



Department of Health and Environmental Sciences

STATE OF MONTANA HELENA, MONTANA 59601

Solid Waste Management Bureau
Board of Health Building
Helena, Montana 59601
Telephone: (406) 449-2821

~~XXXXXXXXXXXX~~
DIRECTOR
A. C. Knight, M.D.
Acting Director

December 27, 1976

Honorable Thomas Judge, Governor, State of Montana, Helena
Environmental Quality Council, 1228 11th Avenue, Helena
Bureau of Land Management, P.O. Box 30157, Billings
Soil Conservation Service, State Office, P.O. Box 970, Bozeman
Soil Conservation Service, District Office, P.O. Box 416, Forsyth
Montana Fish and Game Department, Helena
Montana Department of State Lands, Helena (+2)
Department of Natural Resources and Conservation, Helena
Department of Community Affairs, Division of Planning, Helena
Montana Department of Agriculture, Helena
Montana Bureau of Mines and Geology, West Park, Butte
Montana State Library, Helena (4 copies)
Board of County Commissioners, Courthouse, Forsyth
Eldon Rice, Rosebud County Planning Board, 251 N. 17th Ave., Forsyth (+2)
Mark Stevens, Rosebud County Sanitarian, P.O. Box 1056, Forsyth
E. R. Hoff, Rosebud County Extension Agent, Courthouse, Forsyth
Environmental Information Center, Box 12, Helena
Tom Horobik, President, Montana Wilderness Association, ~~4000~~ 4th Ave. N., Great Falls
Billings Gazette, 401 N. Broadway, Billings
Don Bailey, Rosebud County Protective Assn., Route 1, Forsyth
Northern Plains Resource Council, 419 Stapleton Bldg., Billings
Louise Rankin Galt, President, 71 Ranch Co., 316 Fuller Ave., Helena
Center for the Public Interest, Box 931, Bozeman
James Goetz, 15 S. Tracy Ave., Bozeman
Concerned Citizens for a Quality Environment, c/o Ron Erickson, Chairman, University
of Montana, Missoula
Student Environmental Research Center, University of Montana, Room 212, Venture
Center, Missoula
Environmental Protection Agency, Region VIII, 1860 Lincoln Street, Suite 900, Denver,
Colorado
Tom Lippert, County Sanitarian, Box T, Hardin
Harold Stepper, TRYAC, Forsyth
Dick Bassett, Box 72, Sumatra
John P. Duke, Assistant Vice President, Land Management, Burlington Northern, 650
Central Building, Seattle, Washington

Gentlemen:

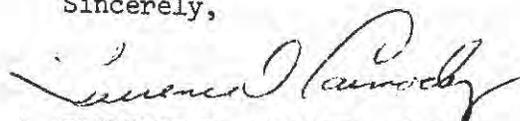
The enclosed draft environmental impact statement has been prepared for the Health Department's Pesticide Disposal Demonstration Project, which involves the establishment of a state owned land disposal facility in northern Rosebud County.



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December 27, 1976

This statement is submitted for your consideration. Comments and questions will be accepted for thirty (30) days following issuance of this statement at which time it will be assumed that the persons or agencies consulted have no comments to make. All comments should be sent to the undersigned.

Sincerely,



TERRENCE D. CARMODY, CHIEF
Solid Waste Management Bureau
Environmental Sciences Division

TDC/RCT/lb

Enclosure

cc: Ben Wake
Tom Ellerhoff
J. Anne Skinner
Don Willems
Mike Roach
Steve Brown
Ken Quirkenden



MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

Draft Environmental Impact Statement

Pesticide Disposal Demonstration Project

Contract No. 68-01-2961

December 27, 1976

Department of Health and Environmental Sciences
Environmental Sciences Division
Solid Waste Management Bureau
Helena, Montana 59601



Department of Health and Environmental Sciences
Solid Waste Management Bureau

Environmental Impact Statement

Prepared in accordance with Section 102(2)(c) of P.L. 91-190
and Section 69-6504(b)(3) of R.C.M. 1947.

SUMMARY

The Department of Health and Environmental Sciences (DHES) aided by the U.S. Environmental Protection Agency (EPA), Pesticide Disposal Demonstration Contract No. 68-01-2961, plans to implement a statewide demonstration program for the systematic collection, transportation and disposal of waste pesticides and emptied pesticide containers.

The Container Management Program and the Waste Pesticide Management Program are aimed at removing toxic and environmentally unsafe waste pesticides and empty containers from rural and urban Montana to designated storage disposal sites where access and environmental protection are controlled and monitored.

Waste pesticides will be disposed of by: 1) alternative uses, 2) chemical treatment, 3) ponding, 4) landfilling and 5) soil injection (i.e. soil biodegradation). Empty pesticide containers will be cleaned and recycled as scrap steel or landfilled when recycling is not feasible.

Waste pesticide disposal activities will be carried out at a specially designated 20-acre land disposal site situated 11 miles north of Ingomar, in Rosebud County, Montana.

Waste pesticides will continue to be stored at Glasgow Air Force Base in two ammunition bunkers presently being leased by the DHES. Pesticide containers will be collected for cleaning and disposal at specially designated drum collection centers throughout the state.

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I. HISTORY

The Pesticide Disposal Demonstration Project is a \$150,000 contract with the EPA's Region VIII Office, Denver, Colorado. The contract will enable the Department of Health and Environmental Sciences to establish and demonstrate the effectiveness of a program to accept and provide proper disposal for waste pesticides and emptied pesticide containers.

The disposal of hazardous waste materials in Montana, including pesticides, has not been well controlled in the past and little has been done at the state or local level to provide safe and effective means for pesticide disposal. In 1969, an interim program was established by the Montana Departments of Health and Environmental Sciences, Fish and Game, and Agriculture to provide secure storage for waste pesticides. The use of an ammunition bunker at the inactive Glasgow Air Force Base site was obtained, and the three departments cooperated in a program to accept and store waste pesticides. Pesticides have been collected over the seven-year period as the result of suspension and cancellation actions, lapse of product registrations, highway spills and requests for disposal assistance from farmers, ranchers and others.

In the last few years the DHES has assumed full responsibility for this program, although the other agencies still have provided assistance. The Department of Health now leases two bunkers from the U.S. Air Force at the Glasgow site. These bunkers are held under a five-year renewable lease, terminable upon 90 days notice by the Secretary of the Air Force. Approximately 150,000 pounds of pesticides are currently stored in the two facilities, occupying about 80 percent of the usable storage space.

In addition to maintaining these storage facilities, the Solid Waste Management Bureau of the DHES has been working to improve the disposal situation throughout the state. Open dumps are being eliminated or upgraded to landfills, and community landfill facilities are being improved through regulation. Landfills which may be suitable for the disposal of quantities of waste pesticides need to be identified, and a program is now in progress which will assess and classify all landfill facilities in

in the state.

Department of Health rules and guidelines which define hazardous wastes, classify landfills and specify acceptable waste pesticide and pesticide container disposal procedures (See Appendix A) have been promulgated to improve pesticide disposal practices in Montana. The fact remains, however, that few community landfills are able to meet the requirements for accepting waste pesticides (other than the small amounts of waste pesticides and containers which are disposed of by gardeners and homeowners). Through the above-mentioned guidelines, the Solid Waste Management Bureau has encouraged pesticide users to utilize a triple-rinsing procedure to clean emptied containers, making them safer for disposal.

Due to the limitations involved with storing pesticides at Glasgow Air Force Base, the DHES began in 1974 to seek a special land disposal site for hazardous wastes. An application was submitted to the EPA, and the present contract was awarded to the Department of Health. The contract became effective in October, 1974, and was scheduled to run until June of 1976. However, performance of the contract has been dependent on the acquisition of a suitable disposal site, and such a site was not finally acquired until August of this year. The contract has now been extended to last through December, 1977.

In the selection of a disposal site for use in this project, criteria were developed based on discussions in various reports concerning land disposal of hazardous waste materials (EPA, 1973; Battelle, 1973; Lindsey, 1974). In general, these reports conclude that a land disposal site must be located away from flood plains, natural depressions and slopes exceeding five degrees, in an area of low population density, low land use value with few conflicting uses, low potential for land development, low potential for groundwater and surface water contamination, low precipitation, high evaporation and in area of minor or negligible seismic activity. The site should also be reasonably accessible by road. For this project the vegetation, soils and geologic characteristics must also be conducive to soil disposal and landfilling requirements.

In the initial stage of the site selection process, geographic areas in Montana suitable for site investigation were chosen on the basis of geologic bedrock, precipitation and land use characteristics. Distance from the pesticide storage facilities at Glasgow Air Force Base was also a consideration in minimizing overall program costs.

Three bedrock types were selected and ranked as to their suitability for chemical waste disposal (Higgins, 1974). These bedrock formations in priority ranking are: 1) Bearpaw Shale, 2) Colorado Shale and 3) Fort Union Formation. These formations are all found in areas of central and eastern Montana, where average annual precipitation is low and large regions of low value rangeland exist. Screening efforts concentrated on Bearpaw Shale areas, since this formation "... is the most homogeneous of the selected bedrock ... and provides the most impervious barrier between a disposal site and groundwater."

Soil Conservation Service (SCS) soils maps and aerial photographs were used in the preliminary screening evaluations. Potential sites with clay loam or gravelly clay soil, with flat topography and few outlet drainages were selected for field evaluation. Solid Waste Management Bureau staff and consulting specialists made field evaluations of many of the potential sites. In the course of this search, six sites were found suitable for use and were pursued for possible acquisition.

Attempts to gain title to the selected sites were unsuccessful in the first five cases. In the case of one potential site, located on Bureau of Land Management (BLM) land in the Glasgow area, the application and appeal process lasted for more than 14 months before the final negative decision was received from the Secretary of the Interior. Similarly, with the other four sites, agreement could not be reached with the owners or lessees to transfer the land to the DHES for our use.

The site which has now been acquired is located in a section of state school trust land. In order for the site to be transferred to the jurisdiction of the Health Department, an application had to be submitted to and approved by the Montana Land

Board, and the school trust fund reimbursed the full value of the land withdrawn.

The Land Board met and approved our application in July 1976.

In the time that has been spent in site acquisition, some portions of the work outlined in the EPA contract have been completed. Through both direct contacts and news releases, pesticide users have been asked to notify the DHES if they want assistance in disposing of pesticide wastes or emptied bulk containers (approximately 4,000 containers and 7,500 pounds of waste pesticides have been reported). From this information, a list of potential container turn-in sites has been developed for use by the public; the waste pesticides reported have already been picked up and placed in the storage bunkers. Also a mobile unit for rinsing pesticide drums has been designed and tested. A preliminary study using 120 steel barrels has shown the effectiveness of the unit in cleaning residues from emptied containers. The remainder of the contract work awaits development of the disposal site for planned operation next summer. Appendix B contains a summary of the specific criteria used in the site selection process.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Container Management Program

1. Purpose

The objective of this program is the removal of hazardous empty pesticide containers now being stockpiled, proper preparation of metal containers for scrap metal recycling or burial in Class II sanitary landfills and the safe disposal of contaminated rinse water or rinsate.

Federal and state pesticide disposal regulations and guidelines require pesticide containers to be disposed of according to the type of container and product. The classifications include:

- Group I - These containers are combustible containers formerly containing organic or metallo-organic pesticides (except organic mercury, lead, cadmium or arsenic compounds). These canisters should be disposed of in a pesticide incinerator or buried in a specially designated landfill (Class I designation in Montana). A small number of these containers may be buried by the user in open fields.
- Group II - Group II containers are non-combustible containers formerly containing organic and metallo-organic pesticides (except mercury, lead, cadmium or arsenic compounds). These containers should be triple rinsed prior to disposal. Triple-rinsed containers in this group may be returned to the manufacturer, recycled as scrap steel or disposed of in Class II sanitary landfills. Unrinsed containers should be disposed of only in specially designated landfills or in a pesticide incinerator.
- Group III - These containers include both combustible and non-combustible containers, formerly containing organic mercury, lead, cadmium, or arsenic

compounds or inorganic pesticides. These may be disposed of in a sanitary landfill if triple rinsed. Unrinsed or combustible containers in this group should be disposed of in specially designated landfills.

Container residues and rinse liquids which cannot be added to the spray mixture must be disposed of in a manner prescribed for each specific pesticide group (refer to page 10).

In addition to these guidelines developed by the EPA and adopted by the DHES, the Montana Department of Agriculture plans to develop regulations regarding the stockpiling and handling of emptied pesticide containers. These regulations should be implemented next year and would apply to all licensed pesticide applicators in Montana.

2. Montana Container Disposal Problem

Presently there are numerous empty pesticide containers stockpiled throughout Montana. Most of these containers have not been properly cleaned for disposal. To comply with federal and state regulations, unrinsed containers must be disposed of in specially designated landfill areas (Class I sites). Presently there are two Class I sites in Montana (Yellowstone and Gallatin Counties), and the Solid Waste Management Bureau believes this number will not change appreciably in the near future.

Proper rinsing by applicators of the existing stockpiled containers to make them suitable for disposal in Class II sites or by recycling may generate a large volume of contaminated rinsate. Disposal of large quantities of such rinsate could contaminate nearby wells, groundwater and soils and create an unnecessary health hazard.

3. Program Outline

The Container Management Program will be a continuing program. The EPA grant money designated for this program will be used next summer to rinse and dispose of the present stockpile of used pesticide containers.

The creation of container collection centers will be the first step in implementing the program. The primary choice for the location of collection sites will be county motor vehicle graveyards; second choice will be county sanitary landfills. In both cases, there are existing requirements for supervision during hours of operation, controlled access and locating where surface and groundwater will not be contaminated. In some cases, a center may serve several counties.

The auto graveyards are the most desirable because all properly cleaned metal containers can be crushed along with junk vehicles and recycled as scrap steel. Landfill sites will be used as collection centers in instances where auto graveyards have not been established or are not considered acceptable for container collection and short-term storage of empty pesticide containers.

Public information campaigns will encourage persons to turn in the empty containers. Direct contact will be made with weed and mosquito control districts, aerial applicators and other large volume chemical users. The news media will be asked to inform persons and organizations not directly contacted.

Priority will be given to turning in unrinsed 5-, 30-, 50- and 55-gallon metal containers. These metal drums will become the property of the state and may not be reused. Homeowners using small numbers of pesticide containers such as paper bags, glass and plastic bottles or aerosol cans, will be encouraged to dispose of these containers with their household refuse. This will prevent large numbers of small non-ferrous containers from being received at county collection sites.

A mobile drum cleaning unit has been designed by Solid Waste Management Bureau staff and will be used to clean the containers at the collection sites. This unit consists of a flatbed truck on which are mounted tanks, portable power system, pump and pressure spray washer. The truck is a unit rented from the State Highway Department and has an 18-foot bed. The tanks provide 1,500 gallons of rinse water storage capacity.

The bureau will schedule the unit to visit all of the collection sites. A high

temperature jet wash will be used to clean the containers. Contaminated rinsate will be retained and hauled to the Ingomar site for disposal.

The mobile cleaning unit was tested in a special residue study conducted by the Solid Waste Management Bureau, and it was determined that the containers were effectively cleaned by the tested equipment and procedures.

After the containers received at the collection centers are cleaned, they will be crushed with junk automobiles and recycled, or buried in a sanitary landfill if crushing is not possible. Non-combustible containers of a similar size, such as plastic, will be disposed of after cleaning in a sanitary landfill or disposed of without rinsing at the Ingomar site.

Next summer's rinsing program will appreciably reduce or eliminate the stockpile of unrinsed containers. Through new State Department of Agriculture regulations and periodic public education programs, persons applying pesticides in the future should turn in containers which are properly rinsed and ready for disposal.

B. Waste Pesticide Management Program

Under this program, the pesticide materials presently stored in the bunker facilities at Glasgow Air Force Base, as well as any additional pesticides turned over to the Health Department during the project, will be transported to the selected disposal site for final disposal. Following guidelines promulgated by EPA in the Federal Register, May 1, 1974, waste pesticides will be disposed of by soil injection or by burial. Ponding and chemical pre-treatment may be employed, where applicable, prior to landfilling.

1. Transportation of Pesticides

The pesticide materials stored at Glasgow Air Force Base will be surveyed for the adequacy of the present containers for shipment. All materials which are in inadequate containers will be repackaged prior to shipment. It is anticipated that a private trucking firm will be contracted to haul these materials, although use of state-owned vehicles (Highway Department) is an alternative option. Department of Transportation, Environmental Protection Agency, and Montana Department of Public Service Regulation rules regarding packaging, placarding and transportation will be followed. The trucks will be equipped with necessary safety and cleanup equipment to handle any leaks or spills that might occur during loading, transport and unloading.

2. Development of the Disposal Site

Construction at the site will be limited to a perimeter fence and gate and a metal shed for temporary storage of equipment and waste chemicals. Water diversion channels and low berms will be constructed to control surface water runoff. A soil survey of the quarter section encompassing the site and soil core samples will provide background information necessary for planning the disposal operations. Soil samples will also be tested for background pesticide and microflora levels to be used for comparison in analyzing biodegradation data.

A gate will be placed in the existing fence running along the eastern border of this section, and a trail or road will be constructed to give access to the disposal

site.

3. Federal Disposal Guidelines

The EPA guidelines for disposal of waste pesticides are specific as to the type of pesticide material. Organic pesticides (excluding organic mercury, lead, cadmium, or arsenic compounds) may be: 1) incinerated in a pesticide incinerator, 2) buried in a specially designated landfill, 3) chemically treated (degraded, neutralized, detoxified), 4) soil injected or 5) maintained in safe storage.

Metallo-organic pesticides (except organic mercury, lead, cadmium or arsenic) may be: 1) subjected to chemical processes to remove and collect the heavy metal with subsequent incineration of the remaining hydrocarbon structure, 2) buried in a sanitary landfill, 3) soil injected, 4) chemically degraded or 5) maintained in safe storage.

