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Streptomycin Summary Document
Registration Review: Initial Docket
December 2008

Case # 0169

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Approved by:

for **Steven Bradbury, Ph.D.**
Director, Special Review and
Reregistration Division

Date: 12/9/08

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Please Note

This Preliminary Work Plan and Fact Sheet summarize the Environmental Protection Agency's current position based on the following supporting documents:

1. Preliminary Problem Formulation for the Environmental Risk Assessment of Streptomycin. September 3, 2008.

2. Streptomycin Sulfate and Streptomycin Human Health Assessment Scoping Document in Support of Reregistration Review. September 17, 2008.

3. Streptomycin Sulfate and Streptomycin Human Health Assessment Scoping Document in Support of Reregistration Review. October 23, 2008.

4. Streptomycin Screening Level Usage Analysis (SLUA). February 27, 2008.

5. Streptomycin Sulfate Screening Level Usage Analysis (SLUA). February 27, 2008.

6. Appendix A: Food/Feed & Non-Food/Non-Feed Uses Considered in Registration Review Work Planning: Streptomycin Sulfate. April 03, 2008.

Additional documents for streptomycin may be found in the docket EPA-HQ-OPP-2008-0687 at www.regulations.gov.

I. Preliminary Work Plan

Introduction

The Food Quality Protection Act (FQPA) of 1996 mandated the registration review program. All pesticides distributed or sold in the United States generally must be registered by the U.S. Environmental Protection Agency (USEPA, EPA, or the Agency) EPA, based on scientific data showing that they will not cause unreasonable risks to human health, workers or the environment when used as directed on product labeling. The registration review program is intended to make sure that, as the ability to assess risk evolves and as policies and practices change, all registered pesticides continue to meet the statutory standard of no unreasonable adverse effects. Changes in science, public policy, and pesticide use practices will occur over time. Through the registration review program, the Agency periodically reevaluates pesticides to make sure that as change occurs, products in the marketplace can be used safely. Information on this program is provided at http://www.epa.gov/oppsrrd1/registration_review/.

The Agency has begun to implement the registration review program and will review each registered pesticide every 15 years to determine whether it continues to meet the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) standard for registration. The public phase of registration review begins when the initial docket is opened for each case. The docket is the Agency's opportunity to state what is knows about the pesticide and what additional risk analyses and data it believes are needed to make a registration review decision. After reviewing and responding to comments and data received during this initial comment period, the Agency will develop and commit to a final work plan and schedule for the registration review of streptomycin.

Streptomycin (Case # 0169) contains the active ingredients streptomycin sulfate (PC Code 006310) and streptomycin (PC Code 006306), which are considered equivalent in this document and will both be referred to as streptomycin. There are no active registrations for the active ingredient streptomycin (006306). Streptomycin is an antibiotic pesticide in agriculture used mainly as one of the few tools available to treat apples and pears for fire blight. There are also minor uses on peppers, tobacco, and tomatoes. Registered formulations of streptomycin include dusts, soluble concentrates, and wettable powders. These formulations are generally applied by ground or aerial spray, though it can also be used as a liquid soak, dust treatment, and seed treatment. There is also pharmaceutical use of streptomycin as an injectable antibiotic drug in humans and animals.

Anticipated Risk Assessment and Data Needs

The Agency anticipates conducting a human health risk assessment of occupational handlers of streptomycin, as well as a comprehensive ecological risk assessment for streptomycin. The Agency will conduct an endangered species assessment for streptomycin.

Ecological Risk:

- The most recent comprehensive ecological risk assessment for registered uses of streptomycin was conducted in support of the 1992 streptomycin RED.

- The Agency anticipates needing the following data in order to conduct a complete ecological risk assessment, including an endangered species assessment, for all uses:

  Environmental Fate Studies:

  - A Data Call-in (DCI) was sent to the registrants in July 2008 requesting four environmental fate studies. The Agency is currently reviewing the response to the DCI from the registrants. Refer to the *Data Call-in Status* section on page 14 below for further details.

  - Required environmental fate data will address some of the uncertainties laid out in the 2006 streptomycin TRED regarding potential antibiotic resistance from pesticidal uses.

