Municipal Yearly Operational Plan 2019

City of Framingham

Department of Public Works

Municipal Operations Center
100 Western Avenue
Framingham, Massachusetts 01702

INTRODUCTION

The purpose of 333 CRM 11.00, Rights of Way Management, is to promote the implementation of integrated pest management techniques and to establish standards, requirements and procedures necessary to minimize the rash of unreasonable adverse effects on human health and the environment associated with the use of herbicides to maintain streets. These regulations establish procedures, which guarantee ample opportunity for public and municipal agency review and input on the right-of-way maintenance plans.

A yearly Operational Plan or YOP must be submitted to the Department of Food and Agriculture every year herbicides are intended for use to maintain Rights of Way. The YOP provides a detailed program for vegetation management for the year. A five-year Vegetation Management Plan (VMP) has been approved by the Department and is available for review at the Board of Health, Conservation Commission, and office of the Chief-elected official of the municipality.

Upon receipt of this YOP, the Department publishes a notice in the Environmental Monitor. The applicant must provide a copy of the proposed YOP and Environmental notice to the Board of Health, Conservation Commission, and the Chief elected municipal official for the city or town in which the herbicide treatment is proposed. The Department allows a 45-day comment period on the proposed YOP beginning with publication of the notice in the Environmental Monitor and receipt of the YOP and Environmental Monitor notice by each municipality.

Public notification and herbicide application to the streets is made at least 21 days in advance of the treatment by a separate notice. Notice is made to the Department of Food and Agriculture, the Mayor, City Manager or chairman of the Board of Selectman, the Board of Health, and the Conservation Commission of the municipality where the streets lie.

Any comments on this YOP should be directed to the contact person listed on page 3.

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I. Individual Supervising YOP

Individual supervising implementation and conditions of the YOP

Name and Title:	Daniel Nau Director of Highway and Sanitation
Department:	Department of Public Works
Address:	100 Western Ave. Framingham, MA 01702
Telephone Number:	(508) 532-6030
Signature:	Daniel S. Nau

II. Municipal Department Performing Herbicide Treatment

Framingham Department of Public Works

Contracted employees will perform herbicide treatment. Applicators are certified by the Department of Food and Agriculture in the applicator category.

Name:	Matthew Tolppa
Company:	Integrated Vegetation Services, LLC
Address:	73 J Street Athol, MA. 01331
Telephone Number:	978-424-5713
Signature:	_____ Matthew Toloppa

III. Herbicides Proposed including Application Rates, Carriers, Adjuvants

Herbicides that may be used on municipal roadways will be the following. They shall not be mixed together.

Trade Name	EPA Reg No	Active Ingredients	Guidelines
Roundup Pro	524-475	Glyphosate	See Attached
Razor Pro	228-366	Glyphosate	See Attached
Rodeo	62719-324	Glyphosate	See Attached

The names and the active ingredients of the herbicides proposed and the names of any carriers, adjuvants or additives to be used. Herbicide Fact Sheets for the herbicides proposed are found in Appendix A.

Control Method	Herbicide(s) Mixture %	Carriers or Adjuvants	Application Rate/Acre
Foliar Treatment	2 oz/gal 3%	NA	NA

Control Method will be one of the following: hand cutting, mowing, foliar treatments, cut stump treatment, or selective trimming.

IV. Herbicide Application Techniques and Alternative Control Applications

Roadway vegetation management will involve mechanical methods (sweeping, hand cutting, selective trimming and mowing) and chemical control (foliar herbicide treatments and cut stump treatments). The particular method(s) chosen will be based on a variety of factors to establish an easily maintainable, stable plant population that will not interfere with vehicles or pedestrians. Emphasis will be given to the control tactic that will address the vegetation problems in the most environmentally sound manner and in a way to minimize vegetation control in the long term. The method chosen for given vegetation problems will attempt to achieve a long term, low maintenance vegetation management program.

