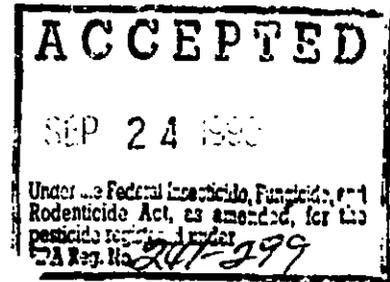


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241-299

1 of 23



ARSENAL®
herbicide
APPLICATORS CONCENTRATE

ACTIVE INGREDIENT:

Isopropylamine salt of Imazapyr (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid)*..... 53.1%

INERT INGREDIENT..... 46.9%

TOTAL..... 100.0%

*Equivalent to 43.3% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid or 4 pounds acid per gallon.

EPA Reg. No. 241-299

EPA Est. No.

KEEP OUT OF REACH OF CHILDREN

CAUTION!

PRECAUCION

PRECAUCION AL USUARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

In case of emergency endangering life or property involving this product, call collect, day or night, Area Code 201-835-3100.

See next page for Additional Precautionary Statements.

AMERICAN CYANAMID COMPANY
AGRICULTURAL DIVISION
VPC VENTURES
WAYNE, NJ 07470 ©1990

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PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

CAUTION!

Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

FIRST AID

IF ON SKIN: Wash with plenty of soap and water.

IF IN EYES: Flush with plenty of water. Get medical attention if irritation persists.

ENVIRONMENTAL HAZARDS

DO NOT apply directly to water or wetlands. DO NOT contaminate water when disposing of equipment washwaters. This herbicide is phytotoxic at extremely low concentrations. Nontarget plants may be adversely affected from drift.

PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of ARSENAL should be mixed, stored, and applied only in stainless steel, fiberglass, plastic, and plastic-lined steel containers.

DO NOT mix, store, or apply ARSENAL or spray solutions of ARSENAL in unlined steel (except stainless steel) containers or spray tanks.

IMPORTANT

DO NOT use on food or feed crops. Keep from contact with fertilizers, insecticides, fungicides, and seeds to prevent unintentional exposure of desirable vegetation with ARSENAL herbicide. DO NOT apply or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. DO NOT side trim desirable vegetation with this product. Prevent drift of spray to desirable plants. DO NOT USE in California.

Clean application equipment after using this product by thoroughly flushing with water.



173

GENERAL INFORMATION

ARSENAL herbicide APPLICATORS CONCENTRATE is a surfactant free aqueous solution to be mixed in water and applied as a spray for control of most annual and perennial grasses, broadleaf weeds, vines and brambles, and hardwood trees for forestry site preparation and release from woody and herbaceous competition. ARSENAL herbicide APPLICATORS CONCENTRATE is also recommended for control of undesirable vegetation along forest roads, non-irrigation ditchbanks, and the establishment and maintenance of wildlife openings. ARSENAL may also be mixed in water and used for stump and cut-stem treatment for control of unwanted woody vegetation.

ARSENAL is readily absorbed through foliage and roots and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Chlorosis first appears in the youngest leaf tissue. In perennials, the herbicide is translocated into and kills the underground storage organs, thus preventing most resprouting. Chlorosis and tissue necrosis may not be apparent in some plant species for several weeks after application. Complete kill of some brush species may not occur for several months.

DIRECTIONS FOR USE

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

ARSENAL herbicide APPLICATORS CONCENTRATE should be used only in accordance with recommendations on the leaflet label. Keep containers closed to avoid spills and contamination.

A postemergence application of ARSENAL is recommended for control of most annual and perennial grasses and broadleaf weeds, vines and brambles, and woody brush and tree species for forestry site preparation and release from woody and herbaceous competition. ARSENAL may be applied for the control of annual and perennial weeds and brush along drainage ditches and forest roads in forest management areas. ARSENAL may also be used in the establishment and maintenance of wildlife openings.

ARSENAL may be applied using helicopters, ground operated sprayers, low-volume hand-operated spray equipment such as back-pack and pump up sprayers, and injection equipment. DO NOT apply ARSENAL directly to water. DO NOT treat any ditch into which roots of desirable trees or other plants may extend, as injury may result.

Observe all cautions and limitations in the package labels of products used in combination with ARSENAL.

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STORAGE AND DISPOSAL

- PROHIBITIONS:** DO NOT store below 10°F.
DO NOT contaminate water, food, or feed by storage or disposal.
- PESTICIDE DISPOSAL:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.
- CONTAINER DISPOSAL:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in an approved sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

MIXING AND APPLICATION INSTRUCTIONS

HELICOPTER SPRAY EQUIPMENT:

Thoroughly mix the recommended amount of ARSENAL in 5 to 30 gallons of water per acre and uniformly apply with properly calibrated aerial equipment. A suitable nonionic surfactant such as Valent¹ X-77² may be added to the spray solution to enhance proper control of undesirable vegetation. All precautions should be taken to minimize or eliminate spray drift. Applications should not be made under gusty conditions or when wind velocity exceeds 5 mph. Except when applying with a MICROFOIL³ boom, THRU-VALVE BOOM⁴ or other similar equipment, a drift control agent may be added at the recommended label rate. A foam reducing agent may be added at the recommended label rate, if needed.

IMPORTANT: DO NOT make applications by fixed wing aircraft. Maintain adequate buffer zones to insure that drift does not occur off the target area. Thoroughly clean application and mixing equipment, including landing gear, immediately after use. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part.

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¹Trademark of Valent U.S.A. Corporation
²Registered Trademark of Chevron Chemical Company
³Trademark of Rhone Poulenc Ag. Company
⁴Trademark of Waldrum Specialties

5/23

GROUND OPERATED SPRAY EQUIPMENT:

Thoroughly mix and apply the recommended amount of ARSENAL in 15 to 100 gallons of water per acre. A suitable nonionic surfactant such as Valent X-77* may be added to the spray solution to enhance proper control of undesirable vegetation. A drift control agent and a foam reducing agent may be added at the recommended label rates, if needed. If desired, a spray pattern indicator may be added at the recommended label rate.

For best results, uniformly cover the foliage of the vegetation to be controlled with the spray solution.

IMPORTANT: DO NOT spray under windy or gusty conditions. Maintain adequate buffer zones to insure that drift does not occur off the target area. **HIGH VOLUME APPLICATIONS ARE RECOMMENDED FOR KUDZU WEED CONTROL PROGRAMS.** To avoid potential off-site damage use the minimum gallonage appropriate for the specific application. Clean application and mixing equipment after using this product by thoroughly flushing with water.

DIRECTED OR SPOT SPRAY EQUIPMENT:

When making directed or spot spray applications with helicopter or ground spray equipment, or low-volume hand-operated spray equipment, thoroughly mix a solution of 1/2 - 5 percent by volume of ARSENAL herbicide APPLICATORS CONCENTRATE and a minimum of 1/4 percent by volume of a nonionic surfactant such as Valent X-77* in water.

To mix the spray solution, add the volume of ARSENAL herbicide and nonionic surfactant indicated in the table below to the desired amount of water.

SPRAY SOLUTION MIXING GUIDE

SOLUTION VOLUME	ARSENAL CONCENTRATION (%)				SURFACTANT
	0.5	1	2.5	5	
1 gallon	2/3 oz.	1 1/3 oz.	3 1/3 oz.	6 2/3 oz.	1/3 oz.
5 gallons	3-1/3 oz.	6 2/3 oz.	1 pint	2 pints	1-2/3 oz.
10 gallons	6-2/3 oz.	13 1/3 oz.	2 pints	4 pints	3-1/3 oz.
25 gallons	1 pint	2 pints	5 pints	10 pints	8 oz.
100 gallons	4 pints	1 gal.	2.5 gal.	5 gal.	2 pints

2 tablespoons = 1 fluid ounce

For best results, uniformly cover the foliage of the vegetation to be controlled with the spray solution. Avoid making applications directly to desirable conifers. **BIGLEAF MAPLE REQUIRES AT LEAST A 2.5% CONCENTRATION SPRAY SOLUTION.**

IMPORTANT: DO NOT overapply causing runoff from the treated foliage. Avoid direct application to desired plant species as injury may occur. **DO NOT** exceed recommended dosage rate per acre. Clean application and mixing equipment after using this product by thoroughly flushing with water.