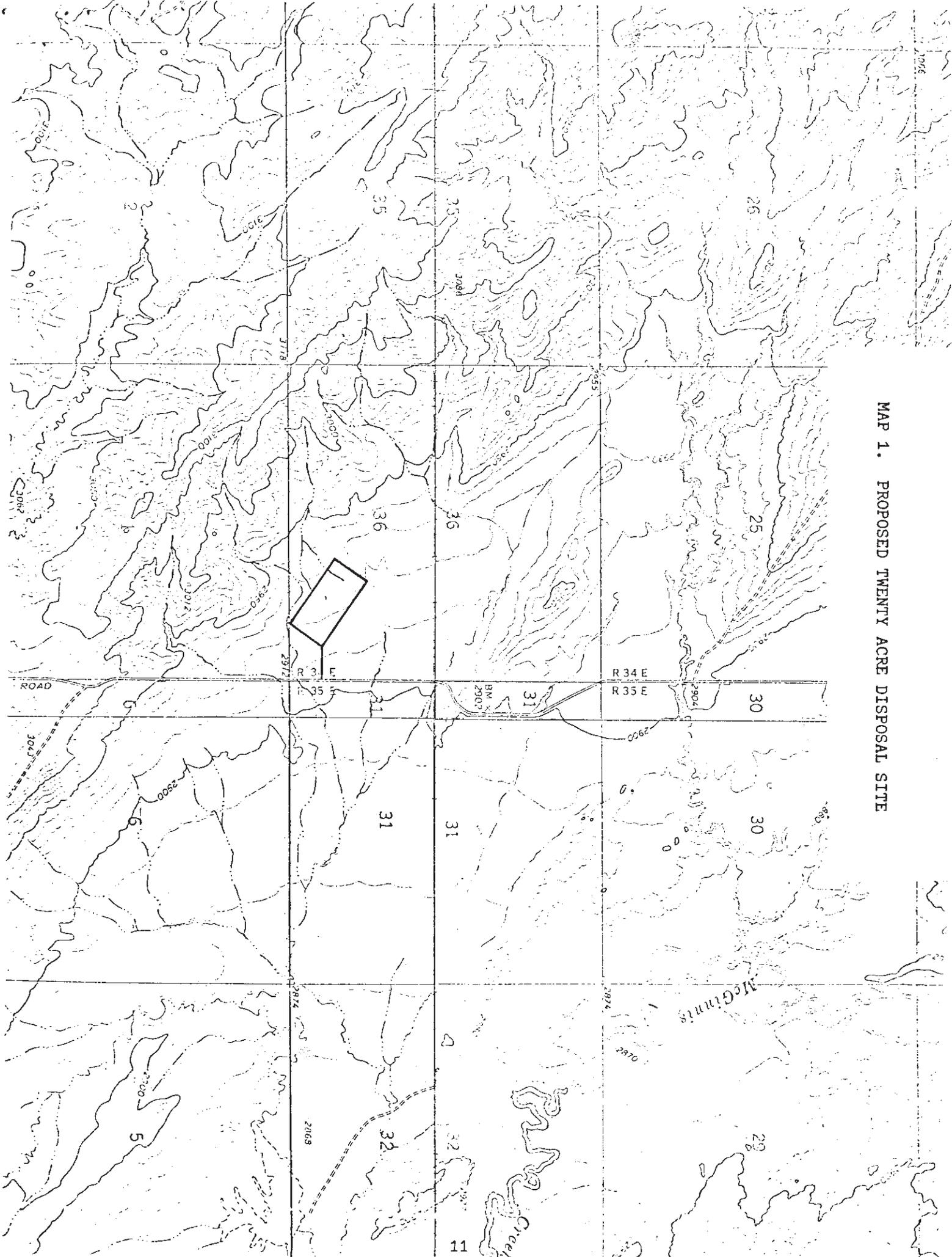
Organic mercury, lead, cadmium and arsenic compounds and inorganic pesticides may be disposed of by: 1) chemical deactivation of the pesticide to a non-hazardous compound with recovery of the heavy metal, 2) encapsulation and burial in a specially designated landfill or 3) by maintaining in secure storage.

4. Specific Disposal Methods to be Employed

a. Soil Injection

The concern over the environmental persistence of certain pesticides has given rise to research on the biodegradability of pest-controlling agents. The subject has been reviewed by Alexander (1966), Bollage (1972), Esser (1970), and Kearney and Kaufman (1969), among others. It is certain that biodegradation in soils is not a viable method of destroying all unwanted pesticides; environmentally persistent compounds containing heavy metals are examples of poor biodegradation candidates. However, certain organic compounds have been shown to degrade in soils when applied in massive amounts, and many others have been shown to readily break down when applied at lower rates of application. Chemicals shown to readily decompose in the soils include: 2,4-D; 2,4,5-T; MCPA; Picloram and Malathion. Such chemicals which

MAP 1. PROPOSED TWENTY ACRE DISPOSAL SITE



are shown in the literature to degrade in soils will be candidates for soil injection. Two pesticides will be selected for soil injection studies at the disposal site. The two pesticide materials now stored at Glasgow which appear to be the best candidates for soil injection are Sinox B (dinitrobutylphenol) and Avadex BW (triallate). Both are dry organic herbicide formulations.

The materials will be injected six to ten inches below the soil surface, using an agricultural implement modified to apply large volumes of dry chemical. Waste chemicals will be injected in bands separated by bands of undisturbed soil in order to retard soil erosion.

A program of soil sampling will be implemented to reveal the rate of degradation of the injection compounds in the soil. Sampling will continue until the pesticides degrade to background levels.

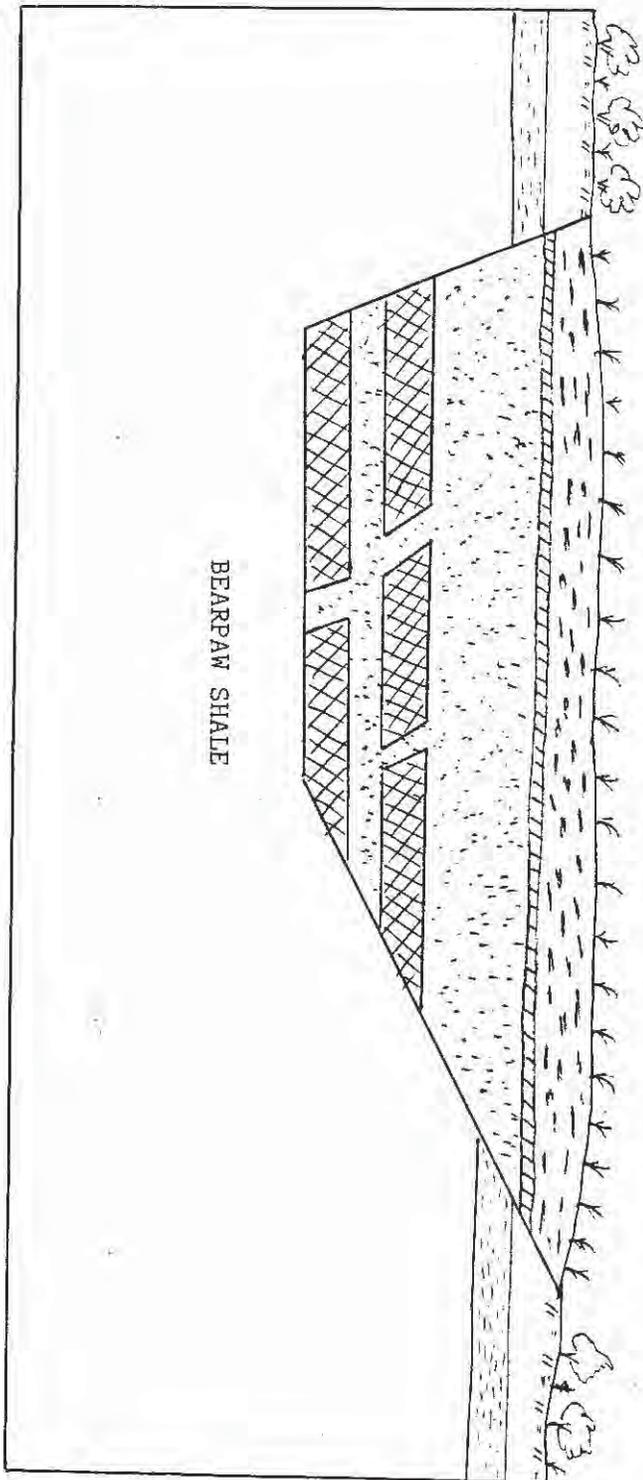
b. Secure Landfill Disposal

A trench method of landfilling will be utilized for disposal of waste pesticides. Waste pesticides will be placed 15 to 20 feet into the impervious bedrock material and segregated into several separate cells. Final dimensions of the trench will be determined from waste chemical volume requirements and preliminary surface excavation.

Waste pesticides will be covered at the end of each working day. Cracking of cover material will be minimized by using dry material and maintaining a small working face--bringing a small area to final grade before starting a new cell or area. Additional cover material may be obtained by exposing the excavated bedrock material to the weather and allowing it to decompose (bedrock material is Bearpaw Shale).

Waste materials will be buried at least two feet below the top of the underlying contiguous bedrock. The last layer of waste pesticide will be covered with earth and capped to bring the trench to the natural level of the surrounding terrain. The surface will be reclaimed with native grasses. The trench will not be allowed to remain open past one operating season (summer), thus preventing water runoff or

FIGURE 1. CONCEPTUAL SCHEMATIC OF CHEMICAL LANDFILL



-  Developed soil from bearpaw shale
-  Weathered bearpaw shale
-  One foot sand overburden
-  Clay earth fill
-  Hazardous waste cells
-  "Topsoil" for reclamation

snow from accumulating in the trench.

c. Treatment Methods

1) Chemical Pre-Treatment

Chemical treatment of pesticides has been investigated as a potential method of neutralizing hazardous materials (Kennedy et al, 1974; Shih and Dal Porto, 1975). The problem encountered throughout these investigations has been the extreme variety in chemical structures of pesticides. It is apparently impossible to develop a single chemical reaction procedure which can be universally employed for neutralization of pesticides. Certain pesticides may be unaffected by specific chemical treatment processes and others may be more affected by one process than another. The result of treatment may be incomplete degradation with a fraction of the parent toxic chemical remaining, unidentified reaction products, reaction products of unknown toxicities or reaction products more toxic than the parent compound. Some chemical treatment processes also employ reagents which are extremely dangerous to use, especially on a large scale. Therefore, the pesticides presently in storage will be screened for compounds that have been shown in the literature to decompose with treatment, and a cost benefit analysis will be performed to reveal whether the treatment is justified.

2) Encapsulation

Inorganic compounds and organic compounds containing heavy metals will be encapsulated prior to burial, as specified in the EPA disposal guidelines.

3) Ponding

The dilute pesticide rinsate solution generated from the container management program will be concentrated by evaporation in a shallow pond prior to disposal. It is planned that a 15 foot x 15 foot pond will be constructed at the site and lined with a synthetic liner. The rinsate material will be allowed to evaporate until only a semi-solid residue remains, and the liner and residue will then be removed and buried in the fill. Any rinse water from equipment cleaning, etc., may be handled in the same manner.

d. Reuse or Reprocessing

The pesticide materials collected under this program and now stored in the bunker facilities are outdated and generally may not be used for the purposes originally intended. However, there may be possibilities for reprocessing or reclamation of these chemicals by certain industries. Where feasible, this method of "disposal" will be given priority over landfilling of the waste pesticides.

5. Monitoring at the Disposal Site

A program of sampling and monitoring will be developed for the disposal site which will include the following:

a. Soils

Soil samples will be collected for residue analysis, determination of chemical degradation, soil microbiological determinations and evaluation of off-site contamination. Samples will be collected directly from the soil injection bands and also from potentially affected off-site soils. A more detailed description of the proposed soil sampling schedule as well as other monitoring activities is contained in Appendix C.

b. Water

Surface water runoff will be collected by berms constructed at the site. When water is available behind the berms, it will be monitored for possible chemical contamination. Water which might penetrate the soil layer and move along the soil-shale contact zone will be intercepted by strategically placed monitoring wells. These wells will be periodically tested, and any water that might be collected will be analyzed for suspect pesticides originating from the evaporation pond, landfill trenches and soil biodegradation plots. Should pesticide leachate be found in any of these wells, further testing will be performed to ascertain the extend of movement of leachate from the disposal site.

c. Vegetation

Vegetation samples will be collected and chemically analyzed for pesticide residues which might originate from wind movement of pesticides or translocation of soil

injected materials.

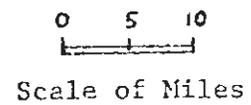
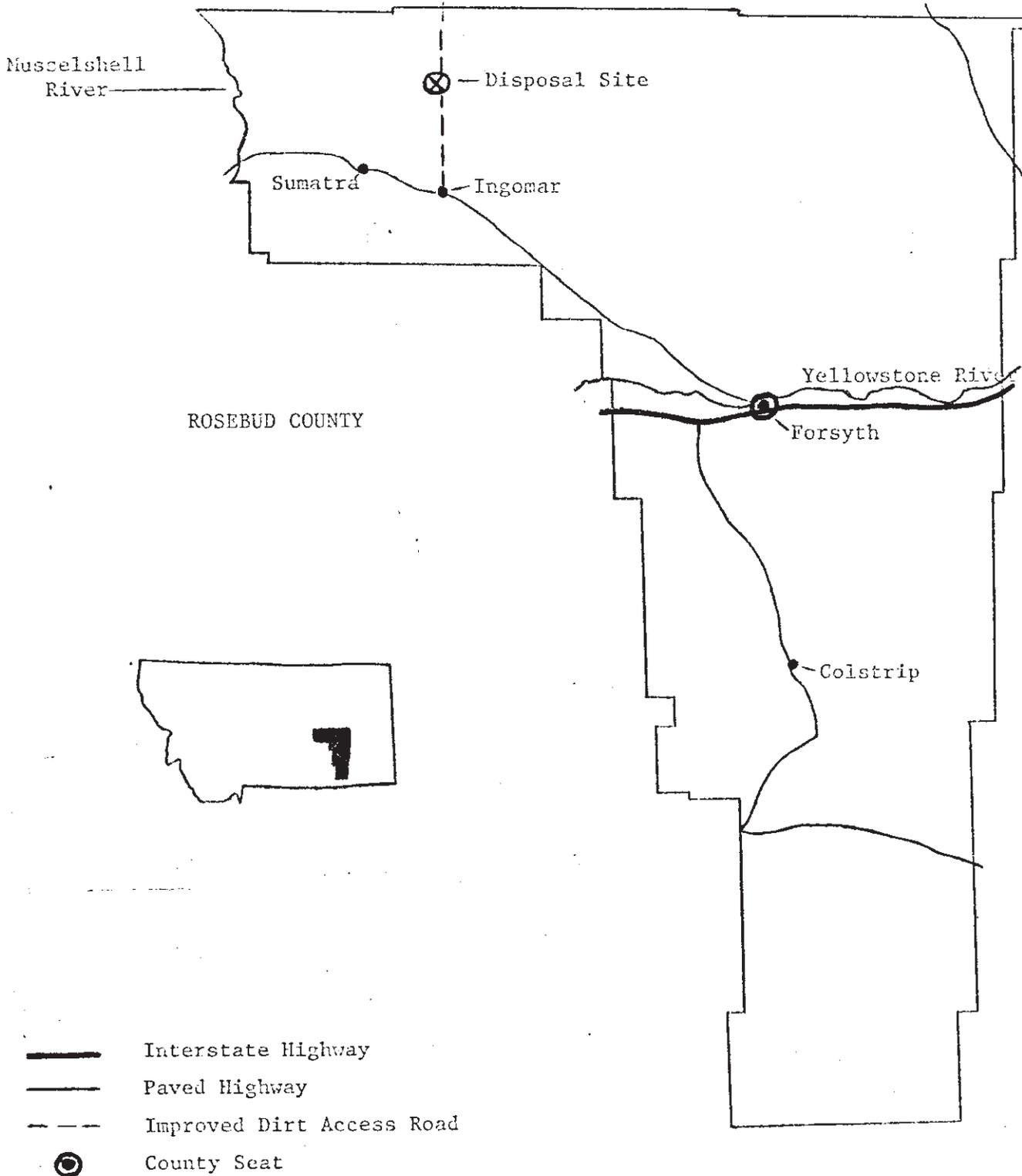
d. Human Health

Those persons involved with the project whose work involves possible exposure to the cholinesterase inhibiting group of pesticides will be required to undergo routine cholinesterase blood testing.

III. EXISTING CONDITIONS

The proposed hazardous waste disposal site is located near Ingomar in the northwest portion of Rosebud County - a sparsely populated agricultural area of eastern Montana. More specifically, the site is in the S $\frac{1}{2}$, SE $\frac{1}{4}$, Section 36, Township 12 North, Range 34 East, Rosebud County.

The area is one of semi-arid grazing land. The agricultural productivity is limited by moisture and by soil characteristics. Geologically, the region is one of sedimentary plains; the bedrock formation exposed at the site is Bearpaw Shale. The topography varies from gently rolling plains to broken and steeper terrain, some distance from the site. Most of the land within a 25 mile radius of the site shows a vegetative cover of range grasses and sagebrush. There are no perennial streams or large reservoirs within 20 miles. Forsyth, the Rosebud County seat, is the nearest town of more than 250 persons; it is 52 miles southeast of the proposed disposal site. Billings, Montana's largest city, is located 120 miles southwest of the site.



IV. ENVIRONMENTAL IMPACTS

A. Potential Impacts on the Physical Environment

1. Terrestrial and Aquatic Life and Habitats

The area of the proposed disposal site is a mixed grass-sagebrush ecosystem, and according to the Department of Fish and Game, provides excellent habitat for antelope and sage grouse. Mule deer habitat exists in the more broken terrain some distance from the site. Elsewhere in Rosebud County, populations of white-tailed deer, sharp-tail grouse, Hungarian partridge, pheasants and wild turkey are found and provide recreational hunting. A Fish and Game Department census of antelope conducted in July 1975, revealed an average of four antelope per square mile in Section 36 (Eustace 1976).

No habitat for fish exists in the area. The only streams are intermittent, flowing during high precipitation and runoff periods, and the retention ponds for stock watering do not provide the proper quality and quantity of water to support fish populations. The Yellowstone and Musselshell Rivers, both more than 20 miles from the site, are the nearest streams that flow year-around.

It is anticipated that the proposed disposal facility will have a minimal impact on all forms of wildlife. The site is small in relation to the wildlife habitat existing in the area. Operation of the site will be limited to Health Department personnel and private contractors. The moderate increase in activity and traffic, due to the site operation should not disturb game or bird populations.

The disposal site will be fenced to exclude cattle and big game. The six-foot fence will be wire mesh, topped with barbed wire. Evaporation ponds or water catchments constructed on the site will be screened to prevent access by birds and small mammals.

Chemicals disposed of by soil injection and by landfill techniques will be confined entirely below the soil surface and should not present any hazard to animal life that may be able to enter the fenced area. Any spills that might occur will be

immediately cleaned up.

Soil microorganism populations will be affected by the soil injection of candidate pesticides. Although most organic pesticides have been shown to degrade in the soil, microbial populations are strongly affected by the incorporation of large amounts of pesticide material in the soil surface. What has usually been seen in studies of soil biodegradation of pesticides is an initial "lag period" in which degradation of the pesticide is very slow, followed by a period of rapid chemical breakdown (Goulding, 1973; Young, 1972; Kaufman, 1971). This lag time is believed to be due to an adaptation of the microbial population to the applied pesticide. This adaptation may be due to a metabolic shift in the microorganisms, allowing them to utilize the chemical as an energy source or to a rapid increase in the numbers of microorganisms already able to utilize the pesticide at the expense of organisms not adapted to using the pesticide.

2. Geology and Soil Quality, Quantity, and Moisture

a. Geology

Rosebud County lies wholly within the Great Plains and is underlain by gently dipping sedimentary rocks. Cretaceous Age Bearpaw Shale is exposed in the area of the disposal site; beneath it lie several thousand feet of sedimentary rock, the bulk of which are shales and shaly sandstones of Cretaceous Age. These strata dip to the southwest off the Porcupine Dome at slopes of one-to two degrees. Approximately three to four miles east of the disposal site the Judith River Formation is exposed; the Claggett Shale outcrops two or three miles farther east of that. To the west and southwest of the site the Hell Creek and Fox Hills formations cap the Bearpaw Shale and are expressed by a ridge of sandstone hills. In Rosebud County, the Bearpaw Shale attains a total thickness of 1,200 feet, but it is only 500 feet thick at the site, the rest having been eroded away. No water or oil wells are known to have been drilled in Section 36, thus the thickness of the Bearpaw Shale at the site is a projection from formation tops encountered in adjacent oil test wells (see Map 3).

Descriptions of the pertinent bedrock formations:

1) Hell Creek and Fox Hills Formations. These formations consist of friable white or tan sandstone, somber gray sandstone and greenish shaly clay and mudstone containing dinosaur bones. A few thin subbituminous and lignite coal beds are found in the Hell Creek Formation. The Fox Hills Sandstone and the basal sandstone of the Hell Creek Formation together form a good aquifer and may provide water of adequate quality and quantity for domestic and stock use (SCS, 1975). Because these formations are stratigraphically and topographically higher than the Bearpaw Shale, their water-bearing potential cannot be affected by residues at the disposal site.

