Y-12

**OAK RIDGE
Y-12
PLANT**

MARTIN MARIETTA

**Y-12 PLANT
DECONTAMINATION AND DECOMMISSIONING
PROGRAM**

**SURVEILLANCE AND MAINTENANCE PLAN
FY 1992 - 2000**

**Y-12
Decontamination and Decommissioning
Program**

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**Prepared by the
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for the

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

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SUMMARY

The Decontamination and Decommissioning (D&D) Program at the Oak Ridge Y-12 Plant is part of the Environmental Restoration (ER) and Waste Management (WM) Programs (ERWM). The objective of the ER Program is to provide Y-12 the capability to meet applicable environmental regulations through facility development activities and site remedial actions. The WM Program supports the ER program. The D&D Program provides collective management of sites within the Plant which are in need of decontamination and decommissioning efforts, prioritizes those areas in terms of health, safety, and environmental concerns, and implements the appropriate level of remedial action. The D&D Program provides support to identifiable facilities which formerly served one or more of the many Plant functions. Program activities include (1) surveillance and maintenance of facilities awaiting decommissioning; (2) planning safe and orderly facility decommissioning; and (3) implementing a program to accomplish facility disposition in a safe, cost effective, and timely manner. In order to achieve the first objective, a formal plan which documents the surveillance and maintenance needs for each facility has been prepared. This report provides this documentation for the Y-12 facilities currently included in the D&D Program, as well as those planned for future inclusion in the Program, and includes projected resource requirements for the planning period of FY 1993 through FY 2000.

**THE Y-12 PLANT
DECONTAMINATION AND DECOMMISSIONING (D&D) PROGRAM
SURVEILLANCE AND MAINTENANCE (S&M) PLAN**

1. INTRODUCTION

The D&D Program at the Oak Ridge Y-12 Plant is part of the Environmental and Waste Management Program (ERWM). This work is funded through the Office of Environmental Restoration and Waste Management (EW-20) and Weapons Operation (GB-91). Its objective is to provide Y-12 the capability to meet applicable environmental regulations through facility decommissioning activities and site decontamination actions. In support of this objective, the D&D Program provides collective management of sites within Y-12 which are in need of action; prioritizes those areas in terms of health, safety, and environmental concerns; and implements the appropriate level of remedial action. The Program provides support to identifiable facilities which formerly served one or more of the many Y-12 functions. Program activities include (1) surveillance and maintenance of facilities awaiting decommissioning; (2) planning safe and orderly facility decommissioning; and (3) implementing a program to accomplish facility disposition in a safe, cost effective, and timely manner. In order to achieve the first objective, a formal plan which documents the S&M needs for each facility must be prepared. This report provides this documentation for the facilities currently included in the D&D Program.

1.1 THE D&D PROGRAM

The D&D Program was organized during FY 1990 to encompass the needs of surplus contaminated facilities at Y-12. The need existed for a program which would include Weapons Program facilities and those which were utilized by several programs within Y-12. The D&D Program was organized to complement other Y-12 Remedial Action programs to meet the needs of the many facilities which eventually will fall into these categories. Identification of these has only begun. A quick survey has been made revealing over twenty (20) buildings in Y-12 which will eventually fall into the category of D&D need.

Many other facilities are portions of larger facilities or buildings and therefore have at least some degree of surveillance already in place. In most cases, however, the effort cannot

adequately address the needs of continued safe surveillance and maintenance due to budget or manpower constraints. In addition, some areas are stand-alone structures which are largely neglected and already in a deteriorating condition, potentially threatening the safety of personnel and the environment. The list should also include a few sites which are still in operation but will become surplus in the near future, mainly by phaseout. The intent is to encompass these areas within the Y-12 D&D Program and remain open to yet other facilities which may fall into these categories in the future. Table 1 provides a functional listing of the facilities presently included in the D&D Program as well as those planned for inclusion in the near-term.

The S&M Plan is the first of two major documents which will guide the Program in the near term. Its purpose is to describe the activities involved in securing safe, protective storage until final facility disposition is initiated. The second document will be a long-range plan which will provide an indepth overview of the entire program including plans for facility management up to and including final decommissioning.

1.2 S&M PROGRAM OBJECTIVES

The objectives of the Y-12 S&M Program are:

1. to ensure adequate containment of residual radioactive and hazardous materials remaining in the facilities,
2. to provide safety and security controls to minimize the potential hazards to on-site personnel and the general public, and
3. to manage the facilities in the most cost effective manner.

Successfully meeting these objectives requires unified effort of the D&D Program staff, facility operating personnel, health and safety personnel, Y-12 security forces, and maintenance crafts. The program is also structured to be responsive to all applicable environmental regulations as well as Y-12 Plant standard operating practices and procedures.

