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**K/TSO-30**
**Rev. 4**

# $UF_6$ CYLINDER PROJECT MANAGEMENT PLAN

**JULY 1999**

**ENRICHMENT FACILITIES MANAGEMENT**

**K/TSO-30**
**Rev. 4**

# $UF_6$ CYLINDER PROJECT MANAGEMENT PLAN

## ENRICHMENT FACILITIES MANAGEMENT

## JULY 1999

**Prepared by:**
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**managed by**
**BECHTEL JACOBS COMPANY LLC**
**for the**
**U. S. DEPARTMENT OF ENERGY**
**under contract DE-AC05-98OR22700**

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# ACRONYMS

| | |
|---|---|
| ASME | American Society of Mechanical Engineers |
| CID | Cylinder Information Database |
| CM | configuration management |
| DADs | Detailed Activity Directives |
| DNFSB | Defense Nuclear Facilities Safety Board |
| DOE | Department of Energy |
| $DUF_6$ | depleted uranium hexafluoride |
| EDP | Engineering Development Plan |
| HQ | headquarters |
| ISMS | Integrated Safety Management System |
| K-25 | K-25 Site |
| LMES | Lockheed Martin Energy Systems, Inc. |
| MOA | Memorandum of Agreement |
| MOU | Memorandum of Understanding |
| NE-1 | Office of Nuclear Energy-DOE |
| NE-30 | Office of Depleted Uranium Hexafluoride Management-DOE |
| NMC&A | Nuclear Material Control and Accountability |
| ORO | Oak Ridge Operations |
| PGDP | Paducah Gaseous Diffusion Plant |
| PORTS | Portsmouth Gaseous Diffusion Plant |
| PMP | Project Management Plan |
| SAR | Safety Analysis Report |
| SEMP | Systems Engineering Management Plan |
| SRD | System Requirements Document |
| TAD | Task Assignment Directives |
| $UF_6$ | uranium hexafluoride |
| UP | Uranium Programs |
| USEC | United States Enrichment Corporation |
| USQD | Unreviewed Safety Question Determination |
| WAs | Work Authorizations |
| WAD | Work Authorization Directive |
| WBS | work breakdown structure |
| WCS | work control structure |
| WSS | work smart standards |

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# EXECUTIVE SUMMARY

The Department of Energy manages an inventory of uranium hexafluoride through the Uranium Hexafluoride Cylinder Project. The uranium hexafluoride is stored in steel cylinders, which are located at the East Tennessee Technology Park (formerly known as K-25 Site), in Oak Ridge, Tennessee, and at the gaseous diffusion plants in Portsmouth, Ohio, and Paducah, Kentucky. The various types of construction and the subsequent deterioration of the storage yards have led to substandard storage conditions for many of the cylinders. Cylinder design affects the location of corrosion. Design of handling methods has affected the number of cylinders damaged by operations.

In response to Defense Nuclear Facilities Safety Board Recommendation 95-1 on Depleted Uranium, Lockheed Martin Energy Systems, Inc., and its successor Bechtel Jacobs Company LLC committed to using a Systems Engineering approach for managing the $UF_6$ Cylinder Project activities. The Systems Engineering approach provides assurance that Project activities and their integration will be improved.

The $UF_6$ Cylinder Project Management Plan is one of four key Systems Engineering documents used by the Bechtel Jacobs Company, to manage the storage of uranium hexafluoride in cylinders. It is the Systems Engineering document for specifying when operations are to be accomplished. The Project Management Plan describes roles and responsibilities, the Project work control structure, and schedule of activities. A key component of the work control structure is the work breakdown structure.

The work breakdown structure provides the following detail:

- work breakdown flow chart that describes the relationship of the work breakdown structure elements,
- work breakdown structure dictionary to define each element including the Systems Engineering Management Plan activities allocated to the work breakdown structure elements.

This plan is the Project Manager's tool for ensuring that planned activities are communicated to responsible individuals and that progress toward completing the Project mission is demonstrated.

# 1. INTRODUCTION

## 1.1 BACKGROUND

The Department of Energy (DOE) owns an inventory of uranium hexafluoride ($UF_6$) nominally less than 5% enrichment. This inventory is managed by the $UF_6$ Cylinder Project. The bulk of the DOE inventory is 675,000 metric tons of depleted $UF_6$ ($DUF_6$) produced by the gaseous diffusion plant enrichment process. The balance of the inventory is normal assay and low-enriched assay $UF_6$ contained in cylinders.

The inventory is stored as a crystalline solid principally under vacuum. The $DUF_6$ is stored primarily in 48-inch-diameter steel cylinders with capacities of 10 or 14 tons. Typical cylinders are 5/16-inch-thick pressure vessels that were designed and manufactured to the American Society of Mechanical Engineers (ASME) code.[1] The cylinders are maintained at three sites: the Paducah Gaseous Diffusion Plant (PGDP), in Paducah, Kentucky; the Portsmouth Gaseous Diffusion Plant (PORTS), in Piketon, Ohio; and the East Tennessee Technology Park (formerly known as the K-25 Site or K-25), in Oak Ridge, Tennessee. The inventory of cylinders containing $DUF_6$ is distributed at the three sites as follows: 35,200 cylinders at PGDP; 16,100 cylinders at PORTS; and 4,800 cylinders at the East Tennessee Technology Park.

After a significant inventory of $DUF_6$ was produced from the enrichment process, outdoor storage facilities evolved independently at the sites. Cylinder yards were constructed of either concrete or compacted gravel, and cylinders were stacked in two-tiered rows on wooden or concrete saddles. The handling equipment used to stack these cylinders in double-tiered rows has also evolved, from mobile cranes to specially designed tractors that grasp and lift the cylinders with hydraulically actuated tines.

Until 1990, surveillance of the $DUF_6$ consisted of an annual nuclear materials inventory of the cylinders. The East Tennessee Technology Park cylinder yards were surveyed in May 1990 to provide input for planning long-term corrosion monitoring of cylinders. Cylinder valves with corrosion and evidence of potential valve leakage were discovered. A June 1990 survey of valves of cylinders at PORTS revealed two cylinders with breached side walls. Investigation of these cylinder breaches determined that the causes were mechanical tears caused by impact from the lifting lugs of adjacent cylinders.[2] Subsequent inspections of stored $DUF_6$ cylinders revealed four breached cylinders at the East Tennessee Technology Park. Two breaches were attributed to handling damage, and two were most likely initiated by external corrosion resulting from substandard storage conditions.[3] Another breached cylinder resulting from handling damage was discovered at PGDP. In 1998, a pinhole sized breach was discovered at ETTP during cylinder refurbishment operations. This latest breach most likely stemmed from a weld flaw.

The risk to personnel health and safety, and the potential environmental impact, posed by these cylinder breaches and valve leaks has been low, by nature of the system. The $UF_6$ inventory is stored as a solid. Reaction deposits formed when $UF_6$ is exposed to the atmosphere in the presence of the mild steel containers have a self-sealing nature. The bulk of the inventory is depleted in the fissionable isotope of the $UF_6$ such that the hazard is mostly chemotoxic, not radiological. These factors contribute to the low risk incurred from these and potential additional failures. This low risk was confirmed by analysis of the air and soil samples collected near the breaches at PORTS and by subsequent weighing of the cylinders. Although the risk posed by these breaches is low, the existence of breached cylinders heightened the importance of a comprehensive, long-term three-site cylinder management program. Consequently, in 1992, a cylinder integrity management plan was developed to address concerns within the storage yards and to establish the initial premise of the Project today.[4]

On May 5, 1995, the Defense Nuclear Facilities Safety Board (DNFSB) issued to DOE a recommendation regarding the storage of depleted $UF_6$ in cylinders.[5] The recommendations are summarized as follows:

- Start an early program to renew the protective coating of cylinders containing the tails from the historical production of enriched uranium.
- Explore the possibility of additional measures to protect these cylinders from the damaging effects of exposure to the elements, as well as any additional handling that may be called for.
- Institute a study to determine whether a more suitable chemical form should be selected for long-term storage of the depleted uranium.

On June 29, 1995, DOE accepted Recommendation 95-1[5] and emphasized five focus areas for DOE response:

- removing cylinders from ground contact and keeping cylinders from further ground contact;
- relocating all cylinders into adequate inspection configuration;
- repainting cylinders as needed to avoid excessive corrosion;
- updating handling and inspection procedures and site-specific Safety Analysis Reports (SARs); and
- completing an ongoing study that will include an analysis of alternative chemical forms for the material.