2) Bearpaw Shale. This formation consists of dark gray to black, nonfissile bentonitic shale containing clay-ironstone concretions alternating with thick units of fissile, non-bentonitic shale containing limestone and other concretions (BLM, 1970). The shale weathers easily through disaggregation; the depth of the weathered zone depends on the rate of erosion, composition of the beds and intricacy of the jointing. Where the shale contains appreciable quantities of bentonite, weathered zones are shallow, but in other areas they may be tens of feet thick.

The Bearpaw Shale is not known to yield usable water and is not a potential aquifer. Fractures and jointing, which would normally carry water, do not generally extend deep into the Bearpaw Shale. Most of those few that do are sealed by minerals deposited from percolating water.

3) Judith River Formation. This formation consists of grayish-white sandstone and light to dark gray sandy shale and clay. The formation contains three units -- a 30-foot sandstone at the top, a 165-foot shale member and a 100-foot sandstone at the bottom. This formation is marine in Rosebud County. The Judith River generally yields highly mineralized water. Locally, where the sandstone is not covered with shale, water of adequate quantity and quality for stock and domestic use may be obtained (SCS, 1975, and BLM, 1970).

4) Claggett Formation. This formation may be described as a black to brownish-gray shale containing numerous beds of bentonite and some calcareous lenses. The Claggett is an impermeable marine shale that generally does not yield water to wells.

MAP 3. GEOLOGY OF NORTHWEST ROSEBUD COUNTY

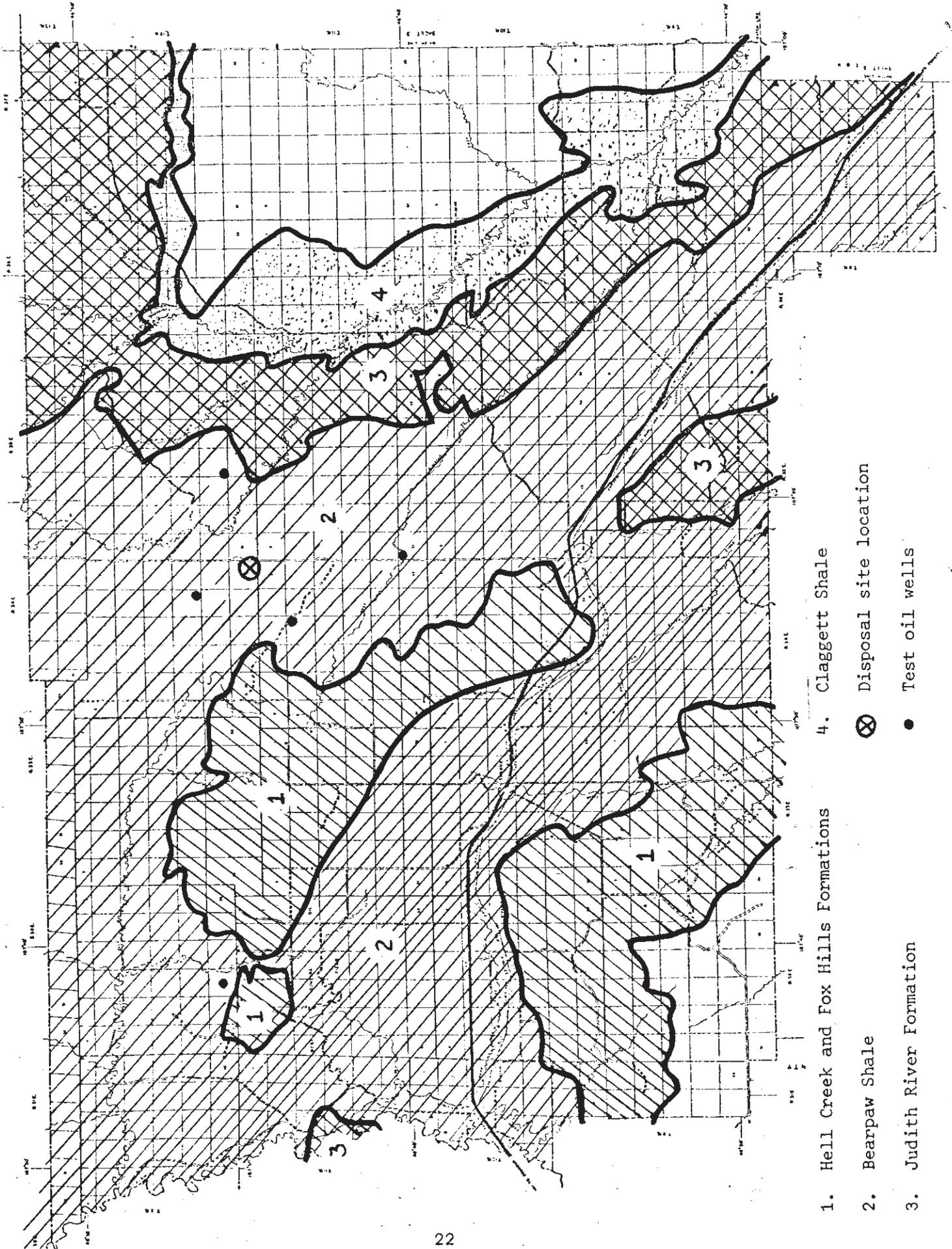
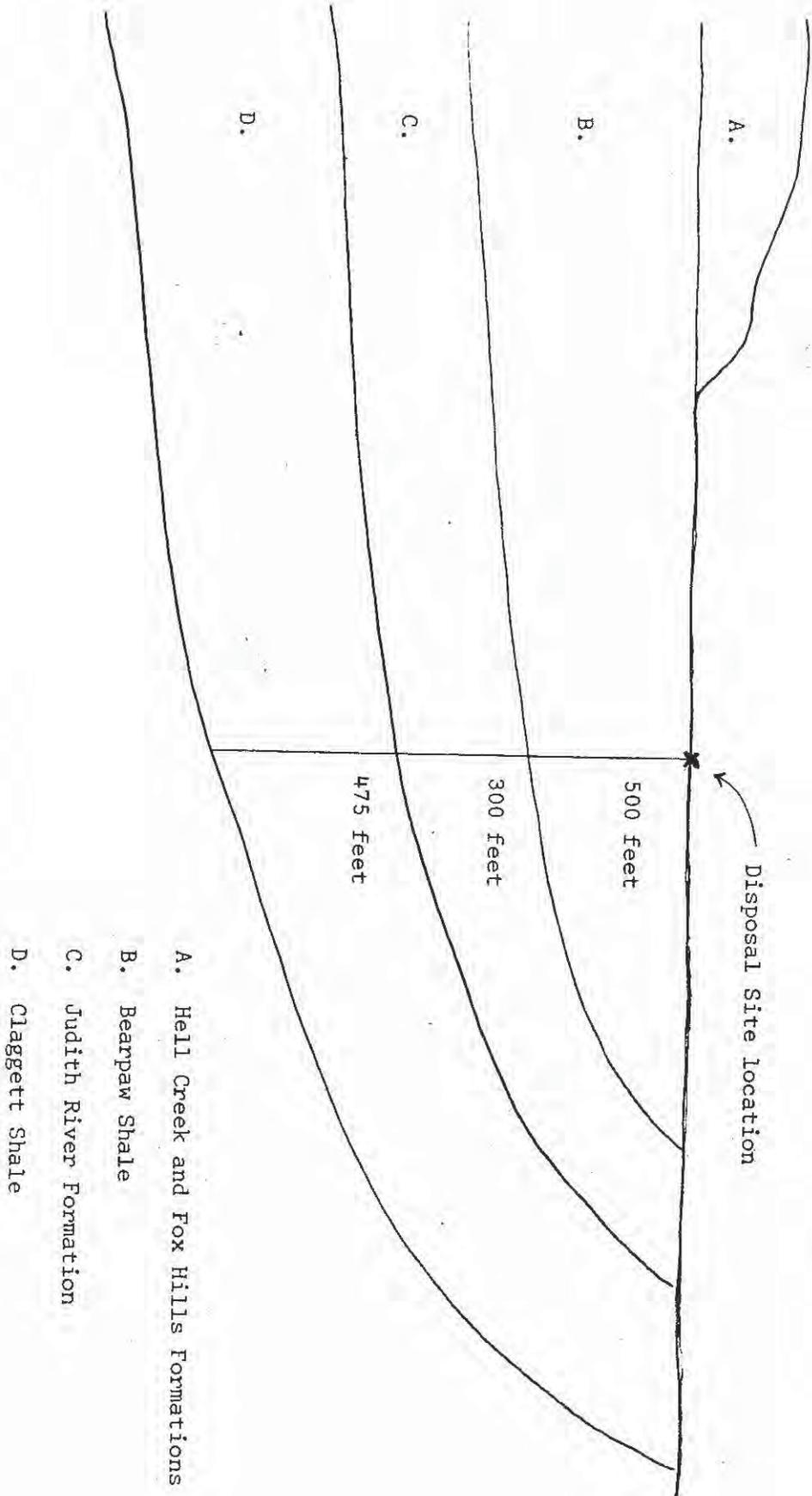


FIGURE 2. DEPICTED PROFILE OF GEOLOGIC STRATA



Locally it may yield small supplies of highly mineralized water unsuitable for any use. In Rosebud County, this formation is approximately 475 feet in thickness (SCS, 1975, and BLM, 1970).

Consulting geologists selected Bearpaw Shale as the geologic bedrock formation that provided the best environmental protection in siting a chemical waste facility due to its impermeability and homogenous composition. The thickness of this shale formation at the selected site insures containment of any wastes buried there, with little or no chance of leachate formation from the fill. The landfill will be engineered and operated in such a manner as to prevent any water entry into the fill from rainfall and runoff.

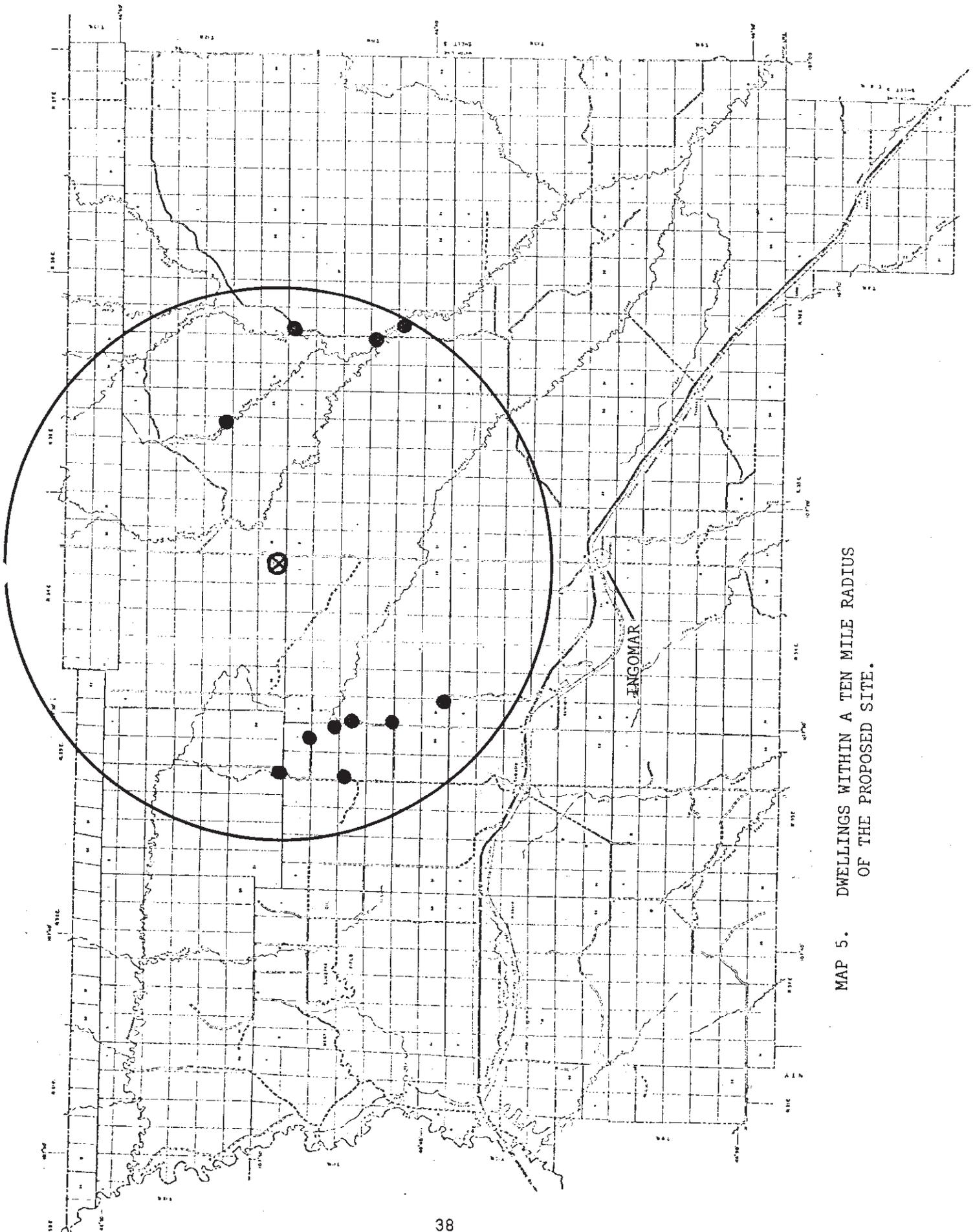
b. Soils

There has been no detailed soil survey in the northern portion of Rosebud County as yet (a countywide soil survey now being conducted is progressing northward from the southern part of the county). A special soils evaluation of the quarter section in which the proposed disposal site is located has been performed for the DHES by the Forsyth office of the Soil Conservation Service. They identified the soils in the area of the site as vaeda silty clays (Daniels, 1976). The vaeda series of soils are described as "deep, well drained soils formed in alluvium mainly from shale. They are nearly level to gently sloping and are on fans. The mean annual air temperature is 43° F and the mean annual rainfall is about 12 inches."

At the site, the soils are derived entirely from the weathering of the underlying Bearpaw Shale and from erosional transport of weathered shale from farther upslope. This dense, nearly impermeable soil is classed as a CL* (Unified Classification). It is unlikely that water from rain or snowmelt will infiltrate this soil beyond 18 inches unless deep mudcracks should form. Soil moisture did not extend below nine inches in any of the holes dug during site evaluation.

The 20 acre site is situated on alluvial fan deposits between a shale ridge and

* CL - Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays or lean clays.



MAP 5. DWELLINGS WITHIN A TEN MILE RADIUS OF THE PROPOSED SITE.

1970. However, the northwest part of the county has undergone a slight decrease in population in the same time period.

The population density for all of Rosebud County is 1.9 persons per square mile. In the northwest part of the county, the population density is only 0.5 persons per square mile.

The towns nearest the site are Ingomar, population 69 (from the 1970 U.S. Census); Sumatra, 7; Vananda, 30; and Melstone in Musselshell County, 227.

The creation of the disposal site should not alter the population trends for the area.

The housing situation should be similar to population--no anticipated impact. Since there will be no permanent employment associated with the maintenance of the disposal site, there will be no need for permanent housing. Temporary housing (motels or hotels) will be needed during the construction phase of the project and once or twice a year when materials are buried. Such housing is available in Roundup, Forsyth and Melstone.

9. Demands for Local Government Services

This project is intended as a service of state government to the agricultural community in Montana and is designed to replace existing disposal, which often involves community or district refuse disposal sites.

The project should have no effect on local government services, except to provide a desirable alternative to the disposal of waste pesticides in the local landfills or dumps.

No improvements to county roads are required, and increased use of the existing roads during operation of the site should have a minimal impact on the roads. Additionally, the site will not require patrolling by the Sheriff's Department, nor will it affect the enrollment in local school systems.

10. Industrial and Commercial Activity

This project should not create commercial or industrial spinoff developments. A small demand for food, lodging and related goods and services will be created in

material stored at Glasgow Air Force Base will generate some income, but after the site is constructed the income generated by the annual or semi-annual operation of the facility will be minimal.

6. Access to and Quality of Recreational and Wilderness Activities

The proposed project should have no effect on wilderness activities and little to no effect on recreational opportunities in the area.

There are no wilderness areas in or near Rosebud County. The only known recreational use of the area around the site is hunting; however, disposal activities will not occur during the fall hunting season.

It's possible the 20 acre site might be of interest to amateur fossil hunters, but the Bearpaw Shale formation is a large formation and provides a vast area for use by such persons.

7. Quantity and Distribution of Employment

Development and operation of the site will require contracting with private firms for fencing, core drilling, trench excavation, road construction and transportation of the pesticides from Glasgow Air Force Base. Soils testing, sampling and monitoring, laboratory analyses and soil injection of pesticide will be performed by state government personnel.

All tasks, including disposal of pesticides, will likely be contracted to established firms which will accomplish the work with existing personnel.

8. Distribution and Density of Population and Housing

The northern part of Rosebud County (from Interstate Highway 94, north) is predominantly agricultural land. The ranches are large and the population is thinly spread throughout the area. In southern Rosebud County and in adjacent counties, the character of the land is changing due to coal development. Coal mining and the construction of electrical generating plants at Colstrip are causing an influx of persons to the Forsyth and Colstrip areas.

A special census taken earlier in the year revealed that the county population has grown dramatically; the current population is 9,750 persons compared to 6,032 in

3. Agricultural or Industrial Production

The ~~permanent~~ loss of 20 acres of good to marginal grazing land should not be a significant impact to the local agricultural community.

According to information from the Department of State Lands, the site is in a section of land capable of sustaining 10 animal units. The grazing lease for the 640 acres is \$144 a year, or 22¢ an acre. In terms of loss in animal units, changing the use of 20 acres will result in a loss of about one-third of an animal unit.

The disposal site will be fenced to keep out wildlife and domestic livestock.

There is no industrial development in the area.

4. Human Health

The health and safety of all persons involved with the project will be a major consideration in all operations. All workers will be given instruction in necessary safety precautions for handling pesticides. Appropriate safety equipment will be provided and safe working and personal hygiene procedures will be stressed. Persons working with the disposal of pesticides will be required to have physical exams and to undergo cholinesterase testing to monitor possible pesticide toxicity effects.

The disposal site will be fenced, have a locked gate and have signs cautioning against unauthorized entry. Routine checks will be made to insure that fences are in good repair and that gates are properly locked and have not been tampered with.

All necessary precautions will be taken to prevent accidental spillage of pesticides during transportation to and disposal at the site, and an accident contingency plan will provide for rapid response to any spills or similar accidents.

This project will provide a major beneficial impact on human health by providing a safe disposal alternative for hazardous wastes, thus allowing removal of waste chemicals and unrinsed empty containers from unsafe storage and preventing future disposal in improper landfills and dumps.

5. Quantity and Distribution of Community and Personal Income

The project will not generate income for the local community, but will produce some personal income. Pre-development tests, construction and disposal of the waste

B. Potential Impacts on the Human Environment

1. Social and Cultural Considerations

According to the 1975 Rosebud-Treasure Counties Situation Statement, many Rosebud County residents are rural traditionalists who value credibility, trust, honesty and a way of life shaped by an agricultural economy and sparse population. Ranch families and residents of the county's small towns feel strongly about being able to make their own decisions and control their destinies.

The recent increase in coal mining in the southern part of the county has resulted in an influx of people from more urban areas. The interjection of these persons into the county's social structure is beginning to affect the lives of county residents.

The Situation Statement said, "...People are generally resisting this type of change."

Persons living in the northern half of the county have not been as greatly affected by the social/cultural impacts of coal development and, considering the geology of the northern part of the county, it is doubtful that mineral development will ever occur on the scale it is occurring in the southern part. Consequently, changes in the social/cultural lives of persons living in northern Rosebud County should be on a lesser scale than for persons living in the southern part of the county.

Area residents may feel apprehensive about the intrusion of a hazardous waste disposal site into the rural agricultural setting. However, ranches are large and only a small number of persons live within the vicinity of the site. There are no residences within a five mile radius of the site.