1.3 SCOPE OF THE S&M PLAN

This S&M Plan will address S&M requirements, appropriate for each facility in the program, until decommissioning and decontamination is completed. The plan will provide: (1) an outline of the program structure including functional and reporting responsibilities;

TABLE 1. FUNCTIONAL LISTING OF SURPLUS CONTAMINATED FACILITIES

Mercury Contaminated Facilities

Building 9201-4 *
Building 9201-2 **

Research Facilities

Building 9202 **
Building 9731 **

* Accepted into the D&D Program

** Planned for inclusion in the D&D Program

(2) requirements of general, radiological, safety, and security inspections; (3) requirements of facility maintenance including programmed and special maintenance activities; (4) documentation of program activities; (5) project summaries describing facility characteristics pertinent to S&M and estimates of annual resource commitments to carry out S&M; and (6) an integrated S&M strategy which will summarize the resource requirements within the functional framework of the program. The latter section will be used as a budget planning base for near-term (<10 years) program funding requirements.

In order for the S&M plan to remain current and effective, it will be reviewed annually and updated as required. The revised plan will serve as a reference document providing DOE and management personnel with program philosophy and direction.

2. PROGRAM DESCRIPTION

2.1 STRUCTURE AND RESPONSIBILITIES

The Y-12 D&D Program is administered by the Program Management division, with programmatic direction from Central D&D Office under the Office of Environmental Restoration and Waste Management. Figure 1 provides an organizational structure of the Y-12 D&D Program.

S&M is one of three primary functions in the implementation of D&D remedial action. The other functions include management of current remedial action projects and near-term and long-range planning.

S&M functions are carried out by a multidisciplinary team from many different operational, support, and research divisions. Primary responsibility for conducting S&M, however, lies with the division under whose control the facility formerly operated, or in some cases, the division responsible for D&D. The multidisciplinary team will evaluate each facility that falls into the category of D&D, and will recommend assignment of S&M responsibility based upon their evaluation of the facility contaminated materials involved. The determination for S&M responsibility will be made to assure all safety requirements are met. Financial support for these activities flows through the Program Management division, which, therefore, has the ultimate responsibility for ensuring that the objectives of the program are being met. Facilities that are presently funded by the D&D Program or are planned for near-term inclusion are listed in Table 2, with responsibility for day-to-day activities delegated to the respective divisions. This responsibility may be further delegated within a division to a single identifiable facility supervisor which will serve as the program contact for daily activities. Project reporting will flow through the section offices as indicated or as established by

TABLE 2. D&D SURVEILLANCE AND MAINTENANCE RESPONSIBILITIES

<u>Category/facility</u>	<u>Responsible Division</u>
Mercury Contaminated/Building 9201-4	Waste Management Division
Mercury Contaminated/Building 9201-2	Fusion Energy at ORNL
Research/Building 9202	Development Division
Research/ Building 9731	Development Division

agreement with respective divisions.

The facility supervisors are charged with the responsibility of providing adequate surveillance and maintenance of their respective facilities to assure compliance with program objectives. They also have the responsibility for notifying the program office of any significant occurrence at the facilities under their control which may impact the health and safety of working personnel or the general public, or adversely affect the environment. Surveillance requirements have been established for each facility based on the operational history, the current facility conditions, and the occupancy of the building or area. These requirements were judged to adequately address facility requirements based on information obtained from scoping surveys conducted by the Health Safety Environmental and Accountability (HSEA) Division and after consultation with facility personnel. Some facilities require continuous monitoring of ventilation streams and process liquid discharges, while others may need only periodic surveillance of exterior surfaces to assess the adequacy of the containment. Maintenance requirements for D&D facilities include both routine repairs or equipment replacements as well as major repairs of structurally deteriorating systems. Requests for maintenance manpower and resources are initiated by the respective facility supervisor.

In support of the D&D S&M activities, the following divisions have direct responsibility for facility control:

1. Waste Management
2. Development
3. Fusion Energy Division of ORNL

In addition, other divisions/departments have active participation in the program by their direct or indirect support:

1. Plant Laboratory
2. Equipment Testing and Inspection
3. Engineering
4. Quality
5. Health, Safety, Environment, & Accountability
6. Maintenance and Utilities

This support is provided either at the request of the facility supervisor or is conducted independently as part of the overall Y-12 D&D S&M program. For those activities conducted specifically for the D&D, direct funding is provided through the program office. Those activities provided as part of normal Y-12 operation are funded through overhead, and do not require D&D funds.