7/90

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STUMP AND CUT STEM TREATMENTS

ARSENAL APPLICATORS CONCENTRATE may be used to control undesirable woody vegetation in forest management by applying the ARSENAL solution to the cambium area of freshly-cut stump surfaces or to cuts on the stem of the target woody vegetation. Applications can be made at any time of the year except during periods of heavy sap flow in the spring.

MIXING:

ARSENAL may be mixed as either a concentrated or dilute solution for stump and cut stem treatments. The dilute solution may be used for applications to the surface of the stump or to cuts on the stem of the target woody vegetation. Concentrated solutions may be used for applications to cuts on the stem. Use of the concentrated solution permits application to fewer cuts on the stem, especially for large diameter trees. Follow the application instructions to determine proper application techniques for each type of solution.

To prepare a dilute solution, mix 4 to 6 fluid ounces of ARSENAL with one gallon of water.

To prepare a concentrated solution, mix 2 quarts of ARSENAL with no more than 2 quarts of water.

APPLICATION WITH DILUTE SOLUTIONS

For cut stump treatments: Spray or brush the solution onto the cambium area of the freshly cut stump surface. Insure that the solution thoroughly wets the entire cambium area (the wood next to the bark of the stump).

For tree injection treatments: Using standard injection equipment, apply 1 milliliter of solution at each injection site around the tree with no more than one inch intervals between cut edges. Insure that the injector completely penetrates the bark at each injection site.

For frill or girdle treatments: Using a hatchet, machete, or similar device, make cuts through the bark at intervals around the tree with no more than two inch intervals between cut edges. Spray or brush the solution into each cut until thoroughly wet.

APPLICATION WITH CONCENTRATED SOLUTIONS

For tree injection treatments: Using standard injection equipment, apply 1 milliliter of solution at each injection site. Make at least one injection cut for every 4 inches of diameter at breast height (dbh) on the target tree. For example, a 4 inch dbh tree will receive 1 injection cut and an 8 inch dbh tree will receive 2 injection cuts. On trees requiring more than one injection site place the injection cuts at approximately equal intervals around the tree.

For frill or girdle treatments: Using a hatchet, machete, or similar device, make cuts through the bark at approximately equal intervals around the tree. Make at least one cut for every 4 inches of dbh on the target tree. For example, a 4 inch dbh tree will receive 1 cut and an 8 inch tree will receive 2 cuts. Spray or brush the solution into each cut until thoroughly wet.

NOTE: Injury may occur to non-target or desirable woody plants if they extend from the same root system or their root systems are grafted to that of the treated tree.

SITE PREPARATION TREATMENTS

ARSENAL may be used to control labeled grasses, broadleaf weeds, vines, brambles, and woody brush and trees on forest sites in advance of regeneration. Herbaceous grass and broadleaf weeds are controlled and do not provide fuel to facilitate a site preparation burn, if desired, to control residual conifers.

Use ARSENAL for site preparation in advance of regeneration with the following species:

Species	Rate (pints/A)
Loblolly Pine (<u>Pinus taeda</u>)	1 1/2 - 2 1/2
Loblolly X Pitch Hybrid	1 1/2 - 2 1/2
Longleaf Pine (<u>Pinus palustris</u>)	1 1/2 - 2 1/2
Shortleaf Pine (<u>Pinus echinata</u>)	1 1/2 - 2 1/2
Slash Pine (<u>Pinus elliottii</u>)	1 1/2 - 2 1/2
Virginia Pine (<u>Pinus virginiana</u>)	1 1/2 - 2 1/2
Black Spruce (<u>Picea mariana</u>)	3/4 - 2
Jack Pine (<u>Pinus banksiana</u>)	3/4 - 2
Pitch Pine (<u>Pinus rigida</u>)	3/4 - 2
Red Spruce (<u>Picea rubens</u>)	3/4 - 2
White Pine (<u>Pinus strobus</u>)	3/4 - 2
White Spruce (<u>Picea glauca</u>)	3/4 - 2
Douglas Fir (<u>Pseudotsuga menziesii</u>)	5/8 - 2
Lodgepole Pine (<u>Pinus contorta</u>)	5/8 - 2
Ponderosa Pine (<u>Pinus ponderosa</u>)	5/8 - 2

Apply recommended rate of ARSENAL per acre when making helicopter or mechanical ground spray applications. Refer to mixing and application instructions for proper spray volumes. Use a minimum of 1/4 percent volume of a nonionic surfactant. Use the higher label rates of ARSENAL and higher spray volumes when controlling particularly dense or multi-layered canopies of hardwood stands, or difficult to control species. Tank mixing may be necessary for chemical control of residual conifers and other species tolerant to ARSENAL in certain cases. Observe all precautions and restrictions on the product labels. Always follow the most restrictive label.

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8723

DO NOT plant seedlings of species other than Douglas-fir on sites that have been broadcast treated with ARSENAL or into the treated zone of spot or banded applications for three months following application or injury may occur. Do not plant Douglas-fir into areas treated with ARSENAL for two months following application or injury may occur.

HERBACEOUS WEED CONTROL

Use ARSENAL for release of the following conifers from herbaceous competition:

Species	Rate (fl.oz./A)
Loblolly Pine (<u>Pinus taeda</u>)	6 - 10
Loblolly X Pitch Hybrid	6 - 10
Virginia Pine (<u>Pinus virginiana</u>)	6 - 10
Longleaf Pine (<u>Pinus palustris</u>)	4 - 10
Slash Pine (<u>Pinus elliottii</u>)	4 - 10

ARSENAL herbicide may be applied as a broadcast or directed spray application for release of young conifers from herbaceous weeds. Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. For release of conifers from herbaceous weeds, apply the recommended rate of ARSENAL by either helicopter or ground spray applications. Refer to mixing and application instructions for proper spray volumes. A suitable nonionic surfactant may be added at a rate not to exceed 1/4 percent by volume in water. For best results, applications should be made to newly emerged weeds. For difficult to control weeds, use the higher rates of ARSENAL.

ARSENAL herbicide may be tank mixed with other registered herbicides to broaden the spectrum of weeds controlled. To prevent possibility of conifer injury, do not apply ARSENAL when conifers are under stress from diseases, animal or winter injury, planting shock or other stresses.

CONIFER RELEASE TREATMENTS

ARSENAL may be applied as a broadcast or directed spray application for control of labeled weed species. Directed spray applications may be made with low-volume applications in conifer stands of all ages and species by targeting the unwanted vegetation and avoiding direct application to the conifer.

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9 33

Use broadcast applications of ARSENAL for release of the following conifers from hardwood competition:

Species	Rate (fl. oz./A)*
Loblolly Pine (<u>Pinus taeda</u>)	16 - 32
Loblolly X Pitch Hybrid	16 - 32
Virginia Pine (<u>Pinus virginiana</u>)	16 - 32
**Longleaf Pine (<u>Pinus palustris</u>)	12 - 16
Pitch Pine (<u>Pinus rigida</u>)	12 - 16
**Shortleaf Pine (<u>Pinus echinata</u>)	12 - 16
**Slash Pine (<u>Pinus elliottii</u>)	12 - 16
***White Pine (<u>Pinus strobus</u>)	8 - 16
**Douglas Fir (<u>Pseudotsuga menziesii</u>)	8 - 12
**Lodgepole Pine (<u>Pinus contorta</u>)	8 - 12
**Ponderosa Pine (<u>Pinus ponderosa</u>)	8 - 12
**Black Spruce (<u>Picea mariana</u>)	6 - 12
**Jack Pine (<u>Pinus banksiana</u>)	6 - 12
**Red Spruce (<u>Picea rubens</u>)	6 - 12
**White Spruce (<u>Picea glauca</u>)	6 - 12
**Balsam Fir (<u>Abies balsamea</u>)	2 - 8

* Rates less than 16 fl. oz./A could result in reduced control of some labeled species.