Chemical controls include foliar treatments. The type of equipment for foliar treatments will be hand sprayer, lowpressure hydraulic pump utilizing hand gun, low pressure hydraulic pump boom or nozzle application with manual control, WeedSeeker Selective low pressure hydraulic pump boom. The treatment uses low pressure, below 60 psi at the nozzle, for application.

V. Identification of Target Vegetation

Target Vegetation along roadways is limited to vegetation which poses a public nuisance and/or poses a risk to pedestrian or vehicular safety. Target vegetation and control methods intended are indicated below. For a full description of each target vegetation, refer to the VMP.

Target Vegetation	Mechanical Control	Chemical Control
Public Nuisance Vegetation- poison Ivy and other "poisonous" vegetation growing within 10 foot roadway	----------	low volume low pressure foliar spray
Nuisance Grass- stem density and height impedes movement or hampers visibility	selective trimming and mowing	low volume low pressure foliar spray
Vegetation Posing A Risk to Safety- Vegetation hampers visibility or impedes movement along roads and trails	hand cutting and selective trimming	low volume low pressure foliar spray

VI. Flagging Methods to Designate Sensitive Areas on the Row

Sensitive areas are identified as public ground water supplies, public surface water supplies, private drinking water supplies, surface waters, wetlands, habitated areas and agricultural areas. For the purpose of identification, sensitive areas are separated into two categories, areas not readily identifiable in the field, and areas that are identifiable in the field.

Sensitive areas not readily identifiable in the field include public groundwater supplies, wetlands, private water supplies and public surface water supplies. These will be flagged and marked as "No Spray Zones" in the following manner:

FLAGGING METHODS

Pink pavement markings will be used to identify "No spray zones" pavement, granite curbing and sidewalks will be marked with a pink line with the letters stenciled NSZ.

Qualified FDPW personnel will be ahead of crews to flag the no spray zones. Crews will be provided with street maps with no spray zones clearly marked.

Process of sensitive areas:

1. Areas to be sprayed were walked to determine sensitive areas
2. Questionable areas were checked by Conservation Commission
3. Board of Health records were reviewed to locate wells of older homes that do not confirm to today's stringent setback requirements. Homeowners were contacted in cases where no records were available.

SENSITIVE AREA RESTRICTIONS (333 CMR 11.04)

Sensitive Area	No-Spray Zone	Limited Use Zone
Wetlands	125 feet	10-100 feet Selective low pressure Storm treatments Comply with local Conservation regulations.
Public ground Water Supplies	400 feet	Primary Recharge Area: 24 months must elapse between application; Selective low pressure storm treatments

Public surface water Supplies	100 feet	100-400 feet, 24 months must elapse between Application; selective pressure storm treatments.
Private Drinking Water	125 feet	50-1000 feet 24 months must elapse Between application: Selective pressure storm treatments.
Surface Waters	125 feet	10-100 feet 12 months must elapse between application: Selective pressure storm treatments.
Agricultural and Habituated		0-100 feet 12 months must elapse Between application: Selective pressure storm treatments.

VII. Procedure and Locations for Handling Mixing and Loading of Herbicide Concentrates

All mixing and loading of herbicides will be conducted at a public works facility or at the contractor facility. Only the amount of herbicide necessary as determined by monitoring results will be mixed to carry out the vegetation control. The vehicle carrying out the spray operations or the supervising DPW vehicles will be equipped with a bag of absorbent, activated charcoal, leak-proof containers, a broom and a shovel in case of minor spills. A clipboard log of the herbicides on the vehicle will be kept on the vehicle. Herbicide labels and fact sheets should be carried on-site by the applicator.

As soon as any spill is observed, immediate action will be taken to contain the spill and protect the spill area. The cause of the spill must be identified and secured. Spill containment will be accomplished by covering the spill with absorptive clay or other absorptive material or, for large spills, building clay or soil dikes to impede spill progress. Until completely clean, protection of the spill area will be accomplished by placing barriers, flagging or crew members at strategic locations. If a fire is involved, care will be taken to avoid breathing fumes from any burning chemicals.

