

DEPARTMENT OF ENERGY
SOUTHWESTERN POWER ADMINISTRATION

Use of Herbicide for Vegetation Control Along
Transmission Line Rights-of-Way

AGENCY: Southwestern Power Administration, Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI) for the Environmental Assessment (EA) for the use of herbicides for vegetation control along transmission line Rights-of-Way.

SUMMARY: Southwestern Power Administration (Southwestern) has performed an Environmental Assessment (EA) for Vegetation Control Along Transmission Line Rights-of-Way. The EA studied four methods of vegetation control: (1) mechanical/manual control (no action), (2) fire control, (3) biological control, and (4) a combination of mechanical/manual and herbicide control (the proposed action). Based on the analysis developed in the EA, Southwestern has concluded, that with proper herbicide application restrictions, there will be no significant environmental impact to the following:

1. **Air Quality - Restrictions:** Spray pressure and wind velocity limits shall be used to minimize mist formation, duration, and drift.
2. **Surface Water Quality - Restrictions:** Only herbicides registered by EPA for use in surface waters shall be used where surface water is present. Buffer zones and other erosion control methods shall be used near streams and other bodies of water wherever temporary loss of vegetation could cause movement of herbicide and sediment into surface water.
3. **Ground Water Quality - Restrictions:** Herbicides that have high soil adsorption and therefore, will have low likelihood of reaching ground water, shall be used. Herbicides shall not be used within 15 feet (4.6 meters) of sinkholes, visible rock fractures in outcrops, sinking creeks, and caverns identified in the Rights-of-Way. Training will be provided to enable applicators to identify these features.
4. **Wetlands - Restrictions:** Herbicides that cause only short term loss of vegetation and have a low toxicity to wildlife shall be used.

5. **Vegetation - Restrictions:** Herbicides that cause only short term loss of vegetation shall be used. Herbicides shall not be used on tracts where there are crops or gardens or are actively used as farmland.
6. **Wildlife - Restrictions:** Herbicides shall show low oral toxicity to wildlife.
7. **Aquatic Life - Restrictions:** Herbicides shall not be used within 15 feet (4.6 meters) of running water and lakes or ponds where fish may be present.
8. **Threatened and Endangered Species - Restrictions:** Herbicides shall not be used on the likely habitat of T&E species. Ground surveys shall be performed by qualified personnel to identify these areas. Herbicides that are highly toxic to fish shall not be used in areas where streams and recharge zones provide habitat for T&E fish species.
9. **Cultural Resources - Restrictions:** None, subsurface areas are not disturbed during herbicide application.
10. **Recreation and Aesthetics - Restrictions:** None, only temporary "brown outs" shall be acceptable.
11. **Human Health Effects - Restrictions:** Herbicides shall not be used where grazing and haying restrictions specified by the herbicide manufacturer cannot be followed by the landowner. Herbicides shall not be used where landowners or tenants have allergies or other health related conditions which could be affected by herbicide use on the Rights-of-Way. Landowners shall be informed of these restrictions to assist in determining if herbicides may be used on their portion of the Rights-of-Way. Application procedures and Personal Protective Equipment recommended by the manufacturer shall be used to protect application personnel.
12. **Transportation - Restrictions:** Herbicides shall be transported in the manufacturer's original containers. Material Safety Data Sheets and spill clean-up materials shall be transported with the herbicides.
13. **Disposal of Waste Materials - Restrictions:** Waste herbicide materials and containers shall be disposed according to manufacturers recommendations and applicable federal, state, and local regulations.

FOR FURTHER INFORMATION CONTACT:

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Southwestern Power Administration
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PUBLIC AVAILABILITY:

Copies of the EA and this FONSI are available from Southwestern at the above address.

DETERMINATION:

The impacts to the environment and public health implicit in the above 13 items are all temporary. Based on these considerations, Southwestern has concluded that there will be no significant impact to the human environment within the meaning of, 42 U.S.C. 4321, et seq. Therefore, the preparation of an environmental impact statement is not required, and Southwestern Power Administration is issuing this FONSI.

Issued in Tulsa, OK this 28th day of APRIL 1995.



Forrest E. Reeves
Acting Administrator
Southwestern Power Administration

SOUTHWESTERN POWER ADMINISTRATION

ENTRY PERMIT FOR APPLICATION OF HERBICIDE TO THE TRANSMISSION LINE
RIGHT-OF-WAY

In consideration of their mutual promises, _____, the Grantor and the Grantee, Southwestern Power Administration (Southwestern), covenant and agree as follows:

1. Effective upon the date this Permit is executed, the Grantor hereby grants to Southwestern, its agents, assignees, successors or contractors permission to apply herbicides as described in the attached pamphlet "Herbicide Application Program for Transmission Rights-of-Way" to the location described in Part 6 below.
2. The Grantor hereby releases and discharges Southwestern, its agents, assignees, successors or contractors from any claims, demands and causes of action that may arise as a result of the use of herbicides as described above.
3. The Grantor agrees that the herbicide application(s) are for the mutual benefit of Southwestern and the Grantor.
4. The Grantor may revoke this permit upon 12 months advance written notice to Southwestern. Such notice shall be effective when received by Southwestern.
5. The Grantor represents that, to the best of his/her knowledge, record title to the property and location described in Part 6 below is presently vested in:

_____. The Grantor further represents that the only persons occupying said Right-of-Way or having the right to possession are:

6. TRACT NUMBER: _____ LINE NUMBER: _____

STARTING LOCATION DESCRIPTION (Structure number and/or landmark):

ENDING LOCATION DESCRIPTION (Structure number and/or landmark):

GRANTOR (Landowner or Tenant):

Name (Print)

Telephone

Address and ZIP (Print)

Signature

Date

**Final
Environmental Assessment
for
Vegetation Control along Transmission Line
Rights-of-Way**

**Prepared for
Southwestern Power Administration
U.S. Department of Energy**

**Prepared by
Black & Veatch**

April 13, 1995

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1.0 Purpose and Need for Action

Southwestern Power Administration (Southwestern), a division of the U.S. Department of Energy, accesses transmission lines within their rights-of-way (ROW) for the purpose of line and structure maintenance and emergency response. The most significant impediment to structure maintenance and emergency response is the growth of woody vegetation (trees & shrubs) within the ROW. The primary goal of vegetation control is to minimize woody vegetation growth while increasing the growth of herbaceous vegetation (grasses) within the ROW. The purpose of this environmental assessment (EA) is to evaluate the alternatives available for controlling woody vegetation growth within the ROW.

Southwestern maintains approximately 1,380 miles (2,220 kilometers) of transmission line ROW in Oklahoma, Arkansas, and Missouri crossing private and government-owned lands. The ROW is typically 100 feet (30.48 meters) wide and covers approximately 12.12 acres (4.90 hectares) per mile. Southwestern generally controls vegetation in forest and overgrown shrubland. Areas used for pastureland and farming require little to no vegetation control. Based on Southwestern's observations of the land use along the ROW and past ROW clearing operations, Southwestern maintenance personnel have estimated that approximately 700 miles of ROW (1,120 kilometers) require vegetation control.

Southwestern has been using mechanical methods to control vegetation. The mechanical methods have often resulted in a long term increase in stem counts and the establishment of a dense woody cover. As a result of these effects, mechanical methods have required extensive reclearing efforts every three years and limited annual reclearing (brush-hogging) of controlled areas for localized line maintenance. Reductions in staff and budgetary resources require Southwestern to identify more efficient methods of controlling vegetation within the ROW. Based on these concerns, Southwestern is evaluating a number of alternative methods for vegetation control within the ROW. The alternatives evaluated for controlling vegetation in the ROW include: (1) mechanical/manual control (no action), (2) fire control, (3) biological control, and (4) a combination of mechanical/manual and herbicide control (proposed action). The herbicides suitable for use in the last alternative were evaluated to determine the potential impacts to the environment. Southwestern proposes to implement the selected vegetation control method beginning in Spring 1995.

An Environmental Impact Statement (EIS) evaluating similar vegetation control alternatives was prepared by the U.S. Department of Agriculture (USDA), National Forest

Service for use in National Forest lands in Oklahoma and Arkansas. Alternative evaluations and issues of concern discussed in this EA often reference information contained in the USDA EIS.

Prior to implementing the selected vegetation control alternative, Southwestern must determine whether the selected alternative poses a significant impact to the environment. This determination is aided through the review of the EA. The EA was developed with input from federal and state agencies, public organizations and individuals, and experts familiar with the various alternatives and their impacts. This input was solicited during the scoping process, when these groups were identified and informed of Southwestern's intent to prepare the EA. These groups were given the opportunity to provide the document manager with information on the alternatives under evaluation or to suggest other reasonable alternatives.

The scoping process consisted of the notification of federal and state agencies with interest in the project, public notification published in local newspapers (near the study area), and direct contact with various experts familiar with relevant portions of the EA. Significant issues concerning impacts to human health and the environment were raised during the scoping process including: air quality; water quality; wetlands; vegetation; wildlife; threatened and endangered species; archaeological, cultural, and historical resources; and recreation and aesthetics. In addition, issues concerning the transportation and storage of herbicides and the potential effects of accidents and spills were raised.

In the event that the selected alternative does not pose a significant impact to the environment, a Finding of No Significant Impact (FONSI) would be issued by Southwestern. If a FONSI is not issued, an EIS may be developed.

2.0 Description of the Alternatives

Southwestern maintains the ROW under a legal easement that allows the cutting, trimming, mowing or removal of vegetation that interferes with operations and maintenance of the ROW. Potential alternatives for vegetation control from the scoping process and the USDA EIS include: manual and mechanical (no action), herbicide, fire, and biological vegetation control. Each of these alternative methods are used by private landowners and public agencies for the purpose of vegetation control. The alternatives were evaluated against the rights granted by the easements. In addition, comments received from interested persons, organizations, and governmental agencies were reviewed and considered by the preparation team. Two alternatives, fire control and biological control, were considered but eliminated because they (1) eliminate both desirable and undesirable vegetation, (2) present unacceptably high risks (uncontrolled fires), (3) are not specifically permitted under the terms of Southwestern's easement, or (4) require more resources than are available. The no action alternative, manual and mechanical vegetation control (status quo), and the proposed action, the selective use of herbicides in addition to manual and mechanical vegetation control, were evaluated in greater detail.

2.1 Alternative 1 - No Action

The no action alternative continues the use of mechanical and manual methods to control vegetation. The mechanical method currently used by Southwestern is a tractor-mounted brush hog and a truck-mounted boom-tip saw that clears the vegetation. The manual methods used by Southwestern include chain saws and brush saws. Resprouting of forbs, woody shrubs, or other undesirable plants is usually numerous and vigorous and causes competition with grasses. As a result of resprouting, Southwestern performs an extensive reclearing effort every three years and limited annual reclearing of certain areas.

The brush hog mowing tool cuts, chops, or shreds vegetation near the land surface and allows mulching of vegetation and onsite nutrient recycling. This tool is most effective on vegetation 3 inches (7.6 centimeters) or less in diameter.¹ Brush hogging the ROW may incidentally impact desirable vegetation by cutting plants below the growing point. These impacts may occur prior to seed dispersal, which may inhibit grasses from

¹U.S. Department of Agriculture, Forest Service, Southern Region, "Final Environmental Impact Statement for Vegetation Management in the Ozark/Ouachita Mountains", Management Bulletin R8-MB, March 1990, pp. II-22, II-27.

spreading throughout the ROW. Southwestern uses this method to maintain the majority of the ROW.

The boom-tip saws are used to cut encroaching tree limbs along the sides of the ROW. Southwestern uses this tool to selectively control tree limbs growing into the ROW, while allowing the live tree to remain.

The manual methods using a chain saw and brush saw are used to control vegetation larger than 3 inches (7.6 centimeters) in diameter, including dense shrub growths, tree limbs, and large trees.¹ These manual methods are initially effective on woody vegetation; however, resprouting from the stumps or other exposed woody vegetation is common. Southwestern uses this method to control larger trees and along slopes too steep for the tractor-mounted brush hog.

2.2 Alternative 2 - Proposed Action

The proposed action includes combining herbicide application with mechanical and manual methods to control undesirable vegetation along the ROW. Discussions on the proposed action in this report are confined to the addition of different methods of herbicide treatment to the established vegetation control methods. The current mechanical and manual vegetation control methods that would be used in conjunction with the selective use of herbicides are discussed in Section 2.1.

With the use of herbicides, woody vegetation would be controlled while promoting the growth of desirable grasses. Herbicide application methods would include a combination of Cut-Surface Treatments, Basal Application, and Foliar Spray Application depending on the season of the year and species controlled. Trees would be primarily controlled using Cut-Surface Treatments and Basal Application. Dense brush would be primarily controlled using Foliar Spray Application.

The combination of herbicides with mechanical and manual methods would reduce the maintenance requirements of the ROW for Southwestern. Southwestern has estimated that the initial herbicide application would eliminate approximately 75-80% of the broadleaf shrub and tree species. The second application would control any broadleaf shrub and tree species that were not controlled in the initial application and any vegetation that has sprouted since the initial application. After the second application, Southwestern has estimated that subsequent applications would be needed every 5 to 6 years depending on species resistance and growth patterns.

Herbicides would be applied using one, or a combination of the following methods: (1) a power-driven vehicle-mounted mechanical sprayer, (2) backpack sprayers, (3)

pressurized sprayers, and/or (4) squirt bottles. The vehicle-mounted mechanical sprayer contains a 200-gallon (757-liter) tank and a 25-foot (7.6-meter) radiarc spray head. This 200-gallon (757-liter) tank would be refilled with water from a 500-gallon (1892.7-liter) polyethylene tank. This refill water is mixed with herbicide in the 200-gallon (757-liter) sprayer tank. The mechanical sprayer allows the herbicide to be sprayed onto the woody vegetation to approximately 6 feet (1.88 meters) above land surface. Herbicide would be applied using the mechanical sprayer at pressures not to exceed 50 pounds per square inch (345 kilo Pascals) to minimize spray fines. Application using the mechanical sprayer would not occur when wind gusts exceed 10 to 12 miles per hour (16 to 19 kilometers per hour), the temperature is above 98 degrees Fahrenheit (37 degrees Celcius), and the humidity is less than 20%. The backpack sprayers, pressurized sprayers, and squirt bottles are standard items and can be manually adjusted to deliver the amount of herbicide needed.

Nine herbicides were initially evaluated to assist mechanical vegetation control methods including Accord, Arsenal, Escort, Garlon 3A, Garlon 4, Krenite-UT, Spike-80W, Tordon-K, and Tordon 101M. The characteristics of each herbicide are depicted in two matrices developed during the scoping process. The Application Matrix, Table 1, depicts each herbicide's characteristics of physiological and biochemical behavior, target vegetation, habitat usage, application method, soil persistence, degradation mechanisms, and relative cost. The Impact Matrix, Table 2, depicts the ability of each herbicide to effect air quality, surface water quality, groundwater quality, wetlands, vegetation, aquatic life, wildlife, threatened and endangered species, cultural resources, recreation and aesthetics, and human health effects.

These nine herbicides were then evaluated against a herbicide selection criteria developed by Southwestern. Southwestern has determined that herbicides proposed for use in vegetation control along ROW must meet all of the following herbicide selection criteria:

- 1) active on deciduous vegetation,
- 2) able to use in both terrestrial and wetland habitats,
- 3) exhibits a half-life in soil of 60 days or less,
- 4) exhibits high soil adsorption,
- 5) exhibit a low likelihood to migrate to surface water or leach to groundwater,
- 6) exhibit a non- or low- oral toxicity to wildlife, and
- 7) not exhibit toxicological effects on human internal organs.

Based on the results of this evaluation three herbicides, Accord, Garlon 3A, and Garlon 4, meet all of the herbicide selection criteria and could be used by Southwestern to assist manual and mechanical vegetation control. Prior to application, these herbicides would be diluted with water. Occasionally, herbicides would be diluted with either mineral oil, diesel oil, kerosene, limonene, or a surfactant when used in conjunction with the cut stump or basal application methods. A coloring agent may be added to the mixture to aid the applicator in determining the area covered.

2.2.1 Cut-Surface Treatments

Cut-surface treatments are used to eliminate undesirable trees. Tree injection, frill or girdle, and cut-stump treatments are the most commonly used cut-surface treatments. These methods could be applied during any season including the dormant season. However, the proposed herbicides are most efficient when applied during the growing season. Some herbicides are better applied during the late summer and fall. Free-bleeding species, such as red maple, would not be treated during the spring sap rise, as the sap would push the herbicide out of the injection points. Herbicide would not be applied to frozen trees.

Tree Injection Method (Hack and Squirt) - This method includes exposing the cambium of the target tree and then injecting herbicide into the wound. A hatchet and squirt bottle are often the tools used in this method. The wound would angle downward through the bark into the sapwood. The herbicide would be applied when the hatchet is removed.^{2,3} This method would be used to control larger trees in the ROW, and to control saplings and trees located within wetland areas in the ROW.

Frill or Girdle Method - This method involves cutting completely around the tree trunk into the sapwood with an ax, hatchet, or chainsaw. The cuts would be completely wetted with herbicide using a squirt bottle or pressurized spray unit. The wood chips produced during the cutting would not be removed, rather remain attached to the tree trunk to aid in containing the herbicide within the wounds.^{2,3} This method would be used to control larger trees in the ROW, and to control saplings and trees located within wetland areas in the ROW.

²Ibid, pp. 2 - 8.

³Williamson, Max, "Selective Herbicide Applications for Low Impact Vegetation Management of Right-of-Ways, Southern United States, undated.

Cut Stump Method - This method is used on freshly cut or older stumps of any size to prevent resprouting. The cambial area (approximately the outer 1 inch (2.54 centimeters) of the stump) would be wetted with herbicide using either a pressurized backpack sprayer or vehicle mounted radiarc head sprayer. The herbicide would be applied to smooth level stumps free of bark tears, sawdust, or other debris. If a delay of more than 2 hours between cutting and herbicide application occurs, the effectiveness of the herbicide can be reduced; therefore, an oil additive would be added to the herbicide mixture as a cambium treatment.^{2,3} This method would be used to control vegetation after mowing with a tractor-mounted brush hog using the mechanical sprayer and to stumps with a backpack sprayer.

2.2.2 Basal Application

Basal applications are used for selective control of undesirable saplings and brush. Under this method, herbicide in an oil-based diluent would be applied directly onto the bark encircling the lower 12 to 24 inches (0.31 to 0.61 meter) of the target stems until thoroughly wet, but not to the point of runoff. The herbicide mixture would be applied with a backpack sprayer and spray gun or wand. This method allows for selective stem removal while desirable plants are left unharmed.^{2,3} Basal applications could be applied during any season; however, application during the dormant season is preferred because the stem bases are easily accessible.

2.2.3 Foliar Spray Application

Foliar Spray Application is used for individual plant treatments and to selectively control undesirable woody vegetation. Under this method, herbicide would be applied directly onto the target foliage in a uniform spray generating large spray droplets using the mechanical sprayer, backpack sprayers, or pressurized sprayers. Foliar Spray Application would be applied when vegetation is fully leaved, green, and growing.^{2,3} Early season application would be made after full leaf-out of the species to be controlled is obtained; late season application would be made prior to the appearance of fall colors.

2.2.4 Cumulative Actions

Cumulative actions are actions resulting from or associated with the proposed alternative that do not specifically affect the goals of the proposed alternative. Cumulative actions associated with the proposed action include waste generated, herbicide containment, and access development.

2.2.4.1 Waste Generated

Wastes generated during the proposed alternative include herbicide product containers, spray tips, and personal protection equipment. Herbicide product containers would be triple rinsed with water, punctured, and disposed of in a sanitary landfill or by any other method indicated on the manufacturer's label. Spray tips would be triple rinsed and disposed of in a sanitary landfill or by any other method indicated on the manufacturer's label. Personal protection equipment would either be rinsed and disposed of in a sanitary landfill or washed and reused. The rinse water generated in cleaning containers and spray tips would be applied in the treated areas.

There would be no excess herbicide mixture remaining onsite after each day because any excess herbicide mixture would be applied within the ROW before Southwestern personnel leave the site.

2.2.4.2 Herbicide Containment

Product herbicide would be delivered to the site in either 2.5-gallon (9.46-liter) or 55-gallon (208.19-liter) containers. The herbicide would normally be diluted with water. Occasionally, herbicides would be diluted with either mineral oil, diesel oil, kerosene, limonene, or a surfactant. Surfactants and/or dyes may also be added to the herbicide depending on the method of application. Non-water diluents would be transported to the site in small (less than 5-gallon (18.93-liter)) containers and would be poured into the hand or backpack sprayers as necessary. The herbicide dilution would occur within the ROW.

In case of a rupture or other release of a herbicide container, the remainder of mixed herbicide would be applied to the target area until the container was empty. Leaking herbicide containers would not be transported off of the ROW until no herbicide remained in the container. If an uncontrollable rupture or other release of a herbicide or non-water diluent container did occur, Southwestern personnel would contain any liquids within the ROW.

To further reduce the risk of release, no product herbicide, diluted herbicide, or non-water diluents would remain in non-contained areas within the ROW without Southwestern personnel supervision.

2.2.4.3 Access Development

Access roads into the ROW do not exist in many areas. While some portions of ROW may be accessible at points where the ROW crosses existing roads, many areas

would need to be accessed through private properties. Access through private property would be maintained with permission of the specific landowner.

Access to target areas within the ROW exists through existing jeep trails or would be developed as the machinery travels over forbs and grasses. The access to the target areas would be the final area treated once personnel and machinery have exited the treated area. The use of this access reduces the threat of personnel and machinery contacting treated areas and transporting the herbicide offsite.

2.2.5 Future Activities

In the future, development of new herbicides could occur. The characteristics and potential impacts of new herbicides proposed for use would be compared to the subjects listed in Tables 1 and 2. Selection of new herbicides would be limited to herbicides meeting the herbicide selection criteria, as discussed in section 2.2.

In addition, modifications to the existing ROW, such as additional ROW acquired or developed by Southwestern, could occur. Modifications that occur within the three Physiographic Provinces described in the Environmental Setting, section 3.0, would not need to be evaluated with respect to potential impacts from herbicide application. The potential impacts upon the environment and human health in these three Physiographic Provinces has been conducted in this EA; however, the presence of protected streams, karst geology, threatened and endangered species, and archaeological, historical, or cultural resources would need to be identified and mitigated following the practices identified in this EA.

**Table 1
Application Matrix**

Herbicide	Physiological & Biochemical Behavior	Target Vegetation	Habitat Usage	Application Method	Soil Persistence	Degradation Mechanisms	Relative Cost (1-9, 1 being highest)	Remarks
Accord ^{a,b,c} (41.5% Glyphosate)	Inhibits protein synthesis	All vegetation, non-selective	Terrestrial Wetland Aquatic	Cut-Surface Basal Foliar Spray	60-day half-life. High soil adsorption.	Soil microbes	3	Widely used.
Arsenal ^{a,d} (28.7% Imazapyr)	Inhibits cell growth and plant DNA synthesis	Deciduous vegetation, non-selective	Terrestrial Wetland	Cut-Surface Basal Foliar Spray	3-month to 2-year activity period. High soil adsorption.	Photodegraded	9	Widely used. Not active on coniferous trees.
Escort ^{a,e} (60% Metsulfuron)	Inhibits cell division	All vegetation, non-selective	Terrestrial Wetland	Cut-Surface Basal Foliar Spray	1 to 6-week half-life. Limited soil adsorption.	Soil microbes, chemical hydrolysis	8	12-hour Worker Re-entry Restriction.
Garlon 3A ^{a,b,f} (44.4% Triclopyr amine)	Inhibits normal growth processes	Deciduous broadleaf vegetation, selective	Terrestrial Wetland	Cut-Surface Basal Foliar Spray	30 to 46-day half-life. High soil adsorption.	Soil microbes, photodegraded	1	Widely used. Selectively encourages the growth of grasses.
Garlon 4 ^{a,b,g} (61.6% Triclopyr ester)	Inhibits normal growth processes	Deciduous broadleaf vegetation, selective	Terrestrial Wetland	Cut-Surface Basal (mixed with oil)	30 to 46-day half-life. High soil adsorption.	Soil microbes, photodegraded	2	Widely used. Selectively encourages the growth of grasses.
Krenite-UT ^{a,b,h} (41.5% Fosamine)	Prevents bud growth	Deciduous broadleaf vegetation, selective. Works during subsequent growing season.	Terrestrial Wetland	Cut-Surface Basal Foliar Spray	1-week half-life. Moderate soil adsorption.	Soil microbes	7	Prevents "brown out" by effecting bud development in subsequent growing seasons.

**Table 1
Application Matrix**

Herbicide	Physiological & Biochemical Behavior	Target Vegetation	Habitat Usage	Application Method	Soil Persistence	Degradation Mechanisms	Relative Cost (1-9, 1 being highest)	Remarks
Spike-80W ^{a,b,i} (80% Tebuthiuron)	Inhibits photosynthesis	All vegetation, non-selective	Terrestrial Wetland	Soil Spray by Hand Only	12 to 15-month half-life. Soil sterilant. Limited soil adsorption.	Soil microbes	6	Takes up to 3 years to be effective. Active within 6 feet of area sprayed.
Tordon-K ^{a,b,j} (24.4% Picloram)	Inhibits plant growth	Broadleaf vegetation	Terrestrial Wetland	Cut-Surface Basal Foliar Spray	1-month half-life. Low soil adsorption.	Soil microbes, photodegraded	4	Mild skin irritant to workers.
Tordon 101M ^{a,b,k} (10.2% Picloram, 39.6% 2,4-D)	Inhibits plant growth	Broadleaf vegetation	Terrestrial Wetland	Cut-Surface Basal Foliar Spray	1-month half-life. Low soil adsorption.	Soil microbes	4	Combustible at 35C.

^aWeed Science Society of North America, Herbicide Handbook, 1989.

^bU.S. Department of Agriculture, Forest Service, Pesticide Background Statements, Volume 1 - Herbicides, Agricultural Handbook No. 633, August 1984.

^cMonsanto Corporation, Specimen Label for Accord, 1992.

^dAmerican Cyanamid Company, Specimen Label for Arsenal, 1992.

^eE.I. Dupont de Nemours and Co., Specimen Label for Escort, 1993.

^fDow Elanco, Specimen Label for Garlon 3A, 1993.

^gDow Elanco, Specimen Label for Garlon 4, 1993.

^hE.I. DuPont de Nemours and Co., Specimen Label for Krenite-UT, 1993.

ⁱDow Elanco, Specimen Label for Spike 80W, 1992.

^jDow Elanco, Specimen Label for Tordon-K, 1992.

^kDow Elanco, Specimen Label for Tordon 101M, 1992.

**Table 2
Impact Matrix**

Method	Air Quality	Surface Water Quality	Ground Water Quality	Wetlands	Vegetation	Wildlife	Aquatic Life	T&E Species	Cultural Resources	Recreation & Aesthetics	Human Health Effects
No Action											
Manual or Mechanical Control	Dust from cutting operations.	Erosion of treated areas may cause increased turbidity.	No Impacts.	Short-term loss of most vegetation. Change in habitat type.	Short-term loss of most vegetation. Change in habitat type.	Potential injury from mower blades. Secondary impacts from habitat loss.	Impacts to life from increased sediment. Decrease in dissolved oxygen.	Cutting or damage of plants. Nest disruption.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary loss of berry picking areas.	Injury from airborne vegetation.
Proposed Action											
Accord	Application method minimizes mist drift.	Half-life of 2 weeks in water. ^{b,c} Registered by EPA for use in water. ^c Erosion of treated areas may cause increased turbidity.	Low likelihood to leach to ground water based on soil adsorption. ^b	Short-term loss of most vegetation. Change in habitat type.	Short-term loss of most vegetation. Change in habitat type.	Slight eye irritation in rabbits. ^{a,b} Low oral toxicity. ^{a,b}	Non-toxic to fish. Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary "brown out".	Potential effects from inhalation during application.

**Table 2
Impact Matrix**

Method	Air Quality	Surface Water Quality	Ground Water Quality	Wetlands	Vegetation	Wildlife	Aquatic Life	T&E Species	Cultural Resources	Recreation & Aesthetics	Human Health Effects
Arsenal	Application method minimizes mist drift.	Restricted from use in surface water. ^d Erosion of treated areas may cause increased turbidity.	Moderate likelihood to leach to ground water based on long activity period. ^a	Short-term loss of most vegetation. Change in habitat type.	Short-term loss of most vegetation. Change in habitat type.	Mild skin and eye irritant. ^{a,d} Non-toxic.	Non-toxic to fish and inverts. ^d Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary "brown out".	Mild skin and eye irritant during application.
Escort	Application method minimizes mist drift.	Restricted from use in surface water. ^e Erosion of treated areas may cause increased turbidity.	Moderate likelihood to leach to ground water based on limited soil adsorption and short half-life. ^a	Short-term loss of most vegetation. Change in habitat type.	Short-term loss of most vegetation. Change in habitat type.	Eye and skin irritant, low oral toxicity. ^{b,e}	Non-toxic to fish. ^b Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary "brown out".	Potential effects from inhalation during application, skin and eye irritant.

**Table 2
Impact Matrix**

Method	Air Quality	Surface Water Quality	Ground Water Quality	Wetlands	Vegetation	Wildlife	Aquatic Life	T&E Species	Cultural Resources	Recreation & Aesthetics	Human Health Effects
Garlon 3A	Application method minimizes mist drift.	Restricted from use in surface water. Half-life of 3 hours. ^{b,f} Erosion of treated areas may cause increased turbidity.	Low likelihood to leach to ground water based on soil adsorption. ^b	Short-term loss of woody vegetation. Does not affect grasses. Change in habitat type.	Short-term loss of woody vegetation. Does not affect grasses. Change in habitat type.	Low oral toxicity. ^{b,f}	Non-toxic to fish. ^{b,f} Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary "brown out".	Potential effects from inhalation during application, eye and skin irritant.
Garlon 4	Application method minimizes mist drift.	Restricted from use in surface water. Half-life of 12 to 24 hours. ^{b,g} Erosion of treated areas may cause increased turbidity.	Low likelihood to leach to ground water based on soil adsorption. ^b	Short-term loss of woody vegetation. Does not affect grasses. Change in habitat type.	Short-term loss of woody vegetation. Does not affect grasses. Change in habitat type.	Low oral toxicity. ^{b,g}	Highly toxic to fish. ^{b,g} Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary "brown out".	Potential effects from inhalation during application, eye and skin irritant.

**Table 2
Impact Matrix**

Method	Air Quality	Surface Water Quality	Ground Water Quality	Wetlands	Vegetation	Wildlife	Aquatic Life	T&E Species	Cultural Resources	Recreation & Aesthetics	Human Health Effects
Krenite-UT	Application method minimizes mist drift.	Restricted from use in surface water. ^h Can persist for over 8 weeks ^{a,b} Erosion of treated areas may cause increased turbidity.	Low likelihood to leach to ground water based on soil adsorption and short half-life.	Short-term loss of woody vegetation. Does not affect grasses. Change in habitat type.	Short-term loss of woody vegetation. Does not affect grasses. Change in habitat type.	Mild skin, eye, and inhalation irritant to mammals. Non to slightly toxic to wildlife. ^{b,h}	Non-toxic to fish and inverts. ^b Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. No "brown out".	Mild skin, eye, and inhalation toxicity.
Spike-80W	Application method minimizes mist drift.	Restricted from use in surface water. ⁱ Erosion of treated areas may cause increased turbidity.	High likelihood to leach to ground water based on limited soil adsorption and long half-life.	Short-term loss of most vegetation. Change in habitat type. High threat to non-target vegetation.	Short-term loss of most vegetation. Change in habitat type.	Slight toxicity to invertebrates; low toxicity to mammals. ^{b,i} Mild skin, eye, and inhalation irritant to mammals. ^{b,i} Decreases growth.	Slightly toxic to fish and inverts. ^{b,i} Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary "brown out".	Mild skin, eye, and inhalation toxicity.

**Table 2
Impact Matrix**

Method	Air Quality	Surface Water Quality	Ground Water Quality	Wetlands	Vegetation	Wildlife	Aquatic Life	T&E Species	Cultural Resources	Recreation & Aesthetics	Human Health Effects
Tordon K	Application method minimizes mist drift.	Restricted from use in surface water. ^j Erosion of treated areas may cause increased turbidity.	High likelihood to leach to ground water based on low soil adsorption. ^b	Short-term loss of most vegetation. Change in habitat type.	Short-term loss of most vegetation. Change in habitat type.	Low oral toxicity. Eye and skin irritant. ^{b,j} Increase in tumor development. ^b	Slightly toxic to fish. ^{b,j} Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary "brown out".	Severe eye irritation, skin irritation and skin burn, repeated exposure may cause liver effects. ^{b,j}
Tordon 101M	Application method minimizes mist drift.	Restricted from use in surface water. ^k Erosion of treated areas may cause increased turbidity.	High likelihood to leach to ground water based on low soil adsorption. ^b	Short-term loss of most vegetation. Change in habitat type.	Short-term loss of most vegetation. Change in habitat type.	Toxic. Eye and skin irritant. ^{b,k} Increase in tumor development. ^b Potential teratogen. ^b	Slightly toxic to fish. ^{b,j} Prevent algae growth, large scale use may affect aquatic life by reducing food sources.	Herbicide will not be used near T&E species. No Impact.	No impact. No sub-surface areas are disturbed.	Better access to ROW. Temporary "brown out".	Severe eye irritation, skin irritation and skin burn, repeated exposure may cause liver effects. ^{b,k}

**Table 2
Impact Matrix**

Method	Air Quality	Surface Water Quality	Ground Water Quality	Wetlands	Vegetation	Wildlife	Aquatic Life	T&E Species	Cultural Resources	Recreation & Aesthetics	Human Health Effects
^a Weed Control Society of North America, <u>Herbicide Handbook</u> , 1993. ^b U.S. Department of Agriculture, Forest Service, <u>Pesticide Background Statements, Volume 1 - Herbicides</u> , Agricultural Handbook No. 633, August 1984. ^c Monsanto Corporation, Specimen Label and MSDS for Accord, 1992. ^d American Cyanamid Company, Specimen Label and MSDS for Arsenal, 1992. ^e E.I. Dupont de Nemours and Co., Specimen Label and MSDS for Escort, 1993. ^f Dow Elanco, Specimen Label and MSDS for Garlon 3A, 1993. ^g Dow Elanco, Specimen Label and MSDS for Garlon 4, 1993. ^h E.I. DuPont de Nemours and Co., Specimen Label and MSDS for Krenite-UT, 1993. ⁱ Dow Elanco, Specimen Label and MSDS for Spike 80W, 1992. ^j Dow Elanco, Specimen Label and MSDS for Tordon-K, 1992. ^k Dow Elanco, Specimen Label and MSDS for Tordon 101M, 1992.											

2.3 Alternatives Considered but Eliminated

2.3.1 Vegetation Control with Fire

Prescribed fire would be the planned use of fire. It is used to reduce hazardous forest fuels, prepare sites for seeding or planting, rejuvenate wildlife and range forage species, maintain fire-dependent species and ecosystems, control insects and diseases, manage wilderness, and manage threatened and endangered species and their habitats. There are six commonly used techniques to dispense fire including backing fires, strip-head fires, flanking fires, spot fires, ring fires, and slash pile or windrow fires. The three common ignition tools include the traditional ground-based hand-held drip torch, and the aerial ignition systems of the helitorch and plastic sphere dispenser. The success of vegetation control using fire is dependent upon plant characteristics, fire type and behavior, topography, wind speed, temperature, length of exposure, and season of the year.⁴

This alternative was not further considered because: (1) it impacts all vegetation, (2) there is a high potential for uncontrolled fires, and (3) it requires more resources than are available. The use of fire for vegetation control will impact all vegetation in the ROW, leaving the soil exposed and susceptible to erosion. Fire would be especially difficult to control since flames, heat, or burning airborne material may cause wildfires outside of the ROW. The use of fire would require the construction of fire breaks throughout the ROW and the mobilization of additional Southwestern and local response personnel.

2.3.2 Biological Control

Biological control uses living organisms to suppress, inhibit, control, or eliminate growth of herbaceous and woody vegetation. Grazing within the ROW by domestic livestock was evaluated because other potential methods of biological control, such as microbial agents, plant pathogens, and insect, are in the experimental development stages. The effectiveness of grazing for vegetation control depends on the area size, amount of control needed, types and amounts of herbaceous and woody species present, and feeding selectivity of animals used.⁵

This alternative was not further considered because: (1) it damages most vegetation, (2) restrictive measures would need to be constructed along the ROW, and (3) it requires more resources than are available. Biological vegetation control would leave the soil

⁴U.S. Department of Agriculture, Forest Service, Southern Region, "Final Environmental Impact Statement for Vegetation Management in the Ozark/Ouachita Mountains", Management Bulletin R8-MB, March 1990, pp. II-19, IV-30.

⁵Ibid, pp. II-39, II-40.

exposed and susceptible to erosion. In addition, the trampling of soil and vegetation by grazing animals would increase soil erosion. The construction of restrictive measures to contain grazing animals within the ROW would also restrict landowner activities. Biological control would be resource intensive, requiring resources not currently available to Southwestern such as herd health managers and agricultural experts.

3.0 Environmental Setting

The Environmental Setting is a general description of the area that the ROW passes through and may be affected by the no action and the proposed action alternatives. The ROW passes through the Central Lowland, Ozark Plateau, and Mississippi Alluvial Plain Physiographic Provinces. The Central Lowland Province is characterized by numerous wide, flat valleys incised by rivers. The Ozark Plateau Province is characterized by deep, narrow valleys with sharp ridges. The Mississippi Alluvial Plain Province is a relatively flat area, that is well drained and contains excellent farmland.⁶

3.1 Air Quality

Air flow and quality are dominated by changing air masses and storm systems. In the Ozark region, air flow and quality are dominated by migrating, frequently changing air masses during the dormant season and an Atlantic high-pressure system, whose clockwise movement pulls in tropical air from the Gulf of Mexico during the growing season. Prevailing winds in the region are typically from the northwest from October to March, and from the southwest from April to September.⁷

Regionally, air quality is generally good in winter and spring when changing weather patterns keep the atmosphere mixed. Occasional stagnation periods in summer and fall cause natural and manmade pollutants to accumulate. Stagnation is worsened in valleys, where pollutants are contained by surrounding hills and downslope air flows. The ROW passes through nonattainment areas where air quality is well within U.S. Environmental Protection Agency standards.^{8,9,10}

⁶Lapedes, Daniel N., Editor, McGraw-Hill Encyclopedia of the Geological Sciences, 4th edition. New York: McGraw-Hill, Inc. 1977.

⁷U.S. Department of Agriculture, Forest Service, Southern Region, "Final Environmental Impact Statement for Vegetation Management in the Ozark/Ouachita Mountains", Management Bulletin R8-MB, March 1990, pp. III-18.

⁸Missouri Department of Natural Resources (MDNR), Division of Environmental Quality, Air Pollution Control Program Report, 1992.

⁹Oklahoma Department of Environmental Quality (ODEQ), Air Quality Service, Oklahoma 1992 Air Quality Report, 1992.

¹⁰U.S. Environmental Protection Agency, Aerometric Information Retrieval System, Air Quality Subsystem for Arkansas, provided by the Arkansas Department of Pollution Control and Ecology, August 11, 1994.

3.2 Water Quality

The humid climate of the region produces abundant precipitation. Precipitation can either generate overland flow and runoff into surface waters or infiltrate into the soil and recharge groundwater. Evaporation and evapotranspiration (uptake of water by vegetation) can have a significant effect on runoff and infiltration depending on the local geographic conditions, soil permeability, soil thickness, and geology.

3.2.1 Surface Water

The ROW crosses numerous perennial and intermittent streams, natural lakes, manmade lakes, and reservoirs. Most perennial streams in the study area are fed by intermittent streams, springs, and natural lakes. Many of the watersheds fed by the perennial streams are used as sources for public drinking water. Surface water quality is excellent in most streams except during major storms, when runoff from mines, farms, roads, and construction sites contribute runoff materials to the surface water. Localized contamination often occurs near urban areas, industrialized centers, agricultural chemical use areas, and waste sites. In the Salem and Springfield portions of the Ozark Plateau, limestone and dolomite produce a neutral pH surface water high in dissolved minerals. Elsewhere in the Ozark Plateau, sandstone and novaculite produce neutral pH surface water low in dissolved minerals.^{11,12,13,14}

The ROW crosses several state-designated scenic rivers including one in Oklahoma (Big Lee's Creek) and eight in Arkansas (Kings River, Spring River, Mulberry River, Strawberry River, Eleven Point River, North Fork Illinois Bayou, Middle Fork Illinois Bayou, and Big Piney Creek). The ROW also crosses Buffalo National River in Arkansas, a federally-designated wild and scenic river.

¹¹U.S. Department of Agriculture, Forest Service, Southern Region, "Final Environmental Impact Statement for Vegetation Management in the Ozark/Ouachita Mountains", Management Bulletin R8-MB, March 1990, pp. III-16.

¹²U.S. Geological Survey, Water Resources Data - Arkansas, Water Year 1993, Water Data Report AR-93-1, March 1994.

¹³U.S. Geological Survey, Water Resources Data - Missouri, Water Year 1993, Water Data Report MO-93-1, April 1994.

¹⁴U.S. Geological Survey, Water Resources Data - Oklahoma, Water Year 1993, Water Data Reports OK-93-1 and OK-93-2, May 1994.

3.2.2 Aquatic Life

The diverse aquatic habitats of the region support many species of fish, reptiles, amphibians, mollusks, and aquatic insects. The basic habitat types are lotic (standing water such as lakes and ponds) and lentic (flowing water such as streams).

Lentic habitats contain the greatest diversity of species and are divided into cool and warm water. Cool water streams are generally found in the Ozark Plateau and support various fish species including brown and rainbow trout (*Salmo trutta* and *S. gairdneri*), smallmouth bass (*Micropterus dolomieu*), and darters (*Etheostoma spp.*). Warm water streams are generally found in the Mississippi Alluvial Plain and the Central Lowlands. These streams support various fish species including largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), and minnows (*Notropis spp.*). One of the basic food sources for all of these fish are aquatic invertebrates including mayflies (Order Ephemeroptera), stoneflies (Order Plecoptera), caddisflies (Order Trichoptera), crayfish (Order Decapoda), worms (Phylum Annelida), and mussels (Order Mollusca). Generally, these invertebrates are very sensitive to water quality changes.^{15,16,17}

Lotic habitats are often fed or drained by lentic habitats thereby allowing some of the species to migrate and colonize the different habitats; however, in a general description, these two habitats function and support life differently. Fish found in lotic habitats include largemouth bass, walleye (*Stizostedion vitreum*), bluegill sunfish (*Lepomis macrochirus*), and crappie (*Pomoxis spp.*). Aquatic invertebrates commonly found within lotic habitats include dragonflies and damselflies (Order Odonata), and zooplankton.^{15,16,17}

3.2.3 Groundwater

Groundwater levels in the surficial aquifers generally respond to climatic influences, as continual discharges to streamflow are offset by periodic rainfall. There are also areas within the study area where streams recharge the groundwater in a region. Water levels in these unconfined aquifers are typically highest in the winter and lowest in the summer.

Groundwater found within limestone and dolomite usually contains high levels of calcium carbonate. Groundwater found with the valley deposits of the Mississippi,

¹⁵U.S. Department of Agriculture, Forest Service, Southern Region, "Final Environmental Impact Statement for Vegetation Management in the Ozark/Ouachita Mountains", Management Bulletin R8-MB, March 1990, pp. III-16, III-17.

¹⁶Pennak, Robert W., Ph.D., Fresh-Water Invertebrates of the United States. New York: The Ronald Press Company, 1953.

¹⁷Wetzel, Robert G. and Gene E. Likens, Limnological Analyses. New York: Springer-Verlag, 2nd edition, 1991.

Arkansas, Red, Ouachita, and White Rivers is often high in iron. Groundwater can be easily impacted in karst terrain through sinkholes, sinking creeks, and caverns.^{12,13,14}

Generally the transmission lines in Oklahoma are located within the Central Lowlands Physiographic Province and traverse areas where the surficial geologic deposits are predominantly bedrock formations consisting of shale, and shaly sandstone and to a lesser extent non-karst limestone. In southern Johnston and Atoka counties there exists a sandstone bedrock aquifer which crops out at the land surface. The water table is most typically 20 to 50 feet (6.1 to 15.2 meters) below land surface in this aquifer. Due to the relatively high permeability of this sandstone formation, the infiltration rate of precipitation is expected to be higher than in most areas of Oklahoma. The transmission lines cross the Canadian River, the North Canadian River, and the Arkansas River alluvial valleys. The transmission lines also cross numerous less significant alluvial valleys. The surficial geologic deposits in these areas consist of unconsolidated clay, silt, sand and gravel. These deposits comprise unconfined aquifers with moderate to high permeability whose water table is generally within 10 to 30 feet (3.0 to 9.1 meters) below land surface. Along the transmission line in Cherokee and Adair counties, groundwater in the surficial aquifer in this region exists in fractured and karstified carbonate formations.

All transmission lines in southwest Missouri and northern Arkansas are situated within the Ozark Plateau Physiographic Province except for the lines east of the western one-third of Lawrence County, Arkansas and the western two-thirds of Randolph County, Arkansas. The Ozark Plateau is characterized by an extremely thick sequence of carbonate (limestone and dolomite) bedrock formations. Generally there exists a thick clay rich residual soil overlying the bedrock. Groundwater in the surficial geologic deposits exists in unconfined to semiconfined fractured and karstified bedrock formations.

All transmission lines in Dunklin, New Madrid, Pemiscot, Mississippi, Butler, and Stoddard counties Missouri, and in Craighead, Mississippi, Greene, and Clay Counties, Arkansas, are situated in the Mississippi Alluvial Plain Physiographic Province. The surficial geologic deposits in this region consist of unconsolidated alluvial deposits of clay, silt, sand, and gravel. The surficial aquifer in this area is generally unconfined and groundwater occurs relatively close to the land surface.¹⁸

¹⁸U.S. Environmental Protection Agency, Regional Assessment of Aquifer Vulnerability and Sensitivity in the Conterminous United States, August, 1991.

3.3 Wetlands

Wetlands are transitional lands between terrestrial and aquatic ecosystems, and are characterized by the presence of hydrophytic vegetation, hydric soil, and hydrology. In addition to providing habitats for many plants and animals, wetlands function to improve water quality, control flood waters, and control erosion.¹⁹

Wetlands have been impacted through agriculture in the United States. Agricultural impacts include drainage and filling, channelization, alteration of wetland hydrology, and the runoff of herbicides, pesticides, fertilizers, and soil into the wetland.²⁰

The ROW crosses several types of wetlands, including forested, scrub-shrub, and emergent. Forested wetlands are dominated by woody vegetation greater than 20 feet (6 meters) tall. Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet (6 meters) tall. Emergent wetlands are dominated by erect, rooted, herbaceous hydrophytic vegetation.¹⁹

3.4 Vegetation

The ROW is a corridor through various ecosystems and plant communities. The ROW passes through agricultural lands, where the ecological succession and vegetation abundance and diversity have been influenced by man. The ROW in these areas are often used for crops or pasture and are represented by vegetation typical of these areas. The ROW also passes through forested areas, where historical ROW mechanical maintenance activities have altered the habitat into more of an oldfield/shrubland habitat. ROW in these areas is generally characterized by a thick growth of low spreading shrubs, forbs, or grasses caused by selectively removing developing trees, and allowing a dense shrub, forb, and grass cover to establish and outcompete invading tree seedlings. Species such as goldenrod (*Solidago spp.*), fescue grass (*Festuca spp.*), huckleberries (*Gaylussacia spp.*), blueberries (*Vaccinium spp.*), sweet fern (*Comptonia peregrina*), greenbrier (*Smilax spp.*), meadowsweet (*Spireau spp.*), and arrowwood (*Viburnum spp.*) are typical of these areas. The edge between the surrounding forest and ROW corridor (an ecotone) is very

¹⁹Tiner, Ralph W., Jr., "Classification of Wetland Ecosystems" in Wetlands Ecology and Conservation: Emphasis in Pennsylvania, The Pennsylvania Academy of Science, 1989.

²⁰Tiner, Ralph W., Jr., "Agricultural Impacts on Wetlands in the Northeastern United States", presented at the National Symposium on Protection of Wetlands from Agricultural Impacts, sponsored by the U.S. Fish and Wildlife Service, April 26-28, 1988.

diverse in vegetation, since it contains species found both within the corridor and the forest.²¹

3.5 Wildlife

The wildlife found within the ROW is influenced by the adjoining land use. The two primary land uses crossed by the ROW include agricultural and forested lands. Wildlife use the ROW for foraging, nesting, and as a travel corridor. Typical species likely to be found within the ROW include various mammals, such as the white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), and white-footed mouse (*Peromyscus leucopus*), various birds, such as the wild turkey (*Meleagris gallopavo*), northern bobwhite quail (*Colinus virginianus*), rufous-sided towhee (*Pipilo erythrophthalmus*) and common yellowthroat (*Geothlypis trichas*), various reptiles, such as the black rat snake (*Elaphe obsoleta*) and copperhead (*Agkistrodon contortrix*), and various amphibians, such as the spotted salamander (*Ambystoma maculatum*).²¹ Since the ROW edge is an ecotone between the adjoining land use and the ROW, and usually has more species diversity than either of the adjoining land uses, the ROW is generally high in species diversity and potentially includes species of both land uses.

