54-8
Dichloro diphenyl trichloroethane (DDT)	U061	50-29-3
Dichloroethyl ether	U025	1191-17-9
2,4-Dichlorophenoxyacetic, salts and esters (2,4-D)*	U240	94-75-7
1,2-Dichloropropane	U083	8003-19-8
1,3-Dichloropropene (Telone)	U084	542-75-6
Dimethyl phthalate	U102	131-11-3
Epichlorohydrin (1-chloro-2,3-epoxypropane)	U041	106-89-8
Ethyl acetate	U112	141-78-6
Ethyl 4,4'-dichlorobenzilate (chlorobenzilate)	U038	510-15-6

*Proposed for deletion by TCLP proposal

Ethylene dibromide (EDB)	U067	106-93-4
Ethylene dichloride*	U077	107-06-2
Ethylene oxide	U115	75-21-8
Formaldehyde	U122	50-00-0
Furfural	U125	98-01-1
Hexachlorobenzene*	U127	118-74-1
Hexachlorocyclopentadiene	U130	77-47-4
Hexachloroethane*	U131	67-72-1
Hydrofluoric acid	U134	7664-39-3
Isobutyl alcohol*	U140	78-83-1
Lead acetate	U144	301-04-2
Lindane*	U129	58-89-9
Maleic hydrazide	U148	123-33-1
Mercury	U151	7439-97-6
Methoxychlor*	U247	72-43-5
Methyl alcohol (methanol)	U154	67-56-1
Methyl bromide	U029	74-83-9
Methyl chloride	U045	74-87-3
2,2'-Methylenebis (3,4,6-trichlorophenol) (hexachlorophene) [acute waste per 261.31]	U132	70-30-4
Methylene chloride*	U080	75-09-2
Methyl ethyl ketone*	U159	78-93-3
4-Methyl-2-pentanone (methyl isobutyl ketone)	U161	108-10-1
Naphthalene	U165	91-20-3
Nitrobenzene*	U169	98-95-3
p-Nitrophenol	U170	100-02-7
Pentachloroethane	U184	76-01-7
Pentachloronitrobenzene (PCNB)	U185	82-68-8
Pentachlorophenol* [acute waste per 261.31]	U242	87-86-5
Phenol*	U188	108-95-2
Pyridine*	U196	110-86-1
Resorcinol	U201	108-46-3
Safrole	U203	94-59-7
Selenium disulfide	U205	7488-56-4
Silvex [acute waste per 261.31]	U233	93-72-1
1,1,2,2-Tetrachloroethane*	U209	79-34-5
Tetrachloroethylene*	U210	127-18-4
2,3,4,6-Tetrachlorophenol* [acute waste per 261.31]	U212	
Thiram	U244	137-26-8
Toluene*	U220	108-88-3
1,1,1-Trichloroethane* (methyl chloroform)	U226	71-55-6
Trichloroethylene*	U228	79-01-6
Trichloromonofluoromethane (Freon 11®)	U121	75-69-4
2,4,5-Trichlorophenol* [acute waste per 261.31]	U230	95-95-4
2,4,6-Trichlorophenol* [acute waste per 261.31]	U231	88-06-2

2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)* [acute waste per 261.31]	U232	93-76-5
Warfarin (<0.3%)	U248	81-81-2
Xylene	U239	1330-20-7
Zinc phosphide (<10%)	U249	1314-84-7

83 ACTIVES

III. USE INDEX APPENDIX

DRAFT
SAI/IIRI-U
061601

EPA Index to Pesticide Chemicals

PARAQUAT DICHLORIDE*

TYPE PESTICIDE: Herbicide, Defoliant, Desiccant

FORMULATIONS:
FI (29.1%, 43.5%)
SC/L (2 lb/gal SC/L)
PrL (0.276%)

GENERAL WARNINGS AND LIMITATIONS: A nonselective herbicide and desiccant with fast acting contact action. Chemical is inactivated upon contact with soil. Apply when weeds are succulent and new growth is 1 to 6 inches high. Thoroughly cover weed foliage. Do not combine with liquid fertilizers except as specified. Do not combine with suspension-type liquid fertilizers, as activity will be reduced. Weeds emerging after application will not be controlled. The dosages for this chemical were calculated using the cation by weight.

Agricultural Crop Tolerances (other than those listed in text):

Acerola	- 0.05 ppm
Beans, forage	- 0.1 ppm
Beans, hay	- 0.4 ppm
Beans, lima (succulent)	- 0.05 ppm
Beans, snap (succulent)	- 0.05 ppm
Birdsfoot trefoil	- 5.0 ppm
Broccoli	- 0.05 ppm
Cabbage	- 0.05 ppm
Carrots	- 0.05 ppm
Cauliflower	- 0.05 ppm
Chinese cabbage	- 0.05 ppm
Collards	- 0.05 ppm
Cucurbits	- 0.05 ppm
Kiwifruit	- 0.05 ppm
Mint, hay	- 0.5 ppm
Mint, hay, spent	- 3.0 ppm
Oat, grain	- 0.05 ppm
Onion, dry bulb	- 0.05 ppm
Onion, green	- 0.05 ppm
Peas (succulent)	- 0.05 ppm
Peas, forage	- 0.2 ppm
Peas, hay	- 0.8 ppm
Pistachio nuts	- 0.05 ppm
Rye grain	- 0.05 ppm
Strawberries	- 0.25 ppm
Turnips (roots)	- 0.05 ppm
Turnips (tops)	- 0.05 ppm

*1,1'-dimethyl-4,4'-bipyridinium dichloride

PARAQUAT DICHLORIDE

GENERAL WARNINGS AND LIMITATIONS (continued)

Livestock Tolerances:

Cattle (fat)	- 0.01 ppm (N)
Cattle (meat)	- 0.01 ppm (N)
Cattle (mbyp)	- 0.01 ppm (N)
Eggs	- 0.01 ppm (N)
Goats (fat)	- 0.01 ppm (N)
Goats (meat)	- 0.01 ppm (N)
Goats (mbyp)	- 0.01 ppm (N)
Hogs (fat)	- 0.01 ppm (N)
Hogs (meat)	- 0.01 ppm (N)
Hogs (mbyp)	- 0.01 ppm (N)
Milk	- 0.01 ppm (N)
Poultry (fat)	- 0.01 ppm (N)
Poultry (meat)	- 0.01 ppm (N)
Poultry (mbyp)	- 0.01 ppm (N)
Sheep (fat)	- 0.01 ppm (N)
Sheep (meat)	- 0.01 ppm (N)
Sheep (mbyp)	- 0.01 ppm (N)

TIME REQUIRED FOR CONTROL: Acts within a few hours of application.

PHYTOTOXICITY TO TARGET WEEDS: Causes wilting and rapid desiccation of foliage.

PHYTOTOXICITY TO CROPS: Plants emerged at the time of application will be killed.

MODE OF ACTION: Causes the formation of free radicals during photosynthesis which acts to disrupt membrane permeability.

BROADLEAF WEEDS CONTROLLED:

AAB	Annual broadleaf weeds	
IAA	Burclover	
GAA	Buttercup	
CBA	Carolina geranium	
AAC	Chickweed	
AAB	Clover	
QAA	Cocklebur	(a)
EBA	Common ragweed	
IBB	Dandelion	
HAA	Dock	
CBB	Dogfennel	
JAA	Fiddleneck	(b)
JAA	Filaree	
BB	Florida pursley	
AA	Groundsel	
BA	Henbit	
BA	Jim Hill mustard	
AB	Lambsquarter	

PARAQUAT DICHLORIDE

BROADLEAF WEEDS CONTROLLED (continued)

PBGAAAB	Morningglory	(c)
PFGAEAA	Nettle	
PDPABAA	Oxalis	
PAAAAAF	Perennial weeds	(c)
PAAAABI	Pigweed	(b)
PDXABAA	Plantain	
PAHABBI	Poison ivy	
PFMAFBB	Puncturevine	
PAAAABP	Purslane	
PBFAEAA	Ragweed	
PCQBYBH	Red clover	
PBKAHBA	Sheperdspurse	(c)
PZAAACS	Smartweed	
PBFDUAA	Spikeweed	(b)
PBVAGAA	Spurge	
PBKANBB	Tansy mustard	
PAAAAAX	Thistle	
PDAABBB	Velvetleaf	
PBKAFBE	Wild mustard	
PBKBABA	Wild radish	
PEUANBA	Witchweed	

(a) Use the higher dosages.
(b) Treat when weeds are small.
(c) Top kill and suppression only.