Minor spills will be remedied by soaking up the spill with absorptive clay or other absorptive material and placing it in leak-proof containers for proper disposal. Dry herbicides, such as granulars, will be swept up or shoveled up directly in leak-proof containers for proper disposal. All contaminated soil will be placed in leak-proof containers, removed from the site, and disposed of properly. Activated charcoal will be incorporated into the soil at the spill location at a rate of seven pounds per thousand square feet to inactivate any herbicide residue. Any minor spill will be reported to the Pesticide Bureau.

Major spills will be handled in a similar manner as minor spills, except in cases where the spill cannot be contained and/or removed by the crew. In this case, the DEP Incident Response Unit and Pesticide Bureau must be contacted.

VIII. Emergency Contacts

In the event of a spill or emergency, information on safety precautions clean-up procedures may be gathered from the following sources:

Herbicide Label

Herbicide Fact Sheet

Herbicide Material Safety Data Sheet

Herbicide Manufacturer

Monsanto	(617) 551-7200
Massachusetts Pesticide Bureau	(617) 626-1784
Massachusetts Department of Environmental Protection	(617) 292-5500
Chemtrec	(800) 262-8200
Pesticide Hotline	(800) 858-7378
Massachusetts Poison Control Center	(800) 222-1222
Local Police	911
Local Fire	911

Streets to be Treated 2019

Fountain Street
Winthrop Street
Mellin Street
Hollis Street
Irving Street
Beaver Street
Grant Street
Bishop Street
Howard Street
Hartford Street
Lincoln Street
Union Avenue
Main Street
Franklin Street
Mt. Wayte Avenue
Maple Street
State Street
Maynard Road
High Street
Salem End Road
Winter Street
Pleasant Street
Temple Street
Vernon Street
Library Street
Oak Street
Edgell Road
Brook Street
Frost Street
Water Street
Potter Road
Elm Street
Concord Street (Sax Sq. to Rt. 9)
Rt. 30 (Concord St. to Rt. 9)
Beacon Street
Summer Street
Central Street
School Street
Hamilton Street
Old Conn. Path
Speen Street
Rt. 30 (Concord St. to Mass Pike includes center island)

Note: Subject to funding

MUNICIPAL ROADWAY VEGETATION MANAGEMENT PLAN

This Municipal Roadway Vegetation Management Plan submitted to the Massachusetts Department of Food and Agriculture pursuant to the Rights of Way Management Regulations (333 CMR 11.00) has been reviewed and is recommended for adoption in the below named municipality. The undersigned hereby acknowledges the conditions of the Municipal Roadway Vegetation Management Plan will be adopted and complied with.

MUNICIPALITY: CITY OF FRAMINGHAM

PLAN TYPE: (CIRCLE ONE) Vegetation Management Plan VMP Yearly Operational Plan YOP

PLAN AUTHOR: Daniel S. Nau- Director of Highway and Sanitation

DEPARTMENT: Department of Public Works

ADDRESS: 100 Western Ave., Framingham, MA 01702

PHONE NUMBER: (508) 532-6030 FAX: (508) 620-4801

SIGNATURE, PLAN AUTHOR: Daniel S. Nau

SIGNATURE, CHAIRPERSON, BOH: Sam Wong

SIGNATURE, CHAIRPERSON, CONSERVATION COMMISSION: Robert McArthur

SIGNATURE, CHIEF ELECTED OFFICIAL: Mayor Yvonne M Spicer

A copy of this document should be kept on file in the municipality offices. Please send the original to the Massachusetts Department of Food and Agriculture with the submitted Vegetation Management Plan/Yearly Operational Plan.

Massachusetts Department of Food and Agriculture, Pesticide Bureau, Right of Way Program, 251 Causeway Street Suite 500, Boston, Massachusetts 02114-2151.