On October 16, 1995, DOE submitted an Implementation Plan[6] that incorporated completed and near-term activities in accordance with these five focus areas. The Implementation Plan[6] also committed to managing the $UF_6$ Cylinder Project using a Systems Engineering approach. The approach was developed concurrent with field response activities and was enhanced through an open dialogue among DNFSB staff and personnel from DOE and Lockheed Martin Energy Systems, Inc. (LMES). The Implementation Plan[6] specifies the following interim and final deliverables and defines their respective content to establish an operative Systems Engineering process for the continued improvement of depleted $UF_6$ management through the $UF_6$ Cylinder Project. The deliverables are:

- System Requirements Document (SRD);[7]
- System Engineering Management Plan (SEMP);[8]
- Engineering Development Plan (EDP);[9]
- $UF_6$ Cylinder Project Management Plan (PMP); and
- Approved SARs.[10, 11, 12]

## 1.2 OVERVIEW

***The purpose of the PMP is to define the three-site $UF_6$ Cylinder Project work scope, schedule, costs, and the roles and responsibilities of participating organizations.***

As stated in the Implementation Plan, the PMP provides the work breakdown structure, establishes schedule and costs, and is used to control the Project. In order for the PMP to be an effective tool for controlling the execution of Project activities in the field, it must be in a usable format and understandable to the workers. A Project life cycle cost projection is provided in Fig. 3.4. Detail Project cost information is available in the Baseline Program Plan for Enrichment Facilities and the Project Detailed Activity Directives (DADs).

The work control structure (WCS) in Section 3 provides:

- the allocation of work activities into elements for Project control and integration,
- the mechanisms for controlling these elements including command media, and
- the performance measures to assess progress.

In the SEMP, these three parameters of the WCS are identified as the work breakdown structure (WBS), the specification tree, and the performance tree, respectively. The WBS is complimented with a WBS dictionary that defines work elements for planning, prioritization, and control. The WBS also facilitates the ability to identify interfaces among work elements for integration of the overall Project. The specification tree identifies how work elements are completed and includes command media such as procedures, policies, and contracts to accomplish work. The specification tree also includes the verification method for the Project including verification of the scope and verification of completed activities. The cost data collected in the Uranium Programs Baseline Program Plan is used for measuring and reporting actual cost performance. Monthly budget performance is reported. Cost variances are explained, and solutions are recommended. The performance tree provides the metrics used to monitor progress within the Project toward mission completion. Performance measures include metrics of cost, schedule, and technical performance. These measures are provided for near-term activities (the next 18 months) by WBS elements and for Project life-cycle activities at the WBS summary levels.

# 2. ROLES AND RESPONSIBILITIES

Management of DOE's depleted, natural, and enriched uranium is the responsibility of the Office of Nuclear Energy, Science and Technology (NE-1) and the Office of Depleted uranium Hexafluoride Management (NE-30). A program manager for depleted uranium resides under NE-30, Office of Depleted Uranium Hexafluoride Management. In accordance with the Energy Policy Act of 1992,[13] the Director of NE-1 is responsible for executing DOE's obligations with respect to materials not transferred to or generated by United States Enrichment Corporation (USEC). The Director of Nuclear Energy reports to the Secretary of Energy and is also responsible for ensuring execution of DOE's 1995 Implementation Plan[6] commitments to DNFSB. Overall Project policy, planning, and management (with particular emphasis on maintaining integration in support of ultimate material disposition) are carried out by the Director, a principal subordinate in NE-30, or a designee (the Assistant Manager for Uranium and Engineering Services). The DOE Site Manager is the contact for DNFSB within the responsibility of the Assistant Manager for Uranium and Engineering Services.

The $UF_6$ Cylinder Project is part of the Enrichment Facilities Program in the Bechtel Jacobs Company. The $UF_6$ Cylinder Project organization is shown in Fig. 2.1. Specific roles and responsibilities for Project personnel are provided in Section 2.1-2.4.

## 2.1 THREE-SITE $UF_6$ CYLINDER PROJECT MANAGER

Project Role: Manage, integrate, and guide the three-site $UF_6$ Cylinder Project.

Project Responsibilities:

- Lead and integrate the three-site Project level team in strategic planning, development, prioritization, and optimization.
- Develop and refine the Systems Engineering approach. As necessary, revise the SRD, SEMP, and PMP.
- Develop and maintain a roll-up of three-site Project cost and schedule baseline to meet overall Project goals and milestones. Each site is responsible for developing and, once agreed to, maintaining site-specific goals and milestones to meet overall project requirements.
- Ensure three-site consistency in requirements and implementation via the Systems Engineering process.
- Measure and verify Project performance within Bechtel Jacobs Company LLC and communicate performance to the EF Program Manager, and to Paducah and PORTS project managers, with particular emphasis on the commitments made to DNFSB.
- Provide adequate support for development of DOE's Programmatic Environmental Impact Statement by identifying issues and coordinating three-site resolution.
- Provide Project guidance for development and implementation activities.
- Communicate the safety, timeliness, and cost efficiency of the Project.
- Serve as the central point of contact for DOE-ORO and DOE-HQ project information requests. Coordinate with three-site personnel to ensure accurate information and good communication.
- Provide monthly status to the Bechtel Jacobs EF Program Manager and Paducah, PORTS, and ETTP project managers, on performance relative to budget, schedule, and milestones.

- C Lead development and integration of three-site corrective actions to maintain consistency with Project mission and objectives.
- C Coordinate and provide Bechtel Jacobs response to DNFSB Recommendation 95-1[5] in accordance with the DOE Implementation Plan[6] and as necessary.

Interfaces: The Three-Site $UF_6$ Cylinder Project Manager takes direction from EF Program Manager and interfaces with Paducah, PORTS, and ETTP project management; site cylinder personnel; site subject matter (environmental, safety and health) experts; legal; and DOE-ORO personnel or their designees. Project Management also interfaces with DNFSB staff and DOE-Headquarters (HQ) personnel on specific issues with the awareness of DOE-ORO Assistant Manager for Uranium and Engineering Services or his designee (DOE Paducah Site Manager) and with the EF Program Manager.

## 2.2 THREE-SITE $UF_6$ CYLINDER OPERATIONS MANAGER

Project Role: Establish efficient, consistent three-site procedures/methods for executing work. Verify work is compliant with established controls. Ensure that safety and performance concerns are understood and actions are taken to improve performance in all areas.

Project Responsibilities:

- Maintain and develop Work Smart Standards for the project by coordinating with the three-site operating personnel.
- Assist PGDP, PORTS, and ETTP project managers and staff personnel in implementing an integrated safety management approach to project work.
- Coordinate and integrate establishment of three-site operations safety envelope.
- Coordinate and integrate development and maintenance of three-site procedures and guidelines as necessary to ensure work is performed safely and consistently.
- As directed by the Three-site $UF_6$ Cylinder Project Manager and with concurrence of Site Project Managers, approve Three-site Operations Procedures.
- C Coordinate and verify SAR requirement flow-down matrices are consistently maintained in the three-site procedures.
- C Assist in assessing site operations to ensure work is performed in accordance with procedures.
- C Serve as central point of contact for the three-site Cylinder Project personnel for operational issues and performance.
- C Facilitate three-site consistency in requirements and implementation via the Systems Engineering process.
- C In conjunction with Site Project Taskheads, perform the three-site assessment to verify execution of three-site Project requirements.
- C Provide Project guidance for implementing three-site Project activities.
- C Coordinate and integrate all activities related to transmittal of data from CID for use by the Nuclear Material Control and Accountability (NMC&A) systems, the cylinder inventory modeling system, and other systems that require data from CID.

Interfaces: The Operations Manager takes direction from the Three-site $UF_6$ Cylinder Project Manager and interfaces with the EF Program Manager and Paducah, PORTS, and ETTP project managers, subcontractors, site cylinder personnel, site subject matter experts, legal, DOE-ORO personnel, DNFSB staff, DOE-HQ personnel, and business and finance personnel.

