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Management Response Plan
for the
Chemical Safety Vulnerability Working Group Report

Volume 1 of 2
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Endorsement

The Chemical Safety Vulnerability Working Group identified a number of significant chemical safety vulnerbilities within the Department of Energy complex. Although these vulnerabilities do not represent an immediate danger to the public, workers, or the environment, they do require management attention to eliminate the potential for chemical exposures and accidents.

This management response plan describes actions intended to correct these vulnerabilities and to prevent their recurrence through specific activities and programmatic improvements in chemical safety.

We, the Department's Cognizant Secretarial Officers, are committed to improving chemical safety across the Department of Energy complex and will work together to achieve an environment, safety, and health program for chemicals and chemical operations that we can be proud of. We endorse this plan, which is a starting point to coordinate our efforts in this important endeavor.

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VOLUME 2

INITIAL SITE RESPONSE PLANS

Brookhaven National Laboratory

Hanford Site

Idaho National Engineering Laboratory

Lawrence Livermore National Laboratory

Los Alamos National Laboratory

Oak Ridge Site (Oak Ridge National Laboratory, K–25 Plant, and Y–12 Plant)

Rocky Flats Plant

Sandia National Laboratories

Savannah River Site

Executive Summary

The objectives of this response plan are twofold: to correct existing chemical problems within the Department of Energy complex and to prevent the recurrence of similar problems in the future.

This Management Response Plan describes a coordinated set of actions by the Department's Cognizant Secretarial Offices to correct the generic vulnerabilities and management weaknesses identified in the *Chemical Safety Vulnerability Working Group Report*, September 1994. The Report describes eight generic chemical safety vulnerabilities that confront the Department. The Report also describes four management weaknesses that contribute to the perpetuation of the generic vulnerabilities. The conclusions of the Report are based on the findings of teams of chemical safety experts who conducted site visits at nine representative Department of Energy (DOE) sites.

The vulnerabilities identified by the Chemical Safety Vulnerability Working Group are of two types, those that resulted from past practices — the Department's chemical "legacy" — and those that result from current program inadequacies. Although these vulnerabilities do not represent immediate danger to the public, workers, or the environment, they do require immediate and sustained management attention to prevent more serious problems. In addition, the nine DOE sites visited by the Chemical Vulnerability Working Group field verification teams represent only a few of the DOE sites that use or store chemicals. Therefore, DOE considers it important to address the safety of chemical operations at all of their sites on a priority basis.

To address the generic vulnerabilities and management weaknesses identified by the Chemical Safety Vulnerability Working Group in a timely manner, a management team was formed to develop this Management Response Plan. The team reviewed the vulnerabilities and weaknesses, considered existing Departmental organizations, current safety initiatives, and Department constraints, and then identified specific actions and programs that would contribute to addressing these problems. These actions became the foundation for developing this integrated

management response. During this entire process, communications were open and information was exchanged among DOE's line program offices, field offices, and site contractors. Thus, this Plan represents a commitment by the Cognizant Secretarial Offices to address vulnerabilities and their underlying management weaknesses.

The actions and programmatic improvements proposed in this Management Response Plan are ambitious. They build on the commendable practices identified by the Chemical Safety Vulnerability Working Group and call for active involvement by DOE line program offices, field offices, and site contractors, with support and oversight by the Office of Environment, Safety and Health. The Plan reflects current Department initiatives and constraints, such as the streamlining of the Department's Directives System, improved performance-based contracting, emphasis on teamwork, and the use of resource reallocations to accomplish actions under existing budget restraints.

The vision of this Management Response Plan is to achieve, by the year 2000, a level of safety within DOE equal to that of the leading chemical companies. The plan provides a set of actions that support this vision.

- **Ensuring that chemical safety receives proper emphasis, management attention, and resources**
- **Building partnerships with leading chemical safety organizations:**
  - **Developing a partnership agreement with the Chemical Manufacturers Association to access its environment, safety, and health programs for use within DOE, as appropriate, including the guidelines of the *Responsible Care* ® program**
  - **Joining the Center for Chemical Process Safety of the American Institute of Chemical Engineers to facilitate access to chemical engineering and safety expertise**
- **Incorporating proven chemical safety principles and practices into DOE's environment, safety, and health programs**

The objectives of this plan are twofold: to correct existing chemical problems within the DOE complex and to prevent the recurrence of similar problems in the future. Of the two, correcting existing problems will be, by far, the most lengthy and resource-intensive. This response plan sets up the mechanisms to allow corrections to take place in a controlled and timely manner. Preventing the recurrence of problems, however, can be accomplished in a straightforward manner by adapting for use within DOE the chemical safety management systems and programs already developed and used by leading chemical companies.

The various DOE program offices face different types of issues related to chemicals and chemical processes at their sites. For example, the Office of Defense Programs must deal with legacy chemicals and aging chemical facilities and processes that continue to operate at its sites. Problems for the Office of Environmental Management are mostly with the proper transfer and safe cleanup of inactive chemical facilities, and also include the safe disposition or disposal of chemicals and wastes. The Office of Energy Research manages many research laboratories that must continue to track and safely handle numerous hazardous chemicals in small quantities.

This Management Response Plan directly addresses site-specific chemical problems in Tasks 1 and 2 under which program offices, through the DOE sites, provide initial and comprehensive plans of action. The balance of the plan's 10 tasks address complex-wide programmatic actions. These tasks are organized into sections that correspond to the management weaknesses identified in the *Chemical Safety Vulnerability Working Group Report*. The response tasks are practical and cost effective, build on existing field efforts, and will result in tangible and early progress. Appendix A of this plan lists the tasks, responsibilities, products, and completion dates for the tasks and actions proposed in this plan.

The nine DOE sites visited by the Chemical Safety Vulnerability Working Group field verification teams have already implemented initial site response plans that address their site-specific vulnerabilities (Task 1, completed September 1994). Actions include cleanup and disposal of chemicals, improved control over chemical inventories, better maintenance, improved chemical storage, better preparedness for chemical emergencies, and more extensive chemical safety training.

Their individual response plans are summarized in Section III and are reproduced *in toto* as Volume 2 of this Management Response Plan. These early actions demonstrate DOE's commitment to correct the Department's chemical vulnerabilities on a priority basis.

In addition, to further ensure significant early progress, these sites will, on a priority basis, directly address three of the generic vulnerabilities identified by the Chemical Safety Vulnerability Working Group to:

- **Remove excess and unneeded chemicals**
- **Ensure proper storage of chemicals**
- **Control inventories through tracking of chemicals from procurement through disposal**

All practical actions for early progress in these areas will be implemented by September 1995.

Two actions in this Management Response Plan have significant budgetary and resource impacts, namely, new line item requests to permit long-term storage of "legacy" chemicals in facilities specifically engineered for storage, and reallocation of resources to better control the hazards posed by continuing operations in aging facilities. Comprehensive site response plans (Task 2, to be completed by September 1995) will address priority and resource allocation issues and will contain definitive actions to correct these existing problems as well as actions to ensure that chemical safety is adequately incorporated into environment, safety, and health programs.

Tasks 3 through 10 of this Management Response Plan address complex-wide programmatic actions. These actions will focus management attention on chemical safety, ensure chemical safety principles and practices are integrated into environment, safety, and health programs, upgrade the physical condition of aging facilities still housing active chemical operations, assure that inactive facilities are managed so that they remain in a safe condition through final disposition, and improve resource allocations so that chemical safety receives appropriate funding.

Implementation of these actions will ensure that:

- **Chemical hazards are recognized and addressed appropriately through effective engineering solutions, safe work practices, and proper chemical use and storage.**

- **Proper engineering analyses are conducted and engineered operational upgrades are implemented for facilities that will accommodate new or additional chemical operations.**

- **All facilities housing chemical operations receive adequate maintenance and repairs. Line programs are accountable for surveillance and maintenance of surplus facilities before they are turned over to the Office of Environmental Management for disposition.**

- **Safety analyses for both nuclear and nonnuclear facilities adequately address chemical hazards. The analyses address the adequacy of facility support systems to support the chemical operations they house, including facilities that house multiple operations or operations for which they were not originally designed.**

- **The Department places adequate importance on chemical safety, and allocates sufficient resources (competent personnel and budgets) to identify and control chemical hazards. DOE directives place adequate emphasis on chemical safety. Budget priorities provide the resources necessary to address chemical safety problems.**

The plan calls for the charter of an Action Team for Chemical Safety, composed of representatives from the Office of Environment, Safety and Health, the Cognizant Secretarial Offices, and the Operations Offices. The Action Team will coordinate response plan actions; will recommend improvements in the plan, as needed; will facilitate solving difficult problems that affect multiple sites; and will assist in program improvement efforts, as requested. The Team will also act as a clearinghouse for distribution of information about effective chemical safety management tools and practices already developed and used at particular sites.

Accountability for plan implementation will be defined in performance measures developed by the Cognizant Secretarial Offices and incorporated into new or modified contracts. These measures will be periodically reviewed and upgraded as appropriate. Plan implementation will be monitored by Headquarters line program offices with oversight by the Office of Environment, Safety and Health. Until the actions in the site-specific management response plans are completed, annual letter reports from the sites and verification reports from the Office of Environment, Safety and Health will be prepared.

I. Introduction

On February 14, 1994, Secretary of Energy Hazel O'Leary announced initiation of a vulnerability review of chemical safety at Department of Energy (DOE) facilities. The objective of the review was to identify and characterize adverse conditions involving hazardous chemicals at facilities owned or operated by DOE.

Based on this Secretarial initiative, the Assistant Secretary for Environment, Safety and Health established the Chemical Safety Vulnerability Working Group to identify chemical safety vulnerabilities that might result in fires or explosions from uncontrolled chemical reactions, release of hazardous chemicals to the environment, or exposure of workers or the public to chemicals.

BACKGROUND

The Chemical Safety Vulnerability Review was conducted between February and July 1994 and involved evaluation of chemical safety vulnerabilities in 146 facilities at 29 sites across the DOE complex. Three types of vulnerabilities were identified: facility-specific (those unique to a facility); site-specific (those unique to a site); and generic (those affecting the entire DOE complex). The generic vulnerabilities were identified and generalized from facility-specific and site-specific vulnerabilities.

Eight generic vulnerabilities were documented in the *Chemical Safety Vulnerability Working Group Report,* September 1994. These eight generic vulnerabilities are related to:

- **Abandoned chemicals and chemical residuals**
- **Past chemical spills and ground releases**
- **Characterization of legacy chemicals and wastes**
- **Disposition of legacy chemicals**
- **Storage facilities and conditions**
- **Condition of facilities and support systems**
- **Unanalyzed and unaddressed hazards**
- **Inventory control and tracking**

In addition to the generic vulnerabilities, the Chemical Safety Vulnerability Working Group also identified management weaknesses in chemical safety at the DOE sites. These management weaknesses are manifest as deficiencies in five programmatic areas. The programmatic deficiencies are related to:

- Management commitment and planning
- Chemical safety management programs
- Aging facilities that continue to operate
- Nonoperating facilities awaiting transfer to the Office of Environmental Management for deactivation, decontamination, and final disposition
- Resource allocations

These five programmatic deficiencies form the basis for establishing eight of the tasks proposed in this Management Response Plan. These tasks identify the actions and programs needed to address both the generic vulnerabilities and the programmatic deficiencies. Most of the actions and programs proposed in these tasks are improvements to ongoing efforts.