MUNICIPAL ROADWAY VEGETATION MANAGEMENT PLAN

This Municipal Roadway Vegetation Management Plan, approved by the Department of Food and Agriculture pursuant to the Rights of Way Management Regulations (333 CMR 11.00), has been adopted by the following roadway vegetation management program of the named municipality. The undersigned hereby acknowledges that the conditions of the Roadway Vegetation Management Plan will be adopted and complied with. The Roadway Vegetation Management Plan will be effective for 5 (five) years unless sooner modified or revoked by the Department.

MUNICIPALITY:	CITY OF FRAMINGHAM
AGENCY:	DEPARTMENT OF PUBLIC WORKS
ADDRESS:	100 WESTERN AVE. FRAMINGHAM, MA 01702
PHONE:	(508) 532-6030
NAME:	DANIEL S. NAU
SIGNATURE:	
DATE:	January 28, 2019

A municipality will be considered to have an approved Vegetation Management Plan only when a completed copy of this cover page is submitted to the Department of Food and Agriculture. The Conservation Commission, Board of Health and chief elected official in the community must receive a copy of this page and the entire Roadway Vegetation Management Plan.

MUNICIPAL YEARLY OPERATIONAL PLAN

2019

This Yearly Operational Plan, approved by the Department of Food and Agriculture pursuant to the Right-of-Way Management Regulations (333 CMR 11.00) has been adopted by the following roadway vegetation management program of the City of Framingham. The undersigned hereby acknowledge that the conditions of this Yearly Operational Plan will be adopted and complied with.

MUNICIPALITY	CITY OF FRAMINGHAM
NAME	DANIEL S. NAU
AGENCY	FRAMINGHAM DEPARTMENT OF PUBLIC WORKS
ADDRESS	100 WESTERN AVE., FRAMINGHAM, MA 01702
TELEPHONE	(508) 532-6030
SIGNATURE	_____
DATE	_____
WETLAND DELINEATION	Robert McArthur CONSERVATION AGENT

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
Department of Agricultural Resources
251 Causeway Street, Suite 500, Boston, MA 02114
617-626-1700 fax: 617-626-1850 www.mass.gov/agr
MDAR MASSACHUSETTS DEPARTMENT OF AGRICULTURAL RESOURCES

GLYPHOSATE

In addition to the review that is presented below, a comprehensive review available from USDA Forest Service provides information that incorporates more recent studies and data. The US Forest Service risk assessment report is available at: http://www.fs.fed.us/foresthealth/pesticide/risk.shtml

Review conducted by MDAR and MassDEP for use in Sensitive Areas of Rights-of-Way in Massachusetts

Common Trade Name(s): Roundup, Glyphosate VMF Round Up Pro, Rodeo, Accord, Accord Concentrate,

Chemical Name: N—(phosphonomethyl)glycine—isopropylamine salt
CAS No.: 1071-83-6

GENERAL INFORMATION
Glyphosate, n-phosphonomethyl glycine, is a systemic, broad spectrum herbicide effective against most plant species, including deep rooted perennial species, annual and biennial species of grasses, sedges, and broadleafed weeds. The major pathway for uptake in plants is through the foliage, however, some root uptake may occur. The presence of surfactants and humidity increases the rate of absorption of glyphosate by plants (15).

Foliarly applied glyphosate is readily absorbed and translocated from treated areas to untreated shoot regions. The mechanism of herbicidal action for glyphosate is believed to be inhibition of amino acid biosynthesis resulting in a reduction of protein synthesis and inhibition of growth (10, 15, 101).

Glyphosate is generally formulated as the isopropylamine salt in aqueous solution (122). Of the three products containing glyphosate considered here, Roundup is sold with a surfactant and Rodeo and Accord are mixed with surfactants prior to use (15). Glyphosate has been reviewed by US Forest Service (15), FAO (122), and EPA 00W (51).