## 2.3 THREE-SITE TECHNICAL MANAGER

Project Role: Facilitate development of contingency requirements for the $UF_6$ Cylinder Project; participate in technical investigations and evaluations including procurement; represent technical aspects of the Project to DNFSB and DOE; and participate in implementation of the Systems Engineering process.

Project Responsibilities:

- Obtain technical guidance on corrosion issues (includes painting and related specification and vendor evaluations, inspection requirements, results interpretation, and valve monitoring concerns) in coordination with site Project personnel.
- Manage and integrate the engineering development process as described in the EDP and facilitate implementation of technical requirement (participate in development of procedures and Project plans) by coordinating with site, Project personnel.
- Prepare and coordinate with the three-site Project personnel the EDP Activity WCS Form and submit to the Three-site $UF_6$ Cylinder Project Manager and EF Project Engineer for approval.
- Perform development verification in accordance with the EDP; assign lead developer.
- Ensure documentation of technical information.
- Facilitate resolution of three-site technical issues.
- Stay abreast of the state-of-the-art corrosion management techniques.
- Participate in corrosion management conferences.
- Locate and assist in acquisition of technical expertise as deemed necessary.
- Compile status of development activities periodically.

Interfaces: The Technical Manager takes direction from the Three-site Project Manager and EF Project Engineer, has ongoing interfaces with the EF Program Manager and Paducah, PORTS, and ETTP project managers; site Project personnel (for example engineering personnel involved in development); other Project technical personnel such as Inventory Modeling and Optimization Modeling; and Project/site field personnel, such as Operations and Maintenance personnel, and Quality Inspectors. The Technical Manager works with the designated Lead Developer to define the scope of development activities in accordance with the EDP.

## 2.4 PADUCAH, PORTS, AND ETTP CYLINDER TASK LEADS

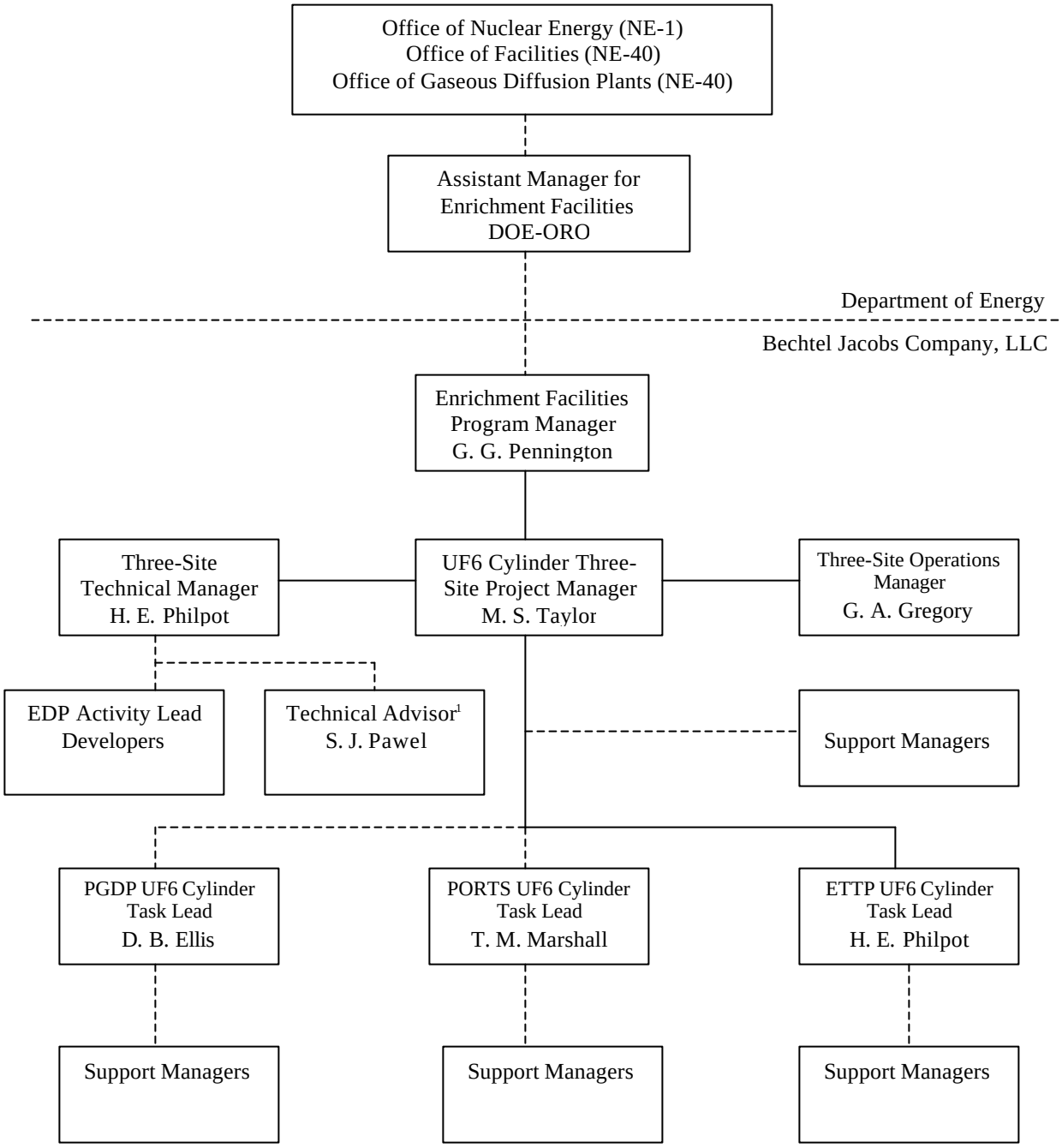
Project Role: Plan and execute work at the site level. Provide direction and oversight for the site portion of the $UF_6$ Cylinder Project. This includes Project control to be accomplished through participation in the Systems Engineering process. Attend public and technical meetings as necessary.

Project Responsibilities:

- Execution, quality, reporting, and safe performance of Project activities.
- Serves as the single point-of-contact with DOE for occurrence reporting.
- Maintain a safe work environment and create a culture where work place safety is a core value.
- Ensure that the site Project operates within the safety envelope.
- Establish $UF_6$ Cylinder Site Management Project objectives and priorities consistent with EF Project management direction.
- Execute, and manage the site Project activities and budget including baseline management and performance measurement.
- Integrate and coordinate activities between various organizations to accomplish the objectives and goals of the Project.
- Provide leadership and guidance to the Cylinder Yard Supervisor maintaining the Project work force under Bechtel Jacobs Work Authorization.
- Prepare and maintain Work Authorization forms and subcontractor's statement of work.
- Direct Project personnel and subcontractors.
- Ensure a focal point is established and effective through which all communication flows between subcontractors and Bechtel Jacobs Company LLC.
- Ensure use, refinement, and accuracy of the Cylinder Project Information (CID) Database.
- Monitor safety, cost, and schedule efficiency for the respective site.
- Lead site-specific Project teams.
- Implement ES&H requirements.
- Provide requested input as requested by Site Project Management in timely and consistent manner.
- Confirm personnel are trained and qualified before starting work.
- Communicate policy, worker rights, and responsibilities.
- Distribute Project-related documents to appropriate site personnel for comment, review, and use.
- Maintain cognizance of three-site activities and methods for the purpose of ensuring consistent use of best available technology.
- Identify new or site-specific system requirements.
- Lead sites in planning of the Project.
- Serve as MBA custodian.
- Ensure documentation of technical information.
- Facilitate resolution of three-site technical issues.
- Stay abreast of the state-of-the-art corrosion management techniques.

- Locate and assist in acquisition of technical expertise as deemed necessary.
- Compile status of development activities periodically.

Interfaces: The Paducah, PORTS, and ETTP project Task Leaders interface with the Three-site $UF_6$ Cylinder Project Manager, Three-site $UF_6$ Cylinder Operations Manager, and the EF Site Project Manager. The task leaders also interface with the functional area management, technical personnel, subcontractors, and DOE site office, DOE ORO, DOE HQ, and the DNFSB.




[1] Subcontracted

**Fig. 2.1. Project organization chart.**

# 3. WORK CONTROL STRUCTURE

The WCS organizes activities to be accomplished by the Project, how these activities are to be accomplished, and the expected performance of these activities.