2.2 S&M REQUIREMENTS

Brief outlines of the S&M requirements for the surplus contaminated facilities are presented in the following report sections. These discussions include (1) surveillance requirements, (2) maintenance requirements, and (3) documentation. Details of the S&M activities conducted at each facility to fulfill these requirements are provided in Section 3.

2.2.1 Surveillance Requirements

Routine surveillance is provided at D&D facilities in order to assure that each site remains in a radiologically safe condition and hazardous materials are safely contained. Inspections are conducted to survey radiological conditions, monitor the operability of any equipment required to maintain safe conditions, check safety-related items, provide site security controls, and inspect structural integrity. Requirements have been established for these activities in four general areas: (1) Facility Surveillance, (2) Radiological Surveillance, (3) Safety Inspections, and (4) Security and Protection. Discussion of these requirements is as follows.

2.2.1.1 Facility Surveillance

Periodic inspections of each facility under the D&D Program must be conducted. The frequency of inspection is determined by the type of facility, the level of containment provided for hazardous or radioactive materials, and the potential for personnel access to the site. The minimum frequency of inspection is annual; however, facilities which have active containment, process, or monitoring systems must be inspected on a more frequent basis (daily, weekly, or monthly).

Facility surveillance is normally carried out by the facility supervisor or his designated appointee as part of a routine inspection of other operating areas. Surveillance items include:

1. Visual inspection of the facility or equipment for structural or system failures, material degradation, liquid leaks, radiation monitor indications, burning odors, equipment irregularities, etc.;
2. Routine checks on containment ventilation systems, including pressure drop readings, indicators of building or cell negative pressures, operability of auxiliary containment systems, etc.;
3. Observation of liquid levels in sump areas, storage tanks, canals, and storage pools;
4. Process equipment operability checks, including air

compressors, water pumps, sump pumps, etc.; and

5. Other facility-specific needs, such as argon manifold checks, steam system checks, manipulator inspections, and other mechanical systems vital to maintaining safe protective storage.

In addition to these operator surveillance activities, routine inspections of the radiation detection instrumentation, building exterior and roof conditions, overhead cranes, and testing of HEPA filtration systems are provided through the Plant-wide surveillance program as it applies to individual facilities. Y-12 quality assurance requirements are met through these on-site inspections and routine QA audits.

2.2.1.2 Radiological Surveillance

The requirements for radiological surveillance are broken down in two categories: (1) radiation/contamination surveys, and (2) radioactive waste stream and environmental monitoring. Radiation surveys are conducted regularly by Health Physics technicians, on a schedule dictated by the type and levels of contamination, and the facility design or layout. Waste stream or environmental monitoring of areas or individual facilities is provided as part of the Y-12 Waste Management operations and environmental management. Environmental monitoring is accomplished through a comprehensive sampling and monitoring program directed at early detection and mitigation of releases which could otherwise have adverse effects on operating personnel, the general public, and the environment.

Radiation survey procedures have been established at Y-12 to provide adequate characterization and surveillance of radiation/contamination zones at the D&D facilities. These procedures include:

1. 50-66-HP-133, "Uranium Smear Program Procedure."
2. 50-66-HP-135, "Permanent (Fixed) Uranium Air Sampling Program Procedure."

This routine surveillance is provided by the Health Physics Department as part of their regular inspection of active and surplus facilities within each established survey area. Additional survey support is obtained by the facility supervisors as needed to meet special requirements.

In addition to these surveillance activities, periodic sampling and analysis of liquid effluents are conducted, primarily in the vicinity of abandoned low-level liquid waste (LLW) collection and/or storage tank inventories. Monthly dry-well samples are obtained to give an indication of potential radionuclide migration into groundwater around tanks.

2.2.1.3 Safety Inspections

Safety inspections will be conducted on a routine basis for all D&D facilities to identify existing and potential hazards to personnel and inspect facilities and safety related equipment for proper accessibility and operability. Inspections will be performed semi-annually in accordance with Plant practices and procedures. To maximize the efficiency and consistency of the process, the inspections should be carried out in conjunction with the routine safety inspections for the active facilities in the respective areas and by the same inspection team appointed for this task. Safety surveillance will focus on general inspection of building conditions to identify unsafe conditions, practices, fire hazards, etc. Action items that result from these inspections will be referred to facility supervisors for correction, and corrective action or maintenance performed as a result will become part of the S&M file for the facility. More frequent (weekly, monthly, or quarterly) inspections or testing of emergency equipment may be undertaken as deemed appropriate by the facility supervisor, fire protection, or safety staff personnel.