ENVIRONMENTAL FATE

Mobility
Glyphosate is relatively immobile in most soil environments as a result of its strong adsorption to soil particles. Adsorption to soil particles and organic matter begins almost immediately after application. Binding occurs with particular rapidity to clays and organic matter (15). Clays and organic matter saturated with iron and aluminum (such as in the Northeast) tend to absorb more glyphosate than those saturated with sodium or calcium. The soil phosphate level is the main determinant of the amount of glyphosate adsorbed to soil particles. Soils which are low in phosphates will adsorb higher levels of glyphosate (14, 15).

Glyphosate is classified as immobile by the Helling and Turner classification system. In soil column leaching studies using aged (1 month) Glyphosate, leaching of glyphosate was said to be insignificant after 0.5 inches of water per day for 45 days (14).

Persistence
It has been reported that glyphosate dissipates relatively rapidly when applied to most soils (14). However, studies indicate that the soil half-life is variable and dependent upon soil factors. The half-life of glyphosate in greenhouse studies when applied to silty clay loam, silt loam, and sandy loam at rates of 4 and 8 ppm was 3, 27 and 130 days respectively, independent of application rate (14). An average half-life of 2 months has been reported in field studies for 11 soils (15).

Glyphosate is mainly degraded biologically by soil micro-organisms and has a minimal effect on soil microflora (15). In the soil environment, glyphosate is resistant to chemical degradation such as hydrolysis and is stable to sunlight (15). The primary metabolite of glyphosate is aminomethyl phosphonic acid (AMPA) which has a slower degradation rate than glyphosate (15). The persistence of AMPA is reported to be longer than glyphosate, possibly due to tighter binding to soil (14). No data are available on the toxicity of this compound.

Glyphosate degradation by microorganisms has been widely tested in a variety of field and laboratory studies. Soil characteristics used in these studies have included organic contents, soil types and pHs similar to those that occur in Massachusetts (117).

Glyphosate degradation rates vary considerably across a wide variety of soil types. The rate of degradation is correlated with microbial activity of the soils and does not appear to be largely dependent on soil pH or organic content (117). While degradation rates are likely temperature dependent, most reviews of studies do not report or discuss the dependence of degradation rate on temperature. Mueller et al. (1981 cited in 117) noted that glyphosate degraded in Finnish agricultural soils (loam and fine silt soils) over the winter months; a fact which indicates that degradation would likely take place in similar soils in the cool Massachusetts climate. Glyphosate halflives for laboratory experiments on sandy loam and loamy sand, which are common in Massachusetts, range up to 175 days (117). The generalizations noted for the body of available results are sufficiently robust to incorporate conditions and results applicable to glyphosate use in Massachusetts.

TOXICITY REVIEW

Acute (Mammalian)
Glyphosate has reported oral LD5Os of 4,320 and 5,600 mg/kg in male and female rats (15,4). The oral LD5Os of the two major glyphosate products Rodeo and Roundup are 5,000 and 5,400 mg/kg in the rat (15).

A dermal LD5O of 7,940 mg/kg has been determined in rabbits (15,4). There are reports of mild dermal irritation in rabbits (6), moderate eye irritation in rabbits (7), and possible phototoxicity in humans (9). The product involved in the phototoxicity study was Tumbleweed marketed by Murphys Limited UK (9). Maibach (1986) investigated the irritant and the photo irritant responses in individuals exposed to Roundup (41% glyphosate, water, and surfactant); Pinesol liquid, Johnson Baby Shampoo, and Ivory Liquid dishwashing detergent. The conclusion drawn was that glyphosate has less irritant potential than the Pinesol or the Ivory dishwashing liquid (120).

Metabolism
Elimination of glyphosate is rapid and very little of the material is metabolized (6,106).
Subchronic/Chronic Studies (Mammalian)
In subchronic tests, glyphosate was administered in the diet to dogs and rats at 200, 600, and 2,000 ppm for 90 days. A variety of toxicological endpoints were evaluated with no significant abnormalities reported (15,10).

