REPORT OF SURVEY OF OAK RIDGE BUILDING 3597 HOT STORAGE GARDEN

U.S. Department of Energy
Office of Environmental Management
&
Office of Science

Report of Survey of Oak Ridge Building 3597 Hot Storage Garden

FINAL

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1. Introduction

1.1 Purpose

The purpose of this document is to report the results of a survey conducted at the Hot Storage Garden facility (identified as "Building" 3597) on the Y-12 Plant property at the Oak Ridge Site. The survey was conducted during the week of 11/15/99.

The primary purpose of the survey is to identify facility conditions and to define the characterization, stabilization, and material/waste/equipment removal (if any) requirements that need to be met to transfer responsibility for the facility from the Office of Science (SC) to the Office of Environmental Management (EM). Additionally, estimated post stabilization surveillance and maintenance (S&M) activities and costs are identified for transfer along with the facility. The second purpose is to provide EM with insight regarding the facility's risks and liabilities, which may influence the management of eventual downstream life-cycle activities.

The survey and this report are part of a process for implementing the requirements related to the disposition of excess facilities addressed in **DOE Order 430.1B Chg. 2, REAL PROPERTY & ASSET MANAGEMENT**, using the associated guidance for facility transition, deactivation, surveillance & maintenance, and decommissioning.

1.2 Facility Description

The Hot Storage Garden is a fenced-in, open air facility. It is a 12 m by 5 m concrete pad with two rows of pre-cast, reinforced concrete, cylindrical pipes that form 14 vertical storage wells with caps. A 5 m by 2.7 m by 3.7 m deep reinforced concrete canal of approximately 41,600 liters adjoins the pad. An enclosed sand filter and pump house with non-operating equipment used previously for water cleanup is still in place. Structural steel is in place with hoisting equipment.

The area was previously utilized to store radioactive components (including spent fuel rods) in below-grade wells and in the partially above-grade (about half), water filled canal. It is exposed to the weather. The stored materials were stated to have been removed in 1980 (This could not be verified).

The storage canal can be emptied via drains to Y-12 central water processing.

The boundaries of transfer are expected to include the 3597 facility (facility footprint plus six feet in each direction). Boundaries for utilities associated with the facility are expected to be the first source connection, exterior to the facility.

1.3 Organization Representatives

Contacts in transferring and receiving organizations are:

Oak Ridge SC	Stan Frey
Oak Ridge EM	John Michael Japp
Headquarters SC	Barry J. Sullivan
Headquarters EM	Andrew Szilagyi

1.4 Survey Participants

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2. Summary, Conclusions & Recommendations

2.1 Transfer Considerations

The conditions of the Hot Storage Garden area (3597) are such that very few stabilization actions are required to transfer ownership from SC to EM. The near term integrity of the facility does not pose a significant risk. Surveillance and maintenance resource requirements are low.

The sand filter, which is substantially radioactive (emitting dose readings up to approximately 2.5 feet beyond the facility boundary), is in a housing of questionable integrity. As it is outdoors, a breach would have radiological cleanup and disposal consequences. As a result, it should be removed and disposed of relatively soon. This can be done either before or after transfer to EM (see below), but should not be deferred indefinitely.

Although it is believed that there are no materials remaining in the storage wells, this either needs to be verified, or contingency for costs incurred by EM should be provided for discovery of such after transfer. The memorandum for transfer should include language which would assign budgetary responsibility to the Office of Science for an unexpected discovery of nuclear material (fuel) within the wells.

Experience at DOE sites has confirmed a continuously increasing S&M requirement and cost over time as facilities degrade; as such, the current S&M estimate is anticipated to increase over time.

2.2 EM Path Forward & Management Risk

In general, the Hot Storage Garden can be readily decontaminated and demolished. The effort and resources required for demotion is judged to be low.

The cost for maintaining the facility as-is is very low.

The water contained within the canal presents a potential for contamination mobilization and therefore, should be drained. Additionally, any sludge remaining in the canal after the water has been drained will require dispositioning. Should circumstances prevent sludge removal, some water should be left to prevent drying out and release as potential airborne contamination.

