
INITIAL SITE RESPONSE PLAN

**OAK RIDGE SITE
(OAK RIDGE NATIONAL LABORATORY,
K-25 PLANT, AND Y-12 PLANT)**



**OAK RIDGE OPERATIONS
SITE MANAGEMENT RESPONSE PLAN
FOR THE
CHEMICAL SAFETY VULNERABILITY FIELD ASSESSMENT**

Introduction

Based on direction from the Secretary of Energy, the Assistant Secretary for Environment, Safety and Health established the Chemical Safety Vulnerability Working Group to review and identify chemical safety vulnerabilities within the Department of Energy (DOE). The Chemical Safety Vulnerability Working Group sponsored a series of field assessments at nine DOE sites. A field assessment was conducted at Oak Ridge Operations for Y-12, K-25, and Oak Ridge National Lab in April 1994. The facilities visited at K-25 site included the K-1070-A Burial Ground, the K-25 Process Building (lithium storage vaults), the Pond Waste Management Project, Building K-725, and the K-1066 Storage Yards. The facilities visited at Y-12 site included Building 1405, Building 9201-4 (Alpha-4), Building 9201-5 (Alpha-5), Building 9202, and the 9720-5 Warehouse. The facilities visited at ORNL included Building 3047, Building 3506 (Waste Evaporator), 7658 Contractor Landfill, and Building 7821 (Emergency Waste Basin). The Chemical Safety Vulnerability review at Oak Ridge was designed and undertaken to identify and characterize adverse conditions and circumstances involving potentially hazardous chemicals at specific facilities. Specifically, the review was designed to identify, characterize, and prioritize facility-specific and generic chemical safety vulnerabilities that might result in (1) fires or explosions from uncontrolled chemical reactions, (2) exposure of workers or the public to hazardous chemicals, or (3) release of hazardous chemicals to the environment. Special attention was given to those facilities being transferred to, awaiting, or undergoing decontamination and decommissioning (D&D). This included laboratories, process facilities, landfills, hazardous materials storage areas, and storage facilities. The review identified five vulnerabilities.

This site-specific Management Response Plan addresses the vulnerabilities identified in the Draft Field Verification Report for the Oak Ridge Reservation, dated April 26, 1994. Near-term and short-term actions are noted, but broader issues require more comprehensive responses that will be addressed in the Implementation Plan to the DOE Chemical Safety Vulnerability Management Response Plan.

Response Summary

Two of the vulnerabilities addressed the storage of chemicals. One identified that chemicals are stored in facilities not designed for the purpose of chemical storage. The facilities selected for storage of chemicals are appropriately modified and maintained, as needed, to provide safe storage. Buildings which have been selected for chemical storage are adequate for this purpose and have required a minimum of new construction, avoiding unnecessary delays and escalated costs (e.g., the K-25 lithium hydroxide storage area has been modified to meet chemical storage area requirements). The other vulnerability identified large quantities of specialty and other industrial chemicals stored without consistent strategic planning. Currently, mercury is being collected and sold. Some quantities of lithium hydroxide have been sold in the past, and increased amounts are planned to be sold over the next several years.

Another vulnerability addressed the possibility that uncharacterized areas could contain potentially hazardous materials that are increasingly accessible to employees and the public. At Oak Ridge, access to facilities and the sites is primarily based on the hazards and security requirements of the facilities/sites. All areas are controlled to some degree, ranging from strict personnel access control to the posting of signs. Also, there are ongoing efforts to characterize facilities and the sites in the Oak Ridge Reservation. This is in support of activities required for routine surveillance

and maintenance, environmental monitoring, facility maintenance, D&D, hazard assessments, and safety analyses. Changes to perimeter boundaries and fences have been limited to lowering or eliminating security clearance requirements for entry. These areas still require personnel entering the area to be escorted unless they meet site-specific training requirements. These areas are not open to general access by the public. These areas have been evaluated for unusual risks. All persons entering these areas are informed of the hazards or escorted by knowledgeable persons. Hazard screening took full advantage of personnel who had process or operating history in order to provide adequate hazard evaluation. Safety and health programs are in place to ensure appropriate measures are taken to protect employees and the public.