In other subchronic tests, rats received 0, 1,000, 5,000, or 20,000 ppm (57, 286, 1143 mg/kg) in the diet for 3 months. The no observable adverse effect level (NOAEL) was 20,000 ppm (1,143 mg/kg) (115). In the one year oral dog study, dogs received 20, 100, and 500 mg/kg/day. The no observable effect level (NOEL) was 500 mg/kg (116).

Oncogenicity Studies
Several chronic carcinogenicity studies have been reported for glyphosate including an 18 month, mouse study; and a two year rat study. In the rat study, the animals received 0, 30, 100 or 300 ppm in their diet for 2 years. EPA has determined that the doses in the rat study do not reach the maximum tolerated dose (112) and replacement studies are underway with a high dose of 20,000 ppm (123). The mice received 1000, 5000 or 30,000 ppm for 18 months in their diets. These studies were non-positive (112,109). There was a non-statistically significant increase in a rare renal tumor (renal tubular adenoma (benign) in male mice (109). The rat chronic study needs to be redone with a high dose to fill a partial data gap (112). The EPA weight of evidence classification would be D: not classified (51).

Mutagenicity Testing
Glyphosate has been tested in many short term mutagenicity tests. These include 7 bacterial (including Salmonella typhimurim and B. subtilis) and 1 yeast strain Sacchomyces cerevisiae as well as a mouse dominant lethal test and sister chromatid exchange. The microbial tests were negative up to 2,000 mg/plate (15), as were the mouse dominant lethal and the Chinese hamster ovary cell tests. EPA considers the mutagenicity requirements for glyphosate to be complete in the Guidance for the Registration of Pesticide Products containing glyphosate (112).

The developmental studies that have been done using glyphosate include teratogenicity studies in the rat and rabbit, three generation reproduction studies in the rat, and a reproduction study in the deer mouse. (15)

Rats were exposed to levels of up to 3,500 mg/kg/d in one rat teratology study. There were no teratogenic effects at 3,500 mg/kg/d and the fetotoxicity NOEL was 1,000 mg/kg/d. In the rabbit study a fetotoxicity NOEL was determined at 175 mg/kg/d and no teratogenic effects were observed at 10 or 30 mg/kg/d in one study and 350 mg/kg/d in the other study (15). No effects were observed in the deer mouse collected from conifer forest sprayed at 2 lbs active ingredient per acre (15).

Tolerances & Guidelines
EPA has established tolerances for glyphosate residues in at least 75 agricultural products ranging from 0.1 ppm (most vegetables) to 200 ppm for animal feed commodities such as alfalfa (8).

U.S. EPA Office of Drinking Water has released draft Health Advisories for Glyphosate of 17.50 mg/L (ten day) and 0.70 mg/L (Lifetime)(51).

Avian
Two types of avian toxicity studies have been done with glyphosate: ingestion in adults and exposure of the eggs. The species used in the ingestion studies were the mallard duck, bobwhite quail, and the adult hen (chickens). The 8 day feeding LC5Os in the mallard and bobwhite are both greater than 4,640 ppm. In the hen study, 1,250 mg/kg was administered twice daily for 3 days resulting in a total dose of 15,000 mg/kg. No behavioral or microscopic changes were observed (15).

Invertebrates
A variety of invertebrates (mostly arthropods) and microorganisms from freshwater, marine, and terrestrial ecosystems have been studied for acute toxic effects of technical glyphosate as well as formulated Roundup. The increased toxicity of Roundup compared with technical glyphosate in some studies indicates that it is the surfactant (MONO 818) in Roundup that is the primary toxic agent (117). Acute toxicity information may be summarized as follows:

Glyphosate (technical): Acute toxicity ranges from a 48 hr EC5O for midge larvae of 55 mg/L to a 96 hr TL5O for the fiddler crab of 934 mg/L (15).