The rancher who has land adjacent to the site--and who holds the grazing rights to Section 36--has given written approval to the DHES to situate and operate the disposal site.

2. Local and State Tax Base and Tax Revenue

Since state land cannot be taxed, the change in use of the 20 acres will not affect the tax status of the land.

has been found in Bearpaw Shale, but finds of this kind are rare indeed."

There has not been a significant find on or near the site, thus the loss of 20 acres in comparison to the vast amount of land covered by the two shale formations will not affect paleontological efforts.

9. Historical and Archaeological Sites

The Montana Historic Preservation Plan lists 18 historic sites in Rosebud County, but none of the sites are near the proposed pesticide disposal site.

According to Professor Dee Taylor, Department of Anthropology, University of Montana, there are a number of known archeological sites in the county, but they are south of the proposed site.

"...We do not know of any recorded sites within T12N, R34E, but our lack of data may reflect the fact that archaeological reconnaissance probably has not yet been done in that area," Taylor said.

Although there are no known historical or archaeological sites near the disposal site, the Bearpaw Shale and Claggett Shale formations contain fossils of prehistoric sea life. Eugene S. Perry, in his Bureau of Mines and Geology bulletin, Montana In The Geologic Past, said:

"Later in Cretaceous time the marine shales of the Claggett and Bearpaw Formations were deposited. Again in these seas a great variety of Cretaceous marine life thrived and left their shells as fossils. Oysters and clams are commonplace. Particularly plentiful and well preserved are specimens of ammonites (Placenticeras, Baculities) on some of which, portions of the "Mother of Pearl" of the original shell show in beautiful colors. Specimens of Baculities, which were only partly coiled, are generally broken into segments. People unfamiliar with fossils incorrectly call them vertebrae or segments of a backbone. Along with these forms are the usual Cretaceous oysters and clams. Fossils in both the Colorado and Bearpaw commonly occur in large ball-like masses of limy material (concretions), a foot or more in diameter. A sledge hammer may be necessary to break these open, but in their centers may be present several kinds of fossils such as oysters, clams or ammonites. South of Fort Peck Dam a fossil skeleton, nearly complete of the large marine fish-like reptile Mosasaur or Ichthyosaur

No adverse effect on air quality is expected from the disposal site operation. Some blowing dust will occur from site use, but this will be a negligible addition to dust produced from travel on the existing dirt public road.

All pesticides disposed of at the site will be covered by earth; none will be applied to the ground surface. In the case of the soil injected pesticides, some volatilization may occur through the three to six inches of overlying soil. A previous soil biodegradation study of a similar nature (Goulding, 1973) showed air concentrations of the injected pesticide to be at levels far below what would occur from a normal agricultural application procedure. It is anticipated that the effect on the ambient air from pesticide disposal will be negligible.

7. Unique, Endangered, Fragile, or Limited Environmental Resources

No known unique, endangered, fragile or limited resources will be affected.

8. Demands on Environmental Resources of Land, Water, Air, and Energy

The major demand of the project will be the withdrawal of the 20 acre disposal site from production as rangeland. This loss of grazing potential will be negligible based on the carrying capacity of the range. It is also likely that the land surface may be able to be returned to grazing use after the site is de-activated. The State *DHEC* will retain the site until its capacity to hold wastes is exhausted or until future changes may end the need for retention of such a site. The life expectancy for this site will depend on specific disposal methods used and on future rates of accumulation of pesticide residues, but certainly should not be less than 25 years. The site could probably be returned to grazing use within two years after the last disposal of wastes, although continued monitoring activities might be necessary.

It is not anticipated that air and water resources will be measurably affected.

Energy will be consumed chiefly in the form of gasoline used for truck transport of the materials to the site, operation of equipment in site development, and disposal operations, and in the operation of the mobile pesticide drum cleaning unit. There will be no need for bringing electrical power lines to the site.

times each year. This site has been selected in a remote area, well removed from towns, residences and heavily used roads.

In an area of open plains such as this, however, even additional fencing becomes a noticeable change. The fence enclosing the site will be similar in appearance to existing fences in the area, and from the public use road, the boundary fence and a small steel shed should be the only visual evidence of the disposal site when it is not being operated. This disposal site should in no way encourage any additional developments which would change the character of the land.

6. Air Quality

The climate in northern Rosebud County varies considerably. Weather conditions range from blizzards, to hail, high winds, snow, flash floods and droughts.

The northwest part of the county receives some of the lowest amounts of precipitation in the county.

The climate for the area has followed a cyclic climatic pattern. The last 40 years have gone from dry weather in the 1930s to wet weather in the 1940s, dry 1950s, wet 1960s and above average moisture in the 1970s.

The Billings office of the National Weather Service of the National Oceanographic and Atmospheric Administration lists the following climatological data for the Forsyth area of Rosebud County.

TABLE 4. AVERAGE TEMPERATURE, PRECIPITATION AND SOLAR RADIATION (S.R.)

	<u>Jan.</u>	<u>Feb.</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>
Temp.	17.3	23.9	31.4	45.5	55.9	63.9
Pre.	.28	.31	.50	1.40	1.90	2.95
S.R.	151	270	380	465	570	625
	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>
Temp.	73.1	71.5	59.6	48.6	33.4	28.3
Pre.	1.33	1.15	1.06	.70	.48	.35
S.R.	640	535	420	290	180	125

1. Average annual temperature 45.6° F (1941-1970)
2. Average annual precipitation 12.40 inches (1941-1970)
3. Average annual solar radiation 390 langlies (1972-1974)

The site has been located on the alluvial fan material to take advantage of the better soil and vegetative conditions. Representative species identified at the disposal site include western wheatgrass, sandberg bluegrass, bottlebrush foxtail, prickly pear cactus, gumbo lily, nuttall saltbush and big sagebrush. *and grasses*

The vegetation will be affected by a variety of operations at the disposal site including berm construction, soil incorporation, landfilling, vehicle operation and construction of a road to the site from the existing public road--a little more than 500 feet in distance.

The berms will be reseeded with native grasses after construction. The areas used for landfill and soil injection disposal will also be reclaimed and reseeded as soon as the operation of an area is completed.

The soil injection of pesticides may have an adverse effect on the vegetation, lasting beyond the immediate effects of disruption from the application itself. The herbicidal effect should be confined to the actual bands of the application, however, and vegetation should be able to be re-established in the bands as the chemicals are broken down.

No adverse effect on vegetation is expected outside the confines of the disposal site. Within the disposal site, general conditions of the vegetation should actually improve with time because of the removal of grazing pressure.

5. Aesthetics

To many people, the operation of any sort of a land disposal site is considered to be aesthetically objectionable. Much of this attitude is associated with the open, burning refuse dumps and the poorly planned and operated sanitary landfill operations that may still be found throughout the country. The proposed chemical disposal site, however, will have little in common with this type of operation and, in fact, not much in common with any ordinary sanitary landfill operation. There will be little noticeable activity at the site over the course of a year. Disposal operations will be limited to one or two periods in the first summer and no more than once per year from then on. Other activities at the site will include sampling and monitoring several

presently carrying upland drainage across the site will be diverted around the site boundary. Berms will also be constructed to control the flow of runoff from precipitation falling on the site itself. These will be placed to catch surface water for chemical analysis. There will also be monitoring wells placed within or near the site to test for possible formation and movement of leachate.

TABLE 2. AVERAGE ANNUAL PRECIPITATION*

Jordan	11.42 inches
Melstone	13.41 inches
Forsyth.	12.13 inches
Rock Springs	11.22 inches

*Based on records for thirty years.

TABLE 3. DISTRIBUTION OF PRECIPITATION

Reporting Station	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Melstone	.49	.44	.57	1.17	1.99	3.10	1.44	1.15	1.26	.76	.53	.51
Forsyth	.28	.31	.50	1.40	1.90	2.95	1.33	1.15	1.06	.70	.48	.35

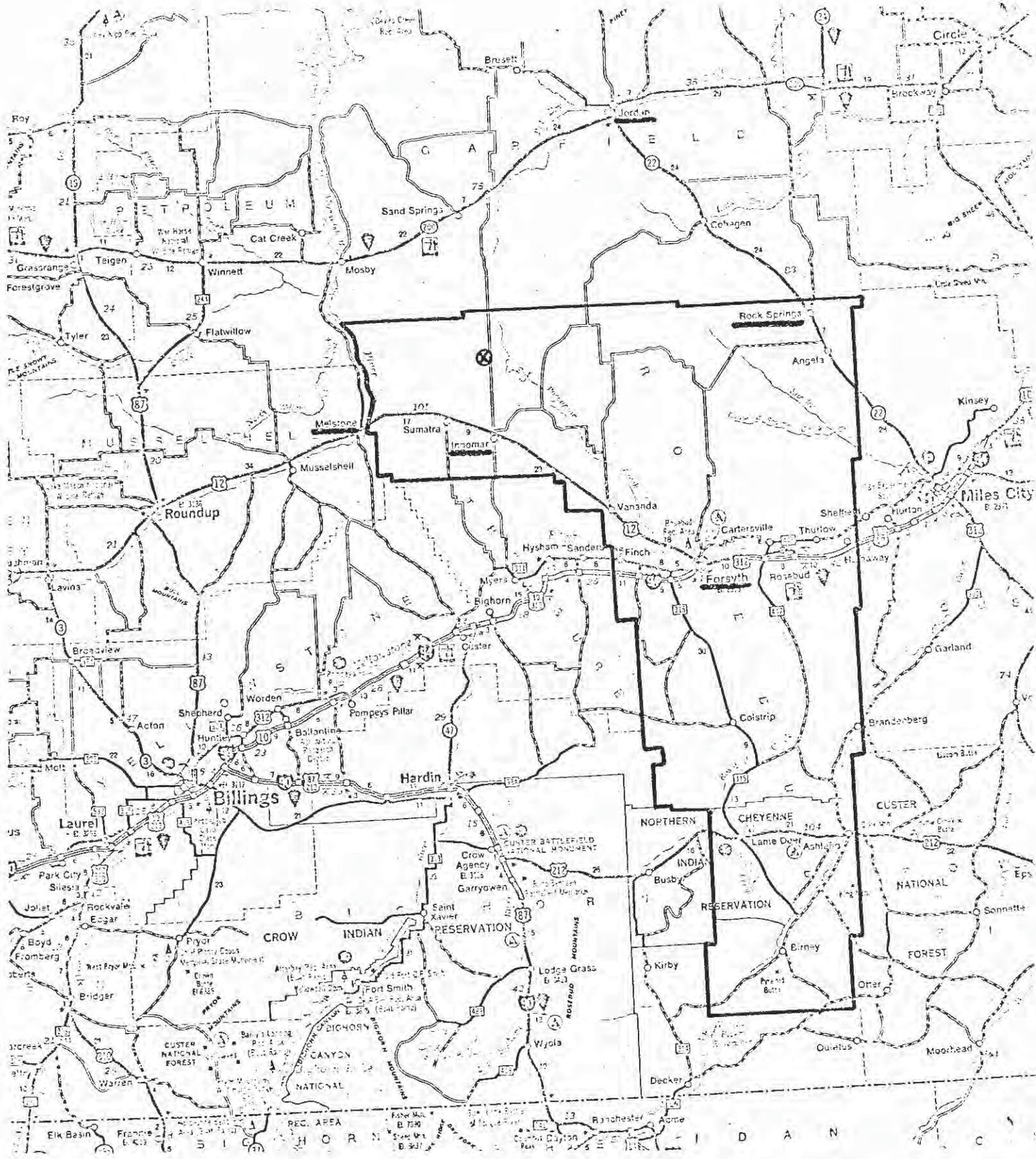
4. Vegetation

The northern part of Rosebud County is characterized by sagebrush and grassland range country. The limitations of soil and rainfall restrict the growth of trees, except along the drainages. Likewise, crops are not found to any great extent except near the Musselshell and Yellowstone Rivers and near the lower reaches of Great Porcupine Creek. Eighty-five percent of all the land in the county is rangeland.

According to the county's 1975 Situation Statement, the disposal site is in an area which has a growing season of about 110 days.

The proposed disposal site shows a mixed cover of grasses, forbs and shrubs. On the flat between the 20-acre site and the road, the vegetative cover is very sparse, but becomes somewhat heavier and more diverse on the alluvial fan material. On the fan the cover varies from 30 to 70 percent, with an average of about 50 percent cover.

MAP 4. LOCATED MAP - ROSEBUD COUNTY AND SOUTHERN MONTANA



unstable and susceptible to erosion. The sparse vegetation, due to the low producing soils and grazing, does not intercept enough precipitation to prevent erosion. The steep, deeply cut stream channels also contribute to the loss of soil.

Because of the impermeable soils and poor watershed conditions, runoff is very high during heavy rainfall, and flooding may occur. Although the average annual rainfall is low (12 inches per year) much of this rainfall may be concentrated in short intense storms.

Overland flow water is of low quality, with high loads of dissolved solids and sediments. In some cases, water for domestic use may be obtained from shallow wells in the areas of exposed sandstone formations. Many area residents, including the town of Ingomar, must haul water for their domestic needs, since surface and ground waters are not available.

The Bearpaw Shale and Claggett formations are not considered aquifers anywhere in Rosebud County. Although the Judith River Formation may be an adequate aquifer elsewhere, in Rosebud County it does not produce water of suitable quality for domestic use except where it outcrops. The water obtained from the Judith River ^{Formation} where it is overlain by Bearpaw Shale is hot and high in minerals and nitrogen gas. This water may be suitable for livestock.

The great distance to groundwater coupled with the impermeability of the Bearpaw Shale and the clay soils should effectively prevent any possibility of groundwater contamination. There are no known water wells within a five mile radius of the site.

Precautions to prevent surface water degradation will include water diversions, berms and contour application of soil-injected pesticides to control erosion. The site receives surface runoff from approximately 100 acres of the ridge in the southwest corner of the section. This runoff presently is carried via several small channels up to three feet in depth that carry water through and around the site and across the road to a larger drainageway. This drainage in turn enters McGinnis Creek 3½ miles below (east of) the site. Drainage diversions and berms will be employed at the site to control the water runoff in the site area. It is planned that the channels

a broad bottomed coulee. Slopes on the fan are two to three percent; slopes in the coulee below the site are zero to one percent. Because of the relatively rapid deposition of material on the fan, the soil is only two to three inches deep. Some scattered gravel may be found on the surface in and around the site; these pebbles are probably derived from concretions in the Bearpaw Shale. Test holes dug on the site revealed that gypsum crystals and salts are abundant in the alluvial soil. (Jones, 1976; Bergantino, 1976). Some of the soil parameters as determined from laboratory analysis of a representative soil sample are shown in Table 1 below.

Although the dense clay soils found at the site may be somewhat limiting both to the speed of soil biodegradation of pesticides and to operation of the landfill, it was felt in selecting sites, that the highly impermeable shale soil complex characteristic of Bearpaw Shale areas was of prime importance to prevent any movement of pesticide or leachate from the immediate area. The soils, geology and hydrogeology of this area insure against the possibility of water pollution from the disposal operation.

TABLE 1. DISPOSAL SITE SOIL CHARACTERISTICS

pH	Soil Texture	Percent Sand	Percent Silt	Percent Clay	Organic Matter % 90 %	CEC Meq Na/ 100 gm	Total N mg/l
7.7	Clay	8.36	28.00	63.64	1.1	30.06	.043

3. Water Quality, Quantity, and Distribution

The area of Rosebud County in which the disposal site is situated has limited surface and groundwater resources. From the Musselshell River east and south to the Yellowstone River, the stream systems are intermittent, only flowing during periods of snowmelt and heavy precipitation. Many acres of rangeland in this area depend on ponds formed by damming drainages to provide water for livestock. Large silt loads are carried by the surface runoff, and these stock ponds silt in rapidly. The life expectancy of many ponds is low -- from eight to ten years.

The potential for soil erosion is high in this country. Soils are generally

Roundup, Melstone and Forsyth by workers at the site. The effects on these communities will be negligible.

11. Demands for Energy

The project will not involve the use of natural gas or electricity. Consumption of gasoline for transportation and for equipment to develop and operate the site will be insignificant compared to daily consumption of gasoline in Rosebud County and Montana.

12. Locally Adopted Environmental Plans and Goals

Rosebud County does not have a countywide comprehensive plan.

Most of the planning effort has been directed toward growth and in the southern part of the county.

There are no specific long range environmental plans and goals for the area in which the disposal site is situated.

13. Transportation Networks and Traffic Flows

There will be no alteration of current traffic patterns. After the disposal site is constructed, it will only be visited several times a year, including both disposal activities and monitoring; thus the current frequency of road use will not be significantly altered.

V. PRIMARY, SECONDARY AND CUMULATIVE IMPACTS

The Pesticide and Container Disposal Programs will remove stockpiled pesticide containers and pesticides from the environment. The proper disposal of these items will be the primary impacts of the proposed programs.

Additionally, the proposed pesticide disposal site north of Ingomar will give the agricultural community throughout Montana an established place to dispose of unused or banned pesticides.

In terms of secondary impacts, there will be a long-term commitment of land reserved for the disposal of pesticides. However, the environmental conditions of the location mitigate many problems which would occur if the disposal site was situated in other parts of the state. Another mitigating factor is that the land will be reclaimed and eventually will revert back to its current use as rangeland.

The cumulative impact of the programs will be to provide a safer environment for Montanans. Currently there is no place to properly dispose of stockpiled pesticide containers or the pesticides stored in the bunkers at Glasgow Air Force Base. The Container Disposal Program will enable cleaned containers to be crushed and buried in landfills and the rinsate taken to the disposal site near Ingomar. The pesticide disposal site will provide a definite solution to disposing of a large quantity of excess or banned pesticides.

VI. POTENTIAL GROWTH INDUCING OR INHIBITING IMPACTS

It is anticipated that the Pesticide Disposal Demonstration Project will create few, if any, new jobs, thus it will not be growth inducing or inhibiting.

Work done in connection with the project will be done by state government employees or by means of contracting with established businesses.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The selection of the site to be used for hazardous waste disposal is crucial to the overall potential impact of the project. The characteristics of the chosen site determine the degree to which the operation of the facility may affect the environment. This project is designed to remove waste chemicals from areas where their storage or disposal may cause major health and environmental dangers to a specially selected, secure disposal site. The careful selection of the site according to pre-determined site selection criteria can successfully limit the environmental effects to minimal levels, and further, confine those effects to the disposal site itself.

The development of a hazardous waste disposal site is an irretrievable commitment of resource in that future use of the land is restricted. Even after the site is closed to further disposal operations, certain forms of use of the land must be prohibited due to the persistent materials in the fill. These materials will be confined to the bedrock vault however, and the land surface may be reclaimed to use as grazing land.

The site will be monumented and recorded with the county clerk and recorder. Development requiring any entry into the subsoil or bedrock will be prohibited.

VIII. SHORT-TERM VS. LONG-TERM COSTS AND BENEFITS

A. Short-Term Costs and Benefits:

1. Costs - The change in land use for 20 acres and the alteration of the natural landscape will be short-term costs.
2. Benefits - However, a number of persons and businesses in Montana will benefit from the fact that the stockpile of pesticide containers will be reduced or eliminated and 150,000 pounds of excess or banned pesticides stored at the Glasgow Air Force Base will be disposed of permanently.

B. Long-Term Costs and Benefits:

1. Costs - The subsurface of the land will be permanently dedicated to the storage of pesticides. Once used the ground may never be disturbed. However, the surface will be reseeded and eventually returned to its original use as grazing land.
2. Benefits - The establishment of a long-term statewide program to systematically dispose of unused or banned pesticides without endangering public health will benefit the entire state of Montana.

