UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: EFED Team Review of the Tebuthiuron Registration Eligibility Document (List A, Case # 0054)

FROM: Evert K. Byington, Chief Evert K Byington
Science Analysis and Coordination Staff,
Environmental Fate and Effects Division

TO: Lois Rossi, Chief
Reregistration Branch,
Special Review and Reregistration Division

The EFED Tebuthiuron Team has reviewed the Registration Eligibility Document for Tebuthiuron and has the following comments and/or revisions. If these comments are addressed, then EFED RED Team can concur on the revised RED.

Add the following names to the EFED RED TEAM, page i:

Betsy Behl	Environmental Fate and Groundwater Branch
Paul Mastradone	Environmental Fate and Groundwater Branch
Harry Craven	Ecological Effects Branch

Page 18:

C. Environmental Assessment

Change the numbering to 1 for Environmental Fate instead of 4.

Page 21:

Change reasonable "worst case" scenario to reasonable "high exposure" scenario.

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Page 23:

Just before the Label Advisory, add the following sentence at the end of the first paragraph:

After: A small-scale retrospective ground-water study indicates that tebuthiuron is persistent and mobile and can leach to ground water. **Add:** Moreover, the results of the study indicated that tebuthiuron was persistent and mobile enough to leach at least 15 feet to the water table, then still be present above minimum detection levels more than 4 years after the application.

Add as new paragraph: In addition, tebuthiuron has been found through laboratory studies to pose a significant risk to nontarget plants. The U.S. Fish and Wildlife Service, furthermore, has informed the EPA of phytoxicity concerns for a list of endangered plant species that are found in counties in which tebuthiuron is used.

Add: **Based on the environmental fate assessment for tebuthiuron, the Agency is requiring the following:**

1. Label Advisory: "This chemical is known to leach through soil into ground water under certain conditions as a result of registered (rangeland and non-crop) uses. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

A "shallow" water table is defined as depth to water table of 30 feet or less. Permeable soils include, but are not limited to sandy soils."

Additional restrictions on the use of tebuthiuron will be required for vulnerable use areas, given its persistence in the environment. The Agency has initiated discussion with the registrant to identify such portions of the tebuthiuron use area and is requiring that this information be submitted within 6 months after the issuance of this RED. Therefore, the registrant should consult with the Agency and State soil conservation agencies to develop specific soil series label information to address these vulnerable areas where tebuthiuron is used.

In addition, based on this information, the registrant is required to submit, within 6 months after the issuance of this RED, proposed label statements for tebuthiuron to further mitigate ground water contamination concerns.

2. Tebuthiuron should be considered as a candidate for **Restricted Use due to ground-water contamination concerns**. The Restricted Use classification is required if a chemical triggers certain persistence and mobility parameters; the chemical must also exhibit a number of detections in ground water. Tebuthiuron is rarely chosen as an analyte in monitoring studies and for this reason, only limited monitoring data are available for the compound. However, if more ground-water studies were designed to analyze for tebuthiuron, the compound would likely meet the triggers for Restricted Use Classification.

3. Additional specific restrictions on the use of tebuthiuron should be developed by the registrant for vulnerable use areas, given its persistence in the environment. The registrant should initiate discussion with the Agency to identify such portions of the tebuthiuron use area.

Page 24:

Ecological Effects Section

Add just under 5. Ecological Effects, the following paragraph:

All ecological effect data requirements necessary to support the reregistration of tebuthiuron for the uses set forth in this RED have been satisfied. The Agency, therefore, has sufficient information at this time to provide an overall qualitative assessment for tebuthiuron. Required terrestrial and aquatic field studies (124-1 and 124-2) have been waived under the New Paradigm, the Policy Decision of EPA's Ecological Effects and Environmental Fate Task Force published in October of 1992. However, EPA reserves the right to require these studies, at a later date, if EPA determines that a regulatory decision cannot be made in the absence of these studies.

**** NOTE: The above rationale is directly from the Implementation Paper, describing the basis of waiving mesocosm studies, and has subsequently been applied as the rationale for waiving Tier III plant studies.**

Page 28:

(MRID 138700)

Page 30:

To the end of the first paragraph, change the MRID numbers to:
(MRIDs 00090097, 00090103, 00090105, 00090106, 00090107, and 00090109)

To the end of the third paragraph, change the MRID numbers to:
(MRIDs 40640001, 40640002, 40640003, and 40640004)

Page 31:

Remove the terms terrestrial and aquatic because the second table have both Tier II, terrestrial and aquatic studies represented.

Page 33:

Change the LOC in the first paragraph from 0.1 LD50s/kg to 0.1 LD50s/sq. ft.

Page 35:

Add the following:

Note: 61 ppb is the EEC of 1 lb a.i. applied directly to a one acre water body, six feet deep.

Page 37:

Change 4. Risk to Endangered Species to the following:

4. Risk to Endangered Species

Based on the conclusions in the preceding sections of this document, all registered uses of tebuthiuron pose a significant risk to off-site endangered terrestrial, semi-aquatic, and aquatic plant species.

Furthermore, all endangered plant species inhabiting certain target areas (i.e., rights-of-way, and rangelands) are likely to be jeopardized as they will receive a direct application of tebuthiuron.

On July 15, 1982, the U.S. Fish and Wildlife Service developed a biological opinion on the proposed registration of tebuthiuron for use in the control of woody plant species on rangeland in seven southwestern states. It was determined that this chemical was likely to jeopardize 19 listed plant species (EPA-81-4). On September 23, 1982, the EPA requested the reintiation of a formal Section 7 consultation on the conditional registration for the expanded use of tebuthiuron on range- and pastureland in 17 additional states. USFWS determined that 10 additional listed plant species were likely to be jeopardized by the expanded use of this herbicide (EPA-81-4R).

The Endangered Species Protection Program is expected to become final in 1994. Tebuthiuron has existing biological opinions for which EPA will require a generic endangered species label statement (or an equivalently protective alternative) when the Program is in place. Additional consultation with the Fish and Wildlife Service will be required to address newly listed species and also any use sites not previously considered. However, no additional label changes are anticipated as a result of consultation if the label already contains the generic label statement.