To address the facility-specific and site-specific vulnerabilities, responsible DOE and site-contractor line organizations have developed initial site response plans. These plans, presented as Volume 2 of this Management Response Plan, describe the actions needed to mitigate or eliminate the facility- and site-specific vulnerabilities identified by the Chemical Safety Vulnerability Working Group field verification teams.

ORGANIZATION

This Management Response Plan is organized into four major sections that correspond directly to the management weaknesses identified in the *Chemical Safety Vulnerability Working Group Report.*

This Management Response Plan is organized into four major sections (Sections IV through VII) that correspond directly to the management weaknesses identified in the *Chemical Safety Vulnerability Working Group Report.* These sections are preceded by a discussion of the approach used to develop the plan (Section II) and a discussion of the chemical safety improvements planned or already underway at various sites to correct facility- and site-specific vulnerabilities (Section III).

Sections IV through VII each contain a discussion of the programmatic deficiencies they address; a description of the tasks to be accomplished, the specific actions to be taken, and the organizational responsibilities for implementation; a schedule; and success measures.

II. Approach

This Management Response Plan proposes specific actions and comprehensive integrated programs to address both individual vulnerabilities and programmatic deficiencies.

The *Chemical Safety Vulnerability Working Group Report*, September 1994, presents a broad characterization of the state of chemical safety within the Department of Energy (DOE). The vulnerabilities outlined in the review are of two types: those that result from past practices and those that result from current program inadequacies.

Elimination of vulnerabilities that result from past practices—DOE's chemical "legacy"—will include such activities as identification and characterization of abandoned chemicals and chemical residuals, location and characterization of past chemical spills and intentional ground releases, identification of the chemical constituents of legacy wastes, and disposition of excess chemicals. Correcting program inadequacies will require implementation of comprehensive programs for assessing hazards, controlling chemical inventories, and upgrading facilities and equipment. Accordingly, this Management Response Plan proposes both specific actions and comprehensive integrated programs to address both individual vulnerabilities and programmatic deficiencies.

This Management Response Plan was developed using the following methodology:

- Select cognizant members of the Chemical Safety Vulnerability Working Group to develop the response plan.
- From the generic vulnerabilities, define specific problems that require mitigating actions.
- Brainstorm potential actions, considering existing Departmental organizations and missions and current chemical safety initiatives.
- Identify specific actions or programs that will contribute to addressing specific problems as the foundation for developing an integrated management response.

- Organize the recommended actions and programs into four areas corresponding to the management weaknesses identified in the *Chemical Safety Vulnerability Working Group Report*, September 1994, to ensure that both generic vulnerabilities and programmatic deficiencies are addressed.

- Request review and comment by line and field organizations to ensure that proposed actions will be effective and consistent with ongoing efforts.

To be efficient as well as effective, the programs and actions recommended in this Management Response Plan build on and enhance ongoing program and safety initiatives.

The programs and actions in this response plan reflect the following Departmental initiatives and constraints:

- **DOE's commitment to use existing directives whenever possible and to reduce the number of Orders by 50 percent**

- **DOE's Contract Reform Initiative, which recommends improved performance-based contracting**

- **DOE's budget limitations and the need to prioritize and accomplish actions within existing budgets**

- **DOE's emphasis on cooperation among the safety experts in the Office of Environment, Safety and Health and the line organizations**

- **DOE's emphasis on assisting the sites in improving overall safety performance**

In addition, the programs and actions recommended in this Management Response Plan reflect the following Departmental objectives:

- Provide assistance through mentoring, workshops, management tools, and commercial chemical industry programs and practices.

- Identify and use existing commendable programs, and share successes through outreach mechanisms.

- Identify actions that can be supported by existing resources through team and matrix support approaches.

- Expand existing initiatives (e.g., DOE Chemical Safety Program).

- Establish partnerships with private sector organizations dedicated to chemical safety.

- Build on corrective actions already under way.

The intent of this Management Response Plan is to address all generic vulnerabilities identified by the Chemical Safety Vulnerability Working Group through programmatic solutions. Consequently, the plan does not address all of the eight generic vulnerabilities directly. However, the programmatic actions proposed here will lead to the eventual mitigation or elimination of all of the vulnerabilities identified by the Working Group. Moreover, these actions will ensure that comprehensive programs are implemented to prevent the recurrence of similar problems in the future. Most of the actions proposed in this plan are improvements to ongoing programs.

Nine DOE sites have prepared initial site response plans to address the facility- and site-specific vulnerabilities identified by the Chemical Safety Vulnerability Review Working Group field verification teams at their sites (see Volume 2 of this Management Response Plan). All DOE sites that maintain chemical operations, chemical storage facilities, or other holdings of chemicals no longer in use will prepare site response plans to identify the generic vulnerabilities not adequately controlled under their current environment, safety, and health programs. These comprehensive plans will address the vulnerabilities at the sites whose mitigation is required to comply with regulations, standards and DOE directives.

An Action Team for Chemical Safety composed of representatives from the Office of Environment, Safety and Health, the Cognizant Secretarial Offices, and the Operations Offices will be chartered. This team will assist in developing DOE approval processes for actions called for in this Management Response Plan and in coordinating the actions called for in this plan.

III. Response to Facility- and Site-Specific Vulnerabilities

Actions required by this Management Response Plan will build on existing field efforts.

During their nine site visits, the Chemical Safety Vulnerability Working Group field verification teams identified not only facility- and site-specific vulnerabilities, but also many commendable practices at sites. These facility- and site-specific findings and commendable practices are discussed in detail in the *Chemical Safety Vulnerability Working Group Report*, September 1994. This section summarizes past site efforts to reduce hazardous chemical inventories and current site actions to respond directly to the facility- and site-specific findings of the Chemical Safety Vulnerability Working Group field verification teams.

Actions required by this Management Response Plan will build on these existing field efforts. For example, field efforts to reduce chemical inventories are strengthened in proposed actions discussed in Section IV, Task 7. In addition, as described in Section IV, Task 2, all sites that maintain chemical holdings will prepare comprehensive site response plans to address the generic vulnerabilities identified by the Chemical Safety Vulnerability Working Group that are not adequately controlled under their current environment, safety, and health programs.

HAZARDOUS CHEMICAL INVENTORY REDUCTIONS

In 1992, the Department of Energy (DOE) Chemical Oversight Review determined that sites had made efforts to reduce, substitute, and administratively control hazardous chemical inventory levels (*Task Group Report to the Assistant Secretary for Environment, Safety and Health on Oversight of Chemical Safety at the Department of Energy*, Volume 1, November 1992). By the time of this review, many sites had reduced their hazardous chemical inventories significantly.

To assess the risk of catastrophic accidents involving highly hazardous chemicals, DOE surveyed all sites in 1993 to determine those sites having chemicals above the threshold quantity

levels as defined in the Occupational Safety and Health Administration rule, Title 29 of the Code of Federal Regulations (CFR), Part 1910.119, "Process Safety Management of Highly Hazardous Chemicals," and the U.S. Environmental Protection Agency proposed rule 40 CFR 68, "Risk Management Programs for Chemical Accidental Release Prevention." Results of this survey showed that site inventory reductions have continued.

Reductions in chemical inventories have resulted primarily from:

- **Use of less hazardous chemicals in place of more hazardous ones**
- **Attempts by the sites to keep chemicals regulated by the Occupational Safety and Health Administration at levels below their threshold quantities**
- **Downsizing of the DOE weapons complex, with concomitant reduction of chemical throughputs**
- **Cancellation of DOE weapons programs, with concomitant elimination of chemical operations**

The most notable instance of risk reduction through substitution occurred at the Savannah River Site, where chlorine was replaced by the less hazardous sodium hypochlorite at all water treatment facilities. All chlorine cylinders still containing gas were returned to the supplier in June 1993. Empty cylinders were cut up for scrap. Today, the Savannah River Site stores no chlorine.[1] Liquid sodium hypochlorite is received in 15-gallon carboys.

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[1] DOE has initiated a program for highly hazardous chemical risk reduction. Under this program, DOE sites are identifying the highly hazardous chemicals they have onsite that pose the greatest risks to workers, the public, and the environment. Sites will then develop plans for risk reduction through elimination, substitution, inventory reduction, or improvements in process design or operation. The initial focus of this program is on chlorine.

Some sites have shut down processes that used hazardous chemicals, thus eliminating the need for them. For example, the Uranium Mill Tailings Remedial Action Project discontinued an ion exchange process that required chlorine.

Many sites have reduced their chemical inventories administratively to below Occupational Safety and Health Administration threshold quantity levels. Brookhaven National Laboratory, the Pantex Plant, and the Rocky Flats Plant now keep chlorine in less than threshold quantities at single locations on their sites. Fermi National Accelerator Laboratory has reduced its ethane inventory; the Stanford Linear Accelerator Center has reduced the quantities of ammonia that it keeps onsite in a single location to below threshold level; and the Pinellas Plant has reduced its inventory of liquid hydrogen to below threshold. In addition, several other sites have reduced or eliminated storage of hazardous chemicals onsite by contracting with vendors for timely, direct delivery to the process location.

ACTIONS TO ADDRESS VERIFICATION TEAM FINDINGS

Although no imminent danger conditions were discovered during the field verification visits for the Chemical Safety Vulnerability Review, verification teams did identify conditions that posed risks, and DOE site management responded by implementing actions to address them. For example, in response to a finding that chemical hazards were given less management support than radiation hazards, the Rocky Flats Plant is conducting hazards assessments on an accelerated basis. Ten facilities will be assessed rather than the four planned in the fiscal year 1994 budget. At the Oak Ridge National Laboratory, several minor problems were corrected, including cleanup of a chemistry laboratory located in a surplus facility, perimeter cleanup of a landfill erosion problem, and placement of a storage barrier between incompatible chemicals.

INITIAL SITE RESPONSE PLANS

The Chemical Safety Vulnerability Working Group field verification teams visited nine DOE sites. The sites that received field verification visits developed initial site response plans that describe the actions needed to mitigate or eliminate the facility- and site-specific vulnerabilities identified by the field verification teams at their sites. These plans are reproduced *in toto*

in Volume 2 of this Management Response Plan. Table 1 briefly summarizes the actions and improvements that the sites will accomplish by December 1994.

These actions are examples of efforts to correct current problems. This Management Response Plan builds on these actions with the goal of achieving an effective, complexwide, DOE chemical safety program.