Another vulnerability addressed the issue of facilities being placed in caretaker status without appropriate cleanup or documentation. Years ago, the buildings cited in this vulnerability were placed in caretaker status without appropriate cleanup or documentation. Currently, there are programs to prevent additional facilities being placed in caretaker status without appropriate cleanup or documentation (e.g., Surplus Facilities Deactivation program). Each site on the Oak Ridge Reservation has programs to cover the D&D process. Also, Energy Systems policies and procedures require proper safety analysis documentation on facilities before becoming storage areas for hazardous materials. Analyses include compatibility with the building and its contents. Additionally, computerized chemical tracking systems are in place for procurement, inventory, and physical location.

The remaining vulnerability addressed the inconsistent rigor and formality that apply to managing hazardous materials. The wide variety of type, form, and quantity of hazardous materials in use and in storage hinders the application of generic requirements for their handling and storage. Additionally, differences in appropriate hazardous materials storage conditions can occur due to differences in the authorizing permits for the specific facilities. General requirements for safe handling and storage of chemicals are provided, but specific application is the responsibility of the qualified, immediate supervision with guidance from support organizations, including hazardous waste operations, industrial hygiene, and industrial safety. There are consistent policies, procedures, and management practices designed to uniformly track and control hazardous materials. Also, the DOE UF₆ cylinders are currently managed in one program to ensure uniform management.

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

Site/Facility: Oak Ridge

Vulnerability Number: CSVR-OR-ORR-01

Vulnerability:

- Uncharacterized areas containing potentially hazardous materials are increasingly accessible.

Summary of Vulnerability:

- Security areas at the Oak Ridge sites are shrinking as programs are cut back. The costs of maintaining such areas are high, and the Department's increased openness promotes reduction in controlled areas, consistent with missions. Other access control measures, both administrative and physical, will diminish over time. At Oak Ridge, all facilities and operations have been subjected to at least a preliminary hazard screening. However, excess and abandoned facilities/sites may not have been fully evaluated and characterized, and some will become available for access by workers and the public. Those individuals will not be knowledgeable of the history of the facility/site, nor will they be aware of the real or potential hazards that may be present.

Response:

- Access to facilities/sites is primarily based on the hazards and security requirements of the facilities/sites. As a general rule, all areas are to some degree controlled, ranging from strict personnel access control to the posting of signs.

The K-25 Site is currently undergoing a residue characterization assessment to complete the Tennessee Oversight Agreement commitment B.6(2). A K-25 working group is performing these assessments by questioning facility managers or responsible persons concerning the management procedures or plans addressing potentially hazardous residues still present. Part of this interview process specifically addresses the historical uses, contamination, and residues present at facilities onsite that are used for "new missions."

Each building at the K-25 Site has an individual assigned as the building operator. This individual is responsible for knowing the hazards of the building. The shutdown process buildings in the site's D&D program are subjected to routine surveillance and maintenance by a dedicated organization that evaluates the condition of the buildings' physical structures as well as potential hazardous conditions or environmental concerns created from chemicals or degradation products.

Perimeter boundaries and fences have not changed at the K-25 Site. Some areas, which were previously restricted due to security concerns, have been opened to uncleared employees. These areas have been evaluated for unusual risks. All persons entering these areas are informed of the hazards or escorted by knowledgeable persons. Hazard screening took full advantage of personnel who had process or operating history in order to provide adequate hazard evaluation.

Building 9201-4 is the only facility at Y-12 which is presently undergoing remediation. Associated activities have extensive planning efforts in place to control the soil, decontamination waste, debris, and other "disturbed" materials during D&D. Also, extensive analysis of the protective and/or mitigative features for personnel and public safety have been performed. There are no activities at the facility except for the actual D&D work (i.e., there are no operations ongoing). The Chemical Safety Vulnerability Assessment Team was very complimentary of the conduct of the activities. Further, the facility is located within a guarded, alarmed fence, far from public access. Physical and administrative barriers are in place, e.g., the rotogate and badge reader to prevent "causal" entrance to the facility. Workers are required to attend HAZWOPER training prior to working in the building. Those who enter the building and are not trained must be escorted. Also, all DOE and Energy Systems employees and visitors onsite for 10 or more days are required to take General Employee Training (GET) prior to site access.

