

# Y-12

Y/DD-238

Revised

**OAK RIDGE  
Y-12  
PLANT**

**ASSESSMENT OF SOLID LOW-LEVEL RADIOACTIVE  
WASTE MANAGEMENT**

Merwyn Sanders

**MARTIN MARIETTA**

October 1977

**MANAGED BY  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
FOR THE UNITED STATES  
DEPARTMENT OF ENERGY**

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WASTE MANAGEMENT**

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Y-12 Technical Division

**Oak Ridge Y-12 Plant**

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Prepared for the US Energy Research  
and Development Administration

Under US Government Contract W-7405-eng-26

## SUMMARY

This report describes solid, low-level radioactive waste management programs at the Oak Ridge Y-12 Plant. The discussion includes methods of operation, monitoring activities in and around burial facilities, and an environmental assessment of the operation.

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## Y-12 PLANT ASSESSMENT OF SOLID LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

### I. Site Description

#### A. Physiography

The ERDA Reservation occupies about 37,000 acres adjacent to the City of Oak Ridge, 80% within Roane County and 20% within Anderson County. The eastern, southern, and western boundary is the Clinch River and the northern boundary is Black Oak Ridge and the City of Oak Ridge. The Reservation lies in the Valley and Ridge Subregion of the Appalachian Highlands Physiographic Province. Alternating ridges and valleys occur from the northern end of the Reservation to the southern end. The altitude above mean sea level ranges from 741 to 1356 feet.

#### B. Geology

The geological material responsible for the creation of the topographical features is composed of highly deformed, but unmetamorphosed, sedimentary rocks. Limestone, dolomites, and calcareous shales are the most important constituents of these geological strata, but arenaceous and argillaceous shales and sands are also very common. The soils of the Oak Ridge area are relatively infertile and ill-suited to agriculture.

The Oak Ridge Reservation lies in seismic zone 2, which is an area of moderate activity. A shock of major focus is not likely to occur in the Oak Ridge area during the next several thousand years. Consequently, earthquake forces generally have not been considered in the design of facilities on the Oak Ridge Reservation.

#### C. Hydrology

All waters drained from the Oak Ridge Reservation eventually reach the Tennessee-Ohio-Mississippi water system via the Clinch River which borders much of the Reservation. Major streams of the Reservation are Poplar Creek, which drains the ORGDP area; the East Fork of Poplar Creek and Bear Creek, which drain the Y-12 Plant Area; and Whiteoak Creek and Melton Branch, which drain the ORNL Area. In general, the waters of all the streams are of the calcium-magnesium-bicarbonate type.

#### D. Meteorology

Heavy precipitation occurs in both winter and summer months; comparatively, spring and autumn are dry. Average annual precipitation is between 50 and 60 inches. Monthly average temperatures are in the moderate range (40 to 80° F). Temperature extremes of > 100 and < 0° F are rare. The wind direction pattern reflects the topographic orientation of the Valley and Ridge Province that consists of prevailing up-valley (southwest and west-southwest) and down-valley (northeast and east-northeast) flow.

## **E. Ecology**

The area includes gently sloping valleys, rolling-to-steep slopes, and ridges. Soils developed from the weathered geologic substrate are members of the ultisol group which includes the red and yellow podzolic soils.

The general vegetation of the area was formerly classified as an oak-chestnut association within the Ridge and Valley Province. As individual chestnut trees were eliminated by the blight, suppressed or co-dominant species (oaks and hickories) replaced the chestnut as major canopy components. Most forests in the area have had some timber removed since the area was settled in the late 18th century.

Because of the proximity of the Oak Ridge area to the Cumberland Mountains, the dominant oak-hickory association is strongly related to the mixed mesophytic associations of more moist cove and slope forests. The ecological systems of the Oak Ridge Reservation are characteristic of those found in the intermountain regions of Appalachia from the Allegheny Mountains in southern Pennsylvania to the southern extension of the Cumberland Mountains in northern Alabama. The oak-hickory association shares equal prominence with the yellow pine-hardwood type. Cove hardwoods are found interspersed between the dissected ridge systems. Second growth, yellow-poplar dominated bottomland, and lower slope associations are widespread. Riparian vegetation is primarily willow, sycamore, and maple. Large areas of abandoned cropland were planted with loblolly pine between 1947 and 1956.

About 80% of the Reservation is forested, and a comprehensive forest management program is carried out on the second-growth forest system and pine plantations on the area. Table 1 gives a breakdown of approximate acreage of forest-management forest types. There are numerous areas within the forest management system that are used extensively for ecology research.

## **F. Cultural Factors**

Prior to 1942, the principal land uses of the area were small-farm agriculture (pasturing cattle and hogs) and some limited tobacco and vegetable growing. In 1942, the Federal Government acquired 56,000 acres in Anderson and Roane Counties for the three plants (ORNL, ORGDP, Y-12) and an employee housing community. In 1959, the City of Oak Ridge was incorporated. ERDA retained control of approximately three-fourths of the original 56,000 acres, but allowed individuals to buy their homes and land and gave to the town the municipal facilities, including utilities, streets, sewers, schools, and a hospital.

Currently, ERDA land holdings represent 64.8% of the City of Oak Ridge. When land holdings by TVA (4.0%) and the University of Tennessee (4.4%) are added, the total Federal and State land holdings amount to 73.2% of the total land in Oak Ridge, leaving 26.8% of the land owned by the City or by private citizens.

Table 1  
 APPROXIMATION OF THE ACREAGE OF THE  
 VEGETATIVE ASSOCIATIONS ON THE  
 OAK RIDGE RESERVATION

| Association         | Approximate<br>Area<br>(acres) | Percent of<br>Total |
|---------------------|--------------------------------|---------------------|
| Hardwood            | 11,000                         | 37                  |
| Pine Plantation     | 5,000                          | 17                  |
| Natural Pine        | 5,000                          | 16                  |
| Cedar and Pine      | 500                            | 2                   |
| Hardwood-Cedar      | 1,700                          | 5                   |
| Hardwood and Pine   | 5,000                          | 20                  |
| Hardwood-Cedar-Pine | 600                            | 3                   |
| <b>Total</b>        | <b>28,800</b>                  | <b>100</b>          |

Urban land, amounting to 13,918 acres, is zoned in four main categories: residential, commercial, industrial, and public. Residential land accounts for 3594 acres (25.9%) and is divided into single-family, residential multifamily, and commercial residential (hotels and motels). Commercial land use accounts for 250 acres, and industrial use (excluding the ERDA facility) accounts for 42.4 acres. Private vacant land accounts for 5409 acres, which are classified as proposed residential, proposed industrial, and "Greenbelt" land.

Given the government acquisition of the original 56,000-acre block of land in 1942, no conflict exists at present between ERDA current use of land and local land-use policies. Moreover, since ERDA will most likely not need to acquire more land for expansion of its activities in the Oak Ridge area, there is no reason to expect any future conflict with local land-use policies.