** Applications should be made after formation of final conifer resting buds in the fall or height growth inhibition may occur.

*** DO NOT make applications to white pine stands younger than three years old. To minimize potential white pine injury, release treatments should not be made prior to July 15.

Apply recommended rate of ARSENAL per acre when making broadcast applications with helicopter or ground spray equipment. Refer to mixing and application instructions for proper spray volumes. Addition of a nonionic surfactant at no more than 1/4 percent by volume is recommended. Use the higher label rates of ARSENAL when controlling particularly dense stands or difficult to control species.

Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. To minimize potential conifer height growth inhibition, do not make applications to conifer stands before formation of conifer resting buds at the end of the second growing season. To minimize potential conifer height growth inhibition in conifer stands that have been established in the field for more than two growing seasons, broadcast release treatments may be made after formation of final conifer resting buds in the fall. To prevent possibility of conifer injury, do not apply ARSENAL when conifers are under stress from diseases, animal or winter injury, or other stresses.

10-23

Use ARSENAL for spot treatment of undesirable hardwood vegetation:

ARSENAL may be used to control undesirable brush and hardwoods in the management of all conifer species (including, but not limited to, those conifer species listed in the broadcast application section above) of all ages as a directed foliar or injection application. Refer to mixing and application instructions for proper use rates, equipment, and application techniques.

Avoid direct application to desired plant species as injury may occur. Injury may occur to non-target or desirable hardwoods or conifers if they extend from the same root system or their root systems are grafted to those of the treated tree or if their roots extend into the treated zone.

WEEDS CONTROLLED

ARSENAL herbicide APPLICATORS CONCENTRATE will provide postemergence control and some residual control of the following target vegetation species. Degree of control is both species and rate dependent. ARSENAL herbicide should be used only in accordance with the recommendations on this label.

GRASSES

The species of annual and perennial grasses controlled by ARSENAL herbicide include the following:

- Annual bluegrass (Poa annua)
- Bahiagrass (Paspalum notatum)
- Beardgrass (Andropogon spp.)
- Bermudagrass (Cynodon dactylon)
- Big bluestem (Andropogon gerardii)
- Broadleaf signalgrass (Brachiaria platyphylla)
- Canada bluegrass (Poa compressa)
- Cattail (Typha spp.)
- Cheat (Bromus secalinus)
- Crabgrass (Digitaria spp.)
- Dallisgrass (Paspalum dilatatum)
- Downy brome (Bromus tectorum)
- Fall panicum (Panicum dichotomiflorum)
- Feathertop (Pennisetum villosum)
- Fescue (Festuca spp.)
- Foxtail (Setaria spp.)
- Goosegrass (Eleusine indica)
- Guineagrass (Panicum maximum)
- Italian ryegrass (Lolium multiflorum)
- Johnsongrass (Sorghum halepense)
- Kentucky bluegrass (Poa pratensis)
- Lovegrass (Eragrostis spp.)
- Orchardgrass (Dactylis glomerata)
- Paragrass (Brachiaria mutica)
- Phragmites (Phragmites australis)

- Prairie cordgrass (Spartina pectinata)
- Prairie threeawn (Aristida oligantha)
- Quackgrass (Agropyron repens)
- Reed canary grass (Phalaris arundinacea)
- Saltgrass (Distichlis stricta)
- Sand dropseed (Sporobolus cryptandrus)
- Sandbur (Cenchrus spp.)
- Smooth brome (Bromus inermis)
- Timothy (Phleum pratense)
- Torpedograss (Panicum repens)
- Vaseygrass (Paspalum urvillei)
- Wild barley (Hordeum spp.)
- Wild oats (Avena fatua)
- Wirestem muhly (Muhlenbergia frondosa)
- Witchgrass (Panicum capillare)

BROADLEAF WEEDS

The species of annual and perennial broadleaf weeds controlled by ARSENAL herbicide include the following:

- Bull thistle (Cirsium vulgare)
- Burdock (Arctium spp.)
- Camphorweed (Heterotheca subaxillaris)
- Canada thistle (Cirsium arvense)
- Carolina geranium (Geranium carolinianum)
- Carpetweed (Mullugo verticillata)
- Clover (Trifolium spp.)
- Cocklebur (Xanthium strumarium)
- Common chickweed (Stellaria media)
- Common ragweed (Ambrosia artemisiifolia)
- Dandelion (Taraxacum officinale)
- Dock (Rumex spp.)
- Dogfennel (Eupatorium capillifolium)
- Filaree (Erodium spp.)
- Fleabane (Erigeron spp.)
- Giant ragweed (Ambrosia trifida)
- Goldenrod (Solidago spp.)
- Hoary vervain (Verbena stricta)
- Horseweed (Conyza canadensis)
- Indian mustard (Brassica juncea)
- Lambsquarters (Chenopodium album)
- Little mallow (Malva parviflora)
- Milkweed (Asclepias spp.)
- Miners lettuce (Montia perfoliata)
- Mullein (Verbascum spp.)
- Nettleleaf goosefoot (Chenopodium murale)
- Oxeye daisy (Chrysanthemum leucanthemum)
- Pepperweed (Lepidium spp.)
- Pigweed (Amaranthus spp.)
- Plantain (Plantago spp.)
- Pokeweed (Phytolacca americana)

- Primrose (Oenothera kunthiana)
- Purslane (Portulaca spp.)
- Silverleaf nightshade (Solanum elaeagnifolium)
- Smartweed (Polygonum spp.)
- Sorrell (Rumex spp.)
- Sowthistle (Sonchus spp.)
- Sunflower (Helianthus spp.)
- Sweet clover (Melilotus spp.)
- Tansymustard (Descurainia pinnata)
- Texas thistle (Cirsium texanum)
- Western ragweed (Ambrosia psilostachya)
- Wild carrot (Daucus carota)
- Wild lettuce (Lactuca spp.)
- Wild parsnip (Pastinaca sativa)
- Wild turnip (Brassica campestris)
- Woollyleaf bursage (Ambrosia grayi)
- Yellow starthistle (Centaurea solstitialis)
- Yellow woodsorrel (Oxalis stricta)

VINES AND BRAMBLES

The species of vines and brambles controlled by ARSENAL herbicide include the following:

- Blackberry (Rubus spp.)*
- Dewberry (Rubus spp.)*
- Field bindweed (Convolvulus arvensis)
- Greenbriar (Smilax spp.)
- Hedge bindweed (Calystegia sepium)
- Honeysuckle (Lonicera spp.)
- Kudzu (Pueraria lobata)**
- Morningglory (Ipomoea spp.)
- Poison ivy (Rhus radicans)
- Redvine (Brunnichia cirrhosa)
- Trumpet creeper (Campsis radicans)
- Virginia creeper (Parthenocissus quinquefolia)
- Wild buckwheat (Polygonum convolvulus)
- Wild grape (Vitis sp.)
- Wild rose (Rosa spp.)
- Including: Multiflora rose (Rosa multiflora)
- Macartney rose (Rosa bracteata)

*The degree of control may be species dependent. Some Rubus species may not be controlled.

** Use a minimum of 75 GPA - Control of established stands may require multiple applications.

WOODY BRUSH AND TREES

The species of woody brush and trees controlled by ARSENAL herbicide include the following:

- American beech (Fagus grandifolia)
- Ash (Fraxinus spp.)
- Aspen (Populus spp.)
- Bald cypress (Taxodium distichum)
- Bigleaf maple (Acer macrophyllum)
- Blackgum (Nyssa sylvatica)
- Boxelder (Acer negundo)
- Cherry (Prunus spp.)
- Chinaberry (Melia azedarach)
- Chinese tallow-tree (Sapium sebiferum)
- Dogwood (Cornus spp.)
- Hawthorn (Crataegus spp.)
- Hickory (Carya spp.)
- Maple (Acer spp.)
- Mulberry (Morus spp.)*
- Oak (Quercus spp.)
- Persimmon (Diospyros virginiana)
- Poplar (Populus spp.)
- Privet (Ligustrum vulgare)
- Red alder (Alnus rubra)
- Red maple (Acer rubrum)
- Sassafras (Sassafras albidum)
- Sourwood (Oxydendrum arboreum)
- Sumac (Rhus spp.)
- Sweetgum (Liquidambar styraciflua)
- Willow (Salix spp.)
- Yellow poplar (Liriodendron tulipifera)

*The degree of control may be species dependent.