IX. ALTERNATIVES TO THE PROPOSED ACTION

Should the Department of Health and Environmental Sciences reject the Federal demonstration contract and choose not to establish a state hazardous waste land disposal site, several alternative actions might be taken to meet present and future pesticide disposal problems in the state. These include: maintenance of secure storage facilities, out-of-state disposal, development of a state-owned incineration facility or no action at the state level. In the opinion of the Department of Health and Environmental Sciences, none of these offer sufficient merit to justify rejecting the proposed demonstration project.

A. Secure Storage Facilities

The Department of Health and Environmental Sciences could attempt to gain permanent control of the storage bunkers at the Glasgow Air Force Base site and develop additional storage facilities as needed. Above-ground storage does have certain advantages. Operation of the present bunker storage system requires little equipment and has not been expensive. Also, the stored materials may be easily reclaimed if a use should be found for them in the future.

There are many limitations, however. The present storage facilities are nearly full; to build similar facilities would involve considerable expense, and security might be a problem at sites not on the Glasgow Air Force Base. Stored pesticides must be continually inspected for leakage or container deterioration, and this involves human exposure considerations as well as the expense of repackaging. Also the Glasgow Air Force Base is located in an unfavorable geologic area of Flaxville Gravel. This gravel formation is a shallow aquifer, meaning that any spills or leaks from the bunkers could cause groundwater pollution problems.

The future of the Glasgow Air Force Base is uncertain at the present time. It is not unlikely that changes at the base in the next few years may preclude the maintenance of pesticide storage facilities there.

B. Shipping Wastes Out of State for Disposal

There are no private facilities in Montana which accept hazardous wastes for disposal. There are such facilities in other states, however, and some of these have been contacted by the Health Department for information on their services.

The limitations are that the shipment to and disposal at such out-of-state facilities is very expensive. Also, such a program would not provide an assured means for future disposal, and secure storage facilities would still be needed to hold hazardous wastes until enough had accumulated to justify shipment for disposal.

C. Develop a State-Owned Incineration Facility

Incinerators of special design can burn most organic hazardous wastes without environmental harm. However, inorganic wastes are not suitable for this kind of disposal. Also, these sophisticated incinerators are extremely expensive to build and operate. The expense of such facilities prohibits development except where large volumes of organic chemical wastes are routinely generated.

D. No Action at the State Level

The state could discontinue its program of accepting waste pesticides, depending on private individuals or local governmental sites to provide for such disposal. This is an unacceptable solution since local refuse disposal sites are generally not acceptable for disposal of Class I (hazardous) waste materials. Also, the state now holds and must provide long-term storage or disposal for the 75 tons of waste pesticides in the Glasgow Air Force Base bunkers.

Alternative Disposal Sites

Of all the potential sites screened and considered for possible use in this project, none were found which would have physically been better sites for pesticide disposal. The DHES feels that the selected site provides as safe a disposal site as any that could be found within the state.

X. CONSULTATION WITH OTHERS

The following groups, individuals and agencies were consulted in the development of this project and in the preparation of this environmental statement.

Federal:

U.S. Department of Agriculture, Soil Conservation Service

State Office, Bozeman
Glasgow Field Office
Forsyth Field Office

U.S. Department of Commerce, NOAA, National Weather Service

U.S. Department of Interior

Geological Survey
Bureau of Land Management

State of Montana:

Department of Agriculture, Pesticide Division

Department of Natural Resources & Conservation, Water Resources Division

Department of Fish and Game

Department of State Lands

Montana State University

Animal & Range Sciences Department
Agricultural Engineering Department
Chemistry Department
Plant Pathology Department
Plant & Soil Science Department

University of Montana

Chemistry Department
Microbiology Department
Anthropology Department

Montana Bureau of Mines & Geology

Rosebud County
County Planning Board

Board of County Commissioners

County Sanitarian

County Agent, Cooperative Extension Service

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CONTRIBUTORS:

- Thorvilson, Roger C., BS, MS Zoology
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Federal register

WEDNESDAY, MAY 1, 1974

WASHINGTON, D.C.

Volume 39 ■ Number 85

PART IV



ENVIRONMENTAL PROTECTION AGENCY

PESTICIDES AND PESTICIDE CONTAINERS

■

Regulations for Acceptance and
Recommended Procedures for Disposal
and Storage

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

PART 165—REGULATIONS FOR THE ACCEPTANCE OF CERTAIN PESTICIDES AND RECOMMENDED PROCEDURES FOR THE DISPOSAL AND STORAGE OF PESTICIDES AND PESTICIDES CONTAINERS

The previous Federal pesticide legislation, the Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (7 U.S.C. 135 et seq.), known as FIFRA, did not address the problems of disposal or storage. However, the Federal Environmental Pesticide Control Act of 1972 (PL 92-516, 86 Stat. 973) alters and broadens FIFRA to provide for the first definitive control of pesticide, and pesticide container, disposal and storage. Under section 19(a) of the amended Act, the Administrator of the Environmental Protection Agency is required to "establish procedures and regulations for the disposal or storage of packages and containers of pesticides and for disposal or storage of excess amounts of such pesticides, and accept at convenient locations for safe disposal a pesticide the registration of which is canceled under section 6(c) if requested by the owner of the pesticide." The regulations for acceptance, and recommended procedures for disposal and storage, contained herein represent the Agency's first issuance in accordance with the provisions of section 19(a) of the new Act.

The potential seriousness of health and environmental hazards due to improper disposal and storage of pesticides and containers became increasingly clear in the late 1960's, as documented case studies accumulated. Expanding usage of pesticides in the United States (an estimated 665 million pounds in 1968) and increasing numbers of spent containers requiring disposal (240 million in 1968, up 50 percent over the number in 1963) indicated that these problems could be expected to increase. Since little was known of the extent of the problem, or of proper methods of disposal and storage, the Working Group on Pesticides, composed of experts from several Federal departments, was asked to study the subject. Their initial recommendations were published under the title "Summary of Interim Guidelines for Disposal of Surplus Waste Pesticides and Pesticide Containers." More recently, in 1972 a Task Force on Excess Chemicals, with representation from all parts of the Environmental Protection Agency, was formed to study disposal problems relating to pesticides and other hazardous chemicals, and to recommend solutions.

In drafting these regulations and recommended procedures the Agency drew heavily on the knowledge and information developed by these two groups, other Federal and State agencies and departments, and the private sector. Thus, these documents represent a broadly-based judgment regarding the pesticide and container disposal and storage requirements necessary to protect the environment. Compliance is achievable using available technology; however, facilities utilizing this technology are not readily

available to the general public in all geographic areas at the present time.

Among the new features of the Act is the requirement that the Administrator of the Environmental Protection Agency accept at convenient locations for safe disposal a pesticide the registration of which is canceled under section 6(c) if requested by the owner of the pesticide. Section 6(c) of the new Act refers only to those pesticides the registrations of which have been canceled after first having been suspended to prevent imminent hazards during the time required for cancellation proceedings. The owner of such a pesticide is required to make a formal request in writing to the appropriate Regional Administrator; upon approval of the request, mutually convenient arrangements will be made for acceptance. Since pesticides finally canceled under section 6(c) are not subject to a grandfather clause, pesticides canceled under the FIFRA prior to October 21, 1972, will not qualify. Other canceled pesticides which do not qualify under the conditions set forth in section 6(c) of the new Act will not be accepted pursuant to section 19(a) of the new Act, and their safe storage or disposal is the responsibility of the owner.

The recommended disposal procedures apply to all pesticides and pesticide-related wastes, including those which are or may in the future be registered for general use or restricted use, or used under an experimental use permit. Additionally, they also apply to full containers, spent or used containers, and container residues. For packages and containers of pesticides intended for use in the home and garden or on farms and ranches when single containers are to be disposed of, the Agency does not require that disposal procedures be followed. Such disposal will have only minimal environmental impact and is preferable to concentrating these products and containers.

The storage criteria and procedures apply to all pesticides, pesticide-related wastes and contaminated containers which are classed as "highly toxic" or "moderately toxic," according to EPA's classification system for pesticides. The storage of pesticides and their containers which are in the mildly toxic category is judged not to present any undue hazards to public health or the environment and, therefore, is excluded from these criteria and procedures. The temporary storage of limited quantities of pesticides in the other categories, if undertaken at environmentally safe sites, is also excluded.

In considering disposal techniques, first preference should be given to procedures designed to recover some useful value from excess pesticides and containers. Where large quantities are involved, one of the first recommendations is that the excess material should be used for the purpose originally intended, provided this use is legal. Another alternative is to return the material to the manufacturer for potential reuse or reprocessing. A third alternative, in some cases, may be the export of the material to countries where its use is desired and legal.

Should these alternatives be in applicable, the ultimate disposal method should be determined by the type of material. Organic pesticides which do not contain mercury, lead, cadmium, or arsenic may be disposed of by incineration at temperatures which will ensure complete destruction. Maximum volume reduction is achieved by incineration, and the incinerator emissions can be treated so that only relatively innocuous products are emitted. Incineration is not, however, applicable to those organic pesticides which contain heavy metals such as mercury, lead, cadmium, or arsenic, nor is it applicable to most inorganic pesticides or metallo-organic pesticides which have not been treated for removal of heavy metals.

If incineration is not applicable or available, disposal in specially designated landfills is suggested as an alternative. However, encapsulation prior to landfilling is recommended for certain materials such as those containing mercury, lead, cadmium, and arsenic, and inorganic compounds which are highly mobile in the soil. Encapsulation of these will retard mobility and contain them within a small area which can be permanently marked and recorded for future reference. Properly rinsed pesticide containers, however, may be reused or recycled as scrap or safely disposed of in a sanitary landfill; rinse liquids which cannot be used should be disposed of as if they were an excess pesticide. Among the disposal procedures not recommended are water dumping, open dumping, and open burning, except that open burning of small quantities of certain containers, and open field burial of single containers on farms and ranches by the pesticide user may be acceptable in some areas.

Other disposal processes, such as soil injection, well injection, and chemical degradation, may be acceptable in specific cases. At present, such methods have been neither sufficiently described nor classified to suggest their general use, and further study is necessary.

Storage sites and facilities should be located and constructed to prevent escape of pesticides and contaminated materials into the environment. Where practicable, provision for separate storage of different classifications of pesticides according to their chemical type, and for routine container inspection, should be considered. Special procedures should be followed in case fires or explosions occur where pesticides are stored.

A notice of proposed rulemaking and issuance of procedures was published in the FEDERAL REGISTER (40 CFR Part 165) on May 23, 1973. The Agency invited the submittal of comments by July 23, 1973. Sixty-two letters of comment were received and their suggestions were carefully considered. The several major issues raised, and the results of the Agency's consideration of them, follow.

The largest number of commenters questioned the appropriateness of the proposed 500 lb. exclusion from the recommended storage procedures, on the basis that there are variations in the

hazards of different pesticides. They pointed out that a few pounds of one kind can, in certain cases, represent a greater hazard than several thousand pounds of another kind. The Agency concluded that the 500 lb. exclusion was unrealistic and that the storage recommendations should be keyed to a rating system that would consider the overall hazard of the pesticide and would be readily apparent to even untrained personnel. It was decided to adopt the current EPA toxicity rating system for pesticide labeling. Under that system the following signal words are required on labels:

Category	Signal words/symbol required on labels
Highly toxic-----	DANGER, POISON, Skull and Crossbones.
Moderately toxic---	WARNING.
Slightly toxic-----	CAUTION.

Pesticides in the first two classes, highly toxic and moderately toxic, and which have the corresponding signal words or symbol on the container label, will be covered by the recommended storage criteria and procedures. Other pesticides, including most of those registered for use in the home and garden, represent a lower degree of hazard, and will not be covered.

Several requests for temporary storage exemptions from the recommended storage criteria and procedures were made, for example, by commercial pesticide applicators operating in remote areas where availability or construction of recommended facilities is impractical. These requests were resolved in two ways. First, the hazard rating system for recommended storage procedures will exclude many of the pesticides normally used. Second, temporary storage for a single application's amount has been provided for at isolated and secured sites where the less stringent criteria and procedures will not increase the potential for environmental pollution.

The statement that " * * * these disposal procedures are mandatory only for the Agency * * * " caused the Environmental Defense Fund to question the appropriateness of the promulgation of disposal and storage recommended procedures instead of regulations, in view of the FIFRA as amended wording on this subject. However, adequate disposal sites and the necessary facilities are not readily available nationwide, and significant information gaps exist which make it infeasible to write specific criteria for certain disposal methods and procedures. Further, information on the full extent of environmental damages and of the economic impact of such regulations is lacking. Therefore, the Agency has retained the recommended procedures approach. At such time as this information has been obtained and analyzed, consideration will be given to proposing comprehensive regulations relative to storage and disposal.

The merit in the comments above derives from the potential for considerable environmental damage caused by acts

such as water dumping, open dumping, open burning, inadequately controlled well injection, and storage next to food and feed. Consideration of these comments has led the Agency to begin drafting a new proposed rulemaking to prohibit or further constrain certain disposal and storage practices, and possibly to change procedures based on updated information as it becomes available. It is expected that this proposed rulemaking will be published in 1974.

Although section 12 of the new Act makes unlawful distribution, shipment or receiving for delivery of an unregistered or canceled pesticide, the Agency interprets section 19 as authorizing the movement of such pesticides for the specific purposes of disposal or storage.

Several commenters were concerned that there were no provisions for reuse or recycle as scrap of noncombustible containers. The recommended triple rinsing procedure will clean Group II containers sufficiently well so that insignificant contamination occurs when such containers are legally refilled with another pesticide belonging to the same chemical class. Triple rinsing also prepares containers for crushing or shredding and recycle as scrap. Provisions for this resource conservation step have been included in § 165.9(b), and specifically require that adequate rinsing be undertaken before such reuse or recycle.

Besides these major revisions, several minor wording changes were made which did not significantly change the direction or scope of the recommended procedures.

It is hoped that these regulations and recommended procedures will alert all Federal, State and local government agencies and private manufacturers, handlers, and users of pesticides to the need for proper disposal and storage of excess pesticides, pesticide containers and pesticide-related wastes. The United States Environmental Protection Agency will follow these recommended procedures in its own operations. Each office, laboratory or other facility of the Agency will conform strictly to these procedures in the disposal or storage of pesticides and their containers. State and local agencies are cautioned against adoption of these recommended procedures as regulations without careful study of the environmental and economic factors applicable to their own situations, including the availability of disposal sites and facilities.

These regulations and recommended procedures for disposal and storage of pesticides and pesticide containers are issued under the authority of sections 19(a) and 25(a) of the Federal Insecticide, Fungicide, and Rodenticide Act as amended by the Federal Environmental Pesticide Control Act of 1972 (86 Stat. 955, 977), and section 204 of the Solid Waste Disposal Act (P.L. 89-272, as amended by P.L. 91-512).

RUSSELL E. TRAIN,
Administrator.

APRIL 24, 1974.

-Subpart A—General	
Sec. 165.1	Definitions.
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Subpart D—Pesticide-Related Waste Recommended Procedures	
165.11	Procedures for disposal and storage of pesticide-related waste.

AUTHORITY: Secs. 19(a) and 25(a) of the Federal Insecticide, Fungicide, and Rodenticide Act as amended by the Federal Environmental Pesticide Control Act of 1972 (86 Stat. 955, 977), and sec. 204 of the Solid Waste Disposal Act (Pub. L. 89-272 as amended by Pub. L. 91-512).

Subpart A—General

§ 165.1 Definitions.

As used in this part, all terms not defined herein shall have the meaning given them by the Act.

(a) "The Act" means the Federal Insecticide, Fungicide, and Rodenticide Act as amended by the Federal Environmental Pesticide Control Act of 1972 (Pub. L. 92-516, 86 Stat. 973).

(b) "Agency" means the U.S. Environmental Protection Agency.

(c) (1) "Administrator" means the Administrator of the Agency, or any officer or employee thereof to whom authority has been heretofore delegated or to whom authority may hereafter be delegated, to act in his stead.

(2) "Regional Administrator" means the Administrator of a Regional Office of the Agency or his delegatee.

(d) "Adequate storage" means placing of pesticides in proper containers and in safe areas as per § 165.10 as to minimize the possibility of escape which could result in unreasonable adverse effects on the environment.

(e) "Complete destruction" of pesticides means alteration by physical or chemical processes to inorganic forms.

(f) "Container" means any package, can, bottle, bag, barrel, drum, tank, or other containing-device (excluding spray applicator tanks) used to enclose a pesticide or pesticide-related waste.

(g) "Decontamination/detoxification" means processes which will convert pesticides into nontoxic compounds.

(h) "Degradation products" means those chemicals resulting from partial decomposition or chemical breakdown of pesticides.

(i) "Diluent" means the material added to a pesticide by the user or manufacturer to reduce the concentration of active ingredient in the mixture.

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(j) "Encapsulate" means to seal a pesticide, and its container if appropriate, in an impervious container made of plastic, glass, or other suitable material which will not be chemically degraded by the contents. This container then should be sealed within a durable container made from steel, plastic, concrete, or other suitable material of sufficient thickness and strength to resist physical damage during and subsequent to burial or storage.

(k) "Heavy metals" means metallic elements of higher atomic weights, including but not limited to arsenic, cadmium, copper, lead, mercury, manganese, zinc, chromium, tin, thallium, and selenium.

(l) "Imminent hazard" means a situation which exists when the continued use of a pesticide during the time required for cancellation proceedings would be likely to result in unreasonable adverse effects on the environment or will involve unreasonable hazard to the survival of a species declared endangered by the Secretary of the Interior under Public Law 91-135.

(m) "Ocean dumping" means the disposal of pesticides in or on the oceans and seas, as defined in P. L. 92-532.

(n) "Open burning" means the combustion of a pesticide or pesticide container in any fashion other than incineration.

(o) "Open dumping" means the placing of pesticides or containers in a land site in a manner which does not protect the environment and is exposed to the elements, vectors, and scavengers.

(p) "Pesticide" means (1) any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or (2) any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

(1) "Excess pesticides" means all pesticides which cannot be legally sold pursuant to the Act or which are to be discarded.

(2) "Organic pesticides" means carbon-containing substances used as pesticides, excluding metallo-organic compounds.

(3) "Inorganic pesticides" means non-carbon-containing substances used as pesticides.

(4) "Metallo-organic pesticides" means a class of organic pesticides containing one or more metal or metalloid atoms in the structure.

(q) "Pesticide-related wastes" means all pesticide-containing wastes or by-products which are produced in the manufacturing or processing of a pesticide and which are to be discarded, but which, pursuant to acceptable pesticide manufacturing or processing operations, are not ordinarily a part of or contained within an industrial waste stream discharged into a sewer or the waters of a state.

(r) "Pesticide incinerator" means any installation capable of the controlled combustion of pesticides, at a temperature of 1000°C (1832°F) for two seconds

dwelling time in the combustion zone, or lower temperatures and related dwelling times that will assure complete conversion of the specific pesticide to inorganic gases and solid ash residues. Such installation complies with the Agency Guidelines for the Thermal Processing of Solid Wastes as prescribed in 40 CFR Part 240.

(s) "Safe disposal" means discarding pesticides or containers in a permanent manner so as to comply with these proposed procedures and so as to avoid unreasonable adverse effects on the environment.

(t) "Sanitary landfill" means a disposal facility employing an engineered method of disposing of solid wastes on land in a manner which minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying cover material at the end of each working day. Such facility complies with the Agency Guidelines for the Land Disposal of Solid Wastes as prescribed in 40 CFR Part 241.

(u) "Scrubbing" means the washing of impurities from any process gas stream.

(v) "Soil injection" means the emplacement of pesticides by ordinary tillage practices within the plow layer of a soil.