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-01

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none">In the past, hazardous materials have escaped from buildings and have contaminated the soil around and beneath some buildings, e.g., the 9201-4 Production Building at Y-12.	<p><u>Y-12</u>: Hazardous materials have escaped from buildings and have contaminated the soil around and beneath 9201-4 Production Building at Y-12. The D&D sites at the Y-12 plant are currently HAZWOPER sites. Physical access to these sites is controlled in accordance with the provisions of the applicable sections of the CFRs defining these requirements.</p> <p>Areas where hazardous materials have escaped from buildings and have contaminated the soil are not accessible to the public or generally accessible to employees. When soil is to be excavated, a determination is made regarding its appropriate, safe management.</p>	S.H.Howell

CHEMICAL SAFETY VULNERABILITY REVIEW

September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSVR-OR-ORR-01

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none"> ● Past operational practices involving the disposal of chemicals into building drains may have leaked hazardous materials to the soil, which has not been characterized for contaminants. ● Access on unlocked, unguarded roads in the vicinity of landfills and work areas is no longer rigorously controlled. 	<p><u>K-25</u>: Areas where hazardous materials have escaped from buildings and have contaminated the soil are not generally accessible to employees or the public. When soil is to be excavated, a determination is made regarding its appropriate, safe management.</p>	R.S.Eby
	<p><u>K-25</u>: Although some landfills and burial grounds have been declassified, access by the general public is denied. Workers who enter these areas are trained in the hazards of working with unknown chemicals.</p>	R.S.Eby
	<p><u>ORNL</u>: The inactive Contractor Landfill is located well within the ORNL posted site boundary. Access control to the ORNL site was increased in 1992 by adding guard control of traffic except for certain hours. The access road into the 7658 area has a locked gate and is posted.</p>	Larry Hawk

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

Site/Facility: Oak Ridge

Vulnerability Number: CSVR-OR-ORR-02

Vulnerability:

- Chemicals are stored in facilities not designed for that purpose.

Summary of Vulnerability:

- Funding requested for some dedicated storage facilities has not been provided. Therefore, the use of less-than-adequate facilities has been required. Drums could corrode, releasing chemicals to the environment and/or causing potential worker exposures. Cylinders containing uranium hexafluoride are stored outside and are exposed to the elements. Severely corroded cylinders have released uranium hexafluoride to the environment. Additional cylinder failures are expected to cause more uranium hexafluoride releases. A plan currently exists to demolish Building 9201-4 at some time in the future. In the interim, the building could be used for storage. Future use of the facility may not be consistent with the potential hazards associated with residual levels of mercury and other facility limitations.

Response:

- Facilities selected for storage of chemicals are modified, maintained, and surveilled, as needed, to provide safe storage. Buildings which have been selected are adequate for this purpose and have required a minimum of new construction, avoiding unnecessary delays and escalated costs. The K-25 lithium hydroxide storage area has been modified to meet chemical storage area requirements.

Monthly inspections and surveillances are conducted of stored materials. These inspections are limited to accessible drums. Inspections include visual examination for corrosion and chemical leakage. Corrective actions are initiated on any identified deficiencies. In addition, the accountable material is subjected to an annual statistical sampling for the required inventory, and an audit is performed annually by the Nuclear Materials Control and Accountability personnel.

UF₆ is currently stored in containers manufactured per ASME boiler and pressure vessel codes and Department of Transportation (DOT) specifications (i.e., engineered controls). Although some external corrosion of the containers has occurred due to environmental exposure, these concerns are understood and are the focus of detailed technical evaluations. A compensatory management program consisting of monitoring, inspection, testing, and repair is in place to ensure the integrity of these containers. A management plan has the planning in place to replace the deteriorated yards and refurbish the cylinders. The design of the yard is to be completed in September 1994, but funding for construction has not yet been approved. The refurbishment facility design is funded and scheduled to be completed by October 1995.

Two breaches in cylinder containment have been identified with failure modes attributed to corrosion damage. Two other breached cylinders have been identified with failure attributed to handling damage. These cylinders were identified during a baseline inspection used to determine the current conditions of the containers and their storage environments. UF_6 is stored as a solid, and a breach in the container will typically result in reaction of the UF_6 with atmospheric moisture to produce gaseous hydrogen fluoride (HF) and solid uranyl fluoride (UO_2F_2). The solid UO_2F_2 quickly accumulates around the opening in the cylinder and seals it; thus limiting further release. Minimal release of both HF and UO_2F_2 has occurred from such cylinder breaching. In addition, the areas in which the UF_6 cylinders are stored are access controlled. Personnel performing work or inspections on the cylinders are instructed as to the appropriate actions to implement in the event that a breached cylinder is identified.