GRASSES AND OTHER MONOCOTS CONTROLLED:

PCACKBA	Annual bluegrass	
PCAAAAB	Annual grasses	
PCABSAA	Barley (volunteer)	
PCABHBB	Barnyardgrass	
PCAARAA	Brachiaria	
PCAAZBA	Bermudagrass	(c)
PCACKAA	Bluegrass	
PCAATAA	Brome	(a)
PCACFBL	Bullgrass	
PCAATBK	Cheat	
PCABFAA	Crabgrass	(b)
PCAAFAA	Foxtail	
PCABIBA	Goosegrass	
PCACWBC	Johnsongrass	(c)
PCACWBG	Johnsongrass (seedling)	
PCABSBF	Little barley	(d)
PCACBBD	Nimblewill	
PBMADAA	Nutgrass	
PCABBBA	Orchardgrass	
PCAAAAC	Perennial grasses	(c)
PCABZAA	Ryegrass	
PCABMBE	Tall fescue	

GRASSES AND OTHER MONOCOTS CONTROLLED (continued)

PCACEBL	Texas millet	
PCABRBA	Velvetgrass	
PCAAOBB	Wild oats	

(a) Use the higher dosages.
(b) Treat when weeds are small.
(c) Top kill and suppression only.
(d) Apply at mid-boot stage.

WOODY PLANTS CONTROLLED:

PAAAAAI	Trees	
PAAAAAO	Woody plants	(c)

(c) Top kill and suppression only.

PLANT REGULATOR CLAIMS:

PZZZZZC	Defoliant
PZZZZZB	Desiccant

PARAQUAT DICHLORIDE

Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations

TERRESTRIAL FOOD CROP

(Agricultural Crops)

General Warnings and Limitations: RESTRICTED USE PESTICIDE. Do not use around home gardens, schools, recreational parks or playgrounds. To prevent injury to germinating crop seedlings, do not apply preplant or preemergence to soils lacking clay minerals, i.e., peat, mulch, pure sand or artificial planting media. For band or spot treatment, reduce dosage in proportion to area actually treated.