(w) "Specially designated landfill" means a landfill at which complete long term protection is provided for the quality of surface and subsurface waters from pesticides, pesticide containers, and pesticide-related wastes deposited therein, and against hazard to public health and the environment. Such sites should be located and engineered to avoid direct hydraulic continuity with surface and subsurface waters, and any leachate or subsurface flow into the disposal area should be contained within the site unless treatment is provided. Monitoring wells should be established and a sampling and analysis program conducted. The location of the disposal site should be permanently recorded in the appropriate local office of legal jurisdiction. Such facility complies with the Agency Guidelines for the Land Disposal of Solid Wastes as prescribed in 40 CFR Part 241.

(x) "Triple rinse" means the flushing of containers three times, each time using a volume of the normal diluent equal to approximately ten percent of the container's capacity, and adding the rinse liquid to the spray mixture or disposing of it by a method prescribed for disposing of the pesticide.

(y) "Unreclaimable residues" means residual materials of little or no value remaining after incineration.

(z) "Water dumping" means the disposal of pesticides in or on lakes, ponds, rivers, sewers, or other water systems as defined in P. L. 92-500.

(aa) "Well injection" means disposal of liquid wastes through a hole or shaft to a subsurface stratum.

§ 165.2 Authorization and scope.

(a) The regulations in this part and recommended procedures are published

pursuant to sections 19(a) and 25(a) of the Act, which give the Administrator the authority to establish regulations and procedures for the disposal or storage of packages and containers of pesticides, and for disposal or storage of excess amounts of such pesticides, and require the Administrator to accept for safe disposal a pesticide the registration of which is canceled under section 6(c) of the Act if requested by the owner of the pesticide. Section 165.11 of these recommended procedures (Pesticide-Related Wastes) is published pursuant to Section 204 of the Solid Waste Disposal Act (P.L. 89-272 as amended by P.L. 91-512) which authorizes the Administrator to make information available and to make recommendations concerning the disposal and handling of wastes.

(b) Regulations for acceptance for safe disposal of pesticides canceled under section 6(c) and recommended procedures for disposal or storage of pesticides, pesticide containers, and pesticide-related wastes are those which the Administrator judges as necessary, with an adequate margin of safety, to protect public health and the environment. Such procedures are subject to addition and revision as the Administrator deems necessary.

(c) The recommended procedures for the disposal of pesticides and pesticide containers apply to all pesticides, pesticide-related wastes (and their containers) including those which are or may in the future be registered for general use or restricted use, or covered under an experimental use permit, except those single containers discussed in paragraph (e), of this section. These disposal procedures are mandatory only for the Agency in carrying out its pesticide and container disposal operations.

(d) The recommended procedures and criteria for the storage of pesticides and pesticide containers apply to all pesticides and excess pesticides and to used empty containers and containers which contain pesticides. These procedures and criteria apply to sites and facilities where pesticides that are classed as highly toxic or moderately toxic, and bear the signal words DANGER, POISON, or WARNING, or the skull and crossbones symbol, on the label are stored. Pesticides covered by an experimental use permit should also be stored in accordance with these procedures. These storage procedures are mandatory only for the Agency in carrying out its pesticide and container storage operations. Temporary storage by the user of the quantity of pesticide needed for a single application may be undertaken in isolated areas in accordance with the procedures and criteria given in § 165.10(a).

(e) Recommended pesticide and pesticide container disposal procedures shall not apply to containers of pesticides registered for use in the home and garden if securely wrapped in several layers of paper and disposed of singly during routine municipal solid waste disposal, nor to containers of pesticides used on farms and ranches where disposal by open-field burial of single containers is undertaken

with due regard to the protection of surface and sub-surface waters.

(f) As a general guideline, the owner of excess pesticides should first exhaust the two following avenues before undertaking final disposal:

(1) Use for the purposes originally intended, at the prescribed dosage rates, providing these are currently legal under all Federal, State, and local laws and regulations.

(2) Return to the manufacturer or distributor for potential re-labelling, recovery of resources, or reprocessing into other materials. Transportation must be in accordance with all currently applicable U.S. Department of Transportation regulations, including those prescribed in 49 CFR Parts 170-179 and 397, 46 CFR Part 146, and 14 CFR Part 103. The "for hire" transportation of unregistered pesticides across state lines may be subject to the Interstate Commerce Commission's economic regulations (49 U.S.C. 1 et seq. for rail carriers; 306, 307, and 309 for motor carriers; and 909 for domestic water carriers), and the Commission should be contacted in case of doubt.

Note: Some excess pesticides may be suitable for export to a country where use of the pesticide is legal. All pesticides so exported should be in good condition and packed according to specifications of the foreign purchaser, and must be transported to the port of embarkation in accordance with all Department of Transportation regulations. All shipments should be in conformance with section 17(a) of the Act.

(g) To provide documentation of actual situations, all accidents or incidents involving the storage or disposal of pesticides, pesticide containers, or pesticide-related wastes should be reported to the appropriate Regional Administrator.

Subpart B—Acceptance Regulations

§ 165.3 Acceptable pesticides.

The Administrator will accept for safe disposal those pesticides the registrations of which have been canceled, after first having been suspended to prevent an imminent hazard during the time required for cancellation proceedings as specified in section 6(c) of the Act. However, no other pesticides will be accepted pursuant to section 19(a) of the Act, and nothing herein shall obligate the Federal Government to own or operate any disposal facility.

§ 165.4 Request for acceptance.

(a) Before the owner of such a pesticide requests acceptance by the Administrator for disposal, he shall make every reasonable effort to return the material to either its manufacturer, distributor, or to another agent capable of using the material.

(b) If such an effort is unsuccessful, the following procedure shall be used by the owner of a suspended pesticide to request acceptance by the Administrator:

(1) The owner of such a pesticide must make a formal request for acceptance, in writing, to the Regional Administrator for the area where such pesticides are located.

(2) Records and data pertaining to the amount, location, physical form, type and condition of containers, and date of manufacture or purchase of individual lots must be submitted. Certification that the owner of the suspended pesticide has made every reasonable effort to return the material to the manufacturer, distributor of the pesticide, or to other agents capable of re-labeling, recovering, recycling or reprocessing the material and has been refused on the basis of technological infeasibility, must also be submitted.

§ 165.5 Delivery.

If it is found that a canceled pesticide meets the requirements for acceptance, the Regional Administrator will confer with the owner for purposes of arranging a mutually convenient location for acceptance of individual lots of such canceled pesticides. Transportation to the acceptance location will be the responsibility of, and transportation costs will be borne by, the owner of the pesticide.

§ 165.6 Disposal.

Following such acceptance, the Regional Administrator will cause the disposal or storage of such pesticide as appropriate, in accordance with the procedures outlined in subparts A and C of this part.

Subpart C—Pesticides and Containers

§ 165.7 Procedures not recommended.

No person should dispose of or store (or receive for disposal or storage) any pesticide or dispose of or store any pesticide container or pesticide container residue:

(a) In a manner inconsistent with its label or labeling.

(b) So as to cause or allow open dumping of pesticides or pesticide containers.

(c) So as to cause or allow open burning of pesticides or pesticide containers; except, the open burning by the user of small quantities of combustible containers formerly containing organic or metallo-organic pesticides, except organic mercury, lead, cadmium, or arsenic compounds, is acceptable when allowed by State and local regulations.

(d) So as to cause or allow water dumping or ocean dumping, except in conformance with regulations developed pursuant to the National Marine Protection, Research and Sanctuaries Act of 1972 (Pub. L. 92-532), and to Sections 304, 307, and 311 of the Federal Water Pollution Control Act as Amended (Pub. L. 92-500).

(e) So as to violate any applicable Federal or State pollution control standard.

(f) So as to violate any applicable provisions of the Act.

§ 165.8 Recommended procedures for the disposal of pesticides.

Recommended procedures for the disposal of pesticides are given below:

(a) Organic pesticides, (except organic mercury, lead, cadmium, and arsenic compounds which are discussed in paragraph (c) of this section) should

be disposed of according to the following procedures:

(1) Incinerate in a pesticide incinerator at the specified temperature/dwell time combination, or at such other lower temperature and related dwell time that will cause complete destruction of the pesticide. As a minimum it should be verified that all emissions meet the requirements of the Clean Air Act of 1970 (42 U.S.C. 1857 et seq.) relating to gaseous emissions; specifically any performance regulations and standards promulgated under sections 111 and 112 should be adhered to. Any liquids, sludges, or solid residues generated should be disposed of in accordance with all applicable Federal, State, and local pollution control requirements. Municipal solid waste incinerators may be used to incinerate excess pesticides or pesticide containers provided they meet the criteria of a pesticide incinerator and precautions are taken to ensure proper operation.

(2) If appropriate incineration facilities are not available, organic pesticides may be disposed of by burial in a specially designated landfill. Records to locate such buried pesticides within the landfill site should be maintained.

(3) The environmental impact of the soil injection method of pesticide disposal has not been clearly defined nationally, and therefore this disposal method should be undertaken only with specific guidance. It is recommended that advice be requested from the Regional Administrator in the region where the material will be disposed of prior to undertaking such disposal by this method.

(4) There are chemical methods and procedures which will degrade some pesticides to forms which are not hazardous to the environment. However, practical methods are not available for all groups of pesticides. Until a list of such methods is available, it is recommended that advice be requested from the Regional Administrator in the region where the material will be disposed of prior to undertaking disposal by such method.

(5) If adequate incineration facilities, specially designated landfill facilities, or other approved procedures are not available, temporary storage of pesticides for disposal should be undertaken. Storage facilities, management procedures, safety precautions and fire and explosion control procedures should conform to those set forth in § 165.10.

(6) The effects of subsurface emplacement of liquid by well injection and the fate of injection materials are uncertain with available knowledge, and could result in serious environmental damage requiring complex and costly solutions on a long-term basis. Well injection should not be considered for pesticide disposal unless all reasonable alternative measures have been explored and found less satisfactory in terms of environmental protection. As noted in the Administrator's Decision Statement No. 5, dated February 6, 1973, the Agency's policy is to oppose well injection of fluid pesticides

"without strict controls and a clear demonstration that such emplacement will not interfere with present or potential use of the subsurface environment, contaminate ground water resources or otherwise damage the environment." Adequate pre-injection tests, provisions for monitoring the operation and the environmental effects, contingency plans to cope with well failures, and provisions for plugging injection wells when abandoned should be made. The Regional Administrator should be advised of each operation.

(b) Metallo-organic pesticides (except organic mercury, lead, cadmium, or arsenic compounds which are discussed in paragraph (c) of this section), should be disposed of according to the following procedures:

(1) After first subjecting such compounds to an appropriate chemical or physical treatment to recover the heavy metals from the hydrocarbon structure, incinerate in a pesticide incinerator as described in paragraph (a)(1) of this section.

(2) If appropriate treatment and incineration are not available, bury in a specially designated landfill as noted in paragraph (a)(2) of this section.

(3) Disposal by soil injection of metallo-organic pesticides should be undertaken only in accordance with the procedure set forth in paragraph (a)(3) of this section.

(4) Chemical degradation methods and procedures that can be demonstrated to provide safety to public health and the environment should be undertaken only as noted in paragraph (a)(4) of this section.

(5) If adequate disposal methods as listed above in this section are not available, the pesticides should be stored according to the procedures in § 165.10 until disposal facilities become available.

(6) Well injection of metallo-organic pesticides should be undertaken only in accordance with the procedures set forth in paragraph 165.8(a)(6) of this section.

(c) Organic mercury, lead, cadmium, arsenic, and all inorganic pesticides should be disposed of according to the following procedures:

(1) Chemically deactivate the pesticides by conversion to non-hazardous compounds, and recover the heavy metal resources. Methods that are appropriate will be described and classified according to their applicability to the different groups of pesticides. Until a list of practical methods is available, however, each use of such procedures should be undertaken only as noted in paragraph 165.8(a)(4) of this section.

(2) If chemical deactivation facilities are not available, such pesticides should be encapsulated and buried in a specially designated landfill. Records sufficient to permit location for retrieval should be maintained.

(3) If none of the above options is available, place in suitable containers (if necessary) and provide temporary storage until such time as adequate disposal facilities or procedures are avail-

able. The general criteria for acceptable storage are noted in § 165.10.

§ 165.9 Recommended procedures for the disposal of pesticide containers and residues.

(a) *Group I Containers.* Combustible containers which formerly contained organic or metallo-organic pesticides, except organic mercury, lead, cadmium, or arsenic compounds, should be disposed of in a pesticide incinerator, or buried in a specially designated landfill, as noted in § 165.8(a); except that small quantities of such containers may be burned in open fields by the user of the pesticide when such open burning is permitted by State and local regulations, or buried singly by the user in open fields with due regard for protection of surface and sub-surface water.

(b) *Group II Containers.* Non-combustible containers which formerly contained organic or metallo-organic pesticides, except organic mercury, lead, cadmium, or arsenic compounds, should first be triple-rinsed. Containers in good condition may then be returned to the pesticide manufacturer or formulator, or drum reconditioner for reuse with the same chemical class of pesticide previously used providing such reuse is legal under currently applicable U.S. Department of Transportation regulations including those set forth in 49 CFR 173.28. Other rinsed metal containers should be punctured to facilitate drainage prior to transport to a facility for recycle as scrap metal or for disposal. All rinsed containers may be crushed and disposed of by burial in a sanitary landfill, in conformance with State and local standards or buried in the field by the user of the pesticide. Unrinsed containers should be disposed of in a specially designated landfill, or subjected to incineration in a pesticide incinerator.

(c) *Group III Containers.* Containers (both combustible and noncombustible) which formerly contained organic mercury, lead, cadmium, or arsenic or inorganic pesticides and which have been triple-rinsed and punctured to facilitate drainage, may be disposed of in a sanitary landfill. Such containers which are not rinsed should be encapsulated and buried in a specially designated landfill.

(d) *Residue disposal.* Residues and rinse liquids should be added to spray mixtures in the field. If not, they should be disposed of in the manner prescribed for each specific type of pesticide as set forth in § 165.8.

§ 165.10 Recommended procedures and criteria for storage of pesticides and pesticide containers.

(a) *General.* (1) Pesticides and excess pesticides and their containers whose uncontrolled release into the environment would cause unreasonable adverse effects on the environment should be stored only in facilities where due regard has been given to the hazardous nature of the pesticide, site selection, protective enclosures, and operating procedures, and where adequate measures are taken to assure personal safety, accident preven-

tion, and detection of potential environmental damages. These storage procedures and criteria should be observed at sites and facilities where pesticides and excess pesticides (and their containers) that are classed as highly toxic or moderately toxic and are required to bear the signal words DANGER, POISON, or WARNING, or the skull and crossbones symbol on the label are stored. These procedures and criteria are not necessary at facilities where most pesticides registered for use in the home and garden, or pesticides classed as slightly toxic (word CAUTION on the label) are stored. All facilities where pesticides which are or may in the future be covered by an experimental use permit or other special permit are stored should be in conformance with these procedures and criteria.

(2) Temporary storage of highly toxic or moderately toxic pesticides for the period immediately prior to, and of the quantity required for a single application, may be undertaken by the user at isolated sites and facilities where flooding is unlikely, where provisions are made to prevent unauthorized entry, and where separation from water systems and buildings is sufficient to prevent contamination by runoff, percolation, or wind-blown particles or vapors.

(b) *Storage sites.* Storage sites should be selected with due regard to the amount, toxicity, and environmental hazard of pesticides, and the number and sizes of containers to be handled. When practicable, sites should be located where flooding is unlikely and where soil texture/structure and geologic/hydrologic characteristics will prevent the contamination of any water system by runoff or percolation. Where warranted, drainage from the site should be contained (by natural or artificial barriers or dikes), monitored, and if contaminated, disposed of as an excess pesticide as discussed in § 165.8. Consideration should also be given to containing wind-blown pesticide dusts or particles.

(c) *Storage facilities.* Pesticides should be stored in a dry, well ventilated, separate room, building or covered area where fire protection is provided. Where relevant and practicable, the following precautions should be taken:

(1) The entire storage facility should be secured by a climb-proof fence, and doors and gates should be kept locked to prevent unauthorized entry.

(2) Identification signs should be placed on rooms, buildings, and fences to advise of the contents and warn of their hazardous nature, in accordance with suggestions given in paragraph (g)(1)(i) of this section.

(3) All items of movable equipment used for handling pesticides at the storage site which might be used for other purposes should be labeled "contaminated with pesticides" and should not be removed from the site unless thoroughly decontaminated.

(4) Provision should be made for decontamination of personnel and equipment such as delivery trucks, tarpaulin covers, etc. Where feasible, a wash basin, and shower with a delayed-closing pull

chain valve should be provided. All contaminated water should be disposed of as an excess pesticide. Where required, decontamination area should be paved or lined with impervious materials, and should include gutters. Contaminated runoff should be collected, and treated as an excess pesticide.

(d) *Operational procedures.* Pesticide containers should be stored with the label plainly visible. If containers are not in good condition when received, the contents should be placed in a suitable container and properly relabeled. If dry excess pesticides are received in paper bags that are damaged, the bag and the contents should be placed in a sound container that can be sealed. Metal or rigid plastic containers should be checked carefully to insure that the lids and bungs are tight. Where relevant and practicable, the following provisions should be considered:

(1) *Classification and separation.* (i) Each pesticide formulation should be segregated and stored under a sign containing the name of the formulation. Rigid containers should be stored in an upright position and all containers should be stored off the ground, in an orderly way, so as to permit ready access and inspection. They should be accumulated in rows or units so that all labels are visible, and with lanes to provide effective access. A complete inventory should be maintained indicating the number and identity of containers in each storage unit.

(ii) Excess pesticides and containers should be further segregated according to the method of disposal to ensure that entire shipments of the same class of pesticides are disposed of properly, and that accidental mixing of containers of different categories does not occur during the removal operation.

(2) *Container inspection and maintenance.* Containers should be checked regularly for corrosion and leaks. If such is found, the container should be transferred to a sound, suitable, larger container and be properly labeled. Materials such as adsorptive clay, hydrated lime, and sodium hypochlorite should be kept on hand for use as appropriate for the emergency treatment or detoxification of spills or leaks. (Specific information relating to other spill treatment procedures and materials will be published as it is confirmed.)

(e) *Safety precautions.* In addition to precautions specified on the label and in the labeling, rules for personal safety and accident prevention similar to those listed below should be available in areas where personnel congregate:

(1) *Accident prevention measures.* (i)

Inspect all containers of pesticides for leaks before handling them.

(ii) Do not mishandle containers and thereby create emergencies by carelessness.

(iii) Do not permit unauthorized persons in the storage area.

(iv) Do not store pesticides next to food or feed or other articles intended for consumption by humans or animals.

(v) Inspect all vehicles prior to departure, and treat those found to be contaminated.

(2) *Safety measures.* (i) Do not store food, beverages, tobacco, eating utensils, or smoking equipment in the storage or loading areas.

(ii) Do not drink, eat food, smoke, or use tobacco in areas where pesticides are present.

(iii) Wear rubber gloves while handling containers of pesticides.

(iv) Do not put fingers in mouth or rub eyes while working.

(v) Wash hands before eating, smoking, or using toilet and immediately after loading, or transferring pesticides.

(vi) Persons working regularly with organophosphate and N-alkyl carbamate pesticides should have periodic physical examinations, including cholinesterase tests.

(f) *Protective clothing and respirators.* (i) When handling pesticides which are in concentrated form, protective clothing should be worn. Contaminated garments should be removed immediately, and extra sets of clean clothing should be maintained nearby.

(2) Particular care should be taken when handling certain pesticides to protect against absorption through skin, and inhalation of fumes. Respirators or gas masks with proper canisters approved for the particular type of exposure noted in the label directions, should be used when such pesticides are handled.