  - Given the estimated persistence/high mobility and solubility of streptomycin, the chemical is expected to dissipate relatively slowly and at the same time be vulnerable to leaching/run-off. Thus, the Agency anticipates requiring the following additional fate data:

    - (GLN 830.7370) Dissociation Constant
    - (GLN 835.4200) Anaerobic Soil Metabolism
    - (GLN 835.4300) Aerobic Aquatic Metabolism
    - (GLN 835.4400) Anaerobic Aquatic Metabolism
    - (GLN 835.1240) Adsorption/Desorption

  Ecological Effects Studies:

  - No chronic data are available for birds, fish, or aquatic invertebrates. Although acute data do not appear to indicate a risk to these organisms, there is a potential for chronic risk.

  - Terrestrial plant toxicity data are not available for streptomycin.

  - Tier 2 aquatic plant toxicity data are required given that the 1992 RED risk assessment indicated that streptomycin is highly toxic to non-vascular plants (algae). These data will provide more definitive information for the risk assessment.

- (GLN 850.2300) Avian Reproduction
- (GLN 850.1300) Freshwater Invertebrate Life Cycle
- (GLN 850.1400) Freshwater Fish Early Life Stage
- (GLN 850.4100) Terrestrial Plant Toxicity – Tier 1 Seedling Emergence
- (GLN 850.4150) Terrestrial Plant Toxicity – Tier 1 Vegetative Vigor
- (GLN 850.4400) Aquatic Plant Toxicity – Tier 2 Vascular
- (GLN 850.5400) Aquatic Plant Toxicity – Tier 2 Nonvascular

- The planned ecological risk assessment will allow the Agency to determine whether streptomycin use has "no effect" on, or "may affect" federally listed threatened or endangered species (listed species) or their designated critical habitats. If the assessment indicates that streptomycin "may affect" a listed species or its designated critical habitat, the assessment will be refined. The refined assessment will allow the Agency to determine whether use of streptomycin is "likely to adversely affect" the species or critical habitat or "not likely to adversely affect" the species or critical habitat. When an assessment concludes that a pesticide's use "may affect" a listed species or its designated critical habitat, whether those effects are likely or not likely, the Agency will consult with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service (Services), as appropriate.

- Please refer to the *Preliminary Problem Formulation for the Environmental Risk Assessment of Streptomycin* for a detailed discussion of the anticipated risk assessment needs.

Human Health Risk:

- The most recent human health risk assessment for registered uses of streptomycin was conducted in support of the 2006 streptomycin TRED.

- The Agency anticipates conducting an occupational exposure assessment during the registration review of streptomycin.

- All toxicity data requirements are waived for streptomycin because of the extensive database in humans and animals that exists from the streptomycin drug use.

- Please refer to the *Streptomycin Sulfate and Streptomycin Human Health Assessment Scoping Document in Support of Reregistration Review (09/17/08)* for a detailed discussion of the anticipated risk assessment needs.

Timeline

EPA has created the following estimated timeline for the completion of the streptomycin registration review.

Registration Review for Streptomycin Projected Registration Review Timeline	
Activities	**Estimated Completion**
Phase 1: Opening the docket	
Open Docket and Public Comment Period for Streptomycin	2008 – Dec.
Close Public Comment Period	2009 – March
Phase 2: Case Development	
Final Work Plan (FWP)	2009 - May
Issue DCI	2010 – Jan-March
Data Submission	2012 – Jan-March
Open Public Comment Period for Preliminary Risk Assessments	2013 – July-Sept.
Close Public Comment Period	2013 – Oct-Dec.
Phase 3: Registration Review Decision	
Open Public Comment Period for Proposed Registration Review Decision	2014 – Jan-March
Close Public Comment Period	2014 – Apr.-June
Final Registration Review Decision and Begin Post-Decision Follow-up	2014 – July-Sept.
Total (years)	6

Guidance for Commenters

The public is invited to comment on EPA's preliminary registration review work plan and rationale. The Agency will carefully consider all comments as well as any additional information or data provided in a timely manner prior to issuing a final work plan for the streptomycin registration review case.

Through the registration review process, the Agency intends to solicit information on trade irritants and, to the extent feasible, take steps toward facilitating irritant resolution. Growers and other stakeholders are asked to comment on any trade irritant issues resulting from lack of Maximum Residue Limits (MRLs) or disparities between U.S. tolerances and MRLs in key export markets, providing as much specificity as possible regarding the nature of the concern.