At Y-12, it is not known at this time how far the D&D of Building 9201-4 will be taken. Considerations and options range from "green field" to surveillance and maintenance. Y-12 and Energy Systems policies and procedures require that any change to a facility be evaluated for the existence of an Unreviewed Safety Question. Any further use of Building 9201-4 affecting worker or public safety will be analyzed, including chemical compatibility with the building contents.

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-02

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none"> ● Lithium hydroxide drums were observed stored in the lower level of the K-25 Process Building. - No consistent policy was used for stacking drums. - Storage facilities do not have adequate temperature or humidity controls. 	<p><u>K-25</u>: Lithium hydroxide is a stable, nonflammable, water soluble solid, which is stored in plastic-lined steel drums and stacked up to three pallets high. The container protects the product from humidity and water in the event of leaks or fires. The containers also prevent direct contact of personnel with the product. Monthly inspections are used to identify and correct abnormal or unsafe conditions.</p> <p>The storage array is four drums to a pallet, two pallets high, with the exception of some drums in one vault that are stacked three pallets high. Plans are being developed to relocate and restack the three-high stacks near the aisles by July 31, 1995.</p> <p>The presence of a large volume of lithium hydroxide was analyzed in the K-25 Process Building Hazard Screening Report (HS/K-25/PK20.2/R0), dated March 1992. The hazard screening resulted in a moderate rating for the facility. The major contributor to the hazard classification of the K-25 Building was the toxicity of the uranium and not the lithium hydroxide. The lithium compounds stored in the vaults are not susceptible to reactions from the normal range of temperature and humidity experienced while in storage.</p> <p>In 1985/1986, the lithium hydroxide monohydrate originally packed in polyethylene-lined fiber drums was overpacked into DOT-approved, 80-gallon polyethylene-lined steel drums. The accountable materials, originally packaged in steel drums, are overpacked as needed.</p>	<p>R.S.Eby</p> <p>R.S.Eby</p> <p>R.S.Eby</p> <p>R.S.Eby</p>

CHEMICAL SAFETY VULNERABILITY REVIEW

September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-02

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none"> - Significant corrosion was evident on the exterior of many drums. 	<p>Some drums of the accountable lithium show signs of corrosion, but do not have visible penetrations. Over the past few years, approximately 45 drums of questionable condition have been overpacked. Monthly inspections and surveillances are conducted throughout the vaults. These inspections are limited to accessible drums since the facility does not have sufficient space to provide standard aisle spacing to optimize inspection. A drum-corrosion standard, complete with pictures illustrating surface and penetrating corrosion and instructions as to what corrosion levels are acceptable and which should be overpacked is incorporated into monthly inspections. Corrective actions are initiated on any identified deficiencies. The accountable material is subjected to an annual statistical sampling for the required inventory, and an audit is performed annually by the Nuclear Materials Control and Accountability personnel. During these activities, the condition of the accessible drums is also evaluated.</p>	<p>R.S.Eby</p>
<ul style="list-style-type: none"> - Deteriorated wooden pallets could fail, causing one or more drums to rupture and spill lithium hydroxide. 	<p>The pallets are in good condition. If, during inspection, damage pallets are identified, corrective action is initiated. The hazard of spilled lithium hydroxide is addressed in the following paragraph.</p>	<p>R.S.Eby</p>
<ul style="list-style-type: none"> - Potential personnel exposure to lithium hydroxide, resulting in caustic burns. 	<p>Lithium hydroxide has a health hazard rating of three, a fire rating of zero, and a reactivity of one. The health hazard is minimized since the lithium is contained and not available for skin contact, inhalation, or ingestion. If breaches are found, appropriate personal protective equipment is prescribed for cleanup.</p>	<p>R.S.Eby</p>

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

Site/Facility: Oak Ridge

Vulnerability Number: CSV-OR-ORR-03

Vulnerability:

- Facilities were placed in caretaker status without appropriate cleanup or documentation.

Summary of Vulnerability:

- When a facility changes from operational to caretaker status without thorough cleanup operations, chemicals left in the facility can represent a potentially hazardous condition and/or environmental concern. Such chemicals may be hazardous in their original state or as degradation products that result over time. Chemicals and/or their degradation products may also cause damage to equipment or structures or be affected by building or container deterioration due to natural aging. The loss of corporate memory (e.g., as a result of personnel transfers and retirements, facility aging, downsizing, multiple usage, and adequate configuration management and recordkeeping in the past) may result in chemical hazards when new operations are attempted.

Response:

- Energy Systems policies and procedures require proper safety analysis documentation of areas before becoming a storage area for hazardous materials. Analyses will include compatibility with the building and its contents.