123001AA	Alfalfa	5 ppm Do not graze animals in treated fields before first cutting. Do not graze, cut or harvest within 90 days after application.
	0.12-0.50 (2 lb/gal SC/L)	Use limited to CA. Postemergence. Broadcast. For suppression and control of weeds in alfalfa seedlings grown for hay. Apply with a non-ionic surfactant in 25 to 50 gallons of water per acre. Apply during late winter or early spring. Use the lowest rate for alfalfa with 3 trifoliate leaves, a medium rate when alfalfa has 6 trifoliate leaves, and the highest rate only when there are 9 or more leaves. Alfalfa foliage will be burned. Do not apply more than once during the first growing season. Seedling alfalfa stands will be reduced and replanting may be necessary.
	0.25-0.75 (2 lb/gal SC/L)	Broadcast. Tank mix with simazine. Apply in 20 to 100 gallons of water per acre by ground, or 5 to 10 gallons by air. Do not apply more than once per season.
	0.50-0.75 (2 lb/gal SC/L)	Use limited to CA (counties of Del Norte, Siskiyou, Modoc, Shasta, Lassen, Plumas, Sierra and Nevada), CO, ID, MT, NV, OR, UT, WA, and WY. Dormant. Broadcast. Apply with a non-ionic surfactant in 20 to 100 gallons of water per acre by ground or 5 to 10 gallons by air. Do not apply if regrowth, following the last fall cutting, is more than 2 inches tall. Crop foliage will be burned. Do not apply more than once per season.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
03001AA	Almond	0.05 (N) ppm (almond, apricot, avocado, banana,
05001AA	Apricot	cherry, citrus fruits, coffee benas,
28000AA	Avocado	fig, nectarine, nuts, olive, papaya,
06002AA	Banana	plums (fresh prunes))
05002AA	Cherry	0.5 ppm (almond hulls)
20001AA	Citrus Fruits	Do not graze treated areas.
01002AA	Coffee	General Information: Do not apply when nuts to
06005AA	Fig	be harvested are on the ground.
03005AA	Filbert	
03007AA	Macadamia Nut	
05003AA	Nectarine	
28014AA	Olive	
06010AA	Papaya	
05005AA	Plum (fresh prunes)	
05006AA	Prune	
03009AA	Walnut	
	0.50-1.00 (2 lb/gal SC/L)	Directed spray. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees.
04001AA	Apple	0.05 (N) ppm
04003AA	Pear	Do not graze treated areas.
	0.50-1.00 (2 lb/gal SC/L)	Directed spray. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees.
	0.50-1.00 (2 lb/gal SC/L)	Directed spray. Tank mix with simazine. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Use the lower dosage on coarse textured or low organic matter soils, and the higher dosage on fine textured or high organic matter soils. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees. Make only 1 application per year. Apply only in orchards where trees have been established 1 year or more.
	Apricot	See Almond cluster.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
16002AA	Asparagus	0.5 ppm Eighteen month preharvest interval.
	0.50-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Allow maximum weed emergence prior to treatment. Apply with a non-ionic surfactant in 50 to 100 gallons of water per acre. Seeding or transplanting should be done with a minimum of soil disturbance.
	Avocado	See Almond cluster.
22025AA 22017AA	Bahiagrass (pasture, rangeland)	5 ppm Do not graze treated areas within 60 days after treatment.
	0.25 (2 lb/gal SC/L)	Use limited to the South and Southeast. Broadcast or band. Use band treatment over the drill row when recovery of sod is desired. Apply with a non-ionic surfactant in 20 to 30 gallons of water per acre. Apply broadcast when existing grass species are undesirable and total suppression is required. Apply in late summer or early fall, prior to or at time of seeding winter annuals. Sod must not exceed 3 inches in height.
	Banana	See Almond cluster.
28063AA	Barley	0.05 (N) ppm (grain) Do not graze treated areas.
	0.50-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.
22017AA	Bermudagrass (pasture, rangeland)	5 ppm Do not graze treated areas or mow for hay within 60 days after treatment. Refer to Bahiagrass (pasture, rangeland) for dose and use patterns.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
01002AA 01009AA 01003AA 01006AA	Blackberry Blueberry Boysenberry Raspberry	0.05 (N) ppm (small fruits)
	0.05-1.00 (2 lb/gal SC/L)	Directed spray. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Thoroughly wet weeds. Apply before emergence of new canes or shoots, as injury may result.
	Blueberry	See Blackberry cluster.
	Boysenberry	See Blackberry cluster.
	Cherry	See Almond cluster.
	Citrus Fruits	See Almond cluster.
23003AA	Clover	5 ppm Do not graze animals in treated fields before first cutting. Do not graze, cut or harvest within 90 days of application.
	0.50-0.75 (2 lb/gal SC/L)	Use limited to CA (counties of Del Norte, Siskiyou, Modoc, Shasta, Lassen, Plumas, Sierra and Nevada), CO, ID, MT, NV, OR, UT, WA, and WY. Dormant. Broadcast. Apply with a non-ionic surfactant in 20 to 100 gallons of water per acre by ground or 5 to 10 gallons by air. Do not apply if regrowth, following the last fall cutting, is more than 2 inches tall. Do not apply more than once per season.
	Coffee	See Almond cluster.
80005AA	Corn	0.05 (N) ppm (fresh (including sweet (K+CWHR)) 0.05 (N) ppm (sweet, grain, forage, and fodder) Do not graze treated areas.
	0.50-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Apply with a non-ionic surfactant in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
	Corn (continued)	
	0.25-0.50 (2 lb/gal SC/L)	Preplant or preemergence. For use where corn will be planted directly into cover crop, established sod, or in previous crop residues. Tank mix with atrazine; atrazine plus simazine; bladex; or alachlor plus atrazine. Apply with a non-ionic surfactant in 20 to 60 gallons of water per acre. Tank mix of paraquat dichloride and atrazine may be applied in liquid nitrogen fertilizer and/or complete liquid fertilizer solutions in combination with a non-ionic surfactant.
	0.50 (2 lb/gal SC/L)	Postemergence. Directed spray. For use in United States Department of Agriculture Witchweed Eradication Program. Apply in 10 to 20 gallons of water per acre. Initiate treatment in early July and repeat in early August if regrowth of grass weeds occurs.
'28006AA	Corn, Field	0.05 (N) ppm (grain, fodder, and forage) Do not graze treated areas or feed treated forage to livestock.
	0.25 (2 lb/gal SC/L)	Postemergence. Directed spray. Apply with a non-ionic surfactant in 20 to 40 gallons of water per acre. For control of weeds and grasses less than 4 inches tall. Apply when corn plants are at least 10 inches tall. Direct spray no higher than the lower 3 inches of corn stalks. Do not mix with liquid fertilizer. May be tank mixed with atrazine.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
28007AA	Cotton	0.5 ppm (cottonseed) Three day preharvest interval. Seven day preharvest interval when used with phosphate or chlorate defoliants. Do not graze lactating dairy animals. Do not graze livestock in treated fields until 15 days after treatment. Remove livestock from treated area 30 days before slaughter. Do not feed gin trash to livestock. General Information: May be applied as a split application. Repeat application if necessary. Do not make more than 2 applications or exceed a total of 2 pints per acre. Apply with a non-ionic surfactant.
	0.12-0.25 (2 lb/gal SC/L)	Use limited to CA. For control of emerged volunteer barley. Preplant. Broadcast. Apply by air in 5 to 10 gallons of water per acre. Apply to preformed seedbeds.
	0.50-1.00 (2 lb/gal SC/L)	Preplant. Broadcast. Beds should be preformed to permit maximum weed emergence prior to treatment. Seeding should be done with a minimum amount of soil disturbance. Apply in 20 to 60 gallons of water per acre.
	0.12 (2 lb/gal SC/L)	Preharvest desiccation. Broadcast. Tank mix with phosphate or chlorate defoliants. Apply when 80 percent or more of the bolls are open and the remaining bolls are mature. Apply in 10 to 30 gallons of water per acre by ground or 3 to 10 gallons by air.
	0.25-0.50 (2 lb/gal SC/L)	Preharvest desiccation of stripper cotton. Broadcast. When foliage is dense, use 2 applications of the lower dosage if necessary. Apply when 85 percent or more of the bolls are open and the remaining bolls are mature. Apply in 10 to 30 gallons of water per acre by ground or 3 to 10 gallons by air.
	0.12 (2 lb/gal SC/L)	Use limited to AZ, CA, and NM. Preharvest defoliation. Broadcast. Tank mix with phosphate or chlorate defoliants. Apply when 60 percent or more of the bolls are open and the remaining bolls are mature. Apply in 10 to 30 gallons of water per acre by ground or 3 to 10 gallons by air.
	Fig	See Almond cluster.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
	Filbert	See Almond cluster.
014AA	Grapes	Do not graze treated areas. Do not use in vineyards established less than 3 years.
	0.50-1.00 (2 lb/gal SC/L)	Use limited to CA. Directed spray. Postemergence. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around vines.
8066BA	Grasses (grown for seed)	N.F. Do not graze treated areas. Do not use seed from treated areas for animal feed. Do not use straw from treated areas for animal bedding or feed.
	0.50 (2 lb/gal SC/L)	Preplant. Broadcast. Apply to seedbed when weeds are at the 3 to 5 leaf stage. Apply with a non-ionic surfactant in 20 to 40 gallons of water per acre. Treatment can be repeated prior to or on the day of seeding.
26011AA	Guar	0.5 ppm (guar beans) Four day preharvest interval. Do not graze treated areas or feed treated forage to livestock.
	0.50 (2 lb/gal SC/L)	Preharvest desiccation. Broadcast. Apply with a non-ionic surfactant in 20 to 30 gallons of water per acre. Apply after pods are mature.
06006AA 06014AA	Guava	0.05 (N) ppm Do not graze treated areas.
	1.00 (2 lb/gal SC/L)	Directed spray. Postemergence. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Do not allow spray to contact green stems, fruit or foliage, as injury may result. Use a shield when applying around young trees.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
/08020AA	Hops	0.2 ppm (hops, dried) 0.1 ppm (fresh hops) 0.5 ppm (hop vines) Fourteen day preharvest interval. Do not allow animals to graze in treated hopyards. Hop vine refuse and silage may be fed to livestock. General Information: Do not apply more than 3 times per season. Do not allow spray to contact green stems, foliage, flowers, or cones, as injury may result. Apply with a non-ionic surfactant.
	0.50 (2 lb/gal SC/L)	Use limited to ID, OR, and WA. Directed spray. Postemergence. Apply in 20 to 100 gallons of water per acre. Spray in interspaces and around the base of hop plantings. Do not apply around hop vines less than 10 feet tall. Retreatment or spot treatment may be necessary.
	(Cascade, Yakima Cluster and Bullion varieties) 0.50 (2 lb/gal SC/L)	Directed spray. Postemergence. Apply in 20 to 100 gallons of water per acre. For suckering and stripping, spray only basal 2 feet of vines. Do not apply to hop vines less than 10 feet tall. Repeat as necessary.
/13020AA	Lettuce	0.05 (N) ppm General Information: Apply with a non-ionic surfactant.
	0.12-0.25 (2 lb/gal SC/L)	Use limited to CA. For control of emerged volunteer barley. Preplant. Broadcast. Apply by air in 5 to 10 gallons of water per acre. Apply to preformed seedbeds.
	0.50-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.
	Macadamia Nut	See Almond cluster.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
10001AA	Melons	0.05 ppm General Information: Apply with a non-ionic surfactant.
	0.12-0.25 (2 lb/gal SC/L)	Use limited to CA. For control of emerged volunteer barley. Preplant. Broadcast. Apply by air in 5 to 10 gallons of water per acre. Apply to preformed seedbeds.
	0.50-1.00 (2 lb/gal SC/L)	Preplant and preemergence. Broadcast or band. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.
	Nectarine	See Almond cluster.
	Olive	See Almond cluster.
	Papaya	See Almond cluster.
06014AA	Passion Fruit	0.2 ppm Do not graze treated areas. General Information: If bark is still green, wrap vine prior to application to prevent injury. If applied during harvest, apply only after picking fruit off the ground. Refer to Guava for dose and use patterns.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
/28035AA	Pastures	5 ppm (alfalfa) 5 ppm (birdsfoot trefoil) 5 ppm (clover) 5 ppm (grass) West of Cascade and Sierra Nevada Mountains: Do not graze treated areas until growth of newly planted seedlings is 3 to 6 inches high. East of Rocky Mountains: Do not graze treated areas until newly planted seedlings have reached recommended grazing height. General Information: Use band treatment when recovery of sprayed sod is desired. Broadcast when existing grass species are undesirable and total suppression is needed. Apply with a non-ionic surfactant in 18 to 75 gallons of water per acre.
	0.25-0.50 (2 lb/gal SC/L)	Use limited to east of Rocky Mountains. Broadcast or band. Apply prior to or at time of seeding grasses or forage legumes such as alfalfa, clover and birdsfoot trefoil. Use the higher rate to suppress vigorous and coarse sod species such as brome. Apply only to pastures which are not more than 2 to 3 inches in height.
	0.25-0.50 (2 lb/gal SC/L)	Use limited to west of Cascade and Sierra Nevada Mountains. Broadcast or band. Apply prior to or at time of seeding grasses such as hardinggrass and palestine orchardgrass. Apply in October through December after first fall rains and after weeds have emerged. Apply on moderate to heavily grazed areas. Do not use in areas with heavy sod and weed growth.
)5004AA	Peach	0.05 (N) ppm Do not graze treated areas.
	0.50-1.00 (2 lb/gal SC/L)	Directed spray. Postemergence. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees.
	0.50-1.00 (2 lb/gal SC/L)	Use limited to AR, LA, MO, OK, TX, and states East of the Mississippi River. Directed spray. Postemergence. Tank mix with simazine. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Use the lower dosage on coarse textured or low organic matter soils, and the higher dosage