3.6 Threatened and Endangered Species

The presence of federally- or state-listed threatened and endangered (T&E) species within 0.5 mile (0.8 kilometer) on either side of the ROW was investigated for this study. There are over one hundred federally- or state-listed T&E species within this 1.0 mile (1.6 kilometers) zone along the ROW. The majority of the species are state-listed endangered or rare plants that are not located directly within the ROW. T&E species have been identified as being located within the ROW by either the U.S. Fish and Wildlife Service or the respective state office overseeing T&E species. Southwestern plans to review and update the T&E species locations with respect to the ROW on an annual basis.

In Arkansas, the ROW crosses two areas where the following T&E species are present: the pink mucket (*Lampsilis abrupta*) and the heart-leaved plantain (*Plantago cordata*).²² In Missouri, the tradescant aster (*Aster dumosus* var. *strictior*), arrow arum

²¹Kricher, John C., A Field Guide to Ecology of Eastern Forests, North America (The Peterson Guide Series). New York: Houghton-Mifflin Company, 1988.

²²Arkansas Natural Heritage Commission, Data Report of Elements of Special Concern along Southwestern Power Administration Line Corridors, in letter to Corry Platt, BLACK & VEATCH Waste Science, Inc., October 19, 1994.

(*Peltandra virginica*), Loesel's twayblade (*Liparis loeselii*), hyssopleaf thoroughwort (*Eupatorium hyssopifolium*), and a sedge (*Carex bromoides*) are the T&E species identified within the ROW. The Missouri bladderpod (*Lesquerella filiformis*), a federally-listed endangered plant has been identified within the 1 mile study zone of the ROW. Also in Missouri, records of swamp rabbit (*Sylvilagus aquaticus*), black-tailed jackrabbit (*Lepus californicus*), Neosho mucket (*Lampsilis rafinesqueana*), and the Arkansas darter (*Etheostoma cragini*) are listed within the 1 mile study zone of the ROW and may come in contact with activities within the ROW. Subterranean habitats for the Ozark cavefish (*Amblyopsis rosae*) are also crossed by the ROW.²³ In Oklahoma, the following federally-listed T&E species have been documented within the counties that the ROW crosses: bald eagle (*Haliaeetus leucocephalus*), interior least tern (*Sterna antillarum*), and the American burying beetle (*Nicrophorus americanus*). The state endangered longnose darter (*Percina nasuta*) was reported to be present in Big Lee's Creek, which is crossed by the ROW.²⁴

3.7 Archaeological, Cultural, and Historical Resources

During the scoping process, the respective state offices overseeing archaeological, cultural, and historical resources indicated that the proposed action would not disturb subsurface features. Therefore, these offices determined that an additional search to identify archaeological, cultural, and historical resources within the ROW was not warranted.

The ROW adjoins the George Washington Carver National Monument in Granby, Missouri.²⁵ The George Washington Carver National Monument is listed on the National Register of Historic Places, Missouri Register of Historic Places, and Black Register of Historic Places.

3.8 Recreation and Aesthetics

The ROW may be used by neighboring residents for recreational purposes and berry picking. The ROW provides access to undeveloped lands potentially used for hunting, fishing, hiking, or birding/wildlife observation. In addition to the ROW itself being used for recreational purposes, the ROW crosses several publicly-owned lands used for

²³Missouri Department of Conservation, Data Report for Southwestern Power Administration, in letter to Corry Platt, BLACK & VEATCH Waste Science, Inc., September 8, 1994.

²⁴Oklahoma State University (OSU), Endangered and Threatened Species of Oklahoma, Oklahoma State University Press, 1993.

²⁵U.S. Geological Survey, 7.5-Minute Quadrangle Sheet for Granby, Missouri, 1974.

recreation. These recreation areas are used for hunting, fishing, swimming, camping, picnicking, boating, and birding.

Visually, the ROW divides the natural landscape and is easily seen by humans when sightseeing from a mountain top or driving past. The ROW uses large metal towers and double wooden poles to hold the transmission lines above the ground, which are also easily noticeable as they differ significantly from the natural landscape.

4.0 Description of Environmental Impacts

The Description of Environmental Impacts is a description of the known or potential impacts to the Environmental Setting features along the ROW. Table 2, the Impact Matrix provides an overview of the potential impacts of each of the alternatives on the criteria identified during the scoping process. The following contains a summary comparing each alternative to each of the impact criteria identified.

4.1 Air Quality

The brush hogging and mechanical saws used in the no action alternative may create some dust particles. The dust particles created by this method are minimal relative to adjacent land uses such as agriculture.

The Foliar Spray Application method used in the proposed action may result in some drift of droplets of herbicide; however, the droplet size used in the proposed action reduces this likelihood. Under the conditions limiting the use of the Foliar Spray Application, it is unlikely that there would be any drift or volatilization of herbicide, regardless of the herbicide selected.³

4.2 Water Quality

4.2.1 Surface Water Quality

The manual and mechanical methods of the no action alternative may remove vegetation down to the soil surface or disturb the soil, creating an erosion potential. Soil particles may be carried by rainfall runoff into nearby streams where it may increase turbidity and result in habitat loss. In addition, vegetative debris may be carried into nearby streams, affecting nutrient loading, which may affect aquatic life.

Of the herbicides evaluated in the proposed action, only Accord is registered for use in surface waters. Accord exhibits a half-life of 2 weeks in surface water with direct sunlight and is subject to microbial degradation. The other herbicides are specifically restricted from use in surface waters. Initial use of herbicides in the ROW may result in increased erosion due to less vegetative cover; however, the promotion of grass growth in the ROW would reduce impacts to surface water, since grasses provide more soil erosion protection than shrubs and trees. To further reduce any impact to surface water, herbicides would not be applied within 15 feet (4.6 meters) of any flowing surface water.

4.2.2 Aquatic Life

The manual and mechanical methods of the no action alternative may remove vegetation down to the soil surface or disturb the soil, creating an erosion potential. Soil particles may be carried in rainfall runoff into nearby streams where it may increase turbidity and result in habitat loss. In addition, vegetative debris may be carried into nearby streams, increasing turbidity and decreasing dissolved oxygen content, which may adversely affect aquatic life.

Of the herbicides meeting the herbicide selection criteria, Accord and Garlon 3A are non-toxic to fish. The remaining herbicide currently meeting the herbicide selection criteria, Garlon 4, is highly toxic to fish; however, to reduce impacts to aquatic life from any of the herbicides, herbicides would not be applied within 15 feet (4.6 meters) of any flowing surface water.

4.2.3 Groundwater Quality

Manual and mechanical vegetation control activities associated with the no action alternative would have no effect on groundwater quality.

The herbicides in the proposed action were evaluated to determine their affinity to adsorb to soil particles. Herbicides that are strongly adsorbed to soil particles are less likely to leach into groundwater. The herbicides meeting the herbicide selection criteria, Accord, Garlon 3A, and Garlon 4, strongly adsorb to soil particles and are not likely to leach to groundwater. Other herbicides evaluated, Spike-80W, Tordon-K, and Tordon 101M, are especially likely to impact groundwater since these leach rapidly; therefore, these herbicides did not meet the selection criteria and are not proposed for use in the proposed action. To further reduce any potential impacts to groundwater, herbicides would not be applied within 15 feet (4.6 meters) of sinkholes, visible fractures in rock outcrops, sinking creeks, and caverns. Areas exhibiting these karst features would be field identified and marked prior to herbicide application.

4.3 Wetlands

Manual and mechanical vegetation control activities associated with the no action alternative will directly impact vegetation in wetland areas. These impacts are short-term since this vegetation grows back between treatments.

All of the herbicides evaluated in this EA could be used in wetlands to control vegetation; however, only Accord is specifically registered by U.S. Environmental Protection Agency (EPA) for that use. Accord, Escort, Spike, and both Tordon herbicides

are non-selective and would control both herbaceous and deciduous vegetative species to which they are applied. Arsenal is selective for deciduous species and would not be effective on coniferous vegetation. The Garlon herbicides and Krenite-UT are selective for broadleaf plant control and would promote the growth of grasses in wetlands. Wetland soils are generally high in organic content and are generally located at the groundwater/surface water interface. The herbicides meeting the herbicide selection criteria, Accord, Garlon 3A, and Garlon 4, adsorb to sediment which limits migration to adjoining surface water or groundwater. Garlon 4 is highly toxic to aquatic life and may impact invertebrate life within the wetland or connected surface waters.

4.4 Vegetation

Manual and mechanical vegetation control activities associated with the no action alternative will directly impact vegetation in treated areas. These impacts are short-term since this vegetation grows back between treatments.

All of the herbicides evaluated in the proposed action will directly impact vegetation. Accord, Escort, Spike, and both Tordon herbicides are non-selective and will control both herbaceous and deciduous vegetative species to which they are applied. Arsenal is selective for deciduous species and would not be effective on coniferous vegetation. The Garlon herbicides and Krenite-UT are selective for broadleaf plant control and will promote the long-term establishment of grasses in treated areas.

A longterm impact to vegetation from the proposed action is the change of species composition within some areas of the ROW. The control of woody vegetation and respraying every three to six years, as scheduled, would encourage the recolonization of treated areas with grasses, forbs, and broadleaf weed species, creating a diversity of non-woody habitat. This impact is consistent with Southwestern's goal for vegetation control along the ROW. This impact is not significant when compared to the impacts upon the natural vegetative community from agricultural development and highway corridor maintenance, which generally encourage a monotypic species composition and limited habitat.

4.5 Wildlife

Manual and mechanical vegetation control activities associated with the no action alternative may directly impact wildlife by (1) contact with the mower blades and (2) a change in habitat.

All of the herbicides evaluated in the proposed action have some toxicological effects on tested animal species at high experimental doses. The herbicides meeting the herbicide selection criteria would not cause chronic health hazards to wildlife, but may cause skin and eye irritation at high experimental doses. Spike and both Tordon herbicides are associated with increased tumor development, teratogenic effects, and a decrease in growth at high experimental doses; therefore, these herbicides did not meet the herbicide selection criteria and are not proposed for use in the proposed action. The quantity of active ingredient in the diluted herbicide and the application mixture make it unlikely that any wildlife species would be exposed to doses of herbicides high enough to cause direct effects. Indirect effects of herbicide application to wildlife may include loss of habitat for some species and a gain of habitat for others.

A longterm impact to wildlife from the proposed action and the associated change in vegetative species composition is the reduction of woody vegetation habitat used for nesting, foraging, and protective cover. The removal of this habitat and respraying every three to six years, as proposed, would encourage the recolonization of treated areas with grasses, forbs, and broadleaf weed species, creating a diversity of non-woody habitat. The promotion of grasses, forbs, and broadleaf weed species would replace food sources and improve wildlife access along the ROW. Under the no action alternative, the extent of growth and re-establishment of vegetation between cuttings provides a lower quality habitat when compared to adjacent land uses, such as forest; therefore, the reduction of woody vegetation habitat from the proposed action would not have a significant impact to wildlife.

4.6 Threatened and Endangered Species

Threatened and endangered species located within the ROW are minimally impacted by the current vegetation control methods. The mowing and manual cutting of vegetation within the ROW impacts protected vegetation if the protected vegetation is cut. The current vegetation control method temporarily impacts the habitats of the mobile T&E species not located directly within the ROW because the food sources and habitats available within the ROW are reduced. Additional impacts to T&E animal species include disruption of nests and nesting species.

The herbicides evaluated in the proposed action would not be applied on or near the T&E species. Where the T&E species occur within the ROW, the proposed action would not be used, rather target vegetation in this area would be controlled using the established mechanical and manual vegetation control. The known locations of T&E species would

be field identified and marked to aid the applicator in avoiding these areas during herbicide application. As stated in Section 3.6, Southwestern plans to review and update the known locations of T&E species available from the respective state office annually.

The potential for impact to mobile T&E species was evaluated because these species could come in contact with the treated areas. Based on the estimated concentration of herbicide applied through the Foliar Spray Application method, the concentrations of herbicide present within the treated ROW would not be high enough to cause toxic impacts to the T&E mammalian or avian species.

The Missouri bladder-pod inhabits limestone glades and outcrops and is known to exist in four counties along the ROW. The known and potential Missouri bladder-pod habitats along the ROW would be surveyed and species locations would be marked in the field prior to herbicide application.

Threatened and endangered fish (Neosho mucket, longnose darter, and Arkansas darter) and mussel (pink mucket) could be impacted by Arsenal, Garlon 4, Krenite-UT, Spike-80W, and both Tordon herbicides carried by runoff into an inhabited stream; however, of these herbicides only Garlon 4 meets the herbicide selection criteria and is proposed for use. To reduce potential impacts upon T&E fish, herbicides would not be applied within 15 feet (4.6 meters) of flowing surface water. There is no risk to the federally-threatened Ozark cavefish, from the proposed action, since the herbicides meeting the herbicide selection criteria adsorb highly to soil particles and herbicides would not be applied within 15 feet (4.6 meters) of visible karst features.

The American burying beetle inhabits oak-hickory forests and open grasslands in the area of the ROW. Based on this habitat preference and the habitat created within the ROW, the American burying beetle may use the ROW itself as a habitat. The active ingredients in Accord, Garlon, Krenite-UT, Spike-80W, Tordon-K, and Tordon 101M have been tested on invertebrates, other than the American burying beetle, and found to be generally slight to nontoxic at concentrations greater than the expected application rate; therefore, the application of herbicides in the ROW is not expected to impact this species.^{26,27}

²⁶U.S. Department of Agriculture, Forest Service, "Pesticide Background Statements", Volume 1 - Herbicides, Agricultural Handbook No. 633, August 1984,

²⁷Forest Pest Management Institute, "Proceedings of the Carnation Creek Herbicide Workshop", Suite Ste. Marie, Ontario, Ministry of Forests, Research Branch, 1989.

4.7 Archaeological, Cultural, and Historical Resources

There is no significant impact upon archaeological, cultural, and historical resources from the current vegetation control. The mechanical vegetation control may disturb surface soil; however, no subsurface disturbances occur from the current vegetation control method.

According to the respective state office overseeing archaeological, cultural, and historical resources, the proposed action would not impact archaeological, cultural, and historical resources, as no subsurface disturbances would occur. If future activities, as described in section 2.2.5, potentially impact archaeological, cultural, and historical resources mitigation measures recommended by the respective state office would be followed.

4.8 Recreation and Aesthetics

There are minimal impacts to recreation from the current vegetation control method. Hiking along the ROW would be temporarily improved along the ROW, as a reduction of dense brush would ease hiking along the ROW. Berry picking and birding/wildlife observation would be temporarily impacted, until regrowth occurs, because the fruit bearing plants would be cut and the wildlife that feed on the fruits would be reduced. Access to hunting, fishing, hiking, berry picking, birding/wildlife observation, swimming, picnicking, boating, and canoeing would be temporarily improved until regrowth occurs.

There are temporary impacts to aesthetics from the current vegetation control method. After mowing of the vegetation, the remains would turn brown and build up along the ROW. The results of the mowing activities would be easily viewed within the ROW after the current vegetation control method during any season of the year.

There would be no significant impacts to recreation from the proposed action. Activities such as hunting, hiking, fishing, swimming, picnicking, boating, and canoeing would not be detrimentally impacted. Access to hunting, fishing, swimming, picnicking, boating and canoeing areas would be beneficially impacted since the lack of brushy vegetation would ease access to these recreational areas. Hiking along the ROW would be improved because of the lack of dense brush blocking the ROW, and improving the ease of travel along the ROW.

Berry picking and birding/wildlife observation would be impacted along the ROW by the proposed action. The destruction of fruit bearing shrubs would halt berry picking within the ROW. Fruit bearing plants attract many birds and other wildlife that people

observe; without the fruit bearing plants the amount of birds and other wildlife attracted to the ROW would decrease as would the number of people observing these animals.

There would be temporary impacts to aesthetics from the proposed action. A brownout would occur after herbicide treatment, as the leafy vegetation would wilt, turn brown, and die. This brownout would be observed by people viewing portions of the ROW from roadsides, scenic overlooks, or mountain tops. The brownout would disrupt the natural landscape during the spring and summer months; however, during the fall season, the brownout would be similar to leaf-off. Long-term aesthetics would improve because grass growth would be promoted along the ROW.

4.9 Human Health Effects

The manual and mechanical methods associated with the no action alternative would have little long-term effect on human health. Short-term effects include injury to workers from flying objects during clearing operations and wounds from sharp machinery.

Risks to humans generally occur during the Foliar Spray Application method, when herbicide may be inhaled or contacted, and during the manual application methods, when herbicide may contact skin. The greatest potential risks to human health is to workers involved in the application. Herbicides that may cause human health effects through inhalation include Accord, Escort, Garlon 3A and Garlon 4. However, the likelihood of exposure through inhalation is unlikely since the droplet size that would be used reduces airborne herbicide mist. Of the herbicides currently meeting the herbicide selection criteria, Garlon 3A and Garlon 4 may cause skin irritation through dermal contact. A less significant potential risk of human health effects is from the ingestion of water contaminated by these herbicides. This impact is mitigated by the restriction of herbicide use in areas exhibiting karst features.

4.10 Transportation Impacts

For both alternatives, machinery and personnel would be transported to and from the site using established and maintained roadways. Access within the ROW exists through existing jeep trails or would be developed as the machinery travels over herbaceous vegetation. This access would be used by Southwestern personnel to access the target areas within the ROW.

There would be no additional transportation impacts from the no action alternative. A potential for motor vehicle accidents during transportation to and from the site does exist for the no action alternative.

In the proposed action herbicides would be transported to the site in manufacturer's containers, available in either 2.5-gallon (9.46-liter) containers or 55-gallon (208.19-liter) containers. Herbicides would remain in manufacturer's provided containers until mixed with water prior to application. Unused concentrated herbicides would be transported from the site in manufacturer's containers. Diluted herbicides would be transported onsite using a 200-gallon (757.06-liter) tank mounted onto a tractor. No diluted herbicides would be transported offsite because all diluted herbicides would be applied to the ROW prior to removal from the ROW.

A potential exists for motor vehicle accidents to occur while transporting herbicides. No U.S. Department of Transportation placarding is needed on transporting motor vehicles. Absorbent material would be carried with the herbicide to contain any spills resulting from motor vehicle accidents. A copy of the Material Safety Data Sheet (MSDS) for the herbicides and the non-water diluents would be carried with the containers to inform any emergency response personnel of dangers associated with the herbicide.

4.11 Accident Impacts

Potential accident scenarios were identified during the scoping process. There would be a potential for worker injury during the no action alternative. This scenario and associated impacts was discussed in section 4.8.

Three potential accident scenarios were identified in association with the proposed action, including human error in herbicide mixing, application of incorrect mixture, and fire/explosion.

A potential exists for incorrect dilution of herbicide prior to application. The manufacturer's label for each of the herbicides lists a range of recommended dilution rates, depending on the vegetative species needing control. A lower dilution rate would be used for more resistant vegetation. This scenario would pose the greatest threat during the Foliar Spray Application method, as the greatest area is covered by this method. The potential for environmental impacts presented in this report from the three proposed herbicides were evaluated based on the highest concentration of herbicide to be applied by any method according to manufacturer's labels. Any environmental consequences resulting from incorrect dilution would be highly unlikely since Southwestern personnel supervising the application of the herbicide mixture have been formally trained in herbicide handling and application.

A potential exists for applying either the incorrect dilution of herbicide, incorrect herbicide, or applying the herbicides incorrectly. Each of these scenarios would pose negative environmental hazards to a portion of the ROW, if the incorrect action is not within manufacturer's labelled directions. The destruction of desirable vegetation, such as grasses, would increase the time necessary for revegetation and cause a greater risk for erosion. In the case of excess damage to vegetation, Southwestern will mitigate the effected areas. These three scenarios are unlikely since Southwestern personnel supervising the application of the herbicide mixture have been formally trained in herbicide handling and application.

A potential exists for fire and explosion resulting from incorrect storage of the herbicides. Extinguishing agents appropriate for the herbicides used in the proposed action would be carried within Southwestern vehicles transporting or applying the herbicides. A copy of the herbicide MSDS sheets would be carried by Southwestern personnel and transferred to emergency personnel upon any fire or explosion.

4.12 Compliance with other Regulations

4.12.1 Disposal of Excess Herbicide

Southwestern plans to use and accurately mix the amount of herbicide needed to accomplish vegetation control within each section of the ROW. Empty herbicide containers would be triple rinsed and disposed of in a sanitary landfill, following manufacturer's labels. Water from rinsing will be added to the herbicide formulation and applied as normal.

Excess pure herbicides would be stored by Southwestern for future use. In the rare event that pure herbicide would be disposed of, manufacturer's labelled instructions would be followed.

4.12.2 Applicator Certification

Southwestern would have trained personnel supervising the application and mixing of herbicides. Southwestern personnel have been trained by the state of Arkansas in herbicide application. There is currently no certification necessary within the states of Missouri and Oklahoma for landowner herbicide application; therefore, certification of Southwestern personnel within these states is not necessary. Arkansas, Missouri, and Oklahoma do have certification programs for commercial herbicide applicators. In the event that Southwestern would subcontract the herbicide application, the subcontracting firm's field personnel would be required to meet all appropriate local, state, and federal certification requirements.

5.0 List of Preparers and Agencies Consulted

5.1 Preparers

- Corry T. Platt, Black & Veatch Waste Science, Inc., Biologist, principal author
specialties: terrestrial ecology; aquatic ecology; plant ecology; ornithology; wetlands; habitat requirements; waste handling, disposal, and regulations
- Dane G. Pehrman, Black & Veatch Waste Science, Inc., Biologist, co-author
specialties: wetland ecology; water quality; ecological health effects; wildlife
- Kevin EuDaly, Black & Veatch Waste Science, Inc., Scientist
specialties: human health effects
- Timothy T. Travers, Black & Veatch Waste Science, Inc., Scientist
specialties: air quality
- Michael Ferrari, Black & Veatch Waste Science, Inc., Scientist
specialties: recreation and aesthetics; transportation
- John Field, Black & Veatch Waste Science, Inc., Geologist
specialties: regional geology and soils
- Robert Orr, Black & Veatch, Geologist
specialties: NEPA regulatory compliance
- James B. Jennings, Southwestern Power Administration, Office of Maintenance, Special Assistant
specialties: Project Document Manager
- David Dossett, Southwestern Power Administration, Environmental Protection Specialist
specialties: NEPA regulatory compliance
- Jerry Murr, Southwestern Power Administration, Maintenance Supervisor
specialties: herbicide vegetation control; pesticide applicators certification

5.2 Agencies Consulted

The following personnel were contacted to obtain information needed during the preparation of this EA. The individual spoken with, agency representing, and topic(s) discussed are listed below.

Name	Affiliation	Topic(s) Discussed
John Giese	Arkansas Department of Pollution Control & Ecology	Regulations surrounding destruction of wetland vegetation.
Tim Ellison	Arkansas, State Plant Board	Pesticide Applicator Certifications, pesticide application permits.
Cindy Osborne	Arkansas Natural Heritage Program	Threatened and endangered species locations.
Sam Cooke	Arkansas Wildlife Federation	Public concern for herbicide application, herbicide application methods, proposed herbicides.
Ples Spradley	USDA, Arkansas	Regulations surrounding herbicide application.
John Madres	Missouri, Department of Natural Resources, Water Quality Management	Regulations surrounding destruction of wetland vegetation.
Bill Bieffenbach	Missouri Natural Heritage Program	Threatened and endangered species locations; habitat and exact locations of Ozark cavefish; buffer zones.
John Madres	Missouri, Water Quality Branch	Regulations surrounding wetland vegetation.
Paul Brooks	Missouri Dept. of Natural Resources, Air Quality	Herbicide application permits.
Becky Bryan	National Forest Service, Mark Twain National Forest, Missouri	Regulations surrounding herbicide applications, herbicide application permits, Forest Service policies, buffers, sensitive areas.
Paul Ondray & Jim Lea	Missouri Department of Agriculture	Regulations surrounding herbicide application, herbicide application permits.
Ed Fite, III	Oklahoma Scenic Rivers Commission	Buffers surrounding state designated scenic rivers.

Name	Affiliation	Topic(s) Discussed
Derek Smithy	Oklahoma Water Resources Board	Regulations surrounding the destruction of wetland vegetation.
John Hassell	Oklahoma Conservation Commission	Regulations surrounding the destruction of wetland vegetation, anti-degradation regulation.
Sandy Wells & Jim Eigelhardt	Oklahoma Department of Agriculture	Regulations surrounding herbicide applications, herbicide application permits, buffers surrounding threatened & endangered species.
Mark D. Howery	Oklahoma Department of Wildlife Conservation	Threatened and endangered species locations; habitat requirements for the American burying beetle, interior least tern, and longnose darter.
Don Vandersypen	USDA, Soil Conservation Service, Oklahoma	Soil erosion and herbicide application.
Thomas Dominguez	USDA, Soil Conservation Service, Arkansas	Soil erosion and herbicide application.
Russell Mills	USDA, Soil Conservation Service, Missouri	Soil erosion and herbicide application.
Charles M. Scott	USFWS, Ecological Services, Oklahoma Field Office	Threatened and endangered species locations.
Gary D. Frazer	USFWS, Ecological Services, Missouri Field Office	Threatened and endangered species locations; habitat requirements for the Missouri bladderpod.
Dave Purser	National Forest Service, Ozark National Forest, Arkansas	Regulations surrounding herbicide applications, herbicide application permits, Forest Service policies.
Joyce Perser	US Army, Corps of Engineers, Little Rock	Regulations surrounding destruction of wetland vegetation.
John Abley	National Park Service, Buffalo National River, Arkansas	Regulations surrounding herbicide applications, herbicide application permits, buffers, sensitive areas.

Name	Affiliation	Topic(s) Discussed
Tammy Benson	George Washington Carver National Monument, Missouri	Historical designation and preservation listings, uses of land.

BLACK & VEATCH

MEMORANDUM

Southwestern Power Administration B&V Project #15356.423
ROW EASWPA ICS Code #5400.0
Meeting Agenda

<Date>

To: Jim Jennings

From: Robert Orr

The November 30, 1994, meeting to discuss comments on the draft Transmission Line Rights-of-Way Environmental Assessment has been scheduled for 10:30 am, in the 8000 conference room. The meeting may need to be held over into the next day. I have reserved conference room 1531, on December 1, from 8:00 am to 3:00 pm. The tentative agenda for this meeting is as follows:

Wednesday, 10:30 am

- Discuss the preliminary comments supplied by ESH&S and Maintenance.

Lunch Break

Wednesday, 12:30 pm

- Discuss other comments in the document, page-by-page.
- Modify document to reflect changes.

Thursday, 8:00 am

- Submit modified document for review and comment.
- Official decision needs to be made on whether this document is an EA or if there a need for EIS.
- A new schedule for the final draft EA will need to be developed.
- Additional comments and letters from agencies and interested parties, not in the possession of Waste Science, may need to be discussed.
- How are other agencies and interested parties going to be addressed that have requested copies of the draft EA for review and comment.

Lunch Break

Thursday, 12:30 pm

- Complete unfinished business.

Please call me at ext. 7631 if you have questions or comments regarding this agenda.

cc: Francis Gajan
Dave Dossett
Don Hayes
Jerry Murr
Roy Toone
Dane Pehrman

JRP/File

Reply to: 1950/2720

Date: August 31, 1994

Mr. Jim Jennings
Southwestern Power Administration
P.O. Box 3337
Springfield, MO 65807

Dear Mr. Jennings:

Amendment 5 to the Ozark-St. Francis Land and Resource Management Plan directs us to reduce or eliminate herbicide use wherever possible, consistent with protection of other resource values and attainment of multiple use objectives. After reviewing your draft Notice of Intent for Vegetation Control in Right-of-Way and discussing it with my Interdisciplinary Team, I do not see a compelling purpose or need to propose and evaluate a change from the mechanical and manual methods of vegetation control you have been using historically on the right-of-way under permit on the Ozark National Forest.

Given the direction in our Land Management Plan, it would take a clear and compelling need for a specific herbicide application before I would propose permitting its use on National Forest. Based on my study of your draft NOI and the direction in the Land Management Plan, I do not plan, at this time, to propose permitting herbicide use on the right-of-way segment under permit to Southwestern Power on the Ozark National Forest.

Sincerely,


LYNN O. NEFF
Forest Supervisor

cc: D. Pehrman ✓
R. Moore
M. Curran
Regional Forester

Dave,

*Your copy of
Appendix 7.1.*

Bob



United States
Department of
Agriculture

Forest Service
Mark Twain National Forest
314-364-4621 (Voice/TTY)

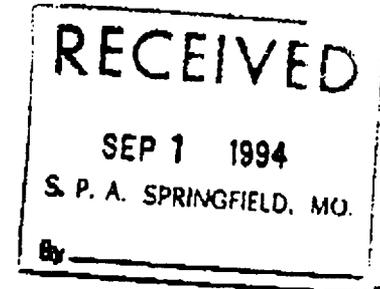
401 Fairgrounds Road
Rolla, Missouri 65401

Caring for the Land and Serving People

Reply to: 2720/1920

Date: August 31, 1994

Mr. Jim Jennings
Department of Energy
Southwestern Power Administration
P.O. Box 3337
Springfield, MO 65804



Dear Mr. Jennings:

We appreciate the opportunity to participate as a cooperator in the Environmental Assessment which your agency is going to prepare for maintenance of powerline rights-of-way within your area of operation. It appears that there is about 3.6 miles of Southwestern right-of-way within the Forest.

There are several requirements which we have to meet as part of the National Environmental Policy Act and National Forest Management Act. These requirements will need to be coordinated throughout this effort. The Forest representative will be Becky Bryan. She is a specialist in NEPA and appeals of NEPA decisions, and is located in Ava (telephone 417-683-4428). A back-up contact is Dick Sibley in Rolla (314-364-4621).

Thank you for the opportunity to cooperate.

Sincerely,

Randy Moore
RANDY MOORE
Acting Forest Supervisor

cc:
Nory Hunze
Becky Bryan
Dick Sibley



Caring for the Land and Serving People



United States Department of the Interior

NATIONAL PARK SERVICE

Midwest Region
1709 Jackson Street
Omaha, Nebraska 68102-2571

IN REPLY REFER TO:
L7619 (MWR-PQ)
MO 1305

AUG 17 1994

Mr. Dane G. Pehrman Project Ecologist
Black & Veatch Waste Science, Inc.
The Curtis Center, Suite 705
601 Walnut Street
Philadelphia, Pennsylvania 19106-3307

Dear Mr. Pehrman:

This is to provide early coordination review of Southwestern Power Administration's (Southwestern) proposed vegetation control on Southwestern transmission line rights-of-way in nineteen different counties in the states of Oklahoma, Missouri, and Arkansas.

Based on the information in your notice, and our general knowledge of the area, it does not appear that implementation of the proposed project will adversely affect any unit of the National Park System.

However, Southwestern should consider potential impacts of vegetation control to recreational sites which were developed and/or acquired with assistance from the Land and Water Conservation Fund (LWCF). Potential impacts on sites assisted through the LWCF program should be addressed by Southwestern in their environmental document. Because your early coordination package does not give the exact location of the proposed vegetation control efforts, we can not provide information on which LWCF sites might be impacted. We would be happy to provide this information as you develop more exact locations for evaluation in the environmental document. We request that this office be included in the review of that document.

If any vegetation control techniques considered interfere with a LWCF-assisted site's present recreational use, or if a significant change of use is determined to have occurred, the site could be declared converted requiring the LWCF project sponsor to provide appropriate replacement. Southwestern should consult with the official who administers the LWCF program in the State of Missouri to determine potential conflicts with section 6(f)(3) of the LWCF act (Public Law 88-578, as amended.) We have no objection to the proposed action provided that the land previously acquired and developed with LWCF assistance remains unaffected. It is stated in section 6(f)(3):

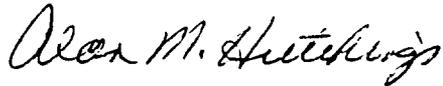
"No property acquired or developed with assistance under this section shall, without the approval of the Secretary (of the Interior), be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location."

Please contact:

Mr. David Shorr, Director
Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102

These comments are provided as informal technical assistance and are not intended to reflect our probable response to any document which may be prepared in this matter to comply with the National Environmental Policy Act or any other applicable environmental protection mandate.

Sincerely,



Alan M. Hutchings
Acting Associate Regional Director
Planning and Resource Preservation

cc:
Mr. David Shorr, Director
Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102



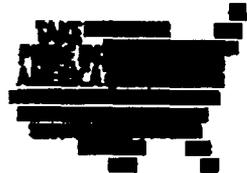
United States Department of the Interior

NATIONAL PARK SERVICE

BUFFALO NATIONAL RIVER

P.O. BOX 1173

HARRISON, ARKANSAS 72602-1173



IN REPLY REFER TO:

L3027 (BUFF-ONR)

August 9, 1994

S
A
W

Mr. Jim Jennings
U.S. Department of Energy
Southwest Power Administration
Maintenance and Engineering Office
2858 South Golden St., P.O. Box 3337
Springfield, Missouri 65807

Dear Mr. Jennings:

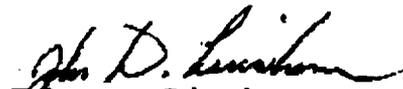
This letter is to inform you of our desire, as a land management agency having a Southwestern right-of-way within our boundaries, to cooperate with the Southwest Power Administration in the development of the environmental document concerning vegetation control on Southwestern transmission line rights-of-way.

Buffalo National River, as a unit of the National Park Service, Department of the Interior, is mandated to insure the protection of those resources for which it was established. Those resources include the Buffalo River's water quality, endangered species such as the gray bat, Indiana Bat, Bald Eagle, and other animal and plant species of special concern known within our boundaries which could be impacted by any decision your agency makes regarding vegetation control efforts.

We view any activities involving herbicide applications as sensitive and appreciate your willingness to work closely with us at this early stage. It is critical that our agencies cooperatively work toward the most environmentally sound management strategy to accomplish Southwestern's goals.

Please keep us advised by contacting George Oviatt of my staff at 501-741-5443 ext. 114 as this document progresses and we are afforded opportunities for input.

Sincerely,


John D. Linahan
Superintendent



United States Department of the Interior



NATIONAL PARK SERVICE

Buffalo National River

P.O. Box 1173

Harrison, Arkansas 72602-1173

IN REPLY REFER TO:

L3027 (BUFF-ONR)

September 26, 1994

Mr. Corey Platt
Black & Veatch Waste Science, Inc.
601 Walnut Street, Suite 705
Philadelphia, Pennsylvania 19106-3307

Dear Mr. Platt:

The National Park Service appreciates the opportunity to provide input to the Southwestern Power Administration (SPA) concerning vegetation management on transmission line rights-of-way. A portion of the SPA's right-of-way crosses the Buffalo National River in Searcy County, Arkansas. SPA's Notice of Intent states that a combination of herbicide application and mechanical control is the preferred alternative being considered.

National Park Service policies require the use of integrated pest management procedures to determine when and how pests are to be controlled. Use of herbicides is considered only when mechanical or other non-chemical methods are not feasible. All proposals to utilize herbicides within the National Park System require review and approval at the national level. The reviews are based upon site specific information regarding the pest, location, timing of treatment, material, and method of application.

While we would prefer that vegetation management be limited to mechanical methods we will review proposals for certain types of herbicide use. These would be limited to cut-stump treatments of triclopyr and glyphosate. We will not approve foliar spray applications for right-of-way maintenance.

We require notice of proposed herbicide use at least 60 days in advance. The proposal must include specific information on the herbicide (EPA registration #) as well as the method and timing of application. If approval is granted, specific restrictions or requirements for implementation will be included as appropriate.

We value the opportunity to provide input on SPA's vegetation management and would appreciate being kept informed.

Sincerely,


John D. Linahan
Superintendent



DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 01
TULSA, OKLAHOMA 74121-0001

REPLY TO
ATTENTION OF:

AUG 23 1994

Planning Division
Environmental Analysis Section

Mr. Jim Jennings
Southwestern Power Administration
2858 South Golden Street
Post Office Box 3337
Springfield, Missouri 65807

Dear Mr. Jennings:

This is in response to your agency's Notice of Intent to prepare an environmental document addressing the potential impacts of various methods of vegetation control on Southwestern Power Administration transmission line rights-of-way. The document was prepared by Mr. Dane G. Pehrman of Black & Veatch Waste Science, Inc. and dated August 2, 1994.

Please add the Tulsa District to your mailing list for copies of all future environmental documentation for this project.

Sincerely,

G. David Steele
G. David Steele, P.E.
Chief, Planning Division

UNITED STATES
DEPARTMENT OF
AGRICULTURE

Soil
Conservation
Service

Room 5404 Federal Office Building
700 West Capitol Avenue
Little Rock, Arkansas 72201

AUG 10 1994

Mr. Jim Jennings
Southwestern Power Administration
Springfield Maintenance and Engineering Office
Post Office Box 3337
Springfield, MO 65808

Dear Mr. Jennings:

The USDA, Soil Conservation Service would appreciate receiving a copy of the environmental document that is being prepared that will address impacts of various methods of vegetation control on Southwestern's transmission line rights-of-way. The information may be of help to us as we work with landowners of north Arkansas, particularly in the Buffalo River Watershed.

If you have any questions, please contact Dennis D. Hackbart at 501-324-5509.

Sincerely,

 Acting For

TOMAS M. DOMINGUEZ
Assistant State Conservationist (Operations)

cc:
Jerry L. Mitchell, AC, SCS, Harrison, AR

JENNSPA.dcx(8/94)

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, marital status, age, or handicap.



United States
Department of
Agriculture

Soil
Conservation
Service

Parkade Center, Suite 250
601 Business Loop 70 West
Columbia, Missouri 65203

August 23, 1994

Mr. Jim Jennings
U.S. Department of Energy, SPA
Springfield Maintenance Engineering Office
2858 South Golden St., P.O. Box 3337
Springfield, MO 65804

Dear Mr. Jennings:

Our agency is interested in more information concerning the study of vegetation control and the alternative chosen.

Sincerely,

ACTING

RUSSELL C. MILLS
State Conservationist



The Soil Conservation Service
is an agency of the
Department of Agriculture

AN EQUAL OPPORTUNITY EMPLOYER



August 18, 1994

Mr. Dane G. Pehrman P.E.
Black & Veatch Waste Science, Inc.
The Curtis Center, Suite 705
601 Walnut Street
Philadelphia, Pennsylvania 19106-3307

Dear Mr. Pehrman:

We have reviewed the Black & Veatch Waste Science, Inc's proposed plan to prepare an environmental document addressing the potential impacts of various methods of vegetation control on Southwestern transmission line rights-of-way. Based on this review, we have determined that this proposed project will not result in any measurable, long-term impact on prime farmland. However, should vegetation be disturbed during construction, the Soil Conservation Service should be contacted or an appropriate erosion control revegetation procedure should be followed in order to minimize soil loss.

Thank you for the opportunity to comment on these proposed actions early in the planning stage.

Sincerely,

Acting for

DON R. VANDERSYPEN
Assistant State Conservationist (WR)





STATE OF ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION
P O BOX 3278
LITTLE ROCK • 72203

OFFICE OF
INTERGOVERNMENTAL
SERVICES

PHONE (501) 682-1074
FAX (501) 682-5206

September 09, 1994

Mr. Dane G. Pehrman
Project Ecologist
Black & Veatch Waste Science Inc.
The Curtis Center, Suite 705
601 Walnut Street
Philadelphia, Pennsylvania 19106-3307

SEP 16 1994

Dear Mr. Pehrman:

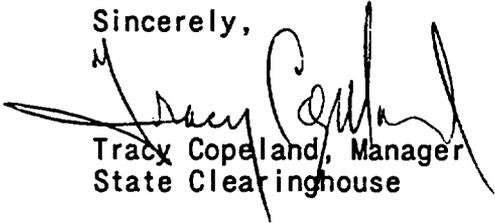
Re: SOUTHWESTERN POWER ADMINISTRATION NOTICE OF INTENT VEGETATION CONTROL IN RIGHTS-OF-WAY

The State Clearinghouse has received the above Document pursuant to the Arkansas Project Notification and Review Sastem.

To carry out the review and comment process, this document was forwarded to members of the Arkansas Technical Review Committee. Resulting comments received from the Technical Review Committee which represents the position of the State of Arkansas are attached.

The State Clearinghouse wishes to thank you for your cooperation with the Arkansas Project Notification and Review System.

Sincerely,


Tracy Copeland, Manager
State Clearinghouse

Enclosure
PC: Randy Young, AS&WCC
TT



Arkansas Soil and Water Conservation Commission

J. Randy Young, P.E.
Executive Director

101 EAST CAPITOL
SUITE 350
LITTLE ROCK, ARKANSAS 72201

PHONE 501-682-1611
FAX 501-682-3991

MEMORANDUM

TO: Mr. Tracy Copeland
Manager, State Clearinghouse

FROM: J. Randy Young, P.E.
Chairman, Technical Review Committee

SUBJECT: SOUTHWESTERN POWER ADMINISTRATION NOTICE OF INTENT
VEGETATION CONTROL IN RIGHTS-OF-WAY

DATE: September 6, 1994

Members of the Technical Review Committee have reviewed the referenced document that the Southwestern Power Administration (Southwestern) is planning to prepare an environmental document addressing the potential impacts of various methods of vegetation control on Southwestern transmission line rights-of-way. Arkansas Game and Fish Commission recommends that mechanical means be used for clearing to the extent possible. Use of chemicals should be held to minimum practicable use. The Arkansas Department of Health feels the preferred alternative would be to use both mechanical means and herbicide applications. Also it appears that there may be a number of public water supply sources near the rights-of-way, both water wells and surface water sources. Pesticides should not be used in these areas, unless it can be shown that such pesticides will not enter a water source through rainfall runoff, spillage, over application, etc.

The opportunity to comment is appreciated. Enclosed are copies of comments from members of the Committee.

JRY:wda
Enclosures
cc: Members of the Technical Review Committee

RECEIVED
SEP 09 1994

INTERGOVERNMENTAL
SERVICES

August 24



STATE OF ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION
P.O. BOX 3378
LITTLE ROCK • 72203

OFFICE OF
INTERGOVERNMENTAL
SERVICES
PHONE (501) 682-1074
FAX (501) 682-5206

RECEIVED
AUG 24 1994
SOIL AND WATER
CONSERVATION COMMISSION

M E M O R A N D U M

TO: All Technical Review Committee Members
FROM: Tracy Copeland, Manager - State Clearinghouse
DATE: 08-08-94
SUBJECT: SOUTHWESTERN POWER ADMINISTRATION NOTICE OF INTENT VEGETATION CONTROL
IN RIGHTS-OF-WAY

Please review the above stated document under provisions of Section 404 of the Clean Water Act, Section 102(2)(c) of the National Environmental Policy Act of 1969 and the Arkansas Project Notification and Review System.

Your comments should be returned by 08-29-94 to - Mr. Randy Young, Chairman, Technical Review Committee, 101 E Capitol, Suite 350, Little Rock, Arkansas 72203.

If we have no reply within that time we will assume you have no comments and will proceed with the sign-off.

- Support
- Do Not Support (Comments Attached)
- Comments Attached
- Support with Following Conditions
- No Comments
- Non-Degradation Certification Issues (Applies to PC&E Only)

Signature J. Belin Agency ASWRC Date 8/15/94

0173N
rdr

RECEIVED
SEP 09 1994

020



STATE OF ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION
P.O. BOX 3278
LITTLE ROCK • 72203

OFFICE OF
INTERGOVERNMENTAL
SERVICES
PHONE (501) 682-1074
FAX (501) 682-5206

RECEIVED
AUG 31 1994
SOIL AND WATER
CONSERVATION COMMISSION

MEMORANDUM

TO: All Technical Review Committee Members
FROM: Tracy Copeland, Manager - State Clearinghouse
DATE: 08-08-94
SUBJECT: SOUTHWESTERN POWER ADMINISTRATION NOTICE OF INTENT VEGETATION CONTROL
IN RIGHTS-OF-WAY

Please review the above stated document under provisions of Section 404 of the Clean Water Act, Section 102(2)(c) of the National Environmental Policy Act of 1969 and the Arkansas Project Notification and Review System.

Your comments should be returned by 08-29-94 to - Mr. Randy Young, Chairman, Technical Review Committee, 101 E Capitol, Suite 350, Little Rock, Arkansas 72203.

If we have no reply within that time we will assume you have no comments and will proceed with the sign-off.

- | | |
|---|---|
| <input type="checkbox"/> Support | <input type="checkbox"/> Do Not Support (Comments Attached) |
| <input checked="" type="checkbox"/> Comments Attached | <input type="checkbox"/> Support with Following Conditions |
| <input type="checkbox"/> No Comments | <input type="checkbox"/> Non-Degradation Certification Issues
(Applies to PC&E Only) |

See attached letter.

Signature *Harold R. Sargent* Agency _____ Date 8/22/94

0173N
rdr

Division of Engineering
Arkansas Department of Health
4815 West Markham
Little Rock, AR 72205-3867
RECEIVED IN DIRECTOR'S OFFICE
AUG 10 1994



JIM GUV TUCKER
GOVERNOR

Arkansas DEPARTMENT OF HEALTH

4815 WEST MARKHAM STREET • LITTLE ROCK, ARKANSAS 72205-3867
TELEPHONE AC 501 661-2000

SANDRA B. NICHOLS, M.D.
DIRECTOR

August 22, 1994

Mr. Randy Young, P.E., Chairman
Technical Review Committee
Soil and Water Conservation Commission
101 East Capitol, Suite 350
Little Rock, AR 72203

Re: Southwestern Power Administration Notice of Intent
Vegetative Control in Rights-of-Way

Dear Mr. Young:

A staff review has been made of the referenced notice of intent on alternatives to vegetative control. The preferred alternative would use both mechanical means and herbicide applications.

Using the general location map provided with the notice, it appears that there may be a number of public water supply sources near the rights-of-way, both water wells and surface water sources. Pesticides should not be used in these areas, unless it can be shown that such pesticides will not enter a water source through rainfall runoff, spillage, over application, etc.

If you have any questions on this matter please contact our office at 661-2623.

Sincerely,

A handwritten signature in cursive script that reads "Harold R. Seifert".

Harold R. Seifert, P.E., Director
Division of Engineering

RECEIVED
SEP 09 1994

INTERGOVERNMENTAL
SERVICES



STATE OF ARKANSAS
 DEPARTMENT OF FINANCE AND ADMINISTRATION
 PO BOX 10000 OUTDOOR RECREATION GRANTS
 LITTLE ROCK • 72203

OFFICE OF
 INTERGOVERNMENTAL
 SERVICES
 PHONE (501) 682-1074
 FAX (501) 682-5206

AUG 11 1994

RECEIVED
 AUG 19 1994

RECEIVED

MEMORANDUM

EXECUTIVE DIRECTOR'S
 OFFICE

TO: All Technical Review Committee Members
 FROM: Tracy Copeland, Manager - State Clearinghouse
 DATE: 08-08-94
 SUBJECT: SOUTHWESTERN POWER ADMINISTRATION NOTICE OF INTENT VEGETATION CONTROL
 IN RIGHTS-OF-WAY

Please review the above stated document under provisions of Section 404 of the Clean Water Act, Section 102(2)(c) of the National Environmental Policy Act of 1969 and the Arkansas Project Notification and Review System.

Your comments should be returned by 08-29-94 to - Mr. Randy Young, Chairman, Technical Review Committee, 101 E Capitol, Suite 350, Little Rock, Arkansas 72203.

If we have no reply within that time we will assume you have no comments and will proceed with the sign-off.

- | | |
|---|--|
| <input type="checkbox"/> Support | <input type="checkbox"/> Do Not Support (Comments Attached) |
| <input type="checkbox"/> Comments Attached | <input type="checkbox"/> Support with Following Conditions |
| <input checked="" type="checkbox"/> No Comments | <input type="checkbox"/> Non-Degradation Certification Issues (Applies to PC&E Only) |

Signature Victor Turner Agency Parks & Tourism Date 8/16/94

0173N
 rdr

RECEIVED
 SEP 09 1994

INTERGOVERNMENTAL
 SERVICES



STATE OF ARKANSAS
 DEPARTMENT OF FINANCE AND ADMINISTRATION
 P.O. BOX 3278
 LITTLE ROCK • 72203

OFFICE OF
 INTERGOVERNMENTAL
 SERVICES
 PHONE (501) 682-1074
 FAX (501) 682-5206

MEMORANDUM

TO: All Technical Review Committee Members
 FROM: Tracy Copeland, Manager - State Clearinghouse
 DATE: 08-08-94
 SUBJECT: SOUTHWESTERN POWER ADMINISTRATION NOTICE OF INTENT VEGETATION CONTROL
 IN RIGHTS-OF-WAY

Please review the above stated document under provisions of Section 404 of the Clean Water Act, Section 102(2)(c) of the National Environmental Policy Act of 1969 and the Arkansas Project Notification and Review System.

Your comments should be returned by 08-29-94 to - Mr. Randy Young, Chairman, Technical Review Committee, 101 E Capitol, Suite 350, Little Rock, Arkansas 72203.

If we have no reply within that time we will assume you have no comments and will proceed with the sign-off.