Table 1. **Summary of Initial Site Response Plan Actions**

SITE	ACTION	1994 PRODUCTS
BROOKHAVEN NATIONAL LABORATORY	Establish chemical safety committees; improve the chemical safety management system	Ad hoc Committee on Chemical Safety formed; improvements to chlorine system initiated; chemical management system improvements initiated (Completion in June 1995)
	Accelerate implementation of core safety programs	Hazards assessments for five facilities initiated; development of OSHA training modules initiated
	Prevent shortfalls in Environment, Safety and Health resources	Vulnerabilities prioritized for inclusion in annual budget submittals
	Improve safety communications for non-English-speaking workers	Contract specifications requiring safety control measures for non-English-speaking workers developed
HANFORD SITE	Improve storage of surplus chemicals; improve disposition process for surplus chemicals	PUREX and Plutonium Finishing Plant chemical storage routinely monitored; plans completed for disposal of chemicals underway (Completion in 1995)
	Incorporate chemical safety improvements into the Hanford Occupational Exposure Assessment Program	Improvements field tested; Hanford Occupational Exposure Assessment Program revised; Hazard Analysis/ Communication Standard issued
	Minimize loss of corporate knowledge	Configuration control system implemented; teaming concepts introduced

Table 1. **Summary of Initial Site Response Plan Actions** (Continued)

SITE	ACTION	1994 PRODUCTS
IDAHO NATIONAL ENGINEERING LABORATORY *(Actions and Products subject to review by the new site contractor)*	Improve the leakage/spill control program	Review and modifications to program elements for leakage/spill site identification, control, remediation, and disposition completed
	Improve the disposition process for surplus chemicals	Action plans completed for the Idaho Chemical Processing Plant cooling water, ICPP hexone, and the Army Reentry Vehicle Facility Site NaK
	Improve Emergency Management Program documentation	Inconsistencies among emergency plans corrected; preparedness for chemical emergencies improved
LAWRENCE LIVERMORE NATIONAL LABORATORY	Improve control and disposition of aging and inactive facilities	Decontamination and decommissioning management plans completed for radioactively contaminated facilities
	Improve hazards analysis program; conduct hazards analyses	Weaknesses in hazards analysis program resolved; schedule for hazards analyses developed; preliminary hazards analysis for Building B-229 completed
	Issue implementing procedures for emergency plans	Implementing procedures for emergency plans issued
	Improve hazardous environment entry training	New Employee Safety Orientation, Chemical Safety, and Pressure Safety training courses improved to address chemical hazards
LOS ALAMOS NATIONAL LABORATORY	Improve characterization, storage, and disposition of chemical wastes	Improved sampling program implemented; construction of waste storage building at TA-54 initiated
	Improve control and disposition of aging and inactive facilities; prevent shortfalls in resources for cleanup	Cleanup of TA-33-86 completed; safety inspection findings of TA-16-340/342 addressed; funding issues reviewed
	Improve the chemical safety program	Revision of the Chemical Safety Program document initiated
OAK RIDGE SITE (Oak Ridge National Laboratory, K-25 Plant, and Y-12 Plant)	Characterize and remove chemical deposits and residues	Draft work plan for Isotopes Facilities cleanup completed; characterization of Y-12 mercury residuals underway (completion by January 1995)
	Improve storage of bulk chemicals	Uranium hexafluoride cylinder monitoring and repair program implemented; improve yard design completed; relocation of three-high stacks of lithium hydride drums initiated
	Improve handling and storage of laboratory chemicals	Relocation of laboratory activities and improperly stored chemicals in Building 3047 initiated

Table 1. **Summary of Initial Site Response Plan Actions** (Continued)

SITE	ACTION	1994 PRODUCTS
ROCKY FLATS PLANT	Improve accuracy and completeness of chemical inventories	Chemical Management Plan completed and major elements implemented, including manuals, work processes, database improvements, and plantwide training
	Prevent shortfalls in resources for activities that control chemical hazards	Work packages reviewed for proper risk-based rating of chemical issues; five new chemical programs proposed; budget request modified; chemical safety expert added to capital projects planning team
	Improve facility maintenance to control deterioration of aging facilities	Sitewide comprehensive maintenance program implemented; funding requested for improved facility maintenance
SANDIA NATIONAL LABORATORIES	Implement a zone management system to improve work control	Zone managers' job descriptions prepared; zone management concept presented to management
	Improve the hazards identification, analysis, and mitigation processes	Qualification and training for environment, safety, and health coordinator and zone managers developed; hazards integration strategy developed; hazards assessment and classification process revised
	Establish configuration management of facilities based on the zone concept	Ventilation systems of old facilities housing chemical operations tested; Facilities Design Manual revised
SAVANNAH RIVER SITE	Improve hazard reviews	Review procedures developed
	Improve characterization of chemical residuals at facilities being prepared for decontamination and decommissioning	Requirements for chemical characterization documented; hazards analyses prepared; sitewide committee established to address environment, safety and health issues associated with lead; asbestos management function established
	Improve management of chemicals sitewide	Chemical Commodity Management Center established and staffed to review chemical requisitions
	Improve sitewide chemical safety program	Charters of site safety committees expanded to include development and coordination functions for chemical safety

IV. Emphasis on, Commitment to, and Implementation of Chemical Safety Programs

Improving chemical safety at DOE sites will require coordinated efforts by both DOE and site contractors.

This section encompasses seven of the ten response tasks proposed in this Management Response Plan. The first two tasks call for Department of Energy (DOE) sites to develop individual site response plans for chemical safety. At the time of this printing, the first task, the development of initial response plans, has already been accomplished. The next three tasks emphasize focusing management attention on chemical safety. The final two tasks address the implementation of comprehensive programs for chemical safety.

DEVELOPING SITE RESPONSE PLANS FOR CHEMICAL SAFETY

Improving chemical safety at DOE sites will require coordinated efforts by both DOE and site contractors. The first two tasks in this Management Response Plan require direct efforts by the sites, first to develop initial site response plans to address the findings of the Chemical Safety Vulnerability Working Group field verification teams, then to develop more comprehensive response plans based on the generic vulnerabilities identified by the Chemical Safety Vulnerability Working Group and on the guidance provided through the remainder of the tasks proposed in this plan.

TASK 1. Preparing Initial Site Response Plans

The initial site response plans were completed in September 1994.

Chemical Safety Vulnerability Working Group field verification teams visited nine DOE sites. The sites that received field verification visits have developed initial site response plans. These plans describe the actions needed to mitigate or eliminate the facility- and site-specific vulnerabilities identified by the field verification teams at their sites.

The initial site response plans were completed in September 1994 and are reproduced *in toto* in Volume 2 of this Management Response Plan.

TASK 2. Preparing Comprehensive Site Response Plans

All DOE sites that maintain chemical operations, storage facilities, or "legacy" chemical holdings will assess their status and prepare comprehensive site response plans to address the vulnerabilities at their sites.

Many DOE sites have management systems that control some or all of the vulnerabilities identified by the Chemical Safety Vulnerability Working Group. However, these systems are not uniform throughout the complex, and they may not be fully effective. To improve effective management of chemicals and chemical operations across the DOE complex, all DOE sites that maintain chemical operations, storage facilities, or "legacy" chemical holdings will assess their status with respect to the eight generic vulnerabilities identified by the Chemical Safety Vulnerability Working Group and will identify any vulnerabilities not currently controlled under their environment, safety, and health programs. The sites will then prepare comprehensive site response plans to report their vulnerabilities and to address those vulnerabilities requiring mitigation to comply with regulations, standards and DOE Directives.

All sites will address three of the generic vulnerabilities on a priority basis during 1995, and, as practical, will implement actions to address these vulnerabilities by September 1995. These sites will work toward:

- ***Removal of excess or unneeded chemicals.*** **Chemicals will be removed from abandoned facilities and from facilities whose operations have been changed or discontinued so that the chemicals are no longer needed. Priority will be placed on removing large quantities of chemicals, especially if they can be returned to the vendor or disposed of in an environmentally safe manner. Chemicals that cannot be returned will be stored in facilities designed for their storage.**

- ***Proper storage of chemicals.*** **Chemical storage areas will be assessed to ensure that they are adequately designed to contain the chemicals they have and that the chemicals stored in them are adequately segregated according to compatibilities.**

- ***Inventory tracking and control.*** **If not already established under pollution prevention actions or occupational safety and health programs, inventory tracking and control systems will be developed and implementation initiated. The systems will control inventories through tracking chemical locations and quantities from procurement through disposal.**

The comprehensive response plans prepared by the DOE sites will include the implementation strategy and actions for upgrading environment, safety, and health programs to comprehensively address chemicals and chemical operations (see Subtask 6.5). The plans will identify current and draft DOE Orders and existing and proposed regulations and standards related to the eight generic vulnerabilities identified by the Chemical Safety Vulnerability Working Group. They will also discuss the influence that these Orders and regulations have on the planned corrective actions.

The response plans will include discussions of priority and budgetary implications of the planned corrective actions compared with other site priorities. These assessments will consider resource allocations and will provide options for resource decision making.

Lead for Coordination and Implementation: All DOE sites with chemical holdings will develop comprehensive response plans and submit them to their Operations Offices (or equivalent) for review (with copies to their Cognizant Secretarial Offices and to the Action Team for Chemical Safety [see Subtask 3.1]).

In addition, sites will submit letter reports to the Secretary and Cognizant Secretarial Offices summarizing the actions they have taken to implement their comprehensive response plans.

Schedule and Success Measures: DOE sites will submit their comprehensive response plans to their respective Operations Offices and Cognizant Secretarial Offices by June 1995. The plans will be approved by September 1995.

As practical, actions to address the three specific vulnerabilities will be implemented by September 1995.

Letter reports from the sites will be submitted in August 1995, in February and August 1996, and annually thereafter, until the actions in the response plans are completed.

FOCUSING MANAGEMENT ON CHEMICAL SAFETY

The Chemical Safety Vulnerability Working Group identified several vulnerabilities that resulted directly from the actions of mid-level and senior managers in Department of Energy (DOE) and site contractor organizations. DOE policies and actions by senior managers exert a powerful and, often, governing impact on operations. Although these actions can be positive, some management actions have been contributing factors to chemical safety vulnerabilities.

Vulnerabilities have increased due to inadequate management emphasis on, and commitment to, chemical safety, as required by regulations, standards and DOE Directives. Examples can be seen in several management areas, including:

- Decisions to restrict hiring of professionals with expertise in managing hazardous chemicals

- Lack of management participation in private sector organizations and programs such as the Chemical Manufacturers Association's *Responsible Care®* program (see Appendix C)

- Failure to endorse necessary engineering upgrades for facilities and operations and engineering controls to protect workers, the public, and the environment from chemical hazards

Three response tasks have been identified to supplement ongoing management efforts. These tasks provide management direction to institute more effective processes for identifying and addressing chemical safety problems and for implementing environment, safety, and health programs that address chemicals and chemical operations.

TASK 3. Improving Management Direction

An Action Team for Chemical Safety will be chartered to coordinate the tasks in this response plan.

DOE sites identified lack of specific guidance from DOE as a reason for not addressing known deficiencies in environment, safety, and health programs that address chemicals and chemical operations. This task will assist field organizations in integrating DOE, Environmental Protection Agency, and Occupational Safety and Health Administration requirements related to chemical safety to ensure a comprehensive and consistent understanding of compliance objectives.

Actions: An Action Team for Chemical Safety will be chartered to coordinate the tasks in this response plan and to assist in developing DOE approval processes for response plan actions. The Action Team will also develop a "roadmap" for chemical safety. This roadmap, which will be provided to DOE sites, will clarify existing requirements and compliance objectives and provide guidance in achieving them.

DOE will develop and issue a chemical safety policy statement.