While no comprehensive program exists at ORNL to reduce excess chemical inventory, several mechanisms have been established which help reduce excess accumulation. For example, the Hazardous Materials Information System (HMIS) is used to track chemical inventory. In the HMIS system, chemicals are identified by a control area (building, room), and a responsible person for the chemical is assigned. Additionally, all new chemical requisitions are screened for hazards by industrial hygiene personnel, and the quantities of chemicals are entered into HMIS. For those chemicals identified as waste, ORNL has an effective organization for handling the disposition of those chemicals. Also, a "swap shop" system has been created which allows employees to identify and use excess inventory.

Many K-25 facilities were shutdown without proper post-operational cleaning and purging. D&D to cleanup the process equipment have not yet begun in the process buildings. Activities required to place the facilities in a safe shutdown condition are in process and are to be completed prior to process equipment cleanup. These activities are removing hazards which are either a health and safety concern or a regulatory issue and are similar to deactivation activities the EM-60 organization performs prior to facility transfer into the D&D program. The Deposit Removal project, currently underway, is specifically designed to remove large uranium deposits.

All facilities and operations at K-25 have been subjected to a preliminary hazard screening. Additional hazard analyses have been performed for the major facilities or those with unusual risks. This resulted in the identification of risk reduction activities, which has reduced or eliminated many hazards.

At K-25, each building has an individual assigned as the building operator. This individual is responsible for knowing the hazards of the building. The shutdown process buildings in the site's D&D program are subjected to routine surveillance and maintenance by a dedicated organization that evaluates the condition of the buildings' physical structures, as well as potential hazardous conditions or environmental concerns created from chemicals or degradation products.

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-03

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none"> ● Visual observation and document reviews indicate that vaults for storage of various materials at K-25 need repair or rehabilitation. ● Limited capability to remove contaminated equipment from K-25 and elsewhere reflects insufficient management controls over the D&D process. Although Freon, lubricating oils, and uranium hexafluoride have been removed from process equipment, deposits and/or residues remain in place (including trace quantities of technetium and plutonium, as well as more substantial quantities of uranium). The presence of such materials limits removal efforts. ● Building K-725 was abandoned years ago without a cleanup. The building and, in particular, the ductwork are known to be contaminated with hazardous chemicals. Warning signs are posted around building. 	<p>The condition of the buildings and vaults are evaluated routinely as part of the surveillance and maintenance efforts at the site. For example, roof leaks are repaired in accordance with the Aging Facilities Program.</p> <p>The K-25 building was shutdown without proper post operational cleaning and purging. Freon and lubricating oils have been removed from process equipment. Deposits and/or residues remain in place. The Deposit Removal project, currently underway, is specifically designed to remove large uranium deposits.</p> <p>The K-25 Site is currently undergoing a residue characterization assessment to complete the Tennessee Oversight Agreement commitment B.6(2). The K-25 working group is performing hazard assessments by questioning facility managers or responsible persons concerning the management procedures or plans addressing potentially hazardous residues still present onsite. Part of this interview process specifically addresses the historical uses, contamination, and residues present at facilities onsite that are used for "new missions." Evaluation of the K-725 building will be conducted as part of the Environmental Restoration Program. In the interim, the area is appropriately posted.</p>	<p>R.S.Eby</p> <p>R.S.Eby</p> <p>M.F.P. Delozier</p>

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

Site/Facility: Oak Ridge

Vulnerability Number: CSV-OR-ORR-04

Vulnerability:

- **Inconsistent formality rigor and formality are applied to managing hazardous materials.**

Summary of Vulnerability:

- **In the absence of specific DOE Orders and/or regulatory requirements, procedures and the conduct of operations related to handling and storing hazardous materials are not uniform between sites and, in some cases, between division and facilities within the same site.**

Response:

- **The wide variety of type, form, and quantity of hazardous materials in use and in storage hinders the application of generic requirements for their handling and storage. Additionally, differences in appropriate hazardous materials storage conditions can occur due to differences in the authorizing permits for the specific facilities. General requirements for safe handling and storage of chemicals are provided, but specific application is the responsibility of the qualified, immediate supervision with guidance from support organizations including hazardous waste operations, industrial hygiene, and industrial safety.**

The foregoing notwithstanding, Energy Systems has a detailed Policy Procedure, ESP-ESH-16, "Hazardous Materials Inventory Program," designed to uniformly track and control hazardous materials. Also, at the K-25 Site, SPP 4111, "Hazardous Material Storage and Inspection," applies to all organizations with hazardous materials holdings. This SPP provides consistent management practices for hazardous material. The lithium compounds management strategy, under development, will specify how the storage requirements will be implemented.