Page 42:

Within IV. B. Regulatory Position, **EFED recommends** that tebuthiuron be a candidate for Restricted Use; **EFED suggests** the following to justify a restricted use classification (2). In addition, EFED has provided **recommendations and suggested language** for the endangered species statement, and labeling/risk mitigation measures.

2. Restricted Use Classification

Tebuthiuron is resistant to biological and chemical degradation under environmental conditions. Its principal route of dissipation in the environment appears to be mobility; laboratory data indicate that photodegradation on soil may occur slowly. Transport to ground water (through leaching) and surface water (following runoff) are likely as a result of tebuthiuron's persistence and low adsorption to soil. According to the Pesticides in Ground

Water Database (1992), tebuthiuron has been detected in ground water in Texas (two wells) and California (one well). Additionally, a small-scale retrospective ground-water study indicates that tebuthiuron is persistent and mobile and can leach to ground water. Moreover, the results of the study indicated that tebuthiuron was persistent and mobile enough to leach at least 15 feet to the water table, then still be present above minimum detection levels more than 4 years after the application.

Tebuthiuron should be considered as a candidate for Restricted Use due to ground-water contamination concerns. The Restricted Use classification is required if a chemical triggers certain persistence and mobility parameters; the chemical must also exhibit a number of detections in ground water. Tebuthiuron is rarely chosen as an analyte in monitoring studies and for this reason, only limited monitoring data are available for the compound. However, if more ground-water studies were designed to analyze for tebuthiuron, the compound would likely meet the triggers for Restricted Use Classification.

Additional restrictions on the use of tebuthiuron should be developed for vulnerable use areas, given its persistence in the environment. The registrant should initiate discussion with the Agency to identify such portions of the tebuthiuron use area.

4. Endangered Species Statement

Tebuthiuron has been found through laboratory studies to pose a significant risk to nontarget plants. The U.S. Fish and Wildlife Service, furthermore, has informed the EPA of phytoxicity concerns for a list of endangered plant species that are found in counties in which tebuthiuron is used.

The Endangered Species Protection Program is expected to become final in 1994. Tebuthiuron has existing biological opinions for which EPA will require a generic endangered species label statement (or an equivalently protective alternative) when the Program is in place. Additional consultation with the Fish and Wildlife Service will be required to address newly listed species and also any use sites not previously considered. However, no additional label changes are anticipated as a result of consultation if the label already contains the generic label statement.

5. Labeling Rationale/Risk Mitigation Measures

a. Manufacturing Use Products.

"Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting

authority has been notified in writing prior to discharge. Do not discharge without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA."

b. **End Use Products.** Based on the environmental fate assessment for tebuthiuron, the Agency is requiring the following:

(1). Ground Water Labeling Requirements

Based on the environmental fate assessment for tebuthiuron, the Agency is requiring the following:

Label Advisory: "This chemical is known to leach through soil into ground water under certain conditions as a result of registered (rangeland and non-crop) uses. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

A "shallow" water table is defined as depth to water table of 30 feet or less. Permeable soils include, but are not limited to sandy soils."

Additional restrictions on the use of tebuthiuron will be required for vulnerable use areas, given its persistence in the environment. The Agency has initiated discussion with the registrant to identify such portions of the tebuthiuron use area and is requiring that this information be submitted within 6 months after the issuance of this RED. Therefore, the registrant should consult with the Agency and State Lead Pesticide Agencies to develop specific soil series label information to address these vulnerable areas where tebuthiuron is used. In addition, based on this information, the registrant is required to submit, within 6 months after the issuance of this RED, proposed label statements for tebuthiuron to further mitigate ground water contamination concerns.

In addition, to further mitigate the concern for ground water contamination, the Agency is requiring, at this time, the following labeling which lowers the maximum application rates and specifies the number and timing of applications:

Granular and Pelleted/Tableted Formulations

Environmental Hazard Statements:

"Collect, cover or incorporate granules/pellets spilled on the soil surfaces. Do not apply to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate."

Use Directions:

"The maximum label rate and frequency of application is 1-2 lbs a.i./A once every three years for vulnerable areas (where soils are sandy and depth to water table is shallow) as identified in the specific soil series labelling supplement."

"For all other areas, the maximum label rate and frequency of application is 4 lbs a.i./A once every three years."

Wettable Powder and Water Dispersable Granules (Dry Flowable)

Environmental Hazard Statement:

"Do not apply to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate."

Use Directions:

"The maximum label rate and frequency of application is 1-2 lbs a.i./A once every three years for vulnerable areas (where soils are sandy and depth to water table is shallow) as identified in the specific soil series labelling supplement."

"For all other areas, the maximum label rate and frequency of application is 4 lbs a.i./A once every three years."

(2). Ecological Effects Labeling Requirements

Based on the results of aquatic/terrestrial plant testing and previous biological opinions, there is a presumption of risk for all endangered plant species which may be exposed to tebuthiuron. At the present time, EPA is consulting with the U.S. Fish and Wildlife Service and other federal and state agencies to develop a program to avoid jeopardizing the continued existence of listed species from the use of pesticides. When this program goes into effect, endangered species precautionary labeling will be required.

Based on the ecological effects assessment for tebuthiuron, the following labeling is required at this time:

Granular and Pelleted/Tableted Formulations

Environmental Hazard Statement:

"Do not apply to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate."

Use Directions:

The maximum label rate and frequency of application is 1-2 lbs a.i./A once every three years for vulnerable areas (where soils are sandy and depth to water table is shallow) as identified in the specific soil series labelling supplement."

"For all other areas, the maximum label rate and frequency of application is 4 lbs a.i./A once every three years."