2.2.1.4 Security and Protection

As a restricted government installation, Y-12 is provided with comprehensive safeguards, security, and protection systems. These systems include exclusion fencing around the main Plant complex and around remote facilities, continuously manned guard posts, controlled access to sensitive and hazardous areas, fire alarm and protection systems, a fully equipped and continuously manned fire department, and routine (random) security patrols. Due to this complete and comprehensive network, little additional security or protective measures are required for D&D sites. Access to facilities where potential hazards exist is further restricted by facility operators who are required to minimize unnecessary personnel entry. Controlled access is usually accomplished by maintaining abandoned areas in a locked and secured condition, providing appropriate entry restrictions, and adequate posting of radiation and chemical hazards.

2.2.2 Maintenance Requirements

Maintenance of D&D facilities falls into two categories: (1) routine, or programmed maintenance, and (2) special maintenance required for major repairs of structures or equipment. Guidance for most maintenance requirements is provided in Maintenance and Utilities Division (M&UD) Procedure Manuals. The M&UD is responsible for conducting most program maintenance according to its own routine maintenance schedule or at the request of facility supervisors. Funding for much of the routine maintenance items (grounds care, exterior painting, and preventative equipment

maintenance) is provided through Y-12 overhead charges. Support for other maintenance, major repairs, or improvements directly related to the upkeep of the surplus facility must be provided by D&D.

2.2.2.1 Routine Maintenance

Preventative maintenance requirements and schedules are established by M&UD for each D&D facility based on the type of structures and equipment involved. Input from the facility supervisor and M&UD field engineer is used to identify critical equipment and systems and determine necessary maintenance frequencies. Routine maintenance activities include inspections, adjustments, lubrication, reconditioning, and other activities designed to preclude failures and prolong the service life of structures and equipment.

Corrective maintenance is provided for equipment failure, malfunction, or breakdown. Repair or replacement is conducted to rectify the immediate problem and provide for long-term operability. Users of facility equipment or personnel designated for facility surveillance are responsible for reporting operational failures or other concerns to the facility supervisor. The supervisor, in turn, submits an appropriate maintenance work request (MWR) to the responsible M&UD work control center (WCC) for corrective action.

Modification maintenance, such as minor facility alterations or improvements, may be required to reduce safety hazards or to provide increased levels of containment. As with the other forms of routine maintenance, this would be initiated by the facility supervisor by requesting the appropriate form of M&UD craft support. No specific review or approval is required from the D&D office.

2.2.2.2 Major Repairs

Periodically, major facility repairs or improvements may be required to correct a serious deficiency such as degradation of structures which could threaten containment, or to eliminate a significant safety concern. Such improvements could involve actions such as roof repair, removal of deteriorating equipment, decontamination of recurring problem areas, or construction of temporary barriers. The scope of this type of project can vary from routine construction jobs to more complex tasks requiring engineering designs, safety reviews, detailed work plans, and specialized construction forces. Since these projects can usually be anticipated and planned for, additional program requirements exist to provide management control over costs and schedules.

Requests for major repairs must be submitted to the D&D office for approval prior to beginning detailed plans. Task plans which

contain cost and schedule projections, must be developed by the facility supervisor at least six months before the anticipated project start date. These major repairs should be forecasted as early as possible to allow proper planning for budget allocations. Direction and control of the project will be the responsibility of the facility supervisor, with routine status reporting required.

2.2.3 Documentation

Documentation of all S&M activities supported by the D&D is provided by the division responsible for each task. Reporting may range from computer control cards submitted by field engineers or surveyors to detailed engineering design packages for major repairs. Facility supervisors are responsible for maintaining a file of all facility-related S&M activities which they initiate or control. Health physics records are archived by the HSEA Division, and M&UD program maintenance files are maintained on computer with routine distribution to appropriate facility operators or division management. Quality Department inspection reports are also computer filed, with summaries distributed to division offices. Remaining S&M participants maintain permanent records of their activities within the respective divisions.

The facility supervisor concept of managing S&M provides the most cost-effective approach to controlling abandoned sites. Responsibility for ensuring the necessary S&M activities are carried out rests with the facility supervisor. Reviews of activities will be conducted periodically and audits of S&M records will be performed to assure the D&D office that adequate S&M is being carried out and documented. Status reports will be provided monthly by the facility supervisors to the D&D office for input to the Central Staff D&D Program monthly report to the DOE. Annual reports summarizing the past year's S&M activity will also be compiled by the facility supervisor at the end of the fiscal year and forwarded to the program office. These reports will provide a concise summary of the past year's surveillance data, summary of significant maintenance carried out, and a log of calibrations of critical surveillance instrumentation. In addition, the annual reports should include a brief discussion of future needs at each site, with cost estimates for major repairs or upgrades. These reports can be appropriately combined for a group of facilities under the control of an individual supervisor. In conjunction with the annual reporting, an annual site review and program audit will be conducted and documented to assess the needs and performance of program participants.