Subtask 3.1: Action Team for Chemical Safety. The Office of Environment, Safety and Health (EH) will coordinate the formation of an Action Team for Chemical Safety. This networking team will be composed of representatives from EH, the Cognizant Secretarial Offices, and the Operations Offices. The team will network with line and field organizations to provide guidance, to facilitate solving difficult problems that affect multiple sites, and to assist the sites, as requested, in coordinating and

implementing management response plan actions. The team, as needed, will also recommend modifications to the tasks and subtasks described in this Management Response Plan.

Subtask 3.2: Chemical Safety Policy Statement. EH will develop a policy statement on chemical safety management. The policy will be coordinated with the Cognizant Secretarial Offices and submitted to the Secretary for approval.

Subtask 3.3: Safety Requirements Compilation. The Action Team will consolidate statutory and regulatory requirements for chemical safety and will develop a "roadmap" for implementation of an environment, safety, and health program for chemicals and chemical operations. The roadmap will specify the types of operations covered under various requirements. Chemical management activities under ongoing programs, such as the Chemical Hygiene Plans developed for the Occupational Safety and Health Administration standard, Title 29 of the Code of Federal Regulations (CFR), Part 1910.1450, "Occupational Exposure to Hazardous Chemicals in Laboratories," will be acknowledged. The work will also be coordinated with applicable DOE standards activities. The consolidated requirements and the "roadmap" will be provided to the site contractors for the development of their programs (see Subtask 6.5).

To ensure adequate consistency between regulatory requirements and DOE Orders, the Action Team, as they consolidate requirements, will work with line management to identify any needed changes to DOE Orders. EH will process these Order changes through the DOE Directives System.

Lead for Coordination and Implementation: EH will lead the policy subtask and will initiate changes to DOE Orders through the DOE Directives System. The Action Team will lead the requirements subtask. EH and the Action Team will coordinate their efforts with those of existing Headquarters and site contractor safety committees, such as the EH Industrial Hygiene Coordinating Committee. Changes to tasks or subtasks in this Management Response Plan will be approved by the Cognizant Secretarial Offices.

Schedule and Success Measures: The Action Team for Chemical Safety will be formed and chartered by October 1994. EH will issue a draft chemical safety policy statement by

December 1994. A final statement will be sent to the Secretary for approval by February 1995. The consolidated requirements and "roadmap" will be provided to the site contractors by February 1995. A suggested matrix for a comprehensive chemical safety management program is provided in Appendix B.

DOE will have a policy on chemical safety. All DOE site contractors will have a consolidated set of requirements for chemical safety and will plan work consistent with compliance objectives. DOE Orders will be consistent with Federal regulatory requirements.

TASK 4. Increasing Emphasis on Chemical Safety

At most DOE sites, mid-level and senior managers are unfamiliar with the safety guidelines issued by the Center for Chemical Process Safety or the *Responsible Care®* program established by the Chemical Manufacturers Association. Moreover, few mid-level or senior managers have been trained to understand hazards posed by chemicals used or stored on their sites. Lack of commercial experience; lack of participation in private-sector professional organizations, trade associations, and programs; and lack of familiarity with incidents and accidents in the DOE complex may be causes for the lack of management commitment to ensuring safe chemical operations and safe storage of hazardous chemicals.

Actions: DOE will expand its chemical safety activities to promote an outreach program among the DOE site contractors and private-sector organizations dedicated to chemical safety management. Through its chemical safety policy, DOE will promote site contractors' (i.e., management and operations, environmental restoration, and site integration) active participation in private-sector organizations and programs for the safe management of chemical operations and hazardous chemicals.

DOE will expand its chemical safety activities to promote an outreach program among the DOE site contractors and private-sector organizations dedicated to chemical safety management.

DOE will develop chemical safety performance measures and will incorporate them into site contracts. Performance measures for chemical processes, handling, and storage will be

derived from those advocated by private-sector organizations dedicated to chemical safety and used by commercial chemical industries.

Subtask 4.1: Partnership with Private-Sector Organizations. EH is currently arranging partnership agreements for DOE with the Center for Chemical Process Safety and the Chemical Manufacturers Association. These agreements will give DOE Headquarters, Field and Area Offices, and site contractors access to the products and services offered by these organizations, including published guidelines and workshops on all aspects of chemical process safety and regulatory compliance. In addition, EH will arrange new workshops based on the guidelines, programs, and methodologies developed and recommended by the Center for Chemical Process Safety and the Chemical Manufacturers Association (see Subtask 6.1).

Subtask 4.2: Develop Performance Measures. Performance measures will be drafted by representatives of the Cognizant Secretarial Offices, assisted by EH. The measures will undergo review through the DOE Directives System and, after approval, will be incorporated into new or modified contracts as part of the contract reform initiative.

Lead for Coordination and Implementation: EH will arrange for management workshops based on the programs and guidelines developed and recommended by the Chemical Manufacturers Association and the Center for Chemical Process Safety as part of an expanded effort to increase awareness of process safety management concepts (see Subtask 6.1). Field and line organizations will coordinate input on performance measures.

Schedule and Success Measures: Management workshops will be conducted initially in 1995 and will be repeated annually (see Subtask 6.1). Performance measures will be drafted by December 1994 and will be distributed for review by the Office of the Chief Financial Officer as part of the fiscal year 1997 Unified Budget Call.

TASK 5. Augmenting Oversight Efforts

The approach of this Management Response Plan is to work cooperatively with field organizations to address problems by maximizing the use of existing program activities and budgets instead of creating new centrally managed corrective action programs. This approach will require that EH avoid narrow compliance reviews and, instead, develop broad assessment protocols to gauge progress in mitigating chemical safety vulnerabilities and implementing effective chemical safety programs.

EH will develop improved chemical safety protocols to be used by oversight staff in conducting their assessments.

Actions: Oversight of chemical safety programs within DOE is a continuous activity involving DOE Headquarters and field organizations. This task calls for the development of improved oversight protocols and training.

EH will consolidate information from *The Chemical Safety Vulnerability Working Group Report* and prepare for followup visits and requests for information to focus on progress made in mitigating the vulnerabilities. To minimize commitment of resources, followup visits will be combined with regularly scheduled field office program reviews.

EH will develop improved protocols to be used by oversight staff in conducting their assessments. Oversight assessments will measure progress toward achievement of goals and not simply the degree of regulatory compliance. Protocols and training will be made available to Operations and Field Offices to facilitate field office program reviews.

EH will modify its guidance documents (e.g., Site Resident Manual) to clarify that performance-based reviews will be conducted in chemical safety. EH will also arrange workshops and staff training on performance-based assessments.

Schedule and Success Measures: EH will conduct periodic followup visits to focus on progress made in mitigating the vulnerabilities identified by the Chemical Safety Vulnerability Working Group field verification teams in 1994. Review and assessment protocols that focus on progress in meeting the objectives of this Management Response Plan will be completed by December 1995. Initial staff training in these protocols will be completed by April 1996.

IMPLEMENTING COMPREHENSIVE INTEGRATED PROGRAMS

The Chemical Safety Vulnerability Working Group Report identified several vulnerabilities associated with the lack of complete and integrated programs for chemical safety and facility management.

To guide prevention efforts for the future, programmatic efforts must be directed toward:

- **Developing and implementing integrated environment, safety, and health programs to address the effective management of bulk process and laboratory chemicals, chemical processes, and laboratory practices; and to address management of chemical processes, from facility and process design, through startup, operation, and safe shutdown**
- **Developing and implementing chemical tracking and control systems to address the effective control of chemicals from procurement through disposition**

Program development and changes to improve the integrity and completeness of existing programs will require coordinated efforts by both the Department of Energy (DOE) and site contractors. Two response tasks are described below. Their implementation should prevent the recurrence of the "legacy" vulnerabilities described in *The Chemical Safety Vulnerability Working Group Report.* Both DOE and contractor field management must be dedicated to developing and implementing these prevention programs in order to make them effective.

TASK 6. Developing Environment, Safety, and Health Programs for Chemical Safety

Environment, safety, and health programs will be developed and implemented to address proper management of bulk process and laboratory chemicals, chemical processes, and laboratory practices. These programs will address management of chemical processes, from facility and process design through startup, operation, and safe shutdown. They will not address decontamination of nonoperating or abandoned facilities, mechanical disassembly of chemical facilities or equipment, or waste management.

Environment, safety, and health programs will be developed and implemented to address proper management of bulk process and laboratory chemicals, chemical processes, and laboratory practices.

The intent of these programs is to prevent accidents that can have adverse effects on workers, the public, or the environment. The sites, supported by DOE, will develop and implement the necessary elements for these programs, based on the types and quantities of hazardous chemicals present within facilities, chemical processes, and laboratories; the types and degree of hazards posed; the age of the facilities; and operating histories.

Actions: DOE Headquarters, through the Action Team for Chemical Safety, will assist the sites in developing sitewide integrated environment, safety, and health programs for chemicals and chemical operations to meet regulations, standards and DOE Directives. Appendix B of this report provides examples of the elements for a chemical safety management program, adapted from the Center for Chemical Process Safety of the American Institute of Chemical Engineers, and a matrix that describes the relationship of these elements with the life-cycle stages of a facility, process, or operation. These elements and matrix are provided as guidance to assist DOE sites in developing their environment, safety, and health programs.

The Office of Environment, Safety and Health (EH) chemical safety activities will be expanded to include more frequent workshops on chemical safety management for both DOE and site contractor staff and increased site technical assistance and training in areas such as hazards analysis and process safety management. In addition, DOE and contractor staff will be encouraged to attend appropriate workshops and training courses sponsored by the Center for Chemical Process Safety.

DOE Headquarters, through the Action Team, will review and disseminate information on innovative programs and practices, such as the inventory tracking software developed by Pacific Northwest Laboratory and promoted under the EH Worker Protection Pilot Program. DOE sites will be encouraged to share and adapt these programs, systems, and software packages to minimize costs. DOE Headquarters will also encourage enhanced communication, cooperation, and information-sharing across the sites and among DOE site contractors, such as that achieved through the Energy Facility Contractors Group or the Westinghouse Savings-Through-Sharing program.

DOE sites will develop and implement environment, safety, and health programs for chemicals and chemical operations. As appropriate, these programs will be integrated into larger, existing safety management systems at the sites. The completeness and adequacy of the chemical aspects of the sites' environment, safety, and health programs will be reviewed during DOE appraisals.

Subtask 6.1: Sponsor Management and Technical Workshops. EH will continue to sponsor workshops in safety management and safety culture for DOE and contractor management staff. These management workshops, about two per year, will be based on the guidelines and programs recommended by the Center for Chemical Process Safety and the Chemical Manufacturers Association and will create opportunities for learning and sharing ideas about safety management principles, programs, and tools. The workshops will address such topics as integrated safety management, developing a sound safety culture, and continuous safety improvement.

EH will also continue to sponsor, on a semiannual basis, technical workshops on chemical safety for DOE contractor technical staff. These technical workshops began in August 1994, with a workshop on chlorine that addressed the findings of a recent accident investigation of a chlorine gas release. Future workshops will discuss chemical releases and source terms, chemical interactions, consequence assessments, and strategies for the substitution or elimination of highly hazardous chemicals in DOE operations.