CC:\

Ev Byington	Doug Urban	Linda Propst	Laura Dye
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C. Environmental Assessment

1. Environmental Fate

All laboratory environmental fate data requirements necessary to support the reregistration of tebuthiuron for the uses set forth in this RED have been satisfied. Required terrestrial field dissipation studies (164-1 and 164-5), have not yet been submitted; these studies are due to the Agency by 7/31/94. It is unlikely, though, that additional information supplied by these studies would change the overall assessment of the degradation, mobility, or accumulation of tebuthiuron in the environment. The Agency, therefore, has sufficient information at this time to provide an overall qualitative assessment for tebuthiuron.

a. Environmental Chemistry, Fate and Transport

Additional studies reviewed since the 1987 Registration Standard are as follows:

Photodegradation in water

Tebuthiuron did not photodegrade in sterile aqueous buffered (Ph 5) solutions that were continuously irradiated for 33 days with a xenon light source at approximately 25°C. Tebuthiuron was the only compound identified in the irradiated and dark control solutions at all sampling intervals. At 33 days posttreatment, tebuthiuron comprised 96.3-97.0% and 99.7-100.1% of the recovered radioactivity in the irradiated and dark control solutions, respectively. (MRID 41328001)

The Agency concludes that tebuthiuron is stable to photodegradation in water.

Aerobic soil metabolism

In a 9-month study, thiadiazole-labeled ^{14}C tebuthiuron, at a concentration of 6 ppm in sandy loam soil incubated in darkness at 24°C and 75% of field moisture capacity, degraded with a half-life (calculated by the registrant) of 35.4 months. The degradates identified by two-dimensional TLC were N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methylurea (compound 104), N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N'-methylurea (compound 105), 5-(1,1-dimethylethyl)-2 methylamino-1,3,4-thiadiazol (compound 107), and 5-(1,1-dimethylethyl)-2 amino-1,3,4-thiadiazol (compound 108). The

concentration of compound 104, which accounted for 6.9% of the applied radioactivity after 9 months of incubation, appeared to be increasing at the end of the experiment. (MRID 41328001)

The Agency concludes that tebuthiuron is stable to aerobic soil metabolism and will persist in an aerobic soil environment.

Anaerobic soil metabolism

Following 30 days of aerobic incubation at 24 ± 1°C and 75% of 0.33 bar moisture capacity and 60 days under flooded conditions in a sandy loam soil, thiadiazol-labeled ^{14}C tebuthiuron (nominal concentration 6 ppm) exhibited very little metabolism. After 60 days of anaerobic incubation, the concentration of parent tebuthiuron had decreased 4.7% from the concentration at initiation of flooding. Degradates identified were N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methylurea (compound 104), N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N'-methylurea (compound 105), and N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methyl-N'-hydroxymethyl-urea (compound 109). (MRID 41328002)

The Agency concludes that tebuthiuron is stable to anaerobic soil metabolism and is likely to persist in an anaerobic soil environment.

Anaerobic aquatic metabolism

Tebuthiuron degraded with a half-life (calculated by the registrant) of >1 year in an anaerobic system containing pond water and sediment incubated for 365 days in darkness at 25.5 ± 0.8°C. During the study there was very little degradation of tebuthiuron, with 93.7% of the applied radiocarbon remaining as parent material at day 365. Degradates were reported to comprise approximately 1.4% of the applied radioactivity at the termination of the study. (MRID 41913101)

The Agency concludes that tebuthiuron is stable to anaerobic aquatic metabolism and is likely to persist in an anaerobic aquatic environment.

Aerobic aquatic metabolism

Tebuthiuron did not degrade appreciably in pond water and sediment that was incubated in darkness at 24 ± 1°C for 4 weeks under aerobic conditions. After 4 weeks of incubation, 95.2% of the

applied radioactivity was present in parent tebuthiuron. Degradates identified by two-dimensional TLC were N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methylurea (compound 104), N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N'-methylurea (compound 105), 5-(1,1-dimethylethyl)-2 methylamino-1,3,4-thiadiazole (compound 107), 5-(1,1-dimethylethyl)-2 amino-1,3,4-thiadiazole (compound 108), and N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methyl-N'-hydroxymethyl-urea (compound 109). (MRID 41372501)

The Agency concludes that tebuthiuron is stable to aerobic aquatic metabolism and is likely to persist in water and sediment in an aerobic aquatic environment.

Bioaccumulation in fish

In a 28-day flow-through study in which bluegill sunfish were exposed to a nominal tebuthiuron concentration of 5.0 ppm, bioconcentration factors of 1.98, 3.40, and 2.63 were reported for edible tissue, nonedible tissue, and whole fish, respectively. Residues in the tissues consisted primarily of tebuthiuron and two metabolites (N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methyl-N'-hydroxymethyl-urea [compound 109]) and compound 103(OH), an hydroxylated form of parent tebuthiuron). Accumulated residues depurated rapidly from fish tissue with depuration half-lives of 0.33 and 0.51 days reported for edible and nonedible tissue, respectively. (MRID 40819501)

Based on the study submitted and the reported octanol/water coefficient (log K_{ow} = 1.79), the Agency concludes that there is slight potential for tebuthiuron residues to accumulate in fish.

Small Scale Retrospective Ground Water Monitoring Study

A small-scale retrospective ground-water monitoring study was performed on a ranch near Sarita, Texas, that had last been treated with tebuthiuron on March 24, 1986. The results of the study indicated that tebuthiuron was persistent and mobile enough to leach at least 15 feet to the water table, then still be present above minimum detection levels more than 4 years after the application.

The extensive site characterization gives a high level of confidence that this study was performed with a reasonable "high exposure" scenario. The site is comprised of eolian sands over fluvial

deposits. Monitoring wells were installed to avoid discontinuous, restrictive clay layers that are found at some portions of the site.

Sampling was discontinued after data showed that, in areas where restricting soil layers did not impede downward flow of ground water, tebuthiuron had leached and was still present in ground water at concentrations of up to 23 parts per billion (ppb). Pesticide Root Zone Modeling (PRZM) of the study site predicted that tebuthiuron would quickly leach to the water table through sandy soils with little organic matter. However, the simulations were unsuccessful at anticipating that some tebuthiuron would also still be present in the unsaturated zone four years after the final application.