3. PROJECT SUMMARIES

Summaries of S&M activities have been developed for each of the D&D sites which are included in the program as well as for the sites planned for near-term inclusion in the program. The summaries have been developed with information obtained from interviews with facility contacts, scoping surveys performed by the HSEA Division, and followup discussion with facility supervisors. In addition to S&M requirements, the summaries also include a brief overview of facility history and current conditions. Manpower estimates and associated costs have been included for each activity. Facility-related costs are integrated for the entire program in Sect. 5.

The S&M activity summaries contain information in the following categories:

1. Facility Name - The Y-12 designated facility title, which in most cases describes the facility or project associated with its former use.
2. Location - A building or site number as defined in the Y-12 Building Directory. Specific shops, laboratories, or other areas within a building are designated by room numbers or other descriptors which define the specific area of inclusion. For those facilities which are not designated by a specific Y-12 number, the area is described by directional reference to an adjacent numbered building.
3. Service Dates - The period of time over which the facility was considered operational. At some locations, the exact dates of operation are not precisely known and have been approximated. Sites may be included which are still in service but are expected to become surplus at some future date.
4. Facility Status - A listing of the current facility status in terms of operability, occupancy, and facility responsibility.
5. Facility Description - A brief discussion of the facility operating history, physical description, current conditions, radiological and chemical hazards, and occupancy. These descriptions are based on available historical information, recollections of knowledgeable personnel, and information obtained from scoping surveys.
6. Security/Protection systems - A description of the security and protection systems provided at each facility. Such items include fire alarms and sprinklers, exclusion fencing, access restriction, radiation/contamination zone posting, and other control measures. The systems described are in addition to the Y-12 Plant-wide security provided by the perimeter fencing, guard stations, and fire fighting equipment.

7. Surveillance Activities - An itemized listing of surveillance tasks conducted at each facility. Specific data are provided in terms of task titles, surveillance frequencies, Y-12 divisional responsibilities, documentation requirements, and estimated manpower or resource needs. The task listings are general in nature, with additional detail provided in the appropriate Y-12 operating manuals. Division responsibilities are consistent with those found in Sect. 2. Surveillance documentation exists in a variety of forms, including shift check sheets, memos-to-file, computer printout, and database storage. Where appropriate, specific Y-12 forms have been identified that are used in recording survey results; otherwise, the listing identifies the type of documentation used and the administrative unit responsible for maintaining the file. Manpower and financial resource requirements are recorded in man-hours per year (mh/y) for individual tasks and in dollar costs (FY 1991 dollars) for material needs. Items that do not require direct D&D funding have been highlighted.

8. Routine Maintenance - An itemized listing of routine maintenance activities for each facility, similar in scope and content to Item 7.

9. Anticipated Repairs/Improvements - A brief description of identified major repairs or other facility improvements scheduled for the planning period. These include the need for repairs, scope of the task (including an estimate of resource needs), and the proposed year of expenditure.

10. Cost and Schedule - A summary of surveillance costs, routine maintenance needs, and major repairs requirements. This summary totals the manpower and dollar costs on an annualized basis and provides a schedule of these costs by year of expenditure through the planning period. Cost estimates beyond FY 1991 are constant FY 1991 dollars.

S&M summaries are presented in Appendix A according to the purpose of their former use as indicated in Table 1. Facilities are treated as individual entities as indicated by their title even though they may reside within a single larger building, or served a common facility or program.

4. PROGRAM DEVELOPMENT

In order to maintain a responsive and viable program, a comprehensive reevaluation will be undertaken at least every five years. This effort will focus on assessing the status of the D&D facilities to ensure adequate control is being maintained and to provide input for establishing decommissioning priorities. In FY 1992, this activity will include indepth site evaluation to support

long-range planning of corrective actions and decommissioning feasibility studies. This will involve on-site inspections, radiation surveys, and safety assessments to provide an evaluation of the current S&M program and provide conceptual decontamination and decommissioning designs and cost estimates for each facility.

5. PROGRAM COSTS AND SCHEDULES

Based on information compiled for each facility, overall S&M program costs have been developed. The annual resource requirements are given in Table 3 for the planning period FY 1991 through FY 2000. Costs have been itemized by facility and grouped according to functional purpose.

Program management support is listed as a separate item. Cost estimates are given in year of expenditure through FY 1991, and in constant FY 1991 dollars for outyear projections.