- | | |
|---|---|
| <input type="checkbox"/> Support | <input type="checkbox"/> Do Not Support (Comments Attached) |
| <input type="checkbox"/> Comments Attached | <input type="checkbox"/> Support with Following Conditions |
| <input checked="" type="checkbox"/> No Comments | <input type="checkbox"/> Non-Degradation Certification Issues
(Applies to PC&E Only) |

Signature *Forrest J. Hill* Agency *Geology* Date *9/10/94*

0173N
 rdr

RECEIVED
 SEP 09 1994

INTERGOVERNMENTAL
 SERVICES

RECEIVED

AUG 22 1994

SOIL AND WATER
CONSERVATION COMMISSION

ARKANSAS GAME AND FISH COMMISSION
August 18, 1994

MEMORANDUM TO: Randy Young, Chairman
Technical Review Committee

FROM: Craig K. Uyeda, Member
Technical Review Committee

Craig Uyeda (a.c.)

In response to memorandums from the State Clearinghouse of August 8 and 10, 1994, with attached correspondence from the U.S. Forest Service and the Little Rock District, U.S. Corps of Engineers, please be advised that we have no objections to the following projects:

8/29 Southwestern Power Administration - Notice of Intent - Vegetation Control in rights-of-way. We have no objections; however, we recommend mechanical means for clearing to the extent possible. Use of chemicals should be held to minimum practicable use.

* * * *

Proposal to Amend the Forest Plan to Provide For Renewal of the Shortleaf Pine/Bluestem Grass Ecosystem and Recovery of the Red-Cockaded Woodpecker (RCW).

Thank you for the opportunity to comment on the above proposals.

CKU:DGC:ac

cc: State Clearinghouse
U.S. Fish & Wildlife Service
Little Rock District, USCE
Regulatory Functions Section

RECEIVED
SEP 09 1994

INTERGOVERNMENTAL
RELATIONS



BLACK & VEATCH Waste Science, Inc.

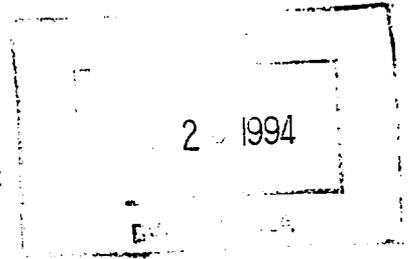
The Curtis Center, Suite 705, 601 Walnut Street, Philadelphia, Pennsylvania 19106-3307, (215) 928-0700, Fax: (215) 928-1780

Southwestern Power Administration
NEPA Environmental Document

B&V Project 15356.423
B&V File C
August 2, 1994

Director, State of Arkansas Clearing House
P.O. Box 3278
Little Rock, Arkansas 72203

Subject: NEPA Notice of Intent



Attention: Mr. Tracy Copeland

Dear Mr. Copeland:

The Southwestern Power Administration (Southwestern) is planning to prepare an environmental document addressing the potential impacts of various methods of vegetation control on Southwestern transmission line rights-of-way. Attached is a notice of intent (NOI), which is provided in accordance with the regulations of the National Environmental Policy Act (NEPA).

If you are interested in more information concerning the study or would like to be a cooperating agency, please contact Mr. Jim Jennings at U.S. Department of Energy, Southwestern Power Administration, Springfield Maintenance and Engineering Office, 2858 South Golden St., P.O. Box 3337, Springfield, MO. in a letter postmarked no later than August 30, 1994.

Very truly yours,

BLACK & VEATCH Waste Science, Inc.

Dane G. Pehrman
Project Ecologist

Date 9/20/94
This undertaking will have no effect
on significant cultural resources.
Cathy Buford Slater
State Historic Preservation Officer

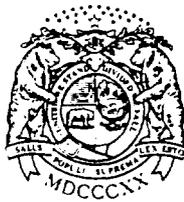
Enclosures

cc: Jim Jennings, Southwestern (Springfield, MO)

RECEIVED
AUG 08 1994

INTERGOVERNMENTAL
SERVICES

Mel Carnahan
Governor



State of Missouri
OFFICE OF ADMINISTRATION
Post Office Box 809
Jefferson City
65102

Stan Perovich
Director
Division of General Services

Richard A. Hanson
Commissioner

August 29, 1994

Dane G. Pehrman
Project Ecologist
Black & Veatch Waste Science, Inc.
The Curtis Center
Suite 705
601 Walnut Street
Philadelphia, Pennsylvania 19106-3307

Dear Mr. Pehrman:

Subject: 94080023 - Southwestern Power Administration
Notice of Intent
Vegetation Control in Rights-of-Way

The Missouri Federal Assistance Clearinghouse, in cooperation with state and local agencies interested or possibly affected, has completed the review on the above project application.

None of the agencies involved in the review had comments or recommendations to offer at this time. This concludes the Clearinghouse's review.

A copy of this letter is to be attached to the application as evidence of compliance with the State Clearinghouse requirements.

Sincerely,

Lois Pohl, Coordinator
Missouri Clearinghouse

LP:cm



Oklahoma Historical Society *Founded May 27, 1893*

STATE HISTORIC PRESERVATION OFFICE
621 N. ROBINSON, SUITE 375 • OKLAHOMA CITY, OK 73102 • (405) 521-6249

August 30, 1994

Mr. Dane Pehrman
Black & Veatch Waste Science, Inc.
601 Walnut Street, Suite #705
Philadelphia, PA 19106

RE: File #1815-94; Southwestern Power Administration Vegetation
Control Project

Dear Mr. Pehrman:

The referenced project does not include construction or earth-moving activities. Comments or opinions by this office are inappropriate for this project.

Should further projects include construction or earth-moving activities, an opinion should be requested from this office.

Further correspondence pertaining to this project must reference the above underlined file number. If you have any questions, please contact Mr. Marshall Gettys, Historical Archaeologist, at 405/521-6249. Thank you.

Sincerely,

Melvena Heisch
Deputy State Historic
Preservation Officer

MH:pm



Oklahoma Archeological Survey

THE UNIVERSITY OF OKLAHOMA

August 18, 1994

Dane G. Pehrman
Black and Veatch Waste Science, Inc.
The Curtis Center, Ste. 705
601 Walnut Street
Philadelphia, Pennsylvania 19106-3307

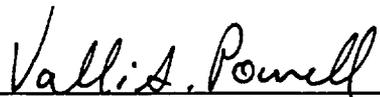
Re: Southwestern Power Administration, vegetation control along right-of-way. Legal Description: R-O-W passes through Bryan, Coal, Hughes, Johnston, Muskogee, Okfuskee, Okmulgee, Pontotoc and Sequoyah Counties.

Dear Mr. Pehrman:

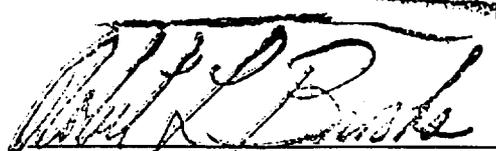
Our office has no objections to the referenced project. The nature of the project is such that it should have no impact on the prehistoric cultural or archaeological resources of Oklahoma. However, if any part of the project requires earth moving activities in previously undisturbed areas, please send us the specific location for review. We would prefer to receive the location on a USGS 7.5' topographic quadrangle map (or xerox copy). Alternatively, we could use a legal description given in quarters (1/4, 1/4, 1/4), section, township and range. Street addresses or lot and block descriptions are usually not helpful.

We will defer to the State Historic Preservation Officer's opinion regarding impacts to historic structures. This review is conducted in cooperation with the State Historic Preservation Office, Oklahoma Historical Society.

Sincerely,



Valli S. Powell
Staff Archaeologist



Robert L. Brooks
State Archaeologist

:lw

cc: SHPO

ED FITE
ADMINISTRATOR



DAVID WALTERS
GOVERNOR

STATE OF OKLAHOMA
OKLAHOMA SCENIC RIVERS COMMISSION

August 19, 1994

Mr. Jim Jennings
U.S. Department of Energy
Southwestern Power Administration
Springfield Maintenance & Engineering Office
P.O. Box 3337
Springfield, MO

Dear Jim:

I am interested in more information on the environmental document addressing the potential impacts of various methods of vegetation control on Southwestern transmission line rights-of-way.

Please contact me at the Oklahoma Scenic Rivers Commission, P.O. Box 292, Tahlequah, OK 74464.

Sincerely,

A handwritten signature in black ink, appearing to read "Ed Fite, III".

Ed Fite, III
Administrator

EHF/maf



STATE OF OKLAHOMA
OKLAHOMA SCENIC RIVERS COMMISSION

MEMORANDUM

DATE: September 26, 1994
TO: Corry Platt
FROM: Ed Fite, Administrator *Ed*
RE: Information on Scenic River Areas

I am providing you with the information you requested on the Scenic Rivers Act. I am sorry I was not able to provide you with the information in a more timely fashion.

If we can be of further assistance to please feel free to contact the OSRC.

Thank You.

Areas of the State designated as "scenic river areas" include:

- (1) The FLINT CREEK and the ILLINOIS RIVER above the confluence of the Barren Fork Creek in Cherokee, Adair and Delaware Counties;
 - (2) The BARREN FORK CREEK in Adair County and Cherokee Counties from the present alignment of Highway 59 West of to the Illinois River;
 - (3) The UPPER MOUNTAIN FORK RIVER above the 600-foot elevation level of Broken Bow Reservoir in McCurtain and Leflore Counties;
 - (4) BIG LEE'S CREEK, sometimes referred to as LEE CREEK, located in Sequoyah County, above the 420-foot elevation, excluding that portion necessary for a dam to be built in the State of Arkansas with a crest elevation of no more than the 420-foot MSL elevation. The Oklahoma Water Resources Board shall make such classifications, designations or adjustments to Oklahoma's water quality standards as required to allow the impoundment of water by said dam; and
 - (5) LITTLE LEE'S CREEK, sometimes referred to as Little Lee Creek, located in Adair and Sequoyah Counties, beginning approximately four (4) miles east-southeast of Stilwell, Oklahoma, and ending at its conjunction with Big Lee's Creek approximately two (2) miles southwest of Short, Oklahoma.
- (c) The term "scenic river area" as used in this act is defined as the stream or river and the public use and access areas located within the area designated.

SECTION 3. This act shall become effective July 1, 1991.

SECTION 4. It being immediately necessary for the preservation of the public peace, health and safety, an emergency is hereby declared to exist, by reason whereof this act shall take effect and be in full force from and after its passage and approval.

ARKANSAS WILDLIFE FEDERATION

7509 Cantrell Road • Suite 104 • Little Rock, Arkansas 72207 • Phone (501) 663-7255

793 7715

Sept 1, 1994

Mr. James B. Jennings
U.S. Dept. of Energy
Southwestern Power Administration
Springfield Maintenance and Engineering Office
P.O. Box 3337
Springfield, MO 65808

Re: Environmental documents addressing the potential impacts of various methods of vegetation control on Southwestern transmission line rights-of-way and radio/substation sites.

Dear Mr. Jennings,

The Arkansas Wildlife Federation is very much interested in knowing more about your scoping process for the assessment of various methods of vegetation control. Please send me any draft environmental documents that you have prepared or that you expect to be prepared in the near future concerning this matter.

Other questions that I have are the following:

1. When does your scoping process end?
2. What types of herbicides are being assessed;
and, where are they being tested?

RICHARD MASON
President

BILL RAMBO
First Vice President

TERRY HORTON
Second Vice President

CHARLES KENNEDY
Secretary

ELEWE MURRAY
Treasurer

CLYDE TEMPLE
Executive-At-Large

BOB APPLE
Executive-At-Large

"YOUR VOICE FOR CONSERVATION"



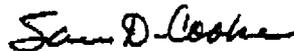
ARKANSAS WILDLIFE FEDERATION

7509 Cantrell Road • Suite 104 • Little Rock, Arkansas 72207 • Phone (501) 663-7255

The Arkansas counties included in your list contain many ecologically sensitive and extraordinary resource streams. The AWF is concerned about the potential harmful impact upon fish and wildlife from herbicide application along transmission line rights-of-way. The AWF is also concerned about the effects of erosion in areas where mechanical debridement of vegetation has been undertaken.

Your response will be appreciated.

Sincerely,



Sam D. Cooke, Dr. (Optometrist)
Executive Committee Member
Arkansas Wildlife Federation

cc: Mr. Clyde Temple
Dr. Mark Schram



RICHARD MASON
President

ELENE MURRAY
Treasurer

BILL RAMBO
First Vice President

CLYDE TEMPLE
Executive-At-Large

TERRY HORTON
Second Vice President

BOB APPLE
Executive-At-Large

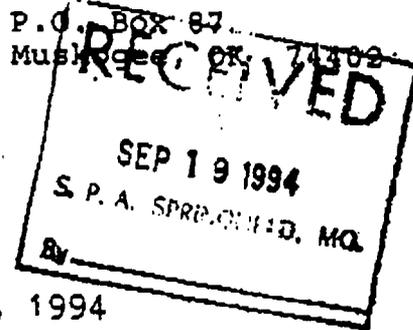
CHARLES KENNEDY
Secretary

"YOUR VOICE FOR CONSERVATION"



STIR

SAVE THE ILLINOIS RIVER INC.



September 15, 1994

Mr. James P. Jennings
U.S. Department of Energy
Southwestern Power Administration
Springfield Maintenance and
Engineering Office
P.O. Box 3337
Springfield, MO 65808

RE: Southwestern Power Administration and Potential
Impacts of Vegetation Control

Dear Mr. Jennings:

As President of Save the Illinois, Inc. (STIR) I would like to request all available information in regard to the above captioned matter. I also serve as Chairman of the Governor's Illinois River Task Force. We would have specific concerns as to transmission line rights-of-way line within the drainage basin of the Illinois River.

In addition, I would like a copy of your mailing list of those who have requested further information or have made comments. At this time, STIR wishes to evaluate the proposed methods of vegetation control and the environmental aspects of such proposals. Upon receipt of the documentation, we will try to assist with sensible comments in regard to our views on the environmental issues concerned.

CLEAN WATER IS EASTERN OKLAHOMA'S FUTURE

STIR

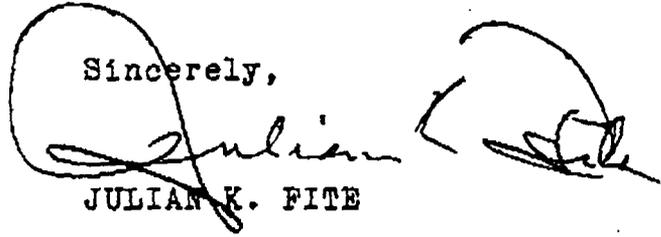
SAVE THE ILLINOIS RIVER INC.

P.O. Box 87
Muskogee, OK 74402

Page two of two
Jennings Letter
September 15, 1994

Should you have any questions, or require further information from me, please feel free to write or call the undersigned.

Sincerely,

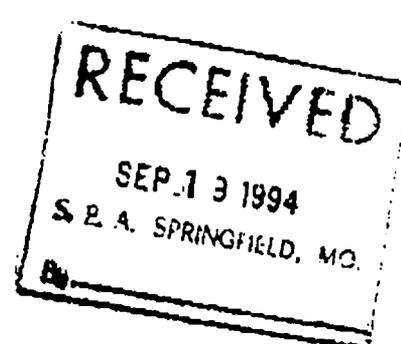
A handwritten signature in black ink, appearing to read "Julian K. Fite", is written over a large, circular scribble. To the right of the signature is another smaller, less legible handwritten mark.

JULIAN K. FITE

JKF/mh

CLEAN WATER IS EASTERN OKLAHOMA'S FUTURE

Kay Marmaduke
HC75 Box 268
Witts Springs AR 72686



September 17, 1994

Mr. James B. Jennings
US Department of Energy
South Western Power Administration
Springfield Maintenance & Engineering Dept.
P.O. Box 3337
Springfield MO 65808

Dear Mr. Jennings:

I understand that your department is currently involved in a scoping process concerning the possibility of using chemical or mechanical means for eliminating vegetation along your easements that might interfere with the power lines.

I appreciate you for giving individuals of the public an opportunity to express their concerns regarding this matter and for giving serious considerations to these concerns as you make your decision.

As a resident with a power easement crossing my property I strongly object to any use of chemical herbicides or pesticides being used on that easement. I have gone to great trouble and expense to keep such chemicals off my land so that I can garden organically and keep honeybees here. Use of chemical toxins of any sort along the power easement would be very detrimental to me for these reasons.

Petit Jean Electric Co-op personnel have been very cooperative with me in this regard along their power easements on and near my property. I have a letter from them on file indicating that it is their policy NOT to use chemical agents of any sort on their easements specifically because so many of their members have contacted them with strong objections to this practice.

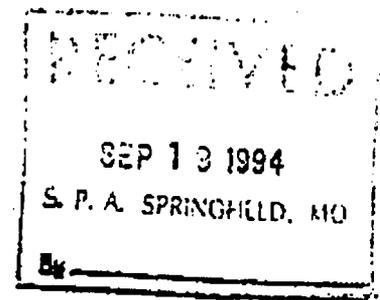
Please confer with Petit Jean Electric Co-op regarding the many concerns voiced to them by residents that would also be affected by any use of chemicals along your easements.

Please continue to rely on mechanical control of vegetation near and beneath your power lines and do not expose residents, their crops, their stock, and the wildlife here to chemical agents. Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Kay Marmaduke". The signature is written in dark ink and is positioned below the typed name "Kay Marmaduke" in the typed signature block.

Mike Marmaduke
Route 3 Box 268
Witts Springs AR
72686



Sept. 17, 1994

James B. Jennings
US Dept of Energy
South Western Power Adm'n.
P.O. Box 3337
Springfield MO 65808

Dear Mr. Jennings,

Please do not apply herbicides to control vegetation along your easements. Please continue to use mechanical control instead.

I have been told that as long as I do not obstruct access to the power lines, I am free to use the portion of my property that the power easement crosses. I hope to pasture cattle on that portion of my land. I am also considering growing crops suitable there such as wildflowers and everlasting flowers both for the flowers themselves and for seed.

Obviously, use of herbicides and/or pesticides along that easement would be very harmful to that type of enterprise.

Thank you for including the concerns of the public who will have to live with your decisions in the decision making process. Please honor my request and the requests of others. I know that many of my neighbors feel the same way, even if they have not been able to write to you & express their views before your deadline.

Please do not use chemical controls along your easement.

Sincerely,

A handwritten signature in cursive script that reads "Mike Marmaduke".

Vivian M. Guffey
HCR 75 Box 269
Witts Springs, AR
72686



Sept. 16, 1994

Mr. James B. Jennings
US Dept. of Energy
Southwestern Power Admin.
Springfield Maintenance & Engineering Office
P.O. Box 3337
Springfield MO 65808

Dear Mr. Jennings,

I read in the Marshall Mountain Wave newspaper that you are considering appropriate ways to manage vegetation that might interfere with electrical power lines.

I am very concerned that you might use chemical poisons to kill vegetation. Please do not use herbicides or any other poisons. Please use mechanical control instead.

My home is very near a large power easement. Even a slight breeze would carry poisons applied on the easement into my yard. I moved this far out in the country because my health is very frail. I am a victim of a chronic respiratory infection and must be very careful not to come in contact with toxins if I can help it.

It is very likely that there are many elderly people like myself who would be adversely affected by poisons being applied along the easement. Please use mechanical controls instead.

Thank you very much for your help in this very important matter.

Yours truly,

Vivian M. Guffey

Dideon, Mo.
Sept 9, 1994

Mr. Thomas B. Jennings
U.S. Dept of Energy
Southwestern Power Administration
Springfield, Maintenance and Engineering Office
P.O. Box 3337
Springfield, Mo. 65808

Dear Mr. Jennings:

I saw your notice of interest in
the New Madrid, Mo. newspapers. I
would like more information on
this subject. Please send
information to

Dwayne Lutzbeck
Box 315
Dideon, Mo. 63848

Sincerely,
Dwayne Lutzbeck

6509

09-26-1994 11:24

P.02

1

Southwestern Power Administration

I am interested in more information concerning environmental documents or vegetation control. I am opposed to herbicide application within wind of my property due to the significant environmental & physical repercussions.

Please send me information regarding this matter.

Thank you,

Jane Aston
HC 75 Box 277A
Witts Spg, ARKANSAS
72686

RECEIVED
SEP 29 1994
S. P. A. SPRINGFIELD MO.

Sept. 16, 1994

Mr. James B. Jennings U.S. Dept of Energy
Southwestern Power Administration
Springfield Maintenance and Engineering Office
P.O. Box 3337
Springfield, MO 65803

RECEIVED
SEP 21 1994
S. P. A. SPRINGFIELD, MO.
By _____

Dear Mr. Jennings,

The undersigned have read in the Marshall Mt. Wave
Notice of Intent.

We would like for all of you to know we are very opposed
to any spraying of any kind. Any thing that will kill trees
will also Kill wild life.

Please register us as against this.

Thank you,

Jerry Carter
Lucie Carter
HC 75 Box 277B
Witts Spring, AR
72686

Kathryn McDaniel
HC 75, Box 289
Marshall, Ar.
72658

Corrine Blair
HC 75, Box 289
Marshall, Ar.
72658

Jamie McDaniel
HC 75 Box 137A
Marshall, AR. 726

Joe Carter
H.C 75 Box 277F
Witts Spring, AR.
72686

Ruth C Nye
HC 75 Box 277B
Witts Springs Ar. 72686

Clare Davis
H.C. 75 BOX
Witts Spring AR.
72686

James W. Von Cawelken
Peggy S. Vandewent
HC 75 Box 277-C
Witts Spring, AR. 72686

09-20-1997 11:25
Janda Hamilton
1C 75 Box 340
Marshall, WV
72650

3

Jarmon Hamilton
1C 75 Box 340
Marshall, WV 72650
Ruth Hamilton
PO Box 242
Marshall, WV 72650
Lanoff Agency



IN THE UNITED STATES DISTRICT COURT IN AND FOR THE WESTERN

DISTRICT OF ARKANSAS

UNITED STATES OF AMERICA,

-vs-

Petitioner,

CERTAIN PARCELS OF LAND IN CRAWFORD COUNTY,
ARKANSAS; and JOHN RAINS, et al.,

Defendants.

CIVIL NO. 752

Filed:

January 15-1948

DECLARATION OF TAKING

I,

Secretary of the Interior

of the United States of America, do hereby declare that:

1. (a) The interest in the lands described in Schedule A hereto attached is hereby taken for the use of the United States under authority of the Act of August 1, 1888, 25 Stat. 357 (40 U. S. C. 257); the Act of February 26, 1931, 46 Stat. 1421 (40 U. S. C. 258 (a) to 258 (e)); the Act of December 22, 1944, 58 Stat. 887, Section 5; Interior Department Appropriation Act, 1947, Public Law 478 - 79th Congress; Executive Order No. 9353, dated June 19, 1943; Executive Order No. 9366, dated July 30, 1943; and Executive Order No. 9373, dated August 30, 1943.

(b) The public use for which the interest in said lands is taken is the transmission and disposition of electric power and energy generated at reservoir projects under the control of the War Department, and in the opinion of the Secretary of War not required in the operation of such projects, in such manner as to encourage the most widespread use thereof at the lowest possible rates to consumers consistent with sound business principles.

2. A description of said lands sufficient for the identification thereof is set forth in Schedule A, annexed hereto and made a part hereof.

3. The estate taken in the lands described in Schedule A, annexed hereto, for said public use is a perpetual easement for the erection, operation and maintenance of a line or lines of poles, towers, or other structures, wires,

cables, and fixtures for the transmission of electric current. The easement taken is subject to existing easements for roads, railroads, canals, ditches, pipelines, telegraph lines, telephone lines and other electric lines. The easement taken includes the perpetual right to remove buildings and improvements, except fences, and except buildings and improvements appurtenant to the easements named in the preceding sentence, and includes the perpetual right to cut down, remove and trim any trees that may interfere with or endanger said transmission line or lines or the maintenance or operation thereof; and the perpetual right to set the necessary guy and brace poles and anchors and to attach all necessary guy wires thereto.

4. A plan showing said lands is annexed hereto as Schedule B and made a part hereof.

5. The sum of money estimated by me to be just compensation for said interests in said lands is set forth in Schedule A, annexed hereto and made a part hereof. Said sum I deposit in the registry of this Court to the use of the persons entitled thereto.

I am of the opinion that the ultimate award of compensation for the taking of said interests in said lands will be within any limits prescribed by law to be paid as the price therefor.

IN WITNESS WHEREOF, I, _____, Secretary
of the Interior of the United States of America, thereunto duly authorized,
have signed this Declaration of Taking this _____ day of _____,
19____, in the City of Washington, District of Columbia.

UNITED STATES OF AMERICA

By _____
Secretary of the Interior.

VII.

Petitioner herein alleges that all unknown owners, lienors, and claimants, having or claiming any right, title, estate, equity, interest, or lien in or to the said lands and all occupants, lessees, licensees, users, holders, and owners of and claimants to any right, title or interest in and to the aforesaid lands, are made parties respondent herein to the end that they may come into court and by proper pleading assert their claim or claims to said land, or to the proceeds arising therefrom by reason of this proceeding.

WHEREFORE, your petitioner prays that this Honorable Court take jurisdiction of this cause of action and make and have entered all such orders, judgments and decrees as may be necessary to bring all of the known owners of said lands before this Court, and to make all unknown persons, firms and corporations having or claiming any interest therein parties respondent hereto; and your petitioner further prays that the lands particularly described hereinabove be condemned for the uses and purposes set forth in this petition and that the value of said lands be fixed and the amount of compensation to which the owners thereof are entitled, for its appropriation by the petitioner herein, be assessed and fixed all as provided by law.

Your petitioner further prays that this Honorable Court make and have entered all such further orders, judgments and decrees as may be necessary to divest out of the defendants herein and to vest in the petitioner, United States of America, the perpetual easement in and to the lands described above for the erection, operation and maintenance of a line or lines of poles, towers, or other structures, wires, cables, and fixtures for the transmission of electric current,

subject to existing easements for roads, railroads, canals, ditches, pipelines, telegraph lines, telephone lines and other electric lines, including the perpetual right to remove buildings and improvements, except fences, and except buildings and improvements appurtenant to the easements named in the preceding sentence, and including the perpetual right to cut down, remove and trim any trees that may interfere with or endanger said transmission line or lines or the maintenance or operation thereof; and the perpetual right to set the necessary guy and brace poles and anchors and to attach all necessary guy wires thereto; and for such other and further orders as to the Court may seem just and proper, and that the just distribution of the final award for the estate taken herein be made as expeditiously as possible to the persons entitled thereto.

And your petitioner further prays that the petitioner, United States of America, be granted immediate possession of such perpetual easement as hereinabove set out.

UNITED STATES OF AMERICA

H. B. Wilson,
United States Attorney

STATE OF ARKANSAS }
COUNTY OF SEBASTIAN }

R. H. Wilson, United States Attorney for the Western District of Arkansas, being duly sworn, avers: That those facts stated as of his own knowledge are true and those stated on information and belief he verily believes to be true; and affiant further states that diligent search and inquiry will be made by petitioner to ascertain the names, places of residence, legal disability and interests of the owners and mortgagees of these lands and they will be named as parties defendant in an amendment hereto.

15/ R. H. Wilson

R. H. Wilson,
United States Attorney

Subscribed and sworn to before me this 15 day
of January, 1948.

(Seal)

TRUSS RUSSELL, Clerk
United States District Court
Western District of Arkansas

15/ Helen Weener
By: _____
Deputy Clerk

IN THE UNITED STATES DISTRICT COURT IN AND FOR THE WESTERN
DISTRICT OF ARKANSAS

UNITED STATES OF AMERICA,

Petitioner,

vs.

CERTAIN PARCELS OF LAND IN BAXTER COUNTY,
ARKANSAS; and WILBUR JONES, et al.,

Defendants.

CIVIL NO. 187

DECLARATION OF TAKING

I, _____, Secretary of the Interior
of the United States of America, do hereby declare that:

1. (a) The lands described in Schedule A hereto attached are
hereby taken for the use of the United States under authority of the Act of
August 1, 1888, 25 Stat. 357 (40 U.S.C. 257); the Act of February 26, 1931,
46 Stat. 1421 (40 U.S.C. 258 (a) to 258 (e)); (Title II of the Act of June 16,
1933, 48 Stat. 200-203 (40 U.S.C. 401-403) as amended and supplemented;) the
Act of December 22, 1944, 58 Stat. 857, Section 5; Interior Department Appro-
priation Act, 1947, Public Law 478 - 79th Congress; Executive Order No. 9353,
dated June 19, 1943; Executive Order No. 9366, dated July 30, 1943; and
Executive Order No. 9373, dated August 30, 1943.

(b) The public use for which the interest in said lands is
taken is for the transmission and disposition of electric power and energy
generated at reservoir projects under the control of the War Department, and
in the opinion of the Secretary of War not required in the operation of such
projects, in such manner as to encourage the most widespread use thereof at
the lowest possible rates to consumers consistent with sound business
principles.

2. A description of said lands sufficient for the identification
thereof is set forth in Schedule A, annexed hereto and made a part hereof.

3. (a) The estate taken in the lands described in Schedule A,
annexed hereto, for said public use is a perpetual easement for the erection,

Deleted by
Power Div.
See Teletype
of 11-14-46

operation and maintenance of a line or lines of poles, towers, or other structures, wires, cables, and fixtures, for the transmission of electric current; together with the perpetual easement and right to cut down, remove and trim any trees that may interfere with or endanger said transmission line or lines or the maintenance or operation thereof; and, together with the perpetual easement, to set the necessary guy and brace poles and anchors and to attach all necessary guy wires thereto; and the perpetual right, privilege and authority to erect, maintain and operate said line or lines of poles, h-frame structures, towers, or other structures, wires, cables and fixtures, upon, over and across any street, alley, highway, or other right-of-way now or hereafter established and existing on or across said lands or adjoining the same or adjacent thereto.

4. A plan showing said lands is annexed hereto as Schedule B and made a part hereof.

5. The sum of money estimated by me to be just compensation for said lands, including all buildings and improvements thereon, if any, all appurtenances thereto and all interests therein, is set forth in Schedule A annexed hereto and made a part hereof. Said sum I herewith deposit in the registry of this Court to the use of the persons entitled thereto.

I am of the opinion that the ultimate award of compensation for the taking of said lands will be within any limits prescribed by law to be paid as the price therefor.

IN WITNESS WHEREOF, I,

Secretary

of the Interior of the United States of America, therunto duly authorized, have signed this Declaration of Taking this _____ day of _____, 1946, in the City of Washington, District of Columbia.

UNITED STATES OF AMERICA

By _____
Secretary of the Interior.

IN THE DISTRICT COURT OF THE UNITED STATES OF AMERICA
FOR THE WESTERN DISTRICT OF MISSOURI
SOUTHERN DIVISION

United States of America,

Plaintiff,

vs.

53 Tracts of Land Situated in Greene
County, Missouri, and Mary Tolliver,
et al.,

Defendants.)

No. 1017

JUDGMENT UPON DECLARATION OF TAKING

It appearing to the Court that on the 9th day of April, 1951, the plaintiff herein, the United States of America, filed a petition for the condemnation of perpetual easements for the erection, operation and maintenance of a line or lines of poles, towers or other structures, wires, cables and fixtures for the transmission of electric current; such easements to include the perpetual right to have removed buildings and improvements, except fences, and except buildings and improvements appurtenant to the said easements; and to include the right to cut down, remove and trim any trees that may interfere with, or endanger, such said transmission line or lines, or the maintenance or operation thereof; and to include also the perpetual right to set the necessary guy and brace poles and anchors and to attach all necessary guy wires thereto, upon, over and across certain lands in said petition described and as described in Schedule "A" hereto attached; such said petition having been filed at the direction of the Attorney General of the United States of America pursuant to a request of Martin G. White, the Solicitor of the Department of the Interior of the United States of America, acting under authority delegated by the Secretary of the Interior of the United States of America under section 2 of Reorganization Plan No. 3 of 1950 (15 F. R. 1174) to the Solicitor of the Department of the Interior of the United States of America in section 28 of Order No. 2509, as amended (15 F. R. 5058), as authorized by the provisions of the Act of Congress of August 1, 1888 (25 Stat. 357), as amended (40 U. S. C., 1946 ed., Supp. III,

sec. 257); the act of February 26, 1931 (46 Stat. 1421, 40 U. S. C., 1946 ed., secs. 258a to 258c); section 5 of the act of December 22, 1944 (58 Stat. 887); The Interior Department Appropriation Act, 1951 (Public Law 759, 81st Congress); Executive Order No. 9353, dated June 19, 1943; Executive Order No. 9366, dated July 30, 1943; and Executive Order No. 9373, dated August 30, 1943.

And it further appearing to the Court that after the filing of said petition on said 9th day of April, 1951, there was filed a Declaration of Taking signed by the said Mastin G. White as Solicitor of the Department of the Interior of the United States of America, as aforesaid, pursuant to the authority hereinbefore recited.

And it further appearing to the Court that the public uses for which said easements are being sought are to transmit and dispose of electric power and energy generated at reservoir projects under the control of the Department of the Army of the United States of America not required in the operation of such reservoir projects, but in such manner as to encourage the most widespread use thereof at the lowest possible rates to consumers consistent with sound business principles.

And it further appearing to the Court that the sum of \$10,543.00 has been deposited in the Registry of this Court and is now on deposit therein for the use of the persons who may be found to be entitled thereto, respectively, as just compensation for the condemnation and taking of such said easements.

IT IS THEREFORE ORDERED, upon the oral motion of the United States Attorney for the Western Judicial District of Missouri, acting as attorney for the plaintiff herein, that the easements as hereinabove set forth and as described, be and the same are hereby vested in the United States of America, subject to existing easements for public roads, railroads, canals, ditches, pipelines, telegraph lines, telephone lines and other electric lines as hereinabove set forth, upon the filing of said Declaration of Taking, together with the right of possession to lands described in Schedule "A" hereto attached and made a part hereof, and to affect the owners, respectively,

of such said lands, as the same are set forth upon Schedule "B" hereto attached and made a part hereof.

Dated at Kansas City, Missouri, this the 9th day of April, 1951.

Albert L. Ridge
JUDGE

PHOTOCOPIED

STATE OF MISSOURI, }
COUNTY OF GREENE } ss. IN THE RECORDER'S OFFICE

I, LeROY F. SCHANTZ, Recorder of said County, do hereby certify that the within instrument of writing was on the 12 day of August A. D. 1951 at 10 o'clock 40 minutes of P. M. duly filed for record, and is recorded in the records of this office, in Book 918 at page 1.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at Springfield, Mo., this 12 day of August A. D. 1951.
LeRoy F. Schantz Recorder
Albert L. Ridge Deputy



918
1

See "Declaration of Taking" for list of tracts.

FILED
★ APR 9 - 1951 ★
A. L. ARNOLD, Clerk
A. L. Arnold Deputy



1-24-95

Dave

Southwestern
ROW EA

B&V Project 15356.423
B&V File C

Mr. Gary D. Frazer
Field Supervisor
U.S. Fish and Wildlife Service, Ecological Services - Columbia Field Office
608 East Cherry Street
Columbia, MO 65201

Subject: Request for informal consultation

Dear Mr. Frazer:

The Southwestern Power Administration, a division of the U.S. Department of Energy, (Southwestern) has conducted an environmental assessment for vegetation control along transmission line rights-of-way (ROW) following the National Environmental Policy Act of 1969 (NEPA). This environmental assessment has identified areas along the ROW that cross near federally-listed threatened and endangered (T&E) species. Your office has responded twice in writing to our consultant, Black & Veatch, in reference to this project (USFWS Reference No. FWS/AES-CMFO).

At this time Southwestern would like to initiate consultation with the U.S. Fish and Wildlife Service pursuant to 50 CFR 402. Attached please find the Draft Environmental Assessment for Vegetation Control along Transmission Line Rights-of-Way for your review and comment. Report sections 3.6 and 4.6 deal specifically with T&E species located along the ROW. We believe that the proposed action (the combination of selective herbicide use and existing mechanical and manual methods) and associated mitigation measures would avoid contact with and therefore eliminate any potential for impacts to T&E species. The exact locations of T&E species are mapped on U.S. Geological Survey quadrangles, held by Southwestern, with information provided by the Missouri Department of Conservation, Natural Heritage Program personnel. We believe that the information provided in the Draft Environmental Assessment supports our request for informal consultation with the U.S. Fish and Wildlife Service since no known T&E species would be impacted by our proposed action.

?
OK
AR

If you have any questions or comments regarding the document, locations of T&E

Mr. Gary D. Frazer

B&V Project 15356.423

species, mitigation measures, or any other concerns please do not hesitate to contact Corry T. Platt, of Black & Veatch, our consultant, at 601 Walnut Street, Suite 705, Philadelphia, PA 19106-3307, phone (215) 928-2232, ~~or myself~~. We would appreciate a response to this request by March 1, 1995.

Very truly yours,

Southwestern Power Administration

James Jennings
Document Manager

Enclosure

cc: Corry Platt, B&V



Department of Energy
Southwestern Power Administration
Post Office Box 1619
Tulsa, Oklahoma 74101

March 30, 1995

Gary D. Frazer, Field Supervisor
United States Department of the Interior
Fish and Wildlife Service
Fish and Wildlife Enhancement
Columbia Field Office
608 East Cherry Street
Columbia, Missouri 65201

Subject: Environmental Assessment for
Vegetation Control Along
Transmission Line Rights-of-Way

Dear Mr. Frazer:

This memorandum of understanding (MOU) has been prepared to address and satisfy issues raised by the U.S. Fish and Wildlife Service (USFWS) in a letter to James B. Jennings, U.S. Department of Energy, Southwestern Power Administration (Southwestern), dated March 14, 1994 regarding the Draft Environmental Assessment (EA) for Vegetation Control along Transmission Line Rights-of-Way (ROW). This MOU will require Southwestern to address and satisfy the concerns raised by your agency. As part of the MOU, Southwestern is requesting a letter of concurrence from the USFWS - Missouri Field Office that the proposed action will not impact federally-listed threatened and endangered species or wetland habitats. The following information summarizes USFWS comments and Southwestern actions to address and satisfy each comment:

USFWS Comment #1

The exact locations for the Missouri bladder-pod (*Lesquerella filiformis*) are not all mapped and there may be some unmapped populations in areas that may be impacted. A survey of this area for the bladder-pod by a qualified botanist is suggested and it is recommended that the results of this survey be incorporated as an element of the Preferred Alternative in the Final EA. Upon completion of the survey, an appropriate protective buffer around bladder-pod populations would be negotiated between USFWS and Southwestern.

Southwestern Action #1

Black & Veatch, Southwestern's consultant discussed the range, habitat, and search parameters for the Missouri bladder-pod with Tim Smith of the Missouri Department of Conservation under the guidance of the USFWS. Mr. Smith informed Black & Veatch that the bladder-pod is only likely to be found in five MO counties including Greene, Dade, Lawrence, Christian, and Jasper. Southwestern plans to have a qualified botanist conduct ground surveys to determine the presence or absence of the bladder-pod along the ROW in these

counties (Dade County is excluded since it contains no ROWs). These surveys will be conducted during April and May of 1995, when the plant is in flower or fruit. In the interim, under this MOU, Southwestern will not conduct vegetation control activities in the bladder-pod counties until the survey has been completed; however, upon issuance of a finding of no significant impact (FONSI), Southwestern will commence with its proposed vegetation control program along other areas of ROW. The results of the bladder-pod survey will be reported to USFWS in the form of a letter report and maps and appropriate buffer zones will be negotiated and included as part of Southwestern's application plan for vegetation control.

USFWS Comment #2

The adequacy of a 15-foot buffer around karst features and streams was a concern with respect to the aerial or foliar application of Garlon 4, due to its high fish toxicity. In subsequent conversations between David Michaelson (USFWS-MO) and Black & Veatch, it was determined that this concern was related to the proximity of the ROW to recharge zones and habitat for the Ozark cavefish (*Ambyloopsis rosae*). USFWS recommended a 100-foot buffer around karst features and streams for the aerial or foliar application of Garlon 4.

Southwestern Action #2

Black & Veatch discussed the location of karst features with local experts and located Ozark cavefishes and their habitat with data from the Missouri Department of Conservation. Based on this information it was determined that the ROW and Ozark cavefish and its habitat are present in Greene, Lawrence, and Newton counties in Missouri. Given the difficulty in identifying and delineating karst features, as described by local experts, Southwestern will not apply Garlon 4 using foliar or aerial application methods in these three counties. However, Southwestern may, at a later date, identify the specific location of recharge zones and reduce this restriction to those areas. Southwestern understands that the identification of these zones will be reported to USFWS in the form of a letter report and maps and appropriate buffers will be negotiated and included as part of Southwestern's application plan for vegetation control.

USFWS Comment #3

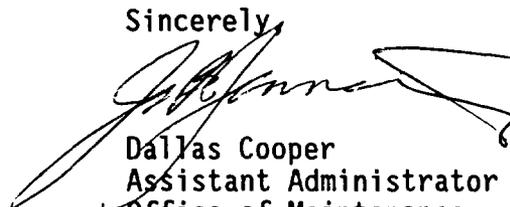
USFWS recommended that erosion control measures, as stated in the Forest Service EIS, be evaluated since vegetation control activities may increase sediment and herbicide runoff into streams.

Southwestern Action #3

Southwestern's proposed action will result in the use of herbicides that eliminate woody vegetation growth while promoting the establishment of grass and herbaceous species. The establishment of a buffer zone, as planned, around streams, and the establishment of a dense layer of grass and herbaceous vegetation will reduce or eliminate the movement of herbicides and sediment into streams. In areas where both mechanical and herbicide methods of vegetation occur, Southwestern will use erosion control measures as specified in the Forest Service EIS. The specifics for these erosion control measures will be addressed in Southwestern's application plan for vegetation control.

Southwestern has prepared this MOU to serve as an agreement between USFWS and Southwestern and feels it adequately satisfies the comments in the USFWS letter. Please address your letter of concurrence to James B. Jennings, Department of Energy, Southwestern Power Administration, P.O. Box 1619, Tulsa, Oklahoma, 74101. If you have any questions, please call James B. Jennings at 417/881-8772 or our consultant, Dane G. Pehrman (Black & Veatch) at 215/928-2203.

Sincerely,

 *Sir Dallas
Cooper*
Dallas Cooper
Assistant Administrator
Office of Maintenance

cc: Jim Jennings
Dave Dossett

B L A C K & V E A T C H

MEMORANDUM

Southwestern Power Administration
ROW EA
T&E Species Identification

OFFICE OF ESH&S
94 FEB 27 PM 1:37
B&V Project #15356.423
SWPA ICS Code #5400.0
February 24, 1995

To: Jim Jennings

From: Robert Orr *RMO*

The attached memorandum from Dane Pehrman discusses the T&E Species survey cost proposals Waste Science provided me with. The States provided enough information to restrict herbicide application along the ROW for about 2.5 miles. Through the work suggested by Proposal A, Waste Science could reduce the restricted area to approximately 1.5 miles. Proposal B suggests that actual field truthing and flagging take place. This could reduce the restricted areas by 50 to 100 percent.

Field truthing and flagging is recommended because, although Southwestern has always used manual and mechanical methods of vegetation control in the ROW, continuation of these previous methods are not appropriate at this time due to the T&E Species Protection Act. The T&E Species Protection Act requires that known locations of T&E species not be disturbed. This suggests that prior to using manual or mechanical methods to control vegetation, Southwestern will have to ensure these species are not harmed. The most effective way to do this would be to conduct field truthing and flagging for vegetative species. Animal T&E species are not generally a concern because they will tend to flee when manual and mechanical methods are employed.

The approximate costs shown on the attached memorandum are for Waste Sciences effort on the T&E species location activities.

cc: Francis Gajan
 Dave Dossett
 Dane Pehrman
 Roy Toone
 Bruce Gockel/File

BLACK & VEATCH Waste Science, Inc.
Philadelphia Office

MEMORANDUM

SW Power
Southwestern T&E Species Survey
Revised Proposal for T&E Services

B&V Project 15356.421
B&V File A
February 21, 1995

To: Roy Toone

From: Dane G. Pehrman

Enclosed within are two proposals for the Southwestern T&E species surveys. These proposals are a revision of the original proposal dated February 2, 1995 and are based on viewing the videotapes, accurately plotting the known ranges of threatened and endangered species, and determining the value added by viewing the videotapes as opposed to directly going to site surveys. The two proposals are broken down by state and include: Proposal A, the review of the video tape in the potentially affected areas and the refinement of restricted areas on the USGS quadrangles. Proposal B includes the components of Proposal A plus the further refinement, field truthing, and flagging of these restricted areas.

MISSOURI

There are five quadrangles that indicate the presence of T&E species/habitat directly within the transmission line ROW or immediately downgradient. Species identified include plants and animals.

Carex bromoides, a sedge, was identified along line 3003 in the Poplar Bluff quadrangle. Based on the Natural Heritage Program (NHP) information, approximately 800 feet of ROW (1.83 acres) was potential habitat for this species. Given that *C. bromoides* is a wetland species, it was possible to use the videotape to narrow the area of potential habitat to a wet depression and an area along a stream, a total of 0.08 acres. *Chielanthes tomentosa*, woolly lip-fern, was identified along the Springfield loop in the Bethpage quadrangle. Based on the Natural Heritage Program information, approximately 1,700 feet of ROW (3.90 acres) was potential habitat for this species. Given that *C. tomentosa* grows on rock outcrops, it may be possible to utilize the videotape to refine the known area of potential habitat for this species. Potential reduction of over 50% of the restricted area may be expected, reducing the limited areas to less than 850 feet (1.95 acres). Missouri bladderpod, *Lesquerella sp.*, is not specifically listed along the ROW; however, FWS has indicated that limestone glades provide excellent habitat for these species and therefore, should be given special consideration. Two glades known to support bladderpod were located by the NHP along a total of 5,200 feet of ROW (11.93 acres) on the Bethpage and Nixa quadrangles.

BLACK & VEATCH Waste Science, Inc.
Philadelphia Office

MEMORANDUM

Page 2

SW Power
Southwestern T&E Species Survey
Revised Proposal for T&E Services

B&V Project 15356.421
February 21, 1995

These glades would be visible from the videotapes and the use of the videotapes may be expected to reduce the areas of potential habitat by 75% or 1,300 feet (2.98 acres). The other T&E specie located along the ROW is the black-tailed jackrabbit, *Lepus californicus*, located along 6,200 feet of ROW in the Rescue and Miller quadrangles, west of Springfield. It would be impractical to search for the actual presence of an animal; however, the habitat required by this rabbit must be protected. This rabbit is common in open prairies and is often seen feeding on grass clumps along roads. These habitats are very similar to those typically found along ROWs. Since this rabbit feeds on upland grasses, which will be unaffected by herbicide treatment, there is no need to restrict application in these habitats.

A total of 1.48 miles (18.18 acres) of ROW is currently restricted from herbicide use based on available information concerning T&E species. Viewing the videotapes along ROW in Missouri may potentially reduce the restricted areas to less than 0.45 miles (5.01 acres). Actual field location of T&E species would identify actual presence of these species and may be expected to reduce the restricted areas by 50 to 100 percent.

ARKANSAS

There are two quadrangles that indicate the presence of T&E species/habitat directly within the transmission line ROW or immediately downgradient. Species identified include only plants.

Plantago cordata, water plantain, was identified along a stream immediately down a steep hill off the ROW near Norfolk Dam on the Norfolk Dam South quadrangle. Based on the Natural Heritage Program (NHP) information, approximately 3,000 feet of this stream (2.06 acres) was potential habitat for this species. This translates into 2,000 feet of ROW which drains through the area. Since this area is not likely to be visible from the videotape, there is not value gained from viewing the tape. Any attempt to reduce this restricted area would have to be based on field investigations. Missouri bladderpod, *Lesquerella sp.*, is not specifically listed along the ROW; however, FWS has indicated that limestone glades provide excellent habitat for these species and therefore, should be given

MEMORANDUM

Page 3

SW Power
Southwestern T&E Species Survey
Revised Proposal for T&E Services

B&V Project 15356.421
February 21, 1995

special consideration. One glade known to support bladderpod was located by the NHP along a total of 1,400 feet of ROW (3.21 acres) on the Russellville West quadrangles. This glade is visible on the USGS quadrangle, therefore there is no value gained from using the videotapes to reduce this restricted area. Any attempt to reduce this restricted area would have to be based on field investigations.

A total of 0.98 miles (5.27 acres) of ROW is currently restricted from herbicide use based on available information concerning T&E species. Viewing the videotapes along ROW in Arkansas will not enable us to further refine the restricted areas. Actual field location of T&E species would be needed to identify actual presence of these species and may be expected to reduce the restricted areas by 50 to 100 percent.

OKLAHOMA

T&E species in Oklahoma are only located to the accuracy of a county; therefore, it is impossible to determine specific areas where a specie may be present at this time. A review of the county lists has indicated that there are five T&E animal species potentially near ROW in Bryan, Muskogee, Sequoyah, and Haskell counties and on the Lake Holdenville quadrangle. There are no T&E plant species listed near the ROW in Oklahoma. Three of these species (bald eagle, piping plover, and the interior least tern) nest and utilize habitats that would not be impacted by herbicide use and are not herbivores that may ingest these chemicals through food. The American burying beetle feeds on carrion and lies in grasslands and forests. While it may be found in ROW areas in Sequoyah, Muskogee, and Bryan counties; there are no direct or indirect effects to these beetles from the proposed herbicides. The whooping crane may be found during migration periods in marshes and prairie pothole wetlands and has been observed in Muskogee County. While the whooping crane may occasionally stopover in treated wetland areas, it does not feed on plants and would not be directly effected by the proposed herbicides.