Subtask 6.2: Issue Guidance Documents. By June 1995, EH will finalize and issue draft DOE-STD-XXXX-YR, "Guide for Chemical Process Hazard Analysis." This draft standard is already in the final review cycle by the Cognizant Secretarial Offices. The standard provides guidance to DOE sites on selecting appropriate process hazard analysis methods to comply with the Occupational Safety and Health Administration rule, Title 29 of the Code of Federal Regulations (CFR), Part 1910.119, "Process Safety Management of Highly Hazardous Chemicals."

EH will also assemble a team of Headquarters and field personnel to develop a standard similar to DOE-STD-3009-94, "Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Safety Analysis Reports," to expand on the requirements of DOE Order 5481.1B, "Safety Analysis and Review System." This standard will address the performance of safety analyses and the preparation of safety analysis reports for nonnuclear facilities. The draft standard will be circulated for review and comment in June 1995.

Consistent with the DOE Directives System and the Technical Standards Program, EH or the Action Team will develop and issue other guidance documents and standards, if such documents have not already been developed by government and nongovernment standards bodies. Whenever applicable, existing consensus standards will be used.

Subtask 6.3: Provide Technical Assistance and Conduct Technical Training. Through coordination with the Action Team for Chemical Safety, DOE Headquarters will seek opportunities to provide technical assistance to sites. Assistance may be in the form of specific training or the performance of a specific activity for purposes of demonstration. For example, in 1995, EH will provide technical assistance to DOE sites to ensure the quality of the chemical process safety programs they have developed to comply with the Occupational Safety and Health Administration process safety management rule (29 CFR 1910.119).

DOE Headquarters will seek opportunities to provide technical assistance to sites.

In addition, EH will continue to conduct a 3-day training course in process hazard analysis. This workshop course, which was presented seven times during 1993 and 1994, provides an overview, with examples, of the process hazard analysis methods identified in 29 CFR 1910.119. EH will present this course three times in 1995.

Subtask 6.4: Promote Sharing of Chemical Safety Management Tools. EH will continue to provide "seed money" to sites as part of the Worker Protection Pilot Program. This program provides for the sharing of experience through exchange of personnel who have helped to develop model systems and tools, so that experiences and technologies can be shared across the DOE complex in the fastest possible time. In addition, upon request, EH will provide assistance to sites in adapting the chemical safety tools and technologies to their sites.

The Action Team for Chemical Safety will serve as a clearinghouse for the review and dissemination of information about Pilot Program activities related to chemical safety and of other information about effective chemical safety management tools, including programmatic and software tools, developed and used by the sites. The Action Team will also coordinate with the Energy Facility Contractors Group and other appropriate organizations for dissemination of information.

Subtask 6.5: Develop Program Elements and Implement Programs. The DOE sites will develop and integrate the elements of their environment, safety, and health programs for chemicals and chemical operations and will identify the stages in the life cycles of their facilities, processes, and operations to which the elements apply. The elements and programs will be developed considering both the types and quantities of the chemicals present on a site and the hazards of the site's chemical operations, as stipulated in regulations, standards and DOE Directives. The Action Team will provide assistance to the sites, as requested. The development of these programs will be incorporated into the comprehensive site response plans (see Task 2).

Example descriptions of elements for these programs are presented in Appendix B, Table B-1. These elements are adapted from the Chemical Process Safety Management System developed by the Center for Chemical Process Safety. A matrix of these program elements with process/facility life-cycle phases is provided as Table B-2. These tables are presented as examples that sites may consider in developing their programs.

Sites may integrate the elements of chemical safety into their broader, existing safety programs. Indeed, this approach is preferred over developing separate programs for chemical safety. Existing DOE guidance on chemical safety may also be used, such as that provided in Office of Environmental Management Standard, "Hazard Baseline Documentation" (DOE-EM-STD-5502-94), and DOE Standard, "Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports" (DOE-STD-3009-94).

Lead for Coordination and Implementation: DOE site contractors will develop and integrate the elements for their site environment, safety, and health programs for chemicals and chemical operations. DOE will review and approve the programs. DOE site contractors will be responsible for program implementation.

Schedule and Success Measures: The network for the clearinghouse activities discussed in Subtask 6.4 will be in place by January 1995. Sites will have developed the elements of their environment, safety, and health programs for chemicals and chemical operations as well as the strategy for integrating these elements into their broader, existing safety programs by September 1995. Program implementation will begin immediately thereafter. Progress will be monitored by EH using performance assessment programs and measures developed by field and line organizations (see Subtask 4.2).

TASK 7. Developing Chemical Life-Cycle Management Systems

Effective management systems will be implemented to control hazardous materials on DOE sites through procurement and inventory controls, through substitution and elimination, and through improvements in process design and operation. These efforts will benefit from integration with current DOE pollution prevention initiatives. Priority attention will be placed on the control of legacy chemicals. The recent declassification of information on some legacy chemicals will facilitate this effort.

Effective management systems will be implemented to control hazardous materials on DOE sites.

Actions: To support the Environmental Protection Agency's "33/50 Pollution Prevention Program," DOE issued interim guidance in 1993 on toxic release inventory reporting and on the

reduction in releases of 17 priority toxic release inventory chemicals. In February 1995, DOE will issue a policy statement defining DOE goals and organizational responsibilities, providing guidance on prioritization and funding of pollution prevention initiatives, and developing the strategy required by Executive Order 12856, "Toxic Material Release Inventory Reporting Program."

Pollution prevention requirements related to toxic chemical use and toxic emissions will play an important role in reducing the quantities of toxic materials used within the DOE complex. DOE will also modify configuration control guidance to address the safe storage of hazardous materials and waste.

EH has an ongoing program for the dissemination of a model chemical inventory tracking system (see Task 6, Subtask 6.4). In addition, sites have inventory systems to comply with the Superfund Amendments and Reauthorization Act, Title III, which requires tracking of specific chemicals and preparation of annual reports to the Environmental Protection Agency. Field organizations will avail themselves of existing information and programs to develop and implement a life-cycle approach for controlling hazardous materials. This system will address procurement and delivery; inventory tracking; and control of storage, use, and disposal.

Subtask 7.1: Provide Life-Cycle Guidance. EH will issue guidance on implementing a life-cycle approach for management of hazardous materials, including proposed modifications to configuration control guidance. A program plan will be issued by January 1995.

Subtask 7.2: Update Procurement Regulations. The Office of Human Resources will change procurement regulations to require DOE site contractors to comply with Executive Order 12856, and EH will issue guidance on implementing it. A proposed strategy will be issued by October 1994. Regulations will be updated by June 1995.

Subtask 7.3: Develop Chemical Acquisition Requirements. EH will develop requirements for the acquisition of new chemicals that include minimum qualifications for workers who handle chemicals, as well as minimum storage facility standards. These requirements will be issued through the DOE Directives System in June 1995.

In addition, this plan recommends that draft DOE Order 5480.10A, "DOE Contractor Industrial Hygiene Program," be adopted.

Subtask 7.4: Implement Inventory Tracking and Control Systems. Sites will develop inventory tracking and control systems to control the purchase, delivery, storage, distribution, use, and disposal of hazardous chemicals to meet regulations, standards and DOE Directives.

EH will provide guidance to the sites in developing their inventory control systems. In addition, by August 1995, the inventory-tracking software developed by the Pacific Northwest Laboratory will be made available complexwide through the EH Worker Protection Pilot Program, and EH will arrange for assistance to DOE sites choosing to implement this software. DOE site contractors will be responsible for validating their own inventory control systems. Sites will have operative inventory tracking and control systems by December 1996.

Subtask 7.5: Develop Strategies for Long-Term Control of Legacy Chemicals. Sites will develop strategies for the long-term control of specialty and legacy chemicals no longer in use. Every site will review the status of its chemical storage to determine if action is required either to remove excess chemicals or to implement long-term storage provisions. Each site or appropriate DOE Operations Office will ensure that funding requests are developed to support the proper treatment, storage, or disposal of these chemicals. These funding requests will be discussed in the comprehensive site response plans (see Task 2).

Sites will use existing treatment technologies to stabilize or detoxify specialty and legacy chemicals where they present a hazard to workers or the environment. Where treatment technologies do not exist or are not proven for particular chemical compounds or waste materials, a cost-benefit approach will be applied. Development of treatment or disposal methods will be accelerated for those chemicals or wastes showing the greatest cost-benefit ratios. Resources for planning and implementation will be included in future funding requests.

Lead for Coordination and Implementation: EH will coordinate life-cycle management actions with the Office of Human Resources, the Office of Environmental Management, and the line and field organizations. Each site will be responsible for implementing inventory tracking and control systems.

Schedule and Success Measures: Sites will have functional chemical inventory tracking and control systems meeting requirements by December 1996. Sites will have long-term plans for the control of legacy chemicals by 1997.

All employees working with hazardous chemicals will be trained and qualified to handle them. All legacy chemicals will be controlled.

V. Management of Aging Facilities

***The Chemical Safety Vulnerability Working Group Report* identified several vulnerabilities associated with old facilities still in operation.**

As operating facilities age, the number, variety, and complexity of problems encountered increase. Without sufficient engineering and maintenance attention, the likelihood of accidents involving hazardous chemicals at these facilities also increases. Moreover, these problems are compounded for facilities whose missions and operations have changed or increased over the years.

The Chemical Safety Vulnerability Working Group Report identified several vulnerabilities associated with old facilities still in operation.

To guide efforts to correct these vulnerabilities, actions must address the following problems:

- Facilities are used for purposes other than those for which they were designed, often without adequate safety analyses and engineering modifications or upgrades to ensure the adequacy of facility support systems.

- Facilities are shared and used for multiple purposes without benefit of any unifying management to ensure hazards analyses are complete, workers are informed, and potential adverse interactions are addressed.

- Facilities are not refurbished and continue to operate using outdated and fatigued equipment. Normal surveillance and maintenance are inadequate to ensure the safe operation of these facilities.

Changes to improve the safety and integrity of aging facilities and operations will require coordinated efforts by both the Department of Energy (DOE) and site contractors. The following response task has been identified, whose implementation should help to ensure the safety of old facilities within the DOE complex that continue to operate.

TASK 8. Upgrading Old Facilities That Continue to Operate

Specific actions will be taken to ensure that the age-related and operational problems identified in *The Chemical Safety Vulnerability Working Group Report* are addressed, that comprehensive hazards and engineering analyses are completed for aging facilities, and that facilities are refurbished and upgraded to levels appropriate to ensure safety.

The subtasks described below are generally expansions of existing efforts. They will be performed primarily by existing facility operators and owners. The Office of Environment, Safety and Health (EH) will provide technical assistance for preliminary and detailed hazards analyses, as requested. Line programs will coordinate actions associated with resource allocations.

Subtask 8.1: Conduct Preliminary Hazards Analyses. For those aging facilities housing active chemical operations, field organizations will conduct preliminary hazards analyses, including "walkthroughs" of facilities and surrounding grounds, and will review existing safety analysis and hazards assessment documents. Priority will be given to old facilities currently housing chemical operations for which they were not originally designed, those housing additional operations beyond their design intent, those housing multiple operations with different "owners," and those lacking an identified responsible building manager or management organization.