The S&M program is structured to provide adequate control over facilities until they enter active decommissioning. In cases where decommissioning will be a multi-year effort requiring extensive characterization and planning, S&M support will be provided for the first few years until the decommissioning effort is established, at which time this function will be provided through the decommissioning project budget and reevaluation to establish an annual cost for continued S&M activities. A long-range plan for the D&D is scheduled to be developed in FY 1993 and will assess priorities for decommissioning and thus affect the schedule of S&M support as indicated in Table 3. As now presented, the table indicates S&M support continuing for an indefinite period. Following the long-range planning effort, this table will be revised to reflect the expected initiation of decommissioning efforts.

Special project funds are included in each of the planning years to provide adequate support for nonroutine facility maintenance or special needs. Identification of specific tasks which need this form of funding has been addressed in Section 2.2.2.2. Schedules for special projects will be determined each year as funding is allocated to address priority needs. Provision for capital equipment requirements has also been included in this category, primarily for upgrading surveillance instrumentation or improving containment features.

TABLE 3. SURVEILLANCE AND MAINTENANCE PROGRAM COSTS (\$Mil)

Category/ Facility	Site Operations Support	91	92	93	94	95	96	97	98	99
<hr/>										
Mercury										
Contaminated/										
9201-4	ER	.47	.49	.79	.79	.79	.79	.79	.79	-
9201-2	ER	-	-	.41	.66	.64	.62	.59	-	-
Research/										
9731	ER	-	-	.42	.67	.64	.62	.60	-	-
9202	ER	-	-	.42	.67	.64	.62	.60	-	-
SUBTOTAL		.47	.49	2.04	2.77	2.71	2.65	2.58	.79	
Program Mgmt			.10	.15	.20	.20	.25	.30	.30	
TOTAL EXPENSE		.47	.59	2.19	2.97	2.91	2.90	2.88	1.09	

APPENDIX A

PROJECT S&M ACTIVITY SUMMARIES

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FIGURE 2. MAP OF Y-12 ACTIVE AND PROPOSED D&D SITES	A1
A.1 Mercury Contaminated Facilities	
Building 9201-4	A2
Building 9201-2	A7
A.2 Research Facilities	
Building 9202	A9
Building 9731	A13

FIGURE 2. MAP OF Y-12 ACTIVE AND PROPOSED D&D SITES

BUILDING 9201-4

1. **FACILITY NAME:** Lithium Isotope Separation Production Facility
2. **LOCATION:** Building 9201-4, on First Street within the Protected Perimeter Area of the Y-12 Plant
3. **SERVICE DATES:** 1955-1962
4. **FACILITY STATUS:** The facility is inactive and is kept in an environmentally safe condition by the Waste Management Division (O. K. Clotfelter, Building Manager).
5. **FACILITY DESCRIPTION:** Figures 3 and 4 provide two views from the outside of the building.

- (a) Operating History - Building 9201-4 (Alpha-4) originally began operating as an uranium isotope separation facility in 1945 utilizing electromagnetic separation to enrich uranium. In 1947 the process shutdown but stayed in a stand-by mode until 1953. In 1953, installation of the lithium isotope separation process by the column exchange (Colex) method was begun, becoming operational in June, 1955. The Colex process used substantial quantities of mercury as a solvent to affect the separation of lithium 6 from natural lithium which was fed as lithium hydroxide. The process was shut down in December 1962 and was drained of mercury but not cleaned; thus, residual amounts of mercury and lithium hydroxide remained in the process equipment.
- (b) Physical Description - The facility consist of columns, electroplating trays, motor generator equipment, pumps, piping, and associated auxiliary equipment. The equipment is located throughout the building and immediate adjacent outside areas.
- (c) Current Condition - The equipment and associated piping are in good condition, with some apparent degradation having taken place over the years of inactivity.
- (d) Radiological and Chemical Hazards - The building and equipment are contaminated with mercury, mercury compounds, lithium, and lithium compounds. Less than ten percent of equipment and piping, sludges, and other residuals are expected to have a low level of detectable uranium and will fall into a low level waste (LLW) category.
- (e) Occupancy - The south center section of the building contains a 13.8 KVA electrical switchgear deemed

vital to the Y-12 Plant. There are infrequent visits of M&UD personnel to the switchgear. A minimal work force maintains the integrity of the building.

6. **SECURITY/PROTECTION SYSTEMS:** Building 9201-4 is within the Y-12 Bear Creek Valley complex. The complex has a perimeter fence, safeguard parameters in place, guard patrols around-the-clock, and manned guardposts. The building has a main entrance badgereader/rotogate to limit personnel entry. Fire protection is provided by the Plant Fire Protection Department, fire alarm boxes, and portions of the building are equipped with fire suppression water sprinkler systems.