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
	Peach (continued)	
		on fine textured or high organic matter soils. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees. Make only 1 application per year. Apply only in orchards where trees have been established 1 year or more.
	Pear	See Apple cluster.
/03008AA	Pecan	0.05 (N) ppm (nuts) Do not graze treated areas. General Information: Do not apply when nuts to be harvested are on the ground.
	0.50-1.00 (2 lb/gal SC/L)	Directed spray. Postemergence. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Apply with a non-ionic surfactant in 30 to 50 gallons of water per acre. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees.
/28017AA	Pepper	0.05 ppm (vegetables, fruiting) Do not graze treated areas.
	0.50-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Apply with a non-ionic surfactant in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.
	0.50 (2 lb/gal SC/L)	Use limited to Middle Atlantic, Southeast, South Central regions, and Southwest to the Western boundary of TX. Postemergence. Directed spray. Band application between the rows. Apply with a non-ionic surfactant in 20 to 100 gallons of water per acre. Use shields to protect crop plants. Can be used between plastic mulch covered rows. Do not make more than 3 applications per crop season.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
/06013AA	Pineapple	0.05 (N) ppm Twenty day preharvest interval.
	0.50-1.00 (2 lb/gal SC/L)	Directed spray. Postemergence. Apply with a non-ionic surfactant in 100 to 200 gallons of water per acre. Retreatment may be necessary on more mature weeds.
	Plum (fresh prunes)	See Almond cluster.
/14013AA	Potato	0.5 ppm Three day preharvest interval. Do not graze livestock in treated potato fields. General Information: To avoid injury to subsequent crops, do not use on mulch or peat soils. Do not use for desiccating potato vines when potatoes are to be stored or used for seed. Apply with a non-ionic surfactant.
	0.25-0.50 (2 lb/gal SC/L)	Preemergence. Broadcast. Apply in 30 to 100 gallons of water per acre. Delay application to provide maximum weed emergence but not later than ground cracking.
	0.25-0.50 (2 lb/gal SC/L)	Preharvest desiccation. Broadcast. Apply in 50 to 100 gallons of water per acre. Use the higher dosage where vine growth is vigorous or where quick vine kill is desired. Use 2 applications of the lower dosage when growth is dense. Use the lower rate on maturing vines. Do not make more than 2 applications with a minimum of 5 days between applications.
	0.12-0.25 (2 lb/gal SC/L)	Use limited to CA. For control of emerged volunteer barley. Preplant. Broadcast. Apply by air in 5 to 10 gallons of water per acre. Apply to preformed seedbeds.
	Prune	See Almond cluster.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
28045AA	Rangeland	5 ppm (alfalfa) 5 ppm (birdsfoot trefoil) 5 ppm (clover) 5 ppm (grass) West of Cascade and Sierra Nevada Mountains: Do not graze treated areas until growth of newly planted seedlings is 3 to 6 inches high. East of Rocky Mountains: Do not graze treated areas until newly planted seedlings have reached recommended grazing height. General Information: Use band treatment when recovery of sprayed sod is desired. Broadcast when existing grass species are undesirable and total suppression is needed. Apply with a non-ionic surfactant in 18 to 75 gallons of water per acre.
	0.25-0.50 (2 lb/gal SC/L)	Use limited to east of Rocky Mountains. Broadcast or band. Apply prior to or at time of seeding grasses or forage legumes such as alfalfa, clover and birdsfoot trefoil. Apply only to pastures grazed or mowed to no more than 2 to 3 inches in height.
	0.25-0.50 (2 lb/gal SC/L)	Use limited to west of Cascade and Sierra Nevada Mountains. Broadcast or band. Apply prior to or at time of seeding grasses such as hardinggrass and palestine orchardgrass. Apply in October through December after first fall rains and after weeds have emerged. Apply on moderate to heavily grazed areas. Do not use in areas with heavy sod and weed growth.
	Raspberry	See Blackberry cluster.
)AA	Rhubarb	0.05 (N) ppm Do not graze treated areas. General Information: Do not apply more than 2 applications per season.
	0.50-1.00 (2 lb/gal SC/L)	Dormant application. Apply before crown buds begin to grow. Apply 50 to 150 gallons of spray mix per acre.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
'27008AA	Safflower	0.05 (N) ppm (seed) General Information: Apply with a non-ionic surfactant.
	0.12-0.25 (2 lb/gal SC/L)	Use limited to CA. For control of emerged volunteer barley. Preplant. Broadcast. Apply by air in 5 to 10 gallons of water per acre. Apply to preformed seedbeds.
	0.50-1.00 (2 lb/gal SC/L)	Use limited to CA. Preplant or preemergence. Broadcast or band. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.
'8019AA	Sorghum	0.05 (N) ppm (forage, grain)
	0.50-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Apply with a non-ionic surfactant in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit minimum weed emergence. Seeding should be done with a minimum of soil disturbance.
4006AA	Sorghum (grain crop)	0.05 ppm (forage, grain) General Information: Apply with a non-ionic surfactant.
	0.25-0.50 (2 lb/gal SC/L)	Preplant or preemergence. Tank mix with atrazine and terbutryn. Apply in 20 to 60 gallons of water per acre. Use where sorghum will be planted directly into previous crop residues.
	0.25-0.50 (2 lb/gal SC/L)	Postemergence. Directed spray or band treatment between the crop rows. For control of crabgrass and pigweed 3 inches or less in height. Treat when crop is at least 12 inches tall. Use the lower rate for weeds less than 2 inches tall and the higher rate for weeds 2 to 3 inches tall. Apply in 20 to 40 gallons of water per acre. Apply so that only the lower 3 inches or less of sorghum stalk is sprayed.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
3023AA	Soybeans	0.05 (N) ppm (soybeans and forage) Postemergence directed spray: Do not graze treated areas or feed treated forage to livestock. Preharvest broadcast: Do not pasture livestock within 15 days after treatment. Remove livestock from treated fields at least 30 days before slaughter. Do not use treated vines for feed or forage. General Information: Apply with a non-ionic surfactant.
	0.25-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Use the lower rate when spring weeds are less than 4 inches high or when a directed spray or cultivation will be used within 3 weeks after planting. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seeding should be done with a minimum of soil disturbance.
	0.25-0.50 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast. For use in minimum tillage systems. Tank mix with alachlor and linuron. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air.
	0.25 (2 lb/gal SC/L)	Preemergence. Broadcast or band. Tank mix with linuron. For use where soybeans will be planted directly into preformed bed, cover crop, or in previous crop residues. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seeding should be done with a minimum of soil disturbance.
		OR
	0.25-0.50 (2 lb/gal SC/L)	Preemergence. Broadcast. Tank mix with metribuzin. For preemergence control of smartweed, pigweed, and cocklebur. Apply in 20 to 60 gallons of water per acre. Use the higher dosage if weeds are 4 to 6 inches tall.
		OR