Preliminary hazards analyses will characterize the types and seriousness of facility and operational hazards, as well as external hazards, and will identify any chemical safety hazards that can be eliminated immediately. Results of the analyses will be used to prioritize the need for further detailed analyses.

Subtask 8.2: Perform Detailed Hazards and Engineering Analyses. For those facilities identified in Subtask 8.1 as requiring further analyses, field organizations will perform detailed hazards and engineering analyses to identify facility support system deficiencies or process hazards.

Performance of detailed hazards and engineering analyses will be prioritized according to the inherent hazards of the chemicals and operations in each facility.

Performance of detailed hazards and engineering analyses will be prioritized according to the inherent hazards of the chemicals and operations in each facility. A schedule will be developed and approved by the Operations Offices for the performance of engineering analyses, process hazard analyses, or both. Priority will be placed on multiple-user facilities and facilities using old equipment or containing residual or legacy chemicals.

Facilities housing chemical operations that have final, approved safety analysis reports (SARs) prepared under either DOE Order 5480.23, "Nuclear Safety Analysis Reports," using DOE Standard, "Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports" (DOE-STD-3009-94), or DOE Order 5481.1B, "Safety Analysis and Review System," need not re-do their analyses. However, safety analyses prepared under DOE Order 5481.1B should be reviewed to ensure that they address not only the potential consequences of failures of existing systems, but also the adequacy of existing systems. (In June 1995, DOE will issue a draft standard providing guidance on the requirements of DOE Order 5481.1B [see Subtask 6.2].) In addition, all modular or functional SARs (SARs prepared for two or more operations of the same type housed in one or more buildings) should be reviewed to ensure that they address both the potential interactions that may occur among neighboring operations that occupy the same building and the adequacy of each building's support systems to support the modular operation and all of its neighbors.

Subtask 8.3: Upgrade and Control Use of Facilities. If hazards and engineering analyses cannot document that facilities are adequate to safely support current operations, field organizations will take appropriate actions to ensure worker safety.

Appropriate actions may include, in order of preference, engineered operational upgrades or engineered backfitting of a facility so that it can safely accommodate the operations it houses; administrative control measures, including better procedures, to limit the potential adverse consequences of continued operation; transfer of insupportable operations in a facility to another, adequately engineered facility; or shutdown of insupportable operations or of the facility itself.

Lead for Coordination and Implementation: Field organizations will conduct the activities associated with these subtasks, with technical assistance from Headquarters, as requested. Line management will address reallocation and reprioritization of facility resources. Engineered operational upgrades and engineered backfitting for facilities housing chemicals and chemical operations will be coordinated with other engineering upgrade initiatives, such as those proposed in the spent fuel and plutonium vulnerabilities management response plans.

Schedule and Success Measures: DOE sites will incorporate schedules for walkthroughs of facilities housing chemical operations, schedules for completing detailed hazards and engineering analyses, and schedules for engineering upgrades into their comprehensive response plans (see Task 2). EH will monitor progress during normal assessment and assistance efforts.

Those aging DOE facilities housing chemical operations that continue to operate will have comprehensive hazards analyses, up-to-date engineering analyses of appropriate depth, and appropriate engineering upgrades implemented according to approved schedules.

VI. Transition of Facilities from Active Status to New Missions or to Decontamination and Decommissioning

The *Chemical Safety Vulnerability Working Group Report* identified several vulnerabilities associated with active facilities transitioning to new missions and new operations and with inactive facilities awaiting transfer to the Office of Environmental Management (EM) for deactivation, decontamination, and final disposition.

To guide efforts to reduce or eliminate these vulnerabilities, actions must address the following problems:

- Throughout their operating histories, most facilities lacked configuration management and documentation of original engineering designs (as-builts) and engineering changes. These circumstances have resulted in inadequate current knowlege of facility engineering configuration and operating history.

- Hazards analyses for some facilities, both active and inactive, either are outdated or do not exist. As a result, chemical hazards in these facilities may not be identified or characterized.

- Line organization staffing and budget resources tend to decrease for inactive facilities awaiting transfer to EM for disposition. As a result, these facilities are left in need of maintenance and repair.

- Former ground-release locations for chemicals and chemical wastes, such as seepage pits, evaporation ponds, lagoons, landfills, burial grounds, and grout injection and hydrofracture sites, may not be identified as "facilities" for transition.

Updating hazards and engineering analyses for active facilities whose missions and operations are changing is discussed in Section V. According to Department of Energy (DOE) Directives, all facilities that will house new chemical operations must evaluate the need for appropriate operational upgrades, engineered safeguards, and administrative controls to ensure their safe operation.

Changes to improve the safety of inactive facilities intended for transfer to EM for deactivation, decontamination, and final disposition will require coordinated efforts by both DOE and site contractors. The following response task has been identified to help ensure the integrity of the transition process and the safety of inactive facilities.

TASK 9. Managing Inactive Facilities

Two efforts related to inactive facilities already have been initiated.

Completion or discontinuation of a facility's mission is often accompanied by funding termination without orderly withdrawal and deactivation of the facility. Some facilities, such as seepage pits, evaporation ponds, lagoons, landfills, and burial grounds, may not be recognized as requiring transition. Regardless of their missions, facilities must be maintained, both physically and administratively, so that they do not pose an undue hazard to the safety and health of workers, the public, or the environment.

Two efforts related to inactive facilities already have been initiated. The EM Surplus Facility Inventory and Assessment Project identified surplus contaminated facilities, their contamination or physical status, and ownership. Also the Office for Field Management (FM) and EM initiated a DOE Process Improvement Team. This team is developing a Department protocol for transferring contaminated surplus facilities to EM that will formalize the transfer process by establishing criteria and organizational responsibilities.

Several of the subtasks described below are expansions of these and other existing Departmental efforts. They are based on limited experience with the facility transfer and deactivation process. In addition, a working group of DOE staff and site contractors will be established to address ownership responsibility and performance expectations. This action will also be coordinated with the ongoing EM Surplus Facility Inventory and Assessment Project.

Subtask 9.1: Identify Facilities. DOE field organizations will extract and consolidate facilities information from existing DOE physical property accounting systems, eliminate duplication, and identify facilities not currently accounted for. Priority will be placed on identifying former ground-release locations for chemicals and chemical wastes, such as seepage pits, evaporation ponds, lagoons, landfills, burial grounds, and grout injection and hydrofracture sites, which may not have been recognized as "facilities" for transfer and deactivation. DOE field organizations will work with Headquarters to organize the information for inclusion in the EM Condition Assessment Survey database.

From this expanded database, the DOE sites will identify as candidate transition facilities ground-release locations, abandoned facilities, and facilities that are nearing or have reached the end of their useful lives.

Subtask 9.2: Establish Facility Ownership and Responsibilities. For all candidate transition facilities, DOE will establish a facility owner, define the facility owner's responsibilities, and clarify performance expectations. Ownership responsibilities will include establishing and revising the facility's mission and functions; identifying and providing minimum levels of staff and funding; providing minimum levels of facility surveillance and maintenance; capturing and retaining "facility knowledge," including records of engineering designs and changes, inventories, incidents, and operating history; establishing and implementing administrative controls and interim compensating measures to maintain safety; and providing for the conduct of activities through transfer to EM for final disposition.

Subtask 9.3: Perform Limited Facility Assessments. Field organizations will perform limited assessments of the types and extent of hazards associated with the candidate transition facilities and ground-release locations per DOE Directives. As appropriate, the chapter on hazard characterization in the draft EH/EM "Handbook for Occupational Safety and Health During DOE Hazardous Waste Activities" may be used to guide hazards assessments. Priority will be placed on characterization of the hazards associated with aging equipment and with residual and legacy chemicals. Previous accidental ground releases will be identified, and both accidental and intentional ground releases will be characterized to the extent possible.

Priority will be placed on characterization of the hazards associated with aging equipment and with residual and legacy chemicals.

The assessment activity may use a format similar to that used by the EM Surplus Facility Inventory and Assessment Project, although it will be simplified to provide for basic inventory and hazard analysis data elements. The assessment information will be organized for inclusion into the DOE Condition Assessment Survey database.

Subtask 9.4: Define Deactivation Responsibilities for Transfer of Ownership. By December 1995, the DOE Process Improvement Team, working with Program Offices, will identify those actions and activities a facility owner must complete before transfer of the ownership of a facility may occur. These activities will include documentation of facility operating experience; analysis of facility hazards to which future workers may be exposed; and documentation of cleanup, treatment, and disposal activities necessary for both facilities and chemical ground releases.

Subtask 9.5: Define the Transition Process. The DOE Process Improvement Team, working with Program Offices, will define the process for transferring facilities to EM for final disposition. Field organizations will identify those activities necessary for the continued safety of the facility, including mission, staffing, funding, surveillance and maintenance, recordkeeping, cleanup, security, and oversight, during the transition process.

Lead for Coordination and Implementation: The five subtasks discussed above will be coordinated and implemented through the EM Surplus Facility Inventory and Assessment Project and the transition process being established by the DOE Process Improvement Team. The fiscal year 1994 and 1995 activities associated with these efforts are already underway. Actions for implementation by field organizations (Subtasks 9.1 through 9.3) will be identified with guidance and assistance from EM.

Schedule and Success Measures: Candidate transition facilities will be identified, facility ownership and ownership responsibilities will be established, and limited hazards assessments will be completed on an on-going basis. A formalized process for transitioning facilities to EM will be in place by June 1996.

By 1998, facility transition will be governed by a well-defined, consistent process to identify facilities for transfer; establish ownership and responsibility; provide for appropriate hazard characterization; conduct surveillance and maintenance, as well as deactivation and cleanup activities; and plan for transition to EM for final disposition.

VII. Budget Decision Making for Chemical Safety

Actions to improve chemical safety programs and eliminate specific chemical problems must compete for limited Department resources.

Effective risk-based planning requires understanding of the costs and benefits of chemical safety activities.

Actions to improve chemical safety programs and eliminate specific chemical problems must compete for limited Department resources. The test for funding any activity under this Management Response Plan will be whether the potential gains from the activity in mission performance, worker and public safety, and quality of the environment exceed those obtainable from other environment, safety, and health activities or other Departmental activities.

Effective chemical safety management and corrective action programs require adequate budgets. Current problems with the practical implementation of risk-based planning and budgeting processes that inhibit mitigation of generic vulnerabilities and implementation of effective prevention programs can be grouped as follows:

- Because of externally imposed limits on indirect costs, environment, safety, and health programs and activities funded solely from overhead accounts are generally limited in their levels of effort. As a result, inactive facilities often receive inadequate maintenance and repairs, and "legacy" chemical wastes receive inadequate surveillance and attention.

- In a constrained budget environment, it is difficult to obtain funds for capital projects that do not eliminate or mitigate significant, visible, immediate risks but that represent improvements in overall risk management. As a result, active facilities often receive inadequate engineering upgrades to support new or additional operations, and "legacy" chemical wastes often are not stored in facilities specifically engineered for them.

- Risks assigned to some vulnerabilities may be too low. Risk-based planning using inadequate information and assumptions may lead to underfunding of environment, safety, and health programs. Risk-based priority systems exclude funding for low-priority activities, thereby resulting in some chemical problems never being addressed.