Soil sampling at and near the study site showed convincingly that tebuthiuron can persist at relatively high concentrations in soil and soil water if restrictive layers block leaching to the ground water. (MRID 42390901)

The Agency concludes that tebuthiuron is persistent and mobile and can leach to ground water.

b. Environmental Fate Assessment

Based on acceptable environmental fate laboratory data reviewed in the 1987 Registration Standard and data submitted and reviewed subsequent to the Registration Standard, tebuthiuron is persistent and mobile. The principal route of dissipation appears to be mobility. Tebuthiuron is stable to hydrolysis and photodegradation in water ($t_{1/2}$ = much greater than 30 days). It has a soil photolysis half-life of 39.7 days. Tebuthiuron is metabolized very slowly in soil under aerobic ($t_{1/2} \approx$ 35.4 months) and anaerobic conditions ($t_{1/2}$ = much greater than 60 days). In aerobic and anaerobic aquatic metabolism studies, tebuthiuron's respective half-lives were much greater than 1 month and >1 year. Tebuthiuron is very mobile to mobile (K_{ads} for sand, sandy loam, loam, and clay loam soils were 0.11, 0.62, 0.82, and 1.82, respectively). The compound's K_{oc} was reported as 4. In addition, aged leaching data indicate that one metabolite, N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methylurea (compound 104) has similar mobility to parent tebuthiuron. Terrestrial and aquatic field dissipation studies have not been submitted, however, an interim terrestrial field dissipation report supports the results of the laboratory studies. In California, Nebraska, and Florida field half-lives were estimated at 1-2 years. In CA and NE, tebuthiuron moved into the 6-12" soil depth,

with small quantities detected at 12-18" and 18-24". In a FL soil (92% sand), tebuthiuron leached to a depth of >72". Tebuthiuron has slight potential to accumulate in fish with bioconcentration factors of 1.98, 3.40, and 2.63 reported for edible tissue, nonedible tissue, and whole fish, respectively. Accumulated residues depurated rapidly.

Degradation products identified in laboratory studies were N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methylurea (compound 104), N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N'-methylurea (compound 105), 5-(1,1-dimethylethyl)-2 methylamino-1,3,4-thiadiazol (compound 107), 5-(1,1-dimethylethyl)-2 amino-1,3,4-thiadiazol (compound 108), and N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N'-(hydroxymethyl)-N-methylurea (compound 109). After 9 months of aerobic soil incubation, compound 104 accounted for 6.9% of the applied radioactivity. This was the highest concentration of any degradation product identified in the laboratory studies.

In summary, tebuthiuron is resistant to biological and chemical degradation under environmental conditions. Its principal route of dissipation in the environment appears to be mobility; laboratory data indicate that photodegradation on soil may occur slowly. Transport to ground water (through leaching) and surface water (following runoff) are likely as a result of tebuthiuron's persistence and low adsorption to soil. According to the Pesticides in Ground Water Database (1992), tebuthiuron has been detected in ground water in Texas (two wells) and California (one well). Additionally, a small-scale retrospective ground-water study indicates that tebuthiuron is persistent and mobile and can leach to ground water. Moreover, the results of the study indicated that tebuthiuron was persistent and mobile enough to leach at least 15 feet to the water table, then still be present above minimum detection levels more than 4 years after the application.

In addition, tebuthiuron has been found through laboratory studies to pose a significant risk to nontarget plants. The U.S. Fish and Wildlife Service, furthermore, has informed the EPA of phytoxicity concerns for a list of endangered plant species that are found in counties in which tebuthiuron is used.

Based on the environmental fate assessment for tebuthiuron, the Agency is requiring the following:

1. Label Advisory: "This chemical is known to leach through soil into ground water under certain conditions as a result of registered (rangeland and non-crop) uses. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

A "shallow" water table is defined as depth to water table of 30 feet or less. Permeable soils include, but are not limited to sandy soils."

Additional restrictions on the use of tebuthiuron will be required for vulnerable use areas, given its persistence in the environment. The Agency has initiated discussion with the registrant to identify such portions of the tebuthiuron use area and is requiring that this information be submitted within 6 months after the issuance of this RED. Therefore, the registrant should consult with the Agency and State Lead Pesticide agencies to develop specific soil series label information to address these vulnerable areas where tebuthiuron is used.

In addition, based on this information, the registrant is required to submit, within 6 months after the issuance of this RED, proposed label statements for tebuthiuron to further mitigate ground water contamination concerns.

2. Tebuthiuron should be considered a candidate for **Restricted Use due to ground-water contamination concerns**. The Restricted Use classification is required if a chemical triggers certain persistence and mobility parameters; the chemical must also exhibit a number of detections in ground water. Tebuthiuron is rarely chosen as an analyte in monitoring studies and for this reason, only limited monitoring data are available for the compound. However, if more ground-water studies were designed to analyze for tebuthiuron, the compound would likely meet the triggers for Restricted Use Classification.

3. Additional specific restrictions on the use of tebuthiuron should be developed by the registrant for vulnerable use areas, given its persistence in the environment. The registrant should initiate discussion with the Agency to identify such portions of the tebuthiuron use area.

2. Ecological Effects

All ecological effect data requirements necessary to support the reregistration of tebuthiuron for the uses set forth in this RED have been satisfied. The Agency, therefore, has sufficient information at this time to provide an overall qualitative assessment for tebuthiuron. Required terrestrial and aquatic field studies (124-1 and 124-2) have been waived under the New Paradigm, the Policy Decision of EPA's Ecological Effects and Environmental Fate Task Force published in October of 1992. However, EPA reserves the right to require these studies, at a later date, if EPA determines that a regulatory decision cannot be made in the absence of these studies.

a. Ecological Effects Data

The ecotoxicological database is adequate to characterize the toxicity of tebuthiuron to nontarget terrestrial and aquatic organisms when used on terrestrial feed and terrestrial nonfood sites.

(1) Terrestrial Data

In order to establish the toxicity of tebuthiuron to birds, the following tests are required using the technical grade material: one avian single-dose oral (LD50) study on one species (preferably mallard or bobwhite quail); two subacute dietary studies (LC50) on one species of water fowl (preferably the mallard duck) and one species of upland game bird (preferably bobwhite quail or ring-necked pheasant).

Avian Acute Toxicity

Species	% Test Material (TGAI)	LD50	Conclusions
Mallard duck	98	>2000 mg/kg	practically non toxic

Based on acute toxicity data, tebuthiuron is practically non-toxic to birds. An avian acute oral study performed on the mallard duck resulted in a LD50 value of greater than 2000 mg/kg. (MRID 00041692)

Avian Subacute Toxicity

Species	% Test Material	LC50	Conclusions
Bobwhite Quail	99.1	>5113 ppm	practically non toxic
Mallard Duck	99.1	>5093 ppm	practically non toxic

On a subacute dietary basis, tebuthiuron is practically non toxic to birds. Two studies, one on the mallard duck and one on the bobwhite quail produced LC50s >5000 ppm. (MRIDs 40601002, 40601001).