Based on this information, there appears to be no need to survey the ROW in

MEMORANDUM

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SW Power
Southwestern T&E Species Survey
Revised Proposal for T&E Services

B&V Project 15356.421
February 21, 1995

Oklahoma for T&E species since there is either no exposure route to these species or there are no adverse effects from exposure to the proposed herbicides.

PROPOSAL A

This project could be completed relatively quickly with work beginning immediately.

Missouri

View Video Tape	6 hrs Sr. Env. Eng.	DP
	6 hrs Env. Eng	CP
Locate Areas	1 hrs Sr. Env. Eng.	DP
	1 hrs Env. Eng.	CP
Mapping	1 hrs Sr. Env. Eng.	DP
	1 hrs Env. Eng	CP

Arkansas

View Video Tape	4 hrs Sr. Env. Eng.	DP
	4 hrs Env. Eng	CP
Locate Areas	1 hrs Sr. Env. Eng.	DP
	1 hrs Env. Eng.	CP
Mapping	1 hrs Sr. Env. Eng.	DP
	1 hrs Env. Eng	CP
Mapping QA/QC	2 hrs Sr. Env. Eng.	DP
	4 hrs Sr. Proj Mgr.	RT
Map Submission	4 hrs Admin	PHL

Total Hours for Proposal A - 38 hours

Sr. Proj Mgr.	RT	4 hours
Sr. Env. Eng	DP	16 hours
Env. Eng.	CP	14 hours
Admin	PHL	4 hours

BLACK & VEATCH Waste Science, Inc.
Philadelphia Office

MEMORANDUM

Page 5

SW Power
 Southwestern T&E Species Survey
 Revised Proposal for T&E Services

B&V Project 15356.421
 February 21, 1995

PROPOSAL B

Once focused by the work performed in Proposal A, the remaining tasks in Proposal B could be started in May through August (based on flowing times of target plant species). These tasks will include travel to each potential T&E location, field survey for habitat and/or the species itself, recording on field maps, and flagging of areas with orange stake flagging. The work will start with Arkansas and finish with Missouri. This will be accomplished using a two-man survey team (1 B&V person and 1 Southwestern person). I intend to fly into Springfield, MO, use a rental vehicle, and fly out from Memphis.

		<u>Proposal B</u>	<u>Proposal A</u>	<u>Total B</u>
Sr. Proj. Mgr	RT	0 hours	4 hours	4 hours
Sr. Env. Eng	DP	96 hours	16 hours	112 hours
Env. Eng.	CP	0 hours	16 hours	16 hours
Admin	PHL	0 hours	4 hours	4 hours
TOTALS		96 hours	40 hours	136 hours

Expenses:			
Per Diem	\$300.00	\$0.00	\$300.00
(1 @ 10 days @ \$30/day)			
Hotel	\$540.00	\$0.00	\$540.00
(1 @ 9 nights @ \$60/nite)			
Airfare	\$400.00	\$0.00	\$400.00
(1 @ \$400)			
Car Rental	\$500.00	\$0.00	\$500.00
(\$30/day for 10 days plus one-way charge)			
Gasoline/Auto	\$200.00	\$0.00	\$200.00
TOTAL EXPENSES	\$1,940.00	\$0.00	\$1,940.00
TOTAL LABOR		\$2,980	\$13,416.00
<hr/> TOTAL COSTS		\$2,980	\$15,356.00

United States Government

Department of Energy

Southwestern Power Administration

memorandum

DATE: January 27, 1995

REPLY TO

ATTN OF: Don L. Hayes, S1040

SUBJECT: Draft Environmental Assessment for Vegetation Control Along Transmission Line Rights-of-Way

TO: Ms. Mary Barger, Archaeologist

In a telephone conversation with Robert Orr, of Black & Veatch, you requested a copy of our environmental assessment (EA) because you were considering a similar assessment for your rights-of-way. We have asked that Black & Veatch give you a copy since they have an office near by and they prepared the EA for Southwestern. Please use the draft copy for in-house use only as it is still a draft document.

If you have any questions or concerns about this document please contact Dave Dossett at (918) 581-5819, or me at (918) 581-7415.

Very truly yours,



Don L. Hayes
Specialist, Environmental Protection

cc: Francis Gajan, S1020
Jim Jennings, S8001
Dave Dossett, S1040
Bruce Gockel, B&V
Roy Toone, B&V-KC

File: S1040(5400)

Desk

S1040:DHayes:x7415:1y:01/27/95:(WP51 C:\data\wp50\bob\memoswpa.001)

January 25, 1995

Mr. Gary D. Frazer
U.S. Fish and Wildlife Service, Ecological
Services - Columbia Field Office
608 East Cherry Street
Columbia, MO 65201

Re: Request for Informal Consultation

Dear Mr. Frazer:

The Southwestern Power Administration (Southwestern), a division of the U.S. Department of Energy, has conducted an environmental assessment for vegetation control along transmission line rights-of-way (ROW) in accordance with the National Environmental Policy Act of 1969 (NEPA). This environmental assessment has identified areas along the ROW that cross near federally-listed threatened and endangered (T&E) species. Your office has responded twice in writing to our consultant, Black & Veatch, in reference to this project (USFWS Reference No. FWS/AES-CMFO).

At this time Southwestern would like to initiate informal consultation with the U.S. Fish and Wildlife Service in accordance with 50 CFR 402. Attached please find the Draft Environmental Assessment for Vegetation Control along Transmission Line Rights-of-Way for your review and comment. Report sections 3.6 and 4.6 discuss T&E species located along the ROW. We believe that the proposed action (the combination of selective herbicide use and existing mechanical and manual methods) and associated mitigation measures would avoid contact with and therefore eliminate any potential for impacts to T&E species. The exact locations of T&E species are mapped on U.S. Geological Survey quadrangles, held by Southwestern, with information provided by the Missouri Department of Conservation, Natural Heritage Program personnel. We believe that the information provided in the Draft Environmental Assessment supports our request for informal consultation with the U.S. Fish and Wildlife Service since no known T&E species would be impacted by our proposed action.

CONCURRENCES		
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If you have any questions or comments regarding the document, locations of T&E species, mitigation measures, or any other concerns please do not hesitate to contact Corry T. Platt, of Black & Veatch, our consultant, at 601 Walnut Street, Suite 705, Philadelphia, PA 19106-3307, phone (215) 928-2232. We would appreciate a response to this request by March 10, 1995.

Sincerely,

James B. Jennings
Special Assistant for
Administration

Enclosure

cc:
Corry Platt, B&V

File: S1040 (5425.1)
Desk
S1040:BOrr:lh:x7631:01-25-95 (B:\CONSLTOR.LTR)

January 25, 1995

Mr. Alan Mueller
U.S. Fish and Wildlife Service, Ecological
Services - Vicksburg Field Office
900 Clay Street, No. 235
Vicksburg, MS 39180

Re: Request for Informal Consultation

Dear Mr. Mueller:

The Southwestern Power Administration (Southwestern), a division of the U.S. Department of Energy, has conducted an environmental assessment for vegetation control along transmission line rights-of-way (ROW) in accordance with the National Environmental Policy Act of 1969 (NEPA). This environmental assessment has identified areas along the ROW that cross near federally-listed threatened and endangered (T&E) species.

At this time Southwestern would like to initiate informal consultation with the U.S. Fish and Wildlife Service in accordance with 50 CFR 402. Attached please find the Draft Environmental Assessment for Vegetation Control along Transmission Line Rights-of-Way for your review and comment. Report sections 3.6 and 4.6 discuss T&E species located along the ROW. We believe that the proposed action (the combination of selective herbicide use and existing mechanical and manual methods) and associated mitigation measures would avoid contact with and therefore eliminate any potential for impacts to T&E species. The exact locations of T&E species are mapped on U.S. Geological Survey quadrangles, held by Southwestern, with information provided by the Arkansas Natural Heritage Commission personnel. We believe that the information provided in the Draft Environmental Assessment supports our request for informal consultation with the U.S. Fish and Wildlife Service since no known T&E species would be impacted by our proposed action.

CONCURRENCES	
RTG SYMBOL	8000
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If you have any questions or comments regarding the document, locations of T&E species, mitigation measures, or any other concerns please do not hesitate to contact Corry T. Platt, of Black & Veatch, our consultant, at 601 Walnut Street, Suite 705, Philadelphia, PA 19106-3307, phone (215) 928-2232. We would appreciate a response to this request by March 10, 1995.

Sincerely,

James B. Jennings
Special Assistant for Administration

Enclosure

cc:
Corry Platt, B&V

File: S1040 (5425.1)
Desk
S1040:BOrr:lh:x7631:01-25-95 (B:\CONSLTAR.WP5)

*Bob Info -
write on target*

OFFICE OF ESH&S
94 NOV 32 PM 1:53

J
11-30-94

November 28, 1994

SUBJECT: Review of Vegetation Management (R-O-W) Environmental Assessment

Concur with Bob's and Jim's comments.

Additionally:

page 9, 2.4.3 Most areas there is not a road

page 13, 3.2.3 Top of page, end of sentence, maybe "other" should be added

page 17, 3.8 Change from "poles" to "structures"

I think where you have used "absorb/absorption" you mean "adsorb/adsorption, ex. page 5, last paragraph, page 18, 4.1.1.1 last sentence, possibly other areas

Cumulative Actions (2.4) are probably not a separate action but part of the proposed action (2.2)

Reference to the Wetlands Assessment should be in the EA and the FONSI (if that is the ultimate outcome)

Threatened and Endangered Species (3.6) should state that "informal consultation" was accomplished with the Fish & Wildlife folks and they indicated that a "formal consultation" was not required.

Don
Don

cc: Francis Gajan
Dave Dossett
Jim Jennings
Jerry Merr
Roy Toome
Dane Pehrman
JRP / file

Southwestern Power Administration Environmental Assessment
Names and Addresses of Parties involved in the EA review

Arkansas

Final draft

Submitted to
Senior Staff on 1
1/11/95 by
JJ.

1. Mr. Tracy Copeland
Director, State of Arkansas Clearing House
P.O. Box 3278
Little Rock, AR 72203

MM

15 copies are needed to be sent to the AR Clearing House
copies to the Technical Review Committee. The Technical Review Committee
includes to the following state departments represented on the committee:

- 1) Soil and Water Commission
- 2) Game and Fish Department
- 3) Geological Commission
- 4) Department of Health
- 5) Parks and Recreation
- 6) Waterways Commission
- 7) Natural Heritage Commission
- 8) Natural and Scenic Rivers Commission
- 9) Historic Preservation Commission
- 10) Industrial Development Commission
- 11) Forestry Commission
- 12) Highway and Transportation Commission
- 13) Natural Resources and Land Use Commission
- 14) Department of Pollution Control and Ecology

2. Mr. Harold Grimmatt, Director
Arkansas Natural Heritage Commission
1500 Tower Building
323 Center Street
Little Rock, AR 72201

Jim Jennings,

1/9/95

Attached are your copies of the:
1) ROW EA - January 10 version
2) list of the government agencies and private individuals involved in the review process
3) highlighted version of the Jan. 10. ROW EA - showing areas changed from the 12/9/94 version.
Any questions don't hesitate to call me (215) 928-2232 -CARRY

Missouri

1. Ms. Lois Pohl, Coordinator
Missouri Federal Assistance Clearing House
P.O. Box 809
Jefferson City, MO 65102

1 copy is needed to be sent to the MO Clearing House, who then writes a short summary of the document. This short summary is included in a weekly index published by the Clearing House and is sent to state departments involved or interested in environmental issues. These government departments can access our document by requesting it from the Clearing House. Any comments made by the state departments are compiled by the Clearing House. The Clearing House will send us a letter with any comments made by the different state agencies or without any comments if none were made generally within 3 weeks of receipt of our document. The state departments included in the mailing list are similar to the departments in Arkansas. In addition to the state departments, the Regional Planning Commissions and some senators receive the Clearing House's weekly index.

2. Dan F. Dickneite
Planning Division Chief
Natural Heritage Program
Missouri Department of Conservation
P.O. Box 180
Jefferson City, Missouri 65102-0180

Oklahoma

1. Conservation Commission
2800 North Lincoln, Suite 160
Oklahoma City, OK 73105
2. Department of Environmental Quality
1000 N.E. 10th Street, Room 1212
Oklahoma City, OK 73117-1212
3. Mr. Ed Fite, III, Administrator
Oklahoma Scenic Rivers Commission
P.O. Box 292
Tahlequah, OK 74465
4. Natural Resources Section
Oklahoma Department of Wildlife Conservation
1801 North Lincoln
Oklahoma City, Oklahoma 73105

Federal Agencies

1. Mr. Gary Frazer, Field Supervisor
U.S. Fish and Wildlife Service, Ecological Services - Missouri Field Office
608 East Cherry Street
Columbia, MO 65201
2. Jerry Brabander, Field Supervisor
U.S. Fish and Wildlife Service, Ecological Services - Oklahoma Field Office
222 South Houston, Suite A
Tulsa, OK 74127
3. Alan Mueller, Field Supervisor
U.S. Fish and Wildlife Service, Ecological Services - Vicksburg Field Office
900 Clay Street, No. 235
Vicksburg, MS 39180
has jurisdiction over AR
4. Alan M. Hutchings
Acting Associate Regional Director
Planning and Resource Preservation
National Park Service, Midwest Region
1709 Jackson St.
Omaha, NE 68102-2571
has jurisdiction over George Washington Carver National Monument in Missouri
5. Ms. Jan Schmitt
National Park Service
P.O. Box 728
Sante Fe, New Mexico 87504-0728
has jurisdiction over the Buffalo National River in Arkansas
6. George Oviatt, Natural Resource Manager
Buffalo National River
P.O. Box 1173
Harrison, AR 72602-1173
7. Mr. Russell Mills
State Conservationist
USDA, Soil Conservation Service
Parkade Center, Suite 250
601 Business Loop 70 West
Columbia, MO 65203

8. Mr. Ronnie Murphy
State Conservationist
USDA, Soil Conservation Service
Federal Building, Room 5404
700 West Capital Street
Little Rock, AR 72201-3228

9. Mr. Bob Steffans, Planning Staff Officer
Becky Bryan, NEPA Compliance Officer
National Forest Service
Mark Twain National Forest
401 Fairgrounds Rd.
Rolla, MO 65401

10. G. David Steele, P.E.
Chief, Planning Division
U.S. Army Corps of Engineers District, Tulsa
P.O. Box 61
1645 South 101 East Avenue
Tulsa, OK 74121-0061

11. Mr. Gene Gunn
ENRV Branch
U.S. EPA, Region 7
726 Minnesota Avenue
Kansas City, KS 66101
has jurisdiction over MO

12. Mr. William L. Cox
Chief, Federal Assistance Section
U.S. EPA, Region 6
1445 Ross Avenue
Dallas, TX 75202
has jurisdiction over AR and OK

Private Agencies

1. Julian K. Fite
Save the Illinois River, Inc.
P.O. Box 87
Muskogee, OK 74402
2. Dr. Sam Cooke
Arkansas Wildlife Federation
7509 Cantrell Road, Suite 104
Little Rock, AR 72207

Private Individuals wanting more information

1. Dwayne LunBeck
Box 315
Gideon, MO 63848
2. Jane Aston
HC 75, Box 277A
Witts Springs, AR 72686

Private Individuals against Herbicide Use

1. Kay Marmaduke
HC 75, Box 268
Witts Springs, AR 72686
2. Mike Marmaduke
Route 3, Box 268
Witts Springs, AR 72686
3. Vivian M. Guffey
HCR 75, Box 269
Witts Springs, AR 72686
4. Jerry and Leslie Carter
HC 75, Box 277B
Witts Springs, AR 72686
5. Joe Carter
HC 75, Box 277F
Witts Springs, AR 72686
6. Clare Davis
HC 75, Box *unknown*
Witts Springs, AR 72686
7. Kathryn McDaniel
HC 75, Box 289
Marshall, AR 72650
8. Corrine Blair
HC 75, Box 289
Marshall, AR 72650
9. Ruth C. Nye
HC 75, Box 277B
Witts Springs, AR 72686
10. James W. Vanderwerken
Peggy S. Vanderwerken
HC 75, Box 277C
Witts Springs, AR 72686

Southwestern Power Administration Environmental Assessment
Names and Addresses of Parties involved in the EA review

Page 8

11. Jeannie McDaniel
HC 75, Box 137A
Marshall, AR 72650
12. Norman and Wanda Hamilton
HC 75, Box 340
Marshall, AR 72650
13. Hugh Hamilton
HC 75, Box 242
Marshall, AR 72650
14. James Yancey
unknown address

31 additional individuals listed on a letter held at Southwestern



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
Columbia Field Office
608 East Cherry Street
Columbia, Missouri 65201

IN REPLY REFER TO:

FWS/AES-CMFO

APR - 6 1995

Mr. James B. Jennings
Department of Energy
Southwestern Power Administration
Post Office Box 1619
Tulsa, Oklahoma 74101

Dear Mr. Jennings:

This letter is in response to the March 30, 1995 Memorandum of Understanding regarding comments on the Environmental Assessment for Vegetation Control Along Transmission Rights-of-Way. Based on Southwest Power Administration's actions and commitments set forth in the MOU, we concur with the finding that the proposed action is not likely to adversely affect Federally-listed threatened and endangered species.

We look forward to receiving the results of the Missouri bladderpod (*Lesquerella filiformis*) survey. Should you have questions, or if we can be of any further assistance, please contact David L. Michaelson at the address above, or by telephone at (314) 876-1911 or FAX at (314) 876-1914.

Sincerely,

/s/ Gary D. Frazer

Gary D. Frazer
Field Supervisor

cc: MDC; Jefferson City, MO (Attn: Dan Dickneite)
MDC; Jefferson City, MO (Attn: Dennis Figg)
MDNR; Jefferson City, MO (Attn: John Madras)
EPA; Kansas City, KS (Attn: Kathy Mulder)
Black and Veatch; Philadelphia, PA (Attn: Corry Platt)

DLM:dml:1541/XCHVMPXE



United States Department of the Interior
FISH AND WILDLIFE SERVICE

900 Clay Street, Room 235
Vicksburg, Mississippi 39180

February 14, 1995

Mr. James B. Jennings
Department of Energy
Southwest Power Administration
Post Office Box 1619
Tulsa, Oklahoma 74101

Dear Mr. Jennings:

The Fish and Wildlife Service (Service) has reviewed the draft environmental assessment for vegetation control along transmission line rights-of-way (ROW) supplied with your letter dated January 25, 1995. The document discusses vegetation control along ROWs in Oklahoma, Arkansas, and Missouri. However, this letter concerns only activities within Arkansas. Our offices in Tulsa, Oklahoma and Columbia, Missouri will provide comments concerning potential impacts of vegetation control in the other states. Our comments are submitted in accordance with the Endangered Species Act (87 Stat. 884, as amended 16 U.S.C. 1531 et seq.).

The proposed action consists of combining herbicide application and manual methods to control undesirable vegetation along transmission line ROWs. Herbicides to be used include Accord, Garlon 3A, and Garlon 4. All have short half lives and low oral toxicity to wildlife. Although Garlon 4 is toxic to fish, it has a half life of 12 to 24 hours and would not be applied near waterbodies. Further, herbicides would not be applied near any listed endangered or threatened species. Therefore, the Service concurs with your determination that the proposed action would not adversely affect any listed species.

We appreciate your interest in the preservation of endangered species.

Sincerely,


for
Curtis B. James
Environmental Coordinator

BLACK & VEATCH Waste Science, Inc.
Philadelphia Office

TELEPHONE MEMORANDUM

Southwestern
ROW EA
Consultation with USFWS-OK

B&V Project 15356.423
B&V File C
January 25, 1995
1000h

To: Ken Frasier
Company: USFWS
Phone No.: (918) 581-7458

Recorded by: Corry T. Platt

I called the USFWS - Oklahoma Field Office to discuss consultation requirements. On August 30, 1994, BVWS requested threatened and endangered species information from the USFWS-OK. On September 22, 1994, BVWS received a reduced copy of our letter with a stamp reading "NO EFFECT FINDING, The described action will have no effect on listed species, wetlands, or other important wildlife resources." from the USFWS-OK. In addition, a consultation number (2-14-94-I-1067) was handwritten on the stamp.

I wanted to confirm with the USFWS-OK that this stamp represented informal consultation and that Southwestern's responsibility for consultation according to 50 CFR 402 was met. Ken confirmed that our consultation requirements have been met and that the stamp qualifies as informal consultation. He said that the stamp is being used by their office to reduce paperwork and manhours but is equivalent to a letter explaining that there is no impact and concurrence with the agency's finding of no significant impact.



BLACK & VEATCH Waste Science, Inc.

The Curtis Center, Suite 705, 601 Walnut Street, Philadelphia, Pennsylvania 19106-3307, (215) 928-0700, Fax: (215) 928-1780

Southwestern Power Administration
Environmental Assessment

B&V Project 15356.423
B&V File C
August 30, 1994

Jerry J. Brabander, Field Supervisor
U.S. Fish and Wildlife Service, Oklahoma Field Office
222 South Houston, Suite A
Tulsa, OK 74127-8908

Subject: Threatened and Endangered Species
Request

Dear Mr. Brabander:

BLACK & VEATCH Waste Science, Inc. is conducting an Environmental Assessment of a Vegetation Management Plan for the U.S. Department of Energy, Southwestern Power Administration. The Environmental Assessment preferred alternative includes control of vegetation within the right-of-way by application of herbicide using cut-surface, basal, and foliar application methods. We are asking your office to inform us of the presence of listed or proposed threatened and endangered species, natural areas, and ecologically sensitive areas within the study area. We have also submitted a similar request to the Oklahoma Department of Wildlife Conservation, Natural Resources Section.

The study area for the Environmental Assessment follows transmission lines operated by Southwestern Power Administration and includes a 1/2 mile buffer zone along each side of the right-of-way. The study area has been plotted on 47 USGS quadrangles, 7.5 minute series, reduced by 50 percent. It would be appreciated if your office could plot the locations of any sensitive environments directly onto these maps and return all of the maps to us.

NO EFFECT FINDING

The described action will have no effect on listed species, wetlands, or other important wildlife resources.

Date 9/19/94

Consultation # 2-14-94-I-1067

Approved by Charles M. Swain

U.S. FISH and WILDLIFE SERVICE, TULSA, OK

SEP 22

ENVIRONMENTAL

Scott

BLACK & VEATCH Waste Science, Inc.
Philadelphia Office

MEMORANDUM

Southwestern
ROW EA
Missouri bladder-pod

B&V Project 15356.423
B&V File C
April 12, 1995

To: Dave Dossett
Bob Orr

From: Corry T. Platt

Below is listed a possible method for traversing the potential habitats of the Missouri bladder-pod during the field identification and mapping project. This recommended survey method is commonly used when attempting to locate individual plant species and is based on a visual survey of the entire potential habitat.

The recommended survey method along the ROW includes the following steps:

1. Locate the potential habitat in the field, based either the respective potential habitats marked on the USGS quadrangle or by common field indicators, such as limestone outcrops.
2. Begin along one side of the potential habitat and place pin flags every three paces (10 feet) to establish transect locations.
3. Travel to the other side of the potential habitat and repeat Step 2.
4. Begin to conduct the visual survey by traversing the transect lines established when visually connecting the pin flags located across from each other. As you travel each transect scan a 5 foot area to your right and left for Missouri bladder-pod or similar species with yellow flowers. Confirm any potential plant locations by comparing the live plant with a taxonomic key. Field delineate any Missouri bladder-pod location with pin flags or other marking device and transfer location to the USGS quadrangle or comparative map. Return to transect line and continue. *(Hint: The use of two different color pin flags can help to establish transect lines and reduce confusion when walking a long transect line. Alternating the placement of an orange and a blue flag when establishing the transect lines during Step 2 makes visually connecting the flags when walking much simpler.)*
5. If two persons are available for the survey, it is recommended that the two people begin together on one side of the potential habitat and travel through the habitat along alternating transects (i.e. one connect orange flags and one connect blue flags), covering a combined 20 foot survey area. This technique provides not only

MEMORANDUM

Page 2

Southwestern
ROW EA
Missouri bladder-pod

B&V Project 15356.423
April 11, 1995

for better visual coverage of an area since two people have scanned similar but not identical transects, but also allows both survey team members to be near each other for confirmation of plant identification if a Missouri bladder-pod is found. *(Hint: the use of the two different color pin flags reduces any confusion in determining which transect to follow when two people snake the potential habitat).*

The recommended survey method at the stations includes the following steps:

1. Determine the overland surface water runoff pattern at each station.
2. Identify any potential habitats along the runoff patterns using common field indicators such as limestone outcrops.
3. Visually survey the potential habitats for Missouri bladder-pod from the station boundary until the point where overland flow would enter a drainage ditch or stream. This survey should be restricted to the station itself and areas where surface water flow would travel from the site. A written description of the surface water flow pathway from the site and any potential habitats along that pathway, including the distance between plant and station, would be helpful to later determine a possible risk to these species locations from herbicides chosen for application.
4. Compare plant characteristics with taxonomic key for identification. Mark and record the plant location on USGS topographic maps.



United States Department of the Interior

APR 11 1995

FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Columbia Field Office
608 East Cherry Street
Columbia, Missouri 65201

IN REPLY REFER TO:

FWS/AES-CMFO

APR - 6 1995

Mr. James B. Jennings
Department of Energy
Southwestern Power Administration
Post Office Box 1619
Tulsa, Oklahoma 74101

Dear Mr. Jennings:

This letter is in reference to your March 30, 1995 request for comments regarding the qualifications of Mr. David Dossett, related to conducting a survey of the transmission line right-of-way for Missouri bladderpod (*Lesquerella filiformis*). We have consulted with Mr. Tim Smith, a botanist with the Missouri Department of Conservation (MDC), and agree that Mr. Dossett's coursework and field experience make him sufficiently qualified to conduct this survey. In addition, we understand that he and other Southwestern Power Administration personnel will be attending an MDC plant identification workshop on April 17, 1995 that will emphasize, in part, Missouri bladderpod identification.

We appreciate your continuing cooperation with this project. Should you have questions, or if we can be of any further assistance, please contact David L. Michaelson at the address above, or by telephone at (314) 876-1911 or FAX at (314) 876-1914.

Sincerely,

/s/ Gary D. Frazer

Gary D. Frazer
Field Supervisor

cc: MDC; Jefferson City, MO (Attn: Dan Dickneite)
MDC; Jefferson City, MO (Attn: Dennis Figg)
MDNR; Jefferson City, MO (Attn: John Madras)
EPA; Kansas City, KS (Attn: Kathy Mulder)
Black and Veatch; Philadelphia, PA (Attn: Corry Platt)

DLM:dml:1542/XCHVMPXD



Department of Energy
Southwestern Power Administration
Post Office Box 1619
Tulsa, Oklahoma 74101

March 30, 1995

David Michaelson
United States Department of the Interior
Fish and Wildlife Service
Fish and Wildlife Enhancement
Columbia Field Office
608 East Cherry Street
Columbia, Missouri 65201

Subject: Threatened & Endangered Species
Field Survey

Dear Mr. Michaelson:

Please review the attached qualifications and experience of Mr. David Dossett, Environmental Protection Specialist for Southwestern Power Administration (Southwestern). We would like Mr. Dossett to conduct the field survey and identification for the Missouri Bladder-pod (*Lesquerella filiformis*). This is in response to the Memorandum of Understanding that is being developed between the U.S. Fish and Wildlife Service and Southwestern.

We are anxious to initiate the field survey for the Missouri bladder-pod. Please respond to this letter by contacting me at 417/881-8772 or our consultant, Dane Pehrman (Black & Veatch) at 215/928-2203.

Sincerely,



James B. Jennings
Special Assistant for Administration
Office of Maintenance

Enclosure

cc: Dave Dossett

David J. Dossett
Environmental Protection Specialist
One W. Third St
P.O. Box 1619
Tulsa, OK 74101

Education: BS in Agronomy -- Oklahoma State University in 1970
 Related Subjects: Biological Sciences -- 34 Credit Hours
 General Botany
 Range Management
 Range Management Problems
 Special Agriculture Problems
 Range Grasses
 Plant Physiology
 Plant Identification
 Plant Ecology
 Advanced Range Management

Training: Courses taken during my employment with the federal government
 Stream habitat and Ecology
 Reclamation of Abandoned Mine Lands
 Plant Identification
 Environmental Rules and Regulations

Experience: I have field academic background and field experience to identify many plants. During my employment with the Soil Conservation Service, I was a "Range Conservationist" for several years. I have completed many range surveys which included the identification of all plants in the survey area. This included grasses (both foreign & native), legumes, forbs, composites and woody plant species. I am familiar with the statistical methodology and analyses of sampling, clipping, surveying of vegetation. During my career with the federal service, I have been involved with studies which analyzed a variety of plants, their habitat and environmental consequences and concerns with respect to government actions.



BLACK & VEATCH Waste Science, Inc.

The Curtis Center, Suite 705, 601 Walnut Street, Philadelphia, Pennsylvania 19106-3307, (215) 928-0700, Fax: (215) 928-1780

FAX
TRANSMITTAL SHEET# of Pages Including Cover Sheet 9DATE: 20 March 1995 PROJECT #: 1E356.423TIME: 0920 FAX #: 918 581 7530TO: Bob OrrFROM: CORRY Platt

COMMENTS: Attached are faxes I have received regarding ① comments to the Draft EA-ROW - from the Arkansas Dept. of Health and ② USFWS-MD letter that they do not concur w/ the FONSI and want more T&E work done & incorporated into ROW EA specifically regarding the Musaschi Bladder-pool before they will concur. Please call me (215) 928-2232 to discuss
If you do not receive all pages, please call (215) 928-0700 as soon as possible.
both of these.

U.S. Fish and Wildlife Service



Ecological Services
608 East Cherry Street
Columbia, Missouri 65201



COMM & FT8: (314) 876-1911

FAX: (314) 876-1914 (COMM & FT8)

FAX Cover

DATE: 3-17-95

TO: Corry Platt

FAX No: 215-928-1780

Phone: 215-928-2232

FROM: Kristin - office asst.

SUBJECT: letter - Informal consultation written to Dept. of Energy SW Power Admin.

COMMENTS:

Total pages 4 (including cover)

**FILE COPY
COPY**

FWS/ABS-CMFO

MAR 14 1995

Mr. James B. Jennings
Department of Energy
Southwestern Power Administration
Post Office Box 1619
Tulsa, Oklahoma 74101

Dear Mr. Jennings:

This letter is in reference to your January 25, 1995 request for informal consultation regarding the Draft Environmental Assessment for Vegetation Control along Transmission Line Rights-of-Way, prepared by the consulting firm Black and Veatch. Our comments concern impacts to federally-listed threatened or endangered species or wetland habitats within the area of influence of the proposed project. This response is provided by the U.S. Fish and Wildlife Service (Service) under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4327), the Endangered Species Act of 1973, (16 U.S.C. 1531-1543), as amended, among other statutes, regulations, and guidance information.

We cannot concur at this time with your determination that the proposed project is not likely to adversely affect threatened and endangered species, specifically the Federally-listed threatened Missouri bladderpod (*Lesquerella filiformis*). We have reached this conclusion in consultation with, and with the concurrence of our Vicksburg, Mississippi and Tulsa, Oklahoma Field Offices, which previously commented independently on this project. The Columbia, Missouri Field Office has assumed Service lead for further informal or formal Section 7 consultation on this project. You should direct calls or correspondence to the Service regarding Section 7 consultation to this office, and we will coordinate in-house with other affected field offices in preparing our response.

Page 30, paragraph 2 of the Draft EA states that the known locations of threatened and endangered species will be field identified and marked to aid the applicator in avoiding the treatment of these areas. We do not, as yet, have complete knowledge of every site locality for the Missouri bladderpod, and are concerned about the potential for unknown populations being impacted. We reiterate the recommendation made in our October 13, 1994 letter that habitat types known to foster the growth of this plant along the right-of-way be surveyed by a qualified botanist and further recommend that this survey be incorporated as an element of the Preferred Alternative in the Final EA.

for file
William J. ...
...

¹Watershed Committee of the Ozarks (Attn: Loring Bullard), 300 West Brower, Springfield, Missouri 65802. 417/866-1127
²Ozark Underground Laboratory (Attn: Thomas Aley), Rt. 1 Box 62, Protem, Missouri 65733. 417/785-4289.

Mr. James E. Jennings

2

We would then need to agree on an appropriate buffer zone around areas where Missouri bladderpod is located. Missouri bladderpod is specific to limestone glades and limestone rock outcrops along roadsides or in pastures. The use of aerial photographs or video may be sufficient in identifying this type of habitat.

We also question whether a 15-foot buffer strip around karst features and streams is sufficient, particularly with respect to Carlon-4, which is characterized on page 14 in the Draft EA as being "highly toxic to fish." We recommend that a ≥ 100 foot buffer zone be established around karst features and streams when aerial and foliar applications are used. Because karst features in southern Missouri vary widely in size, some encompassing entire watersheds, we recommend you contact either the Watershed Committee of the Ozarks¹ or the Ozark Underground Laboratory² for detailed information on the exact locations of karst features in the project area.

Activities that directly disturb stream banks, remove and damage riparian vegetation, and allow sediment to enter perennial streams should be avoided. Measures to mitigate and avoid sediment and herbicide runoff into streams should be as rigorous as those described in the Forest Service's EIS evaluating vegetation control techniques.

Informal consultation continues to be an ongoing process with this project. We continue to offer our assistance to you and/or your consultants in developing a Missouri bladderpod survey protocol and establishing buffer areas should any new plant locations be found (this protocol will include reporting new site localities to this office). Should you have questions, or if we can be of any further assistance, please contact David L. Michaelson at the address above, or by telephone at (314) 876-1911 or FAX at (314) 876-1914.

¹Watershed Committee of the Ozarks (Attn: Loring Bullard), 300 West Brower, Springfield, Missouri 65802. 417/866-1127

²Ozark Underground Laboratory (Attn: Thomas Aley), Rt. 1 Box 62, Protem, Missouri 65733. 417/785-4289.

MAR 17 '95 10:06AM USFWS COLUMBIA, MO

Mr. James B. Jennings

3

Sincerely,

/s/ Gary D. Frazer

Gary D. Frazer
Field Supervisor

cc: MDC; Jefferson City, MO (Attn: Dan Dickneite)
MDC; Jefferson City, MO (Attn: Dennis Figg)
MDNR; Jefferson City, MO (Attn: John Madras)
EPA; Kansas City, KS (Attn: Kathy Mulder)
Black and Veatch; Philadelphia, PA (Attn: Corry Platt)

DLM:dml:1541/XCHVMPKC



JIM GUY TUCKER
GOVERNOR

Arkansas DEPARTMENT OF HEALTH

4815 WEST MARKHAM STREET • LITTLE ROCK, ARKANSAS 72205-3887
TELEPHONE AC 501 661-2000

SANDRA B. NICHOLS, M.D.
DIRECTOR

DIVISION OF ENGINEERING FACSIMILE COVER SHEET

FAX TO; NAME: Corry T. Platt
DEPARTMENT: Project Biologist
COMPANY: Black & Veatch Waste Science, Inc.

FAX NUMBER: 215-928-1780 or ABBR NUMBER: _____

NUMBER OF PAGES INCLUDING
COVER SHEET: 4

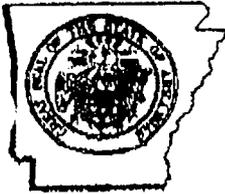
IF YOU DO NOT RECEIVE ALL PAGES AS INDICATED, PLEASE
TELEPHONE: (501) 661 - 2623

FROM: Bob Makin
DOCUMENT
DESCRIPTION: Comments - SW Power Row

FAX TRANSMISSION
COMPLETED BY: _____

TIME: _____ DATE: 3-17-95

COMMENTS: original letter will be mailed to you as
followup to FAX



JIM GUY TUCKER
GOVERNOR

March 17, 1995

Arkansas DEPARTMENT OF HEALTH

4818 WEST MARKHAM STREET • LITTLE ROCK, ARKANSAS 72205-3867
TELEPHONE AC 501 681-2000

SANDRA B. NICHOLS, M.D.
DIRECTOR

Mr. Corry T. Platt
Project Biologist
Black & Veatch Waste Science, Inc.
The Curtis Center, Suite 705
601 Walnut Street
Philadelphia, PA 19106-3307

Re: Draft Environmental Assessment
Southwest Power Rights-of-Way
Vegetation Control

Dear Mr. Platt:

The information submitted on the referenced document has been reviewed. In general we concur with the approach used in the herbicide selection and application process. However, we do take exception to the adequacy of the 15-foot buffer set back in the following instances:

1. When the right-of-way passes over or near a water supply impoundment, no herbicide should be applied within 300 feet of the high water mark. This is consistent with the buffer zone requirements around water supply impoundments contained in our state regulations on public water supplies.
2. When the right-of-way crosses or passes adjacent to a stream or river having a water supply intake located within approximately five (5) miles downstream, no herbicide should be applied within 100 feet of the normal high water mark.
3. Our state regulations also set aside a minimum 100-foot buffer zone around public drinking water wells.

The above distances should be used as minimums. Specific site conditions could dictate the need for greater precaution.

A quick review of water supply locations in the general vicinity of the rights-of-way indicates the following:

Page 2 -- March 17, 1994
Corry Platt

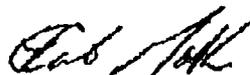
1. The r/w crosses two (2) streams (Spadra Creek and Lee Creek) which are used as water supply sources. Lee Creek is crossed on about five (5) separate occasions.
2. The r/w borders the north shore of the Ozark City Lake, which is the city's sole water supply source.
3. The r/w passes over or crosses near two springs used as water sources.
4. The r/w passes very near eight (8) public water supply wells or well fields.

If your office can supply us with copies of appropriate scale maps, we will attempt to better identify any water supply sources located within about five (5) miles either side of the rights-of-way.

The potentially affected water systems are being notified by copy of this letter. See attached list.

I hope this information is of assistance. If you have any questions, please contact our office.

Sincerely,



Bob Makin, P.E., Assistant Director
Division of Engineering

Page 3 -- March 17, 1995
Corry Platt

Copies of letter sent to:

Mr. Steve Parke
Fort Smith Waterworks
3900 Kelly Highway
Fort Smith, AR 72904

Mr. Harry Short
Ozark Waterworks
Box 513
Ozark, AR 72949

Mr. Larry Wilson
Paragould City Water & Light
P.O. Box 9
Paragould, AR 72451

Mr. W.G. Douglas
Sedgwick Waterworks
c/o City Hall
Sedgwick, AR 72465

Ms. Betsy Bigler
Pyramid Springs Water
8 Westwood Drive
Harrison, AR 72601

Mr. Darrell McCrillis
Saint Francis Waterworks
P.O. Box 117
Saint Francis, AR 72464

Mr. Billy Willis
Clarksville Waterworks
P.O. box 99
Clarksville, AR 72830

Mr. Jim Scheffler
Piggott Waterworks
411 N. Thornton St.
Piggott, AR 72454

Mr. James Reed
Jonesboro Water System
400 East Monroe
Jonesboro, AR 72401

Mr. Louis Qualls
Salesville Waterworks
Rt. 3, Box 316-A
Mountain Home, AR 72653

Mr. Don Riley
Cushman Water System
P.O. Box 161
Cushman, AR 72526

Mr. Ted Suhl
The Lords Ranch
P.O. Box 700
Warm Springs, AR 72478

BLACK & VEATCH Waste Science, Inc.
Philadelphia Office

MEMORANDUM

Southwestern
ROW EA
Deliverables

B&V Project 15356.423
B&V File C
April 12, 1995

To: Bob Orr

From: Corry T. Platt

As per our telephone conversations this week I am enclosing copies of the Final ROW EA and information for the Missouri bladder-pod survey.

Enclosed please find the following in reference to the ROW EA:

1. Three copies of the Final ROW EA.
2. Two copies of the three USFWS letters of concurrence. (*Jim asked for these yesterday*).

Enclosed please find the following in reference to the Missouri bladder-pod survey:

1. Fourteen USGS quadrangles with potential habitats marked in orange and cross-hatched. *One additional quadrangle (Spokane, MO) is needed however, it has been out of stock at the USGS as well as several map vendors since the beginning of this project. I have submitted an additional request for this map and was told that it is now available. We will receive it on Monday. If you could provide the hotel name, address, and phone number of where you will be staying on Tuesday night, I will have the marked up Spokane quad Fedexed to you at the hotel. If we don't review that ROW distance (5 miles or so) using the video, the entire area would need to be surveyed.*
2. Two copies of the "Recommended Survey Method".
3. Information on the training session & species descriptions.
4. Two copies of the USFWS-MO letter accepting Dave Dossett as a qualified botanist (*Jim asked for these yesterday*).

Please call me at (215) 928-2232 if you have any questions.

Appendix 7.1

Appendix 7.2

Specimen Label



Garlon* 3A

Specialty Herbicide

For the control of woody plants and broadleaf weeds on rights-of-way, industrial sites, non-crop areas, non-irrigation ditch banks, forests, and wildlife openings, including grazed areas on these sites

Active Ingredient:
triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid,
as the triethylamine salt44.4%
Inert Ingredients55.6%
Acid equivalent: triclopyr - 31.8% - 3 lb/gal
EPA Reg. No. 62719-37
EPA Est. 464-MI-1

Precautionary Statements

Keep Out of Reach of Children
Hazards to Humans and Domestic Animals

DANGER PELIGRO:

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

Corrosive • Causes Irreversible Eye Damage • Harmful If Swallowed, Inhaled Or Absorbed Through The Skin • Prolonged Or Frequently Repeated Skin Contact With Herbicide Concentrate May Cause An Allergic Skin Reaction In Some Individuals.

Do not get in eyes, on skin or on clothing. Avoid breathing vapor or spray mist.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks
- Protective eyewear

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

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If in eyes: Hold eyelids open and flush with a steady gentle stream of water for 15 minutes. Get medical attention.

If on skin: Wash with plenty of soap and water. Get medical attention if irritation persists.

If swallowed: Call a physician or poison control center. Promptly drink a large quantity of milk, egg whites or gelatin solution, or if these are not available, drink large quantities of water. Do not induce vomiting. Avoid alcohol.

If inhaled: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.

Note to Applicator: Allergic skin reaction is not expected from exposure to spray mixtures of Garlon 3A herbicide when used as directed.

Physical or Chemical Hazards

Do not cut or weld container. Do not use or store near heat or open flame.

Environmental Hazards

Do not apply directly to water, 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.

In case of an emergency endangering health or the environment this product, call collect 517-636-4400.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Garlon* 3A

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Do not use for manufacturing or formulating.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about Personal Protective Equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Waterproof gloves
- Shoes plus socks
- Protective eyewear

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited.

Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate, is a violation of Federal law and may contaminate groundwater. 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.

Container Disposal for Refillable Containers: Seal all openings which have been opened during use. Return the empty container to a collection site designated by DowElanco. If the container has been damaged and cannot be returned according to the recommended procedures, contact DowElanco Customer Service Center at 1-800-258-1470 to obtain proper handling instructions.

Container Disposal (Metal): Do not reuse container. 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.

Container Disposal (Plastic): Do not reuse container. Triple rinse (or equivalent). Then dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

General: Consult federal, state or local disposal authorities for approved alternative procedures.

General Information

Garlon 3A herbicide is recommended for the control of unwanted woody plants and annual and perennial broadleaf weeds in forests, and on non-crop areas including industrial manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides, railroads, fence rows, non-irrigation ditch banks and around farm buildings. Use on these sites may include application to grazed areas as well as establishment and maintenance of wildlife openings.

¹Reference within this label to a particular piece of equipment produced by or available from other parties is provided without consideration for use by the reader at its discretion and subject to the reader's independent circumstances, evaluation, and expertise. Such reference by DowElanco is not intended as an endorsement of such equipment, shall not constitute a warranty (express or implied) of such equipment, and is not intended to imply that other equipment is not available and equally suitable. Any discussion of methods of use of such equipment does not imply that the reader should use the equipment other than as advised in directions available from the equipment's manufacturer. The reader is responsible for exercising its own judgment and expertise, or consulting with sources other than DowElanco, in selecting and determining how to use its equipment.

General Use Precautions

Agricultural Use Requirements for Forestry Uses: For a use on forestry sites, follow PPE and Reentry instructions in the Agricultural Use Requirements section of this label.

Use Requirements for Non-cropland Areas: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is applied to non-cropland areas.

Apply this product only as specified on this label.

Before using any recommended tank mixtures, read the directions and all use precautions on both labels.

Be sure that use of this product conforms to all applicable regulations.

Chemigation: Do not apply this product through any type of irrigation system.

Do not apply Garlon 3A directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers or other desirable broadleaf plants and do not permit spray mists containing it to drift into them.

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs and transitional areas between upland and lowland sites. Do not apply to open water (such as lakes, reservoirs, rivers, streams, creeks, salt water bays or estuaries)

Avoid Injurious Spray Drift

Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants near enough to be injured. It is suggested that a continuous smoke column at or near the spray site or a smoke generator on the spray equipment be used to detect air movement, lapse conditions, or temperature inversions (stable air). If the smoke layers or indicates a potential of hazardous spray drift, do not spray.

Aerial Application: For aerial application on rights-of way or other areas near susceptible crops, apply through a Microfoil or Thru-Valve boom¹, or use an agriculturally registered drift control additive. Other drift reducing systems or thickening sprays prepared by using high viscosity inverting systems may be used if they are made as drift-free as are mixtures containing agriculturally registered thickening agents or applications made with the Microfoil or Thru-Valve boom. Keep spray pressures low enough to provide coarse spray droplets. Spray boom should be no longer than 3/4 of the rotor length. Do not use a thickening agent with the Microfoil or Thru-Valve booms, or other systems that cannot accommodate thick sprays. Spray only when the wind velocity is low (follow state regulations). Avoid application during air inversions. If a spray thickening agent is used, follow all use recommendations and precautions on the product label.

With aircraft, drift can be lessened by applying a coarse spray; by using no more than 30 pounds spray pressure at the nozzles; by using a spray boom no longer than 3/4 the rotor length; by spraying only when wind velocities are low; or by using an approved drift control system.

Ground Equipment: To aid in reducing spray drift, Garlon 3A should be used in thickened (high viscosity) spray mixtures using an agriculturally registered drift control additive, high viscosity invert systems, or equivalent as directed by the manufacturer. With ground equipment, spray drift can be reduced by keeping the spray boom as low as possible; by applying 20 gallons or more of spray per acre; by keeping the operating spray pressures at the lower end of the manufacturer's recommended pressures for the

specific nozzle type used (low pressure nozzles are available from spray equipment manufacturers); and by spraying when wind velocity is low (follow state regulations). In hand-gun applications, select the minimum spray pressure that will provide adequate plant coverage (without forming a mist). Do not apply with nozzles that produce a fine-droplet spray.

High Volume Leaf-Stem Treatment: To minimize spray drift, do not use pressure exceeding 50 psi at the spray nozzle and keep sprays no higher than brush tops. An agriculturally registered thickening agent may be used to reduce drift.

Do not apply on ditches used to transport irrigation water.

Do not apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result.

The use of a mistblower is not recommended.

Grazing and Haying Restrictions

Grazing or harvesting green forage:

1) Lactating dairy animals

2 2/3 quarts/acre or less: Do not graze or harvest green forage from treated area for 14 days after treatment.

Greater than 2 2/3 quarts to 8 quarts/acre: Do not graze or harvest green forage until next growing season.

2) Other Livestock

2 2/3 quarts/acre or less: No grazing restrictions.

Greater than 2 2/3 quarts to 8 quarts/acre: Do not graze or harvest green forage from treated area for 14 days after treatment.

Note: If less than 25% of a grazed area is treated, there is no grazing restriction.

Haying (harvesting of dried forage):

1) Lactating dairy animals

Do not harvest hay until the next growing season.

2) Other Livestock

2 2/3 quarts/acre or less: Do not harvest hay for 7 days after treatment.

Greater than 2 2/3 quarts to 5 1/3 quarts/acre: Do not harvest hay for 14 days after treatment.

Greater than 5 1/3 quarts/acre: Do not harvest hay until next growing season.

Slaughter Restrictions:

Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter. This restriction applies to grazing during the season following treatment or hay harvested during the season following treatment.

Plants Controlled by Garlon 3A

Woody Plant Species

alder	Douglas-fir	salmonberry
arrowwood	dogwood	salt-bush
ash	elderberry	(<i>Baccharis</i> spp.)
aspen	elm	sassafras
bear clover (bearmat)	gallberry	scotch broom
beechnut	hazel	sumac
birch	hornbeam	sweetbay magnolia
blackberry	kudzu†	sweetgum
blackgum	locust	sycamore
Brazilian pepper	madrone	tanoak
casahuate	maples	thimbleberry
Ceanothus	mulberry	tulip poplar
cherry	oaks	waxmyrtle
chinquapin	persimmon	western hemlock
choke cherry	pine	wild rose
cottonwood	poison ivy	willow
Crataegus	poison oak	winged elm
(hawthorn)	poplar	

†For complete control, retreatment may be necessary.