7. **SURVEILLANCE ACTIVITIES:** See Table A. at the end of this section for details of surveillance activities.

8. **ROUTINE MAINTENANCE ACTIVITIES:** Routine maintenance activities are performed as necessary to keep equipment and utilities functional.

9. **ANTICIPATED REPAIRS/IMPROVEMENTS:** The facility is structurally sound and providing adequate containment. No major repairs or improvements are foreseen prior to decommissioning.

10. **COST AND SCHEDULE: (Annualized Costs)**

<u>Annual Manpower Requirements</u>	<u>Man-Years</u>	<u>Cost</u>
Surveillance Activities	5	\$416,000
Routine Maintenance	2.5	208,000
TOTAL	<u>7.5</u>	<u>\$624,000</u>

<u>Annualized Materials Requirements</u>	
Miscellaneous materials	100,000

<u>Anticipated Major Repairs/Improvements</u>	
None	
TOTAL	<u>7.5</u> <u>\$724,000</u>

Table A. Surveillance Activities for 9201-4

Activity	Frequency	Responsibility	Documentation	* mh/y
Routine Insp.	D/W/M/Q	Wst.Mgmt.	Fac. Supv. Records	260
(a) Vis	D			180
(b) H2O	D			2080
(c) Hg	D			1040
(d) Sweep	D			1040
(e) Clean	D			260
(f) Monitor	D			900
(g) Support	D			
Radiological Surveys		HSEA	HSEA Reports	
(a) S&M activities and rad. monitors				**
Safety Insp.	Q	Wst. Mgmt.	Fac. Supv. Records	
Fire Safety Insp.	Q	Wst. Mgmt.	Fac. Supv. Records	
Fire Equip & System Test	Annual	Fire Dept	FD Reports	**
HEPA Filter DOP Testing	As required			**
Routine Security Patrol	D	Security Dept.		**

* Manpower/Resource Requirements in Man Hours per Year (mh/y)

** Costs are included in Y-12 overhead charges. No direct D&D funding is required.

FIGURE 4. OUTSIDE VIEW OF BUILDING 9201-4

BUILDING 9201-2

1. **FACILITY NAME:** Fusion Energy Division (ORNL)
2. **LOCATION:** Building 9201-2, Basement only; located on Second Street Uncleared Area of the Y-12 Plant.
3. **SERVICE DATES:** 1952-1955
4. **FACILITY STATUS:** The basement area is inactive and is a restricted area.
5. **FACILITY DESCRIPTION:**
 - (a) Operating History - Building 9201-2 was used in 1950 and 1951 as a process development facility for the Elex proces, and subsequently used from 1952 through 1955 as a major Colex development facility. Several Coilex pilot plants were built and operated during this time period. Subsequently, this equipment was removed and the building was converted into office and laboratory space for use by the Thermonuclear Division or ORNL, now called the Fusion Energy Division.
 - (b) Physical Description - The basement area of 9201-2 consists of columns, pumps, pipes and miscellaneous equipment. This area has a dirt floor. Approximately 135,000 pounds of mercury is unaccounted for in the ground beneath the basement and a much smaller amount still remains in the building. A heavy layer of sulphur was added to the top of the dirt basement floor to contain any mercury vapor.
 - (c) Current Condition - The equipment and associated piping are in relatively good condition but some degradation has taken place over the years of inactivity.
 - (d) Radiological and Chemical Hazards - The basement area, when undisturbed, has airborne mercury concentration levels of less than 0.025 mg/m³. The OSHA/ACGIH level which cannot be exceeded is 0.05 for an 8 hour day and 0.1 at any one time. These levels could be exceeded if the ground is disturbed (See Review of Available Information for Mercury at Building 9201-2, Y/TS-626, for survey of mercury contamination in 9201-2).
 - (e) Occupancy - There are infrequent visits by Y-12 and Fusion Energy Division personnel to the basement area.

6. **SECURITY PROTECTION SYSTEMS:** Building 9201-2 is within the Y-12 Plant fenced perimeter. Fire protection is provided by the Plant Fire Protection Department, fire alarm boxes, and fire suppression water sprinkler systems.
7. **SURVEILLANCE ACTIVITIES:** No routine surveillance is done. Surveillance is accomplished when any work is done in the basement area.
8. **ROUTINE MAINTENANCE:** There is no routine maintenance done.
9. **ANTICIPATED REPAIRS/IMPROVEMENTS:** The sewer and drain lines are periodically worked on as well as some electrical work for the magnetic laboratory.