Although ERDA's use of land is not in conflict with local land-use policies, these local land policies are affected by the presence of the facilities. The present size and location of the Federal installation limits Oak Ridge's land-use choices. Clearly, the Reservation is land that cannot be developed privately or used by the City without special arrangements. While it can be argued that ERDA ownership of choice industrial land has discouraged industrial development in the private sector, the actual importance of this factor is unknown. Studies have shown that many factors other than availability of usable industrial land play a role in determining whether industries will locate in the East Tennessee area.

The economic dependence of Oak Ridge on ERDA also has an impact on land-use choices by creating uncertainties as to the proper use of existing available land. The question of whether to zone available land "industrial" (to promote industrial development) or "residential" (to create potential home sites for new employees) requires some knowledge of ERDA's future development plans. One consequence of this uncertainty has been an attempt by Oak Ridge to acquire additional land from ERDA for the purpose of promoting private industrial development. Since 1968, several requests have been made and granted: two sites near Y-12 (sites X and M) of 230 acres and 28 acres, respectively; an 86.32-acre site known as the Industrial Park; and 160 acres located behind the Federal Office Building in Oak Ridge.

There is a distinct possibility that ERDA might have to retain virtually all its remaining holdings for future energy facility development.

An archaeological survey of the Oak Ridge Reservation was conducted by the Department of Anthropology, University of Tennessee, Knoxville, from March 15 to June 30, 1974. Sites of aboriginal occupation that might be affected by future activities on the Reservation were located and evaluated. Areas that would be affected by current construction activities or by immediate projects were given first priority.

Reconnaissance and testing were done in several different physiographic zones, including the Clinch River and its larger tributary stream terraces, the interior valleys, selected forested ridges, and specific facility areas. Previously recorded sites, known but unrecorded sites, and previously unknown sites were investigated. The survey techniques included collecting surface artifactual materials, examining subsurface soil strata, and interviewing long-time residents and employees.

Altogether, 45 sites of prehistoric aboriginal occupation and several historic Euroamerican homestead sites were examined. The primary emphasis of the study was on the prehistoric sites.

Archaeological remains that represent about 10,000 years of human occupation in the Oak Ridge area were investigated. The sites are distributed along the Clinch River drainage system; most of them are located along the river.

Although the archaeological survey located a number of sites that could be affected by future expansion activities, the recommendation was made that specific construction projects should include an assessment of the impact on the archaeological resources in the specific plant area.

All the archaeological sites located on the Oak Ridge Reservation have been posted as such; and, with suitable law enforcement, will be protected from vandalism by "relic collectors" under the provisions of the Federal Antiquities Act.

The Y-12 Plant is located in Bear Creek Valley between Chestnut and Pine Ridges. The south exposure of Pine Ridge west of the plant has been affected by radioactive-waste-disposal operations. No evidence of archaeological sites was detected in that area. Surveys along the crests of Pine and Chestnut Ridges in the plant area did not locate any prehistoric sites.

## **II. Facilities**

### **A. Y-12 Plant**

The Oak Ridge Y-12 Plant (see Figure 1) is situated in Bear Creek Valley about 3 miles from the population center of Oak Ridge. The plant proper is located on the valley floor. The area occupied is about 2/3 mile wide by 2 1/2 miles long, the longer axis being essentially parallel to the ridges. About 600 acres are enclosed by the perimeter fence. The plant is about at latitude 35°59'N and longitude 84°15'W.

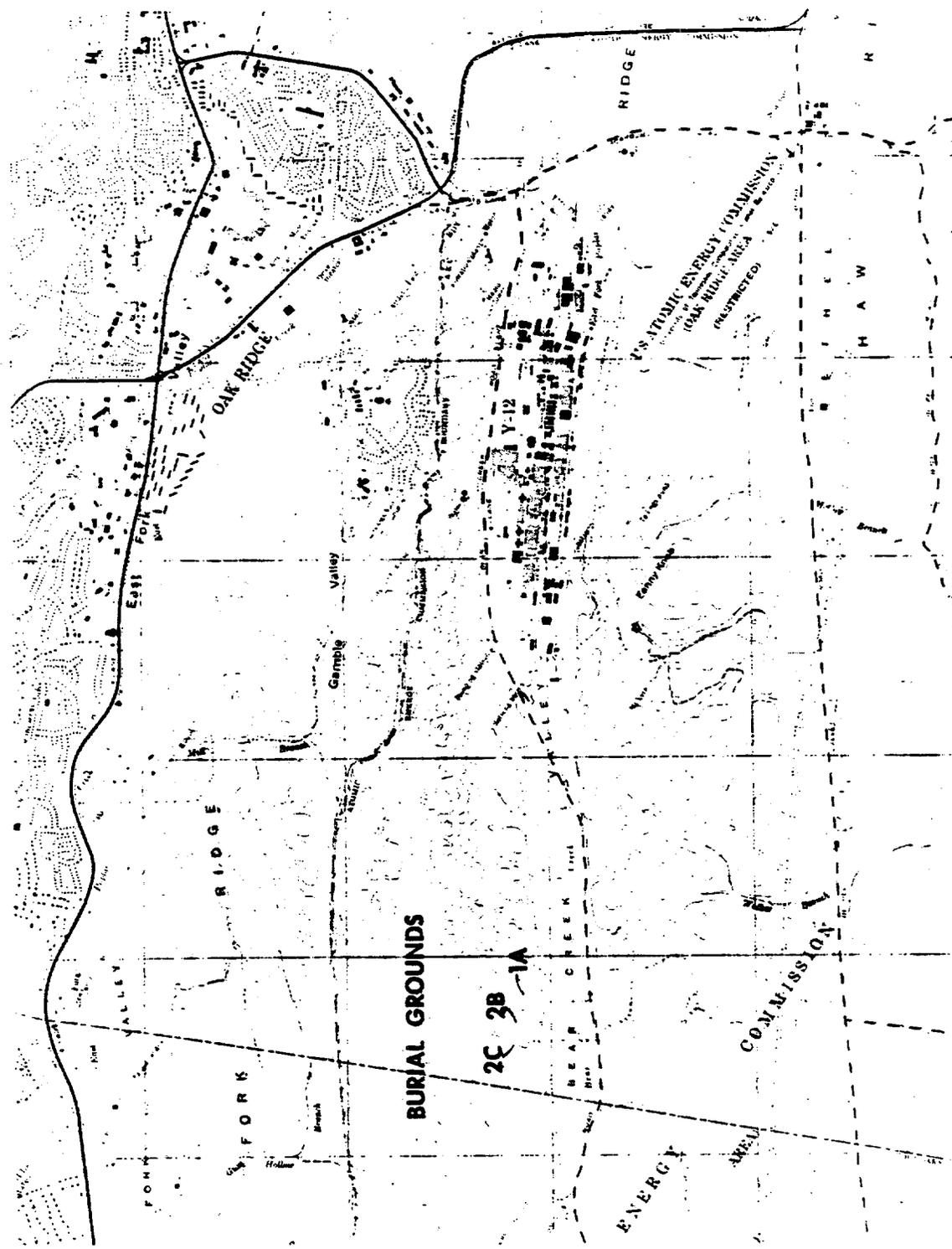


Figure 1. OAK RIDGE Y-12 PLANT IN BEAR CREEK VALLEY.