Improvements in the planning and budgeting process will involve a combination of efforts by the Department of Energy (DOE) and site contractors. Effective risk-based planning requires understanding of the costs and benefits of chemical safety activities. To increase their understanding of chemical safety and risks, planning and management staff at DOE sites, Operations Offices, and Headquarters are requested to attend the management workshops described in Subtask 6.1.

TASK 10. Budgeting for Chemical Safety

The Environment, Safety and Health Management Plan will be the primary vehicle to examine funded and unfunded environment, safety, and health needs. Other initiatives that provide information on environment, safety, and health needs and priorities include the Office of Environmental Management (EM) Surplus Facility Inventory and Assessment Project, which identifies surplus, contaminated facilities throughout the DOE complex, their contamination or physical status, and their ownership.

Most sites have developed risk-based priority management and action tracking systems to assist in managing both low- and high-priority activities within a fixed budget. These systems will be reviewed to ensure that actions to control chemical vulnerabilities are properly funded and scheduled.

Subtask 10.1: Funding Environment, Safety, and Health Programs for Chemical Safety. Working through the ES&H Resource Management Improvement Team, in conjunction with the Chief Financial Officer, the Office of Environment, Safety and Health (EH) will modify the ES&H Management Plan

guidance manual to improve funding and review mechanisms and to enhance management review of overhead funding to support environment, safety, and health programs for chemicals and chemical operations. Modifications of the manual will be completed by December 1994 and provided to the Office of the Chief Financial Officer to be included in the Unified Budget Call for fiscal year 1997. The ES&H database will also be modified to allow easier identification of chemical safety activities.

Field organizations and Program Offices will ensure that adequate environment, safety, and health funding is provided for all facilities in their fiscal year 1997 budget submittals.

Subtask 10.2: Investment in Capital Projects. Working through the ES&H Resource Management Improvement Team, in conjunction with the Chief Financial Officer, EH will modify the ES&H Management Plan guidance manual by December 1994 to improve the mechanism for funding capital projects to mitigate chemical vulnerabilities, such as engineering upgrades for aging facilities. Modifications will be provided to the Office of the Chief Financial Officer to be included in the Unified Budget Call for fiscal year 1997.

Field organizations will propose chemical-safety-related capital projects showing favorable cost/benefit ratios in the Unified Budget Call for fiscal year 1997. The resource planning staffs at Headquarters and at the Operations Offices will review programs to ensure that chemical-safety-related projects are appropriately considered.

Subtask 10.3: Monitoring the Budget Process for Performance. At some sites, internal budgeting processes create preferences for allocation of resources that lead to underfunding of chemical safety programs. The complexwide budget rollup may also result in decisions not to fund or to underfund chemical-related programs. In addition, the allocation process makes it difficult to propose long-term programs that spread costs over many years, as will be required to eliminate many of the "legacy" problems identified in *The Chemical Safety Vulnerability Review.*

Acting in an advisory capacity to field organizations, EH will monitor the budget process as part of the followup to the Chemical Safety Vulnerability Review. The ES&H Resource Management Improvement Team will review the risk-based

allocation practices used to allocate environment, safety, and health resources, as well as the entire prioritization process used to develop the ES&H Management Plan.

Lead for Coordination and Implementation: Consistent with the ES&H Management Plan, EH will coordinate the three subtasks with the line organizations and Operations Offices. Site contractors will prepare their budget plans, and Operations Offices will monitor and review them.

Schedule and Success Measures: The Unified Budget Call for fiscal year 1997 will provide specific guidance for ensuring that the environment, safety, and health component of overhead accounts and capital projects appropriately addresses chemical safety. The fiscal year 1997 budget will be reasonably consistent with ES&H Management Plan projections.

RESOURCE REALLOCATIONS

Integrating environment, safety, and health activities for chemicals and chemical operations into site and facility safety programs will require moderate resource reallocations across the DOE complex. Sites with undeveloped programs will need substantial improvements. These sites must assess their needs and request additional funding.

Integrating environment, safety, and health activities for chemicals and chemical operations into site and facility safety programs will require moderate resource reallocations across the DOE complex.

Development of inventory control programs to reduce the risks to workers posed by hazardous chemicals and to minimize the impacts of chemical releases to the environment through elimination, substitution, or more effective controls will require moderate budget increases and reallocations across the DOE complex. The sites will request support for large capital items, such as process modifications, to allow use of less hazardous chemicals.

Detailed hazards and engineering analyses for aging facilities that continue to operate will require substantial resource increases. Engineered upgrades for these facilities will require even more resources. The sites will provide plans to address these problems, and DOE Headquarters will determine the timing and level of funding.

Progress toward elimination of DOE's chemical "legacy" (e.g., identification and characterization of abandoned chemicals and chemical residuals; location of past chemical spills and characterization of past intentional ground releases;

identification of the chemical constituents of legacy wastes; and disposition of excess chemicals) will also require increased allocations across the DOE complex. The sites must assess their needs and request additional funding.

EM resource issues concerning facility transition and decontamination and decommissioning are outside the scope of this Management Response Plan, and the transition subtasks in this plan are limited to supporting EM activities.

APPENDIX A

TASK SUMMARIES

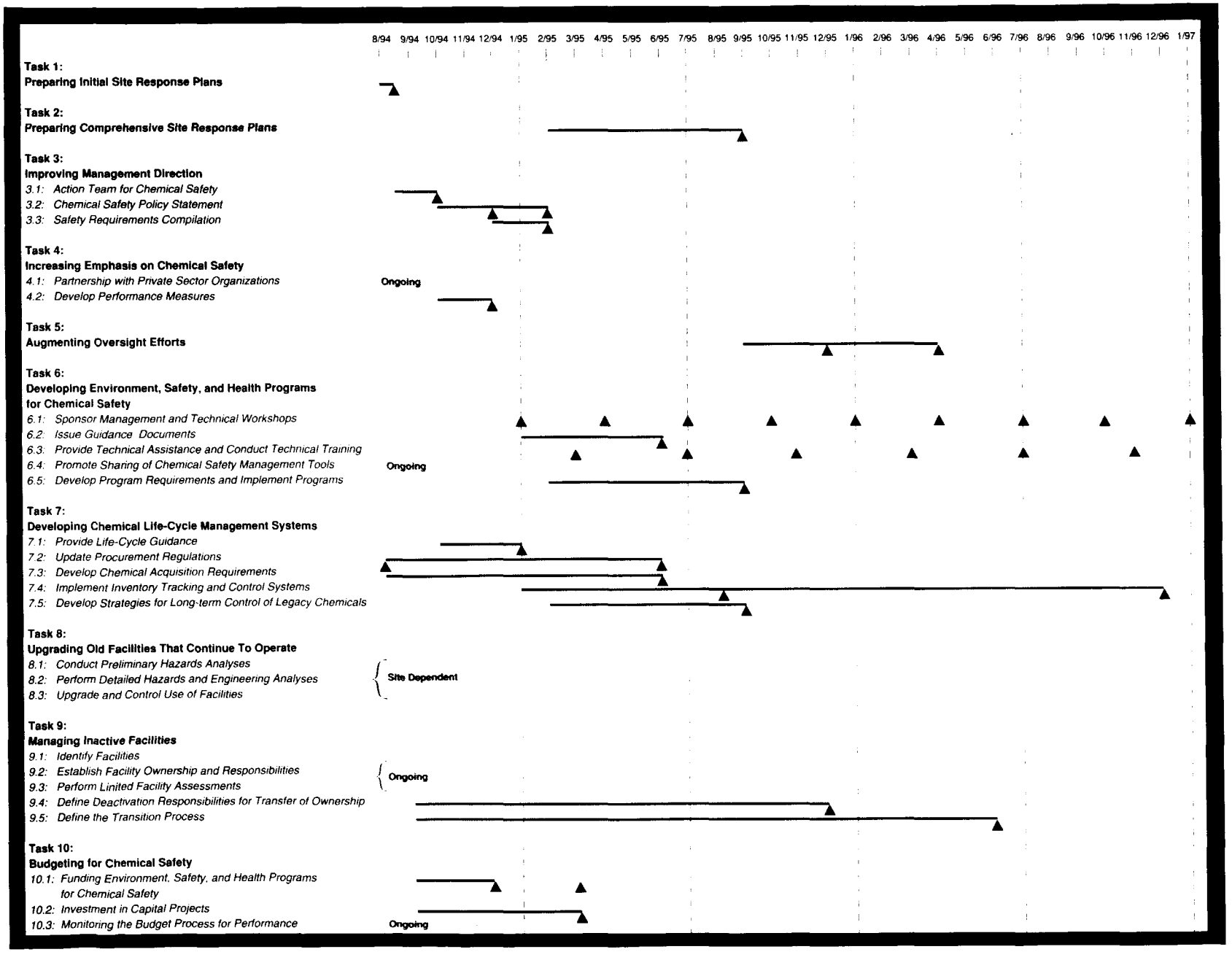
Table A-1. **Summary of Responsibilities, Products, and Schedules for Response Plan Actions**

TASK	RESPONSIBILITY	PRODUCTS	DATES
EMPHASIS ON, COMMITMENT TO, AND IMPLEMENTATION OF CHEMICAL SAFETY PROGRAMS			
Task 1: Preparing Initial Site Response Plans	9 Sites	Initial Plans	9/94
Task 2: Preparing Comprehensive Site Response Plans	All Sites	Comprehensive Plans	9/95
FOCUSING MANAGEMENT ON CHEMICAL SAFETY			
Task 3: Improving Management Direction			
Subtask 3.1: Action Team for Chemical Safety	DOE-EH/Line Organizations	Formation of Team	10/94
Subtask 3.2: Chemical Safety Policy Statement	DOE-EH	Draft Policy Final Policy	12/94 2/95
Subtask 3.3: Safety Requirements Compilation	Action Team	Chemical Safety Requirements and "Roadmap"	2/95
Task 4: Increasing Emphasis on Chemical Safety			
Subtask 4.1: Partnership with Private Sector Organizations	All	Participation in Private Sector Programs	Ongoing
Subtask 4.2: Develop Performance Measures	DOE-CSOs	Performance Measures	12/94
Task 5: Augmenting Oversight Efforts	DOE-EH DOE-EH	Oversight Protocols Protocol Training	12/95 4/96
IMPLEMENTING COMPREHENSIVE INTEGRATED PROGRAMS			
Task 6: Developing Environment, Safety, and Health Programs for Chemical Safety			
Subtask 6.1: Sponsor Management and Technical Workshops	DOE-EH	Workshop Proceedings	4/yr.
Subtask 6.2: Issue Guidance Documents	DOE-EH DOE-EH/Line Organizations	Process Hazard Analysis Standard Draft Preparation Guide/Implementation Standard for DOE 5481.1B	6/95 6/95
Subtask 6.3: Provide Technical Assistance and Conduct Technical Training	Action Team/DOE-EH DOE-EH	Technical Reports Training Courses	Ongoing 3/yr.
Subtask 6.4: Promote Sharing of Chemical Safety Management Tools	DOE-EH Action Team	Program Pilots Clearinghouse Network	Ongoing 1/95
Subtask 6.5: Develop Program Requirements and Implement Programs	Sites	Implementation Strategy (part of Site Plans, Task 2)	9/95