The DOE UF₆ cylinders are currently managed under one program to ensure uniform management.

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-04

Supporting Observations	Response	Responsible Person
<p>a. Lithium hydroxide from Y-12 has been stored at K-25 by two different organizations. Storage is located in controlled access areas, but storage conditions are not consistent with "good management practices." Requested funds to upgrade storage conditions have not been obtained.</p> <ul style="list-style-type: none"> ● Storage Facility Condition <ul style="list-style-type: none"> - Lack of maintenance for heating, ventilation, air-conditioning, and fire protection systems has resulted in water leaks. - Eye wash stations and/or safety showers have not been installed at the storage areas. - Inadequate housekeeping was noted (e.g., dirty floors, discarded banding). 	<p>The lithium materials are packaged in steel drums lined with polyethylene that protect the contents from unfavorable humidity posed by the vault storage. Monthly inspections to monitor container condition will maintain this double containment and further mitigate any unfavorable conditions posed by vault storage. All lithium hydroxide storage facilities are managed by the Operations Division at the K-25 Site.</p> <p>During the severe winter of 1993/1994, the fire protection sprinkler systems experienced freeze damage. These systems have been repaired, inspected, and functionally tested to NFPA standards. Most systems in the vaults have been flushed to meet regulations; a few were not flushed because the volume of drums limited access to the systems.</p> <p>Lithium hydroxide has a health hazard rating of three, a fire rating of zero, and a reactivity of one. The health hazard is minimized since the lithium compounds are contained and not available for eye or skin contact, inhalation, or ingestion. Portable eyewashes are made available to personnel who may come in contact with the lithium during handling.</p> <p>Discarded banding cited in one vault was placed in a proper disposal container. Two vaults have been identified for floor cleaning; however, the existing condition does not present any health or safety concern. Cleaning will be completed by March 31, 1995.</p>	<p>R.S.Eby</p> <p>R.S.Eby</p> <p>R.S.Eby</p> <p>R.S.Eby</p>

CHEMICAL SAFETY VULNERABILITY REVIEW

September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSVR-OR-ORR-04

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none"> ● Drum Stacks <ul style="list-style-type: none"> - Pallets were stacked three high (four drums per pallet) in some areas. Some drum sets are not banded, and some wooden pallets are cracked, causing stacks to tilt slightly. The three-high stacks were reported to be early placements, and this practice is no longer followed. ● Drum Conditions <ul style="list-style-type: none"> - Not all drums were properly labeled. - Some drums showed significant exterior corrosion. - Lid lock-down band on one drum observed to be loose. 	<p>The pallets are in good condition; however, a few are slightly tilted due to pallets not being properly positioned or differing heights of a small number of drums. The drums are secure as currently stacked.</p> <p>All drums are labeled as to content; however, some drums in one vault were shipped from Y-12 before the hazard diamond warning label was required. The hazard diamond placard for each compound is posted at the entrance to this vault.</p> <p>Some drums of the accountable lithium hydroxide show signs of corrosion, but do not have visible penetrations. Over the past few years, approximately 45 drums of questionable condition have been overpacked. Monthly inspections and surveillances are conducted throughout the vaults. These inspections are limited to accessible drums since the facility does not have sufficient space to provide standard aisle spacing to optimize inspection. A drum-corrosion standard, complete with pictures illustrating surface and penetrating corrosion and instructions as to what corrosion levels are acceptable and which should be overpacked, is incorporated into monthly inspections. Corrective actions are initiated on any identified deficiencies. The accountable material is subjected to an annual statistical sampling for the required inventory, and an audit is performed annually by the Nuclear Materials Control and Accountability personnel. During these activities, the condition of the accessible drums is also evaluated.</p> <p>A loose band on a drum is considered a notable deficiency according to the monthly inspection criteria, and corrective actions are initiated as a result of the surveillances.</p>	<p>R.S.Eby</p> <p>R.S.Eby</p> <p>R.S.Eby</p> <p>R.S.Eby</p>