The administrative, or plant, grid is oriented parallel to the long axis of the plant and has a declination of  $34^{\circ}12'51''$  west of true north. The basic fenced area is surrounded with 62,500 linear feet of fencing in the east-west direction and 31,000 ft in the north-south direction on the plant-grid system.

Physically, the Oak Ridge Y-12 Plant, with its working population of some 4900, is rather analogous to an industrial city. Many buildings, large and small, are arranged systematically in the more level part of the site. They are served by an extensive system of streets, sidewalks, bus lines, railroads, office buildings, cafeterias, a dispensary, and fire and police departments.

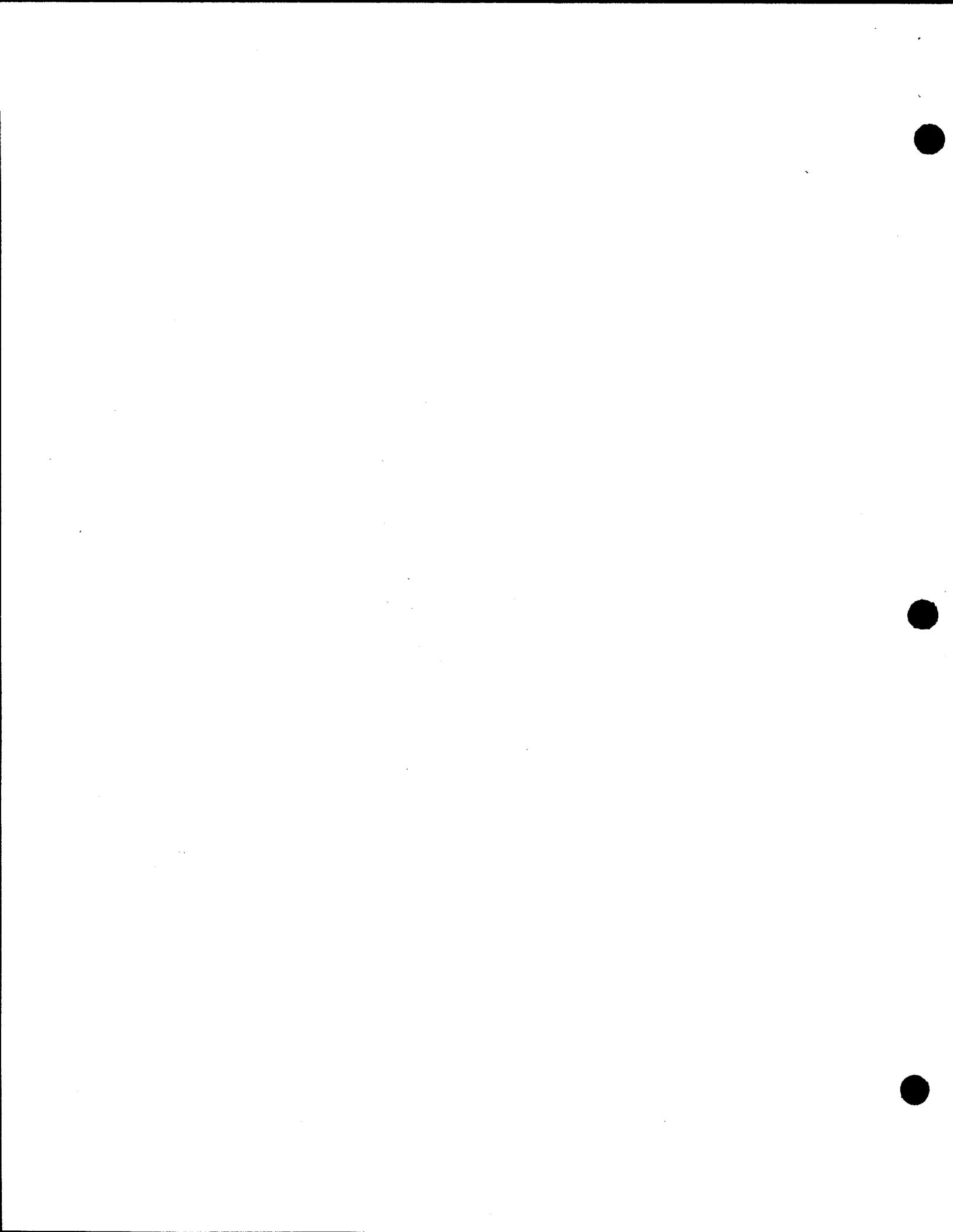
A few plant facilities lie beyond the plant perimeter. They have been installed over a period of some 20 years. Their primary purpose is to protect the environment against the potentially adverse impact of this industrial complex and include a large modern sanitary burial ground, located about 2 miles west of the plant, which is operated by Y-12 and serves all local ERDA facilities. Farther west are burial grounds for the disposal of radioactive wastes. Still farther west is the Bear Creek Surface Water Monitoring Station at the point where Bear Creek turns north to leave the valley.

The allocation of land (not including wooded or grassy areas) in the plant by use is:

| Use                          | Acres      |
|------------------------------|------------|
| Production                   | 90         |
| ORNL Facilities              | 60         |
| Storage (Eastern Area)       | 20         |
| Storage (Western Area)       | 34         |
| Development                  | 9          |
| Maintenance and General Shop | 34         |
| Construction Contractor      | <u>32</u>  |
| Total                        | <u>279</u> |

#### **B. Burial Grounds**

The low-level radioactive waste burial areas are located in Bear Creek Valley (as shown in Figure 1) about 1.8 miles west of the main plant site. The areas are designated Burial Ground 1-A, Burial Ground 2-B, and Burial Ground 2-C. Figure 2 is a map of their locations. The grounds are enclosed by a fence with entrance gates that are kept locked at all times and are opened only by authorized persons as required for entry or exit.



Trenches in Burial Grounds 1-A and 2-C are about 18 feet deep by 26 feet wide. The trenches are excavated with a 3 yd<sup>3</sup> dragline. The excavated material is used to cover the deposited waste material frequently so as to avoid prolonged exposure of the waste-filled trenches. The excess spoil dirt provides a final trench cover that varies in thickness from 5 to 15 feet. The finished trench is leveled and is seeded with grass, and pine seedlings are planted on it for additional erosion control.