## 3.1 WORK BREAKDOWN STRUCTURE

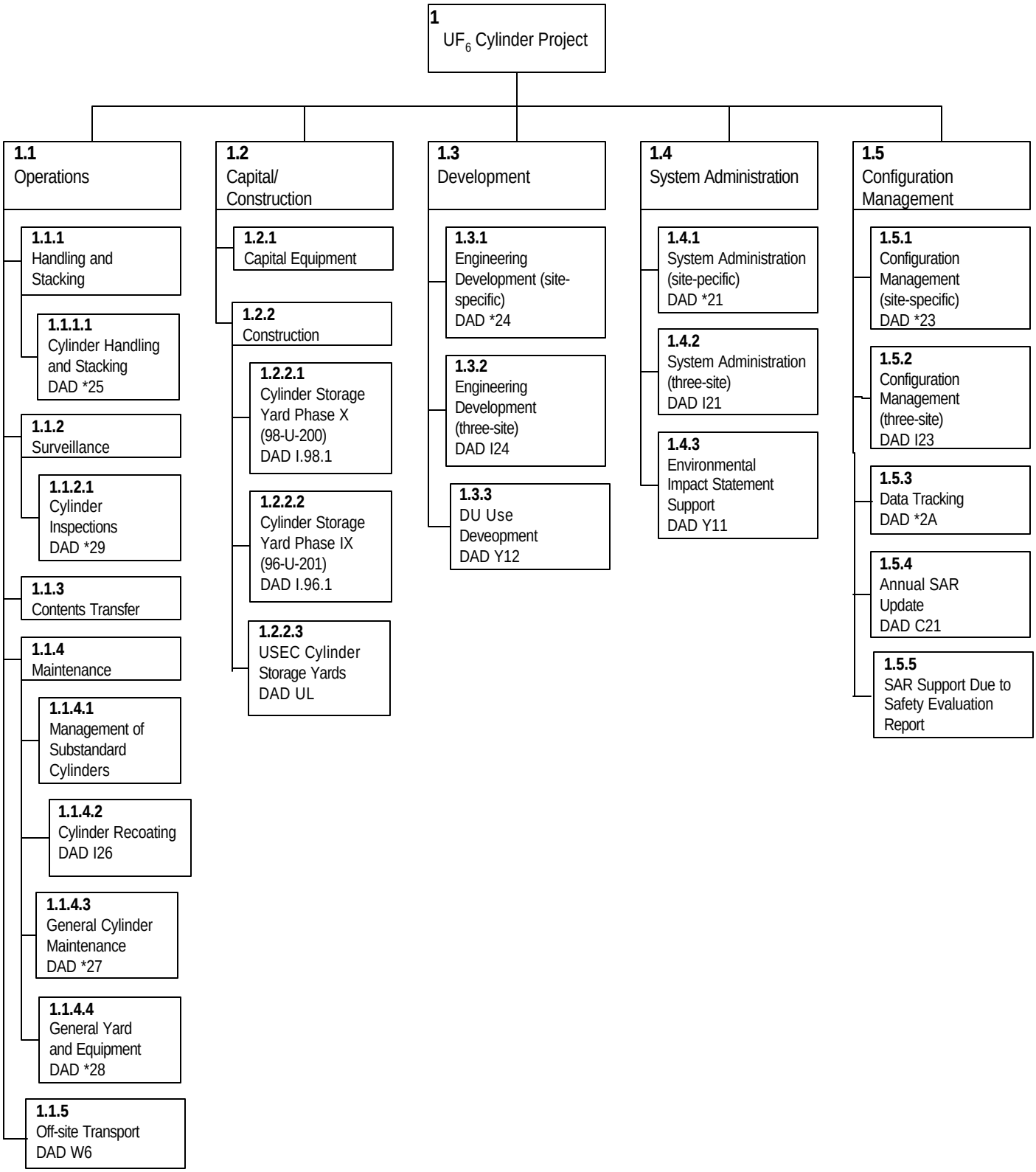
The WBS organizes the activities within the Project so that their execution can be appropriately planned and controlled. The WBS was developed by functionally organizing the work activities necessary to comply with the Project mission, objectives, and requirements provided in the SRD and SEMP. The primary operation and support functions identified by the functional analysis documented in the SRD were used in the creation of the WBS shown in Fig. 3.1.

Funds allocated to the Cylinder Project are authorized through the Baseline Program Plan for Enrichment Facilities. This plan authorizes funds and a scope of work through Work Authorization Directives (WADs) and subsequently more specific Task Assignment Directives (TADs) and DADs. The TADs and DADs for fiscal year 1999 are allocated to the Project WBS as shown in Fig. 3.1. Due to the multiple funding sources now supporting the Project, one WBS element may have multiple WADs. The asteriks(*) in Fig. 3.1 identify multiple WADs for an individual WBS element. The identification of TADs and DADs in the WBS tree indicates where current funding is allocated.

The WBS dictionary is provided in Appendix A. This dictionary describes the WBS tree shown in Fig. 3.1 by defining the scope of work in each element. The dictionary allocates the appropriate SEMP activities to each WBS element. In addition, the dictionary identifies the related WBS elements, the current priority within the Project, and the implementing document (i.e., EDP or PMP) for each SEMP activity.

## 3.2 SPECIFICATION TREE

The specification tree provides information on how the scope of work described in the WBS is accomplished. Management of interfaces is depicted in the WCS. The WBS requires that related tasks be identified. This is accomplished by relating the development elements to operations and administrative branches of the WBS. The specification tree and performance tree also aid Project Managers in integrating system activities.




NOTE: Asterik (*) designates multiple Work Authorization Dirctives (I, U, and Y)

**Fig. 3.1. Work breakdown structure.**

### 3.2.1 Control of Field Operations

Command media that will be implemented for the $UF_6$ Cylinder Project include policies, procedures, guidelines, and other documents that are directive or procedural in nature and are formally approved within prime and subcontractors authorized to perform work. These command media listed in Table 3.1 are established to support Cylinder Project effectiveness and to control the work activities.

External documents considered standards for completing Project work can be found in the SRD. These standards include federal laws, industry standards, state regulations, and applicable DOE orders. Tracing these standards can be accomplished starting with the WBS element and flowing to the corresponding required activities in the SEMP and governing documents specified in the SRD.

Service subcontracts and Work Authorizations (WAs) with external suppliers of goods and services are also executed as a form of command media to control Project work activities. There are many subcontracts with private firms that support the Project. For example, these could range from small task-based contracts for procedures support to high-dollar contracts for cylinder painting. The purpose of WAs as they pertain to the Project is to describe services provided to Bechtel Jacobs by service subcontractors. The WAs provide a detailed description of the work, the period of performance, and a cost estimate for completing the work. Controlled copies of subcontracts are managed by the Procurement Organization. WAs are controlled and managed by the site responsible for obtaining the services.

The $UF_6$ Cylinder Project uses the Integrated Safety Management System (ISMS) approach for integrating safety into all aspects of work planning and execution. Bechtel Jacobs Company has established and submitted for DOE approval a protocol for how ISMS integrates into project management.[1] The objectives of this approach are:

- systematically integrate safety and environmental protection into management and work practices at all levels;
- accomplish work while protecting the workers, the public, and the environment; and
- ensure continuous improvement of existing systems and processes for performing work safely.

The foundation of the Cylinder Project approach to implementing an ISMS is the multi-site procedures process. The procedures process includes functional job analysis and hazard identification. Procedures are written to describe how to safely perform the work and control the hazards. Workers are trained to the procedures via performance-based training. Workers are involved at all levels of the process.