Avian Reproduction

Avian reproduction studies are required when birds may be exposed repeatly or continuously through persistence, bioaccumulation, or multiple applications, or if mammalian reproduction tests indicate reproductive hazard. Tebuthiuron is a persistent herbicide; in areas of low precipitation, it has been estimated that the time required for tebuthiuron to reach a non-detectable level in soils from decomposition is between 3 and 7 years.

Species	% A.I.	NOEL
Bobwhite quail	96.4	no repro. effect at up to 100 ppm

Mallard duck	96.4	no repro. effect at up to 100 ppm

Two avian reproductive studies, one on the bobwhite quail and one on the mallard duck show no effect on reproduction at dietary levels up to 100 ppm. (MRIDs 00104243, 00093690).

Toxicity to Nontarget Mammals

The available mammalian data indicate that tebuthiuron is slightly to moderately toxic to small mammals on an acute basis.

SPECIES	LD_{50}(mg/kg)
Mouse (female)	>528 < 620
Rat (female)	387.5
Rabbit	286

On a chronic basis, a two-generation reproduction study with rats produced a NOEL of 100 mg/kg/day and a LOEL of 200 mg/kg/day.

(2) Aquatic Data

Freshwater Fish Toxicity

In order to establish the toxicity of a pesticide to freshwater fish, the minimum data required on the technical grade of the active ingredient are two freshwater fish toxicity studies. One study should use a coldwater species (preferably the rainbow trout) and the other should use a warmwater species (preferably the bluegill sunfish).

Species	% Test Material (TGAI)	LC50	Conclusions
Rainbow trout	98	143 ppm	practically non toxic
Bluegill sunfish	98	106 ppm	practically non toxic

Two 96-hour acute toxicity studies show that tebuthiuron is practically non-toxic to fish, with LC50 values of 143 mg/l for rainbow trout and 106 mg/l for bluegill sunfish. (MRID 00020661)

Freshwater Fish Toxicity - Acute Studies with Formulated End-Use Products

Formulated product testing on fish may be required when a pesticide is applied directly to water. Since tebuthiuron is not applied directly to water, these data are not currently required. Two fish toxicity studies using formulated products have been submitted, however, and are discussed below for informational purposes only.

A 96-hour LC_{50} study performed on the fathead minnow shows that an 80% WP formulation is practically non-toxic to fish with an LC_{50} value of greater than 180 ppm. (MRID 00041685)

A 96-hour LC_{50} study performed on the fathead minnow shows that a 20% P/T formulation is practically non-toxic to fish with an LC_{50} value of greater than 180 ppm. (MRID 00041685)

Fish Early Life Stage

A fish early life stage test is required when a product is applied directly to water or is expected to be transported to aquatic sites <u>and</u> 1) exposure of aquatic organisms will be continual or recurrent; or 2) the lowest LC50 is 1 mg/l or less; or 3) the EEC in water is equal to or greater than 0.01 of any LC50; or 4) if the EEC is less than any LC50 and the product has reproductive effects on, or cumulative effects in aquatic organisms or has a half-life in water greater than 4 days.

Tebuthiuron is highly soluble in water (2500 ppm) suggesting a high potential for transport from the application site. Tebuthiuron is also stable to photolysis and hydrolysis (t1/2 much greater than 30 days at Ph 3, 6, and 9). Pasture and rangeland are use sites which potentially allow for pesticide transport to water.

Species	% A.I.	Results
Fathead minnow (embryo-larvae)	98	MATC (growth) >9.3 <18 mg/l; survival unaffected at ≤76 mg/l
Rainbow trout (embryo-larvae)	98	MATC (growth & survival) >26 <52mg/l

An early life-stage study performed with the rainbow trout shows that survival and growth are impaired at environmental concentrations of ≤52 mg/l. The MATC (Maximum Allowable Toxic Concentration) is > 26 < 52 mg/l. The fathead minnow early life-stage study shows survival to be unaffected at concentrations as high as 76 mg/l, whereas growth is impaired at ≤ 18 mg/l. The MATC for the fathead minnow is >9.3 <18 mg/l. (MRIDs 00090084, 00090083).

Freshwater Invertebrate Toxicity

The minimum testing required to assess the hazard of a pesticide is a freshwater aquatic invertebrate toxicity test, preferably using first instar *Daphnia magna* or early instar amphipods, stoneflies, mayflies, or midges.

Species	% Test Material (TGAI)	LC50	Conclusions
Daphnia magna	99.2	297 ppm	practically non-toxic

There is sufficient information to characterize tebuthiuron as practically non-toxic to aquatic invertebrates. (MRID 00041694).

Aquatic Invertebrate Life Cycle

A freshwater invertebrate life-cycle test is required when a product is applied directly to water or is expected to be transported to aquatic sites and 1) exposure of aquatic organisms will be continual or recurrent; or 2) the lowest LC_{50} is 1 mg/l or less; or 3) the EEC in water is equal to or greater than 0.01 of any LC_{50}; or 4) if the EEC is less than any LC_{50} and the product

has reproductive effects on, or cumulative effects in, aquatic organisms or has a half-life in water greater than 4 days.

As discussed previously under fish early life stage testing requirements, there is a high potential for transport of tebuthiuron from the application site.

Species	% A.I.	Results
Daphnia magna	97.4	MATC (growth and fecundity) >21.8 < 44.2 ppm

An aquatic invertebrate life-cycle test performed with *Daphnia magna* shows a significant reduction in growth and fecundity at >44.2 mg/l. The MATC (Maximum Allowable Toxic Concentration) is >21.8 <44.2 ppm. (MRID 00138700)

Estuarine/Marine Toxicity

Acute toxicity testing with estuarine and marine organisms is required when an end-use product is intended for direct application to the marine/estuarine environment or is expected to reach this environment in significant concentrations. The large-scale use of tebuthiuron on rangeland may result in exposure to the estuarine environment.