Annual and Perennial Broadleaf Weeds

bindweed	dandelion	smartweed
burdock	field bindweed	tansy ragwort
Canada thistle	lambsquarter	vetch
chicory	plantain	wild lettuce
curly dock	ragweed	

Approved Uses

Use GARLON 3A at rates of 1/4 to 3 gallons per acre to control broadleaf weeds and woody plants. In all cases use the amount specified in enough water to give uniform and complete coverage of the plants to be controlled. Use only water suitable for spraying. Use of an agriculturally registered non-ionic surfactant is recommended for all foliar applications. When using surfactants, follow the use directions and precautions listed on the surfactant manufacturer's label. Use the higher recommended concentrations of surfactant in the spray mixture when applying lower spray volumes per acre. The recommended order of addition to the spray tank is water, spray thickening agent, (if used), additional herbicide (if used), and GARLON 3A. Surfactant should be added to the spray tank last or as recommended on the product label. If combined with emulsifiable concentrate herbicides, moderate continuous adequate agitation is required.

Consult the table to determine which rate of application is suggested for a particular use.

Before using any recommended tank mixtures, read the directions and all use precautions on both labels.

For best results, applications should be made when woody plants and weeds are actively growing. When hard-to-control species such as ash, blackgum, choke cherry, elm, maples, oaks, pines or winged elm are prevalent and during applications made in late summer when the plants are mature and during drought conditions, use the higher rates of GARLON 3A alone or in combinations with TORDON® 101 Mixture herbicide.†

† TORDON 101 Mixture is a restricted use pesticide. See label.

When using GARLON 3A in combination with 2,4-D 3.8 lb amine or low volatile ester herbicides, generally the higher rates should be used for satisfactory brush control.

Use the higher dosage rates when brush approaches an average of 15 feet in height or when the brush covers more than 60% of the area to be treated. If lower rates are used on hard-to-control species, resprouting may occur the year following treatment.

On sites where easy to control brush species dominate, rates less than those recommended may be effective. Consult State or Local Extension personnel for such information.

High-Volume Leaf-Stem Treatment With Ground Equipment

Foliage Treatment

For control of woody plants, use GARLON 3A at the rate of 1/2 to 1 gallon in water to make 100 gallons of spray solution or GARLON 3A at 1 to 4 qts may be tank mixed with 1/4 to 1/2 gallon of 2,4-D 3.8 lb amine or low volatile ester or TORDON 101 Mixture herbicide and diluted to make 100 gallons of spray solution. Apply at a volume of 100 to 400 gallons of total spray per acre depending on size and density of woody plants. Coverage should be thorough to wet all leaves, stems, and root collars. (See "General Use Precautions").

Low Volume Foliar (Directed Spray)

For control of susceptible woody plants, mix 4 to 5 gallons of Garlon 3A in water to make 100 gallons of spray mixture, or mix 1.5 to 3 gallons of Garlon 3A with 1/2 to 1 gallon of Tordon K or 1 to 2 gallons of Tordon 101M in water to make 100 gallons of spray mixture. For best results, a surfactant should be added to all spray mixtures. When treating tall,

high density brush, apply with a truck mounted spray gun and spray tips that deliver about 2 gallons per minute at 40 to 60 psi. For short, low to moderate density brush, backpack applications with spray tips that deliver 1 gallon or less of spray per minute are recommended. Apply at a volume that will wet the target brush, but minimize runoff. Resulting spray volumes will approximate 30 to 60 gallons per acre for truck mounted sprayers and 10 to 20 gallons per acre for backpack sprayers.

Broadcast Applications With Ground Equipment

Make application using equipment that will assure uniform coverage of the spray volumes applied. To improve Spray Coverage, add an agriculturally registered non-ionic surfactant as described later under "Directions For Use".

Woody Plant Control

Foliage Treatment: Use 2 to 3 gallons of Garlon 3A in enough water to make 20 to 100 gallons of total spray per acre or Garlon 3A at 1/2 to 1 gallon may be combined with 1 to 2 gallons of 2,4-D 3.8 lb amine or low volatile esters or Tordon 101 Mixture in sufficient water to make 20 to 100 gallons of total spray per acre.

Broadleaf Weed Control

Use Garlon 3A at rates of 1/3 to 1 1/2 gallons in a total volume of 20 to 100 gallons per acre as a water spray mixture. Apply any time during the growing season. Garlon 3A at 1/3 to 1 gallon may be tank mixed with 1/2 to 1 gallon of Tordon K, Tordon 101 Mixture or 2,4-D 3.8 lb amine or low volatile herbicides to improve the spectrum of activity.

Aerial Application (Helicopter Only)

Aerial sprays should be applied using suitable drift control. (See "General Use Precautions"). Add an agriculturally registered non-ionic surfactant as described under "Directions For Use".

Foliage Treatment (Rights-of-Way)

Use 2 to 3 gallons of Garlon 3A or 1 to 1.5 gallons Garlon 3A in a tank mix combination with 1 to 2 gallons of 2,4-D 3.8 lb amine or low volatile esters or Tordon 101 mixture, and apply in a total spray volume of 10 to 20 gallons per acre. Use the higher rates and volumes when plants are dense or under drought conditions.

Forest Management Applications

For best control from broadcast applications of Garlon 3A, use a spray volume which will provide thorough plant coverage. Recommended spray volumes are usually 10-25 gpa by air or 10 to 100 gpa by ground. To improve spray coverage of spray volumes less than 50 gpa, add an agriculturally registered non-ionic surfactant as described under "Directions for Use". Application systems should be used to prevent hazardous drift to off-target sites. Nozzles or additives that produce larger droplets of spray may require higher spray volumes to maintain brush control.

Forest Site Preparation (not for conifer release)

Use 2 to 3 gallons of Garlon 3A and apply in a total spray volume of 10 to 30 gallons per acre or Garlon 3A at 1 to 1 1/2 gallons may be used with 1 to 2 gallons of Tordon 101 Mixture or 2,4-D 3.8 lb low volatile ester in a tank mix combination in a total spray volume of 10 to 30 gallons per acre. Use of a non-ionic agricultural surfactant is recommended for all foliar applications as described under "Directions For Use".

Note: Conifers planted sooner than one month after treatment with Garlon 3A at less than 1 1/3 gallon per acre or sooner than two months after treatment at 1 1/3 to 3 gal/acre may be injured. When tank mixtures of herbicides are used for forest site preparation, labels for all products in the mixture should be consulted and the longest recommended waiting period before planting observed.

Directed Spray Applications for Conifer Release

To release conifers from competing hardwoods such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, hickory, alder, birch, aspen, and pin cherry, mix 1 to 5 gallons of Garlon 3A in enough water to make 100 gallons of spray mixture. To improve spray coverage, add an agriculturally registered non-ionic surfactant as described under "Directions for Use". The spray mixture should be directed onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after hardwoods have reach full leaf size, but before autumn coloration. The majority of treated hardwoods should be less than 6 feet in height to ensure adequate spray coverage. Care should be taken to direct spray away from contact with conifer foliage, particularly foliage of desirable pines.

Note: Spray may cause temporary damage and growth suppression where contact with conifers occurs; however, injured conifers should recover and grow normally. Over-the-top spray applications can kill pines.

Broadcast Application for Conifer Release in the Northeastern United States

To release spruce, fir, red pine and white pine from competing hardwoods, such as red maple, sugar maple, striped maple, alder, birch (white, yellow or grey), aspen, ash, pin cherry and rubus spp. and perennial and annual broadleaf weeds, use Garlon 3A at rates of 2 to 4 quarts per acre alone or plus 2,4-D amine or 2,4-D ester to provide no more than 4 pounds acid equivalent per acre from both products. Applications should be made in late summer or early fall after conifers have formed their overwintering buds and hardwoods are in full leaf and prior to autumn coloration.

Broadcast Applications for Douglas-Fir Release in the Pacific Northwest and California

To release Douglas-fir from susceptible competing vegetation such as broadleaf weeds, alder, blackberry or Scotch broom, apply Garlon 3A at 1 1/3 to 2 quarts per acre alone or in combination with 4 lb per acre of atrazine. Mix all sprays in a water carrier with a non-ionic surfactant. Applications should be made in early spring after hardwoods begin growth and before Douglas-fir bud break ("early foliar" hardwood stage) or after Douglas-fir seasonal growth has "hardened off" (set winter buds) in late summer, but while hardwoods are still actively growing. When treating after Douglas-fir bud set, apply prior to onset of autumn coloration in hardwood foliage. **Note:** Treatments applied during active Douglas-fir shoot growth (after spring bud break and prior to bud set), may cause injury to Douglas-fir trees.

Cut Surface Treatment

In rights-of-way, other non-crop areas, and forests to control unwanted trees of hardwood species such as elm, maple, oak and conifers, apply Garlon 3A, either undiluted or diluted in a 1 to 1 ratio with water, as directed below:

With Tree Injector Method

Applications should be made by injecting 1/2 milliliter of undiluted Garlon 3A or 1 milliliter of the diluted solution through the bark at intervals of 3-4 inches between centers of the injector wound. The injections should completely surround the tree at any convenient height.

With Hack and Squirt Method

Make cuts with a hatchet or similar equipment at intervals of 3-4 inches between centers at a convenient height around the tree trunk. Spray 1/2 milliliter of undiluted Garlon 3A or 1 ml of the diluted solution into each cut.

With Frill or Girdle Method

Make a single girdle through the bark completely around the tree at a convenient height. Wet the cut surface with undiluted or diluted solution.

Both of the above methods may be used successfully at any season except during periods of heavy sap flow of certain species - for example maples.

Stump Treatment

Spray or paint the cut surfaces of freshly cut stumps and stubs with undiluted Garlon 3A. The cambium area next to the bark is the most vital area to wet.

Suggested Use rates				
Application Site	Gal Product per 100 Gal Water	Gallons per Acre of Product		
		High Volume † 100-400 gal/acre Total Spray Volume	Low Volume Broadcast † † 20-100 gal/acre Total Spray Volume	Aerial Helicopter 10-30 gal/acre Total Spray Volume
	Weeds and Brush	Weeds	Brush	Brush
Utility & Pipeline Rights-of-Way	1/2-1	1/3-1 1/2	2-3	2-3 † † †
Roadsides	1/2-1	1/3-1 1/2	2-3	
Railroads	1/2-1	1/3-1 1/2	2-3	
Industrial Sites	1/2-1	1/3-1 1/2	2-3	
Forest Site Preparation	1/2-1	1/3-1 1/2	2-3	2-3 † † † †

† 1/4 to 1 gal may be tank mixed with 1/4 to 1/2 gal 2,4-D 3.8 amine or low volatile ester or Tordon 101 Mixture.

† † 1/2 - 1 gal may be tank mixed with 1/2 - 1 gal 2,4-D 3.8 lb amine or low volatile ester or Tordon 101 Mixture for weed control; or 1/2 - 1 gal Garlon 3A with 1-2 gal of the aforementioned products for brush control.

† † † 1 - 1 1/2 gal may be tank mixed with 1-2 gal 2,4-D 3.8 lb amine or low volatile ester or Tordon 101 Mixture.

† † † † 1 - 1 1/2 gal may be tank mixed with 1-2 gal of 2,4-D 3.8 lb low volatile ester or Tordon 101 Mixture.

Warranty Disclaimer

DowElanco warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. DOWELANCO MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperature, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of DowElanco or the seller. All such risks shall be assumed by Buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at DowElanco's election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used.

DowElanco shall not be liable for losses or damages resulting from handling or use of this product unless DowElanco is promptly notified of such loss or damage in writing. In no case shall DowElanco be liable for consequential or incidental damages or losses.

The terms of the "Warranty Disclaimer" above and this "Limitation of Remedies" cannot be varied by any written or verbal statements or agreements. No employee or sales agent of DowElanco or the seller is authorized to vary or exceed the terms of the "Warranty Disclaimer" or this "Limitation of Remedies" in any manner.

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DowElanco • Indianapolis, IN 46268

LABEL CODE 113-12-013
EPA APPROVAL 2/23/94 REPLACES 113-12-011

Amendments:

- 1) Revised Precautionary Statements.
- 2) General Use Precautions:
 - Added precautions for treatment of sites which are periodically wet.
 - Revised "Woody Plants Controlled" list.
- 3) Added "Approved Uses" heading in place of "Application Directions" heading.
- 4) Revised "Foliage Treatment" section.
- 5) Added section for "Low Volume Foliar (Directed Spray)" application.
- 6) Revised footnote for "Suggested Use Rates" table.
- 7) Added section for "Douglas-fir Release" in the PNW and California.
- 8) Label revised to comply with the Worker Protection Standard (WPS).
- 9) Modification of language describing allowable treatment sites adjacent to open water (see General Use Precautions section).
- 10) Added boxed referral statements to clarify Agricultural Use Requirements for agricultural and non-agricultural uses of Garlon*3A to General Use Precautions section.

Specialty Products Supplemental Labeling



DowElanco

Quad IV, 9002 Purdue Road

P.O. Box 681428

Indianapolis, Indiana 46268-1189 USA

Garlon* 3A Herbicide

EPA Reg. No. 62719-37

Revised or Additional Uses Recently Approved For Garlon 3A[†] (Approval of label amendment pending in California)

ATTENTION

- [†]This supplemental labeling contains revised or added uses for Garlon 3A recently approved by EPA which supersede those on existing labeling for Garlon 3A. Use of this labeling to supplement existing Garlon 3A labeling is suggested until such revisions appear on new containers for Garlon 3A.
- It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
 - This labeling must be in the possession of the user at the time of application.
 - Read the label affixed to the container for Garlon 3A herbicide before applying. Carefully follow all precautionary statements and applicable use directions.
 - Use of Garlon 3A according to this supplemental labeling is subject to all use precautions and limitations imposed by the label affixed to the container for Garlon 3A, except as described below.

Revised or Added Sections in the Label for Garlon 3A

Revised Wetlands Statement in "Environmental Hazards" Section

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark.

Added Statement in "General Use Precautions" Section

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs and transitional areas between upland and lowland sites. Do not apply to open water (such as lakes, reservoirs, rivers, streams, creeks, saltwater bays or estuaries) nor to water present in fresh-water wetlands, deltas, marshes, swamps, bogs or potholes, or to saltwater marshes below the mean high water mark.

Low Volume Foliar Directed Spray (New Use)

For control of susceptible woody plants, mix 4 to 5 gallons of Garlon 3A in water to make 100 gallons of spray mixture, or mix 1.5 to 3 gallons of Garlon 3A with ½ to 1 gallon of Tordon* K or 1 to 2 gallons of Tordon 101M in water to make 100 gallons of spray mixture. For best results, a surfactant should be added to all spray mixtures. When treating tall, high density brush, apply with a truck mounted spray gun and spray tips that deliver about 2 gallons per minute at 40 to 60 psi. For short, low to moderate density brush, backpack applications with spray tips that deliver 1 gallon or less of spray per minute are recommended. Apply at a volume that will wet the target brush, but minimize runoff. Resulting spray volumes will approximate 30 to 60 gallons per acre for truck mounted sprayers and 10 to 20 gallons per acre for backpack sprayers.

Broadcast Applications for Douglas Fir Release in the Pacific Northwest and California (New Use)

To release Douglas fir from susceptible competing vegetation such as broadleaf weeds, alder, blackberry or Scotch broom, apply Garlon 3A at 1½ to 2 quarts per acre alone or in combination with 4 lbs per acre of atrazine. Mix all sprays in a water carrier with a non-ionic surfactant. Applications should be made in early spring after hardwoods begin growth and before Douglas fir bud break ("early foliar" hardwood stage) or after Douglas fir seasonal growth has "hardened off" (set winter buds) in late summer, but while hardwoods are still actively growing. When treating after Douglas fir bud set, apply prior to onset of autumn coloration in hardwood foliage. Note: Treatments applied during active Douglas fir shoot growth (after spring bud break and prior to bud set), may cause injury to Douglas fir trees.

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123-12-012
Initial printing.

Approved 03/28/93

Amendments:

- 1) Labeling contains revised or additional uses recently approved for Garlon 3A.

Appendix 7.3

Specimen Label



Garlon* 4

Vegetation
Management

Specialty Herbicide

For the control of woody plants and broadleaf weeds on rights-of-way, industrial sites, non-crop areas, non-irrigation ditch banks, forests, and wildlife openings, including grazed areas on these sites

Active Ingredient:

triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester61.6%

Inert Ingredients38.4%

Acid Equivalent:

triclopyr - 44.3% - 4 lb/gal

Contains petroleum distillates

EPA Reg. No. 62719-40

EPA Est. 464-MI-1

Net Content 2.5 gal

Precautionary Statements

Keep Out of Reach of Children

Hazards to Humans and Domestic Animals

CAUTION PRECAUCION:

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

Harmful If Swallowed, Inhaled Or Absorbed Through Skin

Avoid contact with eyes, skin, or clothing. Avoid breathing mists or vapors. Avoid contamination of food.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selections chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber or Viton
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If on skin: Flush skin with plenty of water. Get medical attention if irritation persists.

If swallowed: Do not induce vomiting. Call a physician.

Physical or Chemical Hazards

Combustible - Do not use or store near heat or open flame. Do not cut or weld container.

Environmental Hazards

This pesticide is toxic to fish. Do not apply directly to water, 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.

Notice: Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" inside label booklet.**

In case of an emergency endangering health or the environment involving this product, call collect 517-636-4400.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Garlon* 4

Directions for Use

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

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about Personal Protective Equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber or Viton
- Shoes plus socks

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited.

Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Pesticide, spray mixture, or rinse water that cannot be used according to label instructions must be disposed of according to applicable Federal, state, or local procedures.

Plastic Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Metal Container Disposal: 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.

Container Disposal for Refillable Containers: Replace the dry disconnect cap, if applicable, and seal all openings which have been opened during use. Return the empty container to a collection site designated by DowElanco. If the container has been damaged and cannot be returned according to the recommended procedures, contact the DowElanco Customer Service Center at 1-800-258-1470 to obtain proper handling instructions.

General: Consult federal, state or local disposal authorities for approved alternative procedures.

General Information

Garlon 4 herbicide is recommended for the control of unwanted woody plants and annual and perennial broadleaf weeds in forests, and on non-crop areas including industrial manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides and railroads, fence rows, non-irrigation ditch banks and around farm buildings. Use on these sites may include application to grazed areas as well as establishment and maintenance of wildlife openings.

General Use Precautions

Apply this product only as specified on this label.

Be sure that use of this product conforms to all applicable regulations.

Before using any recommended tank mixtures, read the directions and all use precautions on both labels.

Chemigation: Do not apply this product through any type of irrigation system.

Do not apply Garlon 4 directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers or other desirable broadleaf plants and do not permit spray mists containing it to drift onto them.

It is permissible to treat seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs and transitional areas between upland and lowland sites. Do not apply to open water (such as lakes, reservoirs, rivers, streams, creeks, salt water bays or estuaries) nor to water present in fresh water wetlands, deltas, marshes, swamps, bogs or pot-holes, or to salt water marshes below the mean high water mark.

Avoid Injurious Spray Drift

Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants near enough to be injured. It is suggested that a continuous smoke column at or near the spray site or a smoke generator on the spray equipment be used to detect air movement, lapse conditions, or temperature inversions (stable air). If the smoke layers or indicates a potential of hazardous spray drift, do not spray.

Aerial Application (Helicopter only): For aerial application on rights-of-way or other areas near susceptible crops, use Nalco-Trol drift control additive as recommended by the manufacturer or apply through the Microfoil boom, Thruvalve boom, or equivalent drift control system. Thickened sprays prepared by using high viscosity invert systems or other drift reducing systems may be utilized if they are made as drift-free as are mixtures containing Nalco-Trol or applications made with the Microfoil boom or Thruvalve boom. If a spray thickening agent is used, follow all use recommendations and precautions on the product label. Do not use a thickening agent with the Microfoil boom, Thruvalve boom, or other systems that cannot accommodate thick sprays.

With aircraft, drift can be lessened by applying a coarse spray; by using a spray boom no longer than 3/4 the rotor length; by spraying only when wind velocities are low; or by using an approved drift control system. Keep operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used. Low pressure nozzles are available from spray equipment manufacturers. Select nozzles and pressures which provide adequate plant coverage, but minimize the production of fine spray particles.

Ground Equipment: To aid in reducing spray drift potential when making ground applications near susceptible crops or other desirable broadleaf plants, Garlon 4 Herbicide should be applied through large droplet producing equipment, such as the Radiarc Sprayer or in thickened spray mixtures using Nalco-Trol or Arborchem 38F (not currently registered in California) drift control additive, or with high viscosity invert systems such as may be formed with I'VOD or Visko-Rhap RTU inverting oils. When using a spray thickening or inverting additive, follow all use directions and precautions on the product label. With ground equipment, spray drift can be reduced by keeping the spray boom as low as possible; by applying 20 gallons or more of spray per acre; and by spraying when wind velocity is low. Do not apply with nozzles that produce a fine droplet spray. Keep operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used. Low pressure nozzles are available from spray equipment manufacturers. Select nozzles and pressures which provide adequate plant coverage, but minimize the production of fine spray particles.

High Volume Leaf-Stem Treatment: To minimize spray drift, keep sprays no higher than brush tops and keep spray pressures low enough to provide coarse spray droplets. Nalco-Trol or Arborchem 38F thickening agent or equivalent may be used to reduce spray drift.

Mistblowers: Do not apply this product using mist blowers unless a drift control additive, high viscosity inverting system, or equivalent is used to control spray drift.

Sprays applied directly to Christmas trees may result in conifer injury. When treating unwanted vegetation in Christmas tree plantations, care should be taken to direct sprays away from conifers.

Do not apply on ditches used to transport irrigation water. Do not apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result.

Grazing and Haying Restrictions

Grazing or harvesting green forage:

- 1) Lactating dairy animals
 - 2 quarts/acre or less: Do not graze or harvest green forage from treated area for 14 days after treatment.
 - Greater than 2 quarts to 6 quarts/acre: Do not graze or harvest green forage until next growing season.
- 2) Other Livestock
 - 2 quarts/acre or less: No grazing restrictions.
 - Greater than 2 quarts to 6 quarts/acre: Do not graze or harvest green forage from treated area for 14 days after treatment.
 - Note:** If less than 25% of a grazed area is treated, there is no grazing restriction.

Haying (harvesting of dried forage):

- 1) Lactating dairy animals
 - Do not harvest hay until the next growing season.
- 2) Other Livestock
 - 2 quarts/acre or less: Do not harvest hay for 7 days after treatment.
 - Greater than 2 quarts to 4 quarts/acre: Do not harvest hay for 14 days after treatment.
 - Greater than 4 quarts/acre: Do not harvest hay until next growing season.

Slaughter Restrictions:

Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter. This restriction applies to grazing during the season following treatment or hay harvested during the season following treatment.

Plants Controlled by Garlon 4

Woody Plants Controlled

alder	cherry	locust	sassafras
arrowwood	chinquapin	madrone	scotch
ash	choke cherry	maples	broom
aspen	cottonwood	mulberry	sumac
bear clover	Crataegus	oaks	sweetbay
(bearmat)	(hawthorn)	persimmon	magnolia
beech	dogwood	pine	sweetgum
birch	Douglas-fir	poison ivy	sycamore
blackberry	elderberry	poison oak	tanoak
blackgum	elm	poplar	thimbleberry
Brazilian	gorse	salmonberry	tulip poplar
pepper	hazel	salt-bush	wax-myrtle
buckthorn	hickory	(<i>Baccharis</i>	wild rose
cascara	horbeam	spp.)	willow
Ceanothus	kudzu††	salt-cedar†	winged elm

†For best control of salt-cedar, use either a basal bark or cut stump treatment.

††For complete control, retreatment may be necessary.

Annual and Perennial Broadleaf Weeds Controlled

black medic	curly dock	mustard	vetch
bull thistle	dandelion	Oxalis	wild carrot
burdock	field bindweed	plantain	(Queen Anne's
Canada thistle	goldenrod	purple	lace)
chicory	ground ivy	loosestrife	wild lettuce
clover	lambquarters	ragweed	wild violet
creeping	lespedeza	smartweed	yarrow
beggarweed	matchweed	sweet clover	

Approved Uses

Foliar Applications

Use Garlon 4 at rates of 1 to 8 quarts per acre to control broadleaf weeds and woody plants. In all cases use the amount specified in enough water to give uniform and complete coverage of the plants to be controlled. The recommended order of addition to the spray tank is water, Nalco-Trol (if used), surfactant (if used), additional herbicide (if used), Garlon 4. If surfactant is used, add 1 to 2 quarts per acre of a standard agricultural surfactant such as Tronic, Sponto 712 or Valent X-77. Use continuous adequate agitation.

Before using any recommended tank mixtures, read the directions and all precautions on both labels.

For best results applications should be made when woody plants and weeds are actively growing. When hard-to-control species such as ash, blackgum, choke cherry, elm, maples (other than vine or big leaf), oaks, pines, or winged elm are prevalent and during applications made during late summer when the plants are mature, or during drought conditions, use the higher rates of Garlon 4 alone or in combination with Tordon* 101 Mixture herbicide.

When using Garlon 4 in combination with 3.8 lb/gal 2,4-D low volatile ester herbicide generally the higher rates should be used for satisfactory brush control.

Use the higher dosage rates when brush approaches an average of 15 feet in height or when the brush covers more than 60% of the area to be treated. If lower rates are used on hard-to-control species, resprouting may occur the year following treatment.

On sites where easy to control brush species dominate, rates less than those recommended may be effective. Consult state or local extension personnel for such information.

High-Volume Leaf-Stem Treatment With Ground Equipment

Foliage Treatment

For control of woody plants, use Garlon 4 at the rate of 1 to 3 quarts in water to make 100 gallons of spray mixture, or Garlon 4 at 1 to 3 quarts may be tank mixed with 1/4 to 1/2 gallons of 3.8 lb/gal 2,4-D low volatile ester herbicide or Tordon 101 Mixture herbicides and diluted to make 100 gallons of spray. Apply at a volume of 100 to 400 gallons of total spray per acre depending on size and density of woody plants. Coverage should be thorough to wet all leaves, stems, and root collars.

Low Volume Foliar (Directed Spray)

For control of susceptible woody plants, mix 3 to 5 gallons of Garlon 4 in water to make 100 gallons of spray mixture, or mix 1 to 3 gallons of Garlon 4 with 1/2 to 1 gallon of Tordon K or 1 to 2 gallons of Tordon 101M in water to make 100 gallons of spray mixture. For best results, a surfactant should be added to all spray mixtures. When treating tall, high density brush, apply with a truck mounted spray gun and spray tips that deliver about 2 gallons per minute at 40 to 60 psi. For short, low to moderate density brush, backpack applications with spray tips that deliver 1 gallon or less of spray per minute are recommended. Apply at a volume that will wet the target brush, but minimize runoff. Resulting spray volumes will approximate 30 to 60 gallons per acre for truck mounted sprayers and 10 to 20 gallons per acre for backpack sprayers.

Broadcast Applications With Ground Equipment

Make application using equipment that will assure uniform coverage of spray volumes applied.

Woody Plant Control

Foliage Treatment: Use 4 to 8 quarts of Garlon 4 in enough water to make 20 to 100 gallons of total spray per acre, or Garlon 4 at 3 pints to 3 quarts may be combined with 1 to 2 gallons of 3.8 lb/gal 2,4-D low

volatile ester herbicide or Tordon 101 Mixture in sufficient water to make 20 to 100 gallons of total spray per acre.

Broadleaf Weed Control

Use Garlon 4 at rates of 1 to 4 quarts in a total volume of 20 to 100 gallons per acre as a water spray mixture. Apply at any time weeds are actively growing. Garlon 4 at 1/2 to 6 pints may be tank mixed with 1 to 2 quarts of 3.8 lb/gal 2,4-D amine or low-volatile ester, Tordon* K, or Tordon 101 Mixture herbicides to improve the spectrum of activity. For thickened (high viscosity) spray mixtures, Garlon 4 can be mixed with diesel oil or other invert agent. When using an inverting agent, read and follow the use directions and precautions on the product label.

Aerial Application (Helicopter Only)

Aerial sprays should be applied using suitable drift control (See "General Use Precautions").

Foliage Treatment (Utility and Pipeline Rights-of-Way)

Use 4 to 8 quarts of Garlon 4 alone, or 3 to 4 quarts Garlon 4 in a tank mix combination with 1 to 2 gallons of 3.8 lb/gal 2,4-D low volatile ester herbicide or Tordon 101 Mixture and apply in a total spray volume of 10 to 30 gallons per acre. Use the higher rates and volumes when plants are dense or under drought conditions.

Basal Bark and Dormant Brush Treatments

To control susceptible woody plants in rights-of-way, other non-crop areas, and forests, use Garlon 4 in oil or oil-water mixtures prepared and applied as described below. When preparing mixtures, use as oils either Arborchem Basal Oil, diesel fuel, No. 1 or No. 2 fuel oil, or kerosene. Substitute other oils or diluents only as recommended by the oil or diluent's manufacturer. When mixing with Arborchem Basal Oil or other oils or diluents, read and follow the use directions and precautions on the product label prepared by the oil or diluent's manufacturer.

Oil Mixture Sprays

Add Garlon 4 to the required amount of oil in the spray tank or mixing tank and mix thoroughly. If the mixture stands over 4 hours, reagitition is required.

Oil-Water Mixture Sprays

First, premix the Garlon 4, oil and surfactant in a separate container. Do not allow any water or mixtures containing water to get into the Garlon 4 or the premix. Fill the spray tank about half full with water, then slowly add the premix with continuous agitation and complete filling the tank with water. Continue moderate agitation.

Note: If the premix is put in the tank without any water, the first water added may form a thick "invert" (water in oil) emulsion which will be hard to break.

Basal Bark Treatment

To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 1 to 5 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with knapsack sprayer or power spraying equipment using low pressure (20-40 psi). Spray the basal parts of brush and tree trunks to a height of 12 to 15 inches from the ground. Thorough wetting of the indicated area is necessary for good control. Spray until runoff at the ground line is noticeable. Old or rough bark requires more spray than smooth young bark. Apply at any time, including the winter months, except when snow or water prevent spraying to the ground line.

Low Volume Basal Bark Treatment

To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Spray the basal parts of brush and tree trunks in a manner which thoroughly wets the lower stems, including the root collar area, but not to the point of runoff. Herbicide concentration should vary with size and susceptibility of species treated. Apply at any time, including the winter months,

except when snow or water prevent spraying to the ground line.

Streamline Basal Bark Treatment (Southern and Western States)

To control or suppress susceptible woody plants for conifer release, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using equipment which provides a directed straight stream spray. Apply sufficient spray to one side of stems less than 3 inches in basal diameter to form a treated zone that is 6 inches in height. When the optimum amount of spray mixture is applied, the treated zone should widen to encircle the stem within approximately 30 minutes. Treat both sides of stems which are 3 to 4 inches in basal diameter. Direct the spray at bark that is approximately 12 to 24 inches above ground. Pines (loblolly, slash, shortleaf, and Virginia) up to 2 inches in diameter breast height (dbh) can be controlled by directing the spray at a point approximately 4 feet above ground. Vary spray mixture concentration with size and susceptibility of the species being treated. Best results are achieved when applications are made to young vigorously growing stems which have not developed the thicker bark characteristic of slower growing, understory trees in older stands. This technique is not recommended for scrub and live oak species, including blackjack, turkey, post, live, bluejack and laurel oaks or bigleaf maple. Apply from approximately 6 weeks prior to hardwood leaf expansion in the spring until approximately 2 months after leaf expansion is completed. Do not apply when snow or water prevent spraying at the desired height above ground level.

Low Volume Stem Bark Band Treatment (North Central and Lake States)

To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Apply the spray in a 6 to 10-inch wide band that completely encircles the stem. Spray in a manner that completely wets the bark but not to the point of runoff. The treatment band may be positioned at any height up to the first major branch. For best results apply the band as low as possible. Spray mixture concentration should vary with size and susceptibility of species to be treated. Applications may be made at any time, including winter months.

Thinline Basal Bark Treatment

To control susceptible woody plants with stems less than 6 inches in diameter, apply undiluted Garlon 4 in a thin stream to all sides of the lower stems. The stream should be directed horizontally to apply a narrow band of Garlon 4 around each stem or clump. From 2 to 15 ml of chemical will be required for treatment of single stems and from 25 to 100 ml to treat clumps of stems. Use an applicator metered or calibrated to deliver the small amounts required.

Dormant Stem Treatment

Dormant stem treatments will control susceptible woody plants and vines with stems less than 2 inches in diameter. Plants with stems greater than 2 inches in diameter may not be controlled and resprouting may occur. This treatment method is best suited for sites with dense, small diameter brush. Dormant stem treatments of Garlon 4 can also be used as a chemical side-trim for controlling lateral branches of larger trees that encroach onto roadside, utility, or other rights-of-way.

Mix 4 to 8 quarts of Garlon 4 in 2 to 3 gallons of crop oil concentrate or other recommended oil and add this mixture to enough water to make 100 gallons of spray solution. Use continuous adequate agitation. Apply with Radiarc, OC nozzles, or handgun using 70 to 100 gallons of spray per acre to ensure uniform coverage of stems. Garlon 4 may be mixed with 4 quarts of Weedone 170 to improve the control of black cherry and broaden the spectrum of herbicidal activity. Apply anytime within 10 weeks of budbreak, generally February through April. Do not apply to wet or saturated bark as poor control may result.

Cut Stump Treatment

To control resprouting of cut stumps of susceptible species, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mix-

ture. Apply with a backpack or knapsack sprayer using low pressures and a solid cone or flat fan nozzle. Spray the root collar area, sides of the stump, and the outer portion of the cut surface including the cambium until thoroughly wet, but not to the point of runoff. Spray mixture concentration should vary with size and susceptibility of species treated. Apply at any time, including in winter months, except when snow or water prevent spraying to the ground line.

Treatment of Cut Stumps in Western States:

To control resprouting of salt-cedar and other *Tamarix* species, bigleaf maple, tanoak, Oregon myrtle and other susceptible species, apply undiluted Garlon 4 to wet the area adjacent to the cambium and bark around the entire circumference of cut stumps. Treatments may be applied throughout the year; however, control may be reduced with treatment during periods of moisture stress as in late summer. Use an applicator which can be calibrated to deliver the small amounts of material required.

Note: All basal bark and dormant brush treatment methods may be used to treat susceptible woody species on range and permanent pasture land provided that no more than 1.5 quarts of Garlon 4 are applied per acre. Large plants or species requiring higher rates of Garlon 4 may not be completely controlled.

Forest Management Applications

General: For broadcast applications apply the recommended rate of Garlon 4 Herbicide in a total spray volume of 5 to 25 gallons per acre by air or 10 to 100 gallons per acre by ground. Use spray volumes sufficient to provide thorough coverage of treated foliage. Use application systems designed to prevent spray drift to off-target sites. Nozzles or additives that produce larger droplets may require higher spray volumes to provide adequate coverage.

Broadcast Treatments for Forest Site Preparation (not for conifer release)

Southern States Including Alabama, Arkansas, Delaware, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia: To control susceptible woody plants and broadleaf weeds, apply Garlon 4 Herbicide at a rate of 4 to 8 quarts per acre. To broaden the spectrum of woody plants and broadleaf weeds controlled, apply 2 to 4 quarts per acre of Garlon 4 Herbicide in tank mix combination with 6 to 8 quarts per acre of Tordon® 101 Mixture or 2 to 2 1/2 quarts per acre of Tordon® K Herbicide. Where grass control is also desired, Garlon 4 Herbicide, alone or in combination with Tordon K Herbicide or Tordon 101 Mixture, may be tank mixed with 1 to 4 quarts per acre of Accord or Roundup herbicide, or 8 to 16 fluid ounces per acre of Arsenal Applicator's Concentrated herbicide. Susceptible woody plants, broadleaf weeds and grasses may also be controlled using a tank mix of 2 to 4 quarts per acre of Garlon 4 Herbicide and 16 to 24 fluid ounces of Arsenal Applicator's Concentrate. When applying tank mixes, follow use directions and precautions on each product label.

In Western, Northeastern, North Central and Lake States (States not listed above as southern states): To control susceptible woody plants and broadleaf weeds, apply Garlon 4 Herbicide at a rate of 3 to 6 quarts per acre. To broaden the spectrum of woody plants and broadleaf weeds controlled, apply 1.5 to 3 quarts per acre of Garlon 4 Herbicide in tank mix combination with 4 to 8 quarts of Tordon 101 Mixture, 2 quarts per acre of Tordon K Herbicide, or 1 to 2 gallons per acre of 3.8 lb/gal 2,4-D low volatile ester. Where grass control is also desired, Garlon 4 Herbicide, alone or in tank mix combination with Tordon 101 Mixture or Tordon K Herbicide, may be applied with 1 to 3 quarts per acre of Accord or Roundup herbicide, 2 to 4 ounces per acre of Oust, a combination of Accord (or Roundup) plus Oust at the rates listed, or 8 to 16 fluid ounces of Arsenal Applicator's Concentrate. When applying tank mixes, follow the use directions and precautions on each product label.

Note: Conifers planted sooner than one month after treatment with Garlon 4 at less than 1 gallon per acre or sooner than two months after treatment at 1 to 2 gallons per acre may be injured. When tank mixtures of herbicides are used for forest site preparation, labels for all products in the mixture should be consulted and the longest recommended waiting period observed.

Directed Spray Applications for Conifer Release

To release conifers from competing hardwoods such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, hickory, alder, birch, aspen, and pin cherry, mix 1 to 5 gallons of Garlon 4 in enough water to make 100 gallons of spray mixture. This spray should be directed onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after the hardwoods have reached full leaf size, but before autumn coloration. The majority of treated hardwoods should be less than 6 feet in height to ensure adequate spray coverage. Care should be taken to direct spray solutions away from conifer foliage, particularly foliage of desirable pines.

Note: Sprays may cause temporary damage and growth suppression where contact with conifers occurs; however, injured conifers should recover and grow normally. Over-the-top spray applications can kill pines.

Broadcast Applications for Conifer Release in the Pacific Northwest and California

On Dormant Conifers Before Bud Swell (Excluding Pines): To control or suppress deciduous hardwoods such as vine maple, bigleaf maple, alder or willow before leaf-out or evergreen hardwoods such as madrone, chinquapin, and *Ceanothus* spp., use Garlon 4 at 1 to 2 qt per acre. Diesel or fuel oil carrier may be used especially on deciduous hardwood species. On evergreen hardwoods, water carrier with 1 to 2 gallons of diesel oil per acre or a suitable surfactant or oil substitute at manufacturer's recommended rates are equally effective.

On Conifer Plantations (Excluding Pines) After Hardwoods Begin Growth and Before Conifer Bud Break ("Early Foliar" Hardwood Stage): Use Garlon 4 at 1 to 1.5 qt alone or with 3.8 lb/gal 2,4-D low volatile ester herbicide in water carrier to provide no more than 3 lb acid equivalent per acre from both products. After conifer bud break, these sprays may cause more serious injury to the crop trees. Added surfactant may cause unacceptable injury to conifers especially after bud break.

On Conifer Plantations (Excluding Pines) After Conifers Harden Off In Late Summer and While Hardwoods Are Still Growing Actively: Use Garlon 4 at rates of 1 to 1.5 qt per acre alone or plus 3.8 lb/gal 2,4-D low volatile ester herbicide to provide no more than 3 lb acid equivalent per acre from both products. Treat as soon after conifer bud hardening as possible so that hardwoods are actively growing. Added oil, oil substitute or surfactant may cause unacceptable injury to the conifers.

Note: Sprays may cause discolored needles and temporary growth suppression of some conifers, but they should recover and grow normally.

Broadcast Applications for Conifer Release in the Eastern United States

To release spruce, fir, red pine and white pine from competing hardwoods such as red maple, sugar maple, striped maple, alder, birch (white, yellow, and grey), aspen, ash, pin cherry, and *Rubus* spp. and perennial and annual broadleaf weeds, use Garlon 4 at rates of 1.5 to 3 quarts per acre alone or plus 3.8 lb/gal 2,4-D amine or low-volatile ester herbicides to provide no more than 4 pounds acid equivalent per acre from both products. Applications should be made in late summer or early fall after conifers have formed their overwintering buds and hardwoods are in full leaf and prior to autumn coloration.

Note: Sprays may cause discolored needles and temporary growth suppression of some conifers, but they should recover and grow normally.

Broadcast Applications for Conifer Release in the Lake States Region

To release spruce, fir and red pine from competing hardwoods such as aspen, birch, maple, cherry, willow, oak, hazel, and *Rubus* spp. and perennial and annual broadleaf weeds, use Garlon 4 at rates of 1.5 to 3 quarts per acre. Applications should be made in late summer or early fall after conifers have formed their overwintering buds and hardwoods are in full leaf and prior to autumn coloration.

Spot Treatment to Control Clumps of Resprouting Hardwoods Such as Big Leaf Maple Using a Hovering Helicopter in Forests

Stem Treatment Before Leaf-Out: Mix 1 to 2 gallons of Garlon 4 with about 20 gallons diesel oil and enough water to make 100 gallons of solution. Apply as an invert emulsion by means of a hovering helicopter equipped with a nozzle system to direct sufficient spray to cover the stems to the ground line of the sprouted trees, usually 3/4 to 1 1/2 gallon per clump.

Note: Conifers contacted by this spray may be seriously injured; in existing plantations, drift control systems, such as invert emulsions, should be used to minimize injury to adjacent conifers. A dye or other marking system to designate treated trees may be used.

Warranty Disclaimer

DowElanco warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. DOWELANCO MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperature, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of DowElanco or the seller. All such risks shall be assumed by Buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at DowElanco's election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used.

DowElanco shall not be liable for losses or damages resulting from handling or use of this product unless DowElanco is promptly notified of such loss or damage in writing. In no case shall DowElanco be liable for consequential or incidental damages or losses.

The terms of the "Warranty Disclaimer" above and this "Limitation of Remedies" cannot be varied by any written or verbal statements or agreements. No employee or sales agent of DowElanco or the seller is authorized to vary or exceed the terms of the "Warranty Disclaimer" or this "Limitation of Remedies" in any manner.

* Trademark of DowElanco
DowElanco • Indianapolis, IN 46268

LABEL CODE 113-12-009
EPA APPROVAL 3/22/93 REPLACES 113-12-006

Amendments:

- 1) Revised Environmental Hazard statements.
- 2) General Use Precautions:
 - Added precautions for treatment of sites which are periodically wet.
 - Added application precautions for use around Christmas trees
 - Revised "Woody Plants Controlled" list.
- 3) Added "Approved Uses" heading in place of "Application Directions" heading.
- 4) Revised "Foliage Treatment" section.
- 5) Added section for "Low Volume Foliar (Directed Spray)" application.
- 6) Revised "Basal Bark Treatment" section.
- 7) Added "Western States" to Streamline Basal Bark Treatment section. Added bigleaf maple to list of species for which this treatment is not recommended.
- 8) Added "Low Volume Stem Bark Band Treatment (North Central and Lake States)" section.
- 9) Revised "Dormant Stem Treatment" section.
- 10) Revised "Treatment of Cut Stumps in Western States" section.
- 11) Label revised to Comply with the Worker Protection Standard (WPS).

Specialty Products Supplemental Labeling



DowElanco

Quad IV, 9002 Purdue Road

P.O. Box 681428

Indianapolis, Indiana 46268-1189 USA

Garlon* 4 Herbicide

EPA Reg. No. 62719-40

Revised or Additional Uses Recently Approved For Garlon 4† (Not for Distribution or Use in California)

ATTENTION

- †This supplemental labeling contains revised or added uses for Garlon 4 recently approved by EPA which supersede those on existing labeling for Garlon 4. Use of this labeling to supplement existing Garlon 4 labeling is suggested until such revisions appear on new containers for Garlon 4.
- It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
 - This labeling must be in the possession of the user at the time of application.
 - Read the label affixed to the container for Garlon 4 herbicide before applying. Carefully follow all precautionary statements and applicable use directions.
 - Use of Garlon 4 according to this supplemental labeling is subject to all use precautions and limitations imposed by the label affixed to the container for Garlon 4, except as described below.

Revised or Additional Sections Within Directions For Use For Garlon 4

Revised Wetlands Statement In "Environmental Hazards" Section

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark.

Added Statement In "General Use Precautions" Section

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs and transitional areas between upland and lowland sites. Do not apply to open water (such as lakes, reservoirs, rivers, streams, creeks, salt water bays or estuaries) nor to water present in fresh water wetlands, deltas, marshes, swamps, bogs or potholes, or to salt water marshes below the mean high water mark.

Low Volume Follar Directed Spray (New Use)

For control of susceptible woody plants, mix 3 to 5 gallons of Garlon 4 in water to make 100 gallons of spray mixture, or mix 1 to 3 gallons of Garlon 4 with 1/2 to 1 gallon of Tordon K or 1 to 2 gallons of Tordon 101M in water to make 100 gallons of spray mixture. For best results, a surfactant should be added to all spray mixtures. When treating tall, high density brush, apply with a truck mounted spray gun and spray tips that deliver about 2 gallons per minute at 40 to 60 psi. For short, low to moderate density brush, backpack applications with spray tips that deliver 1 gallon or less of spray per minute are recommended. Apply at a volume that will wet the target brush, but minimize runoff. Resulting spray volumes will approximate 30 to 60 gallons per acre for truck mounted sprayers and 10 to 20 gallons per acre for backpack sprayers.

Low Volume Stem Bark Band Treatment (New Use) In North Central and Lake States

To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Apply the spray in a 6 to 10-inch wide band that completely encircles the stem. Spray in a manner that completely wets the bark but not to the point of runoff. The treatment band may be positioned at any height up to the first major branch. For best results apply the band as low as possible. Spray mixture concentration should vary with size and susceptibility of species to be treated. Applications may be made at any time, including winter months.

(continued on back)

Dormant Stem Treatment (Revised Use Directions)

Dormant stem treatments will control susceptible woody plants and vines with stems less than 2 inches in diameter. Plants with stems greater than 2 inches in diameter may not be controlled and resprouting may occur. This treatment method is best suited for sites with dense, small diameter brush. Dormant stem treatments of Garlon 4 can also be used as a chemical side-trim for controlling lateral branches of larger trees that encroach onto roadside, utility, or other rights-of-way.

Mix 4 to 8 quarts of Garlon 4 in 2 to 3 gallons of crop oil concentrate or other recommended oil and add this mixture to enough water to make 100 gallons of spray solution. Use continuous adequate agitation. Apply with Radiarc, OC nozzles, or handgun using 70 to 100 gallons of spray per acre to ensure uniform coverage of stems. Garlon 4 may be mixed with 4 quarts of Weedone 170 to improve the control of black cherry and broaden the spectrum of herbicidal activity. Apply anytime within 10 weeks of budbreak, generally February through April. Do not apply to wet or saturated bark as poor control may result.

*Trademark of DowElanco

123-12-010 Approved 03/22/93
Initial printing.

Amendments:

1) Labeling contains revised or additional uses recently approved for Garlon 4.

Appendix 7.4

This sample label is current as of December 1, 1992. The product descriptions and recommendations provided in this sample label are for background information only. Always refer to the label on the product container before using Monsanto or any other agricultural product.



Complete Directions for Use in Forestry and Utility Rights-of-Way

EPA Reg. No. 524-326

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, EXPOSED NONWOODY ROOTS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

*Accord is a registered trademark of Monsanto Company.

1993-1 892.65-000.32/CG

Read the entire label before using this product.

Use only according to label instructions.

Read "LIMIT OF WARRANTY AND LIABILITY" before buying or using. If terms are not acceptable, return at once unopened.

REFORMULATION IS PROHIBITED. SEE CONTAINER LABEL FOR REPACKAGING LIMITATIONS.

LIMIT OF WARRANTY AND LIABILITY

This Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the Complete Directions for Use label booklet ("Directions") when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this Company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

Buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this Company, including, but not limited to, incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather, weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied, as well as weather conditions which are outside the application ranges set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF THE LIABILITY OF THIS COMPANY OR ANY OTHER SELLER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE) SHALL BE THE PURCHASE PRICE PAID BY THE USER OR

BUYER FOR THE QUANTITY OF THIS PRODUCT INVOLVED, OR, AT THE ELECTION OF THIS COMPANY OR ANY OTHER SELLER, THE REPLACEMENT OF SUCH QUANTITY OR, IF NOT ACQUIRED BY PURCHASE, REPLACEMENT OF SUCH QUANTITY. IN NO EVENT SHALL THIS COMPANY OR ANY OTHER SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES.

Buyer and all users are deemed to have accepted the terms of this LIMIT OF WARRANTY AND LIABILITY which may not be varied by any verbal or written agreement.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Keep out of reach of children.

CAUTION!

MAY CAUSE EYE IRRITATION.

Avoid contact with eyes, skin or clothing.

Wash thoroughly with soap and water after handling.

FIRST AID: IF IN EYES, flush with plenty of water for at least 15 minutes. Get medical attention.

IF ON SKIN, flush with water. Wash clothing before reuse.