PARAQUAT DICHLORIDE

Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
Soybeans (continued)	
0.25-0.50 (2 lb/gal SC/L)	Preemergence. Broadcast. Tank mix with alachlor and metribuzin. For preemergence control of smartweed, pigweed, cocklebur, foxtail, and crabgrass. Apply in 20 to 60 gallons of water per acre. Use the higher dosage if weeds are 4 to 6 inches tall.
0.063-0.125 (2 lb/gal SC/L)	Postemergence. Directed spray or directed band application between crop rows. Use the lower rate for control of seedling johnsongrass, crabgrass, goosegrass, brachiaria, texas millet and pigweed less than 2 inches tall. Use the higher rate for weeds 2 to 4 inches tall. Do not treat if crop is less than 8 inches tall. Apply in 20 gallons of water per acre. Retreat after 7 to 14 days if needed. Do not treat more than twice.
0.12-0.25 (2 lb/gal SC/L)	Preharvest. Broadcast. Apply when soybean plants are mature. Apply in 20 to 40 gallons of water per acre by ground or 2 to 5 gallons by air. Use the higher rate for control of cocklebur.
25002AA Sugar Beets	0.5 ppm (sugar beets and tops) General Information: Apply with a non-ionic surfactant.
0.12-0.25 (2 lb/gal SC/L)	Use limited to CA. For control of emerged volunteer barley. Preplant. Broadcast. Apply by air in 5 to 10 gallons of water per acre. Apply to preformed seedbeds.
0.50-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
/25003AA	Sugarcane	0.5 (N) ppm Postemergence directed spray in LA: 30 day preharvest interval. General Information: When using directed sprays, apply when weeds are 2 to 6 inches high. Avoid contact with cane foliage. Make a second and final application, if necessary, when new growth is 2 to 6 inches high. Apply with a non-ionic surfactant.
	0.25-0.50 (2 lb/gal SC/L)	Use limited to LA. Postemergence. Directed spray. Apply in 20 to 200 gallons of water per acre. For tiller control, apply when tillers are less than 18 inches high. Use the higher rate with heavier weed growth or tiller growth.
	0.50 (2 lb/gal SC/L)	Use limited to FL. Postemergence. Directed spray. Apply in 50 to 100 gallons of water per acre. Apply early in the season (March to April). Do not apply after June 1st, as cane growth may be stunted and yield reduced.
	0.50 (2 lb/gal SC/L)	Use limited to HI. Postemergence. Directed spray. Apply in 20 to 200 gallons of water per acre. Do not apply after cane rows have closed in.
	0.12-0.25 (2 lb/gal SC/L)	Use limited to FL and TX. Preharvest desiccation. Broadcast. Apply by air in 4 to 10 gallons of water per acre. Apply to mature plant or stubble cane. Use the higher rate under cool, cloudy conditions. Apply 3 to 14 days before burning and harvest. For best results, apply when the weather is clear and warm.
	0.25 (2 lb/gal SC/L)	Preharvest desiccation. Broadcast. Apply to mature plant or stubble cane 7 to 10 days before burning and harvest. Apply by air in 8 to 10 gallons of water per acre. For best results apply when the weather is clear and warm.
/27011AA	Sunflower (oil crop)	6 ppm (seed, hulls) 2 ppm (seeds) Do not graze treated areas or feed treated forage to livestock.
	0.25-0.50 (2 lb/gal SC/L)	Preharvest desiccation. Broadcast. Apply when sunflower seeds reach physiological maturity and harvest 7 to 21 days after application. Apply

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
	Sunflower (oil crop) (continued)	
		with a non-ionic surfactant in 20 to 40 gallons of water per acre by ground or 5 gallons by air. Use the higher rate when crop stands or weed infestations are heavy.
005AA	Tomato	0.05 ppm (vegetables, fruiting) General Information: Apply with a non-ionic surfactant.
	0.12-0.25 (2 lb/gal SC/L)	Use limited to CA. For control of emerged volunteer barley. Preplant. Broadcast. Apply by air in 5 to 10 gallons of water per acre. Apply to preformed seedbeds.
	0.50-1.00 (2 lb/gal SC/L)	Preplant or preemergence. Broadcast or band. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.
	0.50 (2 lb/gal SC/L)	Use limited to Middle Atlantic, Southeast, South Central regions and Southwest to the Western boundary of TX. Postemergence. Directed spray. Band application between the rows. Apply in 20 to 100 gallons of water per acre. Use shields to protect crop plants. Can be used between plastic mulch covered rows. Do not make more than 3 applications per crop season.
	Walnut	See Almond cluster.
	Wheat	0.05 (N) ppm (grain) Do not graze treated areas.
	0.50-1.00 (2 lb/gal SC/L)	Broadcast or band. Preplant or preemergence. Apply in 20 to 60 gallons of water per acre by ground or 5 to 10 gallons by air. Seedbeds should be formed as far ahead of planting and treatment as possible to permit maximum weed emergence. Seeding should be done with a minimum of soil disturbance.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
	TERRESTRIAL NON-FOOD CROP	
	(Ornamental Plants and Forest Trees)	
/35094AA	Apple (ornamental)	N.F.
/35021AA	Arborvitae	
/35022AA	Ash	
/35095AA	Citrus (ornamental)	
/38049AA	Elm	
/35352AA	Filbert (ornamental)	
/35051AA	Fir	
/35052AA	Flowering Almond	
/35053AA	Flowering Apricot	
/35055AA	Flowering Cherry	
/35056AA	Flowering Peach	
/35059AA	Flowering Pear	
/35060AA	Flowering Plum	
/35093AA	Oak	
/35367AA	Olive (ornamental)	
/35098AA	Pine	
	0.50-1.00 (2 lb/gal SC/L)	RESTRICTED USE PESTICIDE. Do not use around home gardens, schools, recreational parks or playgrounds. Directed spray. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Apply in 50 to 200 gallons of water per acre. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees.
/330100A	Ornamental Lawns	N.F.
/320000A	Ornamental Plants (flower beds and foundation plantings)	General Information: Treated areas may be reseeded 24 hours after application.
/350000A	Ornamental Trees	
/340040A	Ornamental Woody Shrubs	
/670110A		
	-- (0.276% PrL)	Edging and spot treatment. Directed spray. Spray weeds thoroughly. Repeat application when necessary. Formulated with petroleum distillates.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
/35353AA	Pecan (ornamental)	N.F.
	0.50-1.00 (2 lb/gal SC/L)	RESTRICTED USE PESTICIDE. Do not use around home gardens, schools, recreational parks or playgrounds. Directed spray. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Apply in 30 to 50 gallons of water per acre. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees.
	(Noncrop, Wide Area and General Indoor/Outdoor Treatments)	
	General Warnings and Limitations: RESTRICTED USE PESTICIDE. Do not use around home gardens, schools, recreational parks or playgrounds. Apply with a non-ionic surfactant.	
670130A 670000A	Rights-of-Way	N.F. General Information: Rights-of-Way include highway, railroad, and utility (transfer station and substation) rights-of-ways.
	0.50-1.00 (2 lb/gal SC/L)	Broadcast. Apply in 50 to 100 gallons of water per acre. Repeat as needed for control of mature woody weeds. Avoid spray contact with foliage or fruit of food crops and ornamentals.
670000A	Uncultivated Non-agricultural Areas	N.F. General Information: Uncultivated Non-agricultural Areas include areas around commercial buildings, fencerows, parkways, storage yards, etc.
		Refer to Rights-of-Way for dose and use patterns.
670110A	Walks, Driveways and Posts	N.F.
		Refer to TERRESTRIAL NON-FOOD CROP, (Ornamental Plants and Forest Trees), Ornamental Lawns cluster for dosage and use patterns.