### **Burial Ground 1-A**

Burial Ground 1-A (see Figure 3) is used for the burial of low-level radioactive material. Solid waste material disposed of in this area includes materials contaminated with depleted uranium, for example: wood, paper, plastics, particulate filters, carbon, mixed-metal machine turnings, metal drums, and small quantities of metal with low economic value. This burial site is 3 to 30 feet above the water table, depending on weather conditions.



Figure 3. BURIAL GROUND 1-A.

The plant annually generates about 1000 tons (760 m<sup>3</sup>) of the low-level radioactive waste that is deposited in Burial Ground 1-A. The waste disposal, compaction, and sealing processes presently require the use of about 0.1 acre per year; therefore, the area available at this location is sufficient for 60 years of continuous operation.

### Burial Ground 2-B

Pure, depleted uranium, which is accountable and recoverable, is stored at Burial Ground 2-B (see Figure 4). The trenches are about 15 feet deep and 10 feet wide. The material is compacted and covered daily. The area is 80 to 110 feet above the water table the year round.



Figure 4. BURIAL GROUND 2-B.

The generation rate of this material is about 800 tons ( $608 \text{ m}^3$ ) per year; therefore, the area available will be sufficient for about 30 years of continuous operation.

### Burial Ground 2-C

Contaminated materials (enriched uranium and natural thorium) are disposed of in Burial Ground 2-C (see Figure 5). The waste materials are the same types as those listed for Burial Ground 1-A. This burial area is from 2 to 6 feet above the water table, depending on the season.

The annually generated quantity is about 500 tons ( $380 \text{ m}^3$ ). The current area usage is 0.1 acre per year; therefore, sufficient area is available for about 50 years of continuous operation.



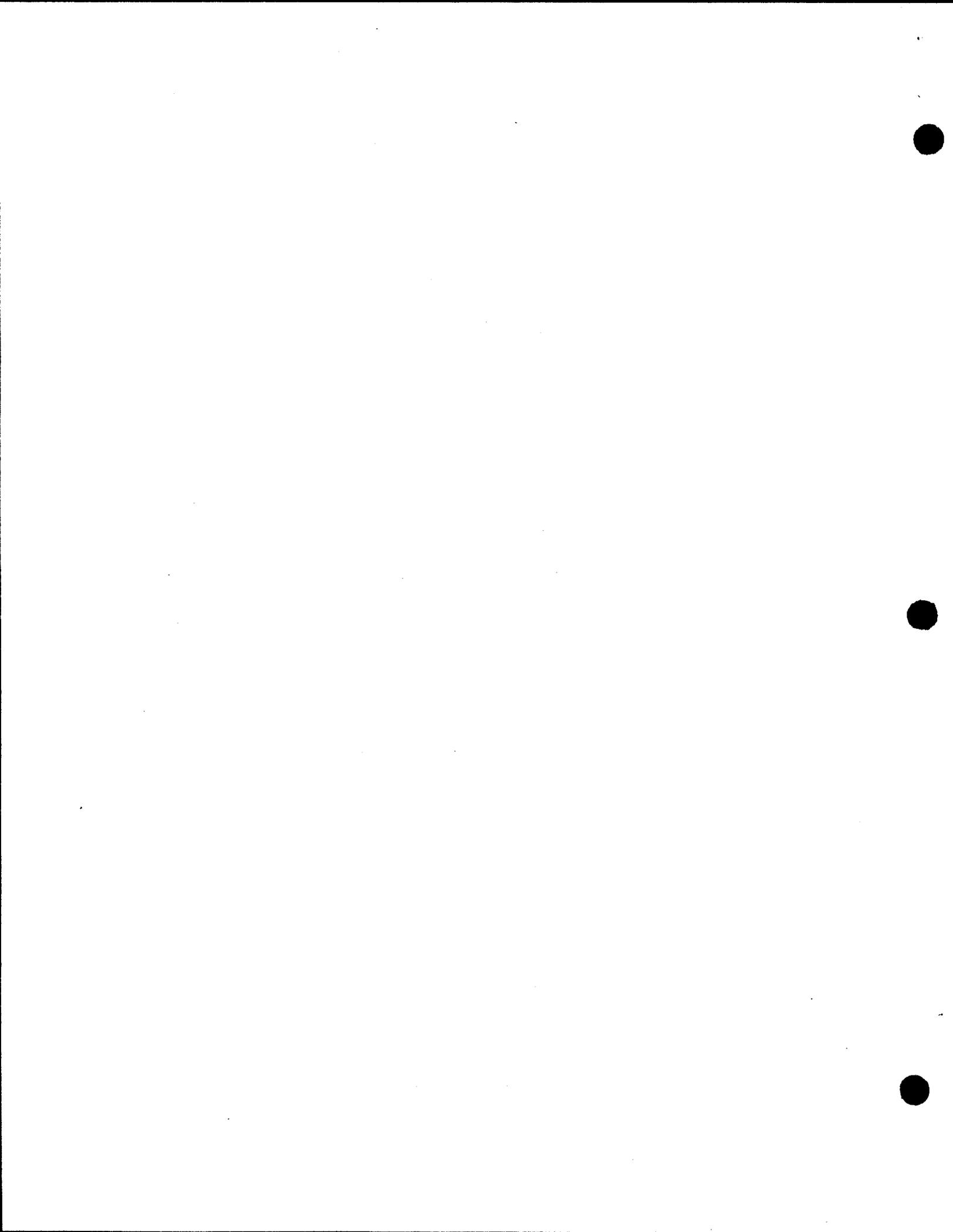
Figure 5. BURIAL GROUND 2-C.

### Security Material Disposals

The classified-material disposal area is inside the main plant. It is used to dispose of classified materials that are radioactive. A 21-ft<sup>3</sup> backhoe is used to excavate a trench that is about 19 feet deep by 8 feet wide. The materials disposed of in this pit consist of classified forms made from uranium, thorium, and other materials. For security reasons, the materials are not left exposed; therefore, they are covered the same day they are deposited in the trench. The minimal thickness of the final cover is 6 feet. The operation requires the use of about 0.03 acre per year; therefore, at the present rate of use, sufficient space is available for centuries of use. A total of 250 tons (160 m<sup>3</sup>) of security materials are disposed of per year. This area is 80 to 100 feet above the normal water table.

### III. Monitoring Activities

Radiological monitoring of surface and underground water in and around the burial ground is performed on a planned frequency (see Figure 6). Table 2 gives the results from this monitoring program for Calendar Year 1976. All results as shown are well below the Radiation Protection Guide (RPG) for uranium in drinking water of  $3 \times 10^{-5}$   $\mu\text{Ci}/\text{cm}^3$ .