Streptomycin is not identified as a cause of impairment for any water bodies listed as impaired under section 303(d) of the Clean Water Act, based on information provided at http://oaspub.epa.gov/tmdl/waters_list.impairments?p_impid=3. The Agency invites submission of water quality data for this pesticide. To the extent possible, data should conform to the quality

standards in Appendix A of the *OPP Standard Operating Procedure: Inclusion of Impaired Water Body and Other Water Quality Data in OPP's Registration Review Risk Assessment and Management Process* (see: http://www.epa.gov/oppfead1/cb/ppdc/2006/november06/session1-sop.pdf), in order to ensure they can be used quantitatively or qualitatively in pesticide risk assessments.

EPA seeks to achieve environmental justice, the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, in the development, implementation, and enforcement of environmental laws, regulations, and policies. To help address potential environmental justice issues, the Agency seeks information on any groups or segments of the population who, as a result of their location, cultural practices, or other factors, may have atypical or unusually high exposure to streptomycin, compared to the general population. Please comment if you are aware of any sub-populations that may have atypical or unusually high exposure compared to the general population.

Stakeholders are asked to provide information regarding the anticipated environmental fate and ecological effects data requirements for streptomycin resulting from streptomycin pharmaceutical use.

Stakeholders are also specifically asked to provide information and data that will assist the Agency in refining the ecological risk assessment, including any species-specific effects determinations. The Agency is interested in receiving the following information regarding the use of streptomycin:

1. confirmation on the following label information
    a. sites of application
    b. formulations
    c. application methods and equipment
    d. maximum application rates in units related to mass per unit area of treatment zone
    e. frequency of application, application intervals, and maximum number of applications per season
    f. geographic limitations on use
2. use or potential use distribution (e.g., acreage and geographical distribution of relevant crops)
3. use history
4. median and 90th percentile reported use rates (lbs ai/acre) from usage data – national, state, and county
5. application timing (date of first application and application intervals) by crop – national, state, and county
6. sub-county crop location data
7. usage/use information for non-agricultural uses (e.g., forestry, residential, rights-of-way)
8. directly acquired county-level usage data (not derived from state level data)
    a. maximum reported use rate (lbs ai/acre) from usage data – county
    b. percent crop treated – county
    c. median and 90th percentile number of applications – county
    d. total pounds per year – county

e. the year the pesticide was last used in the county/sub-county area
f. the years in which the pesticide was applied in the county/sub-county area

9. typical interval (days)
10. state or local use restrictions
11. ecological incidents (non-target plant damage and avian, fish, reptilian, amphibian and mammalian mortalities) not already reported to the Agency
12. monitoring data

Next Steps

After the 90-day comment period closes, the Agency will review any comments received in a timely manner and then issue a final work plan for this pesticide.

II. Fact Sheet

Background Information

- Streptomycin (Streptomycin sulfate and Streptomycin) registration review case number: 0169
- Streptomycin sulfate PC Code: 006310; CAS#: 3810-74-0
- Streptomycin PC Code: 006306; CAS#: 57-92-1
  - There are currently no active registrations of this active ingredient.
- Technical Registrants:
  - Agrosource, Inc.
  - Celsius Property B.V., Amsterdam (NL)
  - Danisco USA, Inc.
  - Nufarm Americas, Inc.
  - Repar Corp.
- Used to treat bacterial infection in humans and animals since the 1940s.
- First registered as a pesticide in 1955.
- US permanent tolerances are established for streptomycin.
- Reregistration Eligibility Decision (RED) issued in September 1992.
- Tolerance Reassessment Decision (TRED) issued in June 2006.
- There are currently 13 end-use and 5 technical active registrations.
- Special Review and Reregistration Division Chemical Review Manager (CRM): José Gayoso: gayoso.jose@epa.gov
- Registration Division (RD) Contacts: Tamue Gibson: gibson.tamue@epa.gov and Mary Waller: waller.mary@epa.gov

Use & Usage Information

For additional details on label rates and allowed uses, please refer to the *Screening Level Usage Analysis (SLUA)* for streptomycin in the registration review docket.

- Streptomycin is an antibiotic which can be used on humans, animals, and plants.
- Use patterns include uses as a bactericide.
- The main agricultural use of streptomycin is to control fire blight (*Erwinia amylovora*) in apples and pears.
- Use sites include foliar treatment of apples and pear; seedlings of celery, peppers, tomatoes, and tobacco; nursery plants; roses and ornamentals; seed and seed pieces treatment of beans and potatoes.
- Streptomycin is formulated for use as a dust, wettable powder, and soluble concentrate.
- Formulations can be applied by ground or aerial spray, liquid soak, dust treatment, or seed treatment.