DISCLAIMER

The label instructions for the use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use or application of the product contrary to label instructions, all of which are beyond the control of American Cyanamid Company. All such risks shall be assumed by the user.

American Cyanamid Company warrants only that the material contained herein conforms to the chemical description on the label and is reasonably fit for the use therein described when used in accordance with the directions for use, subject to the risks referred to above.

Any damages arising from a breach of this warranty shall be limited to direct damages and shall not include consequential commercial damages such as loss of profits or values or any other special or indirect damages.

American Cyanamid Company makes no other express or implied warranty, including other express or implied warranty of FITNESS or of MERCHANTABILITY.

15 of 23

EPA Reg. No. 241-299

**FOR RELEASE OF LOBLOLLY PINE (PINUS TAEDA) SEEDLINGS
FROM WOODY VEGETATION DURING THE FIRST YEAR AFTER
PLANTING WITHIN THE STATES OF ALABAMA, ARKANSAS, FLORIDA, GEORGIA,
LOUISIANA, MISSISSIPPI, NORTH CAROLINA, OKLAHOMA, SOUTH CAROLINA,
TENNESSEE, TEXAS, VIRGINIA, AND WEST VIRGINIA**

**OBSERVE ALL PRECAUTIONARY STATEMENTS IN THE ARSENAL APPLICATORS
CONCENTRATE LEAFLET LABEL BEFORE USING**

DIRECTIONS FOR USE

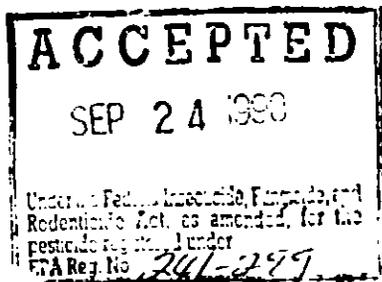
It is a violation of Federal law to use this product in a manner inconsistent with its labeling. This label must be in the possession of the user at the time of herbicide application.

Apply 12 to 16 fluid ounces of ARSENAL herbicide Applicators Concentrate per acre in broadcast applications with helicopter or ground application equipment for suppression of labeled woody vegetation and release of loblolly pine seedlings. Refer to mixing and application instructions on the ARSENAL herbicide Applicators Concentrate leaflet label for proper spray volumes.

Apply ARSENAL spray solutions in late summer or fall after formation of final resting buds on the loblolly pine but before leaves begin to drop on deciduous species. DO NOT make applications during periods of active loblolly pine height growth. To minimize possibility of height growth suppression, do not apply ARSENAL when loblolly pine seedlings are under stress from diseases, animal or winter injury, planting shock or other causes.

PE- 7/90 DL

*Registered Trademark of American Cyanamid Company



**FOR RELEASE OF THE FOLLOWING CONIFERS
FROM HARDWOOD COMPETITION: PITCH PINE (*Pinus rigida*),
WHITE PINE (*Pinus strobus*), PONDEROSA PINE (*Pinus ponderosa*),
JACK PINE (*Pinus banksiana*), DOUGLAS-FIR (*Pseudotsuga menziesii*)
BLACK SPRUCE (*Picea mariana*), RED SPRUCE (*Picea rubens*),
AND WHITE SPRUCE (*Picea glauca*)**

**OBSERVE ALL PRECAUTIONARY STATEMENTS IN THE
ARSENAL HERBICIDE APPLICATORS CONCENTRATE LEAFLET LABEL BEFORE USING
DIRECTIONS FOR USE**

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

ARSENAL herbicide Applicators Concentrate may be applied as a broadcast or directed spray application for control of labeled weed species. Directed spray applications may be made with low-volume applications in conifer stands of all ages and species by targeting the unwanted vegetation and avoiding direct application to the conifer.

Use broadcast applications of ARSENAL for release of the following conifers from hardwood competition:

Species	Rate (fl. oz./A)*
Pitch Pine (<i>Pinus rigida</i>)	12 - 16
***White Pine (<i>Pinus strobus</i>)	8 - 16
**Douglas-Fir (<i>Pseudotsuga menziesii</i>)	8 - 12
**Ponderosa Pine (<i>Pinus ponderosa</i>)	8 - 12
**Black Spruce (<i>Picea mariana</i>)	6 - 12
**Jack Pine (<i>Pinus banksiana</i>)	6 - 12
**Red Spruce (<i>Picea rubens</i>)	6 - 12
**White Spruce (<i>Picea glauca</i>)	6 - 12

- * Rates less than 16 fl. oz./A could result in reduced control of some labeled species.
- ** Applications should be made after formation of final conifer resting buds in the fall or height growth inhibition may occur.
- *** DO NOT make applications to white pine stands younger than three years old. To minimize potential white pine injury, release treatments should not be made prior to July 15.

Apply recommended rate of ARSENAL per acre when making broadcast applications with helicopter or ground spray equipment. Refer to "Directions For Use" and "Mixing and Application Instructions" sections of the ARSENAL leaflet label for proper spray volumes and application timing. Addition of a nonionic surfactant at no more than 1/4 percent by volume is recommended. Use the higher label rates of ARSENAL when controlling particularly dense stands or difficult to control species.

Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. To minimize potential conifer height growth inhibition, do not make applications to conifer stands before formation of conifer resting buds at the end of the second growing season. To minimize potential conifer height growth inhibition in conifer stands that have been established in the field for more than two growing seasons, broadcast release treatments may be made after formation of final conifer resting buds in the fall. To prevent possibility of conifer injury, do not apply ARSENAL when conifers are under stress from diseases, animal or winter injury, or other stresses.

This label must be in the possession of the user at the time of herbicide application.

©Registered Trademark of American Cyanamid Company
PE-11183 2/91DL

Not Reviewed

Advance With PR Notice 82-2
on Draft Labeling Dated

Sept 24, 1990

 **CYANAMID**
American Cyanamid Company
Agricultural Division
Wayne, NJ 07090

BEST AVAILABLE COPY

**FOR RELEASE OF LOBLOLLY PINE (*Pinus taeda*) SEEDLINGS
FROM WOODY VEGETATION DURING THE FIRST YEAR AFTER
PLANTING WITHIN THE STATES OF ALABAMA, ARKANSAS,
GEORGIA, LOUISIANA, MISSISSIPPI, NORTH CAROLINA,
OKLAHOMA, SOUTH CAROLINA, TENNESSEE, AND TEXAS.**

**OBSERVE ALL PRECAUTIONARY STATEMENTS IN THE ARSENAL
APPLICATORS CONCENTRATE LEAFLET LABEL BEFORE USING**

DIRECTIONS FOR USE

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

Apply 12 to 16 fluid ounces of ARSENAL herbicide Applicators Concentrate per acre in broadcast applications with helicopter or ground application equipment for suppression of labeled woody vegetation and release of loblolly pine seedlings. Refer to mixing and application instructions on the ARSENAL herbicide Applicators Concentrate leaflet label for proper spray volumes.

Apply ARSENAL spray solutions in late summer or fall after formation of final resting buds on the loblolly pine but before leaves begin to drop on deciduous species. DO NOT make applications during periods of active loblolly pine height growth. To minimize possibility of height growth suppression, do not apply ARSENAL when loblolly pine seedlings are under stress from diseases, animal or winter injury, planting shock or other causes.

This label must be in the possession of the user at the time of herbicide application.