#### **IV. Operation Practices**

All burial-pit locations are mapped by engineering drawings. Detailed records and descriptions are maintained on each disposal as to the amount of material, type of containers, location, and personnel precautionary measures to be taken during disposal operation. These records are stored in a Federal depository on permanent retention.

The mechanics for making a disposal in the Y-12 Plant are done in accordance with Standard Practice Procedure 70-103, "Disposal of Hazardous Materials" (see Appendix).

#### **V. Burial Ground Operating Cost**

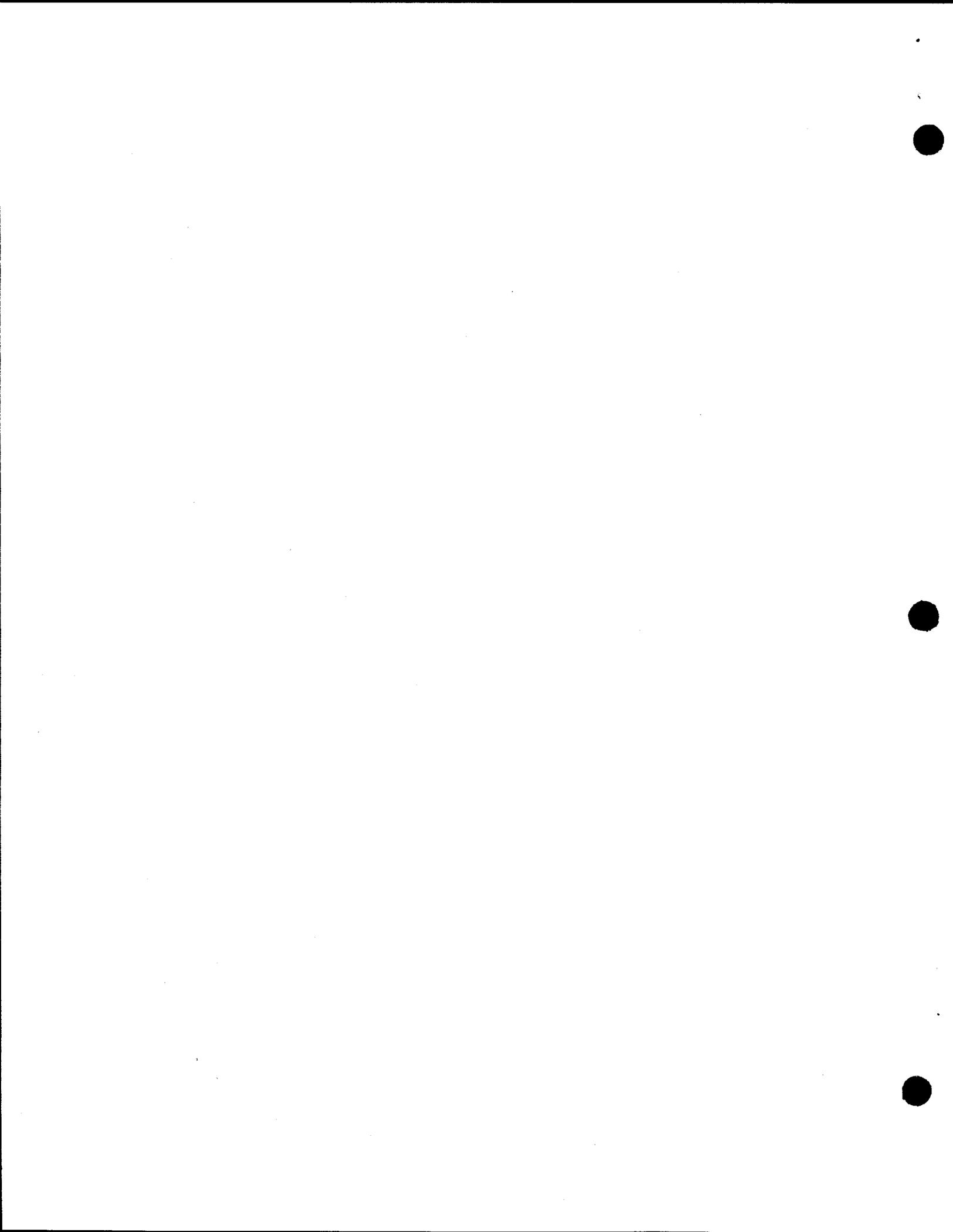
The cost of operating the Y-12 Burial Facilities for Fiscal Year 1976 is included in Tables 3 and 4. Monitoring cost is included in indirect cost which constitutes approximately 5% of the total endeavor.

#### **VI. Burial Ground Weights and Volumes**

Tables 5 through 8 give the weights and volumes included in the burial area operated by the Y-12 Plant.

#### **VII. Assessment**

Monitoring data and method of operation of the solid, low-level radioactive waste burial grounds in Bear Creek reveal no deleterious effect on the environment.



## APPENDIX

## DISPOSAL OF HAZARDOUS MATERIALS

|   |  |   |        |        |      |               |            |                |      |         |
|---|--|---|--------|--------|------|---------------|------------|----------------|------|---------|
| HEALTH & SAFETY   | UNION CARBIDE CORPORATION<br>NUCLEAR DIVISION<br><br>OAK RIDGE Y-12 PLANT | <table border="1"> <tr> <td>NUMBER</td> <td>70-103</td> </tr> <tr> <td>DATE</td> <td>July 21, 1976</td> </tr> <tr> <td>SUPERSEDES</td> <td>March 13, 1975</td> </tr> <tr> <td>PAGE</td> <td>1 OF 10</td> </tr> </table> | NUMBER | 70-103 | DATE | July 21, 1976 | SUPERSEDES | March 13, 1975 | PAGE | 1 OF 10 |
| NUMBER  | 70-103   |   |        |        |      |               |            |                |      |         |
| DATE  | July 21, 1976  |   |        |        |      |               |            |                |      |         |
| SUPERSEDES  | March 13, 1975   |   |        |        |      |               |            |                |      |         |
| PAGE  | 1 OF 10  |   |        |        |      |               |            |                |      |         |
| Subject: DISPOSAL OF HAZARDOUS MATERIALS  |  |   |        |        |      |               |            |                |      |         |
| <p>1.0 PURPOSE</p> <p>To provide guidelines for disposing of unusable hazardous materials (3.1).</p> <p>2.0 SCOPE</p> <p>Applies to the disposal of hazardous materials and equipment, including classified items.</p> <p>3.0 DEFINITIONS</p> <p>3.1 <u>Hazardous Materials</u>: Chemicals, gases, radioactive wastes, oils, coolants, metals, powders, liquids, empty drums which contained toxic or Class 1 flammable (3.2) chemicals, or any material (whether flammable, corrosive, toxic, chemically reactive, or unstable upon prolonged storage) or equipment which might (1) constitute a potential harm to personnel, (2) cause property damage, or (3) cause an insult to the environment upon disposal (4.1). (R)</p> <p>3.2 <u>Class 1 Flammable Liquids</u>: Liquids with flash points below 38° C (100° F) and a vapor pressure at this temperature of less than 2,000 millimeters of mercury (40 psi).</p> <p>3.3 <u>Radioactive Waste</u>: Radioactive materials and radioactively contaminated items which cannot be reprocessed or reused. (R)</p> <p>4.0 REFERENCES</p> <p>4.1 70-202: Hazardous Materials Control (N)</p> <p>4.2 10-051: Disposal of Classified Material and Equipment (R)</p> <p>5.0 RESPONSIBILITIES</p> <p>5.1 <u>Maintenance Division Superintendent</u> appoints Plant Disposal Coordinator. (N)</p> <p>5.2 <u>Plant Disposal Coordinator</u> coordinates Plant activities related to disposal of hazardous materials. (N)</p> |  |   |        |        |      |               |            |                |      |         |
| APPROVED BY <i>Ray P. Snyder</i>  | NUMBER 70-103  |   |        |        |      |               |            |                |      |         |