**Table 3.1. Relationship of command media to WBS elements**

| Procedure no. | Procedure title | Related WBS element(s) |
|---|---|---|
| FS-C-2400 | Handling and Inspection of DOE 48-Inch-Diameter $UF_6$ Cylinders | 1.1.1.1, 1.1.2.1, 1.4.2, 1.5.3 |
| P2401 | Fabrication & Replacement of Identification Tags | 1.1.4.1, 1.1.4.3, 1.4.2 |
| FS-C-2402 | In-storage Inspection of 30- and 48-Inch-Diameter DOE $UF_6$ Cylinders | 1.1.2.1, 1.4.2, 1.5.3 |
| P2403 | Weld Patch Repair of Large-Diameter DOE $UF_6$ Cylinders | 1.1.4.1, 1.4.2 |
| P2404 | Field Replacement of Valves and Plugs | 1.1.4.1, 1.4.2 |
| P2406 | Rotation of DOE 48-Inch-Diameter $UF_6$ Cylinders | 1.1.1.1, 1.4.2 |
| P2407 | Handling and Inspection of DOE 30-Inch-Diameter $UF_6$ Cylinders | 1.1.1.1, 1.1.2.1, 1.4.2, 1.5.3 |
| P2408 | Management of DOE $UF_6$ Cylinder Valves & Plugs | 1.1.4.3 |
| FS-C-2430 | Inspection Check Sheets for DOE $UF_6$ Cylinders | 1.1.1, 1.1.2 |
| SH-A-5134 | Management of Temperature Extremes | 1.1, 1.4.2 |
| KY/EM-174 | Safety Analysis Report, Paducah Gaseous Diffusion Plant | 1.1, 1.4.2 |
| POEF-LMES-89 | Safety Analysis Report, Portsmouth Gaseous Diffusion Plant | 1.1, 1.4.2 |
| K/D-SAR-29 | K-25 Site $UF_6$ Cylinder Yards Final Safety Analysis Report | 1.1, 1.4.2 |
| SH-A-2008 | Hoisting and Rigging Program | 1.1, 1.42. |
| SH-A-5152 | Occupational Safety and Health Program | 1.1, 1.4.2 |
| ESS-CS-101 | Nuclear Criticality Safety Program Elements | 1.1, 1.4.2 |
| TR-101 | Hazardous Materials Transportation and Packaging Safety | 1.1.1, 1.1.4, 1.4.2 |
| TR-102 | Motor Carrier Safety Compliance | 1.1, 1.4.2 |
| | Contract specifications for performance of P-Scan ultrasonic inspection | 1.3.1, 1.4.2 |
| | Contract specifications for painting cylinders | 1.3.1, 1.4.2 |
| ESS-FP-102 | Handling Small Quantities of Flammable/Combustible Liquids | 1.1, 1.4.2 |
| SH-A-2007 | Welding, Burning, and Hotwork Fire | 1.1.4, 1.4.2 |
| DE-A-1101 | Unreviewed Safety Question Determination | 1.1, 1.3, 1.4 |
| PMIS-1103 | Equipment Tagging for Administrative Control | 1.1, 1.4.2 |
| QA-101PD | Quality Program Description | 1.1, 1.4.2 |
| FS-C-2413 | Handling & Inspection of Small Diameter DOE $UF_6$ Cylinders | 1.1.1.1, 1.1.2.1, 1.4.2, 1.5.3 |
| FS-C-2421 | Measurement of 48-Inch Diameter $UF_6$ Cylinder Wall Thickness Manual Ultrasonic Test methods | 1.1.2.1, 1.4.2, 1.5.3 |
| SH-B-4013 | Entry Control | 1.1, 1.4.2 |
| SH-B-4014 | Posting and Labeling | 1.1, 1.4.2 |
| SH-B-4015 | Radiation Protection Program Records | 1.1, 1.4.2 |
| SH-B-4016 | Radiation Exposure Reports to Individuals | 1.1, 1.4.2 |
| SH-B-4018 | Radiological Design and Control | 1.1, 1.4.2 |
| SH-B-4012 | Radioactive Contamination Control and Monitoring | 1.1, 1.4.2 |

| Procedure no. | Procedure title | Related WBS element(s) |
|---|---|---|
| SH-B-4009 | Radiological Monitoring in the Workplace | 1.1, 1.4.2 |
| SH-B-4003 | Standards for Internal and External Radiation Exposure | 1.1, 1.4.2 |
| SH-B-4019 | Radiological Accidents and Emergencies | 1.1, 1.4.2 |
| SH-B-4017 | Radiation Safety Training | 1.1, 1.4.2 |
| SH-A-2003 | Elevated Work/Fall Prevention Program | 1.1.3, 1.1.4 |
| SH-A-5121 | Occupational Noise Exposure and Hearing Conservation Program | 1.1, 1.4.2 |
| SH-A-5138 | Confined Space Program | 1.1, 1.4.2 |
| SH-A-5140 | Hazard Communication | 1.1, 1.4.2 |
| SH-A-2004 | Excavation and Penetration Program | 1.1, 1.4.2 |
| SH-A-2002 | Hazardous Energy Control Procedure | 1.1, 1.4.2 |
| PQ-A-1100 | Procedural Document Process | 3.1.2.1.2 |

### 3.2.2 Baseline Control

Configuration control is performed on baselines within the Project. There are three baselines under configuration control. They are:

- Safety management baseline (SARs and TSRs),
- mission requirements baseline (SRD), and
- work progression baseline (Baseline Program Plan for Enrichment Facilities).

The safety management baseline is controlled via the annual update of approved SARs as specified in 5480.23. Included in the control of the safety envelope is the USQD process and the configuration control activities at the site level to control the safety-significant items identified in the SAR. The site CM procedures are provided in Table 3.1 and are allocated to WBS element 1.5.1.

The mission requirements baseline is controlled via requesting and obtaining mutual agreement to changes between DOE and Bechtel Jacobs Company LLC. Significant changes are noted in a change notification cover sheet.

The work progression baseline is documented in the uranium program baseline plan for the fiscal year. This baseline is controlled by established methods documented in the Baseline Program Plan for Enrichment Facilities. The prime contractor flows the DOE baseline down into the PMP and EDP. The PMP and EDP are under Project control by the prime contractor.

Appendix C provides the listing of items under configuration control, the control procedure, and what organization has change control responsibility.

### 3.2.3 Verification Methods

Methods to verify the appropriate scope of work for activities prior to authorization are developed by the Project Manager (either site-specific or three-site) and the Technical Manager, where appropriate. This method involves reviewing the link between the scope and needed activities stated in the SEMP and the expected benefit from accomplishing the work. Verification that the authorized work scope is completed is the responsibility of the Project Manager. The method for verification of completed work scope is determined by the Project Manager. This method involves verifying progression toward compliance with requirements. To streamline documentation of completion verification for activities identified in the PMP schedule, a fiscal year closeout report is generated. This standard method may require additional verification from the Project Manager prior to completing the closeout report.

## 3.3 PERFORMANCE TREE

### 3.3.1 Fiscal Year Performance Indicators

Monthly cost performance is monitored by DOE and prime contractor senior management. Fiscal Year performance as compared to the baseline schedule and cost is monitored periodically by the Project managers. Status on deliverables is reported monthly to DOE and prime contractor senior management. The deliverables for FY 1999 are provided in the Baseline Program Plan for Enrichment Facilities. The Baseline Program Plan for Enrichment Facilities also provides the cost schedule for the fiscal year which is used as a performance indicator. Performance indicators for FY 1999 are shown in Figs. 3.2 and 3.3.

Detail Project cost information is available in the Baseline Program Plan for Enrichment Facilities. The consistency of planned expenditures with required work is evident in the 1999 DAD information. The cost data collected in the Baseline Program Plan for Enrichment Facilities is used for measuring and reporting actual cost and schedule performance in the PMP. Problems and cost variances are explained, and solutions are recommended.

### 3.3.2 Life-Cycle Budget Projection

The life-cycle cost projection is shown in Fig. 3.4. This metric is segmented into consolidated WBS elements to show the general trend. This figure reflects the fully funded requirements case for out-years of the Project. Reduced funding authorization will affect the duration required to achieve and maintain compliance with system and technical requirements. Detail costs are provided in DAD fact sheets periodically updated in correspondence between DOE and the prime contractor.[14] Other long-range performance indicators are shown in Figs. 3.5 and 3.6.

There are multiple funding sources for the Cylinder Project. These sources include Work for Others, Line Item Construction, Memorandum of Agreement Funds, and regular Congressional appropriations.