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-04

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none">● Inspections<ul style="list-style-type: none">- A monthly inspection program has been instituted, but there is no evidence that drum corrosion is monitored. Inspections have not triggered timely corrective actions for labeling or to upgrade conditions.	Corrosion and labeling concerns are addressed in previous responses. Plans to upgrade conditions are cited in previous responses to stacking and housekeeping concerns. (See CSV-OR-ORR-02 for more information.)	R.S.Eby

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-04

Supporting Observations	Response	Responsible Person
<p>b. Examples of improper handling and storage of hazardous chemicals in laboratories and other conditions that are inconsistent with 29 CFR 1910.1450 were observed:</p> <ul style="list-style-type: none">● Flammables, carcinogens, and corrosive chemicals stored in the same cabinet. ● Ethers not analyzed for peroxides, bottles not dated, and bottles not stored in an explosion-proof refrigerator. ● Incompatible chemicals placed in an open, improperly labeled RCRA satellite storage "area" (container).	<p><u>ORNL</u> Laboratory activities will be relocated to a facility with proper handling techniques and storage facilities. Removal of any inappropriate chemical storage in the nuclear medicine laboratories of Bldg. 3047 will be completed by December 31, 1994.</p>	<p>Russ Knapp</p>

CHEMICAL SAFETY VULNERABILITY REVIEW

September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-04

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none"> ● No potable water and no eyewash or safety shower station at one laboratory. c. Storage of uranium hexafluoride containers - see Vulnerability CSV-OR-ORR-05. 	<p>The nuclear medicine laboratories of Bldg. 3047 have safety showers but lack eye wash. These laboratory activities are to be relocated into renovated laboratories with proper eyewash and safety showers (due December 31, 1994).</p> <p>See response to Vulnerability CSV-OR-ORR-05.</p>	<p>Russ Knapp</p>

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

Site/Facility: Oak Ridge

Vulnerability Number: CSVR-OR-ORR-05

Vulnerability:

- Large quantities of specialty and other industrial chemicals are stored without consistent strategic planning.

Summary of Vulnerability:

- The national defense mission of DOE prompted the purchase and stockpiling of industrial quantities of many unique chemicals. Because of changing strategic requirements, most of these chemicals are now surplus to DOE needs. The storage of these chemicals could result in unanticipated vulnerabilities caused by the absence of appropriate controls, chemical aging, and decomposition to unknown byproducts. It also represents the need for a long-term economic commitment by DOE.

Response:

- Energy Systems has safety programs in place that ameliorate this concern, i.e., material shelf life is monitored; the MSDS aging code is observed; inventories of materials in stores that are not moving are excessed; chemicals are purchased on an as-needed basis; and hazardous chemicals bought on direct purchase are tracked. A large amount of the chemicals stored at K-25 is lithium hydroxide from Y-12. This material has been placed in overpacks to protect the containers from contact with the chemical. Energy Systems has attempted to offer this material for sale; however, no bidder has expressed interest in the bid package as offered. Dialogue has been opened with DOE to modify the process so as to increase the prospect of sale.

CHEMICAL SAFETY VULNERABILITY REVIEW

September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSV-OR-ORR-05

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none"> ● Uranium hexafluoride is stored at a number of areas at K-25. The estimate of the total amount (from the site emergency plan) is more than 50,000 tons. This material is stored in several yards, generally segregated by size of containers and contents. These yards are fenced, and access is controlled. However, these areas lack engineered controls to minimize potential for environmental releases, and the conditions of the yards and containers is deteriorating. This has necessitated reliance on administrative controls (e.g., inspections and testing for container integrity). - Most of the containers are placed on concrete pads with full containers set on wooden saddles. There are numerous instances, however, where saddles have deteriorated or broken and areas where concrete has also deteriorated. - Many containers show evidence of excessive corrosion. A number of containers have leaked, and some may still be leaking. - The yards do not have containment or catch basins to control runoff. 	<p>These observations are generally correct; however, only four breaches have been identified at the K-25 Site out of the 4,700 cylinders stored there. Because of the relatively impervious barrier formed when solid UF₆ reacts with moisture, releases from these four breaches were minimal. Inspections of all accessible surfaces of all the cylinders has been completed.</p> <p>The current cylinder program has the planning in place to replace the deteriorated yard and refurbish the cylinders. The design of the yard is to be completed in September 1994, but funding for construction has not yet been approved. The refurbishment facility design is funded and scheduled to be completed by October 1995. This compensatory management program is designed to ensure the integrity of the cylinders and manage the material while the proposed long-term management strategy for ultimate disposition of the material is being evaluated.</p>	M.F.P. Delozier