In case of an emergency involving this product,
Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Do not contaminate water when disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

In case of:

SPILL or LEAK, soak up and remove to a landfill.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied only in stainless steel, aluminum, fiberglass, plastic and plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

ACTIVE INGREDIENT:

*Glyphosate, N-(phosphonomethyl)glycine,
in the form of its isopropylamine salt41.5%

INERT INGREDIENTS:.....58.5%
100.0%

*Contains 480 grams per litre or 4 pounds per U.S. gallon of glyphosate, N-(phosphonomethyl)glycine, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

STORAGE:

STORE ABOVE 10° F (-12° C) TO KEEP PRODUCT FROM CRYSTALLIZING.

Crystals will settle to the bottom. If allowed to crystallize, place in a warm room 68° F (20° C) for several days to redissolve and roll or shake container or recirculate in multi-bulk containers to mix well before using. For bulk containers, see container label.

DISPOSAL:

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

(See the individual container labels for disposal information)

GENERAL INFORMATION

This product, a water soluble liquid, mixes readily with water and surfactant to be applied as a foliar spray for the control or destruction of most herbaceous and woody plants.

This product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most herbaceous weeds occur within 7 days but on most woody plants may not occur for 30 days or more.

After any site disturbance, such as logging, mechanical brush removal or mowing, allow stump sprouts, resprouts and foliar regrowth from woody brush and perennial herbaceous weeds sufficient time to regrow before treatment.

Always use the higher recommended rates of this product and surfactant when treating dense, multicanopied sites of woody vegetation or difficult-to-control woody and herbaceous plants.

Reduced control may result when woody brush, trees and herbaceous weeds are treated under poor growing conditions caused by drought, disease or insect damage. Reduced control may result if the foliage of undesirable vegetation is covered with dust at the time of treatment.

Rainfall occurring within 6 hours after application may reduce effectiveness. Heavy rainfall within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of mixtures of this product with herbicides or other materials that are not expressly recommended in this label. Mixing this product with herbicides or other materials not recommended on this label may result in reduced performance.

FORESTRY SITE PREPARATION AND UTILITY RIGHTS-OF-WAY

This product is recommended for the control or partial control of woody brush, trees and herbaceous weeds. This product is labeled for use in forestry and utility sites. This product is recommended for use in preparing or establishing wildlife openings within these sites and maintaining logging roads, and for side trimming along utility rights-of-way.

In forestry, this product is recommended for use in site preparation prior to planting any tree species, including Christmas trees and silvicultural nursery sites.

In utilities, this product is recommended for use along electrical power, pipeline, and telephone rights-of-way, and in other utility sites associated with these rights-of-way, such as substations.

APPLICATION RATES AND TIMING

APPLICATION	ACCORD*	SPRAY VOLUME GAL/A
BROADCAST		
Aerial	2 to 10 qts/a	5 to 30
Ground	2 to 10 qts/a	10 to 60
SPRAY-TO-WET		
Handgun, Backpack, Mistblower	3/4 to 2% by volume	spray-to-wet
LOW VOLUME DIRECTED SPRAY		
Handgun, Backpack, Mistblower	5% to 10% by volume	partial coverage*

For low volume directed spray applications, coverage should be uniform with at least 50% of the foliage contacted. Coverage in the top one-half of the plant is important for best results.

In forestry site preparation and utility rights-of-way applications, this product requires use with a nonionic surfactant. Use a nonionic surfactant with greater than 50 percent active ingredient and labeled for use with herbicides. Use of this product without surfactant will result in reduced performance. See the "MIXING AND APPLICATION INSTRUCTION" section of this label for more information.

Mix 2 or more quarts of the nonionic surfactant per 100 gallons of spray solution (0.5 percent or more by spray volume). Use of surfactant concentrations greater than 1.5 percent by spray volume with handgun applications or 2.5 percent by spray volume with broadcast applications is not recommended.

Use higher rates of this product within the recommended range for control or partial control of woody brush, trees and hard-to-control perennial herbaceous weeds. For best results, apply to actively growing woody brush and trees after full leaf expansion and before fall color and leaf drop. Increase rates within the recommended range for control of perennial herbaceous weeds any time after emergence and before seedheads, flowers or berries appear.

Use the lower rates of this product within the recommended range for control of annual herbaceous weeds and actively growing perennial herbaceous weeds after seedheads, flowers or berries appear. Apply to the foliage of actively growing annual herbaceous weeds any time after emergence.

This product has no herbicidal or residual activity in the soil. Where repeat applications are necessary, do not exceed 10.6 quarts of this product per acre per year.

TANK MIXTURES

Tank mixtures of this product may be used to increase the spectrum of vegetation controlled. When tank mixing, read and carefully observe the label claims, cautionary statements and all information on the labels of both products used. Use according to the most restrictive label directions for each product in the mixture. Any recommended rate of this product may be used in a tank mix.

NOTE: For forestry site preparation, make sure the tank mix product is approved for use prior to planting the desired species. Observe planting interval restrictions. For side trimming treatments in utility rights-of-way, tank mixtures with Arsenal 2WSL are not recommended. For side trimming treatments, it is recommended that this product be used alone as recommended, or as a tank mixture with Garlon 4.

PRODUCT	BROADCAST RATE	USE SITE
Arsenal Applicators Concentrate	2 to 16 fluid ounces per acre	Forestry site preparation
Oust	1 to 4 ounces per acre	Forestry site preparation
Garlon 3A*, Garlon 4	1 to 4 quarts per acre	Forestry site preparation, Utility sites
Arsenal 2WSL	2 to 32 fluid ounces per acre	Utility sites

PRODUCT	SPRAY-TO-WET RATES	USE SITE
Arsenal Applicators Concentrate	1/32 % to 1/2 % by volume	Forestry site preparation
Arsenal 2WSL	1/32 % to 1/2 % by volume	Utility sites

PRODUCT	LOW VOLUME DIRECTED SPRAY RATES	USE SITES
Arsenal Applicators Concentrate	1/8% to 1/2% by volume	Forestry site preparation
Arsenal 2WSL	1/8% to 1/2% by volume	Utility sites

* Insure that Garlon 3A is thoroughly mixed with water according to label directions before adding this product. Have spray mixture agitating at the time this product is added to avoid spray compatibility problems.

For control of herbaceous weeds, use the lower recommended tank mixture rates. For control of dense stands or tough-to-control woody brush and trees, use the higher recommended rates.

*Arsenal is a trademark of American Cyanamid Company.

*Oust is a trademark of E. I. du Pont de Nemours and Company.

*Garlon is a trademark of DowElanco Products Company.

FORESTRY CONIFER AND HARDWOOD RELEASE

DIRECTED SPRAY

In forestry conifer and hardwood sites, including Christmas tree plantations and silvicultural nurseries, use a 2 percent spray solution for the control of undesirable woody brush and trees. To control herbaceous weeds, use a 1 to 2 percent solution. Avoid contact of spray, drift or mist with foliage, green bark or non-woody surface roots of desirable species.

Mix 2 to 6 quarts of a nonionic surfactant per 100 gallons of spray solution (0.5 to 1.5 percent by spray volume). Use a surfactant with greater than 50 percent active ingredient.

BROADCAST SPRAY

Except where specifically recommended below, use only where conifers have been established for more than one year.

APPLICATION MUST BE MADE AFTER FORMATION OF FINAL CONIFER RESTING BUDS IN THE FALL OR PRIOR TO INITIAL BUD SWELLING IN THE SPRING.

Injury may occur to conifers treated for release, especially where spray patterns overlap or the higher rates are applied. Damage can be accentuated if applications are made when conifers are actively growing, or are under stress from drought, flood water, insects or diseases.

This product may require use with a surfactant. Unless otherwise recommended in this section of this label, use Entry™ II surfactant at 10 to 30 fluid ounces per acre. Follow the instructions under the "Mixing" portion of the "MIXING AND APPLICATION INSTRUCTIONS" section of this label.

For release of the following conifer species, outside the southeastern United States:

Douglas fir	Pines*
<i>Pseudotsuga menziesii</i>	<i>Pinus spp.</i>
Fir	Redwood, California
<i>Abies spp.</i>	<i>Sequoia spp.</i>
Hemlock**	Spruce
<i>Tsuga spp.</i>	<i>Picea spp.</i>

*Includes all species except loblolly pine, longleaf pine, shortleaf pine or slash pine.

**Use of a surfactant is not recommended for release of hemlock species or California redwood. In mixed conifer stands, injury to these species may result if a surfactant is used.

Apply 1 to 2 quarts of this product per acre as a broadcast spray.

NOTE: For release of Douglas fir with this product or recommended tank mixtures of this product, Entry II or a nonionic surfactant recommended for over-the-top foliar sprays may be used. To avoid possible conifer injury, Entry II rates should not exceed 20 fluid ounces per acre at elevations above 1500 feet, or 10 fluid ounces per acre in the coastal range or at elevations below 1500 feet in Washington and Oregon. Nonionic surfactants may be used at 2 fluid ounces per acre at elevations above 1500 feet, or 1 fluid ounce per acre in the coastal range or at elevations below 1500 feet. Use of surfactant rates exceeding those listed above may result in unacceptable conifer injury and are not recommended. Insure that the nonionic surfactant has been adequately tested for Douglas fir safety before use.

In Maine, up to 3 quarts per acre of this product may be used for the control of difficult species.

OUST TANK MIXTURES - To release jack pine, red pine, white pine, and white spruce, apply 1 to 2 quarts of this product with 1 to 3 ounces of Oust™ per acre. Make applications to actively growing weeds as a broadcast spray over the top of established conifers. Applications at these rates should be made after formation of conifer resting buds in the late summer or fall.

ARSENAL APPLICATORS CONCENTRATE TANK MIXTURES - This product may be tank mixed with Arsenal Applicators Concentrate for release of Douglas fir. Use 1 to 1½ quarts of this product tank mixed with 2 to 6 fluid ounces of Arsenal per acre.

For release of the following conifer species in the south-eastern United States:

Loblolly pine <i>Pinus taeda</i>	Slash pine <i>Pinus elliotii</i>
Eastern white pine <i>Pinus strobus</i>	Virginia pine <i>Pinus virginiana</i>
Shortleaf pine <i>Pinus echinata</i>	

Apply 1.5 to 2.5 quarts of this product per acre as a broadcast spray during late summer or early fall after the conifers have hardened off.

ARSENAL APPLICATORS CONCENTRATE TANK MIXTURES - Apply 1 to 2 quarts of this product with 2 to 16 fluid ounces of Arsenal Applicators Concentrate per acre as a broadcast spray for conifer release. Use only on conifer species that are labeled for over-the-top sprays for both products. Use the higher recommended rates for dense, tough-to-control woody brush and trees.

Read and carefully observe the label claims, cautionary statements and all information on the labels of each product used in these tank mixtures. Use according to the most restrictive label directions for each product in the mixture.

*Dust is a trademark of E. I. du Pont de Nemours and Company.

*Entry is a trademark of Monsanto Company.

HERBACEOUS RELEASE

When applied as directed, this product plus listed residual herbicides provides postemergence control of the annual weeds and control or suppression of the perennial weeds listed in this label, and residual control of the weeds listed in the residual herbicide label. Make applications to actively growing weeds as a broadcast spray over the top of labeled conifers.

Oust tank mixtures - To release loblolly pines, apply 16 to 24 fluid ounces of this product, plus 2 to 4 ounces of Oust per acre.

To release slash pines, apply 12 to 16 fluid ounces of this product, plus 2 to 4 ounces of Oust per acre.

Mix up to 6 fluid ounces per acre of Entry II with the recommended rate of this product plus Oust. Applications can be made over newly planted pines after the emergence of herbaceous weeds in the spring or early summer. Best results are obtained from applications made in May and June.

Weed control may be reduced if water volumes exceed 25 gallons per acre for these treatments.

Atrazine tank mixtures - To release Douglas fir, apply 1 quart of this product, plus 4 pounds a.i. of atrazine per acre. Apply only over Douglas fir that has been established for at least one full growing season. Apply in the early Spring, usually mid-March through early April. Injury will occur if applications are made after bud swell in the Spring. Do not add surfactant to this mix for this use.

Always read and follow the manufacturer's label recommendations for all herbicide and surfactants used.

WETLAND SITES

This product may be used in and around water and wetlands found in forestry and in power, telephone and pipeline rights-of-way sites, including where these sites are adjacent to and surrounding domestic water supply reservoirs, supply streams, lakes and ponds. Read and observe the following before making applications in and around water.

Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat in such areas.

There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.

Do not apply this product directly to water within 1/2 mile upstream of a potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of a potable water intake in a standing body of water such as a lake, pond or reservoir. This restriction does not apply to terrestrial applications made adjacent to potable water intakes.

Do not spray open bodies of water where woody brush, trees and herbaceous weeds do not exist. The maximum application rate of 5 quarts per acre must not be exceeded in a single application.

MIXING AND APPLICATION INSTRUCTIONS

APPLY THESE SPRAY SOLUTIONS IN PROPERLY MAINTAINED AND CALIBRATED EQUIPMENT CAPABLE OF DELIVERING DESIRED VOLUMES. HANDGUN APPLICATIONS SHOULD BE PROPERLY DIRECTED TO AVOID SPRAYING DESIRABLE PLANTS. NOTE: REDUCED RESULTS MAY OCCUR IF WATER CONTAINING SOIL IS USED, such as WATER FROM PONDS AND UNLINED DITCHES.

MIXING

This product mixes readily with water. Mix spray solutions of this product as follows: Fill the mixing or spray tank with the required amount of water while adding the required amount of this product (see the "DIRECTIONS FOR USE" and "WEEDS CONTROLLED" sections of this label). For tank mixtures, add the tank mix product before adding this product. If tank mixing with Garlon 3A, insure that the Garlon 3A is well mixed with at least 75% of the total spray volume before adding this product to avoid incompatibility. Near the end of the filling process, add the required surfactant and mix well. Maintain an air break between the filling hose and the spray solution and remove the hose from the tank immediately after filling to avoid siphoning back into the water source. During mixing and application, foaming of the spray solution may occur. To prevent or minimize foam, avoid the use of mechanical agitators, terminate by-pass and return lines at the bottom of the tank and, if needed, use an approved antifoam or defoaming agent.

APPLICATION EQUIPMENT AND TECHNIQUES

ATTENTION

AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Do not allow the herbicide solution to mist, drip, drift, or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants, or other areas on which treatment was not intended. The likelihood of plant or crop injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. AVOID APPLYING AT EXCESSIVE SPEED OR PRESSURE.

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences. When not in use, keep container closed to prevent spills and contamination.

AERIAL EQUIPMENT

This product is recommended for application by helicopter only in forestry sites and utility rights-of-way. Use the recommended rates of this product and surfactant in 5 to 30 gallons of spray solution per acre as a broadcast spray. (THIS PRODUCT PLUS OUST TANK MIXTURES MAY NOT BE APPLIED BY AIR IN CALIFORNIA).

IN CALIFORNIA, AERIAL APPLICATION MAY ONLY BE MADE IN NONRESIDENTIAL, FORESTRY SITES AND CHAPARRAL AREAS.

AVOID DRIFT - DO NOT APPLY DURING INVERSION CONDITION, WHEN WINDS ARE GUSTY, OR UNDER ANY OTHER CONDITION WHICH WILL ALLOW DRIFT; DRIFT MAY CAUSE DAMAGE TO ANY VEGETATION CONTACTED TO WHICH TREATMENT IS NOT INTENDED. TO PREVENT INJURY TO ADJACENT DESIRABLE VEGETATION, APPROPRIATE BUFFER ZONES MUST BE MAINTAINED.

Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations which dispense spray as fine droplets.

Drift control additives may be used for forestry site preparation and utility rights-of-way applications. When a drift control additive is used, read and carefully observe the cautionary statements and all other information appearing on the additive label. The use of a drift control agent for conifer and herbaceous release applications may result in conifer injury and is not recommended.

Thoroughly wash aircraft, especially landing gear, after each day of spraying to remove residues of this product accumulated during spraying or from spills. PROLONGED EXPOSURE OF THIS PRODUCT TO UNCOATED STEEL SURFACES MAY RESULT IN CORROSION AND POSSIBLE FAILURE OF THE PART. LANDING GEAR ARE MOST SUSCEPTIBLE. The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion.

GROUND BROADCAST EQUIPMENT

This product is recommended for broadcast applications using suitable ground equipment in forestry sites, utility sites and utility rights-of-way. Use the recommended rates of this product plus surfactant in 10 to 60 gallons of clean water per acre as a broadcast spray. Check for even spray distribution throughout the spray pattern.

BACKPACK, HANDGUN OR MISTBLOWER EQUIPMENT

This product is recommended for application through backpack, handgun or hand-held mistblower equipment. For spray-to-wet applications, coverage should be uniform and complete, but not to the point of runoff.

This product can be used for low volume directed sprays for spot treatment of trees and brush. It is most effective in areas where there is a low density of undesirable trees or brush. If a straight stream nozzle is used, start the application at the top of the targeted vegetation and spray from top to bottom in a lateral zig-zag motion. For flat fan and cone nozzles and with mist blowers, mist the application over the foliage of the targeted vegetation. Small, open branched trees need only be treated from one side. If the foliage is thick or there are multiple root sprouts, applications must be made from several sides to ensure adequate spray coverage.

It is suggested that the recommended amount of this product and surfactant be mixed in a larger container and then added to the sprayer.

WEEDS CONTROLLED

When applied as recommended under the conditions described, this product CONTROLS, PARTIALLY CONTROLS or SUPPRESSES most woody brush, trees and herbaceous weeds, some of which are listed below.

WOODY BRUSH AND TREES

Alder <i>Alnus spp.</i>	Eucalyptus, bluegum <i>Eucalyptus globulus</i>
Ash <i>Fraxinus spp.</i>	Hasardia <i>Haplopappus squamosus</i>
Aspen, quaking <i>Populus tremuloides</i>	Hawthorn <i>Crataegus spp.</i>
Bearmat (Bearclover) <i>Chamaebatia foliolosa</i>	Hazel <i>Corylus spp.</i>
Beech <i>Fagus grandifolia</i>	Hickory <i>Carya spp.</i>
Birch <i>Betula spp.</i>	Holly, Florida; Brazilian Peppertree <i>Schinus terebinthifolius</i>
Blackberry <i>Rubus spp.</i>	Honeysuckle <i>Lonicera spp.</i>
Blackgum <i>Nyssa spp.</i>	Hornbeam, American <i>Carpinus caroliniana</i>
Bracken <i>Pteridium spp.</i>	Kudzu <i>Pueraria lobata</i>
Broom: French <i>Cytisus monspessulanus</i>	Locust, black <i>Robinia pseudoacacia</i>
Scotch <i>Cytisus scoparius</i>	Madrone <i>Arbutus menziesii</i>
Buckwheat, California <i>Eriogonum fasciculatum</i>	Manzanita <i>Arctostaphylos spp.</i>
Jascara <i>Rhamnus purshiana</i>	Maple <i>Acer spp.</i>
Catsclaw <i>Acacia greggi</i>	Monkey Flower <i>Mimulus guttatus</i>
Ceanothus <i>Ceanothus spp.</i>	Oak: <i>Quercus spp.</i>
Chamise <i>Adenostoma fasciculatum</i>	Persimmon <i>Diospyros spp.</i>
Cherry: Bitter <i>Prunus emarginata</i>	Pine <i>Pinus spp.</i>
Black <i>Prunus serotina</i>	Poison Ivy <i>Rhus radicans</i>
Pin <i>Prunus pensylvanica</i>	Poison Oak <i>Rhus toxicodendron</i>
Coyote brush <i>Baccharis consanguinea</i>	Poplar, yellow <i>Liriodendron tulipifera</i>
Creeper, Virginia <i>Parthenocissus quinquefolia</i>	Prunus <i>Prunus spp.</i>
Dewberry <i>Rubus trivialis</i>	Raspberry <i>Rubus spp.</i>
Dogwood <i>Cornus spp.</i>	Redbud, eastern <i>Cercis canadensis</i>
Elderberry <i>Sambucus spp.</i>	Rose, multiflora <i>Rosa multiflora</i>
Elm <i>Ulmus spp.</i>	Sage, black <i>Salvia mellifera</i>

Sagebrush, California <i>Artemisia californica</i>	Tallowtree, Chinese <i>Sapium sebiferum</i>
Salmonberry <i>Rubus spectabilis</i>	Tan Oak <i>Lithocarpus densiflorus</i>
Saltbush, Sea myrtle <i>Baccharis halimifolia</i>	Thimbleberry <i>Rubus parviflorus</i>
Sassafras <i>Sassafras albidum</i>	Tobacco, tree <i>Nicotiana glauca</i>
Sourwood <i>Oxydendrum arboreum</i>	Trumpetcreeper <i>Campsis radicans</i>
Sumac: <i>Rhus vernix</i>	Waxmyrtle, southern <i>Myrica cerifera</i>
Sweetgum <i>Liquidambar styraciflua</i>	Willow <i>Salix spp.</i>
Swordfern <i>Polystichum munitum</i>	

HERBACEOUS WEEDS

Bahiagrass <i>Paspalum notatum</i>	Falsellax, smallseed <i>Camelina microcarpa</i>
Balsamapple <i>Momordica charantia</i>	Fescue <i>Festuca spp.</i>
Barnyardgrass <i>Echinochloa crus-galli</i>	Fiddleneck <i>Amsinckia spp.</i>
Bassia, fivehook <i>Bassia hyssopifolia</i>	Flaxleaf fleabane <i>Conyza bonariensis</i>
Bermudagrass <i>Cynodon dactylon</i>	Fleabane <i>Erigeron spp.</i>
Bindweed, field <i>Convolvulus arvensis</i>	Foxtail <i>Setaria spp.</i>
Bluegrass, Kentucky <i>Poa pratensis</i>	Groundsel, common <i>Senecio vulgaris</i>
Brackenfern <i>Pteridium aquilinum</i>	Guineagrass <i>Panicum maximum</i>
Brome <i>Brome spp.</i>	Horsenettle <i>Solanum carolinense</i>
Bromegrass, smooth <i>Bromus inermis</i>	Horseweed/Marestail <i>Conyza canadensis</i>
Broomsedge <i>Andropogon spp.</i>	Johnsongrass <i>Sorghum halepense</i>
Buttercup <i>Ranunculus spp.</i>	Kikuyugrass <i>Pennisetum clandestinum</i>
Cheat <i>Bromus secalinus</i>	Knapweed <i>Centaurea repens</i>
Chickweed, mouseear <i>Cerastium vulgatum</i>	Kochia <i>Kochia scoparia</i>
Clover, red <i>Trifolium pratense</i>	Lambsquarters, common <i>Chenopodium album</i>
Clover, white <i>Trifolium repens</i>	Lespediza: common, sericea <i>Lespediza striata</i> <i>Lespediza cuneata</i>
Cocklebur <i>Xanthium strumarium</i>	Lettuce, prickly <i>Lactuca scariola</i>
Crabgrass <i>Digitaria spp.</i>	Morningglory <i>Ipomoea spp.</i>
Dallasgrass <i>Paspalum dilatatum</i>	Muhly, wirestem <i>Muhlenbergia frondosa</i>
Dock, curly <i>Rumex crispus</i>	Mullein, common <i>Verbascum thapsus</i>
Dwarfdandelion <i>Krigia cespitosa</i>	

Mustard, blue <i>Chorispora tenella</i>	Reed, giant <i>Arundo donax</i>
Mustard, tansy <i>Descurainia pinnata</i>	Ryegrass, perennial <i>Lolium perenne</i>
Mustard, tumble <i>Sisymbrium altissimum</i>	Saltcedar <i>Tamarix spp.</i>
Mustard, wild <i>Sinapis arvensis</i>	Sandbur, field <i>Cenchrus spp.</i>
Napiergrass <i>Pennisetum purpureum</i>	Shepherdspurse <i>Capsella bursa-pastoris</i>
Nightshade, silverleaf <i>Solanum elaeagnifolium</i>	Signalgrass, broadleaf <i>Bracharia platyphylla</i>
Nutsedge: purple, yellow <i>Cyperus rotundus</i> <i>Cyperus esculentus</i>	Smartweed, Pennsylvania <i>Polygonum pennsylvanicum</i>
Oats, wild <i>Avena fatua</i>	Sowthistle, annual <i>Sonchus oleraceus</i>
Orchardgrass <i>Dactylis glomerata</i>	Spanishneedles <i>Bidens bipinnata</i>
Panicum <i>Panicum spp.</i>	Spurry, umbrella <i>Holosteum umbellatum</i>
Pampasgrass <i>Cortaderia jubata</i>	Starthistle, yellow <i>Centaurea solstitialis</i>
Pennycress, field <i>Thlaspi arvense</i>	Stinkgrass <i>Eragrostis cilianensis</i>
Pigweed, redroot <i>Amaranthus retroflexus</i>	Thistle, Canada <i>Cirsium arvense</i>
Pigweed, smooth <i>Amaranthus hybridus</i>	Thistle, Russian <i>Salsola kali</i>
Quackgrass <i>Agropyron repens</i>	Vaseygrass <i>Paaspalum urvillei</i>
Ragweed, common <i>Ambrosia artemisiifolia</i>	Velvetgrass <i>Holcus spp.</i>
Ragweed, giant <i>Ambrosia trifida</i>	Witchgrass <i>Panicum capillare</i>

INJECTION AND CUT STUMP APPLICATIONS

Woody brush and trees may be controlled using injection or cut stump applications of this product in forestry and utility right-of-way sites.

INJECTION APPLICATIONS

Apply the equivalent of 1 ml of this product per each 2 inches of trunk diameter. This is best achieved by applying 25 to 100 percent concentration of this material either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying diluted material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frill or cut areas in species that exude sap freely after frills or cutting. In these species, make frill or cut at an oblique angle so as to produce a cupping effect and use undiluted material. For best results, application should be made during periods of active growth and after full leaf expansion.

CUT STUMP TREATMENTS

Woody vegetation may be controlled by treating freshly cut stumps of trees and resprouts with this product. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut vegetation close to the soil surface. Apply a 50 to 100 percent solution of this product to the freshly cut surface immediately after cutting. Delays in

application may result in reduced performance. For best results, applications should be made during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will CONTROL, PARTIALLY CONTROL or SUPPRESS most woody brush and tree species, some of which are listed below:

Alder <i>Alnus spp.</i>	Oak <i>Quercus spp.</i>
Coyotebrush <i>Baccharis consanguinea</i>	Poplar <i>Populus spp.</i>
Dogwood <i>Cornus spp.</i>	Saltcedar <i>Tamarisk spp.</i>
Eucalyptus <i>Eucalyptus spp.</i>	Sweetgum <i>Liquidambar styraciflua</i>
Hickory <i>Carya spp.</i>	Sycamore <i>Platanus occidentalis</i>
Madrone <i>Arbutus menziesii</i>	Tan Oak <i>Lithocarpus densiflorus</i>
Maple <i>Acer spp.</i>	Willow <i>Salix spp.</i>

CALIFORNIA

Accord® herbicide has been approved by the U.S. Environmental Protection Agency for the uses, crops and sites listed on this label and by California under label designation 1992-1. Approval of the items listed below is pending under the State of California registration requirements. With the exception of these items, this booklet contains the material approved by California in label 1992-1.

These use conditions, crops and sites may not be treated with this product in California until approval is received.

- Use of this product with Entry II surfactant, Arsenal Applicators Concentrate or Arsenal 2WSL.
- Applications of this product plus Oust by air.
- Use of this product for control on the following species:
Russian Olive
- Use of this product for injection treatments on the following species:
Alder
Coyotebrush
Eucalyptus
Madrone
Saltcedar
Tan Oak
Willow
- Use of this product for cut stump treatments on the following species:
Coyotebrush
Dogwood
Hickory
Maple
Poplar
Sycamore

Product protected by
U.S. Patent No. 4,405,531.
Other patents pending.

EPA Reg. No. 524-326

892.65-000.32/CG

In case of an emergency involving this product,
Call Collect, day or night, (314) 694-4000.

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MONSANTO COMPANY

AGRICULTURAL PRODUCTS

ST. LOUIS, MISSOURI 63167 U.S.A.

Appendix 7.5

1. INGREDIENTS (% w/w, unless otherwise noted):

Triclopyr (3,5,6-trichloro-2-pyridinyloxyacetic acid),
as the triethylamine salt CAS# 057213-69-1 44.4%
Other ingredients, including: 55.6%
Water CAS# 007732-18-5
Proprietary emulsifiers and surfactants
Ethanol (1%) CAS# 000064-17-5

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

2. PHYSICAL DATA:

BOILING POINT: Not determined
VAP. PRESS: Not determined
VAP. DENSITY: Not applicable
SOL. IN WATER: High

SP. GRAVITY: 1.135 (68/68F)
APPEARANCE: Amber liquid
ODOR: Not available

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: 110F, 43C
METHOD USED: TCC
FLAMMABLE LIMITS
LFL: Not determined
UFL: Not determined

EXTINGUISHING MEDIA: Alcohol foam and CO₂.
FIRE AND EXPLOSION HAZARDS: Irritating vapors under fire conditions.
FIRE-FIGHTING EQUIPMENT: Use positive pressure self-contained breathing equipment.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Combustible. Avoid sources of ignition if temperature is near or above flash point.
INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Any oxidizing agent. Consult manufacturer for specific cases.

HAZARDOUS DECOMPOSITION PRODUCTS: Irritating vapors under fire conditions.
HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Dike large spills. Keep out of streams and domestic water supplies. Absorb small spills in inert material such as sand.
DISPOSAL METHOD: In case of large spills, contact DowElanco.

Bury clean-up material from small spills in non-crop area away from water supplies, in accordance with local, state, and federal regulations.

6. HEALTH HAZARD DATA:

EYE: May cause severe eye irritation with corneal injury which may result in permanent impairment of vision, even blindness. When tested on animals, dilutions of this material were less irritating to eyes than the undiluted product.
SKIN CONTACT: Prolonged or repeated exposure may cause skin irritation, even a burn. When tested on animals, dilutions of this material were less irritating to skin than the undiluted product.
SKIN ABSORPTION: A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The LD₅₀ for skin absorption in rabbits is >3980 mg/kg.
INGESTION: Single dose oral toxicity is low. The oral LD₅₀ was 2574 mg/kg for male rats and 1847 mg/kg for female rats.

Amounts ingested incidental to industrial handling are not likely to cause injury; however, ingestion of larger amounts may cause injury. Ingestion may cause gastrointestinal irritation or ulceration.
INHALATION: Based on animal data, short, single exposures to this formulation should pose no acute inhalation hazard. The only volatile component of the formulation is a small amount of ethanol.
SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Excessive exposure may cause liver or kidney effects. Ethanol, a minor component, has caused CNS and liver effects.
CANCER INFORMATION: The active ingredient did not cause cancer in long-term animal studies. Available data on ethanol are inadequate to evaluate carcinogenicity.

TERATOLOGY (BIRTH DEFECTS): For the active ingredient, birth defects are unlikely. Even exposures having an adverse effect on the mother should have no effect on the fetus. Ethanol has caused birth defects in laboratory animals. Ethanol has also been toxic to the fetus in laboratory animal tests. Ethanol has been shown to cause human fetotoxicity and/or birth defects when ingested during pregnancy.

REPRODUCTIVE EFFECTS: In animal studies, triclopyr has been shown not to interfere with reproduction. Ethanol, a minor

component, has produced some adverse effects on male fertility in laboratory animals and humans.

MUTAGENICITY (EFFECTS ON GENETIC MATERIAL): Results of in vitro ("test tube") mutagenicity tests have been negative for both triclopyr and ethanol. Results of mutagenicity tests in animals have been negative for triclopyr. Ethanol has been shown to be negative in some animal mutagenicity tests and positive in others. Ethanol is not believed to be a direct acting mutagen.

7. FIRST AID:

EYES: Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.

SKIN: Wash off in flowing water or shower. Clothing: Remove contaminated clothing and wash before reuse.

INGESTION: Do not induce vomiting. Give large amounts of water or milk if available and transport to medical facility.

INHALATION: No adverse effects anticipated by this route of exposure.

NOTE TO PHYSICIAN: If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): Ethanol (ethyl alcohol): ACGIH TLV and OSHA PEL are 1000 ppm. 3,5,6-Trichloro-2-pyridyloxyacetic acid (Triclopyr), triethylamine salt: Dow IHG is 4 mg/m³ as acid equivalent, skin.

VENTILATION: Control airborne concentrations below the exposure guideline. Good general ventilation sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guidelines. When respiratory

protection is required for handling the concentrate under certain operations, use a NIOSH approved air-purifying respirator.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. Use impervious gloves when prolonged or frequently repeated contact with the concentrate could occur.

EYE PROTECTION: Use chemical goggles when handling the concentrate. Eye wash fountain should be located in immediate work area.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: See label. Avoid breathing spray mist. Do not swallow. Avoid skin contact. Prevent eye contact. Wash thoroughly after handling. Keep away from children. Do not contaminate domestic water supplies or water used for irrigation.

MSDS STATUS: Revised section 9 and regsheets.

REGULATORY INFORMATION: (Not meant to be all-inclusive – selected regulations represented.)

NOTICE: The information herein is presented in good faith and believed to be accurate as the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's

responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSD Sheet for health and safety information.

U.S. REGULATIONS:

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:
An immediate health hazard
A delayed health hazard
A fire hazard

1. INGREDIENTS (% w/w, unless otherwise noted):

Triclopyr ((3,5,6-trichloro-2-pyridinyl)oxy) acetic acid, butoxy ethyl ester	CAS# 064700-56-7	61.6%
Other ingredients:		38.4%
Kerosene	CAS# 008008-20-6	
Proprietary ingredients		

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2. PHYSICAL DATA:

BOILING POINT: >302F, 150C initial
VAP. PRESS: 0.1mm @ 37.8C (kerosene)
VAP. DENSITY: >1
SOL. IN WATER: Emulsifies

SP. GRAVITY: 1.08
APPEARANCE: Amber liquid.
ODOR: Not available

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: 147F, 64C
METHOD USED: TCC
FLAMMABLE LIMITS
 LFL: Not determined
 UFL: Not determined

EXTINGUISHING MEDIA: Water fog, foam, CO₂, and dry chemical
FIRE AND EXPLOSION HAZARDS: Combustible.
FIRE-FIGHTING EQUIPMENT: Use positive pressure self-contained breathing equipment.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Combustible. Avoid sources of ignition if temperature is near or above flash point.
INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Acid, base, and oxidizing material.

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides, hydrogen chloride, and phosgene may result under fire conditions.
HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Dike large spills. Keep out of streams and domestic water supplies. Absorb small spills in inert material such as sand.
DISPOSAL METHOD: In case of large spills, contact DowElanco.

Bury clean-up material from small spills in an approved landfill away from water supplies, in accordance with local, state, and federal regulations.

6. HEALTH HAZARD DATA:

EYE: May cause slight transient (temporary) eye irritation.
SKIN CONTACT: Prolonged or repeated exposure may cause skin irritation. Prolonged or frequently-repeated skin contact may cause allergic reactions in some individuals. With the dilute mix, no allergic skin reaction is expected.
SKIN ABSORPTION: A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The LD₅₀ for skin absorption in rabbits is >2000 mg/kg. Repeated skin exposure may result in absorption of harmful amounts.
INGESTION: Single dose oral toxicity is low. The oral LD₅₀ for male rats is 1581 mg/kg and for females 1338 mg/kg. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; swallowing amounts larger than that may cause injury. If aspirated (liquid enters the lung), may cause lung damage or even death due to chemical pneumonia, a condition caused by petroleum and petroleum-like solvents.

INHALATION: Excessive exposure may cause irritation to upper respiratory tract. Signs and symptoms of excessive exposure may be central nervous system effects (due to kerosene).
SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Repeated excessive exposures may cause liver, kidney or blood effects.
CANCER INFORMATION: Did not cause cancer in long-term animal studies.
TERATOLOGY (BIRTH DEFECTS): Birth defects are unlikely. Exposures having no effect on the mother should have no effect on the fetus. Did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother.
REPRODUCTIVE EFFECTS: The active ingredient in this formulation has been shown in animals not to interfere with reproduction.
MUTAGENICITY (EFFECTS ON GENETIC MATERIAL): Results of in-vitro ("test-tube") mutagenicity tests have been negative. Results of mutagenicity tests in animals have been negative.

SAFETY
DATA SHEET

Page 2

7. FIRST AID:

EYES: Irrigate with flowing water immediately and continuously for at least 5 minutes.

SKIN: Wash off in flowing water or shower.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air if effects occur. Consult a physician.

NOTE TO PHYSICIAN: The decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient. Repeated excessive exposure may aggravate preexisting liver and kidney disease.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): For 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester (triclopyr, butoxyethyl ester), the Dow Industrial Hygiene Guide is 2 mg/m³ as the acid equivalent, Skin. Dow Industrial Hygiene Guide is 10 mg/m³ for kerosene.

VENTILATION: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RESPIRATORY PROTECTION: Atmospheric levels should be

maintained below the exposure guidelines. When respiratory protection is required for handling the concentrate under certain operations, use an approved air-purifying respirator.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. Use impervious gloves when prolonged or frequently repeated contact with the concentrate could occur.

EYE PROTECTION: Use safety glasses.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Do not use near heat or open flame. Avoid contact with eyes, skin or clothing. Do not ship or store with food, feeds, drugs, or clothing. Do not contaminate water, food, or feed by storage or disposal.

MSDS STATUS: Revised sections 6 and 8. Also revised Regulatory section.

REGULATORY INFORMATION: (Not meant to be all-inclusive – selected regulations represented.)

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An immediate health hazard
A delayed health hazard
A fire hazard

MONSANTO PRODUCT NAME ACCORD® Herbicide

MONSANTO COMPANY
800 N. LINDBERGH
ST. LOUIS, MO 63167
Date Prepared: November, 1992
Emergency Ph. No. (Call Collect) (314) 694-4000

PRODUCT IDENTIFICATION

EPA Registration Number:	524-326
Synonyms:	None
Chemical Name:	Not Applicable, Formulated Product
Active Ingredient:	*Glyphosate, N-phosphonomethyl glycine, In the form of its isopropylamine salt 41.5%
Inert Ingredients: 58.5%
	100.0%
	*Contains 480 grams per liter or 4.0 pounds per U.S. gallon of the active ingredient glyphosate, N-(phosphonomethyl) glycine in the form of its isopropylamine salt. Equivalent to 356 grams per liter or 3 pounds per U.S. gallon of the acid, glyphosate.
CAS Reg. No.:	Not Applicable, Formulated Product
CAS Reg. No. Active Ingredient:	1071-83-6
DOT Proper Shipping Name:	Not Applicable
DOT Hazard Class/I.D. No.:	Not Applicable
DOT Label:	Not Applicable
Reportable Quantity (RQ) Under Clean Water Act:	Not Applicable
U.S. Surface Freight Classification:	Weed killing compound, N.O.I.B.N.

SARA Hazard Notification/Reporting

Section 302/304 - Emergency Planning and Release Notification: This product does NOT contain a listed extremely hazardous substance.

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Not Applicable

Section 313 Toxic Chemical(s): Not Applicable

Hazardous Chemical(s) Under OSHA Hazard Communication Standard: Not Applicable

WARNING STATEMENTS

Keep out of reach of children.

CAUTION!

MAY CAUSE EYE IRRITATION

REFORMULATION IS PROHIBITED

SEE CONTAINER LABEL FOR REPACKAGING LIMITATIONS

PRECAUTIONARY MEASURES

- Avoid contact with eyes, skin or clothing
- Wash thoroughly with soap and water after handling.
- Do not contaminate water when disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

EMERGENCY AND FIRST AID PROCEDURES

First Aid:

- If in Eyes: Flush with plenty of water for at least 15 minutes. Get medical attention.
If on Skin: Flush with plenty of water. Wash clothing before reuse.
-

OCCUPATIONAL CONTROL PROCEDURES

- Eye Protection:** Accord® herbicide does not present significant eye irritation or eye toxicity requiring special protection. Avoid eye contact as good industrial practice.
- Skin Protection:** Accord® herbicide does not present significant skin concern requiring special protection.
- Respiratory Protection:** Undiluted Product: Respiratory protection should not be required during the normal handling of undiluted product. However, if abnormal exposure to heavy sprays or mists of undiluted product is likely, the use of NIOSH/MSHA approved equipment for pesticide vapor/mist is recommended. The respiratory use limitations specified by NIOSH/MSHA or the manufacturer should be observed.
- Diluted Product: Under typical application conditions with normal use dilutions (as specified in the label instructions) no respiratory protection should be required.
- Ventilation:** No special precautions are recommended.
- Airborne Exposure Limits:**
- | | | |
|-----------------|-------------------------------------|--------------------------------------|
| Product: | Accord® herbicide - 100% by weight: | |
| | OSHA PEL/TWA: None established | ACGIH TLV/TWA/STEL: None established |
-

FIRE PROTECTION INFORMATION

- Flash Point:** >200°F **Method:** Tag Closed Cup
- Extinguishing Media:** Water spray, foam, dry chemical, CO₂, or other class B extinguishing agent.
- Special Firefighting Procedures:** Firefighters or others who may be exposed to mists or products of combustion should wear a self-contained breathing apparatus. Equipment should be thoroughly cleaned after use.
- Unusual Fire and Explosion Hazards:** None
-

REACTIVITY DATA

- Stability:** Stable for at least 5 years under normal conditions of warehouse storage. Heated facilities are not required. (See Storage, Spill/Leak & Disposal Information)
- Incompatibility:** Spray solutions of this product should be mixed, stored and applied only using stainless steel, aluminum, fiberglass, plastic and plastic-lined steel containers.
- DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT USING GALVANIZED OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS.** This product or solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.
- Hazardous Decomposition Products:** None known.
- Hazardous Polymerization:** Does not occur. This product can react with caustic (basic) materials to liberate heat. This is not a polymerization but rather a chemical neutralization in an acid-base reaction.

HEALTH EFFECTS SUMMARY

The following information summarizes human experience and results of scientific investigations reviewed by health professionals for hazard evaluation of Accord® herbicide and development of Precautionary Statements and Occupational Control Procedures recommended in this document.

EFFECTS OF EXPOSURE

Inhalation and skin contact are expected to be the primary routes of occupational exposure to Accord® herbicide. Occupational exposure to this material has not been reported to cause significant adverse health effects. On the basis of available information, exposure to Accord® herbicide is not expected to produce significant adverse human effects when recommended safety precautions are followed.

TOXICOLOGICAL DATA

Data from laboratory studies conducted by Monsanto with Accord® herbicide or a product of similar composition are summarized below.

Oral -	Practically Non-toxic, (Rat LD ₅₀ - >5,000 mg/kg)
Dermal -	Practically Non-toxic, (Rabbit LD ₅₀ - >5000 mg/kg)
Inhalation -	No More Than Slightly Toxic (Rat 4-hr LC ₅₀ - >1.3 mg/L, the highest atmospheric concentration achievable in this study.)
Eye Irritation -	Nonirritating, (Rabbit, 0.0/110.0)
Skin Irritation -	Practically Nonirritating (Rabbit, 24-hr exposure, 0.1/8.0)

Additional toxicity information is available on glyphosate, the active herbicidal ingredient of ACCORD® herbicide. Following repeated exposures (90-days) to glyphosate in their feed, decreased weight gains were noted in mice, while no treatment-related effects occurred in rats. Following repeated skin exposure (3-weeks) to glyphosate, slight skin irritation was the primary effect observed in rabbits. No skin allergy was observed in guinea pigs following repeated skin exposure. There was not evidence of effects on the nervous system, including delayed effects in chickens (repeat oral doses) or cholinesterase inhibition in rats (single oral doses). Reduced body weight gain and effects on liver tissues were observed with long-term (2-year) feeding of glyphosate to mice. No adverse effects were observed in long-term feeding studies with rats (2-year) and dogs (1-year). Glyphosate did not produce tumors in any of these studies. **Based on the results from the chronic studies, EPA has classified glyphosate in Category E (evidence of non-carcinogenicity for humans).** No birth defects were noted in rats and rabbits given glyphosate orally during pregnancy, even at amounts which produced adverse effects on the mothers. No effects were seen on the ability of male or female rats to reproduce when fed glyphosate for three successive generations. Glyphosate has produced no genetic changes in a variety of standard tests using animals and animal or bacterial cells.

PHYSICAL DATA

Appearance:	Colorless solution
Odor:	Essentially odorless
pH:	4.6 - 4.8
Specific Gravity:	1.158 (Water = 1)

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

SPILL, LEAK & DISPOSAL INFORMATION

SPILL/LEAK:

Observe all protection and safety precautions when cleaning up spills -- see Occupational Control Procedures.

Liquid spills on floor or other impervious surfaces should be contained or diked, and should be absorbed with attapulgite, bentonite or other absorbent clays. Collect contaminated absorbent, place in plastic-lined metal drum and dispose of in accordance with instructions provided under DISPOSAL. Thoroughly scrub floor or other impervious surfaces with a strong industrial type detergent solution and rinse with water.

Liquid spills that soak into the ground should be dug up, placed in plastic-lined metal drums and disposed of in accordance with instructions provided under DISPOSAL.

Leaking containers should be separated from non-leakers and either the container or its contents transferred to a drum or other non-leaking container and disposed of in accordance with instructions provided under DISPOSAL. Any recovered spilled liquid should be similarly collected and disposed of.

Do not contaminate water, foodstuffs, seed or feed by storage or disposal.

DISPOSAL:

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, State or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Do not reuse container. Triple rinse container, then puncture and dispose of in a sanitary landfill or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

STORAGE:

Store above 10°F (-12°C) to keep from crystallizing.

Crystals will settle to the bottom. If allowed to crystallize, place in a warm room 68°F (20°C) for several days to redissolve, and roll or shake container or recirculate in mini-bulk containers to mix well before using. For bulk containers, see container label.

ENVIRONMENTAL EFFECTS

96-hr LC ₅₀ Bluegill:	> 1,000 mg/L, Practically Nontoxic
96-hr LC ₅₀ Trout:	> 1,000 mg/L, Practically Nontoxic
96-hr TL ₅₀ Carp:	> 1,000 mg/L, Practically Nontoxic
48-hr EC ₅₀ <i>Daphnia</i> :	930 mg/L, Practically Nontoxic

DATE: November, 1992

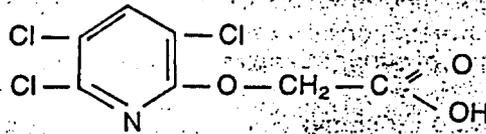
SUPERSEDES: March, 1992 MSDS NO.: S00011151

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CALL: 1-800-323-1421

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Appendix 7.6

ENVIRONMENTAL & TOXICOLOGY PROFILE OF GARLON HERBICIDES



3,5,6-trichloro-2-pyridinyloxyacetic acid

Chemical and Physical Properties

Molecular formula:	C ₇ H ₄ Cl ₃ NO ₃
Molecular weight:	256.48
Physical state:	White solid, odorless
Melting point:	148-150°
Decomposition temperature:	290°C
Vapor pressure:	1.26 x 10 ⁻⁶ mm Hg at 25°C 5.30 x 10 ⁻⁶ mm Hg at 40°C 1.03 x 10 ⁻⁵ mm Hg at 50°C 1.04 x 10 ⁻⁴ mm Hg at 70°C

Solubility:

water	430-440 ppm at 24.5°C
ethanol	very soluble
benzene	slightly soluble

Formulations of Triclopyr Available

GARLON* 3A Herbicide:	A water-soluble triethylamine salt formulation containing three pounds of triclopyr acid equivalent per gallon.
GARLON 4 Herbicide:	An oil-soluble, water-emulsifiable butoxy ethyl ester formulation containing four pounds of triclopyr acid equivalent per gallon.

ENVIRONMENTAL CHEMISTRY PROFILE

The active chemical ingredient in GARLON* Herbicides is triclopyr. Both amine and ester formulations rapidly convert to triclopyr acid when in contact with soil or water. At normal soil and water pH, the triclopyr acid is neutralized and becomes a salt. Thus, triclopyr from the two formulations, GARLON 3A Herbicide (amine salt) and GARLON 4 Herbicide (ester), exists in soil and water as a salt of the cations present. Triclopyr is rapidly degraded by sunlight and microorganisms.

Air

Triclopyr acid is essentially nonvolatile with a vapor pressure of 1.26×10^{-6} mm Hg at 25°C. Significant quantities do not evaporate from soil or water. In GARLON 4 however, the triclopyr is an ester with low volatility and may vaporize at high temperatures.

Water

Triclopyr has a water solubility of 440 ppm at 25°C. Once in water, it stays in solution and will not combine readily with sediments or other organic matter. The breakdown of triclopyr in water is quite rapid because of the action of sunlight and microorganisms. Photolysis can degrade triclopyr in as little as 12 hours.

Hydrolysis has little effect on triclopyr acid, but it does rapidly convert the ester form to the acid.

Soil

The average half-life of triclopyr in soil is 30 days. Triclopyr has little or no toxic effect on soil microorganisms. The compound is readily degraded by soil microorganisms, which account for its relatively short half-life. The activity of the microorganisms depends on the moisture content and temperature of the soil. "Air-dry" soils slow the breakdown; moist soils speed it; saturated soils impede it. A warm temperature speeds microbial activity, and low temperatures retard it.

Leaching in the Soil

Triclopyr has some potential to migrate through soil because it is not highly sorbed to soil. However it does not migrate directly with water, but its movement is retarded by the interaction with soil. Generally, triclopyr degrades rapidly enough to not pose an environmental hazard.