- The Agency currently estimates a total between 20,000 – 40,000 lbs. of streptomycin applied mostly on apples and pears, and minor usage on tobacco, peppers, tomatoes, almonds, and cucumbers.

Recent Actions

- A Data Call-In (DCI) was sent to the technical registrants in July 2008 requesting environmental fate and use and usage data on streptomycin. The Agency is currently reviewing the response to the DCI from the registrants. Please refer to the *Data Call-in Status* section on page 14 below for further details.
- The Agency conducted a qualitative assessment for the 2006 TRED of antibiotic resistance of bacterial pathogens resulting from the pesticidal use of streptomycin. Please see the *Antibiotic Resistance* section on page 13 below for further details.

Ecological Risk Assessment Status

Please refer to *Preliminary Problem Formulation for the Environmental Risk Assessment of Streptomycin,* located in the streptomycin registration review docket, for a detailed discussion of the anticipated ecological risk assessment needs. The following ecological outcomes are anticipated based on the limited data and risk assessments currently available.

- Streptomycin, when used in accordance with current labels, can result in off-site movement of the compound via runoff, spray drift, and direct spray, leading to exposure of nontarget plants and animals.

Risk to Terrestrial Organisms:

- While acute and sub-chronic toxicity data do not indicate a risk to birds, there is a potential for chronic exposure because streptomycin labels allow for multiple repeat applications, and application sites include sites frequented by birds.
- Acute toxicity data are expected to be required to assess risk to terrestrial plants.

Risk to Aquatic Organisms:

- While acute toxicity data do not indicate a risk to freshwater fish and aquatic invertebrates, there is a potential for chronic exposure since, based on available information, streptomycin is considered stable in water at pH 7.
- The previous risk assessment for the 1992 RED describes streptomycin as highly toxic to aquatic plants. Additional toxicity data are expected to be required to assess the effect of streptomycin on aquatic habitats.

Human Health Risk Status

Please refer to *Streptomycin and Streptomycin Sulfate Human Health Assessment Scoping Document in Support of Registration Review (09/17/08),* for a detailed discussion of the anticipated risk assessment needs for human health. The following is a summary of those anticipated needs:

Hazard Characterization:

- When considering the extensive database from drug use, the toxicological database is complete and adequate for the registration review of streptomycin.

Dietary Risk (Food and Water):

- In the 2006 streptomycin TRED, the Agency only assessed chronic dietary exposure. The highest exposure for all infants utilized 9.0% of the chronic population adjusted dose (cPAD). Therefore, current dietary exposure is not of concern.
- A new drinking water assessment will be conducted in support of registration review of streptomycin. As a result, a new dietary assessment may also be required to incorporate potential changes to estimated streptomycin drinking water concentrations.

Residential Risk:

- Residential exposure to streptomycin can occur from using handheld equipment. This may result in dermal and inhalation exposure.
- Risks from dermal exposure were not calculated because dermal absorption is so minimal that systemic toxicity is not of concern.
- Risks from inhalation were calculated and assessed to be below the Agency's level of concern.

Aggregate Risk:

- An aggregate risk assessment was conducted from food, drinking water, and residential exposures for the 2006 streptomycin TRED, and showed the combined risks to be below the Agency's level of concern.
- A pharmaceutical aggregate risk assessment was conducted for the 2006 streptomycin TRED to examine the impact of pesticidal streptomycin exposure on a pharmaceutical user of streptomycin. The Agency found that the pharmaceutical streptomycin exposure a user is expected to receive from a typical therapeutic dose is 3,000 to 21,000 times greater than the estimated dietary exposure from the pesticidal sources of streptomycin. Therefore, because the pesticide exposure has no more than a minimal impact on the total dose to a pharmaceutical user, the Agency concluded that there is a reasonable certainty that the potential dietary pesticide exposure of streptomycin will result in no harm to a pharmaceutical user of streptomycin.

Occupational Risk:

- Dermal and inhalation exposures to streptomycin can occur when occupational handlers use typical agricultural equipment.
- Labels specify the use of personal protective clothing/equipment and/or respirators to reduce the possibility of allergic responses to exposure,
- Risk from inhalation exposure should be calculated for registration review, although it is anticipated that, like residential handler risk, occupational handler risk would not be of concern.
- Post-application occupational exposures were not calculated in previous risk assessments. Post-application assessments are not needed because dermal absorption and inhalation post-application exposure are expected to be negligible.