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- 5.3 Division Superintendent/Director appoints Division Disposal Coordinator and alternates and assures that inventories of hazardous materials within the Division are kept to a practical minimum (4.1). (R)
- 5.4 Division Disposal Coordinator coordinates Division activities related to the disposal of hazardous materials. (R)
- 5.5 Radiation Safety Department
- 5.5.1 Establishes radiation safety guidelines and approves locations for disposal of various types of hazardous materials.
- 5.5.2 Completes the Health Physics Section of Form UCN-2822 for those radioactive wastes (3.3) to be sent for disposal at ORNL facilities (7.4).
- 5.6 Security Department reviews procedures governing the disposition of materials and equipment to ensure that security requirements are followed.
- 5.7 Classification and Information Group maintains current list of Division Classification Committee Members.
- 5.8 Division Classification Committee Member reviews and classifies, from a security standpoint, disposals proposed by the Division.
- 5.9 Safety Department establishes general safety guidelines for handling of hazardous materials.
- 5.10 Fire Protection Engineering Department establishes guidelines for safe handling of flammable and/or explosive materials. (N)
- 5.11 Industrial Hygiene Group establishes industrial hygiene guidelines for safe handling of toxic materials. (R)
- 5.12 Plant Shift Superintendent (PSS) coordinates off-shift disposals. (R)
- 5.13 Salvage Group of General Plant Maintenance Department makes disposals as prescribed by Plant Disposal Coordinator or PSS. (R)

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## 6.0 PROCEDURES

### NOTE

Blanket approval may be given where the same hazardous materials will be disposed of at least once a month. To request it, write "blanket" across the top of Form UCN-2109 (7.1) when initiating the disposal request. After the form is processed, the Salvage Group will make the first disposal in accordance with 6.13 but will make all additional disposals routinely, following any conditions prescribed in the blanket approval. (R)

6.1 Maintenance Division Superintendent appoints Plant Disposal Coordinator. (N)

6.2 Plant Disposal Coordinator (N)

- 6.2.1 Develops and obtains approval (from appropriate staff groups) of methods and procedures for disposal of hazardous materials.
- 6.2.2 Coordinates the efforts of Plant groups for safe disposal of hazardous materials.
- 6.2.3 Maintains a list of Division Disposal Coordinators and alternates authorized to sign hazardous materials disposal requests and checks each disposal request (7.1) to ensure that it has an authorized signature.
- 6.2.4 Uses the list furnished by the Classification and Information Group to see that each request for disposal of classified material (7.3) has the signature of a Classification Committee Member of the requesting division.
- 6.2.5 Investigates the materials or items to be disposed. In each case where there is no clear precedent defining disposal procedure, consults with Industrial Hygiene Group, Safety Department, Fire Protection Engineering Department, Radiation Safety Department, or others as needed.
- 6.2.6 Provides Division Disposal Coordinator with information necessary for proper packaging, identification, storage, and transporting of materials for disposal.
- 6.2.7 Completes the Identification Tag, Form UCN-2114 (7.2), attached to each container.
- 6.2.8 Specifies on Form UCN-2109 (7.1) or, for classified material, UCN-653B (7.3) the disposal location and any disposal or protective equipment requirements.

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- 6.2.9 Sends Form UCN-2822 (7.4) to Radiation Safety Department for completion. (N)
- 6.2.10 Transmits appropriate completed forms (7.1, 7.3, 7.4) to Salvage Group. (N)
- 6.2.11 Reviews blanket disposal approvals on a scheduled basis and recommends whether such approvals should be closed or extended.
- 6.2.12 Maintains up-to-date documentation on disposals of hazardous materials. Provides disposal data required for Plant Environmental Control Coordinator's reports.
- 6.3 Division Superintendent/Director
- 6.3.1 Appoints Division Disposal Coordinator and alternates to coordinate the disposal of hazardous materials for the Division. Furnishes the Plant Disposal Coordinator a current list of the representative and alternates. (R)
- 6.3.2 Assures that Division inventories of hazardous materials (3.1) are kept to a practical minimum and that other possible uses are considered before disposal as waste (4.1).
- 6.4 Division Disposal Coordinator
- 6.4.1 Coordinates Division actions associated with the disposal of hazardous materials.
- 6.4.2 Submits a tabulation of hazardous materials to the Plant Disposal Coordinator requesting information necessary for proper disposal activities, including packaging, identification, storage, or transporting. (N)
- 6.4.3 Initiates the Request for Disposal of Hazardous Chemicals, Gases, and Radioactive Materials, Form UCN-2109 (7.1), for all hazardous materials; if the material is classified, also initiates the Request for Disposal of Classified Material and Equipment, Form UCN-6538 (7.3). Forwards Form UCN-2109 (7.1) to the Plant Disposal Coordinator if the material is unclassified. If it is classified, forwards Form UCN-2109 and Form UCN-6538 to the Division Classification Committee Member. (R)
- 6.4.4 Initiates Authorization for Storage of Radioactive-Contaminated Solid Waste, Form UCN-2822 (7.4) for those radioactive wastes to be sent for disposal at ORNL Burial Ground. Forwards it to Plant Disposal Coordinator. (R)