(g) *Fire control.* (1) Where large quantities of pesticides are stored, or where conditions may otherwise warrant, the owner of stored pesticides should inform the local fire department, hospitals, public health officials, and police department in writing of the hazards that such pesticides may present in the event of a fire. A floor plan of the storage area indicating where different pesticide classifications are regularly stored should be provided to the fire department. The fire chief should be furnished with the home telephone numbers of (i) the person(s) responsible for the pesticide storage facility, (ii) the appropriate Regional Administrator, who can summon the appropriate Agency emergency response team, (iii) the U.S. Coast Guard, and (iv) the Pesticide Safety Team Network of the

National Agricultural Chemicals Association.

(2) *Suggestions for Fire Hazard Abatement.* (i) Where applicable, plainly label the outside of each storage area with "DANGER," "POISON," "PESTICIDE STORAGE" signs. Consult with the local fire department regarding the use of the current hazard signal system of the National Fire Protection Association.

(ii) Post a list on the outside of the storage area of the types of chemicals stored therein. The list should be updated to reflect changes in types stored.

(3) *Suggested Fire Fighting Precautions.* (i) Wear air-supplied breathing apparatus and rubber clothing.

(ii) Avoid breathing or otherwise contacting toxic smoke and fumes.

(iii) Wash completely as soon as possible after encountering smoke and fumes.

(iv) Contain the water used in fire fighting within the storage site drainage system.

(v) Fireman should take cholinesterase tests after fighting a fire involving organophosphate or N-alkyl carbamate pesticides, if they have been heavily exposed to the smoke. Baseline cholinesterase tests should be part of the regular physical examination for such firemen.

(vi) Evacuate persons near such fires who may come in contact with smoke or fumes or contaminated surfaces.

(h) *Monitoring.* An environmental monitoring system should be considered in the vicinity of storage facilities. Samples from the surrounding ground and surface water, wildlife, and plant environment, as appropriate, should be tested in a regular program to assure minimal environmental insult. Analyses should be performed according to "Official Methods of the Association of Official Analytical Chemists (AOAC)," and such other methods and procedures as may be suitable.

Subpart D—Pesticide-Related Wastes

§ 165.11 Procedures for disposal and storage of pesticide-related wastes.

(a) In general all pesticide-related wastes should be disposed of as excess pesticides in accordance with the procedures set forth in §§ 165.7 and 165.8. Such wastes should not be disposed of by addition to an industrial effluent stream if not ordinarily a part of or contained within such industrial effluent stream, except as regulated by and in compliance with effluent standards established pursuant to sections 304 and 307 of the Federal Water Pollution Control Act as amended.

(b) Pesticide-related wastes which are to be stored should be managed in accordance with the provisions of § 165.10.

[FR Doc.74-9911 Filed 4-30-74;8:46 am]



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

27 APR 1976

OFFICE OF ENFORCEMENT

TO: Enforcement Division Directors
Pesticides Branch Chiefs

FROM: A. E. Conroy II, Director
Pesticides Enforcement Division (EN-342) *A. E. Conroy*

SUBJECT: Interim Enforcement Policy: Container Labeling
for Unregistered Pesticides Shipped for Disposal

A. BACKGROUND

Although the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, requires that all pesticides moving in commerce must be registered, the section 3 registration regulations, 40 CFR 162.5(b)(3), exempt from the registration requirements those pesticides transferred for the purpose of disposal, so long as such pesticides bear certain minimum labeling. 40 CFR 162.5(b)(3) provides in pertinent part

... pesticides transferred in accordance with this [exemption] shall be subject to the following misbranding provisions under section 2(q) of the Act: 2(q)(1)(A), (B), (D), (E), (F), (G) in that all containers must be clearly marked that the product is for disposal only; 2(q)(2)(A), (C)(i) and (iii), (D) . . . 1/

1/ In conjunction with section 12(a)(1)(E), section 2(q)(1)(A) makes it unlawful to make false or misleading statements on a product's label; section 2(q)(1)(B) requires that pesticide packaging and containers conform to Agency standards; section 2(q)(1)(D) requires an establishment registration number; section 2(q)(1)(E) requires printing on labeling to be of a size sufficiently conspicuous under customary conditions of sale; section 2(q)(1)(F) requires directions for use; section 2(q)(1)(G) requires warning or caution statements; section 2(q)(2)(A) requires a statement of the product's ingredients; section 2(q)(2)(C)(i) requires the name of the producer, registrant, or person for whom the product was produced; section 2(q)(2)(C)(ii) requires a statement of net weight or content; section 2(q)(2)(D) requires safety labeling.

Since the promulgation of these labeling requirements, certain situations have come to the Agency's attention wherein the transferor of pesticides destined for disposal was able to substantially, but not fully, comply with the labeling requirements found at 40 CFR 162.5(b)(3). For example, in one situation, the product being shipped for disposal did not bear an establishment registration number nor the full directions for use which would ordinarily accompany the pesticide. Another case involved old stocks of pesticides whose container labels were obliterated, damaged, or not in compliance with current labeling standards. However, the full labeling requirements were relaxed on both occasions to effectuate the intent of the registration exemption (40 CFR 162.5(b)(3)) and the recommended procedures for the disposal of pesticides (40 CFR Part 165).

B. STATEMENT OF INTERIM POLICY

To the greatest extent practicable, persons desiring to ship unregistered pesticides for the purpose of disposal should be held to the labeling standards set forth at 40 CFR 162.5(b)(3). Nonetheless, this section should not be applied in a manner which would prevent the safe disposal of pesticides in a manner consistent with the Agency's recommended procedures for pesticide disposal (40 CFR 165) and with the intent of the disposal labeling requirements for unregistered pesticides (40 CFR 162.5(b)(3)). Accordingly, as a matter of exercising prosecutorial discretion, it has been determined by the Pesticides Enforcement Division that the failure to fully comply with labeling requirements of 40 CFR 162.5(b)(3) shall not subject a person shipping pesticides for disposal to enforcement liability, provided that, certain of the labeling requirements are met. As a minimum, pesticides being shipped for disposal shall meet the following requirements:

- (1) Section 2(q)(1)(G) in that all containers must be clearly marked that the product is for disposal only.
- (2) Section 2(q)(2)(A), which requires a statement of ingredients. Where the ingredients are not known, a statement to that effect shall appear on the container.
- (3) Section 2(q)(2)(C)(i), which requires the name and address of the producer, registrant or person for whom the pesticide was produced. In lieu of the above, this requirement shall be deemed satisfied if the pesticide product bears ~~the name and address of the person responsible~~ for the shipment and who can be contacted in case of an accident or emergency.

- (4) Section 2(q)(2)(D), which requires, if the pesticide contains substances highly toxic to man, a warning of the potential toxicity (i. e., a skull and cross-bones and the word 'poison' prominently displayed in red on a contrasting background) and a statement of a practical treatment in case of poisoning.
- (5) Section 2(q)(1)(E), which requires all printing on labeling to be conspicuous.

In addition, the person shipping the pesticide shall indicate the total amount of pesticide being disposed of. This statement should appear on shipping documents accompanying the product.

C. DURATION OF INTERIM POLICY

This policy shall remain in force until such time as 40 CFR 152.5(b)(3) is amended.

If you have any questions concerning this policy, please contact your PED Regional Coordinator.

CONTROL OF REFUSE DISPOSAL AREAS

Enacted and Amended by 1965, 1969 and 1974 Sessions of Legislature

Section 69-4001.

It is hereby found and declared that the health and welfare of Montana citizens are being endangered by improperly operated refuse disposal areas. It is declared the public policy of this state to control refuse disposal areas to protect the public health and safety.

Section 69-4002. Definitions.

Terms used in this act shall be defined as follows:

- (1) "Garbage," putrescible animal and vegetable wastes resulting from handling, preparation, cooking and consumption of food.
- (2) "Refuse," all putrescible and nonputrescible solid wastes (except body wastes), including garbage, rubbish, street cleanings, dead animals, yard clippings and solid market and solid industrial wastes.
- (3) "Rubbish," nonputrescible solid wastes, consisting of both combustible and non-combustible wastes, such as paper, cardboard, abandoned automobiles, tin cans, wood, glass, bedding, crockery and similar materials.
- (4) "Department," means the department of health and environmental sciences, provided for in Title 82A, Chapter 6.
- (5) "Board," means the board of health and environmental sciences, provided for in section 82A-605.

Section 69-4003. Dumping in an unlicensed area is prohibited.

No person, partnership, company, or corporation shall hereafter dispose of any garbage, rubbish or refuse in any place except as permitted under this act.

Section 69-4004. License required.

Each year each person, partnership, company or corporation desiring to operate a refuse disposal area shall obtain a license for operating same from the local, county, or district board of health having jurisdiction. To obtain a license to operate a disposal area, application to the local, county or district board of health having jurisdiction, must be made on forms provided by it. The application shall contain the name and residence of the applicant, the location of the proposed disposal area and such other information as the department may by regulation require. There shall be paid to the local, county or district board of health with each application for such license or for renewal of such license, an annual license fee of twenty-five dollars (\$25). This fee is to be deposited in the general fund of the county in which the refuse disposal area is to be located.

Section 69-4005. State Department of Health to approve disposal area.

Upon receipt of the application, the local, county or district board of health having jurisdiction shall notify the department who will then cause to be made an inspection of the proposed site and determine if the proposed operation

can comply with this act and rules and regulations adopted pursuant thereto. The department shall also inspect and approve plans which have been drawn up by the applicant for the creation of a refuse disposal area. When the department reports favorably upon the application, the local, county or district board of health having jurisdiction may issue a license to the applicant. All licenses shall expire one year after issuance, but may be renewed upon payment of an annual fee of twenty-five dollars (\$25).

Section 69-4006. Revocation of or refusal to renew license.

The local, county or district board of health having jurisdiction may revoke or refuse to renew any license after reasonable notice and hearing if it finds that the disposal area is not operated in a sanitary manner, as set forth by this law and by the rules and regulations adopted under this law.

Section 69-4007. Rules and regulations--inspections and recommendations.

The department is authorized to promulgate rules and regulations for the operation of refuse disposal areas. Said regulations shall be prepared and published and shall contain sanitary standards for disposal areas. The department shall cause all licensed disposal areas to be inspected and recommend to the local, county or district board of health action which may be taken to enforce the provisions of this act.

Section 69-4008. Landowner's rights preserved--publicly operated disposal areas.

This act shall not be construed to prohibit any person from disposing of his own garbage, rubbish or refuse upon his own land as long as such disposal does not create a nuisance. Any incorporated city, town, rural improvement district or county may establish a disposal area and operate same without paying the annual license fee, but must meet all other requirements of this act.

Section 69-4009. Penalty for violations.

Any person violating this act or regulations prescribed by the department under this act, shall be guilty of a misdemeanor and, upon conviction, shall be fined not less than fifty dollars (\$50), nor more than five hundred dollars (\$500). Each day upon which a violation of this act occurs shall be considered a separate offense.

Section 69-4010. Section preserved.

Section 94-3542 (69-4518) is not affected by this act.

MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
Environmental Sciences Division
Solid Waste Management Bureau
Helena, Montana 59601

RULE 16-2.14(2)-S14100 REFUSE DISPOSAL AREAS

Adopted May 24, 1974

(1) Purpose. The following rule is adopted to set forth sanitary standards for refuse disposal areas and waste management.

(2) Definitions. In addition to the terms defined in Section 69-4002, R.C.M. 1947:

"Waste" means useless, unwanted, or discarded solid, semi-solid, or liquid materials.

"Hazardous waste" means any waste or combination of wastes which pose a substantial present or potential hazard to human health or living organisms because such wastes are nondegradable or persistent in nature or because they can be biologically magnified, or because they can be lethal, or because they may otherwise cause or tend to cause detrimental cumulative effects.

"Material" means a primary or raw material utilized in manufacturing a product and includes any secondary material that is or can be utilized in place of a primary or raw material.

"Generation" means the act or process of producing waste materials.

"Storage" means the interim containment of waste after generation and prior to ultimate disposal.

"Transport" means the movement of wastes from the point of generation to any intermediate transfer points, and finally to the point of ultimate disposal.

"Treatment" means any activity or processing designed to change the physical form or chemical composition of waste so as to render such materials non-hazardous.

"Disposal of waste" means the discharge, deposit, or injection of any waste into subsurface strata or excavations or the ultimate disposal of any waste onto the land.

"Disposal site" means the location where any final disposal of waste materials occurs.

"Treatment facility" means a location at which waste is subjected to treatment and may include a facility where waste has been generated.

"Person" means any individual, partnership, company, corporation, association, state, county, or municipality.

"Municipality" means a city, town, county, district, or other public body created by or pursuant to state law with responsibility for the planning or administration of waste management.

"Waste management" means the systematic control of the generation, storage, transport, treatment, recycling, recovery or disposal of waste materials.

"Department" means the department of health and environmental sciences.

(3) Waste classifications.

(a) Group I includes but is not limited to:

(i) All waste classified by the Environmental Protection Agency as hazardous, miscellaneous wastes which are noxious and must normally be excluded from sewage systems and waste water treatment processes.

(ii) Brines, caustics, acids, heavy metals, pesticides, and synthetic organic chemical substances.

(iii) Films and sediments caused by materials like oil sludges, used and wasted petroleum products.

(iv) Hospital, medical laboratory or other wastes that could contain pathogenic organisms.

(v) Excluding radioactive wastes and explosive wastes.

(b) Group II includes but is not limited to:

(i) Decomposable, organic materials or waste mixtures which contain organic materials.

(ii) Wood materials, such as brush and building demolition wastes.

(iii) Manure and other organic agricultural wastes.

(iv) Digested waste water treatment sludges and de-watered water treatment sludge.

(v) Excluding septic tank pumpings.

(c) Group III includes but is not limited to:

(i) Inert solid wastes, such as brick materials, concrete, rock and dirt.

(ii) Excluding industrial mineral wastes.

(4) Site classifications.

(a) A Class I site may accept all groups of waste. Class I sites shall not allow discharge of these materials or their by-products to ground or surface waters. These sites must either confine the wastes to the disposal site with no likelihood that the wastes will escape or they must be situated in a location where the leachate from the wastes can only percolate into underlying formations which have no hydraulic continuity with usable waters.

(b) Class II sites, suitable for receipt of Group II and III materials, must provide for separation of the Group II wastes from underlying or adjacent usable water. The distance of the required separation is established on a case-by-case basis, considering factors such as terrain, type of underlying soil formations, and natural quality of the groundwater.

(c) Class III sites, suitable for Group III wastes only, may contain water such as in marshy areas, deep gravel pits which contain exposed groundwater, or areas which may be periodically flooded, such as along stream flood plains. Class III sites shall not be located on the banks or in a live or ephemeral stream.

(5) Specifications for waste disposal sites.

(a) Class I sites. Operational plan, design, and location shall be approved by the solid waste management bureau of the department and any other agency or board it feels necessary in order to adequately protect the public health and safety before approval of the site will be granted. The site geology, hydrology and climatology and soil conditions will be reviewed.

(i) May accept Groups I, II and III type wastes.

(ii) Site shall be fenced to prevent animals from roaming at large over the site.

(iii) Site shall be supervised during open hours.

(iv) Refuse shall be covered with six inches of compacted dirt at the end of each working day.

(v) Proximity to population centers shall be determined on a case-by-case basis by the department.

(b) Class II sites. Operational plan, design and location shall be approved by the solid waste management bureau of the department and any other agency or board it feels necessary in order to adequately protect the public health and safety before approval of the site will be granted. The site geology, hydrology, climatology and soil conditions will be reviewed.

(i) Shall receive Groups II and III wastes only.

(ii) Site shall be fenced to prevent animals from roaming at large over the site.

(iii) Water and waste water sludges are to be mixed with other wastes to prevent localized leaching.

(iv) Site shall be supervised during open hours.

(v) Refuse shall be covered with six inches of dirt at the end of each working day.

(c) Class III sites. Operational plan, design, and location shall be approved by the solid waste management bureau of the department and any other agency or board it feels necessary in order to adequately protect the public health and safety before approval of the site will be granted. The site geology, hydrology, climatology, and soil conditions will be reviewed.

(i) Shall receive Group III wastes only.

(ii) Shall be covered with dirt from time to time or when the department feels necessary to prevent site from being an eyesore.

(iii) Are to be located to allow for reuse of the land (land reclamation) and to preserve aesthetic values.

(6) Site selection.

(a) A sufficient acreage of suitable land shall be made available for the waste disposal area.

(b) Access roads and bridges shall be capable of supporting loaded trucks during all types of weather.

(c) The disposal area shall be so located as to prevent the pollution or contamination of any waters of the state.

(i) The department will cause to be made an inspection of the proposed site by a soils scientist and a department representative to determine if the proposed operation can comply with this rule.

(ii) Recognized safe distances between any source of public or private water supplies and the site shall be maintained.

(iii) The Class I and II sites shall not be subject to flooding by surface water or have a high groundwater table and shall not be located within a 100 year flood plain.

(iv) The site shall be located and the necessary drainage structures installed so that a natural drainage course does not direct the surface runoff through the refuse disposal area.

(v) Class I and II sites shall not be located where underlying geological formations contain rock fractures or fissures which might lead to pollution of underground waters.

(vi) The Class I and II sites shall not be located in areas where springs exist.

(d) The site should be located so that hauling distances are not too great so that there will be no tendency for persons to discharge refuse along the road to the site.

(7) Operation and maintenance.

(a) Any person who maintains or operates a refuse disposal area or permits the use of land as a refuse disposal area shall maintain and operate such area in conformance with the requirements of this section and all other local zoning, planning, building, and protective covenant provisions and any other legal restrictions that may be in effect for each refuse disposal site.

(i) Burning of refuse at a disposal area is prohibited unless a variance in writing is granted by the department.

(ii) Dumping of refuse shall be confined to an area which can be effectively maintained and operated in accordance with this rule. This shall be controlled by supervision, fencing, signs, or such other means unless an exemption in writing is granted by the department.

(iii) Waste at a refuse disposal area shall be compacted and covered at the end of each day of operation with a compacted layer of at least six inches of suitable earth cover material. Upon completion of the filling operation at the refuse disposal area, a final compacted cover of at least two feet of a suitable earth material shall be placed within one week after the final deposit of refuse at any portion of such refuse disposal area, unless an exemption in writing is granted by the department.

(iv) Effective means shall be taken to control flies, rodents, and other insects or vermin at a refuse disposal area to the extent that they shall not constitute a nuisance affecting public health.

(v) Fencing or other suitable means shall be used to confine papers or other refuse to the refuse disposal area.

(vi) The salvaging of refuse at refuse disposal areas, if permitted by the department, shall be conducted in such manner as not to create a nuisance or affect public health.

(vii) No hazardous wastes shall be accepted at the refuse disposal site unless specially marked in a manner predetermined by the landfill operator with the concurrence of the department.

(viii) Municipal incinerators shall be operated and maintained so as to be in compliance with Montana air pollution standards.

(ix) Pesticides, pesticide containers and residues shall be disposed of according to procedures set forth by the department.

(x) The Environmental Protection Agency publication "Sanitary Landfill Design and Operation" (SW-65ts) shall be used as the design and operation manual for purposes of this rule.

(8) Permit Required--Notice.

(a) Every person desiring to dispose of a hazardous waste in excess of 100 pounds or 30 gallons of formulated product and/or highly toxic, as set forth in guidelines of the department, shall first notify the department at least ten days in advance of the intended disposal date. The quantity of waste to be disposed of shall not be divided into lesser amounts which would have the effect of defeating the purposes of this section.

(b) The notice shall include:

(i) Name and address of person desiring to dispose of waste.

(ii) Proposed method and location of disposal.

(iii) Description and quantity of waste to be disposed of.

(c) The department may refuse to concur with the method and location of disposal when it has reason to believe an imminent hazard will be created:

(i) By the disposal of the waste involved, and/or

(ii) By the method of disposal requested.