Roundup: Acute toxicity ranges from a 48 hr EC5O for Daphnia of 3 mg/L to a 95 hr LC5O for crayfish of 1000 mg/L (15).

Among the insects tested, the LD50 for honeybees was 100 mg/bee 48 hours after either ingestion, or topical application of technical glyphosate and Roundup. This level of experimental exposure is considerably in excess of exposure levels that would occur during normal field applications (15).

Aquatic Species (Fish) Technical glyphosate and the formulation Roundup have been tested on various fish species. Roundup is more toxic than glyphosate, and it is the surfactant that is considered to be the primary toxic agent in Roundup:

Glyphosate (technical):
Acute 96 hr LC5Os range from 24 mg/L for bluegill (Dynamic test) to 168 mg/L for the harlequin fish (15).

Roundup: Acute lethal toxicity values range from a 96 hr LC5O for the fathead minnow of 2.3 mg/L to a 96 hr TL5O for rainbow trout of 48 mg/L (15).

Tests with Roundup show that the egg stage is the least sensitive fish life stage. The toxicity increases as the fish enter the sac fry and early swim up stages.

Higher test temperatures increased the toxicity of Roundup to fish, as did higher pH (up to pH 7.5). Above pH 7.5, no change in toxicity is observed.

Glyphosate alone is considered to be only slightly acutely toxic to fish species (LC5Os greater than 10 mg/L), whereas Roundup is considered to be toxic to some species of fish, having LC5Os generally lower than 10 mg/L (15,118).

SUMMARY
Glyphosate when used as recommended by the manufacturer, is unlikely to enter watercourses through run-off or leaching following terrestrial application (117). Toxic levels are therefore unlikely to occur in water bodies with normal application rates and practices (118).

Glyphosate has oral LD5Os of 4,320 and 5,600 in male and female rats respectively. The elimination is rapid and very little of it is metabolized. The NOAEL in rats was 20,000 ppm and 500 mg/kg/d in dogs. No teratogenic effect was observed at doses up to 3,500 mg/kg/d and the fetotoxicity NOELS were 1,000 mg/kg/d in the rat and 175 mg/kg/d in the rabbit.

The evidence of oncogenicity in animals is judged as insufficient at this time to permit classification of the carcinogenic potential of glyphosate. The compound is not mutagenic.

REFERENCES

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6. The FDA Surveillance Index and Memorandum: Aug. 1981 and up Review and recommendations of the US Food & Drug Admin. Pub. by NTIS, US Dept. of Commerce

7. NTP Technical Report Series U.S. Dept. of Health and Human Services Pub. by The National Institute of Health

8. BNA Chemical Regulation Reporter: starts 1977 A weekly view of activity affecting chemical users and manufacturers. Pub. by The Bureau of National Affairs, Inc. 0148-7973

9. Dept. of Justice - Drug Enforcement Administration Memo dated September 26, 1985

10. The Herbicide Handbook: 1983 Fifth Ed. Handbook of the Weed Science Society of America. Pub. by the Weed Science Society of America, Champaign, Ill.

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15. Pesticide Background Statements: Aug. 1984 USDA Forest Service Agriculture Handbook #633 Vol. 1

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101. IUPAC Advances In Pesticide Science (1978) V—2 p. 139.

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115. Monsanto-Memo-Rat Feeding Study 3 Month.

116. Monsanto-Memo-RE: Day 1 year oral

117. The Herbicide Glyphosate Grossbard E. and Atkinson, D. (19)

118. Non:Target Impacts of the Herbicide Glyphosate Mammal Pest Management, LTD.

120. Maibach, H.I. (1986) Irritation, Sensitization, Photo Irritation and Photosensitic assays with Glyphosate Herbicide. Contact Dermititis 15 152—156.

122. Pesticide Residues in Food - 1986 FAQ Plant Production and Protection Paper 77.

123. Personal communication with Bill Heydens of Monsanto 2/16/89