The requirements under this category include a 96-hour LC_{50} for an estuarine fish, a 96-hour LC_{50} for shrimp, and either a 48-hour embryo-larvae study or a 96-hour shell deposition study with oysters.

Species	% Test Material (TGAI)	LC50	Conclusions
Eastern oyster	98	>180>320	Practically non-toxic
Pink Shrimp	98	62	Slightly toxic

There is sufficient information to characterize tebuthiuron as practically non-toxic to oyster embryos and slightly toxic to pink shrimp. The guideline requirement for testing with a

marine or estuarine fish species is waived due to the demonstrated low toxicity of tebuthiuron to freshwater fish as well as marine and freshwater invertebrates. (MRID 0004168)

Field Monitoring Studies

Field monitoring studies may be required on a case-by-case basis depending on the intended use pattern of the chemical, the toxicity to non-target organisms, and pertinent environmental fate characteristics. Tebuthiuron is extremely persistent in the soil, especially in areas of low precipitation. Tebuthiuron is also highly soluble in water, suggesting a high potential for transport from the application site. When applied over extensive areas, as in the case of rangeland brush control, tebuthiuron would seem to have a high potential for contamination of aquatic systems within the watershed. For these reasons, monitoring studies measuring residues in runoff waters, hydrosoil, and catchment ponds were required.

Instead of a single monitoring study, several studies were submitted by the registrant. The acceptable field monitoring studies are summarized in the following table:

Location	Application Rate	Maximum Residues	Calculated % Lost from Watershed
Boise, Idaho	1.0 lb ai/A	Catchment pond = 12 ppb. Weir (runoff from entire watershed) = 14 ppb. Spring = 7 ppb.	1.9%
Arizona	3.0 lb ai/A	Weir pond = 33 ppb. Weir (runoff from entire watershed) = 54 ppb.	0.05%
Hondo, Texas	2.0 lb ai/A	Catchment pond = 70 ppb. Hydrosoil = 70 ppb.	0.08%
Marietta, Oklahoma	2.0 lb ai/A	Catchment pond = 180 ppb (following a 7" rainfall event). Hydrosoil = 140 ppb.	4.53%

The initial monitoring studies show that tebuthiuron moves from the application site through runoff. It is detectable in the runoff water and in waterbodies receiving runoff from the treated watershed. Maximum residue levels in catchment ponds ranged from 12 ppb to 70 ppb under conditions of normal rainfall. After a single rainfall event of 7 inches, tebuthiuron levels of 180 ppb were detected in one pond. Maximum levels in hydrosoil ranged from 70 ppb - 140 ppb. (MRIDs 00090097, 00090103, 00090105, 00090106, 00090107, and 00090109)

In 1982, the registrant was requested to continue monitoring water and hydrosoil at the various study sites, especially in the catchment pond at the Marietta, Oklahoma site. This information was considered essential in order to better determine the long-term availability of tebuthiuron for runoff into aquatic systems and the likelihood of long-term buildup of tebuthiuron in the hydrosoil.

In 1988, the registrant submitted supplemental information for the four field monitoring studies which documented changes in residue levels until 1984. The Agency reviewed the supplemental information and indicated that tebuthiuron is "a persistent herbicide with a propensity for solubilizing in runoff water three years or longer after application," and that "tebuthiuron is lost over time (3 years) such that the concentrations decrease to a very low level (0.0003 ppm to undetectable). However, residues may remain in soil surrounding the catchments, particularly the lower soil layers. Some pellets may not be carried to a catchment area by runoff. The studies reported aquatic residues ranging from < 1 ppb (measured at the conclusion of the Texas study) up to 180 ppb (measured on 5/5/81 in the Oklahoma study) and hydrosoil residues from < 50 ppb up to 140 ppb. (MRIDs 40640001, 40640002, 40640003, and 40640004)

This series of studies, when taken together, provide adequate environmental monitoring information and can be used to satisfy the field monitoring data requirement (70-1). However, these studies can only be considered valid for use patterns with a single application; they are invalid for uses which require more than one application per year or multiple year applications.

(3) Non-Target Insects Data

The minimum data required to establish the acute toxicity to honey bees is an acute contact LD50 study with the technical material.

Species	% Test Material	LD50	Conclusion

Apis Mellifera	99.1	> 100 ug/bee	Practically non-toxic

There is sufficient information to characterize tebuthiuron as practically non-toxic to bees. (MRID 40840401).

(4) Non-Target Plants Data

Terrestrial plant testing (seed germination, seedling emergence and vegetative vigor) is required for herbicides which have terrestrial nonfood/feed or aquatic nonfood (except residential) use patterns and which have endangered or threatened plant species associated with the site of application. The above conditions apply to tebuthiuron (refer to Section IV.B.4, Endangered Species)

Aquatic plant testing is required for any herbicide applied to terrestrial nonfood (rights-of-way) or aquatic nonfood (except residential) as in the case of tebuthiuron. The following species should be tested: *Selenastrum capricornutum*, *Lemna gibba*, *Skeletonema costatum*, *Anabaena flos-aquae*, and a freshwater diatom.

Tier 1 toxicity data on the technical material are listed below:

Species	% A.I.	EC50
Seed Germination (10 species)	99.6	NOEL > 6 lbs a.i./Acre

Seed germination testing at the Tier II level is not required as none of the terrestrial species tested at the maximum label rate exhibited a 25% or greater detrimental effect as compared to the control.