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- 6.4.5 Arranges, after receiving instructions from the Plant Disposal (R)  
Coordinator, for packaging of hazardous materials for disposal.
- 6.4.6 Completes requester portion of Identification Tag, Form UCN-2114  
(7.2), and attaches it to each container.
- 6.4.7 Stores hazardous materials pending collection for disposal.
- 6.5 Radiation Safety Department
- 6.5.1 Establishes radiation safety guidelines for disposal for (R)  
disposal of hazardous materials.
- 6.5.2 Reviews and comments disposal plans upon request. (N)
- 6.5.3 Completes the Health Physics Section of Form UCN-2822 (7.4) (R)  
for those radioactive wastes to be sent for disposal at ORNL  
facilities. Sends completed form to Plant Disposal Coordinator.
- 6.5.4 Periodically audits Plant disposal system and reports audit (N)  
results to Plant Manager.
- 6.6 Security Department reviews the disposition of materials and (R)  
equipment.
- 6.7 Classification and Information Group furnishes the Plant Disposal (R)  
Coordinator a current list of Division Classification Committee  
Members authorized to sign requests for disposal of classified  
material on Form UCN-6538 (7.3).
- 6.8 Division Classification Committee Member
- 6.8.1 Reviews and classifies each Request for Disposal of Classified (R)  
Material, Form UCN-6538 (7.3).
- 6.8.2 Forwards Form UCN-6538 (7.3) and the accompanying Form  
UCN-2109 (7.1) to Plant Disposal Coordinator.
- 6.9 Safety Department
- 6.9.1 Establishes general safety guidelines for handling of hazardous  
materials.
- 6.9.2 Reviews and comments disposal plans upon request. (N)

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6.10 Fire Protection Engineering Department

6.10.1 Establishes guidelines for safe handling of flammable and/or explosive materials. (N)

6.10.2 Reviews and comments disposal plans upon request. (N)

6.11 Industrial Hygiene Group

6.11.1 Establishes industrial hygiene guidelines for safe handling of toxic materials. (R)

6.11.2 Reviews and comments disposal plans upon request.

6.12 PSS coordinates off-shift disposals, consulting with Plant Disposal Coordinator when communication is possible. (R)

6.13 Salvage Group of General Plant Maintenance Department

6.13.1 Makes disposal according to the instructions on the appropriate forms (7.1, 7.3, 7.4).

6.13.2 Completes and distributes the appropriate disposal forms (7.1, 7.3).

6.13.3 Coordinates disposals going to the ORNL Burial Ground with ORNL personnel; takes Form UCN-2822 with the load and gives it to ORNL Burial Ground personnel. (R)

7.0 APPENDIXES

7.1 Form UCN-2109: Request for Disposal of Hazardous Chemicals, Gases and Radioactive Materials

7.2 Form UCN-2114: Identification Tag -- Hazardous Material Disposal

7.3 Form UCN-6538: Request for Disposal of Classified Equipment and Materials

7.4 Form UCN-2822: Authorization for Storage of Radioactive-Contaminated Solid Waste

|        |        |
|--------|--------|
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|--------|--------|

APPENDIX 7.1

|             |                |
|-------------|----------------|
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| DATE        | July 21, 1976  |
| Supersedes: | March 13, 1975 |
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REQUEST FOR DISPOSAL OF HAZARDOUS CHEMICALS, GASES AND RADIOACTIVE MATERIALS

*MATERIAL TO BE DISPOSED (Our Material To The Show - Material Must Be Identified By Requirement)*

|  |              |                        |
|--|--------------|------------------------|
| LOCATION (Building)                                  | ROOM OR AREA | DATE                   |
| TYPE OF CONTAINER(S) (Cylinder, Gas Cylinder Number) |              | CONDITION OF CONTAINER |
| NUMBER OF CONTAINERS                                 |              | WEIGHT OR VOLUME       |
| PERSON TO CONTACT (Name)                             | ROOM NO.     | PHONE NO.              |

HAZARDS IN HANDLING AND DISPOSAL

|                               |       |       |       |
|-------------------------------|-------|-------|-------|
| SIGNED (Authorized Signature) | DEPT. | BLDG. | PHONE |
|-------------------------------|-------|-------|-------|

INFORMATION BELOW THIS LINE NOT TO BE FILLED IN BY ORIGINATOR

SUGGESTED ACTION FOR DISPOSAL

| PROTECTIVE EQUIPMENT REQUIRED | DISPOSAL AREAS  |
|-------------------------------|---|
|                               | <input type="checkbox"/> Y-12 BUR. GR. "A" STA. # _____ |
|                               | <input type="checkbox"/> Y-12 BUR. GR. "B" STA. # _____ |
|                               | <input type="checkbox"/> Y-12 BUR. GR. "C" STA. # _____ |
|                               | <input type="checkbox"/> ISOLATION AREA                 |
|                               | <input type="checkbox"/> Y-12 WALK IN PIT               |
|                               | <input type="checkbox"/> ACID POND                      |
|                               | <input type="checkbox"/> KERR HOLLOW QUARRY             |
|                               | <input type="checkbox"/> BETHEL VALLEY QUARRY           |
|                               | <input type="checkbox"/> ORNL BURIAL GROUND             |
|                               | <input type="checkbox"/> OTHER _____                    |
| TECHNICAL CONTACTS            | Plant Disposal Coordinator                              |
| PERSON CONTACTED              | DATE  |
|                               | DATE  |

DISPOSAL COMPLETED: DATE \_\_\_\_\_ 19 \_\_\_\_\_

BY: \_\_\_\_\_ DEPARTMENT \_\_\_\_\_

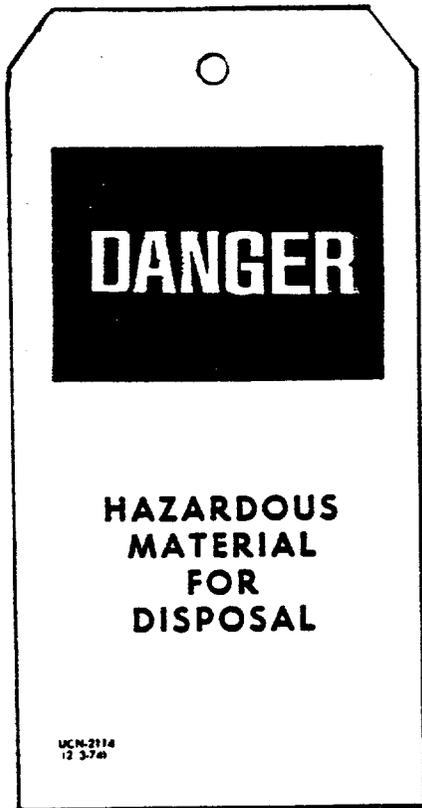
DISTRIBUTION: White Copy to Radiation Safety Department  
 Blue and Yellow Copies to Plant Disposal Coordinator  
 Green Copy retained by Originator

NSR-2100  
 (2-6-76)

|        |        |
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APPENDIX 7.2



(Front)

**IDENTIFICATION TAG**  
**HAZARDOUS MATERIAL DISPOSAL**

See Form 2109 Dated \_\_\_\_\_

~~\_\_\_\_\_~~  
To Be Completed By Requester

Blanket No. \_\_\_\_\_

Type of Material \_\_\_\_\_

Type of Container \_\_\_\_\_

Condition of Container \_\_\_\_\_  
(GOOD, FAIR, POOR)