PARAQUAT DICHLORIDE

	Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
	FORESTRY	
	(Ornamental Plants and Forest Trees)	
	General Warnings and Limitations: RESTRICTED USE PESTICIDE. Do not use around home gardens, schools, recreational parks or playgrounds. Do not allow animals to graze on treated areas.	
30019AA	Arborvitae (shelterbelt)	N.F.
30042AA	Elm (shelterbelt)	
30057AA	Oak (shelterbelt)	
30058AA	Pecan (shelterbelt)	
30059AA	Pine (shelterbelt)	
	0.50-1.00 (2 lb/gal SC/L)	Directed spray. Retreatment or spot treatment may be necessary for hard-to-kill weeds. Apply with a non-ionic surfactant in 50 to 200 gallons of water per acre. Do not allow spray to contact green stems, fruit or foliage. Use a shield when spraying around young trees.
35098AA	Pine (Loblolly, Longleaf, Pitch, Pond, Shortleaf, Slash, Virginia)	N.F. General Information: Select trees from sites not subject to periods of extreme drought and from vigorous, non-stagnated stands either natural or planted. In stagnated stands or commercial timber stands, do not treat sooner than 3 years after commercial thinning. Resin soaking can occur from treatments made any time of the year, however, cool season treatments under non-drought conditions are recommended. The interval between application and tree harvest should be at least 6 months, preferably 12 to 24 months. Treatment may encourage beetle attack or cause premature death of tree. Desiccation of xylem tissue, rather than resin soaking, is more likely at higher dosages. Treatment can result in reduced stem growth.
	0.30%-5.00% cation (wt/wt) (2 lb/gal SC/L)	Resin soaking. Bore-hole application. Bore 0.38 to 0.62 inch holes 2 to 6 inches deep, depending on tree diameter, sloping slightly downward rather than directly towards center of tree. Lower concentrations are usually applied at higher volumes of 15 to 35 milliliters per tree, resulting in application of 45 to 100 milligrams per tree. Using 2 to 4 percent solutions and applying 5 milliliters per single hole per tree results in application of 100 or 200 milligrams per tree. Forty-

Site, Dosage and Formulation (lb cation/A)	Tolerance, Use, Limitations
Pine (continued)	
	five to 100 milligrams per tree have resulted in effective oleoresin induction.
1.00%-4.00% cation (wt/wt) (2 lb/gal SC/L)	Resin soaking. Tree injection. Injections should be made beneath bark and just beneath cambium layer. Make injections 1 to 2 inches apart around one-third of tree circumference, or no closer than 3 inches apart all around tree. Apply 0.2 to 0.4 milliliters per injection. Using 2 to 4 percent solution results in 36 to 144 milligrams chemical applied per 9 inch diameter tree, for holes spaced 1 inch appart around one-third of tree or 3 inches apart all around tree.
1.00%-5.00% cation (wt/wt) (2 lb/gal SC/L)	Resin soaking. Bark cut treatment. Remove a 1 inch wide streak of bark about 1 to 2 feet from ground level. Total length should not exceed one-third of tree circumference. Apply spray to exposed xylem to run-off. For a 9 inch diameter tree, 3 milliliters of spray will cover the streak. Using 3 milliliters of 2 to 4 percent solution will result in applications of 60 to 120 milligrams of chemical per streak.

AERIAL AND TANK MIX APPLICATIONS

001500 AAAAAA	Aerial Application	
	--	Refer to TERRESTRIAL FOOD CROP (Agricultural Crops) Alfalfa, Barley, Clover, Corn, Cotton, Lettuce, Melons, Peppers, Potato, Safflower, Sorghum, Soybeans, Sugar Beet, Sugarcane, Sunflower (oil crop), Tomato, Wheat
900300 AAAAAA	Tank Mix	
	--	Refer to TERRESTRIAL FOOD CROP (Agricultural Crops) Alfalfa, Apple, Corn, Corn (Field), Cotton, Peach, Pear, Sorghum (grain crop), Soybeans

PARAQUAT DICHLORIDE

Listing of Registered Pesticide Products by Formulation

5029.1002 29.1% formulation intermediate
paraquat dichloride (061601)
000239-02422

5043.5002 43.5% formulation intermediate
paraquat dichloride (061601)
000239-02460

5102.0015 2 lb/gal soluble concentrate/liquid
paraquat dichloride (061601)
000239-02186 000239-02286 010182-00074

5200.2819 0.276% pressurized liquid
paraquat dichloride (061601) plus petroleum distillates (063503)
000239-02454

9999999 State Label Registrations

AL Reg. No.
000239-04174

AZ Reg. No.
000239-04186

CA Reg. No.
000239-04224

FL Reg. No.
000239-04176 000239-04179

GA Reg. No.
000239-04177 037800-08394 037800-08395 037800-08396

HI Reg. No.
000239-04187 037843-08551

NM Reg. No.
000239-04191

OK Reg. No.
000239-04178

TX Reg. No.
000239-04174 000239-04190

Appendix A

Listing of Common Chemical Names Used on the Entry

Chemical Code	Common Name (source)	EPA Acceptable Common/Chemical Name
100101	bladex (ISO)	2-((4-chloro-6-(ethylamino)-s-triazin-2-yl)-amino)-2-methylpropionitrile
101101	metribuzin (ISO)	4-amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(4H)-one

EPA Index to Pesticide Chemicals

PARAQUAT DICHLORIDE

Appendix B

Listing by Site/Pest and Site/Formulation/Registration Number

BROADLEAF WEEDS CONTROLLED:

PAAAAAB	Annual broadleaf weeds
PCQBIAA	Burclover
PEHAGAA	Buttercup
PBZACBA	Carolina geranium
PAZAAAC	Chickweed
PCQAAAB	Clover
PBFDQAA	Cocklebur
PBFAEBA	Common ragweed
PBFDHBB	Dandelion
PEAAHAA	Dock
PBFBIBB	Dogfennel
PARABAA	Fiddleneck
PBZABAA	Filaree
PEMAEBB	Florida pursley
PBFCXAA	Groundsel
PCOAFBA	Henbit
PBKBDBA	Jim Hill mustard
PBDAEAB	Lambsquarter
PBGAAAB	Morningglory
PFGAEAA	Nettle
PDPABAA	Oxalis
PAAAAAF	Perennial weeds
PAAAABI	Pigweed
PDXABAA	Plantain
PAHABBI	Poison ivy
PFMAFBB	Puncturevine
PAAAABP	Purslane
PBFAEAA	Ragweed
PCQBYBH	Red clover
PBKAHBA	Sheperdspurse
PZAAACS	Smartweed
PBFDUAA	Spikeweed
PBVAGAA	Spurge
PBKANBB	Tansy mustard
PAAAAAX	Thistle
PDAABBB	Velvetleaf
PBKAFBE	Wild mustard
PBKBABA	Wild radish
PEUANBA	Witchweed

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

GRASSES AND OTHER MONOCOTS CONTROLLED:

:ACKBA	Annual bluegrass
:AAAAB	Annual grasses
:ABSAA	Barley (volunteer)
:ABHBB	Barnyardgrass
:AARAA	Brachiaria
:AAZBA	Bermudagrass
:ACKAA	Bluegrass
:AATAA	Brome
:ACFBL	Bullgrass
:AATBK	Cheat
:ABFAA	Crabgrass
:AAFAA	Foxtail
:ABIBA	Goosegrass
:ACWBC	Johnsongrass
:ACWBG	Johnsongrass (seedling)
:ABSBF	Little barley
CACBBD	Nimblewill
BMADAA	Nutgrass
CABBBA	Orchardgrass
CAAAAC	Perennial grasses
CABZAA	Ryegrass
CABMBE	Tall fescue
CACEBL	Texas millet
CABRBA	Velvetgrass
CAAOBB	Wild oats

WOODY PLANTS CONTROLLED:

AAAAAI	Trees
AAAAAO	Woody plants

PLANT REGULATOR CLAIMS:

ZZZZZC	Defoliant
ZZZZZB	Desiccant

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

TERRESTRIAL FOOD CROP

(Agricultural Crops)

/23001AA Alfalfa
PCACKAA Bluegrass
PCAATBK Cheat
PAZAAAC Chickweed
PBFBIBB Dogfennel
PBZABAA Filaree
PBKBDBA Jim Hill mustard
PCABZAA Ryegrass
PBKAHBA Sheperdspurse
PBKANBB Tansy mustard
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/03001AA Almond
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/04001AA Apple
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/05001AA Apricot
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/16002AA Asparagus
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/28000AA Avocado
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/22025AA Bahiagrass (pasture, rangeland)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/06002AA Banana
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/28063AA Barley
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/22017AA Bermudagrass (pasture, rangeland)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/01002AA Blackberry
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/01009AA Blueberry
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/01003AA Boysenberry
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/05002AA Cherry
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/20001AA Citrus Fruits
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/23003AA Clover
PCACKAA Bluegrass
PCAATBK Cheat
PAZAAAC Chickweed
PBFBIBB Dogfennel
PBZABAA Filaree
PBKBDBA Jim Hill mustard
PCABZAA Ryegrass
PBKAHBA Sheperdspurse
PBKANBB Tansy mustard
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/21002AA Coffee
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/28005AA Corn
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/28006AA Corn, Field
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/28007AA Cotton
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
Pests (See Plant Regulator Claims)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/06005AA Fig
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