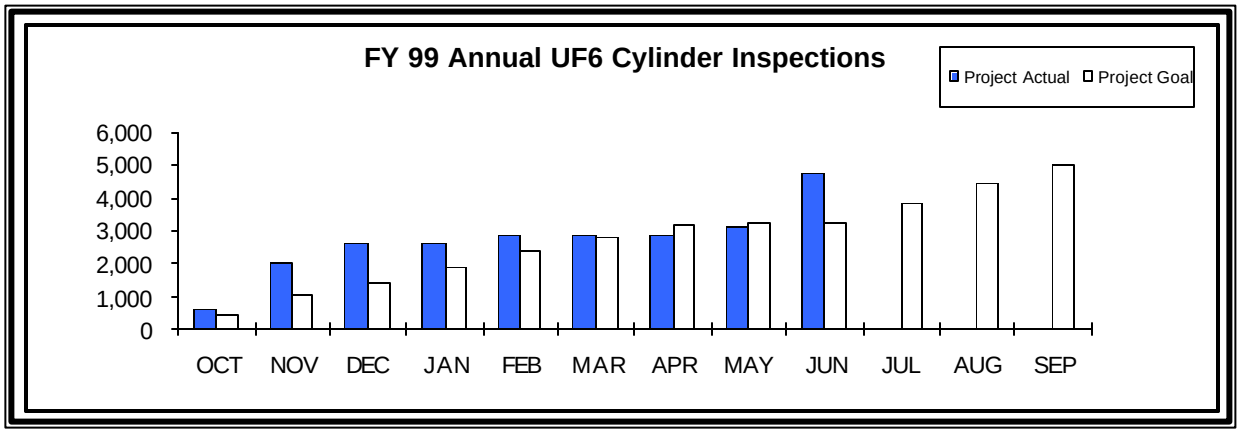
The system administration area shown in Fig. 3.4 includes the costs requested in the system administration and $DUF_6$ conversion support DADs. The configuration management area includes the requested funds in configuration management and data tracking DADs. The development area includes the funds requested in the engineering development and DU use development DADs. The maintenance area includes the funds requested in the general cylinder maintenance and the general yard and equipment maintenance DADs. The surveillance area only includes funds requested in the surveillance DAD. The handling-to-support-construction area only includes the funds requested in the handling and stacking DAD. The capital equipment and construction area includes the funding requested in the capital equipment and line-item construction DADs. The transfer and ship area includes the contents transfer and off-site transport DADs.

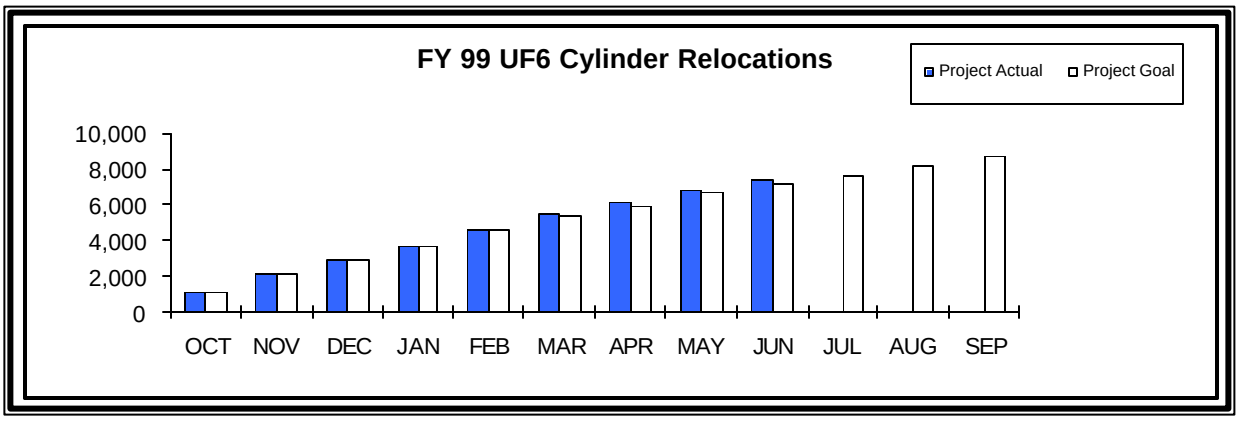
The DADs project funding through FY 2001. In general, cost estimates beyond this point are based on steady state operations (except for increased coating maintenance after the cylinders are initially painted) until FY 2039 when cylinders are planned to be removed from the storage system ($DUF_6$ conversion project) at a rate of 3,000 cylinder per year. Based on this guidance, the Storage Project would end in FY 2039. A three-percent annual escalation in cost has been assumed. As the Department of Energy is about to release a Record of Decision for the Programmatic Impact Statement, the life-cycle cost projects shown herein are expected to change significantly.

Performance indicators used to monitor Project performance are shown on in Figs 3.2 and 3.3. Project performance is continually assessed by ongoing observation of field activities by supervisors, walk-downs by the Project and Operations Managers, reviews and verification of EDP activity proposals by the technical Project Manager, monthly and mid-year milestone and financial reviews. Identified deficiencies are corrected immediately or are investigated and subsequent corrective actions are monitored by the site Project Manager.

### 3.3.3 Schedule

The schedule for completing the $UF_6$ Cylinder Project work activities in FY 99 and 00 are presented in Appendix B. The work activities are listed by WBS number. The schedule is intended to provide a rolling baseline for near-term activities from expected funding levels. The schedule provides a plan for the next 18 to 24 months.



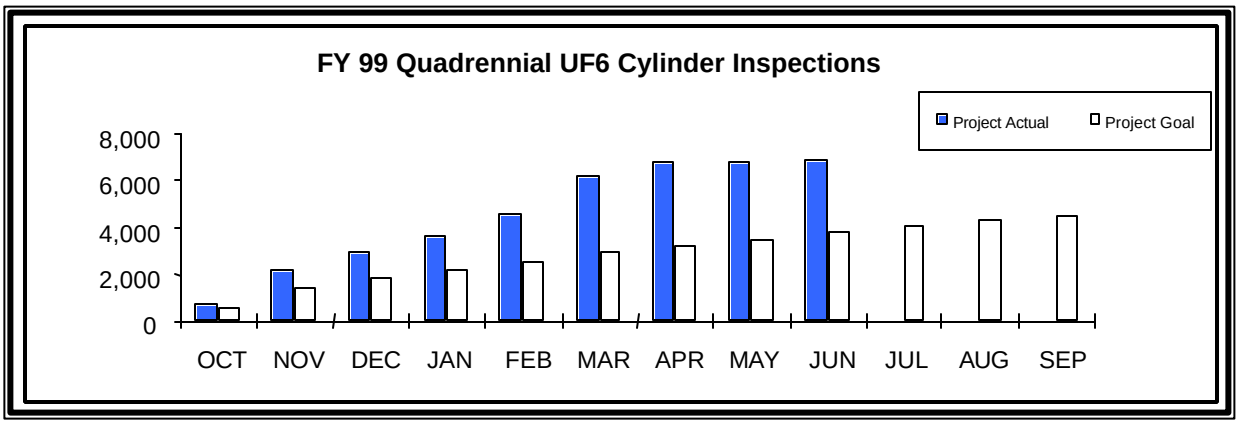
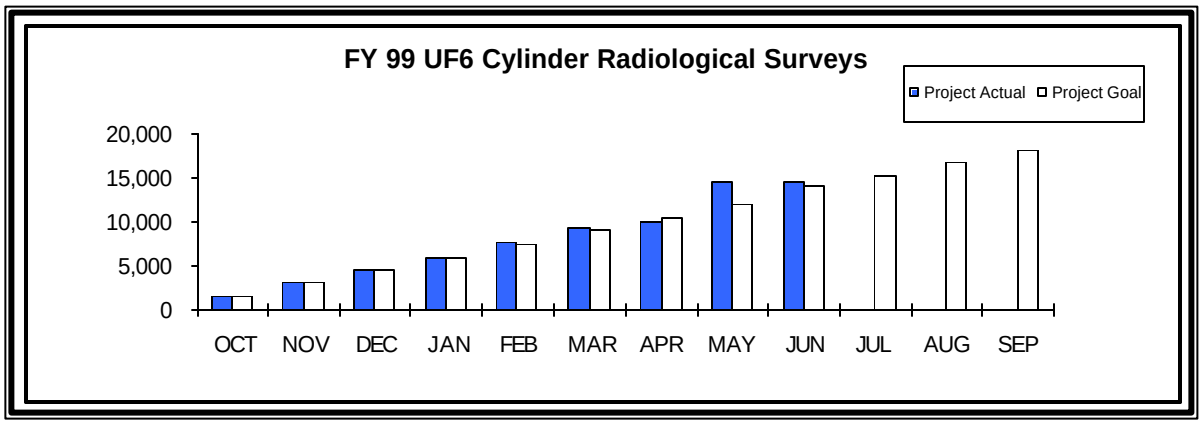
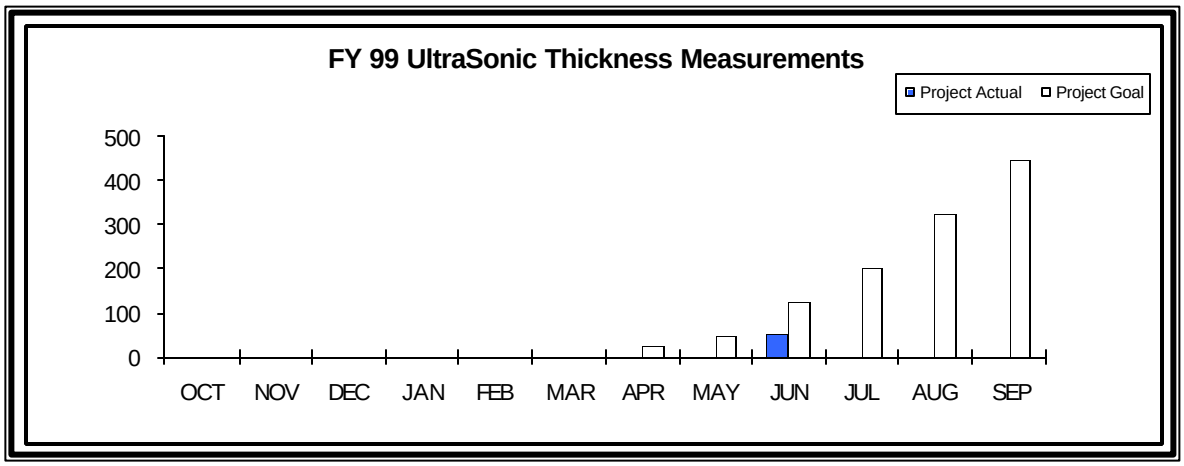