The acceptable Tier II toxicity data on the technical material are listed below:

Species	% AI	EC_{50}

Anabaena flos-aquae	99.08	4.06 ppm (Day 5)
Skeletonema costatum	99.08	0.05 ppm (Day 5)
Navicula pelliculosa	99.08	0.081 ppm (Day 5)
Lemna gibba	99.08	0.135 ppm (Day 14)
Selenastrum capricornutum	98	0.05 ppm (Day 5)
Seedling emergence & Vegetative Vigor (10 species)	99.6	EC_{25} for radish, cabbage, cucumber and wheat = 0.05, 0.03, 0.06, 0.07 lb ai/A

a. Ecological Effects Risk Assessment

1. Risk to Terrestrial Organisms

Avian and mammalian species will be exposed to tebuthiuron through the consumption of insect and plant food material containing tebuthiuron residues or by directly consuming tebuthiuron granules.

a. Acute Effects

The maximum application rate for tebuthiuron, 6 lbs ai/A, is found on labels for terrestrial nonfood crop use. As tebuthiuron is applied as a pelleted or granular formulation for this use pattern, the LD_{50} value was chosen for the toxicity analysis because birds and mammals encounter granules as discrete doses. The number of LD_{50}'s/sq. ft. was calculated for a broadcast application (6 lbs ai/A) with no soil incorporation.

$$\text{mg/sq ft} = \frac{\text{appl. rate (ai lbs/A)} \times 453{,}590 \text{ mg/lb}}{43{,}560 \text{ sq ft/acre}}$$

$$\text{Single dose } LD_{50}\text{/sq ft} = \frac{\text{mg/sq ft}}{LD_{50} \text{ mg/kg} \times \text{weight of bird (kg)}}$$

$$\text{mg/sq ft} = \frac{6 \text{ lbs ai/A} \times 453{,}590 \text{ mg/lb}}{43{,}560 \text{ sq ft/acre}} = 62.5 \text{ mg/sq ft}$$

$$\text{Single dose } LD_{50}\text{/sq ft} = \frac{62.5 \text{ mg/sq ft}}{2{,}000 \text{ mm/kg} \times 1.082 \text{ kg (mallard)}} = 0.03$$

The number of LD_{50}s/sq ft was 0.03 for the mallard. As this number falls below both the Restricted Use Classification (0.2 LD_{50}s/sq ft) and the endangered species level of concern (0.1 LD_{50}s/sq. ft.), acute hazard to nontarget avian species is not expected from a granular/pelleted application at $\leq$ 6 lbs a.i./A.

The maximum use rate for tebuthiuron in a wettable powder form is 6 lbs a.i./A. After a direct application to vegetation at this use rate, the expected residue levels on various avian food items would range from 42 to 1440 ppm. Since tebuthiuron is considered practically nontoxic to birds on a dietary basis (LC_{50} >5000 ppm), acute hazard to avian species is not expected from a wettable powder application at $\leq$ 6 lbs a.i./A.

While tebuthiuron is practically nontoxic to avian species on an acute basis, the existing data indicate that it is slightly to moderately toxic to mammals. A rabbit, for instance, could conceivably consume enough granules to reach a lethal acute dose. The highest percent ai granular formulation for non-cropland use is a 6% formulation. If each granule contains approximately 0.006 mg ai tebuthiuron, a 1.0 kg rabbit (Eastern cottontail) would have to consume 47,666 granules to receive a lethal dose of 286 mg/kg. Therefore, use of a 6 % granular formulation on noncropland should result in minimal hazard to small mammal species such as the Eastern cottontail.

b. Chronic Effects

Avian reproduction studies showed no adverse effects at dietary levels up to 100 ppm. When tebuthiuron is applied directly to vegetation at the maximum use rate for wettable powders (6 lbs ai/A), the expected residue levels on various avian food items (42 - 1440 ppm) would exceed 100 ppm. Little is known about the persistence of tebuthiuron on plant surfaces. However, significant chronic exposure to birds is not expected due to the following information.

About two-thirds of the total tebuthiuron use is on rangeland and pastureland. The maximum application rate for this use pattern is 4 lbs ai/A/year. Actual plant residue data for forage grasses exist for a rangeland use pattern. Residue monitoring at test sites covering a wide range of climatic, edaphic, and geographical conditions all showed residues in grasses to be below 20 ppm.

For rangeland and pastureland use, tebuthiuron is always applied

to the ground as a pelleted/tableted formulation and is never applied directly to vegetation. Therefore, the residue monitoring values represent tebuthiuron that is taken up from the soil and transported to the plant tissues. These values are probably realistic indicators of long-term exposure to avian species. As these residue values (20 ppm) do not exceed the NOEL of 100 ppm in the avian reproduction studies, chronic hazard to birds is not expected.

2. Risk to Aquatic Organisms

Since tebuthiuron is practically nontoxic on an acute basis to fish and aquatic invertebrates, none of the registered uses would result in acute effects or direct mortality to these organisms.

Of concern, however, is the potential for chronic hazard to aquatic organisms. Two fish early life-stage studies showed that the survival and/or growth of fish embryo-larvae are affected at levels well below 100 ppm. A fresh water invertebrate life-cycle test shows growth and reproductive effects also at levels well below 100 ppm.

The maximum application rate for tebuthiuron is 6 lb ai/A. This application rate is for a non-cropland use and represents a worst case situation. In order to calculate an aquatic EEC, the standard scenario of a 10 acre field running off into a one acre water body was employed. Since tebuthiuron is highly soluble in water (2300 ppm), 5 percent runoff from the treated area was assumed. With 5 percent runoff, a total of three pounds tebuthiuron is available to enter the water body (6 lbs X 10 X 0.05 = 3 lbs). The resulting expected concentrations of tebuthiuron in a one acre body of water of various depths are as follows:

Depth of Water	Concentration, ppm
6 inches	2.2
1 foot	1.1
3 feet	0.4
6 feet	0.2

These estimated aquatic concentrations are well below the MATC's for fathead minnow (> 9.3 < 18 mg/l), rainbow trout (> 26 < 52 mg/l), and Daphnia magna (> 21.8 < 44.2 mg/l). Therefore, chronic hazard to aquatic organisms is not expected.

Field monitoring studies (3 years in duration following a single application) reported aquatic residues ranging from < 1 ppb (measured at the conclusion of the Texas study) up to 180 ppb (measured on 5/5/81 in the Oklahoma study) and hydrosoil residues from < 50 ppb up to 140 ppb. The studies were performed utilizing various application rates (1-3 lbs a.i./A) but these rates do not reflect the worst case. The maximum label rate for tebuthiuron is 6 lb a.i./A. Corrected for the maximum label rate, the minimum and maximum aquatic residues found in the studies would be < 6 ppb and 1080 ppb, respectively. Using the same reasoning for the hydrosoil values, the tebuthiuron residues ranged from < 300 to 840 ppb. These values indicate that at the maximum application rate of 6 lbs. a.i./A tebuthiuron is not expected to pose a hazard to aquatic organisms (lowest MATC value of >9.3 < 18 ppm for the fathead minnow) assuming a maximum of one application per 3 years.