•Registered Trademark of American Cyanamid Company
PE-11187 291DL



**Not Reviewed
In Accordance With PR Notice 82-2
Based on Draft Labeling Dated**

Sept 24, 1990

**FOR SITE PREPARATION IN ADVANCE OF REGENERATION WITH
THE FOLLOWING CONIFER SPECIES: BLACK SPRUCE (*Picea mariana*),
RED SPRUCE (*Picea rubens*), WHITE SPRUCE (*Picea glauca*),
JACK PINE (*Pinus banksiana*), PITCH PINE (*Pinus rigida*),
WHITE PINE (*Pinus strobus*), PONDEROSA PINE (*Pinus ponderosa*)
AND DOUGLAS-FIR (*Pseudotsuga menziesii*)**

**OBSERVE ALL PRECAUTIONARY STATEMENTS IN THE
ARSENAL HERBICIDE APPLICATORS CONCENTRATE LEAFLET LABEL BEFORE USING**

DIRECTIONS FOR USE

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

ARSENAL herbicide Applicators Concentrate may be used to control labeled grasses, broadleaf weeds, vines and brambles, and woody brush and trees on forest sites in advance of regeneration of labeled conifer species. Herbaceous grass and broadleaf weeds are controlled and may provide fuel to facilitate a site preparation burn, if desired, to control residual conifers.

Use ARSENAL for site preparation in advance of regeneration with the following species:

Species	Rate (pints/acre)
Black spruce (<i>Picea mariana</i>)	3/4 - 2
Red spruce (<i>Picea rubens</i>)	3/4 - 2
White spruce (<i>Picea glauca</i>)	3/4 - 2
Jack pine (<i>Pinus banksiana</i>)	3/4 - 2
Pitch pine (<i>Pinus rigida</i>)	3/4 - 2
White pine (<i>Pinus strobus</i>)	3/4 - 2
Ponderosa pine (<i>Pinus ponderosa</i>)	5/8 - 2
Douglas-fir (<i>Pseudotsuga menziesii</i>)	5/8 - 2

Apply recommended rate of ARSENAL per acre when making helicopter or mechanical ground spray applications. Refer to "Directions for Use" and "Mixing and Application Instructions" sections of the ARSENAL leaflet label for proper spray volumes and application timing. Use a minimum of 1/4 percent by volume of a nonionic surfactant. Use the higher label rates of ARSENAL and higher spray volumes when controlling particularly dense or multi-layered canopies of hardwood stands by difficult to control species. Tank mixes may be necessary for chemical control of residual conifers and other species tolerant to ARSENAL in certain cases.

Observe all precautions and restrictions on the product labels. Always follow the most restrictive label.

DO NOT plant seedlings of species other than Douglas-fir on sites that have been broadcast treated with ARSENAL or into the treated zone of spot or banded applications for three months following application or injury may occur. Do not plant Douglas-fir into areas treated with ARSENAL for two months following application or injury may occur.

This label must be in the possession of the user at the time of herbicide application.

Registered Trademark of American Cyanamid Company
PE-11184 2/91DL

Not Reviewed
In Accordance With PR Notice 67-2
Based on Draft Labeling Data

CYANAMID
American Cyanamid Company
Vegetation and Herb Control
Wayne, NJ 07410

Sept 24, 1990

19-23

FOR RELEASE OF SHORTLEAF PINE (*Pinus echinata*) and SLASH PINE (*Pinus elliottii*)

**OBSERVE ALL PRECAUTIONARY STATEMENTS IN THE
ARSENAL HERBICIDE APPLICATORS CONCENTRATE LEAFLET LABEL
BEFORE USING**

DIRECTIONS FOR USE

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

ARSENAL herbicide Applicators Concentrate may be applied as a broadcast or directed spray application for control of labeled weed species. Directed spray applications may be made with low-volume applications in conifer stands of all ages and species by targeting the unwanted vegetation and avoiding direct application to the conifer.

Use broadcast applications of 12 to 16 fluid ounces per acre to release shortleaf pine (*Pinus echinata*) and slash pine (*Pinus elliottii*) from hardwood competition. Rates less than 16 fluid ounces per acre could result in reduced control of some labeled species.

Apply recommended rate of ARSENAL per acre when making broadcast applications with helicopter or ground spray equipment. Refer to "Directions For Use" and "Mixing and Application Instructions" sections of the ARSENAL leaflet label for proper spray volumes and application timing. Addition of a nonionic surfactant at no more than 1/4 percent by volume is recommended. Use the higher label rates of ARSENAL when controlling particularly dense stands or difficult to control species.

Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. To minimize potential conifer height growth inhibition, do not make applications to conifer stands before formation of conifer resting buds at the end of the second growing season. To minimize potential conifer height growth inhibition in conifer stands that have been established in the field for more than two growing seasons, broadcast release treatments may be made after formation of final conifer resting buds in the fall. To prevent possibility of conifer injury, do not apply ARSENAL when conifers are under stress from diseases, animal or winter injury, or other stresses.

This label must be in the possession of the user at the time of herbicide application.

Registered Trademark of American Cyanamid Company

PE-11186 2/91DL



CYANAMID

American Cyanamid Company
Agricultural Division
Vegetation and Pest Control
Wayne, NJ 07470 1991

**Not Reviewed
In Accordance With PR Notice 82-2
Based on Draft Labeling Dated**

Sept 24, 1990



APPLICATORS CONCENTRATE

ACTIVE INGREDIENT:

Isopropylamine salt of Imazapyr (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid)*

INERT INGREDIENT

TOTAL

53

46

100

*Equivalent to 43.3% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid or 4 pounds acid per gallon

EPA Reg. No. 241-299

EPA Est. No. 5905

**KEEP OUT OF REACH OF CHILDREN
CAUTION! / ¡PRECAUCION!**

PRECAUCION AL USUARIO: Si usted no lee inglés, no use este producto hasta que la etiqueta le haya sido explicada ampliamente

In case of emergency endangering life or property involving this product, call collect, day or night, Area Code 201-835-3100. See Inside For Additional Precautionary Information. See Inside For Directions For Use.



CYANAMID
American Cyanamid Company

Agricultural Division
Vegetation and Pest Control
Wayne, NJ 07470

1991

Net Contents: 2.5 Gallons

Registered Trademark of American Cyanamid Company

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS**

CAUTION!

Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

FIRST AID

IF ON SKIN: Wash with plenty of soap and water.

IF IN EYES: Flush with plenty of water. Get medical attention if irritation persists.

ENVIRONMENTAL HAZARDS

DO NOT apply directly to water or wetlands. DO NOT contaminate water when disposing of equipment washwaters. This herbicide is phytotoxic at extremely low concentrations. Nontarget plants may be adversely affected from drift.

PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of ARSENAL should be mixed, stored, and applied only in stainless steel, fiberglass, plastic, and plastic lined steel containers.

DO NOT mix, store, or apply ARSENAL or spray solutions of ARSENAL in unlined steel (except stainless steel) containers or spray tanks.

IMPORTANT

DO NOT use on food or feed crops. DO NOT treat irrigation ditches, or water used for crop irrigation or for domestic uses. Keep from contact with fertilizers, insecticides, fungicides, and seeds to prevent unintentional exposure of desirable vegetation with ARSENAL herbicide. DO NOT apply or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. DO NOT side trim desirable vegetation with this product. Prevent drift of spray to desirable plants. DO NOT USE in California.

Clean application equipment after using this product by thoroughly flushing with water.

GENERAL INFORMATION

ARSENAL herbicide APPLICATORS CONCENTRATE is a surfactant free aqueous solution to be mixed in water and applied as a spray for control of most annual and perennial grasses, broadleaf weeds, vines, and brambles, and hardwood trees for forestry site preparation and release from woody and herbaceous competition. ARSENAL herbicide APPLICATORS CONCENTRATE is also recommended for control of undesirable vegetation along forest roads, non-irrigation firebreaks, and the establishment and maintenance of wild fire perching. ARSENAL may also be used in water and applied for

stump and cut-stem treatment for control of unwanted woody vegetation.

ARSENAL is readily absorbed through foliage and roots and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Chlorosis first appears in the youngest leaf tissue. In perennials, the herbicide is translocated into and kills the underground storage organs, thus preventing most resprouting. Chlorosis and tissue necrosis may not be apparent in some plant species for several weeks after application. Complete kill of some brush species may not occur for several months.