03005AA Filbert
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

01014AA Grapes
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

28066AA Grasses (grown for seed)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

6011AA Guar
ZZZZC Defoliant
ZZZZB Desiccant
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

6006AA Guava
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
Pests (See Woody Plants Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

8020AA Hops
ACKBA Annual bluegrass
ABHBB Barnyardgrass
ZAAAC Chickweed
AAABI Pigweed
ABZAA Ryegrass
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

(Cascade, Yakima Cluster and Bullion varieties)
ACKBA Annual bluegrass
ABHBB Barnyardgrass
ZAAAC Chickweed
AAABI Pigweed
ABZAA Ryegrass
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

13020AA Lettuce
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

03007AA Macadamia Nut
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

10001AA Melons
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

15003AA Nectarine
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

18014AA Olive
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

56010AA Papaya
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

30014AA Passion Fruit
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

00035AA Pastures
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/05004AA Peach
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

'04003AA Pear
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

03008AA Pecan
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

28017AA Pepper
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

)6013AA Pineapple
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

)5005AA Plum
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

4013AA Potato
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
Pests (See Plant Regulator Claims)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

5006AA Prune
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

'28045AA Rangeland
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

'01006AA Raspberry
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/13023AA Rhubarb
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/27008AA Safflower
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/28019AA Sorghum
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/24006AA Sorghum (grain crop)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/28023AA Soybeans
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/25002AA Sugar Beets
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/25003AA Sugarcane
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
Pests (See Plant Regulator Claims)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/27011AA Sunflower (oil crop)
?ZZZZZC Defoliant
?ZZZZZB Desiccant
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/11005AA Tomato
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/03009AA Walnut
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/28065AA Wheat
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

TERRESTRIAL NON-FOOD CROP

(Ornamental Plants and Forest Trees)

/35094AA Apple (ornamental)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35021AA Arborvitae
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

'35022AA Ash
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35095AA Citrus (ornamental)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/38049AA Elm
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35352AA Filbert (ornamental)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35051AA Fir
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35052AA Flowering Almond
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35053AA Flowering Apricot
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35055AA Flowering Cherry
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

'35058AA Flowering Peach
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35059AA Flowering Pear
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35060AA Flowering Plum
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35093AA Oak
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/35367AA Olive (ornamental)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

/330100A Ornamental Lawns
PCACKBA Annual bluegrass
PCAAZBA Bermudagrass
PCACFBL Bullgrass
PAZAAAC Chickweed
PCQAAAB Clover
PCABFAA Crabgrass
PBFDHBB Dandelion
PEAAHAA Dock
PEMAEBB Florida pursley
PCAAFAA Foxtail
PCABIBA Goosegrass
PCOAFBA Henbit
PBDAEAB Lambsquarter
PCACBBD Nimblewill
PEMADAA Nutgrass
PCABBBA Orchardgrass
PDPABAA Oxalis
PDMABAA Plantain

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

Ornamental Lawns (continued)

Pest list continued from previous page.

?AHABBI	Poison ivy
?BFAEAA	Ragweed
?BVAGAA	Spurge
?CABMBE	Tall fescue
?CABRBA	Velvetgrass
?CAAOBB	Wild oats

(0.276% PrL)
000239-02454

/320000A	Ornamental Plants (flower beds and foundation plantings)
?CACKBA	Annual bluegrass
?CAAZBA	Bermudagrass
PCACFBL	Bullgrass
PAZAAAC	Chickweed
PCQAAAB	Clover
?CABFAA	Crabgrass
P5FDHBB	Dandelion
PEAAHAA	Dock
PEMAEBB	Florida pursley
PCAAFAA	Foxtail
PCABIBA	Goosegrass
PCOAFBA	Henbit
PBDAEAB	Lambsquarter
PCACBBD	Nimblewill
PBMADAA	Nutgrass
PCABBBA	Orchardgrass
PDPABAA	Oxalis
PDXABAA	Plantain
PAHABBI	Poison ivy
PBFAEAA	Ragweed
PBVAGAA	Spurge
PCABMBE	Tall fescue
PCABRBA	Velvetgrass
PCAAOBB	Wild oats

(0.276% PrL)
000239-02454

/350000A	Ornamental Trees
?CACKBA	Annual bluegrass
?CAAZBA	Bermudagrass
?CACFBL	Bullgrass
PAZAAAC	Chickweed
PCQAAAB	Clover
?CABFAA	Crabgrass
P5FDHBB	Dandelion

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

Ornamental Trees (continued)

Pest list continued from previous page.

?EAAHAA Dock
?EMAEBB Florida pursley
?CAAFAA Foxtail
?CABIBA Goosegrass
?COAFBA Henbit
?BDAEAB Lambsquarter
?CACBBD Nimblewill
?BMADAA Nutgrass
?CABBBA Orchardgrass
?DPABAA Oxalis
?DXABAA Plantain
?AHABBI Poison ivy
?BFAEAA Ragweed
?BVAGAA Spurge
?CABMBE Tall fescue
?CABRBA Velvetgrass
?CAAOBB Wild oats
(0.276% PrL)
000239-02454

'340040A Ornamental Woody Shrubs
'CACKBA Annual bluegrass
'CAAZBA Bermudagrass
'CACFBL Bullgrass
'AZAAAC Chickweed
'CQAAAB Clover
'CABFAA Crabgrass
'BFDHBB Dandelion
EAAHAA Dock
EMAEBB Florida pursley
'CAAFAA Foxtail
CABIBA Goosegrass
COAFBA Henbit
BDAEAB Lambsquarter
CACBBD Nimblewill
BMADAA Nutgrass
CABBBA Orchardgrass
DPABAA Oxalis
DXABAA Plantain
AHABBI Poison ivy
BFAEAA Ragweed
BVAGAA Spurge
CABMBE Tall fescue
CABRBA Velvetgrass
CAAOBB Wild oats

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

Ornamental Woody Shrubs (continued)

(0.276% PrL)
000239-02454

35353AA Pecan (ornamental)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

35098AA Pine
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

(Noncrop, Wide Area and General Indoor/Outdoor Treatments)

670130A Rights-of-Way
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

670000A Uncultivated Non-agricultural Areas
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

670110A Walks, Driveways and Posts
CACKBA Annual bluegrass
CAAZBA Bermudagrass
CACFBL Bullgrass
AZAAAC Chickweed
CQAAAB Clover
CABFAA Crabgrass
BFDHBB Dandelion
EAAHAA Dock
EMAEBB Florida pursley
CAAFAA Foxtail
CABIBA Goosegrass
COAFBA Henbit
BDAEAB Lambsquarter
CAC3BD Nimblewill
EMADAA Nutgrass
CABBBA Orchardgrass
DPABAA Oxalis

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

Walks, Driveways and Posts (continued)

Pest list continued from previous page.

DXABAA Plantain
AHABBI Poison ivy
BFAEAA Ragweed
BVAGAA Spurge
CABMBE Tall fescue
CABRBA Velvetgrass
CAAOBB Wild oats
(0.276% PrL)
000239-02454

FORESTRY

(Ornamental Plants and Forest Trees)

0019AA Arborvitae (shelterbelt)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

0042AA Elm (shelterbelt)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

0057AA Oak (shelterbelt)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

0058AA Pecan (shelterbelt)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

0098AA Pine (Loblolly, Longleaf, Pitch, Pond, Shortleaf, Slash, Virginia)
AAAI Trees
AAAO Woody plants
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

30059AA Pine (shelterbelt)
Pests (See Broadleaf Weeds Controlled)
Pests (See Grasses and Other Monocots Controlled)
(2 lb/gal SC/L)
000239-02186 000239-02286 010182-00074

EPA Index to Pesticide Chemicals

PARAQUAT DICHLORIDE

Auxiliary Documentation

The following state labels were cancelled as of 7/3/84.