Size, Weight, or Volume \_\_\_\_\_

Location of Material \_\_\_\_\_

Date \_\_\_\_\_ Dept. \_\_\_\_\_

SIGNATURE \_\_\_\_\_

~~\_\_\_\_\_~~  
To be Completed by Plant Disposal Coordinator

Checked by \_\_\_\_\_ Date \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(Back)

|        |        |
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APPENDIX 7.4

**AUTHORIZATION FOR STORAGE OF RADIOACTIVE-CONTAMINATED SOLID WASTE**

**REQUIRED: EXECUTE THIS SECTION BEFORE ARRANGING MATERIAL TRANSFER**

|   |  |
|---|--|
| ORIGIN (CELL ID SECTION OF BLDG) DESCRIPTION OF CONTAINER(S)                                      | TRANSURANIC CONTAMINATED WASTE                                     |
| NO. OF CONTAINERS VOLUME OF WASTE   | SPECIFIC RADIOACTIVITY 10 <sup>4</sup> Ci/g YES NO                 |
| TOTAL CU FT % DURNABLE  | ISOTOPE(S) PRESENT AND ISOTOPE QUANTITIES                          |
| TYPE OF WASTE <input type="checkbox"/> GENERAL RAD WASTE <input type="checkbox"/> FISSILE U-235   | <input type="checkbox"/> Pu-239 _____ gms                          |
| <input type="checkbox"/> TRANSURANIC OR U-238 <input type="checkbox"/> OTHER (EXPLAIN IN REMARKS) | <input type="checkbox"/> U-235 _____ gms                           |
| TOTAL RADIOACTIVITY CURIES  | <input type="checkbox"/> OTHER (If Significant, Detail in Remarks) |
| BASED ON ABOVE CONTENT AND/OR HANDLING PROCEDURES   |  |
|   | <b>FISSILE WASTE</b>   |
|   | <input type="checkbox"/> U-235 _____ gms of Enrichment _____ %     |
|   | <input type="checkbox"/> OTHER (Detail in Remarks)                 |
| REQUESTER'S SIGNATURE   | ACCOUNTABILITY NO.   |
| DATE  |  |
| DIVISION  |  |
| ACCOUNT NO.   |  |

**MAIL FORM OR TELEPHONE STORAGE AREA FOREMAN FOR CONCURRENCE PRIOR TO MATERIAL TRANSFER (EXTENSION 2435)**

**HEALTH PHYSICS: TO BE COMPLETED AT POINT OF ORIGIN OF SOLID WASTE AND BEFORE TRANSFER OF MATERIAL**

**RADIATION LEVEL**

|                          |          |         |       |              |       |                                 |
|--------------------------|----------|---------|-------|--------------|-------|---------------------------------|
| NETA SCANS               | SMELGERS | COMPTON | SCANS | SCINTILLATED | SCANS | SCANS                           |
| OUTSIDE REUSABLE CARRIER |          |         |       |              |       | OUTSIDE OF DISPOSABLE CONTAINER |

|   |                                 |   |
|---|---------------------------------|---|
| NEUTRON SCANS   | ALPHA SCANS                     | SPECIAL PROTECTIVE EQUIPMENT (For Storage or Manip) |
| SURFACE CONTAMINATION   | ALPHA SCANS                     | <input type="checkbox"/> COVERALLS, TAPED           |
| N.P. TO ACCOMPANY WASTE   | N.P. TO BE PRESENT              | <input type="checkbox"/> COVERALLS, 2 PAIR          |
| RESERVED REGARDING SAFETY IN HANDLING AND/OR STORAGE AND DISPOSAL | RESPIRATORY PROTECTION REQUIRED | <input type="checkbox"/> HEAD COVER                 |
|   |                                 | <input type="checkbox"/> ASBESTOS MASK              |
|   |                                 | <input type="checkbox"/> CHEMICAL MASK              |
|   |                                 | <input type="checkbox"/> OTHER (DETAIL IN REMARKS)  |

**HEALTH PHYSICS APPROVAL FOR MATERIAL TRANSFER**

SIGNATURE \_\_\_\_\_ BAGGAGE NO. \_\_\_\_\_ PHONE NO. \_\_\_\_\_ DATE \_\_\_\_\_

**STORAGE AREA FOREMAN: COMPLETES AND SENDS COPY TO ORIGINATOR AFTER HANDLING WASTE**

RECORD INFORMATION YES AND YES/D

YES  NO (IF NO, EXPLAIN)

|  |                   |              |                |
|--|-------------------|--------------|----------------|
| WASTE: <input type="checkbox"/> STORED <input type="checkbox"/> BURNED | IN CODE NO.       |              |                |
| TRUCK TYPE AND NO.   | CELL TYPE AND NO. | FFG          | FFY            |
| BUILDING NO.   | COMPARTMENT       | LEVEL        | DEPT. D.       |
| OTHER (EXPLAIN)  |                   |              |                |
| VOLUME (CU. FT.)   |                   |              |                |
| TOTAL  | DURNABLE          | NON-DURNABLE | CONTAINER TYPE |
|  |                   |              |                |

**SUPERVISOR'S RECEIPT OF MATERIALS**

SIGNATURE \_\_\_\_\_ DATE STORED \_\_\_\_\_

U-2352 U-2382

DISTRIBUTION: WHITE - STORAGE AREA FOREMAN RETAINS  
 BLUE - COMPLETED AND RETURNED TO ORIGINATOR  
 CANARY - RETAINED BY ORIGINATOR

|        |        |
|--------|--------|
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**Distribution****Energy Research and Development  
Administration - Oak Ridge**

Hickman, H. D. (10)

**Oak Ridge Gaseous Diffusion Plant**

Stief, S. S.  
Wilcox, W. J., Jr

**Oak Ridge National Laboratory**

King, E. M.

**Oak Ridge Y-12 Plant**

Burditt, R. B.  
Butturini, W. G.  
Cuddy, L. M.  
Davis, R. L.  
Duggan, H. G.  
Ebert, J. W.  
Fraser, R. J.  
Gritzner, V. B.  
Hensley, C. E.  
Johnson, C. E.  
Jordan, R. G.  
Kahl, K. G.  
Keith, A.  
Kite, H. T.  
Martin, W. R./Googin, J. M.  
Mason, D. L.  
Mills, J. M., Jr/ERDA-TIC (3)  
Parsons, J. A.  
Phillips, L. R.  
Sanders, Merwyn (50)  
Smith, H. F., Jr  
Snyder, H. G. P.  
White, J. C.  
Whitson, W. K.  
Y-12 Central Files (master copy)  
Y-12 Central Files (route copy)  
Y-12 Central Files (Y-12RC)  
Y-12 Central Files (5)  
Zerby, C. D.

**Paducah Gaseous Diffusion Plant**

Baker, R. C.