Human Studies:

- The 2006 assessment references two studies which may have involved intentional exposure of human subjects. The Agency intends to consider these studies in the course of the registration review for streptomycin; if the Agency decides to rely on any of these studies, the Agency will ensure that all applicable regulatory requirements are met, including, but not limited to, the requirements for EPA ethics review and Human Studies Review Board review of certain research involving intentional exposure of human subjects.

Antibiotic Resistance:

- The Agency consulted the U.S. Centers for Disease Control and Prevention (CDC), U.S. Food and Drug Administration (FDA) Center for Drug Evaluation and Research (CDER) and Center for Veterinary Medicine (CVM), and U.S. Department of Agriculture (USDA) before assessing the potential for development of antibiotic resistance from agricultural uses of streptomycin. The 2006 streptomycin TRED included a qualitative assessment that the possibility of antibiotic resistance of bacterial pathogens resulting in adverse human health consequences was of medium concern following occupational application and was of high concern following application by residential users. Additionally, the Agency has requested, and expects to request further, environmental fate data to address some of the uncertainties regarding potential antibiotic resistance. No further antibiotic resistance data is needed in support of the human health assessment for the registration review of streptomycin. For further information, please refer to *Streptomycin Sulfate and Streptomycin HED Chapter of the (TRED)* in the streptomycin reregistration docket EPA-HQ-OPP-2005-0493 at www.regulations.gov.

Incidents

- No ecological incidents have been reported for streptomycin based on a recent review of the Agency's Ecological Incident Information System (EIIS).
- There were relatively few reports of ill effects from exposure to streptomycin based on a review of incident reports that was conducted for the 2006 TRED. Most cases involved allergic reactions in workers who were exposed to residues of streptomycin.
- In September 2008, the Agency consulted the Incident Data System (IDS) to conduct a review of streptomycin incident reports in the United States dating back to 2002. No incidents were reported.

Tolerances

- According to Code of Federal Regulations, 40 CFR 180.245, the U.S. has established permanent tolerances for residues of streptomycin in/on celery, peppers, tomatoes, potatoes, and pome fruits of 0.25 ppm. The Agency has recommended the establishment of a tolerance of 0.50 ppm for succulent and dry beans. The recommended value was used in the previously conducted dietary assessment.

- The FDA has established tolerances for residues, resulting from pharmaceutical use, of streptomycin in uncooked, edible tissues of chickens, swine, and calves of 2.0 ppm in kidney and 0.5 ppm in other tissues as listed in 21 CFR 556.610.

Data Call-In Status

- DCIs were sent to the technical registrants of streptomycin in July 2008 requiring the studies listed below. The Agency is currently reviewing responses from the registrants.

Environmental Fate Studies:

- (GLN 835.1230) Sediment and Soil Adsorption/Desorption for Parent and Degradates
- (GLN 835.2120) Hydrolysis of parent and degradates as a function of pH at 25° C
- (GLN 835.2240) Direct Photolysis Rate of Parent and Degradates in Water
- (GLN 835.4100) Aerobic Soil Metabolism

Product Chemistry Studies:

- (GLN 830.7050) UV/Visible Absorption

Use and Usage

- (GLN 810.1000) Overview, Definitions, and General Considerations

Labels

A list of registration numbers is included below and the labels can be obtained from the Pesticide Product Label System (PPLS) website: http://oaspub.epa.gov/pestlabl/ppls.home.

Section 3 Registrations

Registration #	Name	Company Name	Active Ingredient
264-974	Gustafson Ag-Streptomycin	Bayer Cropscience Lp	Streptomycin sulfate
3468-59	Potato Seed Treater A-Strep	Schall Chemical Supply, L.L.C.	Streptomycin sulfate
5481-512	Streptomycin 17	Amvac Chemical Corporation	Streptomycin sulfate
7401-311	Ferti-Lome Fire Blight Spray	Voluntary Purchasing Groups, Inc.	Streptomycin sulfate
34704-994	Agsco Dustret "A"	Loveland Products, Inc.	Streptomycin sulfate