In a recent West Virginia study an aerial application of GARLON 3A was made at 3 1/3 lbs. of triclopyr per acre. Soil and water samples collected down slope from the treated area contained no detectable amounts of triclopyr. This experiment is in agreement with other data and shows that no significant amount of triclopyr moved from the site of application.

TABLE 1 — Environmental Characteristics of Triclopyr

Vapor Pressure =	1.26×10^{-6} mm Hg at 25°C
Water Solubility =	440 ppm at 25°C
Average Half-Life	
Soil	30 days
Water	
Hydrolysis	
Acid	Stable
Ester	Rapid
Photolysis	8-10 hours
Minus Sunlight	Slow or no breakdown

TOXICITY PROFILE

Acute Toxicity: The acute oral toxicity of triclopyr is moderate. The oral LD₅₀ was 729 mg/kg for male rats and 630 mg/kg for female rats. Triclopyr is not absorbed through the skin in acutely toxic amounts — its LD₅₀ is greater than 2000 mg/kg in rabbits. Triclopyr itself is only slightly irritating to eyes.

GARLON 4 has an acute oral LD₅₀ of 2000-2500 mg/kg in rats which indicates low acute oral toxicity. GARLON 4 is only slightly irritating to skin even after repeated, prolonged skin contact in rabbits. It has a dermal LD₅₀ of greater than 4000 mg/kg in rabbits indicating low dermal toxicity. GARLON 4 is essentially non-irritating to eyes as judged by tests on rabbits. An aerosol of GARLON 4 Herbicide caused no deaths and only nasal irritation when tested on rats for 4 hours at a concentration of 0.82 mg/l. This was the highest aerosol concentration possible since higher concentrations coalesced and fell out as droplets - 90% of the aerosol was fine (10 microns or less) to be in the respirable range.

GARLON 3A Herbicide also has a low acute oral toxicity having an LD₅₀ of 2000-3000 mg/kg in rats. GARLON 3A in its undiluted form is slightly to moderately irritating to skin and is severely injurious to eyes. Goggles are recommended during handling or use of GARLON 3A before dilution. GARLON 3A is not absorbed through skin in acutely toxic amounts; its dermal LD₅₀ is greater than 4000 mg/kg in rabbits.

Subchronic toxicity: In a dietary feeding study in rats, there were increased liver weights, decreased body weights and increased relative kidney weights in males receiving the top dose of 100 mg/kg/day. No adverse effects were noted in females at 100, 30, 10 or 3 mg/kg/day or in males at 30 mg/kg/day and

lower. In a 90-day mouse study the males receiving the top dose of 60 mg/kg/day had a reduced body weight but there were no effects at 20 or 6 mg/kg/day. Females tolerated 60 mg/kg/day without adverse effect.

When tested in dogs, triclopyr produced effects at lower doses than in rodents. Doses of 5, 10 or 20 mg/kg/day lowered weight gain and food consumption and produced liver and kidney effects in a 228-day dietary feeding study. These effects were ascribed to an increased urinary retention of triclopyr by the dog. When beagle dogs were fed diets containing 2.5 mg/kg/day for 183 days, the only observable effect was a slightly reduced PSP excretion (a dye used to monitor kidney excretion).

Monkeys were then tested to see if they would be more like rodents and give more security that the dog is unique in its inability to handle triclopyr. In two studies the monkey tolerated 20 or 30 mg/kg/day without evidence of toxic effect and with no effect on renal excretion.

Chronic toxicity: In two separate dietary feeding studies, rats and mice received daily doses of 3, 10 or 30 mg triclopyr/kg body weight for approximately two years. There were no toxic effects.

Reproductive toxicity: Triclopyr is not teratogenic in either rats or rabbits, even at doses causing maternal toxicity — 25 to 200 mg/kg/day. Mild fetotoxicity (delayed ossification of skull) occurred in offspring of pregnant rats receiving 200 mg/kg/day.

Triclopyr produced no effect on reproductive capacity, growth or maturation of rats in a 3-generation dietary feeding study using, 3, 10 or 30 mg/kg/day.

Mutagenicity: Triclopyr showed no evidence of mutagenic response in bacterial assay systems, in cytogenetic evaluation and in a mouse dominant lethal study. A very weak positive response was seen in a rat dominant lethal study, but the negative mouse data appears to cast more doubt on the relevance of the rat study. In fact, a proposed heritable translocation study was cancelled with EPA's consent after the mouse study came out negative.

Metabolism: Triclopyr is rapidly absorbed and excreted rapidly by the kidney mostly as the parent compound with slight amounts of the pyridinol or a conjugated form of the parent acid. The pharmacokinetic profile shows dose-dependent behavior — as the dose increases the body burden increases disproportionately and fecal excretion increases. After i.v. administration in rats, urinary excretion accounted for 91% of the dose at 5 mg/kg and 83% of the dose at 100 mg/kg. Oral administration gave a similar pharmacokinetic profile in rats. Blood plasma ¹⁴C levels in rats displayed apparently saturated clearance curves at the higher dose levels (100 mg/kg), and the half-life for clearance of ¹⁴C from blood plasma of dogs ranged from 14 hours to 96 hours at the low (0.5 mg/kg) and high (20 mg/kg) dose levels, respectively.

In a monkey study, ¹⁴C triclopyr cleared the blood plasma in a biphasic manner with a rapid phase having a 3 hr. half-life and the slower phase having a 151 hr. half-life. The amount of ¹⁴C activity recovered from urine was 75.8%, and 95.7% of that was recovered in the first 24 hours. The authors stated that the rapid clearance of the majority of the ¹⁴C from blood plasma, the relatively efficient renal excretion of ¹⁴C, and the low levels of ¹⁴C detected in the carcass all suggest that triclopyr should not accumulate to excessive levels in the monkey following repetitive daily doses in the range of 30 mg or less per kg. In rats and dogs, all tissues containing measurable quantities of ¹⁴C contained higher concentrations than did the blood plasma. The following tissues had a tissue/plasma ratio greater than 1.

Species	Route	Tissue Concentration	
		Plasma Concentration	> 1
Rat	iv		liver, fat
Rat	oral		liver, fat
Dog	iv		kidney (only found in kidney at low dose — 0.5 mg or 5 mg/kg)
Dog	iv		kidney (also in most other tissues after 20 mg/kg dose, but lower than plasma)
Dog	oral		kidney
Monkey	iv		none (not "stored" in any particular tissue after 30 mg/kg dose)

In general, it appears that the toxicity of triclopyr is closely linked to its pharmacokinetic profile. Non-toxic doses are effectively handled by the animal body. When chemical quantities exceed the capacity of excretory routes they become toxic to the body.

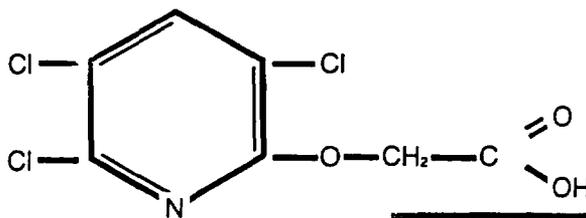
Human experience: More than 600 individuals in 6 European countries and the U.S.A. have been exposed to GARLON 3A during manufacture, formulation and mixing/spraying in field tests.

The only incidents involving irritation were two men in France who had slight and transient eye irritation from direct contact with the spray mist. One mishandled the product and had a mild skin irritation.

TRICLOPYR

Technical
Information
Guide

Technical Information on Triclopyr, the Active Ingredient of GARLON* Herbicides



3,5,6-trichloro-2-pyridinyloxyacetic acid

In both the laboratory and the field, triclopyr herbicide has demonstrated highly effective control of many woody plants and broadleaf weeds. Triclopyr, when applied at rates required for brush and weed control, normally does not injure established grasses. The chemical is used on industrial rights-of-way and for forest site preparation and conifer release. Registrations have also been obtained for use on permanent grass pastures, rangelands, turf, non-irrigation ditch banks, and in wildlife openings.

*Trademark of The Dow Chemical Company

Physical Properties

Molecular formula	C ₇ H ₄ Cl ₃ NO ₂
Molecular weight	256.48
Physical state	White solid, odorless
Melting point	148-150°C
Decomposition temperature	290°C
Vapor pressure	1.26 × 10 ⁻⁶ mm Hg at 25°C 5.30 × 10 ⁻⁶ mm Hg at 40°C

Solubility

Water	430-440 ppm at 24.5°C
Ethanol	very soluble
Benzene	slightly soluble

Formulations of Triclopyr Available

GARLON* 3A Herbicide: A water-soluble triethylamine salt formulation containing three pounds of triclopyr acid equivalent per gallon.

GARLON* 4 Herbicide: An oil-soluble, water emulsifiable butoxy ethyl ester formulation containing four pounds of triclopyr acid equivalent per gallon.

ACCESS* Herbicide: A formulation for basal bark applications containing two pounds acid equivalent of triclopyr butoxy ethyl ester plus one pound acid equivalent of picloram isooctyl ester per gallon.

Physiological Behavior in Plants

Triclopyr induces characteristic auxin-type responses in growing plants. It is absorbed by leaves, and is readily translocated throughout the shoot and root systems.

Foliar applications have achieved maximum efficacy when applied after full leaf development and when soil moisture is adequate for normal plant growth.

Technical Activity

Foliar sprays of triclopyr formulations have provided control of most woody plants when applied to forests for site preparation or conifer release; to non-crop areas including non-irrigation ditch banks, industrial, manufacturing, and storage sites; and to rights-of-way along pipelines, roadsides, railroads, and electrical power lines. These formulations have been shown to be effective on difficult-to-control plants such as sassafras, black locust, ash, red and sugar maple, and blackberry. Control of poplar, aspen, alder, birch, red oak, white oak, sumac, blackgum, sweetgum, hickory, willow and wax myrtle has also been demonstrated. Liquid sprays may be broadcast using a helicopter or ground equipment, or applied as directed treatments using backpack or power equipment.

GARLON 3A Herbicide provides control of woody plants when applied to cut surfaces as an injection, girdle, frill, or cut stump spray. GARLON 4 and ACCESS Herbicides are very effective as directed basal bark sprays when diluted with an oil carrier.

Formulations of GARLON give excellent control of Canada thistle, field bindweed, goldenrod, tall ironweed, redroot pigweed, horseweed, and morning-glory.

All applications should be made in accordance with label precautions and use directions.

*Trademark of The Dow Chemical Company

Environmental Chemistry Profile

The active chemical ingredient in GARLON herbicides is triclopyr. Both amine and ester formulations rapidly convert to triclopyr acid when in contact with soil or water. At normal soil and water pH, the triclopyr acid is neutralized and becomes a salt. Thus, triclopyr from the two formulations, GARLON 3A Herbicide (amine salt) and GARLON 4 Herbicide (ester), exists in soil and water as a salt of the cations present. Triclopyr is rapidly degraded by sunlight and naturally occurring microorganisms.

Air

Triclopyr acid is essentially nonvolatile with a vapor pressure of 1.26×10^{-6} mm Hg at 25°C. Significant quantities do not evaporate from soil or water. In GARLON 4, the triclopyr ester has low volatility.

Water

In water, triclopyr stays in solution and will not combine readily with sediments. The breakdown of triclopyr in water is quite rapid because of the action of sunlight. Triclopyr degrades through photolysis with a 2- to 6-hour half-life at 40° N latitude in the spring, summer, and fall months. Hydrolysis has little effect on triclopyr acid, but does convert the ester form to the acid.

Soil

Under temperature and moisture conditions favorable for microbial activity, triclopyr degrades quite rapidly in soil. In a laboratory incubation study conducted at 35°C with moisture at field capacity, the time required for 50 percent breakdown of triclopyr was 10 days in

Flanagan silty clay loam soil from Illinois and 46 days in Yolo loam soil from California. The average half-life of triclopyr in soil is 30 days. At rates labeled for use on rights-of-way and forest sites (0.5 to 9 lbs./A), phytotoxic residues in soils should cause no problems.

Triclopyr has little or no toxic effect on soil microorganisms. The compound is readily degraded by soil microorganisms, which accounts for its relatively short half-life. The rate at which triclopyr is degraded by microorganisms depends on the moisture content and temperature of the soil. Soil microbial activity is generally increased during warm periods when soil moisture is readily available, but soils are not saturated.

Movement in Soil

The downward movement of triclopyr is retarded by interaction with soil. In a West Virginia study, GARLON 3A Herbicide was aerially applied at 3½ lbs. of triclopyr per acre. Soil and water samples collected down slope from the treated area contained no detectable triclopyr residues. In Oregon, triclopyr residues were largely confined to the upper 15 cm of soil, with approximately 90 percent of residues restricted to the upper 5 cm of soil following application of three pounds of triclopyr/acre. Triclopyr was also not persistent in Ontario field studies and displayed 50 and 90 percent disappearance of the compound within two to four weeks of application of three pounds triclopyr/acre, regardless of soil texture. A total of 97 percent or greater of the recovered triclopyr was within 15 cm of the soil surface. These studies indicate that triclopyr poses no significant environmental hazard due to leaching through soil.

Toxicological Properties

1. **Acute oral toxicity to mammals:** Triclopyr has a moderate acute oral toxicity to mammals and should pose no problem from ingestion incidental to handling and spraying. LD₅₀ values from triclopyr, GARLON 3A Herbicide, and GARLON 4 Herbicide are indicated below:

Acute Oral Toxicity - LD ₅₀			
	Triclopyr	GARLON 3A Herbicide	GARLON 4 Herbicide
Rat (male)	729 mg/kg	2830 mg/kg	2460 mg/kg
(female)	630 mg/kg	2140 mg/kg	2140 mg/kg

2. **Chronic toxicity (triclopyr acid):** In animal dietary feeding tests designed to determine the effects of daily long-term feeding of large doses of triclopyr, it was determined that the liver and kidney were the "target organs." However, the observed effects were minimal and not expected to occur under any labeled use conditions. Triclopyr is not considered to be carcinogenic, mutagenic, or teratogenic.

Pharmacokinetic Studies

Rats – 2 years (1987)	3 mg/kg/day – no observed adverse effect level
Mice – 2 years (1987)	5 mg/kg/day – no observed adverse effect level
Dogs – 1 year (1988)	5 mg/kg/day – no observed adverse effect level
Dogs – 228 days (1976)	2.5 mg/kg/day – no observed adverse effect level

Reproductive Studies

Rabbits (1984) (Hanley et al., <i>Fundamental and Applied Toxicology</i> , Vol. 4, pp. 872-882)	25 mg/kg/day – Caused no birth defects
Rabbits (1988) (Hanley et al., <i>Fundamental and Applied Toxicology</i> , Vol. 4, pp. 872-882)	75 mg/kg/day – Caused no birth defects
Rats (1984) (Hanley et al., <i>Fundamental and Applied Toxicology</i> , Vol. 4, pp. 872-882)	200 mg/kg/day – Caused no birth defects; delayed development
	100 mg/kg/day – Caused no observed adverse effects

Once ingested, triclopyr is rapidly absorbed and excreted by the kidney. Human metabolism studies have indicated a half-life for urinary excretion of five hours after volunteers received oral doses of 0.5 or 0.1 mg triclopyr/kg body weight.

- 3. Eye irritation:** Technical-grade triclopyr is slightly irritating to the eyes. *Undiluted* GARLON 3A Herbicide is severely irritating and injurious to eyes. Chemical goggles should be worn during handling or use of GARLON 3A Herbicide before dilution, and eyewash facilities should be located in the work area. GARLON 3A Herbicide diluted in a 1:3 ratio with water (the highest concentration labeled for aerial application) may cause moderate injury and irritation to eyes, while the formulation diluted in a 1:7 ratio with water (the highest concentration labeled for ground application) may cause only slight transient irritation to eyes. GARLON 4 Herbicide is only slightly irritating to eyes.
- 4. Skin irritation:** Technical-grade triclopyr is essentially nonirritating to either intact or freshly abraded skin. Undiluted GARLON 3A Herbicide may cause slight to moderate irritation, especially if confined to the skin by, for example, contaminated clothing. Avoid prolonged or repeated skin contact with *undiluted* GARLON 3A Herbicide.

GARLON 3A Herbicide diluted in a 1:3 ratio with water (the highest concentration labeled for aerial application) may cause slight irritation, while the formulation diluted in a 1:7 ratio with water (the highest concentration labeled for ground application) is essentially nonirritating. Undiluted GARLON 4 Herbicide may be slightly irritating to the skin.

5. Skin absorption: Neither triclopyr, GARLON 3A Herbicide, nor GARLON 4 Herbicide are absorbed through the skin in acutely toxic amounts. The total absorption of triclopyr applied to the skin of human volunteers as undiluted GARLON 4 Herbicide and left undisturbed for eight hours (dermal penetration rate) was 1.6 percent of the applied dose as determined by urinary output. In rabbits, the dermal LD₅₀ of triclopyr acid was >2000 mg/kg; the dermal LD₅₀ for GARLON 3A was >3980 mg/kg; and the dermal LD₅₀ for GARLON 4 was >4000 mg/kg in females and 2315 mg/kg in males.

6. Inhalation: An aerosol of GARLON 4 Herbicide caused no death and only nasal irritation when tested on rats for four hours at a concentration of 0.82 mg/L. This was the highest aerosol concentration possible since higher concentrations coalesced and fell out as droplets; 90 percent of the aerosol was fine enough (10 microns or less) to be in the respirable range.

7. Toxicity to freshwater organisms: Both triclopyr and GARLON 3A Herbicide have very low toxicity to fish and aquatic invertebrates. GARLON 4 Herbicide is more toxic but is unstable in naturally occurring aquatic systems. The 96-hour LC₅₀ values for fish and an aquatic invertebrate are indicated in the following table.

The effect of prolonged exposure to GARLON 3A Herbicide in water was evaluated with fathead minnows and *Daphnia magna* (water fleas). These tests indicated no effects on fathead minnow embryo hatchability or larval development during a 31-day exposure to 202 mg/L of GARLON 3A Herbicide.

96-Hour LC₅₀

	Triclopyr	Triclopyr TEA Salt	Triclopyr Butoxy Ethyl Ester
Bluegill	148 mg/L	891 mg/L	0.87 to 1.5 mg/L
Rainbow Trout	117 mg/L	552 mg/L	0.74 to 1.3 mg/L
Coho Salmon	—	—	1.3 mg/L
Fathead Minnow	—	248 mg/L	2.2 mg/L
<i>Daphnia magna</i> (water fleas)	133 mg/L	775 mg/L	2.2 to 10 mg/L

Tests indicated no effects on number and size of *Daphnia* young during a 21-day exposure to 110 ppm of GARLON 3A herbicide.

8. Acute toxicity to birds: Triclopyr has very low toxicity to birds. Consequently, environmental exposures should not result in any significant acute hazards to birds. LC₅₀ values from eight-day dietary studies and LD₅₀ values are indicated below:

Eight-Day Dietary LC₅₀

	Triclopyr	Triclopyr TEA Salt	Triclopyr Butoxy Ethyl Ester
Mallard Duck	>5600 ppm	>10,000 ppm	>10,000 ppm
Bobwhite Quail	2935 ppm	11,622 ppm	9026 ppm

Acute Oral LD₅₀

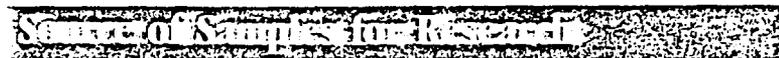
	Triclopyr	Triclopyr TEA Salt	Triclopyr Butoxy Ethyl Ester
Mallard Duck	1698 mg/kg	3176 mg/kg	>4640 mg/kg

9. Reproductive toxicity to birds: In a one-generation reproduction study, bobwhite quail and mallard ducks exposed to 100, 200, and

500 ppm of triclopyr in their diet showed no symptoms of toxicity, behavioral abnormalities, or reproductive impairment.

Tolerances in Grasses and Animal Tissues (ppm)

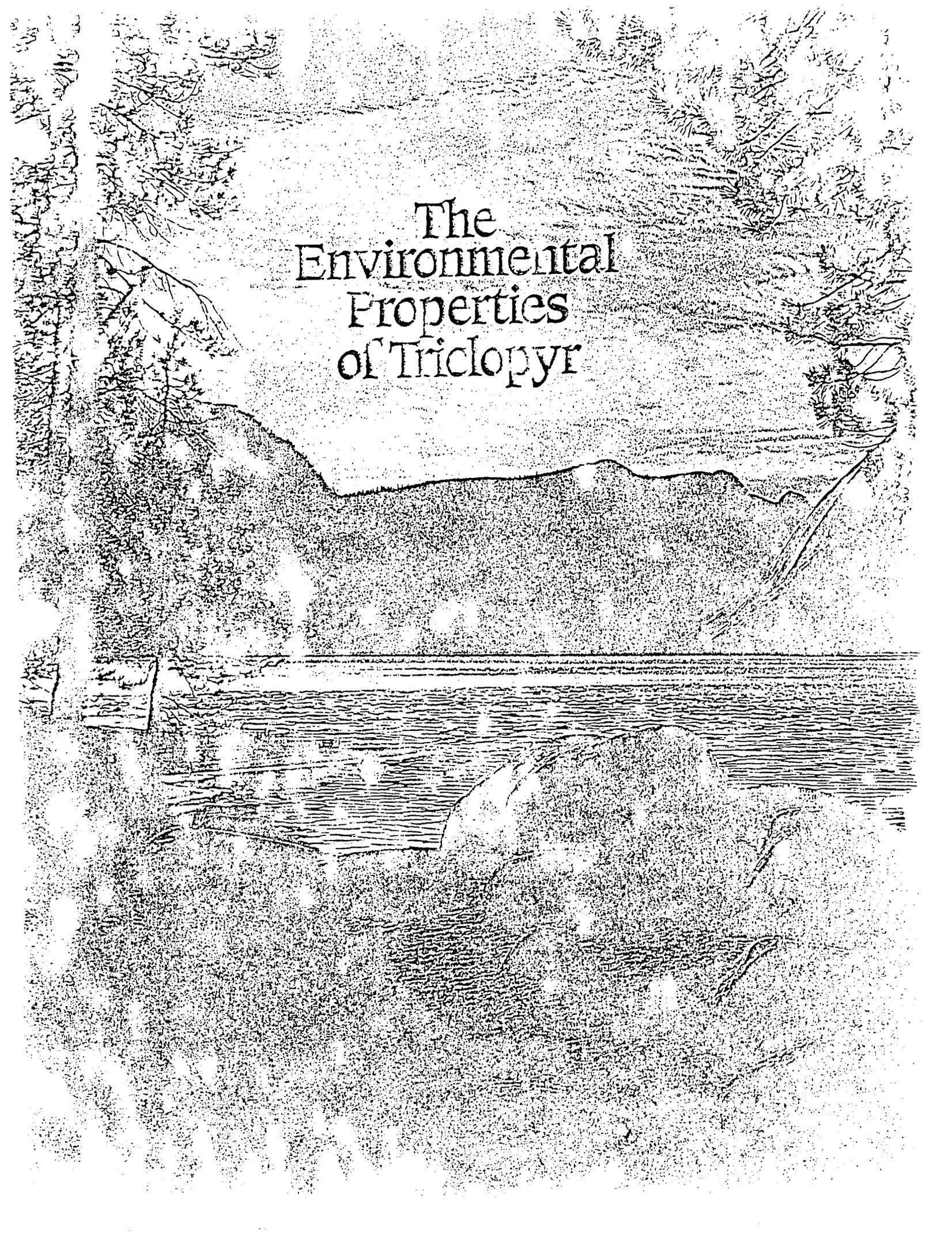
Grasses, Forage	500
Cattle (Meat, Fat, Meat By-Products Except Kidney & Liver)	0.05
Cattle Kidney & Liver	0.5
Goats (Meat, Fat, Meat By-Products Except Kidney & Liver)	0.05
Goats, Kidney & Liver	0.5
Hogs (Meat, Fat, Meat By-Products Except Kidney & Liver)	0.05
Hogs, Kidney & Liver	0.5
Horses (Meat, Fat, Meat By-Products Except Kidney & Liver)	0.05
Horses, Kidney & Liver	0.5
Milk	0.01
Sheep (Meat, Fat, Meat By-Products Except Kidney & Liver)	0.05
Sheep, Kidney & Liver	0.5



Experimental quantities of GARLON 3A and GARLON 4 Herbicides should be requested through Field Technical Service and Development Specialists of The Dow Chemical Company.

Use Precautions: All directions and use precautions on all product labels should be read and followed.

The
Environmental
Properties
of Triclopyr



an overview

Triclopyr is the active ingredient in GARLON® brand herbicides manufactured by DowElanco. It is used to control unwanted vegetation along rights-of-way and on forestry sites.

This brochure will give an overview of how triclopyr behaves when it is placed in the environment under its intended uses.

product characteristics

GARLON herbicide is available in two formulations. In GARLON 3A, triclopyr is pres-

ent as an amine salt; with GARLON 4, triclopyr is present as an ester. Each form has quite different physical properties. The amine salt is somewhat water soluble while the ester is not. However, in soil, both materials convert to the parent triclopyr molecule within a few hours. Therefore, the parent molecule is the species to consider when evaluating the environmental properties of triclopyr in soil. In aquatic environments, the two forms are considered separately.

mobility in the soil/potential to reach groundwater

The potential movement of any chemical, including triclopyr, in the soil is governed by its affinity for soil organic material and the rate it is degraded by soil microorganisms. That



affinity retards movement and the degradation rate determines the length of time triclopyr will be present in the soil and available for movement.

Field studies show that triclopyr degrades fairly rapidly and is generally restricted to the surface layer of soil when used according to label directions. Oregon State University researchers found that less than 20 percent of applied triclopyr remained four months following application. The triclopyr residues that were present were restricted to the top 12 inches of the soil profile.

Researchers in British Columbia studying the persistence of triclopyr in coastal forest soils found greater than 95 percent of the triclopyr had degraded less than two months after application. The residues of triclopyr that remained were found in only the top 4 inches of the soil profile.

These studies also correlate with laboratory soil

degradation studies where the time required for half of the applied triclopyr to degrade (half-life) averaged about 30 days.

This research demonstrates the affinity triclopyr has for organic material in the surface layers of soil. The availability for deeper movement is restricted by its relatively short life in the soil. These properties greatly reduce the potential for triclopyr to reach groundwater.



Therefore, the ester dissipates through a variety of environmental processes in water which collectively will remove the chemical from the water column with an overall half-life of 12-24 hours.

The ester has a greater tendency than the amine to be taken up by fish. Because of this tendency, the ester has a greater degree of toxicity to fish. Laboratory studies, however, have shown that in fish the ester is also quickly converted to the parent

runoff potential

A second process associated with the mobility of chemicals in soil is surface runoff. Chemicals in the top few millimeters of the surface can be washed away during heavy rainfall via overland water flow and soil erosion. Therefore, small amounts of all chemicals applied to soil have runoff potential particularly if heavy rain follows an application. The primary tendency of triclopyr is to move

the top of the soil profile with rainfall, rather than run off. In field studies, only very small amounts of triclopyr have been detected downslope from application sites. Therefore, surface runoff does not represent a significant problem for the movement of triclopyr to surface waters. Typical pesticide application methods use buffer zones near water bodies. That is generally a good practice to follow to further reduce the potential for triclopyr to reach bodies of water.

dissipation in water

The fate of triclopyr in water is governed by a number of dissipation processes and the form of the molecule. The amine salt formulation (GARLON 3A) readily dissociates to the parent triclopyr

molecule in water and tends to remain in the water column since it is somewhat water soluble. In the water column it can be rapidly degraded by sunlight. Its half-life when exposed to summer sun is just a few hours. This form of the molecule has very little potential to accumulate in aquatic organisms such as fish. It, therefore, has a very low toxicity to fish as determined in several laboratory studies.

The ester form of the molecule (GARLON 4) can be transformed to the parent molecule through several processes. It can undergo simple hydrolysis in the water column to form the parent molecule. Unlike the amine, the ester is sparingly water soluble and has a high tendency to move to organic material in sediment. Research has shown that, once in sediment, conversion to the parent molecule is very rapid with a typical half-life of about 3 hours. Once formed, the parent molecule will move back to the water column, where it prefers to reside, and again be subject to photodegradation. The ester, itself, can also undergo photodegradation with a half-life of approximately 12 hours in summer sun.

molecule and then rapidly eliminated back to the water. The amounts necessary to induce short-term toxic effects are greater than any amounts expected to enter water through runoff, drift or accidental overspray. In addition, the ester dissipates to a level at which long-term toxic effects are not a concern.

key points to remember

- Triclopyr degrades quickly in soil and tends to remain in the upper surface layers, adsorbed to soil organic material, when applied in accordance with the label.
- Triclopyr has little potential to reach groundwater.
- Once triclopyr moves into the surface soil layer, its potential for surface runoff is minimal.
- In aquatic environments, both amine and ester forms of triclopyr will be readily converted to the parent molecule which can be rapidly degraded by sunlight. Potential adverse effects on aquatic organisms are unlikely.
- In general, as a result of the physical and chemical properties of triclopyr, it has little potential to cause environmental concerns.



Appendix 7.7



TOXICOLOGICAL AND ENVIRONMENTAL PROPERTIES

Based on the large body of scientific data available on Accord® herbicide and specifically its active ingredient, glyphosate, it can be concluded that, when used in accordance with label instructions:

- Accord herbicide has an ample margin of safety for mammals, birds, fish and crustaceans following single exposures. Following prolonged animal exposure, glyphosate does not cause treatment-related tumors, heritable mutations, nerve damage or reproductive changes.
- Accord herbicide is rapidly and completely degraded into natural products by microorganisms present in soil and water.
- Accord herbicide does not persist in the environment and will not leach through soil to water.
- Accord herbicide does not accumulate in the body tissue of animals, birds, fish or crustaceans.

Introduction

The use of Accord herbicide is an effective method for the control of undesirable vegetation encountered in timber reforestation and right-of-way maintenance. Vegetation management professionals can apply Accord herbicide without adversely affecting human health, wildlife or the environment.

The purpose of this bulletin is to provide a comprehensive review of the extensive toxicological and environmental study data available on Accord herbicide and its active ingredient, glyphosate. Data reviewed include environmental fate, degradation mechanism, potential for bioaccumulation, and tests to assess acute effects and long-term (chronic) effects.

Toxicological Evaluations

Both Accord herbicide and glyphosate were evaluated in numerous tests with laboratory animals using concentrations at, and far in excess of, the normally anticipated exposure levels. Results of these tests define the toxicity of the herbicide. Using these data and information on the environmental fate of the herbicide, an evaluation can be made of the likelihood that a toxic effect would occur under normal conditions of herbicide use.

Short-term (acute) toxicological studies have been conducted at high dosage levels using Accord herbicide and glyphosate. These studies are designed to assess the response to a one-time chemical exposure. Results of acute oral and dermal toxicological tests are expressed as LD₅₀ (50% lethal dose) values.

The LD₅₀ value is the calculated dose of test material (usually expressed as milligrams [mg]/kilogram [kg] of body weight) which induced mortality in 50% of the test animals. Similarly, the acute aquatic LC₅₀ value (50% lethal concentration) is the concentration of test material (usually expressed as milligrams [mg]/liter [l] of water) that induced mortality in 50% of the test subjects.

Eye and skin irritation studies have also been conducted using rabbits. The test results are expressed as a numerical value based on a scale that reflects the increasing degree of irritation. This scale ranges from 0 (no effect level) to 110.0 (maximum irritation) for the eyes and 0 to 8.0 for the skin.

Results obtained in acute toxicological studies with Accord herbicide and glyphosate are presented in Table 1.

TABLE 1 ACUTE TOXICOLOGICAL DATA	
Accord® Herbicide¹	
Oral LD ₅₀ (Rat)	>5000 mg/kg
Dermal LD ₅₀ (Rabbit)	>5000 mg/kg
Eye Irritation (Rabbit)	(FHSA) Score = 0.0 on a scale of 110.0, non-irritating
Skin Irritation (Rabbit)	(FHSA) Score = 0.1 on a scale of 8.0, non-irritating
Glyphosate	
Oral LD ₅₀ (Rat)	5600 mg/kg
Dermal LD ₅₀ (Rabbit)	>5000 mg/kg
Eye Irritation (Rabbit)	(FHSA) Score = 6.9 on a scale of 110.0, slightly irritating
Skin Irritation (Rabbit)	(FHSA) Score = 0.1 on a scale of 8.0, non-irritating

The acute toxicological effects of exposure to Accord herbicide and glyphosate were also assessed using honeybees and various animal species normally found living in the environment. The results (Table 2) show that Accord herbicide is practically non-toxic² to the majority of aquatic and to all avian species tested.

In actual labeled applications of Accord herbicide, which is registered for use over water sites, it is highly improbable that the levels of glyphosate would ever approach the high concentrations used in laboratory testing conditions. Hence, with labeled use of Accord herbicide, it is very unlikely that concentrations of glyphosate would ever reach levels that would be harmful to aquatic species.

In addition to acute toxicological studies, long-term studies were carried out in order to determine the effects of prolonged exposure to glyphosate. These studies were conducted using rats, mice, dogs and other animal species.

In compliance with Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Guidelines, glyphosate was fed to rats at dosages up to 31

mg/kg body weight/day (equivalent to a dietary concentration of about 600 ppm in adult animals). No adverse chronic or carcinogenic effects were observed.

Glyphosate was also fed to mice at dosages equivalent to dietary concentrations up to 30,000 ppm in adult animals (3% of the diet). A slight but statistically insignificant increase in the incidence of microscopic benign (non-cancerous) kidney tumors was observed in male mice (3 of 50) tested at the 30,000 ppm dose. The same type of kidney tumor was also observed in 1 of 50 mice that received no glyphosate in this study.

TABLE 2 ENVIRONMENTAL TOXICITY DATA	
Accord Herbicide	
96 hr LC ₅₀ Bluegill Sunfish	= >1000 mg/l, practically non-toxic
96 hr LC ₅₀ Trout	= >1000 mg/l, practically non-toxic
96 hr LC ₅₀ Carp	= >10,000 mg/l, practically non-toxic
48 hr LC ₅₀ <i>Daphnia magna</i>	= 930 mg/l, practically non-toxic
Glyphosate	
96 hr LC ₅₀ Bluegill Sunfish	= 120 mg/l, practically non-toxic
96 hr LC ₅₀ Trout	= 86 mg/l, slightly toxic
96 hr LC ₅₀ Fathead Minnow	= 97 mg/l, slightly toxic
96 hr TL ₅₀ ³ Carp	= 115 mg/l, practically non-toxic
48 hr LC ₅₀ <i>Daphnia magna</i>	= 780 mg/l, practically non-toxic
48 hr TL ₅₀ ^{3,4} Atlantic Oyster	= >10 mg/l, no more than slightly toxic

96 hr LC ₅₀ Shrimp	= 281 mg/l, practically non-toxic
96 hr LC ₅₀ Fiddler Crab	= 934 mg/l, practically non-toxic
96 hr LC ₅₀ Harlequin Fish	= 168 mg/l, practically non-toxic
8 day LC ₅₀ Mallard Duck	= >4640 ppm, practically non-toxic
8 day LC ₅₀ Bobwhite Quail	= >4640 ppm, practically non-toxic
48 hr LD ₅₀ Honeybee	= >100 µg/bee, practically non-toxic

After reviewing the results of this study, the Environmental Protection Agency (EPA) publicly stated that there was "weak evidence" that glyphosate may be an oncogen.

Contrary to the EPA's supposition, the results of the chronic mouse study did not indicate that glyphosate causes tumors in mice. This determination was the unanimous conclusion of the study's original pathologist, a consultant group of ten expert pathologists and toxicologists, regulatory agencies in Canada, Australia and Europe, and the World Health Organization.

The EPA's Scientific Advisory Panel (SAP) reviewed the issue and did not agree with the EPA's position. The SAP concluded that there was inadequate evidence of animal carcinogenicity; glyphosate should be placed into an unclassified category; and additional studies should be performed to clarify any unresolved questions.

Subsequently, EPA classified glyphosate in "Group D" or having "inadequate animal evidence of oncogenicity," (Federal Register, Vol 52, No. 179, pg 34911). EPA also requested that a chronic feeding study for rats be completed.

The completed rat study has been submitted to the EPA for their review. Monsanto is confident that this additional testing will support the conclusion that glyphosate is not oncogenic to animals.

The results of these and other toxicological studies using various animal species demonstrate that glyphosate does not cause mutagenic effects, nerve damage, birth defects or adverse reproductive changes. The combined results of both short-term and long-term toxicological studies firmly support the following conclusion. Accord herbicide

is a material with a low degree of toxicity and will not substantially affect human or animal health when used in accordance with label directions.

Accord Herbicide Does Not Bioaccumulate

Extensive studies were performed to evaluate the potential of glyphosate to bioaccumulate in the food chain. Studies confirm that there is minimal tissue retention and rapid elimination of glyphosate residue from several animal species including mammals, birds, fish and oysters. The lack of retention in tissues and the rapid elimination of glyphosate from animals indicate that, even in the event of repetitive exposures, glyphosate will not accumulate in the body.

It is virtually impossible to achieve a glyphosate concentration in natural water systems sufficient to produce toxic levels or residues in fish. That's because glyphosate binds to soil particles very tightly. And also because natural lakes, streams and other bodies of water are in constant movement.

This conclusion is firmly supported by results of laboratory studies in which a variety of freshwater fish (catfish, trout, bass) were exposed for 10 to 14 days to water containing glyphosate. The concentrations of glyphosate were as much as four times greater than the maximum instantaneous concentration at the water surface under normal use conditions.

Analysis of the exposed fish showed that the bioconcentration values for glyphosate in tissues were low (in the range of 0.1 to 0.3). Furthermore, of the small amount of glyphosate detected, most was localized in the non-edible portions of the fish. These results confirm that glyphosate does not accumulate in fish, even after a prolonged high-level exposure.

In addition to fish, other animal species were used to evaluate the potential for glyphosate to bioaccumulate. After cows and chickens were fed diets containing glyphosate, their milk and eggs were analyzed. Glyphosate residues were not detectable (i.e., less than 0.025 ppm).

Feeding studies with chickens, cows and swine showed that ingestion of up to 75 ppm glyphosate resulted in non-detectable glyphosate residue levels (i.e., less than 0.05 ppm) in muscle tissue and fat.

Results obtained in the various studies performed with mammals, birds and fish confirm that glyphosate will not accumulate in the food chain.

Accord Herbicide Does Not Persist in the Environment

Results of environmental fate and laboratory studies show that glyphosate binds tightly to soil particles and does not leach. Under laboratory conditions, no detectable glyphosate was leached from soil contained in columns that were eluted with water continuously for 45 days.

Microorganisms normally present in soil degrade glyphosate rapidly (average soil half-life <60 days) and completely into natural products—carbon dioxide, nitrogen, phosphate and hydrogen. Microbial degradation of glyphosate proceeds under both aerobic and anaerobic conditions. Glyphosate does not photodegrade under laboratory conditions. And photodegradation of glyphosate in the field is considered to be negligible. Loss of glyphosate due to chemical decomposition and volatilization is also considered negligible.

The breakdown of glyphosate takes place primarily by microbial degradation. However, soil and water microorganisms are not harmed as a result of glyphosate decomposition. Microorganisms in soil exposed to 5 ppm and 25 ppm of glyphosate, for example, showed no adverse effects in terms of nitrogen fixation, nitrification or degradation of protein, starch and leaf litter.

The stability of glyphosate in water has been studied under both sterile and non-sterile conditions. As expected, glyphosate was found to be completely stable in sterile water. That's because no microorganisms were present to degrade it. Laboratory experiments indicate that once it is bound to suspended soil particles or deposited in bottom soil, glyphosate dissipates rapidly from water (half-life of approximately 2 weeks).

Water temperature, degree of water movement, water pH and the type of soil present in the water are among the key factors determining the water half-life value obtained for glyphosate. For example, somewhat longer water half-life values have been reported for various non-flowing natural water systems, including: sphagnum bog (pH 4.23), 7 weeks;

cattail swamp (pH 6.25), 9 weeks; and pond water (pH 7.33), 10 weeks.

Exposure/Environmental Fate Review

The potential for glyphosate exposure to humans and animals, together with the environmental fate characteristics of glyphosate, have been systematically evaluated. Results obtained in these investigations, coupled with the relatively low inherent toxicity of glyphosate, support the following conclusion. Accord herbicide will not cause substantial adverse impacts on humans, wildlife or the environment when it is used according to label instructions.

Glyphosate has a very low vapor pressure and does not volatilize. This desirable physical property minimizes the possibility of human and animal exposure. Exposure of humans, livestock, and wildlife to glyphosate as a consequence of consumption of food is also very low. That's because glyphosate does not accumulate in the food chain.

Using toxicological data, the EPA has established the human acceptable daily intake (ADI) value of glyphosate at 0.10 mg/kg body weight/day. This ADI value translates into a maximum permissible intake (MPI) value of 6 mg glyphosate/day for the entire human life span.

Based on the MPI value, it is essentially impossible for a person to consume the amount of glyphosate necessary to cause adverse effects. This conclusion holds true for both drinking water and food (meat, fish, fruits, vegetables, grain, milk and eggs) obtained from areas treated according to label directions with Accord herbicide.

Thermal Degradation Studies

Some of the vegetative management programs currently being practiced involve the burning of weeds, trees and brush following herbicidal applications.

Tests show that when glyphosate is burned in the air, 72% of the material is changed to one of four decomposition products, while the

remaining 28% becomes carbon ash. One quarter (25%) of the decomposition material is water (H₂O), 4% is acetonitrile (CH₃CN), while 43% comes off as carbon dioxide (CO₂) and phosphorus pentoxide (P₂O₅).

An assessment of the thermal decomposition products of glyphosate clearly shows that they will not cause substantial adverse effects on individuals exposed to the smoke or gases formed as a result of burning treated vegetation. This assessment is based on an application rate of 5 quarts/acre, and zero decomposition of glyphosate prior to burning.

Now consider what would happen if all of the available glyphosate were to form phosphorus pentoxide. Assume there is enough atmospheric moisture present to convert it all to phosphoric acid (H₃PO₄). The maximum exposure level which could possibly be obtained would still be nine times less than the current threshold limit value (TLV)⁵ for phosphoric acid. The maximum possible exposure level for acetonitrile would be 7,000 times less than its current TLV.

The established TLV already allows a significant margin of safety for individuals occupationally exposed to chemical materials. So it is evident that exposure to the theoretical maximum levels of either of these two materials does not pose a threat to humans.

Water and carbon dioxide are the only other decomposition products observed. Therefore, it is apparent that the burning of unwanted vegetation following application of Accord herbicide will not result in unacceptable atmospheric levels of glyphosate decomposition products.

Environmental Ecosystem Studies

Independently conducted studies have shown that Accord herbicide, when used as directed, has little or no effect on wildlife. In a study⁶ using black-tailed deer, these animals were given a choice of untreated or treated alder and alfalfa browse. The deer either showed no preference or they actually ate more of the

treated foliage. Ingestion of browse treated with glyphosate did not affect consumption of laboratory chow by the deer.

These findings indicate that the presence of glyphosate in upland vegetation would not prevent deer from feeding. Nor would it cause them to leave an area treated with glyphosate in search of food.

Environmental ecosystem data from the "Oregon Forest Ecosystem Study"⁷ provided more valuable information. The study's objective was to learn whether the habitat alteration induced by application of glyphosate would affect resident populations of small mammals and black-tailed deer. Formulated glyphosate had no detectable adverse effects on reproductive potential, growth or survival in natural populations of deer mice—even as long as one year after the forest application.

Furthermore, there were no detectable adverse effects on the distribution and abundance of deer mice, shrews, Oregon voles or Townsend chipmunks resident in the test area during the one-year observation period following glyphosate application. No influx of new animals from the surrounding region or any significant movement of marked animals away from the treated forest areas occurred.

The results obtained from these studies indicate that Accord herbicide, when properly applied to natural ecosystems, will not cause adverse effects on wildlife health, feeding habits or distribution.

Research on glyphosate, from the Carnation Creek Study,⁸ showed the following conclusions about this active ingredient in Accord herbicide:

- Degrades rapidly in soil
- Is essentially immobile in soil
- Is not a threat to either groundwater or surface water
- Does not cause adverse health or migrational changes in fish
- Has no direct measurable effects on aquatic or terrestrial invertebrates

(0.22 inch) fell on the first day after treatment.

1 Accord herbicide formulation contains 41.5% of glyphosate in the form of its isopropylamine salt (equivalent to 4 pounds of isopropylamine salt of N-[phosphonomethyl] glycine per U.S. gallon or 3 pounds per U.S. gallon of the acid, glyphosate) and 58.5% inerts (water).

2 EPA criteria.

3 TL stands for threshold limit.

4 Concentration which was effective in preventing normal embryonic development of the oyster eggs.

5 Established by the American Conference of Governmental Industrial Hygienists (ACGIH). Zero wind conditions existed during the application and a light rain

6 Sullivan, Thomas P., and Sullivan, Druscilla S. (1979). The effects of glyphosate herbicide on food preference and consumption in black-tailed deer. *Canadian Journal of Zoology*, 57, 1406.

7 Newton, M., Howard, F.M., Kelsas, B.P., Danhaus, R., Lottman, C.M., and Dupleman, S. (1984). Fate of glyphosate in an Oregon forest ecosystem. *Journal of Agricultural and Food Chemistry*, 32, 1144.

8 Forest Pest Management Institute. *Proceedings of the Carnation Creek Herbicide Workshop* (Sault Ste. Marie, Ontario, Ministry of Forests, Research Branch, 1989).

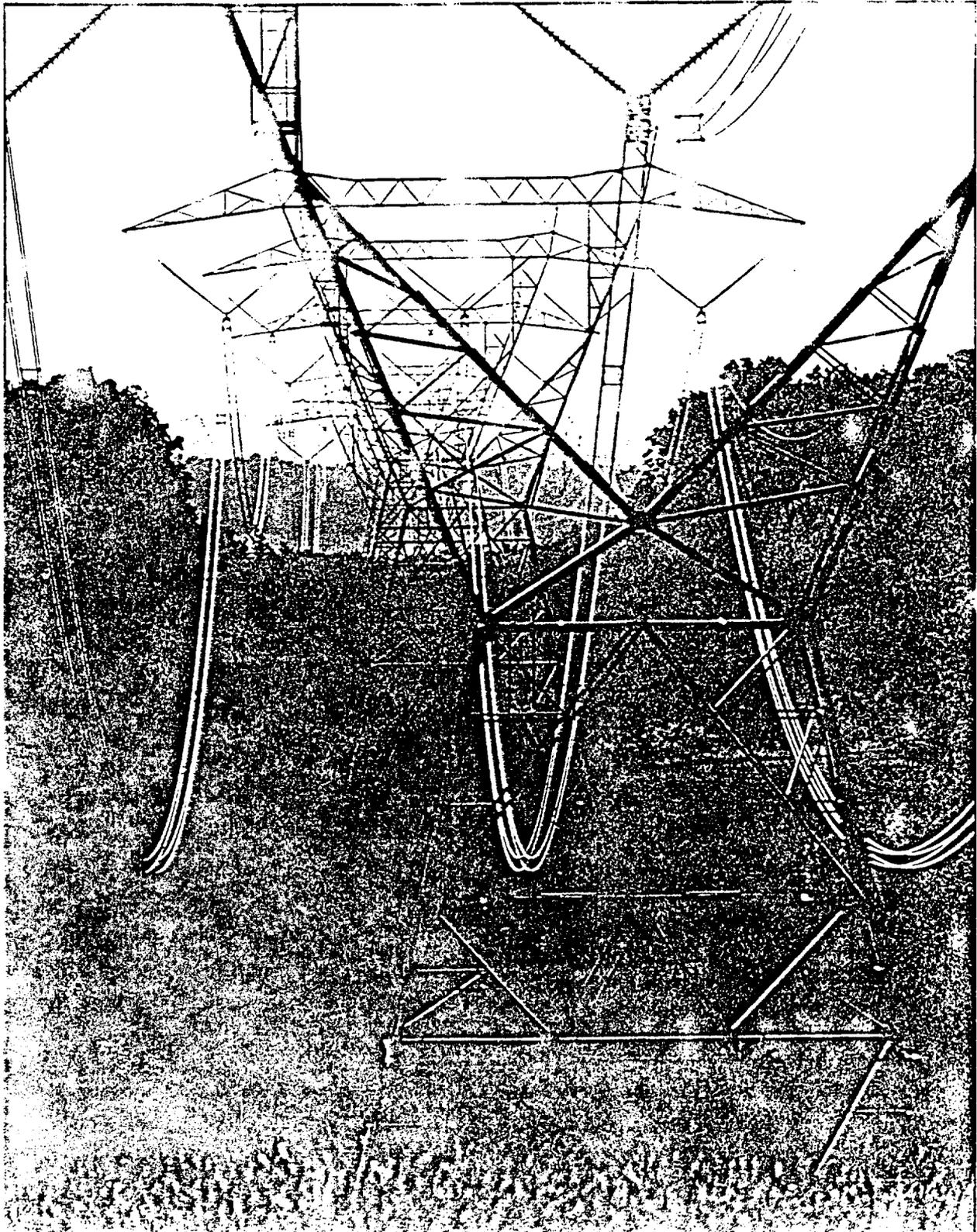
Monsanto

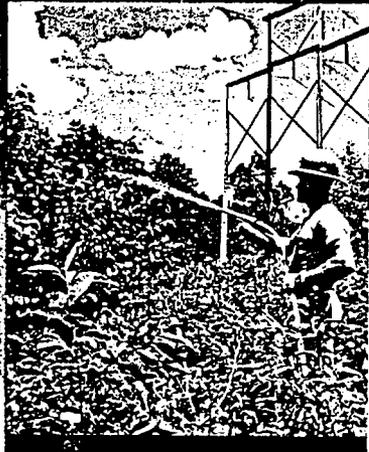
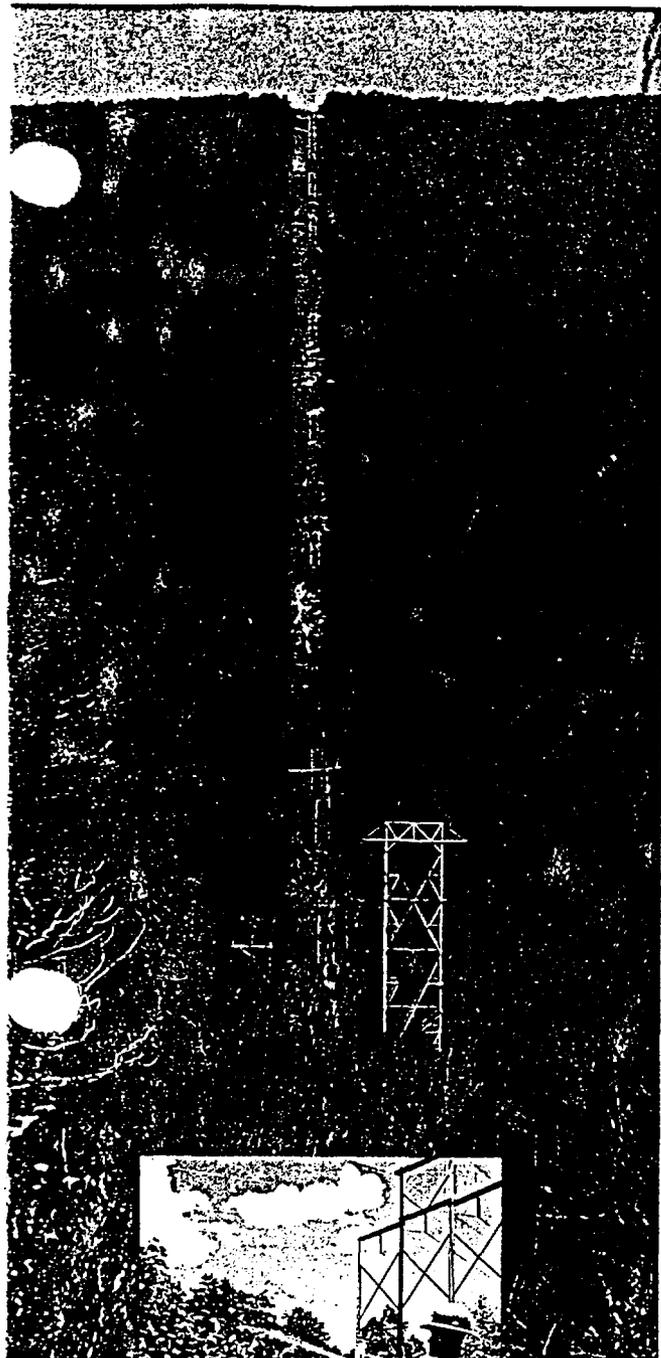
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THE FACTS ARE

ACCORD

by Monsanto





WHAT IS ACCORD

Accord® herbicide contains the active ingredient, glyphosate. The scientific name for glyphosate is N-(phosphonomethyl) glycine, which is a white, odorless solid.