Table A-1. **Summary of Responsibilities, Products, and Schedules for Response Plan Actions** (Continued)

TASK	RESPONSIBILITY	PRODUCTS	DATES
Task 7: Developing Chemical Life-Cycle Management Systems			
Subtask 7.1: Provide Life-Cycle Guidance	DOE-EH	Life-Cycle Guidance	1/95
Subtask 7.2: Update Procurement Regulations	DOE-EH	Implementation Strategy	10/94
	DOE-HR	Updated Regulations	6/95
Subtask 7.3: Develop Chemical Acquistion Requirements	DOE-EH	Acquisition Requirements	6/95
Subtask 7.4: Implement Inventory Tracking and Control Systems	Sites/DOE-EH	Requirements	8/95
		Implementation	12/96
Subtask 7.5: Develop Strategies for Long-Term Control of Legacy Chemicals	Sites	Legacy Chemical Strategies (part of Site Plans, Task 2)	9/95
MANAGEMENT OF AGING FACILITIES			
Task 8: Upgrading Old Facilities That Continue to Operate			
Subtask 8.1: Conduct Preliminary Hazards Analyses	Sites	Preliminary Hazards Analyses	Site Plans
Subtask 8.2: Perform Detailed Hazards and Engineering Analyses	Sites	Process Hazards and Engineering Analyses	Site Plans
Subtask 8.3: Upgrade and Control Use of Facilities	Sites	Engineering Upgrades	Site Plans
TRANSITION OF FACILITIES FROM ACTIVE STATUS TO NEW MISSIONS OR TO DECONTAMINATION AND DECOMMISSIONING			
Task 9: Managing Inactive Facilities			
Subtask 9.1: Identify Facilities	Sites	Updated Condition Assessment Database	Ongoing
Subtask 9.2: Establish Facility Ownership and Responsibilities	Sites	Ownership Determinations	
Subtask 9.3: Perform Limited Facility Assessments	Sites	Facility Assessments	
Subtask 9.4: Define Deactivation Responsibilities for Transfer of Ownership	DOE-FM/DOE-EM	Deactivation Responsibilities	12/95
Subtask 9.5: Define the Transition Process	DOE-FM/DOE-EM	Transition Process	6/96
BUDGET DECISION MAKING FOR CHEMICAL SAFETY			
Task 10: Budgeting for Chemical Safety			
Subtask 10.1: Funding Environment, Safety, and Health Programs for Chemical Safety	RMI Team	Modified ES&H Management Manual	12//94
	Sites	ES&H Overhead Submittals	3/95
Subtask 10.2: Investment in Capital Projects	RMI Team	Modified ES&H Management Manual	12/94
	Sites	Capital Projects Proposed	3/95
Subtask 10.3: Monitoring the Budget Process for Performance	DOE-EH	Budget Process Review	Ongoing

Table A-2. **Gantt Chart of Response Plan Tasks**



APPENDIX B

ELEMENTS FOR CHEMICAL SAFETY MANAGEMENT PROGRAMS

Table B-1. **Descriptions of Elements for Chemical Safety Management Programs**

ELEMENT	DESCRIPTION
ACCOUNTABILITY OBJECTIVES AND GOALS	Demonstrate that safety is an important management function and that setting criteria for safe operation is essential to success. Accountability objectives reinforce the message that safety goals can be used as a basis for monitoring performance and making decisions.
PROCESS KNOWLEDGE AND DOCUMENTATION	Capture operating experiences and technical expertise important to facilities and operations so that others can easily and quickly retrieve and use the information. Responsibility for maintaining process documentation must be very clearly defined, communicated, and understood. Documentation is good practice that can also fulfill regulatory requirements.
CAPITAL PROJECT REVIEW & DESIGN PROCEDURES	Ensure that hazards associated with a process or operation have been identified and that adequate resources are available to minimize risk to workers, the public, and the environment, and to ensure continuity of operations, especially before new operations commence. Project review also facilitates compliance with local, State, and Federal standards and regulations.
PROCESS RISK MANAGEMENT	Identify hazards associated with normal, off-normal, and emergency conditions. Implement actions necessary to reduce the potential for acute releases of dangerous toxic, flammable, explosive, and reactive materials.
MANAGEMENT OF CHANGE	Many changes at DOE facilities are made by maintenance and operations personnel. Ensure that all changes result in operations within established safety operating limits. Ensure a systematic approach to analyzing and administering changes in equipment, processes, and personnel at a facility. Identify, analyze, review, and minimize risks associated with changes. Procedures can ensure that modifications to a facility or process are reviewed and implemented by knowledgeable personnel who assess the risk, take necessary actions, and establish a followup system.
PROCESS AND EQUIPMENT INTEGRITY	Ensure that all equipment is fabricated, installed, and maintained in accordance with design specifications. A documented history should be maintained for all equipment, including initial equipment, any new or replaced equipment, maintenance, and modifications.
HUMAN FACTORS	Human factors play a significant part in process incidents. Ensure that operators, processes, and equipment are "compatible." Placement of equipment, positioning of dials, color coding, etc., can greatly affect operator's ability to perform a task correctly, particularly during process upsets.
TRAINING AND PERFORMANCE	Implement site-specific training. Training and performance programs ensure that workers understand safety hazards associated with their jobs and the precautions necessary to prevent incidents and accidents. All training programs must be documented and a feedback system implemented, including an evaluation to verify that training meets management objectives for safe operations. Training must be specific to job type (e.g., process operator, maintenance personnel, supervisor, ES&H personnel) and must include periodic refresher courses. Changes or new information and lessons learned from chemical process incidents must be communicated to workers and incorporated into training programs.
INCIDENT INVESTIGATION	Incidents that result in, or could result in, fires, explosions, runaway reactions, or releases of highly toxic or flammable materials must be investigated. Management systems must be in place to ensure identification of all causes, including management system failure. Appropriate corrective actions must be taken to prevent recurrence. Information about causes of unplanned incidents provides primary basis for continuous safety improvement.
DOE ORDERS AND OTHER REGULATIONS	Ensure that internal and external guidelines, standards, and regulations are kept up-to-date and disseminated to appropriate departments and personnel. Variance procedures must be a part of the management system, so that changes meet the intent of the guidelines, standards, and regulations and do not compromise safety.
AUDITS AND CORRECTIVE ACTIONS	Audits provide site-specific and/or facility-specific feedback on safety efforts, such as whether procedures are timely, complete, and up-to-date; whether they comply with Orders and regulations; and whether they incorporate good safety practices. They also provide feedback on the status and effectiveness of safety management efforts versus goals or progress toward goals.
ENHANCEMENT OF PROCESS SAFETY KNOWLEDGE	Create a dynamic program that builds on the experience and knowledge within the DOE complex as well as emerging scientific and technical advances. Collection and use of this information should lead to improved productivity as well as enhanced safety.
EMPLOYEE PARTICIPATION	Involve employees at an elemental level in the performance of hazards analyses, the development of accident prevention plans, and the conduct of incident investigations and audits. Provide employees with access to all safety information and analyses.

Table B-2. **Example Matrix of Program Elements Needed During the Life-Cycle Stages of a Facility, Process, or Operation**

Prgm. Elem. / L-C Stage	Concept. Design	Definit. Design	Construct.	Equip. Procure.	Equip. Test	Start-up	Normal Ops.	Test & Maint.	Norm./Int. Shutdown	Rout. Start	Ops. Mod./ Temp. Ops.	Perm. Shutdown	Deact./ Pre-D&D	D&D
Account.	2	2	2	2	2	2	1	2	2	2	1	2	2	2
Process Docs.	1	1	2	1	2	1	2	1	2	2	1	2	2	
Proj. Rev. & Design	1	1	3	2	2	1					1			
Risk Mgmt.	2	1		2	2	2	2				1	2	2	
MOC	2	2	1	2	2	2	2				1	2	1	3
Equip. Integ.	3	2	2	1	1	2	2	1		2	2		3	
Human Facs.		1	1	3		2	2	3			1		2	
Train. & Perf.		2	2		3	1	1	1	1	1	2	2	2	2
Incident Invest.			2			2	1	2			2		2	2
Orders & Regs.	1	1	2	2	2	2	1	1	2	2	2	2	1	2
Audits & Correct. Acts.			2	2	2	2	1	2	2	2	1	2	2	2
Enhance. Knowl. & Tech.	3	1					1	2			2	2	2	
Employee Particip.		2					1	2	2		2	2	2	2

KEY: 1 = Primary Association
2 = Secondary Association
3 = Incidental Association

ROWS:

Prgm. Elem. = Program Elements
Account. = Accountability Objectives and Goals
Process Docs. = Process Knowledge and Information
Proj. Rev. & Design = Capital Project Review and Design Procedures (for new or existing facilities and expansions or modifications)
Risk Mgmt. = Process Hazard and Risk Management
MOC = Management of Change
Equip. Integ. = Process and Equipment Integrity
Human Facs. = Human Factors
Train. & Perf. = Training and Performance
Incident Invest. = Incident Investigation
Orders & Regs. = DOE Orders and Other Regulations
Audits & Correct. Acts. = Audits and Corrective Actions
Enhance. Know. & Tech. = Enhancement of Process Safety Knowledge and Technology
Employee Particip. = Employee Participation

COLUMNS:

L-C Stage = Life-Cycle Stages
Concept. Design = Conceptual Design
Final Design = Final Design
Construct. = Construction
Equip. Procure. = Equipment Procurement
Equip. Test. = Equipment Acceptance Testing
Init./Mod. Start. = Initial Start-Up and Start-Up after Operational Modifications
Normal Ops. = Normal Operations
Test. & Maint. = Routine Testing, Inspection, and Maintenance
Norm./Int. Shutdown = Normal/Interim Shutdown
Rout. Start. = Routine Start-Up after Maintenance
Ops. Mod./Temp. Ops. = Operations Modification/Temporary Operations
Perm. Shutdown = Cessation of Operations/Permanent Shutdown
Deact./Pre-D&D = Deactivation/Pre-Decontamination & Decommissioning
D&D = Decontamination & Decommissioning

APPENDIX C

RESPONSIBLE CARE©

Responsible Care®

The *Responsible Care®* program consists of six codes of performance-based management practices that promote commitment, innovation, and continuous improvement.

CODE 1: Community Awareness and Emergency Response. This code promotes emergency response planning and coordination with community and local government officials to ensure emergency preparedness and to improve community right-to-know regarding chemical hazards.

CODE 2: Distribution Code. This code addresses public and worker safety risks from chemical transportation activities including storage, handling, and packaging.

CODE 3: Pollution Prevention. This code encourages environmental protection to minimize emissions and waste production during chemical manufacture.

CODE 4: Process Safety. This code focuses on plant safety including measures taken to prevent fires, explosions, and accidental chemical releases.

CODE 5: Employee Health and Safety. The objective of this occupational safety code is to improve worker and visitor safety.

CODE 6: Product Stewardship. The most recently developed, this code promotes safe management of chemicals from initial research through recycling and disposal.

Responsible Care® is a registered trademark of the Chemical Manufacturers Association.