BUILDING 9202

1. **FACILITY NAME:** High Head Area of 9202
2. **LOCATION:** Building 9202 High Head (2nd, 3rd, 4th, 5th Floors), located on First Street within the Limited Access Area of Y-12.
3. **SERVICE DATES:** 1943 - 1974
4. **FACILITY STATUS:** Inactive since 1974; not presently in D&D Program.
5. **FACILITY DESCRIPTION:**
 - (a) Operating History - The High Head Area was constructed in 1943 and originally used as part of the original Manhattan Project. Since then, the High Head area has been used for various pilot plants for uranium processes until 1974.
 - (b) Physical Condition - See Figures 5 and 6 for a visual description of the area.
 - (c) Current Condition - The entire area is in a state of ill repair.
 - The roof has severe depressions around all roof penetrations for ducts and stacks. Flashing around duct penetrations is in very poor condition and needs to be replaced, along with pitch pockets. The duct support angles in the pitch pockets are corroded and need to be replaced or repaired. The field of the roof edge and edge flashing appears to be in poor to moderate shape.
 - The fifth floor wood framing has serious deterioration around the stack and duct penetrations, and limited deterioration was uncovered around the window framing, wall ducts, and at the northeast corner on the fifth floor. The wood roof trusses are in sound condition but show some sign of deflection. The base of the wood column at G7 has deteriorated in 1/3rd of its cross-section. This condition is probably due to a localized wall leak. Most of the wood windows are in poor condition and should be replaced or have the opening closed.
 - The fourth floor has large openings in the floor and permanent closures need to be designed to match the floor live load posting. Severe cracks have occurred to the connection of the concrete fifth floor beam to column E. There is no heat to this area and the windows

should be replaced or the opening closed. All of the existing piping on this floor contains asbestos and will need to be removed.

- The third floor is currently closed off due to asbestos contamination. Also, the windows need to be replaced or the opening closed. All the existing piping on this floor contains asbestos and needs to be removed.
- The second floor is in better shape than the preceding floors. The windows need to be replaced or the opening closed, the existing piping has asbestos contamination, and the floor has cracks.

(d) Radiological and Chemical Hazards - There are both chemical and radiological concerns associated with the High Head Area of 9202.

(e) Occupancy - There is currently no occupancy within the High Head Area due to various forms of contamination.

6. **SECURITY/PROTECTION SYSTEMS:** A "Q" Clearance is necessary to enter this area and currently the entire area is a Rad area.
7. **SURVEILLANCE ACTIVITIES:** Routine inspections and periodic health and safety monitoring are performed. Areas are maintained as controlled, limited access due to extent of contamination and condition of facility.
8. **ROUTINE MAINTENANCE:** Replace lights, board windows as necessary, patch roof.
9. **ANTICIPATED REPAIRS/IMPROVEMENT:** Engineering design on replacement of roof and an Engineering survey on the structural problems associated with the High Head of 9202 are needed. At this time, there seems to be no immediate repairs to be made in this area.

FIGURE 5. OUTSIDE VIEW OF BUILDING 9202

FIGURE 6. INSIDE VIEW OF BUILDING 9202

BUILDING 9731

1. **FACILITY NAME:** Chemistry and Chemical Engineering Department/
Development Division
2. **LOCATION:** Building 9731, located within the Limited Access area
of Y-12.
3. **SERVICE DATES:** 1943 - Present
4. **FACILITY STATUS:** Original processes have not been operational
for quite some time, but the building is currently being
occupied. The building is not currently included in the D&D
Program.
5. **FACILITY DESCRIPTION:**
 - (a) Operating History - This was the original building at Y-12;
it contained the pilot plant and housed the 2 calutrons for the
production of Enriched Uranium.
 - (b) Physical Description - Building is located in the Limited
Access Area of the Plant. Figure __ on Page _ is a schematic of
the interior of the building.
 - (c) Current Condition - The condition of the building ranges
from fair to poor.
 - (d) Radiological and Chemical Hazards - There is a potential for
enriched and depleted uranium contamination as well as PCB
contamination from piping.
 - (e) Occupancy - Building now houses the Photography Lab and TV
Studio personnel in the basement and the Classification Office
and Chemistry and Chemical Engineering Department on the first
floor.
6. **SECURITY/PROTECTION SYSTEMS:** Building is protected via the Plant
Security, Fire System, and Safety regulations and procedures.
7. **SURVEILLANCE ACTIVITIES:** Presently weekly inspections of the
building are conducted resulting in occasional cleanup
activities resulting from PCB leaks in building piping.
8. **ROUTINE MAINTENANCE:** Routine maintenance activities are
performed as necessary to keep equipment and utilities
functional.
9. **ANTICIPATED REPAIRS/IMPROVEMENTS:** None identified at the present
time.

END

**DATE
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9/2/93