DIRECTIONS FOR USE

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

ARSENAL herbicide APPLICATORS CONCENTRATE should be used only in accordance with recommendations on the leaflet label. Keep containers closed to avoid spills and contamination.

A postemergence application of ARSENAL is recommended for control of most annual and perennial grasses and broadleaf weeds, vines and brambles, and woody brush and tree species for forestry site preparation and release from woody and herbaceous competition. ARSENAL may be applied for the control of annual and perennial weeds and brush along drainage ditches and forest roads in forest management areas. ARSENAL may also be used in the establishment and maintenance of wildlife openings.

ARS. NAL may be applied using helicopters, ground operated sprayers, low volume hand operated spray equipment such as back pack and pump up sprayers, and injection equipment. DO NOT apply ARSENAL directly to water. DO NOT treat any ditch into which roots of desirable trees or other plants may extend as injury may result.

Observe all cautions and limitations in the package labels of products used in combination with ARSENAL.

STORAGE AND DISPOSAL

PROHIBITIONS: DO NOT store below 10 F. DO NOT contaminate water, soil, or feed by storage or disposal.

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

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in an approved sanitary landfill, or in a location if allowed by state and local authorities by public. If burned, stay out of smoke.

BEST AVAILABLE COPY



APPLICATORS CONCENTRATE

ACTIVE INGREDIENT:
Isopropylamine salt of Imazapyr (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid) 53.1

INERT INGREDIENT 46.9

TOTAL 100.0

Net Contents 43.3 L (4.5 gal) 4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid and its salts and preparations.

EPA Reg. No. 241-299 EPA Est. No. 5905-AR-01

**KEEP OUT OF REACH
OF CHILDREN
CAUTION!
¡PRECAUCION!**

PRECAUCION AL USUARIO: Si usted no lee inglés, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

In case of emergency endangering life or property involving this Product, call collect, day or night, Area Code 707-885-3183.

FIRST AID

IF ON SKIN: Wash with plenty of soap and water.
IF IN EYES: Flush with plenty of water. Get medical attention if irritation persists.



Net Contents 2.5 Gallons
See Inside Leaflet Label For Complete Directions

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS**

CAUTION

Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

ENVIRONMENTAL HAZARDS

DO NOT apply directly to water or wetlands. DO NOT contaminate water when disposing of equipment washwaters. This herbicide is phytotoxic at extremely low concentrations. Nontarget plants may be adversely affected from drift.

PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of ARSENAL should be mixed, stored, and applied only in stainless steel, fiberglass, plastic, and plastic lined steel containers. DO NOT mix, store, or apply ARSENAL or spray solutions of ARSENAL in unlined steel (except stainless steel) containers or spray tanks.

IMPORTANT

DO NOT use on food or feed crops. DO NOT treat irrigation water used for crop irrigation or for domestic uses. Keep from contact with fertilizers, insecticides, fungicides, and seeds to prevent unintentional exposure of desirable vegetation with ARSENAL herbicide. DO NOT apply or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. DO NOT side trim desirable vegetation with this product. Prevent drift of spray to desirable plants. DO NOT USE in California. Clean application equipment after using this product by thoroughly flushing with water.

DIRECTIONS FOR USE

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

ARSENAL herbicide APPLICATORS CONCENTRATE should be used only in accordance with recommendations on the leaflet label. Keep containers closed to avoid spills and contamination.

Observe all cautions and limitations in the package labels of products used in combination with ARSENAL.

See Inside Leaflet Label For Complete Directions

STORAGE AND DISPOSAL

PROHIBITIONS: DO NOT store below 10 F. DO NOT contaminate water, soil, or feed by storage or disposal.

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

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in an approved sanitary landfill, or in a location if allowed by state and local authorities by public. If burned, stay out of smoke.

See Inside Leaflet Label For Complete Directions

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS**

CAUTION!

with skin, eyes, or clothing. Avoid breathing spray mist. Wash with soap and water after handling. Remove clothing and wash before reuse.

ENVIRONMENTAL HAZARDS

Do not apply to water or wetlands. DO NOT contaminate water or equipment washwaters. This herbicide is phytotoxic at concentrations. Nontarget plants may be adversely affected.

PHYSICAL AND CHEMICAL HAZARDS

ARSENAL should be mixed, stored, and applied only in fiberglass, plastic, and plastic-lined steel containers. Do not apply ARSENAL or spray solutions of ARSENAL (except stainless steel) containers or spray tanks.

IMPORTANT

Do not use on food or feed crops. DO NOT treat irrigation ditches or top irrigation or for domestic uses. Keep from contact with insecticides, fungicides, and seeds to prevent unintended injury to desirable vegetation with ARSENAL herbicide. DO NOT flush equipment on or near desirable trees or other plants where their roots may extend or in locations where they may be washed or moved into contact with their roots. DO NOT use on desirable vegetation with this product. Prevent drift of spray on plants. DO NOT USE in California.

Thoroughly flush equipment after using this product by thoroughly flushing with water.

DIRECTIONS FOR USE

It is illegal to use this product in a manner inconsistent with the label.

ARSENAL APPLICATORS CONCENTRATE should be used only in accordance with the recommendations on the leaflet label. Keep containers closed to prevent spills and contamination.

Observe all directions and limitations in the package labels of products used in conjunction with ARSENAL.

See Leaflet Label For Complete Directions For Use.

STORAGE AND DISPOSAL

DO NOT store below 10°F. DO NOT contaminate water, soil, or storage or disposal.

WASTE DISPOSAL: Wastes resulting from the use of this product should be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or puncture and dispose of in an approved container by incineration or, if allowed by state and local authority, by burning. If burned, stay out of smoke.

See Inside Leaflet Label For Disclaimer.

**MIXING AND APPLICATION INSTRUCTIONS
HELICOPTER SPRAY EQUIPMENT.**

Thoroughly mix the recommended amount of ARSENAL in 5 to 30 gallons of water per acre and uniformly apply with properly calibrated aerial equipment. A suitable nonionic surfactant such as Valent X-77 may be added to the spray solution to enhance proper control of undesirable vegetation. All precautions should be taken to minimize or eliminate spray drift. Applications should not be made under gusty conditions or when wind velocity exceeds 5 mph. Except when applying with a MICROFOIL boom, THRU-VALVE BOOM or other similar equipment, a drift control agent may be added at the recommended label rate. A foam reducing agent may be added at the recommended label rate, if needed.

IMPORTANT: DO NOT make applications by flying aircraft. Maintain adequate buffer zones to insure that drift does not occur off the target area. Thoroughly clean application and mixing equipment, including landing gear, immediately after use. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part.

GROUND OPERATED SPRAY EQUIPMENT:

Thoroughly mix and apply the recommended amount of ARSENAL in 15 to 100 gallons of water per acre. A suitable nonionic surfactant such as Valent X-77 may be added to the spray solution to enhance proper control of undesirable vegetation. A drift control agent and a foam reducing agent may be added at the recommended label rates, if needed. If desired, a spray pattern indicator may be added at the recommended label rate.

For best results, uniformly cover the foliage of the vegetation to be controlled with the spray solution.

IMPORTANT: DO NOT spray under windy or gusty conditions. Maintain adequate buffer zones to insure that drift does not occur off the target area. **HIGH VOLUME APPLICATIONS ARE RECOMMENDED FOR KUDZU WEED CONTROL PROGRAMS.** To avoid potential off-site damage use the minimum gallonage appropriate for the specific application. Clean application and mixing equipment after using this product by thoroughly flushing with water.

DIRECTED OR SPOT SPRAY EQUIPMENT:

When making directed or spot spray applications with helicopter or ground spray equipment or low volume hand operated spray equipment, thoroughly mix a solution of 1.2 to 5 percent by volume of ARSENAL herbicide APPLICATORS CONCENTRATE and a minimum of 1.4 percent by volume of a nonionic surfactant such as Valent X-77 in water.

To mix the spray solution, add the volume of ARSENAL herbicide and nonionic surfactant indicated in the table below to the desired amount of water.