Although removable radioactive contamination is likely present throughout the facility, it is limited. The effort to mobilize for sand filter removal may, however, provide a synergistic value for proceeding with decontamination and/or demolition of the rest of the facility. Therefore, planning for sand filter removal should also consider the incremental effort to proceed with removal of all the canal pump system components and decontamination of the facility. Once decontamination has taken place, demolition can take place as an industrial facility.

It is recognized that this recommendation needs to be incorporated into the overall site priority list. The need to remove the sand filter, coupled with the relatively low cost of decontaminating and demolishing this facility, the fact that it is an non-enclosed area, and realization that eventually it will have to be removed, all provide a rationale for doing so in the near term.

3. Survey Results

Table 1 - Survey results

Subject of Survey	Summary – These are observations except as otherwise indicated to be statements or presumptions.
1. Facility Structure	The reinforced concrete appears to be in reasonable shape. However, the concrete block wall surrounding the sand filter and pump station is cracked, the steel cover on the canal is rusting as is the structure used for rigging equipment. The fence surrounding the facility is old, but functional for limiting unintentional access. The sooner these relatively straightforward structures and systems are removed or repaired the lower the susceptibility to degradation consequences. There are vines growing on the structure. Periodic surveillance should address vegetation intrusion.
2. Process Systems	The pumping system and sand filter for the canal are out of commission and degraded from exposure to the weather. The condition of the housing for the sand filter is questionable. The water contained within the canal presents a potential for contamination mobilization. Center sump – there is a sump in the center of the facility which is uncharacterized. It is presumed to be contaminated since it drained the slab which is roped off. This may become significant, but only during decommissioning.
3. Infrastructure and Support Systems	It must be presumed that the hoists are no longer certified and cannot be used - no issue. Could not determine if electricity is still connected.
4. Nuclear Safety & Materials	Well internals – Material was anecdotally stated to have been removed from the wells, but this has not been verified.

5. Hazardous Material	Virtually none. There are lead blankets on the sand filter for shielding.
6. Radioactive Contamination and Waste	Water – the canal is substantially filled with water, although below the overflow pipe. Presumably this water is from rain and snow. The water is contaminated, albeit stated to be at very low levels. The water was last sampled in 1990 when the canal was emptied. As stated above, the water contained within the canal presents a potential for contamination mobilization. The sand filter is contaminated to the point of radiation levels 50-60 mR/hr, indicating a substantial level of internal contamination. At these levels, radiation worker training will be required for workers performing S&M activities in proximity to the sand filter. Special shielding etc. is not required.
7. Environmental	Soil contamination under facility – the design of the wells is open bottomed. The drawings indicate the pool overflow to the process water system is vitrified clay pipe. There is local contamination within the facility and roped off areas at one end of the facility. It can be presumed that removal of the facility will require characterization and removal of some soil. Animals are nesting beneath the sand filter and pump slab.
8. Characterization Information	Last radiation/contamination survey is available. Highest smearable in 1999 annual survey was 2,000 dpm/100 cm^2 beta/gamma. Direct radiation in the vicinity of the sand filter is 50-60 mR/hr. At these levels, radiation worker training will be required for workers performing S&M activities in proximity to the sand filter. Special shielding etc. is not required. A full understanding of the degree of contamination requires a more systematic and thorough survey, including water sampling.
9. Surveillance and Maintenance	The only current activity is an annual radiation survey for direct dose rate and contamination. There has been no maintenance of the facility since the water was last drained from the canal in 1990.

4. Stabilization and Other Actions Required for Transfer

Characterization

- An up-to-date report of an appropriately graded Pre-Transfer Review is required to ensure that the facility's condition, contents, regulatory status and hazards have been identified and documented. This documented review establishes a baseline at the time of transfer, to provide EM with an adequate understanding of the facility, and includes an assessment and graded characterization of the facility. With agreement between SC and EM, this survey report may serve as documentation of an appropriately graded Pre-Transfer Review.
- Storage Well internals – Material (spent fuel) was anecdotally stated to have been removed from the wells, but this has not been verified. Documentation (including photographs) should be provided, or a joint, SC-EM field inspection of the open wells should be conducted prior to the transfer.[1]
- A full understanding of the degree of radioactive contamination requires a more systematic and thorough survey. Water sampling in addition to smear and penetrating radiation surveys should be performed.