3. Risk to Nontarget Plants

Phytotoxicity concerns are limited to off-site, nontarget plants, except where endangered species are concerned. Endangered plant species, whether they are located on or off the treatment site, are of concern.

Terrestrial plant exposure estimates are calculated by using the estimated runoff from 1 acre treated at the highest registered rate impacting an adjacent 1 acre site. An unincorporated ground application at the maximum application rate of 6 lbs a.i. would result in a terrestrial EEC of 0.3 lb a.i./A (6 lbs a.i./A x 5% runoff x 1 acre = 0.3 lbs a.i./A). As this value exceeds the EC_{25} for a variety of crops (cabbage, cucumber, radish, wheat) tested at the Tier II level, the high level of concern for terrestrial plants has been surpassed.

Aquatic plant exposure estimates consider the estimated runoff from 10 acres treated at the highest registered rate flowing into a 1 acre water body six feet deep. An unincorporated ground application at the maximum application rate of 6 lbs a.i./A would result in an aquatic EEC of 183 ppb (6 lbs a.i./A x 10A x 5% runoff x 61 ppb = 183 ppb. Note: 61 ppb is the EEC of 1 lb a.i. applied directly to a one acre water body, six feet deep. As this value exceeds the EC_{50}s for four out of the five aquatic indicator species tested, the high level of concern for aquatic plants has been surpassed.

Environmental monitoring data were also considered in order to better estimate the aquatic plant hazard from tebuthiuron. The following table summarizes the maximum residue values found at four study sites and the extrapolated values for the maximum application rate (6 lbs a.i./A):

Highest Observed Tebuthiuron Concentrations in Catchment Ponds and Extrapolated Values

Study Location	Acreage	Application Rate	Max. Residue Values	Extrapolated Values for 6 lb ai/A
Texas	28.9	2 lbs ai/A	0.07 ppm	0.21 ppm
Idaho	98	1 lb ai/A	0.002 ppm	0.012 ppm
Oklahoma	11	2 lbs ai/A	0.18 ppm	0.540 ppm
Arizona	168	3 lbs ai/A	0.05 ppm	0.100 ppm

Data from the Oklahoma site were used as a high exposure situation. As the extrapolated value for this site (0.54 ppm) exceeds the EC_{50} values of four of the five aquatic plant species tested, the high level of concern for aquatic plants has been exceeded.

To further assess the potential hazard to aquatic plants, an estimated environmental concentration (EEC) was calculated for tebuthiuron on both rangeland and pastureland using the models PRZM 2.0 and EXAMS 2.94. For the rangeland scenario, a site in Oklahoma was chosen as representative of an area receiving less than 20 inches of annual rainfall. Tebuthiuron was applied in a pelleted form at 2 lbs ai/A (the maximum application rate for rangeland receiving < 20 inches of rainfall per year). For the pastureland scenario, a site in New York was chosen as representative of an area receiving > 20 inches of rainfall per year. Tebuthiuron was applied in a pelleted form at 6 lbs ai/A (the maximum application rate for a pasture receiving > 20 inches of rainfall per year). The standard one hectare waterbody, two meters deep was used in both scenarios.

In the Oklahoma rangeland scenario, the one in ten year maximum 4-day EEC for tebuthiuron was 0.36 ppm (range of 0.096 to 0.37 ppm). This value is greater than both the unrefined aquatic EEC (0.183 ppm) and the results from residue monitoring at the Oklahoma site (0.180 ppm). The New York pastureland scenario produced a one in ten year 4-day maximum EEC of 0.92 ppm tebuthiuron (range of 0.24 to 0.96 ppm).

In both scenarios, the one in ten year maximum EEC exceeds the EC_{50}s for four out of the five aquatic plant species tested. As tebuthiuron has an extremely long half-life in aerobic soils ($t_{1/2}$ = 36 mo.), 80% of the amount applied remains one year after application and 63% of this amount remains two years after application. Thus, even when tebuthiuron is applied every other year, its dissolved concentration in pond water steadily increases over the 36 year simulation.

In conclusion, the initial application alone of tebuthiuron at 2 lbs ai/A to rangeland (the most typical use pattern) exceeds the high level of concern for both nontarget terrestrial and aquatic plants. Successive applications of tebuthiuron will compound this hazard due to the extremely long half-life of this chemical. Results from environmental monitoring studies indicate that tebuthiuron is lost over time (3 years) such that concentrations decrease to a very low level (0.0003 ppm to undetectable). Therefore, restriction of tebuthiuron applications to once every three years may reduce the risk to nontarget plants. However, as residues may remain in the soil surrounding catchments, there is a potential for tebuthiuron to solubilize in runoff water three years or longer after application.

4. Risk to Endangered Species

Based on the conclusions in the preceding sections of this document, all registered uses of tebuthiuron pose a significant risk to off-site endangered terrestrial, semi-aquatic, and aquatic plant species.

However, all endangered plant species inhabiting certain target areas (i.e., rights-of-way and rangelands) are likely to be jeopardized as they will receive a direct application of tebuthiuron.

On July 15, 1982, the U.S. Fish and Wildlife Service developed a biological opinion on the proposed registration of tebuthiuron for use in the control of woody plant species on rangeland in seven southwestern states. It was determined that this chemical was likely to jeopardize 19 listed plant species (EPA-81-4). On September 23, 1982, the EPA requested the reintiation of a formal Section 7 consultation on the conditional registration for the expanded use of tebuthiuron

on range- and pastureland in 17 additional states. USFWS determined that 10 additional listed plant species were likely to be jeopardized by the expanded use of this herbicide (EPA-81-4R).

The Endangered Species Protection Program is expected to become final in 1994. Tebuthiuron has existing biological opinions for which EPA will require a generic endangered species label statement (or an equivalently protective alternative) when the Program is in place. Additional consultation with the Fish and Wildlife Service will be required to address newly listed species and also any use sites not previously considered. However, no additional label changes are anticipated as a result of consultation if the label already contains the generic label statement.

++Next Begins++ IV. Risk Management and Reregistration Decision