CHEMICAL SAFETY VULNERABILITY REVIEW
September 1994

SITE/FACILITY: Oak Ridge

Vulnerability Number: CSVR-OR-ORR-05

Supporting Observations	Response	Responsible Person
<ul style="list-style-type: none">• There have been attempts to sell some surplus material (particularly lithium compounds) on the open market. Bids for this material received have been well below market value. MMES is attempting to dispose of lithium and beryllium to commercial vendors.• Lack of a definitive, long-term policy on the disposition of this excess material.• See Vulnerabilities CSVR-OR-ORR-02, CSVR-OR-ORR-03, and CSVR-OR-ORR-04.	<p><u>K-25</u>: The DOE's current strategy for the disposition of approximately 23 million pounds of surplus Lithium Hydroxide Monohydrate (LiOH) stored at the K-25 site is to sell this material to private industries. Prior attempts to accomplish this goal through the use of the "Competitive Bid Sales" process have not been totally effective. A more promising effort is currently underway to use the "Negotiation Sales" approach by dealing directly with the Lithium producers to purchase this material.</p> <p>The DOE long-term policy on the disposition of the excess LiOH stored at the K-25 site is to have all the material removed from the facility within 8 years.</p> <p>See above response.</p> <p>See responses CSVR-OR-ORR-02, CSVR-OR-ORR-03, and CSVR-OR-ORR-04</p>	

RECOGNIZED GOOD PRACTICES

During the April site verification visit many good practices were identified. These good practices included some of the following:

- Defense-in-depth against the hazards of Chlorine at the Water Treatment Facility, K-1515, contact R.S. Eby
- Surplus materials identification and consolidation program
- The Safety Analysis Review Update Program (SARUP), contact John Rayside
- Unreviewed Safety Question Determination (USQD) process, contact Dan Wilson
- Hazardous Materials Information System (HMIS), contact Larry Gray

Of the above, particular attention was given to HMIS and SARUP.

HMIS supports the health and safety, environmental, regulatory, and management needs of Energy Systems, its 20,000 employees at four installations and in the community. The system design is formulated to implement Energy Systems hazardous materials management strategy:

1. to perform an upfront hazard evaluation by an Industrial Hygienist of all material requisitions via the Hazardous Materials Procurement Interface;
2. to ensure a Material Safety Data Sheet (MSDS) is matched to all hazardous materials receipts and made readily available to employees; and
3. to ensure that all hazardous materials entering Energy Systems are tracked and managed.

The Hazardous Materials (HM) Procurement Interface supplies the Inventory Module, a transaction record of all HM receipts which includes the location (HM Control Area) where the material is to be initially stored or used, the volume or weight, the unique identifier (RECID), and basic SARA 312 reporting information. Hazardous items are associated with control lists to allow inventory reports to be generated for Carcinogens, Reproductive Toxins, Peroxidizables, EPA Extremely Hazardous Substances, Air Toxins, Chemical Process Safety List, etc. Authorized users of the Inventory Module are provided several methods to update their inventories electronically (record usage and transfers of materials to other users or to "consumed" control areas). One method of inventory control, used primarily by the labs, is the HMIS Bar Code Application, which allows custodians of HM to produce and attach bar code labels to their inventory items (chemicals); updating of their inventories is then accomplished by using a Bar Code Reader. Other Custodians who use the traditional keyboard method of transferring and updating their inventories may transfer by item, material type, or by RECID. Resource efficiency is achieved by utilizing the HM Inventory data for multiple management and reporting purposes and by incorporating the latest technology.

SARUP is a major Energy Systems program designed to bring existing safety analysis reports and associated documents into compliance with present DOE expectations.

Prior to and after the SARUP inception in 1989, equal consideration has been given to nuclear and nonnuclear hazards. Only standard industrial hazards, those routinely encountered by workers or the general public or those well understood and controlled by consensus standards, have been excluded.

Hazard screening methodology was developed for classifying facilities as High, Moderate, or Low Hazard. Parallel sets of criteria were developed for radiological and general hazards. During SARUP implementation, analysis has shown that chemical toxicity and other general hazards are at least as important as radiological hazards. Accordingly, safety class equipment has been identified and Operational Safety Requirements developed for chemical hazards when needed. Content and format guidance for nuclear safety analysis reports (SARs) will be adopted for SARs addressing only chemical or other general hazards.