Stabilization

- Canal Water – The water in the canal represents mobility for contamination and should be removed along with any sludge. Install a better integrity cover to aid in verifying that source and rate of accumulation is precipitation.
- Ensure sand filter container is not rusted through and better protect from weather until it can be removed.
- Ensure electrical isolation – This is to verify what is already believed to be the case.

5. Surveillance & Maintenance After Transfer

The following are the key surveillance and maintenance activities that should be undertaken to properly manage the facility. Part of the surveillance and maintenance program must include assessments for worker hazards and the appropriate actions taken to assure worker safety. An estimate of near-term annual cost is shown in Table 2.

Surveillance

Annually

- Radiation Surveys – annual and upon entry
- Water sample and analysis

Monthly

- Monthly Walkdown

  - Measure water level changes
  - Vegetation control
  - Animal control to prevent nesting beneath the contaminated equipment
  - Visual inspection to determine if physical degradation has significantly increased

Maintenance

- Periodic draining of canal if necessary – if water continues to accumulate, it should be periodically pumped to the process drains.
- Sand filter – The condition of the sand container is suspect. It is exposed to weather and if it should rust through, contamination will be spread. The sand filter should be removed as soon as EM assumes responsibility, if not before.
- Structure degradation – The metal structure, fence, concrete canal, unused monitoring station and well covers will continue to degrade over time. Eventually they will require some refurbishment to maintain isolation of contamination.

Table 2 - S&M Cost Estimate Worksheet for Activities After Transfer[1]

Surveillance & Maintenance Costs	Basis for Estimate	Annual Estimated Hours & Capital		Annual Estimated Cost	
		By NFDI	By Site	By NFDI	By Site
Nuclear Safety					
Occupational Safety Health					
Fire Protection					[2]
Radiation Protection	Annual radiological survey: multiple smears, dose rates near sand filter, etc.	16 hours		$1,600	
Emergency Management					
Control, Accountability, Security for SNM					
Training and Qualification					
Quality Assurance					
Engineering, Configuration Control					
Environmental & Waste Management	Occasional weed control requires LLW disposal of cut weeds, debris.	40 hours		$4,000	
Administration	Annual management of S&M, reporting, and disposition planning.	80 hours		$8,000	
Facility Structural S&M	Periodic structural inspection of canal.	20 hours		$2,000	$10,520
Facility Systems &					

Components Surveillance					
			Subtotal	$15,600	
Other Direct Costs associated with S&M.	Allow 20% of the S&M labor cost for consumables (HEPA filters, equipment repair parts, paint, absorbent, etc.).			$ 3,000	
Site Overheads					<>$4,261
Site Assessment Costs					
- Utilities					
- Security					
- Site Services					
			Subtotal		
			Overall Total		$15,000

[1] Budget estimate based on $100/hr labor rate - fully loaded
[2] Cost of Fire Protection and Security are included in ORNL overhead

6. Other Transfer Details

Table 3 is a generic list of other considerations for transfer to EM.

Table 3 - Staff Considerations and Information Required for Transfer

Subject	Pre-Transfer Requirement/\Survey Report Statement
Staffing	Staffing considerations are not applicable to Building 3597.
Authorization Basis/Safety Regime	Provide a list of facility-specific Authorization Basis or other Safety Documents, if any, that govern the operation of the facility.
Nuclear & Fissionable Materials Inventory	Not applicable assuming the storage wells do not contain fuel.
Prior Commitments	Provide a list and description, or supporting documents, of *facility specific* commitments, *if any*, for which EM will be responsible after transfer.
Agreements - Permits, Licenses, Purchase Orders, Contracts, etc.	Provide a list and description, or supporting documents, of *facility specific* permits, licenses, purchase orders, contracts, and other agreements, *if any*, for which EM will be responsible after transfer.
Assets and Property Management	Provide a list of government owned capital assets, *if any*, (as defined in 41 CFR 109, Department of Energy Property Management Regulations) for which custody will be transferred to EM along with the facility.

7. Attachments and References

1. Layout sketches and drawings
2. Photographs
3. Annual Radiological Survey Results
4. Response to Questionnaire

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[1] Discussion with Barry Sullivan indicates and Office of Science preference for the establishment of a contingency (specified in the MOA) for the unanticipated presence of spent fuel in the cells.