(d) The department may revise disposal methods to utilize the latest technology available. The department may require the hazardous waste to be taken to a different location for disposal when it has reason to believe an imminent hazard will be created at the proposed disposal site.

(e) The final disposal decision shall rest with the department.

(f) When the department has reviewed the notice, it shall notify the person desiring to dispose of a hazardous waste of its concurrence or revisions.

(g) Upon notification by the department, the person desiring to dispose of a hazardous waste shall conduct the disposal pursuant to the final disposal decision made by the department.

(9) Nuisances and hazards to public health.

(a) Where the operation of a refuse disposal area is conducted in such a manner as to constitute a nuisance or hazard to public health or be in violation of any statute or this rule, the department shall, on receipt of a complaint by any person, inquire into the facts concerning such operation. If it finds that the operation is in contravention of any statute or any section contained in this rule, it shall make and cause to be served personally or by certified mail upon the person operating the refuse disposal area a notice in writing stating the manner in which the operation contravenes such statute or section contained in this rule and specifying the particular statute or rule contravened and ordering the person operating such refuse disposal area to correct or to cease such operation, depending on the nature of the violation. If the person served as aforesaid does not comply with the requirements of such order within the time specified therein, the department shall forthwith cause a report in writing containing a summary of the facts as disclosed by its inquiry, a recital of all action taken, and its recommendations, if any, to be transmitted to the department legal unit for such action as is authorized by law.

SELECTION AND ACQUISITION OF A STATE PESTICIDE DISPOSAL SITE

Accomplishment Report III-D

I. Selection Process

A long, detailed and sometimes frustrating selection process was involved in the acquisition of a site suitable for development as a state operated pesticide disposal facility. As seems to so often happen in seeking land for waste disposal, the chief obstacle encountered was not in finding a site able to meet the physical site selection criteria (though this in itself was a considerable task), but in overcoming the reluctance and opposition of the people having control of the candidate sites, and of other concerned area residents.

The initial selection criteria utilized in the search for a site were climate and geology. Large areas of land in eastern Montana characterized by low annual precipitation and Bearpaw Shale bedrock were chosen for a screening process utilizing aerial photographs, topographical maps, and soil survey information. From this process, many smaller areas were selected for further evaluation. More than fifty potential sites in four separate geographical areas were visited by bureau staff and were checked for access, topography, existing land use, vegetation, drainage patterns, and apparent soils characteristics. Consultants from the U.S. Soil Conservation Service and the Montana Bureau of Mines and Geology assisted in more detailed field evaluations of eight of these potential sites. A total of six sites were finally pursued for possible purchase or lease. These included sites on private, county-owned, state and federal (Bureau of Land Management) land. Approximately two years was spent in the process of selection and acquisition of an acceptable site.

The disposal site which has been acquired, is located in a sparsely populated area of east-central Montana, approximately fifty (50) miles northwest of Forsyth. The twenty (20) acre site is located within a section of state school trust land. In order to obtain control of the land parcel, it was first necessary to obtain the permission of the lessee presently having grazing rights on the state section. Then an application was submitted requesting the Montana Land Board to transfer control of the land from the Department of State Lands to the Department of Health and Environmental Sciences. In order to allow the transfer, this department was required to reimburse the school trust fund the full value of the acreage withdrawn.

II. Specific Selection Criteria

The following table compares known characteristics of the selected site with the desirable limits as presented in previous reports for Parts III-D, and IV-D of the contract. Additional site evaluation is planned before disposal activities are begun. This will involve a detailed soils survey, further soil sampling, and core drilling to determine bedrock characteristics.

II. Specific Site Selection Criteria (cont.)

A. Health, Safety and Environmental Criteria

Selection Criteria

Desirable Limits

Known Site Characteristics

- | | | |
|------------------------------------|--|---|
| 1. Soil characteristics | OH, CH, CL, SC, GC, SM-SC, SW-SC (USGS Classification). | The soil classifies as CL. |
| 2. Soil permeability | $K < 10^{-6}$ cm/sec or 1 foot/year. | Permeability of the soil-shale complex should be $\leq 10^{-8}$ cm/sec. |
| 3. Annual precipitation | ≤ 12 inches per year. | Average annual precipitation is 12 inches/year. |
| 4. Precipitation/evaporation ratio | ≤ 0.50 (evaporation exceeds precipitation by a factor of at least 2). | Precipitation/evaporation ratio = 12 inches/27 inches = 0.44. |
| 5. Nearest surface water or stream | > 2 miles. | Nearest surface water: Stock pond - 1 1/2 mile; intermittent stream - 1 1/3 mile. |
| 6. Nearest use or discharge point. | > 2 miles. | > 8 miles. |
| 7. Seismic activity | Negligible to minor damage potential (seismic zone 0 to 1). | Located in seismic zone 1. |
| 8. Slope | < 5 percent. | 2 to 3 percent. |
| 9. Geomorphic stability | Stable, homogeneous underlying bedrock. | Homogeneous Bearpaw Shale. |
| 10. Flooding potential | Low. | Low potential. |
| 11. Wind erosion potential | Low to moderate (consideration given to operational characteristics and vegetation cover which reduce wind erosion). | Moderate potential. |
| 12. Depth to water table | > 200 feet. | > 500 feet. |
| 13. Nature of fractured bedrock | Fracture must be shallow, not penetrating the bedrock completely. Bedrock where fractures are silted in are desirable. | Bearpaw Shale characterized by shallow, silted-in fractures. |

II. A. Health, Safety and Environmental Criteria (cont.)

<u>Selection Criteria</u>	<u>Desirable Limits</u>	<u>Known Site Characteristics</u>
14. Distance to known fault	> 1 mile.	16 miles.
15. Underlying strata	Bearpaw Shale or Colorado Shale formation (Bearpaw Shale preferred).	Bearpaw Shale.
16. Thickness of bedrock	> 200 feet.	> 500 feet.
17. Effective porosity	> 55 percent.	
18. Hydrogeologic complexity	Easily interpretable.	Easily interpretable.
19. Suitability for surface water runoff control	Easily controllable.	Easily controllable.
20. Monitorability	Terrain must be simple for ease in monitoring.	Slope and drainage characteristics allow easy monitoring.
21. Hydraulic gradient	< 50 feet per mile.	30 feet per mile.
22. Drainage pattern	Simple with few outlet drainages.	Relatively simple.
23. Vegetation cover	Support a fair to good growth of brush and mixed grasses.	Fair to poor growth of mixed grasses and shrubs.
24. Remoteness	> 3 miles from towns, cities, or major highways and roads.	11 miles to nearest community and to paved highways.

B. Operational Requirements

Selection Criteria

Desirable Limits

Known Site Characteristics

1. Transportation		
a) Distance from state pesticide storage facility.	< 60 miles.	185 miles.
b) Road condition	Good or fair condition; not required to be paved.	Improved dirt road: 28 miles to Highway 200; 11 miles to Highway 12.
c) Access	Accessible 9 or 10 months of each year.	> 9 months/year.

II. B. Operational Requirements (cont.)

<u>Selection Criteria</u>	<u>Desirable Limits</u>	<u>Known Site Characteristics</u>
1. d) Ease of access	Accessible by standard truck or field utility vehicle.	Standard truck access.
2. Trench Landfill Requirements		
a) Soil drainage type	Deep, well-drained, or moderately well-drained soils.	Well-drained soils.
b) Flooding	None.	None.
c) Slope	< 5°.	2 to 3 percent.
d) Bedrock	Rippable.	Rippable.
e) Cover material	At least fair to moderate suitability based on moisture, texture, thickness, and porosity.	Fair suitability
3. Soil Incorporation		
a) Cation exchange capacity	> 30.0 meq/100 gm.	39.06 Meq/100 gm.
b) Percent organic matter	0.1 to 1.0 percent.	1.1 percent.
c) pH	7.2 - 9.0.	7.7.
d) Alkalinity	Slight, moderate or strongly alkaline.	Alkaline.
e) Stoniness	Small percentage of cobbles and gravel.	A few scattered gravels.
f) Vegetation cover	Fair to good stand of mixed grasses, forbes and sagebrush.	Fair to poor cover of mixed grasses, forbs, and shrubs.
g) Micro-organism population	Bacteria, fungi, actinomycetes.	
4. Utility Services		
a) Electricity	Not required.	Not available.
b) Water	Obtainable within 10 miles.	Pond 1/2 mile distant.

II. C. Land Use Requirements

<u>Selection Criteria</u>	<u>Desirable Limits</u>	<u>Known Site Characteristics</u>
1. Water resources (surface)	Poor water quality; suited for livestock or wildlife use only. May exist beyond two miles of site. Site location should not conflict with future dam development or geothermal energy production or with Federal Power Commission Licenses.	Surface water in the area is of poor quality, unsuitable for human use. No potential for dam development.
2. Mining and mining claims; mineral leases	Lands not encumbered, or agreement established for thier use without protest. Local mining activities must be compatible with disposal activities.	No mining or mineral claims are held on Section 36. Nearest mining activity approximately 20 miles (bentonite). Nearest oil drilling approximately 8 miles.
3. Right-of-way easement for access	Roads to the site should be public use roads. If access is through private lands, a right-of-way easement must be secured.	Public use roads provide access. No private land easement required.
4. Designated special interest and recreational areas (state parks, wilderness, primitive areas, etc.)	None. The area should have a low potential for this type of development.	Nearest such area is a designated Bureau of Land Management hunting and recreation area 40 miles from the site.
5. Outdoor recreation	Area must not be a high use recreation area, although project requirements do not preclude use of surrounding lands for recreation. Low recreational use of surrounding lands is compatible.	Low potential for recreation except for hunting in the fall.
Resident population density	Low population density, especially for a 15 mile radius from the disposal site.	Population within 10 miles radius < 50 people. Population density for Rosebud County is 1.6 persons per square mile.
7. Land use patterns	Federal or state owned lands largely surrounded by the same are most desirable lands.	Mixed land use pattern. Rosebud County is 18 percent federal, 6 percent state, and 76 percent private land.
8. Endangered species	No endangered species present.	No known endangered species present.

III C. Land Use Requirements (cont.)

<u>Selection Criteria</u>	<u>Desirable Limits</u>	<u>Known Site Characteristics</u>
9. Wildlife and Fish	Area must not be a highly productive wildlife area. Free ranging wildlife can be fenced out of the disposal site and careful operational planning can reduce risk to wildlife.	Small potential for fish in area. Fairly productive area for antelope.
10. Grazing	Grazing not permitted on disposal site. Grazing would be allowable around the fenced disposal site, and, therefore, is compatible with certain constraints.	Site will be fenced to exclude cattle. Site is surrounded by grazing land.
11. Timber production	Not compatible.	No timber production in north Rosebud County.
12. Scenic values	Area should not provide diversity of scenic panoramas.	Rangeland provides very little scenic recreation value.
13. Agriculture	Site must be two miles from small grain crops and other crop production other than livestock.	Nearest cropland - 15 miles.
14. Residential	> 2 miles to closest resident.	Nearest resident - 7 miles.
15. Commercial	Low potential for diverse commercial development. Potential commercial development must be compatible.	Distance from population centers, unavailability of water, etc., make commercial development unlikely.
Industrial	None. Low potential for development.	Low potential for industrial development.

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PLAN FOR ENVIRONMENTAL MONITORING AT THE WASTEPESTICIDE DISPOSAL SITE

Part III - H

I. Introduction

A. Objective

Monitoring activities at the waste pesticide disposal site are twofold in objective; first, is to evaluate soil biodegradation progress; and second, to document and evaluate the environmental effects of the practiced waste pesticide disposal methods.

Monitoring of soils, vegetation and surface and ground waters will be routinely conducted at the hazardous waste disposal site throughout the project period. Soil studies will include chemical residue analyses, microbiological determinations and basic soil chemistry determinations; vegetation will be monitored for chemical residues; and, surface and ground waters will be scrutinized for appearance of chemical wastes.

B. Characterization of Soil Injection

Candidate organic waste pesticides will be injected in a dry formulation into the subsoil in bands approximately 20 inches wide separated by an equal width of undisturbed soil and vegetation. A modified mold board plow, equipped with a single plow blade, hopper, auger and drop tube will inject metered amounts of waste chemical in contoured bands approximately six inches deep. Soil will be lifted by the plow blade to allow the chemical to be deposited and to mix somewhat with the upper soil profile. As the plow blade passes through the soil, the band will be lifted and then dropped back into place.

Candidate waste pesticides will be disposed of by soil injection in two or three separate plots approximately one to two acres in size.

C. Characterization of Landfill

A trench method of landfilling will be used to dispose of water insoluble chemicals conducive to chemical treatment processes. A trench will be constructed within the Bearpaw Shale bedrock. A monitoring well in the trench proper will allow sampling of possible leachate from a collection system constructed below the waste cells.

II. Soil studies will receive a great deal of emphasis because soil affords the principal media through which waste chemicals may be transported or degraded.

A. Soil Biodegradation Study

1. Sample Design

Permanent sampling areas will be randomly located and marked in each of the soil injection plots. Sampling areas will be selected with similar soil characteristics. Each sampling area will be approximately 12 inches x 40 inches in size and will include equal portions of one treated and an adjacent untreated band. Within each sampling

area five sample sites will be designated. Each sample site within a sampling area will be sampled at one of five separate sampling periods. The first sampling period will be within three days after application, the second four weeks later, the third eight weeks later, the fourth twelve weeks later, and the fifth another twelve weeks later. When a sample is collected, its location will be marked to prevent resampling at a future sampling period.

Each sample site will extend the combined width of the treated and untreated bands. From the treated band, soil will be collected from three vertical tiers, according to the sample schedule on Table 1. Each tier will represent a separate sample to a depth of 9, 18, and 27 inches, respectively. The first sample tier will collect soil in which the waste chemical has been deposited. The second and third sample tiers will collect soil from two successive levels below the first tier. Residues detected in the second and third sample tiers will provide information regarding control of the application and degree of vertical migration experienced throughout the monitoring period.

From the untreated band, soil will be collected from a depth of 4 to 11 inches. Soil collected from the top four inches will be discarded to eliminate soil contamination resulting from application drift. Residues detected in the sample tier collected from the untreated band will indicate lateral migration of waste chemical from the treated band.

Sample sites will be located equidistantly within a sampling area. Each site will be randomly chosen for sampling at a given sampling period. Each sample will consist of an equal number of composited soil cores collected across the width of the treated and untreated bands.

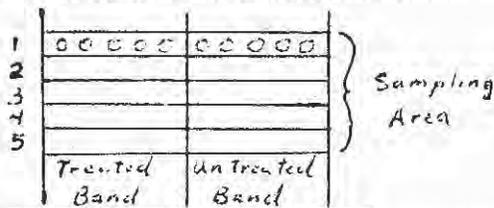


Diagram 1. Sample area illustrating sample sites and core placement. Top view.

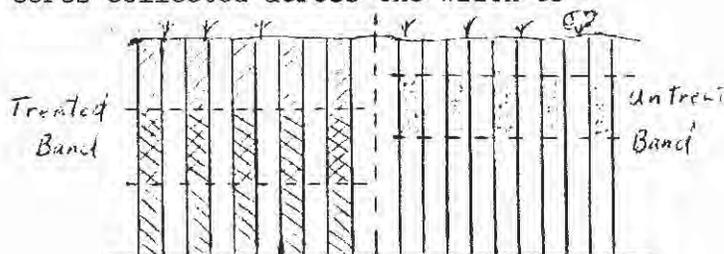


Diagram 2. Treated and untreated bands illustrating position of soil core samples. Cross-sectional side view.

2. Sample Collection Procedure and Preparation

Soil samples will be collected with a metal soil sampling tube. Soil cores from each sample location will be combined and packaged in plastic bags and appropriately labeled. Plastic bags free of PCB's or clean cloth bags will be selected for sample collection. All tools and equipment used for soil collection will be cleaned immediately after each sample collection. Cleaning will entail scrubbing with a brush and water, then rinse with an organic solvent such as alcohol, acetone, or pet. ether (pesticide grade). Sampling tools will be stored in clean cloth bags within a plastic bag when not in use. Neoprene gloves will be used in soil collection and will be changed before handling the succeeding sample. Soil samples will be refrigerated or frozen as soon as possible after collection and when in transit to the contracting laboratory. When a composited sample arrives at the laboratory, it will be blended to a homogeneous composition, and 300g of soil sub-sampled for pesticide analysis.

B. Standard Soil Chemistry

Soil pH, percent organic matter, ion exchange, temperature and moisture measurements will be run on soil samples. Soil moisture and temperature measurements will be determined within the treated bands using an MC-300 series soil moisture--temperature meter and soil cells manufactured by Soil Test, Inc. Soil pH, percent organic matter, soil texture, and cation exchange properties will be determined in a preliminary soils study prior to disposal activities and at the close of the project. Soil analyses will be performed by the Soil Testing Laboratory at MSU, Bozeman, Montana.

C. Soil Microbiology

General population counts of bacteria, actinomycetes, and fungi from both treated and untreated bands will determine micro-organism response to the soil injection waste disposal technique. Soil samples will be collected from treated bands in the same manner, location and according to the same sampling schedule described in I (A) of this section. Soil cores will be collected between cores collected for pesticide residue analyses. Soil cores from a sample site will be blended and sub-sampled for population counts. A total of 156 samples from treated bands and sixty samples from untreated (control) bands will be collected in five sampling periods.

Multiple soil cores will be collected for each sample and composited to attain a homogeneous and uniform sample population. Surface litter will be removed prior to sampling. Collected samples will be placed in plastic bags, labeled and shipped to the contracting laboratory.

Within the limits of financing, index genera known to be associated with biodegradation of phenols may be quantitatively evaluated (e.g. Bacillus, sp., Pseudomonas sp., Trichoderma sp., Fusarium sp., Streptomyces sp.).

III. Vegetation

Three transects will be established for sampling of vegetation. One will be within a treated band in the biodegradation area, one in an untreated band, and the third outside the fenced disposal site. All three transects will be situated in similar vegetation types. Vegetation clippings randomly collected from the three transects will be analyzed for chemical residues. Additional vegetation samples will also be collected from other locations near the landfill and evaporation pond and at various locations outside the disposal site. Samples will be analyzed for the pesticide compounds applied in the biodegradation plots and also screened for several selected organic and inorganic pesticides.

A sample clipping will comprise 20 grams of vegetation. Each sample will be packaged in cloth bags, wrapped in plastic, and labeled. Samples will be handled with fresh neoprene gloves to avoid cross-contamination

Sample Schedule:

First sampling period	16 vegetation samples
Second sampling period	16 vegetation samples

IV. Water

Surface and ground waters will be sampled and analyzed for chemical residues at the disposal site. Surface waters which may collect in land deflations, shallow basins,

or retention ponds located in drainage confluences of the disposal site will be sampled. Sampling wells bored to the bedrock will be constructed at strategic hydrologic locations to intercept subsurface water which may travel along the soil-bedrock contact zone. Sampling wells will be capped when not used and sealed with a concrete collar to prevent surface water entry.

Samples will be collected in chemically cleaned glass sampling bottles. Approximately one liter of water per sample will be collected. A total of 20 water samples will be collected over the duration of the project, particularly after major rain fall and snow melt runoff periods.

Water samples will be analyzed for DNBP and screened for nine selected organochlorine, organophosphate, and inorganic pesticides.

Sample Schedule:

Fall	6 water samples
Spring	6 water samples
Fall	6 water samples

V. Landfill Leachate Sampling

Each spring of the year (two samples during the project period), the landfill monitoring well will be sampled for leachate development. Sampling will be accomplished by lowering a glass sample bottle to the well bottom. Any leachate collected will be screened for nine waste pesticides and/or known decomposition products.