55146-79	Streptomycin Sulfate Technical	Nufarm Americas Inc.	Streptomycin sulfate
55146-80	Streptomycin Sulfate WP	Nufarm Americas Inc.	Streptomycin sulfate
55146-96	Agri-Mycin 17 Agricultural Streptomycin	Nufarm Americas Inc.	Streptomycin sulfate
55146-98	As-50 Agricultural Streptomycin	Nufarm Americas Inc.	Streptomycin sulfate
66222-121	Ag Streptomycin	Makhteshim-Agan Of North America Inc	Streptomycin sulfate
69361-4	Streptomycin 3000 Dust	Repar Corp	Streptomycin sulfate
69361-8	Repar Strepto-Sulfate Technical	Repar Corp	Streptomycin sulfate
69361-9	Repar Streptomycin 17	Repar Corp	Streptomycin sulfate
69678-1	Streptomycin Sulfate Technical	Danisco USA Inc.	Streptomycin sulfate
80990-3	RG S 50 WP	Agrosource, Inc.	Streptomycin sulfate
80990-4	Firewall 17wp Fungicide/Bactericide Agircultural Streptomycin	Agrosource, Inc.	Streptomycin sulfate
80990-5	Agroscience Streptomycin Technical Fungicide/Bactericide Agr	Agrosource, inc.	Streptomycin sulfate
83558-18	Nations Ag II Streptomycin Sulfate Technical	Celsius Property, Bv (Neuhasen A Rhf Branch)	Streptomycin sulfate

III. Glossary of Terms and Abbreviations

ai	Active Ingredient
AR	Anticipated Residue
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
cPAD	Chronic Population Adjusted Dose
CDC	Centers for Disease Control and Prevention
CDER	Center for Drug Evaluation and Research
CSF	Confidential Statement of Formula
CSFII	USDA Continuing Surveys for Food Intake by Individuals
CVM	Center for Veterinary Medicine
DCI	Data Call-In
DEEM	Dietary Exposure Evaluation Model
DFR	Dislodgeable Foliar Residue
DNT	Developmental Neurotoxicity
DWLOC	Drinking Water Level of Comparison
EC	Emulsifiable Concentrate Formulation
EDWC	Estimated Drinking Water Concentration
EEC	Estimated Environmental Concentration
EPA	Environmental Protection Agency
EUP	End-Use Product
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FFDCA	Federal Food, Drug, and Cosmetic Act
FQPA	Food Quality Protection Act
FOB	Functional Observation Battery
GENEEC	Tier I Surface Water Computer Model
IR	Index Reservoir
LC_{50}	Median Lethal Concentration. A statistically derived concentration of a substance that can be expected to cause death in 50% of test animals. It is usually expressed as the weight of substance per weight or volume of water, air or feed, e.g., mg/l, mg/kg or ppm.
LD_{50}	Median Lethal Dose. A statistically derived single dose that can be expected to cause death in 50% of the test animals when administered by the route indicated (oral, dermal, inhalation). It is expressed as a weight of substance per unit weight of animal, e.g., mg/kg.
LOC	Level of Concern
LOAEL	Lowest Observed Adverse Effect Level
µg/g	Micrograms Per Gram
µg/L	Micrograms Per Liter
mg/kg/day	Milligram Per Kilogram Per Day
mg/L	Milligrams Per Liter
MOE	Margin of Exposure
MRID	Master Record Identification (number). EPA's system of recording and tracking submitted studies.
MUP	Manufacturing-Use Product
NA	Not Applicable
NAWQA	USGS National Ambient Water Quality Assessment
NPDES	National Pollutant Discharge Elimination System
NR	Not Required
NOAEL	No Observed Adverse Effect Level
OPP	EPA Office of Pesticide Programs
OPPTS	EPA Office of Prevention, Pesticides and Toxic Substances
PAD	Population Adjusted Dose

PC	Pesticide Chemical
PCA	Percent Crop Area
PDP	USDA Pesticide Data Program
PHED	Pesticide Handler's Exposure Data
PHI	Preharvest Interval
ppb	Parts Per Billion
PPE	Personal Protective Equipment
ppm	Parts Per Million
PRZM/EXAMS	Tier II Surface Water Computer Model
Q_1*	The Carcinogenic Potential of a Compound, Quantified by the EPA's Cancer Risk Model
RAC	Raw Agriculture Commodity
RED	Reregistration Eligibility Decision
REI	Restricted Entry Interval
RfD	Reference Dose
RQ	Risk Quotient
SCI-GROW	Tier I Ground Water Computer Model
SAP	Science Advisory Panel
SF	Safety Factor
SLN	Special Local Need (Registrations Under Section 24©) of FIFRA)
TGAI	Technical Grade Active Ingredient
USDA	United States Department of Agriculture
UF	Uncertainty Factor
WPS	Worker Protection Standard