**Fig. 3.2. FY 1999 performance indicators and performance to date.**



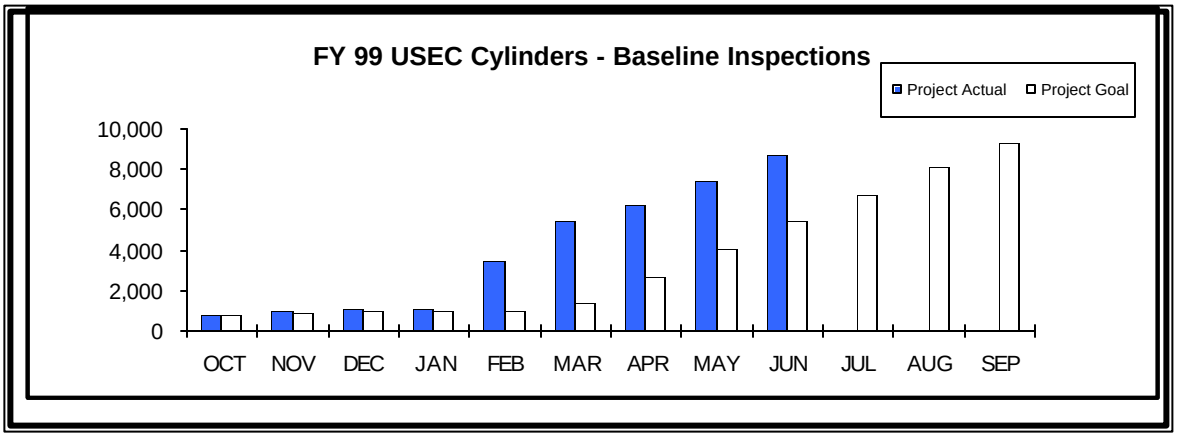




**Fig. 3.3. FY 1999 performance indicators and performance to date.**

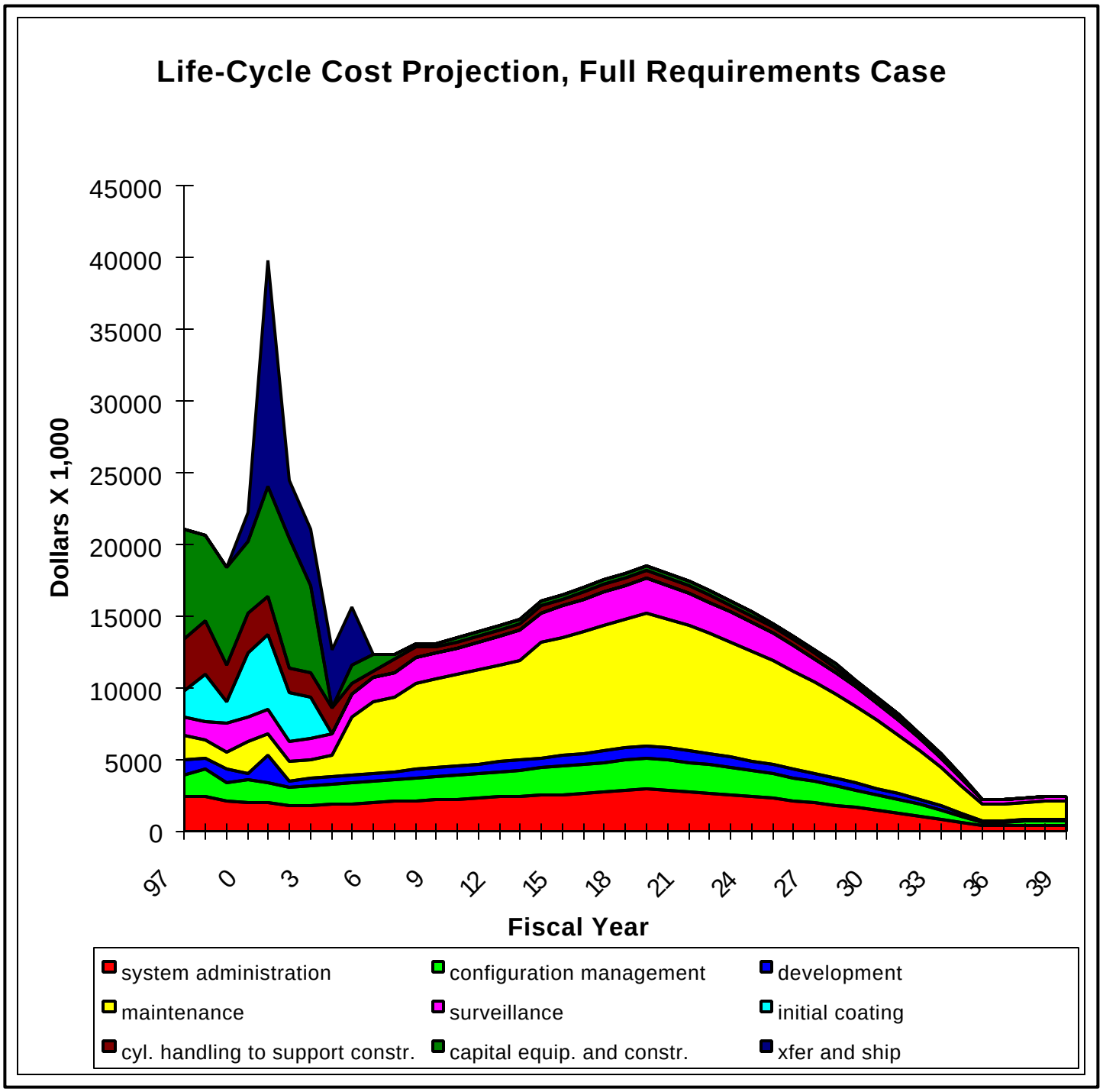
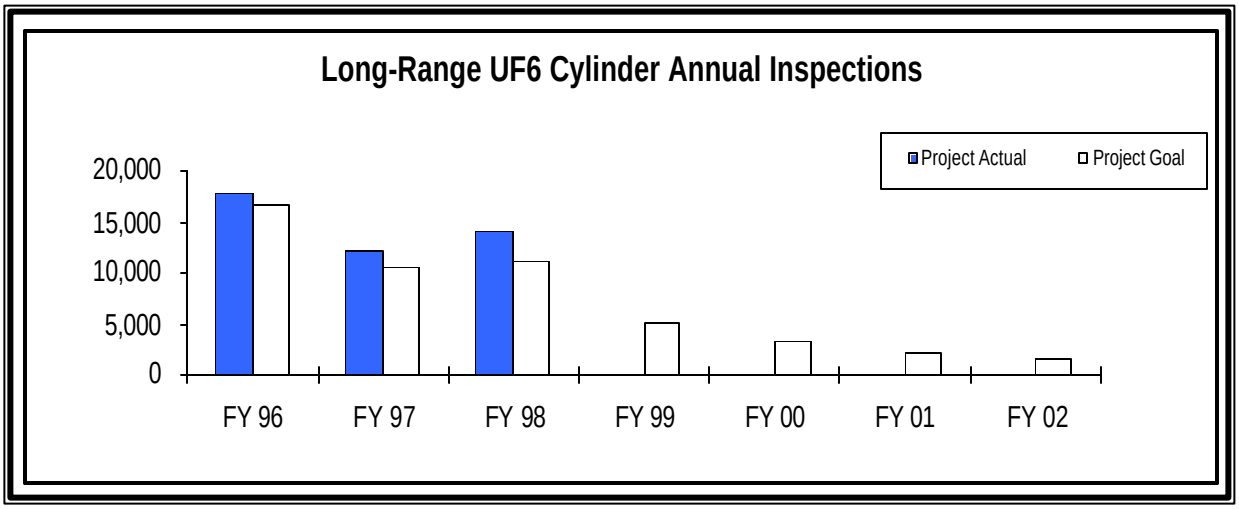