PUTTING GLYPHOSATE TO PRACTICAL USE

Monsanto introduced glyphosate for non-crop use in 1974. Major additional uses were approved by the Environmental Protection Agency (EPA) in 1976, when it was registered for many agricultural uses.

In 1985, a formulation designed to meet the needs of homeowners was registered by the EPA. In 1986, glyphosate also went through the reregistration process as mandated by Congress in 1978.

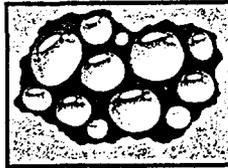
The effectiveness and desirable environmental characteristics of glyphosate are important reasons it's widely accepted throughout a broad base of customer types in a multitude of countries. Glyphosate is the key to the success of Accord herbicide in the utility market.

Accord is a non-selective, broad spectrum, postemergent herbicide with systemic activity in plants. This means the glyphosate in Accord does not distinguish between weeds and desirable plants. As a result, care must be taken to protect desirable plants from accidental contact.

Although conifers are relatively tolerant to glyphosate, a user should always assume that it will kill any plant which comes in contact with it — by accident or intent. Since glyphosate only works on plants that have emerged through the soil, it will not affect seeds that have not yet sprouted.

WORKS SYSTEMICALLY TO KILL TREATED VEGETATION

Glyphosate enters the plant by being absorbed through aboveground parts of the plant, such as leaves, stems and branches. It does not enter the plant through the root system.



LESS RISK OF OFF-SITE DAMAGE

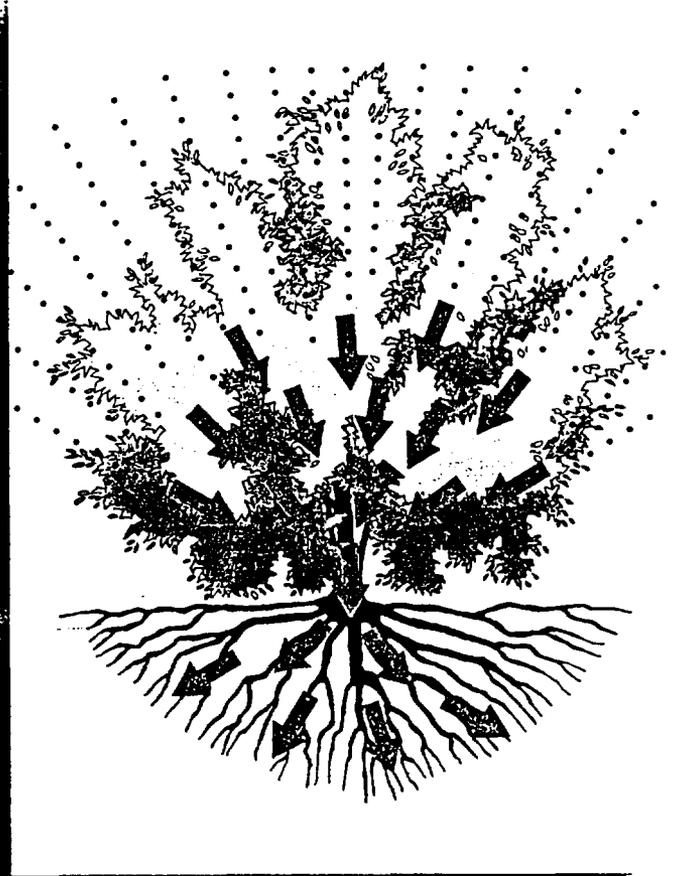
The glyphosate not absorbed by the plant is not taken up by the roots of off-site vegetation. Tests have shown that glyphosate stays where it is placed because it binds tightly to the soil. Thus, there is low potential for leaching or contamination of ground water.

Once in contact with the soil, glyphosate loses its herbicidal qualities and is degraded by soil microorganisms into natural products—carbon dioxide, water, nitrogen and phosphate. The soil microorganisms are not harmed by their role in glyphosate decomposition.

When properly applied to the foliage of actively growing plants, glyphosate is absorbed into the vascular system. Once there, it moves or "translocates" to the plant's underground root system. Simply put, glyphosate inhibits the normal production of a specific type of protein found only in plants.

Obvious signs of treatment may not be visible for two to four days for annual weeds and up to seven days or more for perennials. Different species of plants react differently. Visible effects are gradual wilting and yellowing of the treated plants, followed by complete browning, deterioration of plant tissue and ultimate decomposition of the underground roots and

es.



EXTENSIVE TESTING

The EPA is the arm of the federal government that regulates pesticides. All pesticides must be registered by the EPA before they can be sold in the U.S. In addition, state by state registration is also required. These requirements can be even more stringent than the federal standards.

Before a pesticide can be registered, a variety of studies must be conducted and submitted to government agencies for evaluation. The research includes toxicity studies on laboratory animals, together with metabolism tests and other studies to determine the environmental fate of the chemical.

Toxicological testing with laboratory animals serves as a model for evaluating the potential a substance has for causing adverse effects in humans. Toxicology studies measure the effects of direct exposure to the pesticides.

In addition to these standard tests, numerous studies have been conducted on non-target impacts such as deer, mice, voles, chipmunks and aquatic vertebrates and invertebrates. This diverse testing focused on specifics such as how glyphosate affects birds' ability to lay eggs, the ability of the eggs to survive, and the thickness of the egg shells. Additional studies also examined the impact of glyphosate on habitat change and bacteria in the soil.



While many studies are done, they generally fall within two broad classifications—acute and chronic. Acute studies determine the short-term effects of a material on a test animal—usually after a single, high dose. Acute studies on glyphosate were conducted by four routes of exposure: oral, eye, skin and inhalation.

Oral tests

The results of acute oral tests done on rats, and skin tests done on rabbits, are expressed as LD₅₀ values, i.e., the amount of the substance that produced death in 50% of the test animals. The smaller the LD₅₀ number, the more toxic the substance.

Accord herbicide is rated "practically non-toxic," based on oral and dermal doses given to rats. It's less toxic to rats than table salt following acute oral ingestion. Here are the approximate oral LD₅₀s for rats fed glyphosate and some other familiar substances to help put these numbers into perspective:

Table Salt	LD ₅₀ 3,000 mg/kg
Vitamin A	LD ₅₀ 2,000 mg/kg
Aspirin	LD ₅₀ > 1,000 mg/kg
Nicotine	LD ₅₀ 53 mg/kg

Eye studies

Accord is rated "essentially non-irritating." The irritation observed following exposure to glyphosate was completely reversible.

Skin studies

In acute skin studies using laboratory animals, Accord was shown to be practically non-irritating. Further, Accord did not kill any rabbits when maximum amounts were placed on their skin. The acute skin LD₅₀ value is greater than 5,000 mg/kg, which is practically non-toxic.

Additional tests and surveys were conducted to determine the effect of glyphosate on human skin. Data was recorded from workers handling glyphosate and from tests with human volunteers. The data indicates that irritation to normal human skin from contact with spray solution of glyphosate is not likely to occur.

Inhalation studies

Glyphosate is not volatile, and inhalation is extremely unlikely. However, when rats were forced to breathe spray mist continuously for four hours at the maximum achievable concentration, it was found to be no more than slightly toxic.

LONG-TERM TOXICITY TESTS

Long-term (chronic) toxicological studies have been conducted to determine the effects of prolonged, high-level exposure to glyphosate.

These studies were conducted with rats, mice and other laboratory animals. High doses were administered on a daily basis for the average lifetime of rats and mice and for one year for dogs. The results from these tests have provided additional data supporting the use of glyphosate.

Lifetime (two year) feeding studies with mice and rats resulted in EPA classification of glyphosate as a "Class D" pesticide, i.e., with "inadequate animal evidence of oncogenicity (tumor causing potential)."

The mouse study involved doses that were unusually high—up to 30,000 parts per million of the diet. The EPA stated that the study data was not sufficient to adequately address the question of whether apparent effects in the study were biologically relevant. Monsanto is in discussions with the agency on this issue.

In the rat study, the agency concluded that the data "did not demonstrate an oncogenic response." The study was accepted as a chronic feeding study. However, the EPA requested a further rat study using higher dose rates. That study is underway.

REPRODUCTIVE AND MUTAGENICITY STUDIES

Long-term feeding studies have also shown that glyphosate does not cause reproductive problems. Pregnant rabbits and rats given high dose levels of glyphosate experienced normal pregnancies and delivered normal offspring.

In a study in which glyphosate was fed continuously over three generations, no significant adverse effects were observed on the ability of rats to mate, conceive, carry or deliver normal offspring. Nor were any significant adverse effects observed on the ability of those offspring to develop into normal adults.

Glyphosate has consistently been shown to be negative in an extensive battery of mutagenicity and genotoxicity assays designed to evaluate three major endpoints—gene mutations, chromosome aberrations and DNA damage and repair. Based on the results of these studies, it can be concluded that glyphosate does not interfere with the genetic make-up of cells.

ENVIRONMENTAL TESTS

In addition to the testing done with laboratory animals, a completely different set of tests is done to determine how the herbicide reacts in the environment.

Some of these environmental studies include toxicology tests with domestic animals, aquatic species and wildlife. These tests are very similar to those conducted on laboratory animals.

Glyphosate by itself was found to be only slightly toxic to practically nontoxic in laboratory tests with

numerous aquatic species tested. Also, the Accord formulation was tested in aquatic species and found to be practically non-toxic.

In actual application and use, however, it is highly improbable that the levels of glyphosate would ever approach the concentrations used in laboratory testing conditions. That's because it binds tightly to soil particles and rapidly and completely degrades in soil and water.

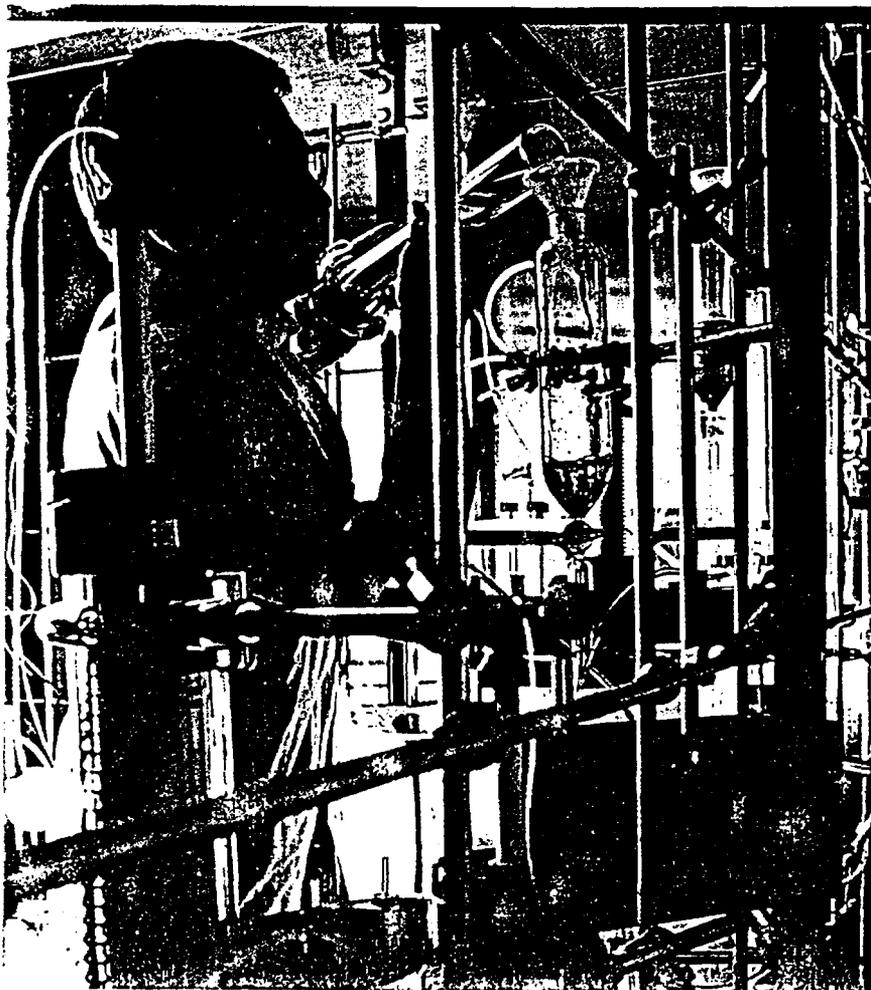
Another series of tests is conducted to measure what happens to the pesticide itself when it enters the environment. Studies measure the tendency of the chemical to bind to the soil and its likelihood of leaching from the soil after rainfall. Other tests measure the ability of microorganisms in the soil to biodegrade the product.

Crop residue analysis determines how a pesticide is processed, or metabolized, by plants. The pesticide under study is applied to food or feed crops under normal use conditions. Then, samples of the crops are examined for the presence of the pesticide or its metabolites.

Crop residues for glyphosate are primarily in the negligible range. Public exposure to residues in food crops is extremely low, if present at all.

Another type of residue study involves feeding livestock with feed rations which include measured amounts of the pesticide. Then food products from the animals are analyzed to see if there are any traces of the pesticide or its metabolites present.

Test results show that glyphosate does not accumulate in animals, birds and aquatic species. Therefore, glyphosate can not be passed up the food chain. The lack of accumulation is also supported by the high water solubility of glyphosate and its rapid elimination from the body. In fact, when milk from lactating cows and eggs from chickens fed diets with glyphosate were analyzed, no residues were detectable.



DEMONSTRATES SUPERIOR ENVIRONMENTAL

Glyphosate has a very favorable combination of physical properties, chemical properties and environmental fate characteristics. These characteristics result in minimal impact to the environment when the product is used in accordance with label directions.

MICROBIOLOGICALLY DEGRADABLE

Glyphosate is not persistent in the environment. The average half-life in soil is less than 60 days, and 90% of the glyphosate is degraded into its natural components in less than six months. The breakdown of glyphosate takes place primarily by normal soil microorganisms (bacteria), not chemical decomposition. In addition, glyphosate does not photodegrade in sunlight under laboratory conditions. Furthermore, photodegradation in the field is considered to be negligible.

The water half-life of glyphosate is between two and ten weeks. Water temperature, degree of water movement, pH and type of soil and microorganisms present are the determining factors for the degradation time of the product.

SOIL ACTIVITY

Tests have shown that glyphosate stays where it is placed because it binds tightly to most types of soil particles. In a laboratory study, columns of soil treated with glyphosate were leached continuously with water for 45 days. The test showed that no glyphosate was released from the soil.

NON-VOLATILE

Since glyphosate has a low vapor pressure, it does not tend to vaporize. This characteristic reduces the likelihood of any vapor inhalation and redistribution by air movement.

DOES NOT BIOACCUMULATE

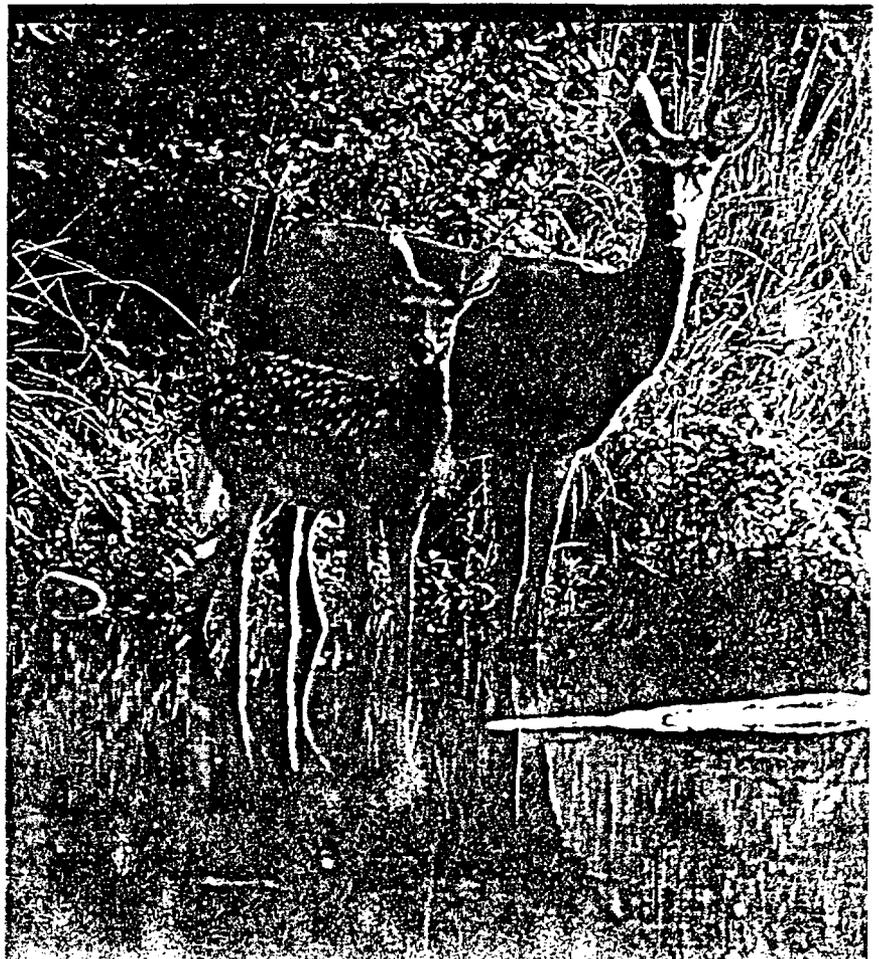
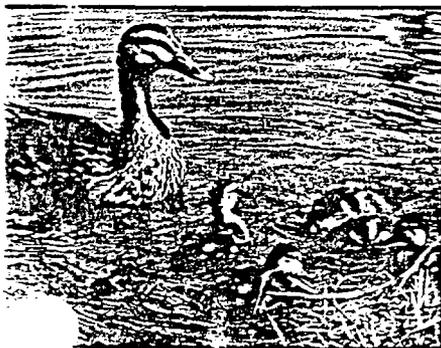
Studies with several species of animals and fish show minimal tissue retention and rapid elimination of glyphosate. Once ingested, glyphosate is poorly absorbed across the gastrointestinal membrane. Any material absorbed is rapidly eliminated. These findings indicate that even in the event of repetitive exposure, glyphosate will not accumulate in the body.

Studies show that glyphosate residues in agricultural crops are extremely minute—primarily in the negligible range. Consequently, the exposure of humans, livestock and wildlife to residue is extremely small.

Feeding tests with chickens, cows and pigs showed the ingestion of feed containing up to 75 ppm glyphosate resulted in non-detectable residue in muscle and fat. Even assuming the highest possible exposure to glyphosate—through consumption of crops from treated fields or meat from animals that have grazed on treated vegetation—a person's intake would be well under established health protective tolerance levels.

CONFIRMED BY RECENT STUDIES AROUND THE WORLD

State-of-the-art studies from around the world have now been completed. Results published by organizations including Oregon State University and the Canadian Ministry of Forestry clearly confirm the low impact of glyphosate on non-target



ENVIRONMENTAL CHARACTERISTICS

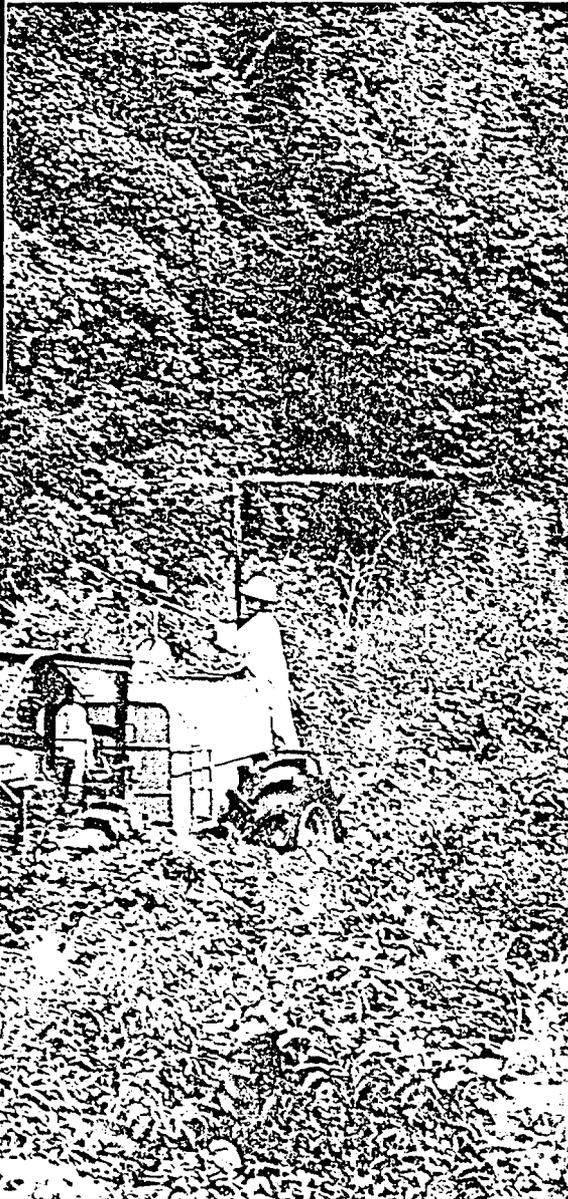
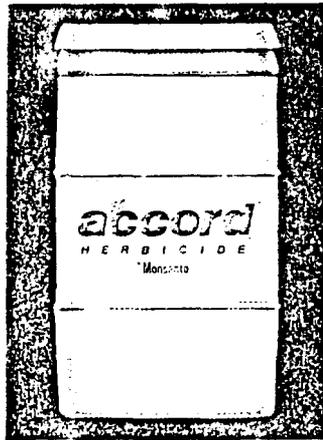
organisms such as birds, fish, deer and other forest wildlife.

In addition, the landmark forest impact research at Carnation Creek, British Columbia, consists of 18 studies conducted by their government. They are some of the most complete studies ever carried out in forestry. As a result of all these combined efforts, environmental information on glyphosate is now among the most extensive of any herbicide on the market today.

USE ACCORD WITH CONFIDENCE

Based on the results of extensive toxicological studies in animals, it has been demonstrated that there is no evidence that Accord herbicide causes birth defects or mutagenic effects. In addition, data from environmental fate studies showed that no significant adverse effects in the environment occurred following exposure to Accord.

Regulatory agencies of other countries have also reviewed the data and have registered glyphosate or use as a herbicide. Accord herbicide is marketed and effectively used in more than 100 countries around the world.



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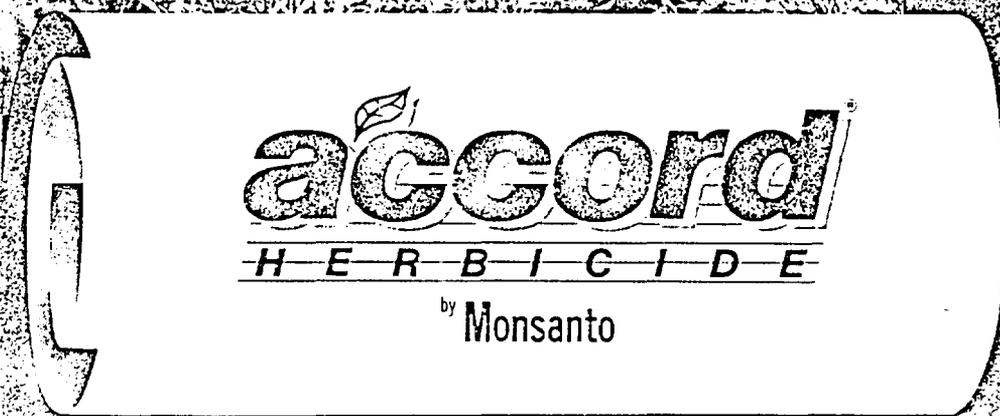
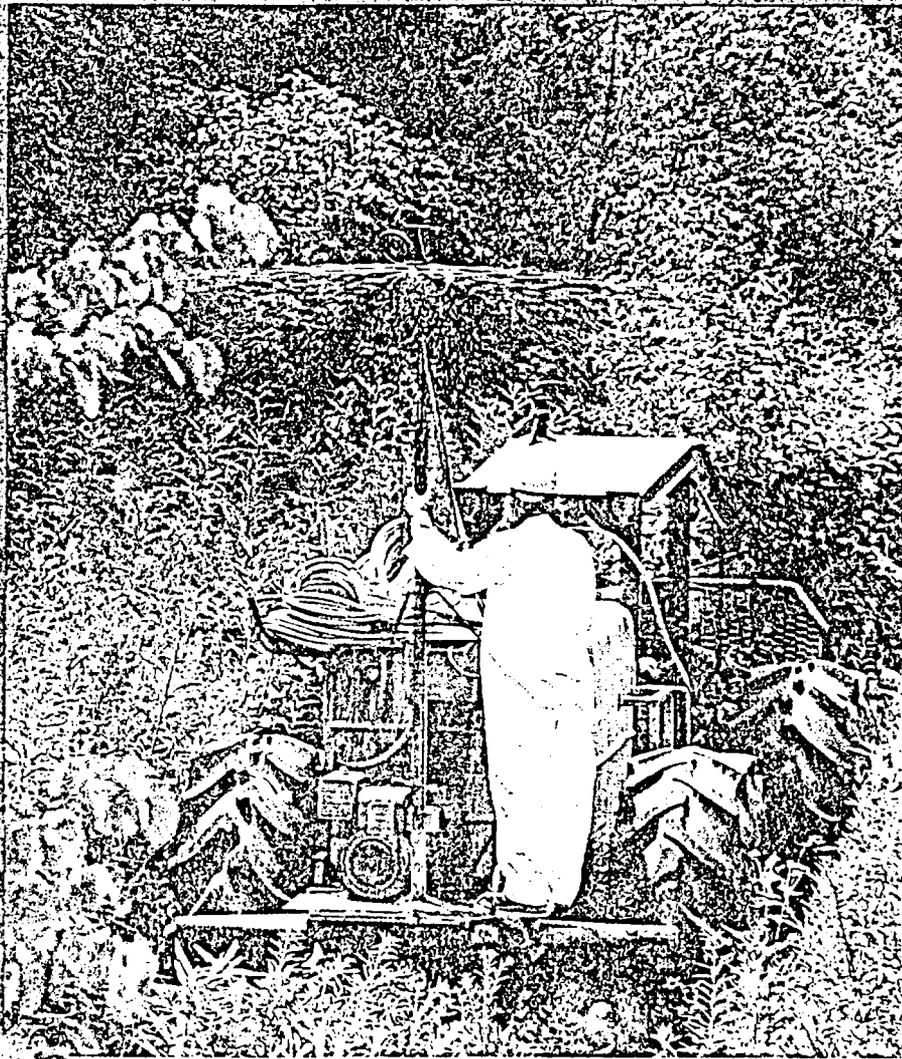
ALWAYS READ AND FOLLOW LABEL DIRECTIONS FOR ACCORD HERBICIDE.

Monsanto

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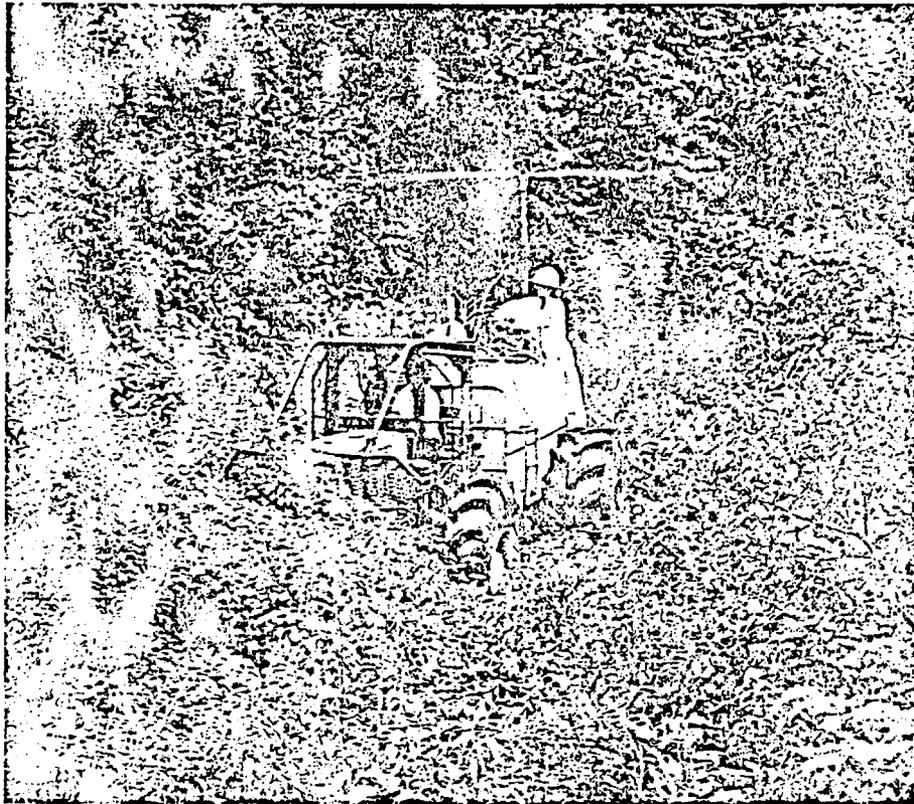
Sound Actions for
the Environment



The right way to use Accord
in utility rights-of-way

HOW ACCORD BEGINS TO START WITH A COMPLETE UNDERSTANDING OF ACCORD

Accord effectively controls or suppresses labeled green vegetation—including tough brush—that can grow into utility power lines. Accord enters through the leaves and spreads through the entire plant—killing it right down through the roots.



Trees and brush treated with Accord will show gradual wilting and falling of leaves that eventually turn brown and drop off. In addition, the branches will become brittle as Accord gradually moves through the plant.

Accord herbicide is very similar to another Monsanto product, Roundup Lawn & Garden grass and weed killer. Roundup has been widely used by homeowners for years to control weeds in side walks and driveways and other situations. Farmers also use Roundup to control weeds in their crops.



Spraying with Accord can start as early as mid-May in the South, mid-June in the Midwest, and early July in far northern areas, such as Maine. It continues until significant fall colors are present. For best results, vegetation should be

in full leaf and vigorously growing. The signs of treatment may appear more slowly with Accord than with some herbicides. Vegetation treated in fall will slowly and naturally blend in with the appearance of fall colors.

Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec

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Get the lowdown on low volume spray: g.

Accord provides effective results when sprayed at low volumes. While smaller amounts of highly concentrated solution are used in low volume applications, it's still important to get good coverage when applying Accord at low volumes.



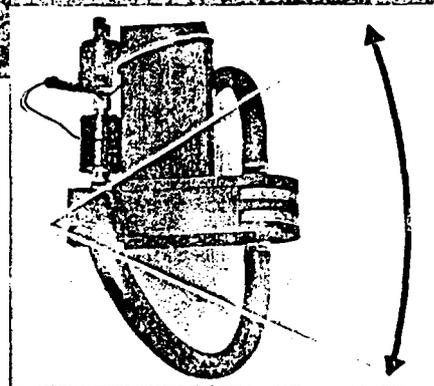
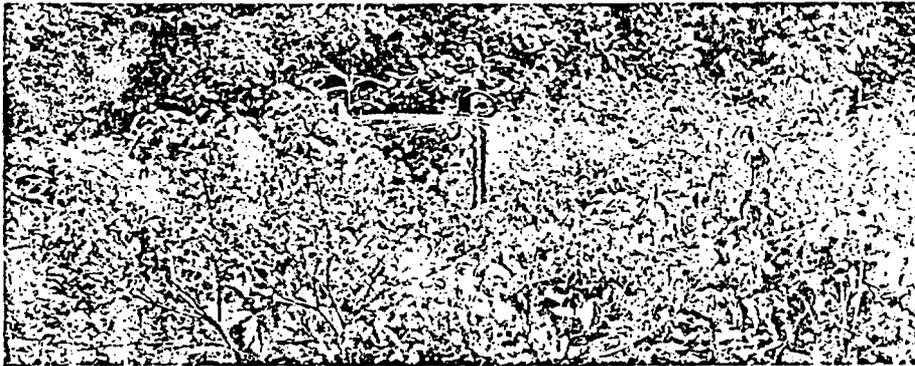
Generally, you'll need 40 to 60 gallons of spray solution per acre when applying Accord at low volumes. A high volume application, by comparison, typically uses 150 to 250 gallons of spray per acre.

Low volume spray systems produce very uniform results and avoid spray patterns. You can get good leaf coverage with reduced potential for drift.

Whether applying Accord at high or low volumes—it works well in both systems. You can count on it to provide cost-effective and effective vegetation management.

STATE-OF-THE-ART RADIARC SPRAYERS

The Radiarc* sprayer is a boomless, low-volume, drift-control spraying system manufactured by Waldron Specialties. Accord works very well when applied with Radiarc. This unit accurately sprays in a sharp-edged pattern that gives you precise control over the vegetation you cover with herbicide. Its various nozzle sizes produce uniform droplets without fine particles, providing excellent drift control.



The Radiarc spray head
tilts up and down.

The Radiarc sprayer delivers between 5 and 100 gallons per acre at application speeds of 1 to 20 miles per hour. Swath widths can be adjusted up to 50 feet in diameter. For best results, the Radiarc spray head should be mounted in a horizontal position 6 to 8 feet above the rear platform of a skidder or other rough-terrain vehicle.

It's important that the Radiarc be mounted high enough to completely cover the tops of the brush canopy. Accord enters the leaves and moves downward through the entire plant, including the root system. The Radiarc spray head can be tilted upward and locked in place before application so spray is directed upward to cover taller vegetation.

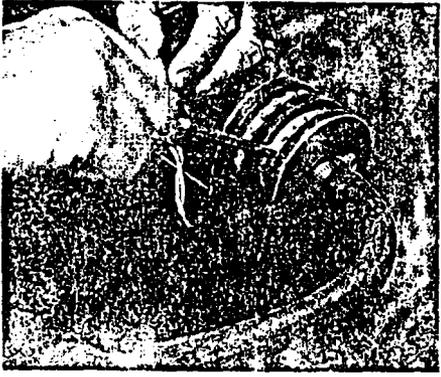
Follow directions in the Radiarc manual, or ask your foreman how to set up the spray system for the right-of-way you're spraying.

Tip on tip selection.

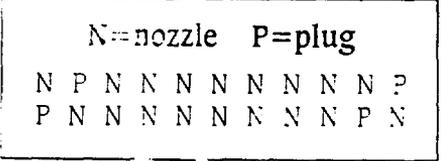
The Radiarc system comes with five standard tip sizes: .050, .045, .070, .085 and .101. Each nozzle delivers different-sized droplets (from 1,500 to 5,000 microns) and volumes. The .050 and .045 nozzles are most often used in low volume utility rights-of-way spraying with Accord herbicide.

The choice of nozzle for a particular job depends upon density of brush, how much herbicide you're going to apply, vehicle speed, type of vegetation, swath width and the kind of coverage you want.

A range of nozzle arrangements.

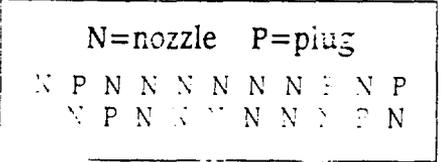


Nozzles are easily removed with a special nut driver. If all nozzles are used, more spray will be placed along the edges of the spray pattern than in the center. For an even pattern across the spray swath, without spraying heavily at the edges, use a nozzle arrangement similar to this:



Test all patterns on a dry area, such as a parking lot, using plain water instead of a herbicide mix. Make adjustments to the nozzles, plugs and rheostat on the control box to obtain an even pattern.

If you wish to overlap spray swaths, remove another nozzle at each end to make this nozzle arrangement:

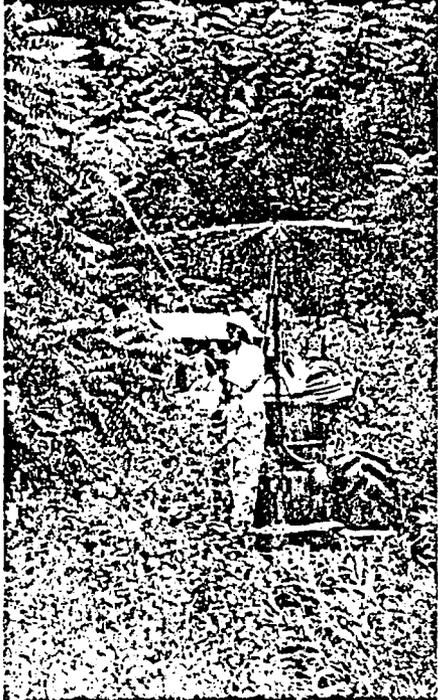


(The manufacturer may suggest other patterns for specific uses.)

Follow directions for properly calibrating the Radiarc sprayer before you begin application. Use the spray guide, or ask your foreman if you aren't sure how to do it.



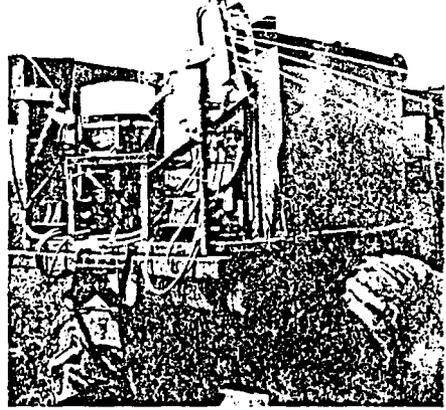
After you've adjusted the nozzles and calibrated the sprayer, you're ready to begin. Spray at a pressure of 25 to 35 psi.



You can spray taller vegetation with a high volume handgun.

Cluster nozzles make it very easy to vary swath width.

Cluster nozzles also provide good spray coverage at lower volumes. Set up for right-of-way spraying of Accord, they should deliver 30 to 50 gallons of spray solution per acre at pressures ranging from 30 to 40 psi.



Because cluster nozzles may produce a wide range of droplet sizes, consider using an anti-drift agent.

Cluster nozzles are easy to adjust for changes in swath and pattern while spraying. Just use the control panel mounted in the operator's cab.

Be sure to calibrate before spraying Accord with cluster nozzles. They're easy to calibrate and highly accurate.

For low volume applications, mix Accord on the basis of recommended gallons per acre. Aim for 40 to 60 gallons of spray solution per acre. The recommended rate for Accord is 8 to 10 quarts, or 2 to 2.5 gallons per acre.

After adding Accord, you'll need 1.5 gallons of non-ionic surfactant for every 100 gallons of solution. Surfactants help the spray solution cover and penetrate the leaf. For a 300-gallon tank, use 4.5 gallons of surfactant.

A colorant may also be added according to label directions. When sprayed, it will leave a colored deposit on the leaf to help you tell where you've gotten coverage.

How to figure total gallons of Accord per acre.

First, determine how many acres you can cover with a tankload of spray. For example, with a 300-gallon tank spraying 50 gallons per acre, you can treat 6 acres.

$$\frac{300 \text{ gal}}{50 \text{ gpa}} = 6 \text{ acres}$$

The recommended rate for Accord is 8 to 10 quarts per acre. So multiply the rate times the number of acres to find out how many quarts of Accord you need per tankload.

$$\begin{array}{r} 6 \text{ acres} \\ \times 8 \text{ qts/acre} \\ \hline 48 \text{ qts Accord} \end{array}$$

Since there are 4 quarts in a gallon, divide the number of quarts by 4 to get the total gallons of Accord you need per tankload.

$$\frac{48 \text{ qts}}{4 \text{ qts/gal}} = 12 \text{ gals Accord}$$

Accord measures up when used at the proper rates.

Sometimes adding Accord herbicide at higher labeled rates or tank-mixing Accord with another herbicide will improve control of some species. Follow the label directions for how much of each herbicide to add to the tank. Or ask your foreman.

Rates of Accord			
	100-gal tank	300-gal tank	500-gal tank
40 gal/acre	5-6.25 gallons	15-18.75 gallons	25-31.25 gallons
50 gal/acre	4-5 gallons	12-15 gallons	20-25 gallons
60 gal/acre	3.3-4.2 gallons	10-12.5 gallons	16.6-20.8 gallons

Rates of Surfactant			
	100-gal tank	300-gal tank	500-gal tank
Surfactant	1.5 gallons	4.5 gallons	7.5 gallons

How to mix a 300-gallon tank for low volume spraying.

Most tanks hold 300 or 500 gallons of solution. If you are using a 300-gallon tank, here's how to mix a solution of Accord to spray 50 gallons of solution per acre:

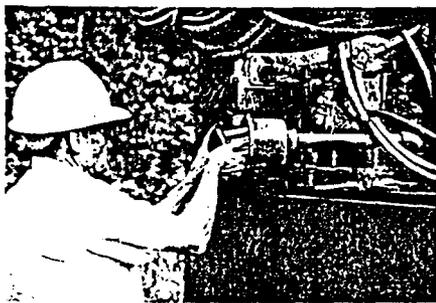
- 1 Fill the tank almost full with clean water.
- 2 If necessary, you may also add an anti-foaming agent.
- 3 Add an anti-drift agent, if needed. Because some low volume systems are designed to control drift, an anti-drift agent isn't always required. Ask your foreman.
- 4 Add 12 to 15 gallons of Accord, depending upon the rate specified by your foreman.
- 5 Add 4.5 gallons of a non-ionic surfactant.
- 6 Add a colorant, if you wish.
- 7 Mix thoroughly.

Do's and don'ts to avoid mixed results.

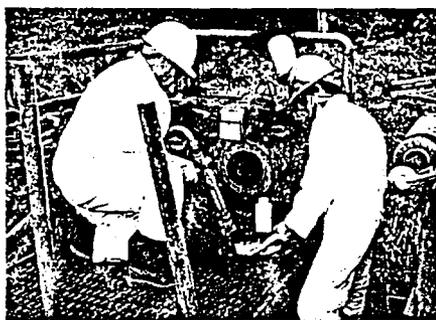
Use clean water! If possible, it's best to use city water or another clean, clear water source. Reduced control may occur if water containing soil is used, such as water from ponds or streams. That's because Accord sticks tightly to soil. Soil particles also increase the wear and tear on spray pumps.



If you must pump from a creek or pond, use adequate filtration to remove most soil particles from the water before mixing. Don't forget to take precautions to prevent backflow of herbicide from the tank into the water source.



Keep agitation to a minimum to avoid foaming. The solution can be recycled by turning the pump on and running the hose back into the tank for a few minutes.



Be sure to follow all label directions for Accord herbicide, surfactants, defoaming agents, colorants or dyes added to the spray solution. Mix thoroughly.

The pattern for success.

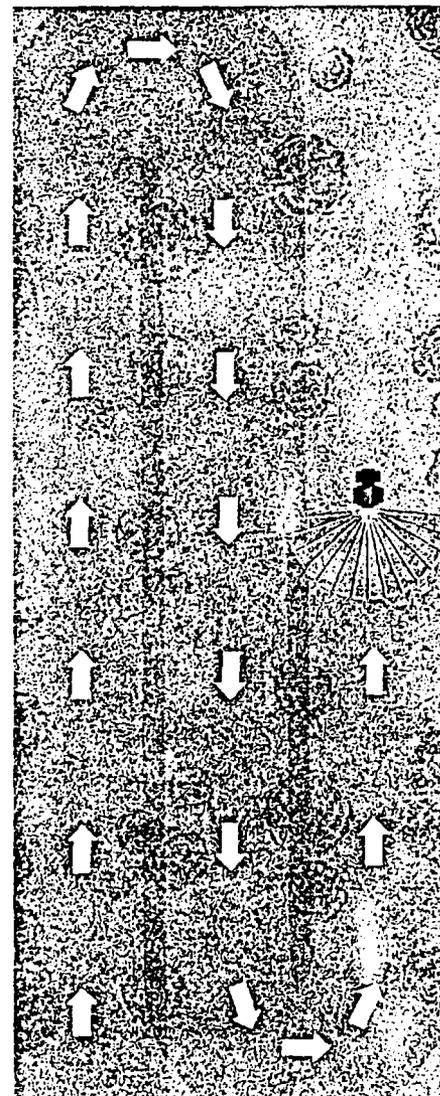
When spraying a utility right-of-way with a low volume boomless sprayer, follow a pattern to make sure you don't skip an area.

Start spraying by following the outer edge of the right-of-way, making sure the end of the spray pattern is still within the right-of-way and not hitting off-site vegetation.

Stop at the start of a new span or at a visible marker, turn around and drive back to the point of entry. Spray a swath next to the one already made, slightly overlapping the spray patterns. Look for wet leaves as an indication of coverage, and use a colorant if you wish to identify sprayed leaves.

When you reach your entry point, turn around and spray another path, moving up and down the right-of-way (see diagram). It's a little like mowing a lawn.

Continue this back-and-forth movement, working around any steep slopes, ditches or water. Watch where you've sprayed to avoid any skips.





Dress for success.

Successful results include attention to personal safety. Always wear protective eye cover, a helmet, gloves, and long-sleeved shirt and pants or coveralls when applying Accord with a low volume spray rig.



Rules of the road.

Store Accord herbicide in a well-secured place away from children or pets. When transporting Accord, follow all Department of Transportation regulations for identifying the container. You should also carry a copy of the Accord Material Safety Data Sheet and the product label in your vehicle.

Finish up by cleaning up.

When the herbicide containers are empty, triple-rinse them with water. Then pour the rinse water into the spray tank for application. The 2.5 gallon containers should be punctured with a knife or other sharp instrument. Dispose of empty herbicide containers according to local or state regulations.



In case of emergency ...

In the event of spills, accidental exposure, fire or other emergencies, contact your local Monsanto representative and the proper authorities. Or call one of the following emergency numbers.

Monsanto Emergency

Number:
1-314-694-4000

Chemtrec Emergency

Number:
1-300-424-9300

ALWAYS READ AND FOLLOW LABEL DIRECTIONS FOR ACCORD HERBICIDE.

Monsanto

Appendix 7.8