010965-09873
010965-09905
010965-09907
010965-09909

IV. BIBLOGRAPHY APPENDICES

Guide to bibliography

Biblography

Guide to Use of This Bibliography

1. CONTENT OF BIBLIOGRAPHY. This bibliography contains citations of all studies considered relevant by EPA in arriving at the positions and conclusions stated elsewhere in the Standard. Primary sources for studies in this bibliography have been the body of data submitted to EPA and its predecessor agencies in support of past regulatory decisions. Selections from other sources including the published literature, in those instances where they have been considered, will be included.

2. UNITS OF ENTRY. The unit of entry in this bibliography is called a "study." In the case of published materials, this corresponds closely to an article. In the case of unpublished materials submitted to the Agency, the Agency has sought to identify documents at a level parallel to the published article from within the typically larger volumes in which they were submitted. The resulting "studies" generally have a distinct title (or at least a single subject), can stand alone for purposes of review, and can be described with a conventional bibliographic citation. The Agency has attempted also to unite basic documents and commentaries upon them, treating them as a single study.

3. IDENTIFICATION OF ENTRIES. The entries in this bibliography are sorted numerically by "Master Record Identifier," or MRID, number. This number is unique to the citation, and should be used at any time specific reference is required. It is not related to the six-digit "Accession Number" which has been used to identify volumes of submitted studies; see paragraph 4(d)(4) below for a further explanation. In a few cases, entries added to the bibliography late in the review may be preceded by a nine-character temporary identifier. These entries are listed after all MRID entries. This temporary identifier number is also to be used whenever specific reference is needed.

4. FORM OF ENTRY. In addition to the Master Record Identifier (MRID), each entry consists of a citation containing standard elements followed, in the case of material submitted to EPA, by a description of the earliest known submission. Bibliographic conventions used reflect the standards of the American National Standards Institute (ANSI), expanded to provide for certain special needs.

OFFICE OF PESTICIDE PROGRAMS
REGISTRATION STANDARD BIBLIOGRAPHY
Citations Considered to be Part of the Data Base Supporting
Registrations Under the Paraquat Standard

MRID CITATION

00012677 Christensen, M.D.; Mangini, L. (1977) Test No.: OW OI 252 76; Objective No. 303060. (Unpublished study received Jul 12, 1977 under 100-501; submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:096243-H)

00012698 Zaccaria, J.J. (1977) Test No.: 02 OI 006 76; Objective No. 303060. (Unpublished study received Jul 12, 1977 under 100-501; submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:096243-AC)

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V. FORMS APPENDICES

EPA Form 8580-1	FIFRA 3(c)(2)(B) Summary Sheet
EPA Form 8580-6	Certification of Attempt to Enter Into an Agreement with Other Registrants for Development of Data
EPA Form 8580-	Product Specific Data Report (End-Use Products)
EPA Form 8580-	Formulators Exemption Statement

OMB Approval No. 2000-0468

FIFRA SECTION 3(C)(2)(B) SUMMARY SHEET	EPA REGISTRATION NO.
PRODUCT NAME	
APPLICANT'S NAME	DATE GUIDANCE DOCUMENT ISSUED

With respect to the requirement to submit "generic" data imposed by the FIFRA section 3(C)(2)(B) notice contained in the referenced Guidance Document, I am responding in the following manner:

☐ 1. I will submit data in a timely manner to satisfy the following requirements. If the test procedures I will use deviate from (or are not specified in) the Registration Guidelines or the Protocols contained in the Reports of Expert Groups to the Chemicals Group, OECD Chemicals Testing Programme, I enclose the protocols that I will use:

☐ 2. I have entered into an agreement with one or more other registrants under FIFRA section 3(C)(2)(B)(ii) to satisfy the following data requirements. The tests, and any required protocols, will be submitted to EPA by:

NAME OF OTHER REGISTRANT

☐ 3. I enclose a completed "Certification of Attempt to Enter Into an Agreement with Other Registrants for Development of Data" with respect to the following data requirements:

☐ 4. I request that you amend my registration by deleting the following uses (this option is not available to applicants for new products):

☐ 5. I request voluntary cancellation of the registration of this product. (This option is not available to applicants for new products.)

REGISTRANT'S AUTHORIZED REPRESENTATIVE	SIGNATURE	DATE

EPA Form 8580-1 (10-82)

OMB Approval No. 2000-0468

CERTIFICATION OF ATTEMPT TO ENTER INTO AN AGREEMENT WITH OTHER REGISTRANTS FOR DEVELOPMENT OF DATA

(To qualify, certify ALL four items)

1. I am duly authorized to represent the following firm(s) who are subject to the requirements of a Notice under FIFRA Section 3(c)(2)(B) contained in a Guidance Document to submit data concerning the active ingredient:	GUIDANCE DOCUMENT DATE ACTIVE INGREDIENT
NAME OF FIRM	EPA COMPANY NUMBER

(This firm or group of firms is referred to below as "my firm".)

2. My firm is willing to develop and submit the data as required by that Notice, if necessary. However, my firm would prefer to enter into an agreement with one or more other registrants to develop jointly, or to share in the cost of developing, the following required items or data:

3. My firm has offered in writing to enter into such an agreement. Copies of the offers are attached. That offer was irrevocable and included an offer to be bound by an arbitration decision under FIFRA Section 3(c)(2)(B)(iii) if final agreement on all terms could not be reached otherwise. This offer was made to the following firm(s) on the following date(s):

NAME OF FIRM	DATE OF OFFER

However, none of those firm(s) accepted my offer.

4. My firm requests that EPA not suspend the registration(s) of my firm's product(s), if any of the firms named in paragraph (3) above have agreed to submit the data listed in paragraph (2) above in accordance with the Notice. I understand EPA will promptly inform me whether my firm must submit data to avoid suspension of its registration(s) under FIFRA Section 3(c)(2)(B). (This statement does not apply to applicants for new products.) I give EPA permission to disclose this statement upon request.

TYPED NAME	SIGNATURE	DATE

EPA Form 8580-6 (10-82)

PRODUCT SPECIFIC DATA REPORT

EPA Registration No. _____ Guidance Document for _____

Date _____

Registration Guideline No.	Name of Test	Test not required for my product listed above (check below)	I am complying with data requirements by		(For EPA Use Only) Accession Numbers Assigned
			Citing MRID#	Submitting Data (Attached)	
§158.20 PRODUCT CHEMISTRY					
61-1	Identity of ingredients				
61-2	Statement of composition				
61-3	Discussion of formation of ingredients				
62-1	Preliminary analysis				
62-2	Certification of limits				
62-3	Analytical methods for enforcement limits				
63-2	Color				
63-3	Physical state				
63-4	Odor				
63-5	Melting point				
63-6	Boiling point				
63-7	Density, bulk-density, or specific gravity				
63-8	Solubility				
63-9	Vapor pressure				
63-10	Dissociation constant				
63-11	Octanol/water partition coefficient				
63-12	pH				

Registration Guideline No.	Name of Test	Test not required for my product listed above (check below)	I am complying with data requirements by		(For EPA Use Only) Accession Numbers Assigned
			Citing MRID#	Submitting Data (Attached)	
63-13	Stability				
63-14	Oxidizing/reducing reaction				
63-15	Flammability				
63-16	Explodability				
63-17	Storage stability				
63-18	Viscosity				
63-19	Miscibility				
63-20	Corrosion characteristics				
63-21	Dielectric breakdown voltage				
§158.135 TOXICOLOGY					
81-1	Acute oral LD-50, rat				
81-2	Acute dermal LD-50				
81-3	Acute inhalation, LC-50 rat				
81-4	Primary eye irritation, rabbit				
81-5	Primary dermal irritation				
81-6	Dermal sensitization				