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SPRAY SOLUTION MIXING GUIDE

SOLUTION VOLUME	ARSENAL CONCENTRATION (%)				SURFACTANT
	0.5	1	2.5	5	
1 gallon	2.3 oz	1-1/3 oz	3-1/3 oz	6-2/3 oz	1.3 oz
5 gallons	3-1/3 oz	6-2/3 oz	1 pint	2 pints	1-2/3 oz
10 gallons	6-2/3 oz	13-1/3 oz	2 pints	4 pints	3-1/3 oz
25 gallons	1 pint	2 pints	5 pints	10 pints	8 oz
100 gallons	4 pints	1 gal	2.5 gal	5 gal	2 pints

2 tablespoons = 1 fluid ounce

For best results, uniformly cover the foliage of the vegetation to be controlled with the spray solution. Avoid making applications directly to desirable conifers. **BIGLEAF MAPLE REQUIRES AT LEAST A 1.5% CONCENTRATION SPRAY SOLUTION.**

IMPORTANT: DO NOT overapply causing runoff from the treated foliage. Avoid direct application to desired plant species as injury may occur. DO NOT exceed recommended dosage rate per acre. Clean application and mixing equipment after using this product by thoroughly flushing with water.

STUMP AND CUT STEM TREATMENTS

ARSENAL herbicide APPLICATORS CONCENTRATE may be used to control undesirable woody vegetation in forest management by applying the ARSENAL solution to the cambium area of freshly cut stump surfaces or to cuts on the stem of the target woody vegetation. Applications can be made at any time of the year except during periods of heavy sap flow in the spring.

MIXING

ARSENAL may be mixed as either a concentrated or dilute solution for stump and cut stem treatments. The dilute solution may be used for applications to the surface of the stump or to cuts on the stem of the target woody vegetation. Concentrated solutions may be used for applications to cuts on the stem. Use of the concentrated solution permits application to fewer cuts on the stem, especially for large diameter trees. Follow the application instructions to determine proper application techniques for each type of solution.

To prepare a dilute solution, mix 4 to 6 fluid ounces of ARSENAL with one gallon of water.

To prepare a concentrated solution, mix 2 quarts of ARSENAL with no more than 2 quarts of water.

APPLICATION WITH DILUTE SOLUTIONS

For cut stump treatments: Spray or brush the solution onto the cambium area of the freshly cut stump surface. Insure that the solution thoroughly wets the entire cambium area (the wood next to the bark of the stump).

For tree injection treatments: Using standard injection equipment, apply 1 milliliter of solution at each injection site around the tree with no more than one inch intervals between cut edges. Insure that the injector completely penetrates the bark at each injection site.

For frill or girdle treatments: Using a hatchet, machete, or similar device, make cuts through the bark at intervals around

the tree with no more than two inch intervals between cut edges. Spray or brush the solution into each cut until thoroughly wet.

APPLICATION WITH CONCENTRATED SOLUTIONS

For tree injection treatments: Using standard injection equipment, apply 1 milliliter of solution at each injection site. Make at least one injection cut for every 4 inches of diameter at breast height (dbh) on the target tree. For example, a 4 inch dbh tree will receive 1 injection cut and an 8 inch dbh tree will receive 2 injection cuts. On trees requiring more than one injection site, place the injection cuts at approximately equal intervals around the tree.

For frill or girdle treatments: Using a hatchet, machete, or similar device, make cuts through the bark at approximately equal intervals around the tree. Make at least one cut for every 4 inches of dbh on the target tree. For example, a 4 inch dbh tree will receive 1 cut and an 8 inch dbh tree will receive 2 cuts. Spray or brush the solution into each cut until thoroughly wet.

NOTE: Injury may occur to non target or desirable woody plants if they extend from the same root system or their root systems are grafted to those of the treated tree.

SITE PREPARATION TREATMENTS

ARSENAL may be used to control labeled grasses, broadleaf weeds, vines and brambles, and woody brush and trees on forest sites in advance of regeneration. Herbaceous grass and broadleaf weeds are controlled and may provide fuel to facilitate a site preparation burn, if desired, to control residual conifers.

Use ARSENAL for site preparation in advance of regeneration with the following species:

Species	Rate (pints/ac)
Loblolly Pine (<i>Pinus taeda</i>)	1.2 - 2.2
Loblolly X Pitch Hybrid	1.2 - 2.2
Longleaf Pine (<i>Pinus palustris</i>)	1.2 - 2.2
Shortleaf Pine (<i>Pinus echinata</i>)	1.2 - 2.2
Slash Pine (<i>Pinus elliotii</i>)	1.2 - 2.2
Virginia Pine (<i>Pinus virginiana</i>)	1.2 - 2.2

Apply recommended rate of ARSENAL per acre when making helicopter or mechanical ground spray applications. Refer to mixing and application instructions for proper spray volumes. Use a minimum of 1.4 percent by volume of a nonionic surfactant. Use the higher label rates of ARSENAL and higher spray volumes when controlling particularly dense or multi-layered canopies of hardwood stands or difficult to control species. Tank mixes may be necessary to control residual conifers and other species tolerant to ARSENAL in certain cases. Observe all precautions and restrictions on the product labels. Always follow the most restrictive label.

DO NOT plant seedlings of species other than Douglas fir on sites that have been broadcast treated with ARSENAL or into the treated zone of spot or banded applications for three months following application or injury may occur. DO NOT plant

Douglas fir into areas treated with ARSENAL for two months following application or injury may occur.

HERBACEOUS WEED CONTROL

Use ARSENAL for release of the following conifers from herbaceous competition.

Species	Rate (fl. oz/ac)
Loblolly Pine (<i>Pinus taeda</i>)	6 - 10
Loblolly X Pitch Hybrid	6 - 10
Virginia Pine (<i>Pinus virginiana</i>)	6 - 10
Slash Pine (<i>Pinus elliotii</i>)	4 - 10

ARSENAL herbicide may be applied as a broadcast or directed spray application for release of young conifers from herbaceous weeds. Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. For release of conifers from herbaceous weeds, apply the recommended rate of ARSENAL by either helicopter or ground spray applications. Refer to mixing and application instructions for proper spray volumes. A suitable nonionic surfactant may be added at a rate not to exceed 1.4 percent by volume in water. For best results, applications should be made to newly emerged weeds. For difficult to control weeds, use the higher rates of ARSENAL.

ARSENAL herbicide may be tank mixed with other registered herbicides to broaden the spectrum of weeds controlled. To prevent possibility of conifer injury, do not apply ARSENAL when conifers are under stress from diseases, animal or winter injury, planting shock or other stresses.

CONIFER RELEASE TREATMENTS

ARSENAL may be applied as a broadcast or directed spray application for control of labeled weed species. Directed spray applications may be made with low volume applications in conifer stands of all ages and species by targeting the unwanted vegetation and avoiding direct application to the conifer.

Use broadcast applications of ARSENAL for release of the following conifers from hardwood competition.

Species	Rate (pints/ac)
Loblolly Pine (<i>Pinus taeda</i>)	1.2
Loblolly X Pitch Hybrid	1.2
Virginia Pine (<i>Pinus virginiana</i>)	1.2

Apply recommended rate of ARSENAL per acre when making broadcast applications with helicopter or ground spray equipment. Refer to mixing and application instructions for proper spray volumes. Addition of a nonionic surfactant at no more than 1.4 percent by volume is recommended. Use the higher label rates of ARSENAL when controlling particularly dense stands or difficult to control species.



23423

Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. To minimize potential conifer height growth inhibition, do not make applications to conifer stands before formation of conifer resting buds at the end of the second growing season. To minimize potential conifer height growth inhibition in conifer stands that have been established in the field for more than two growing seasons, broadcast release treatments may be made after formation of final conifer resting buds in the fall. To prevent possibility of conifer injury, do not apply ARSENAL when conifers are under stress from diseases, animal or winter injury or other stresses.

Use ARSENAL for spot treatment of undesirable hardwood vegetation. ARSENAL may be used to control undesirable brush and hardwoods in the management of all conifer species (including, but not limited to, those conifer species listed in the broadcast application section above) of all ages as a directed foliar or injection application. Refer to mixing and application instructions for proper use rates, equipment, and application techniques.

Avoid direct application to desired plant species as injury may occur. Injury may occur to non-target or desirable hardwoods or conifers if they extend from the same root system or the root systems are grafted to those of the treated tree or if their roots extend into the treated zone.

WEEDS CONTROLLED

ARSENAL herbicide APPLICATORS CONCENTRATE will provide postemergence control and some residual control of the following target vegetation species. Degree of control is both species and rate dependent. ARSENAL herbicide should be used only in accordance with the recommendations on this label.

GRASSES

The species of annual and perennial grasses controlled by ARSENAL herbicide include the following:

- Annual bluegrass (*Poa annua*)
- Bahiagrass (*Paspalum notatum*)
- Beardgrass (*Andropogon* spp.)
- Bermudagrass (*Cynodon dactylon*)
- Big bluestem (*Andropogon gerardii*)
- Broadleaf signalgrass (*Brachiaria platyphylla*)
- Canada bluegrass (*Poa compressa*)
- Cattail (*Typha* spp.)
- Cheat (*Bromus secalinus*)
- Crabgrass (*Digitaria* spp.)
- Dallisgrass (*Paspalum dilatatum*)
- Downy brome (*Bromus tectorum*)
- Fall panicum (*Panicum dichotomiflorum*)
- Feathertop (*Pennisetum villosum*)
- Fescue (*Festuca* spp.)
- Foxtail (*Setaria* spp.)
- Goosegrass (*Eleusine indica*)
- Guineagrass (*Panicum maximum*)
- Italian ryegrass (*Lolium multiflorum*)
- Johnsongrass (*Sorghum halepense*)
- Kentucky bluegrass (*Poa pratensis*)
- Lovegrass (*Eragrostis* spp.)
- Orchardgrass (*Dactylis glomerata*)
- Paragrass (*Brachiaria mutica*)

- Phragmites (*Phragmites australis*)
- Prairie cordgrass (*Spartina pectinata*)
- Prairie threeawn (*Aristida oligantha*)
- Quackgrass (*Agropyron repens*)
- Reed canary grass (*Phalaris arundinacea*)
- Saltgrass (*Distichis stricta*)
- Sand dropseed (*Sporobolus cryptandrus*)
- Sandbar (*Cenchrus* spp.)
- Smooth brome (*Bromus inermis*)
- Timothy (*Phleum pratense*)
- Torpedograss (*Panicum repens*)
- Vaseygrass (*Paspalum urvillei*)
- Wild barley (*Hordeum* spp.)
- Wild oats (*Avena fatua*)
- Wirestem muhly (*Muhlenbergia frondosa*)
- Witchgrass (*Panicum capillare*)

BROADLEAF WEEDS

The species of annual and perennial broadleaf weeds controlled by ARSENAL herbicide include the following:

- Bull thistle (*Cirsium vulgare*)
- Burdock (*Arctium* spp.)
- Camphorweed (*Heterotheca subaxillaris*)
- Canada thistle (*Cirsium arvense*)
- Carolina geranium (*Geranium carolinianum*)
- Carpenterweed (*Mullugo verticillata*)
- Clover (*Trifolium* spp.)
- Cocklebur (*Xanthium strumarium*)
- Common chickweed (*Stellaria media*)
- Common ragweed (*Ambrosia artemisiifolia*)
- Dandelion (*Taraxacum officinale*)
- Dock (*Rumex* spp.)
- Dogfennel (*Eupatorium capillifolium*)
- Filaree (*Erodium* spp.)
- Fleabane (*Erigeron* spp.)
- Giant ragweed (*Ambrosia trifida*)
- Goldenrod (*Solidago* spp.)
- Hoary vervain (*Verbena stricta*)
- Horseweed (*Coryza canadensis*)
- Indian mustard (*Brassica juncea*)
- Lambsquarters (*Chenopodium album*)
- Little mallow (*Malva parviflora*)
- Milkweed (*Asclepias* spp.)
- Mimosa (*Mimosa pudica*)
- Monarda (*Monarda perfoliata*)
- Mullein (*Verbascum* spp.)
- Nettleleaf goosefoot (*Chenopodium murale*)
- Oxeye daisy (*Chrysanthemum leucanthemum*)
- Pepperweed (*Lepidium* spp.)
- Pigweed (*Amaranthus* spp.)
- Plantain (*Plantago* spp.)
- Pokeweed (*Phytolacca americana*)
- Prairie clover (*Cenothera kunthiana*)
- Purslane (*Portulaca* spp.)
- Silverleaf nightshade (*Solanum elaeagnifolium*)
- Smartweed (*Polygonum* spp.)
- Sorrel (*Rumex* spp.)
- Sowthistle (*Sonchus* spp.)
- Sunflower (*Helianthus* spp.)

- Sweet clover (*Melilotus* spp.)
- Tansymustard (*Descurainia pinnata*)
- Texas thistle (*Cirsium texanum*)
- Western ragweed (*Ambrosia psilostachya*)
- Wild carrot (*Daucus carota*)
- Wild lettuce (*Lactuca* spp.)
- Wild parsnip (*Pastinaca sativa*)
- Wild turnip (*Brassica campestris*)
- Woollyleaf bursage (*Ambrosia grayi*)
- Yellow starthistle (*Centaurea solstitialis*)
- Yellow woodsorrel (*Oxalis stricta*)

VINES AND BRAMBLES

The species of vines and brambles controlled by ARSENAL herbicide include the following:

- Blackberry (*Rubus* spp.)
- Clematis (*Rubus* spp.)
- Field bindweed (*Convolvulus arvensis*)
- Greenbriar (*Smilax* spp.)
- Hedge bindweed (*Calystegia sepium*)
- Honeysuckle (*Lonicera* spp.)
- Kudzu (*Pueraria lobata*)
- Morningglory (*Ipomoea* spp.)
- Poison ivy (*Rhus radicans*)
- Redvine (*Brunnicha cirrhosa*)
- Trumpet creeper (*Campsis radicans*)
- Virginia creeper (*Parthenocissus quinquefolia*)
- Wild buckwheat (*Polygonum convolvulus*)
- Wild grape (*Vitis* spp.)
- Wild rose (*Rosa* spp.)
- Including Multiflora rose (*Rosa multiflora*)
- Macartney rose (*Rosa bracteata*)

* The degree of control may be species dependent. Some *Rubus* species may not be controlled.
 ** Use a minimum of 75 GPA. Control of established stands may require multiple applications.

WOODY BRUSH AND TREES

The species of woody brush and trees controlled by ARSENAL herbicide include the following:

- American beech (*Fagus grandifolia*)
- Ash (*Fraxinus* spp.)
- Aspen (*Populus* spp.)
- Bald cypress (*Taxodium distichum*)
- Bigleaf maple (*Acer macrophyllum*)
- Blackgum (*Liquidambar styraciflua*)
- Boxelder (*Acer negundo*)
- Cherry (*Prunus* spp.)
- Chinaberry (*Melia azedarach*)
- Chinese tallow tree (*Sapium sebiferum*)
- Dogwood (*Cornus* spp.)
- Hawthorn (*Crataegus* spp.)
- Hickory (*Carya* spp.)
- Maple (*Acer* spp.)
- Mulberry (*Morus* spp.)
- Oak (*Quercus* spp.)
- Persimmon (*Diospyros virginiana*)
- Poplar (*Populus* spp.)
- Privet (*Ligustrum vulgare*)
- Red alder (*Alnus rubra*)
- Red maple (*Acer rubrum*)
- Sassafras (*Sassafras albidum*)
- Sourwood (*Oxydendrum arboreum*)
- Sumac (*Rhus* spp.)
- Sweetgum (*Liquidambar styraciflua*)
- Willow (*Salix* spp.)
- Yellow poplar (*Liriodendron tulipifera*)

* The degree of control may be species dependent.

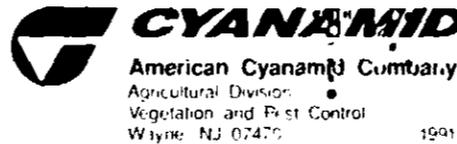
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