**Fig. 3.4. Life-cycle cost projection requirements case.**



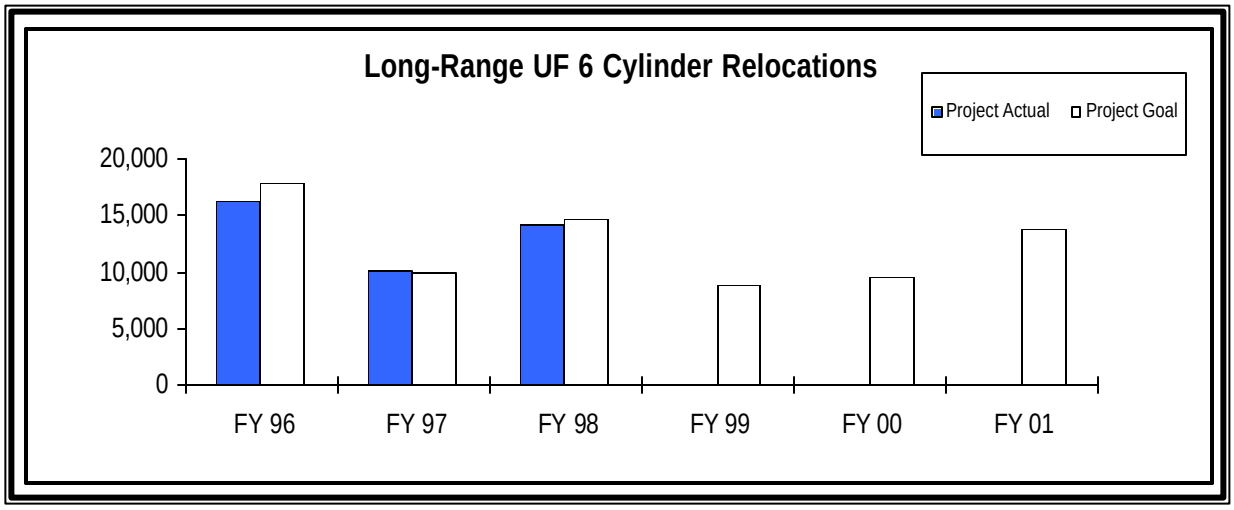
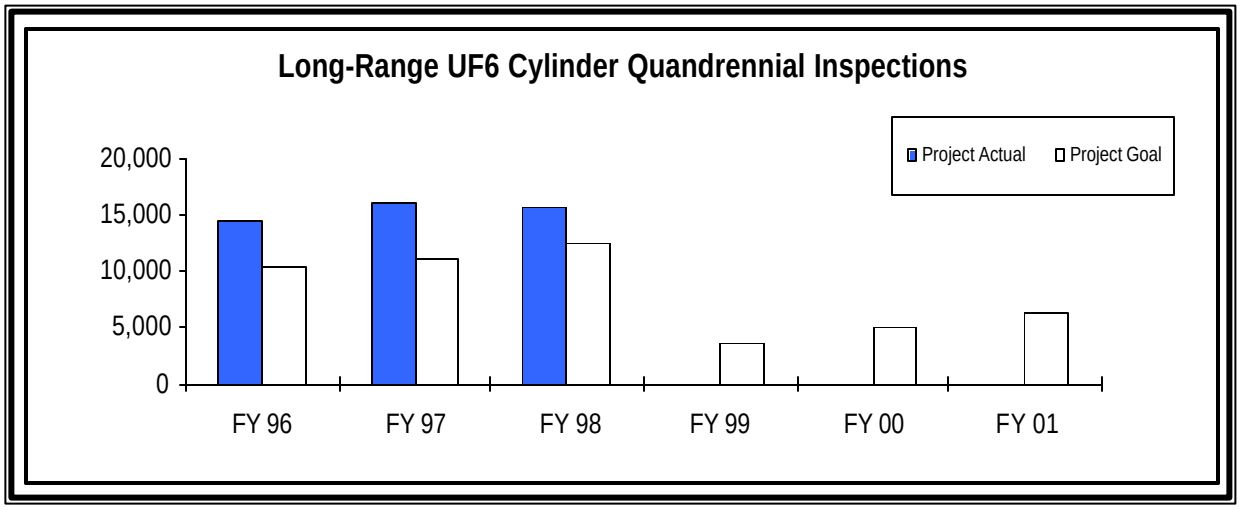




**Fig. 3.5. Long-range performance measures.**



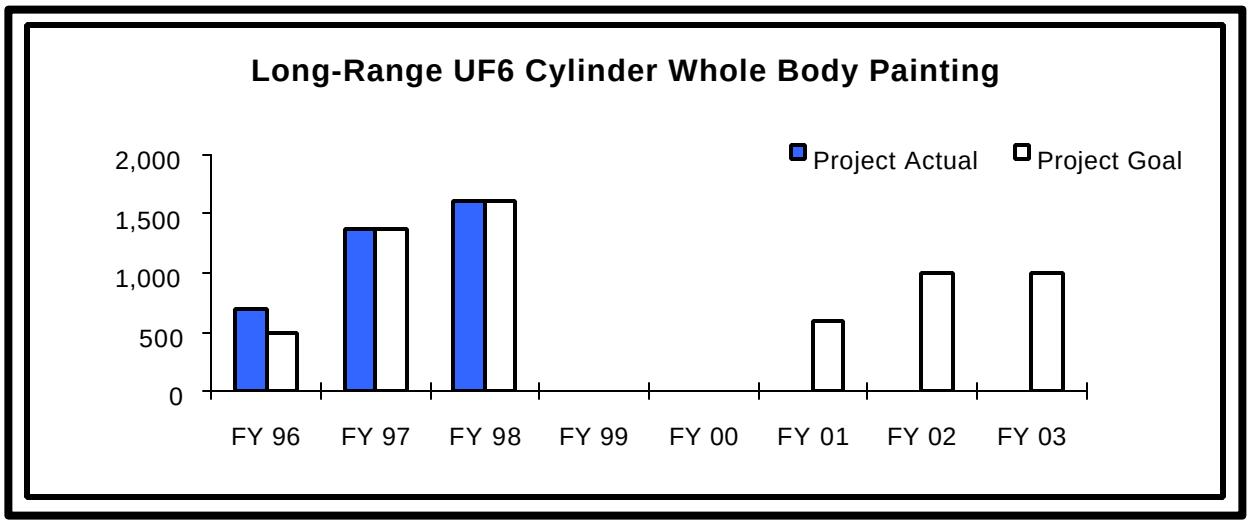




**Fig. 3.6. Long-range performance measures.**

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12. *K-25 Site $UF_6$ Cylinder Storage Yards Final Safety Analysis Report*, K/D-SAR-29, Lockheed Martin Energy Systems, Inc., February 28, 1997.

13. Energy Policy Act of 1992, Public Law 102-486, U. S. Department of Energy (1992).

14. G. Gregg Pennington, Bechtel Jacobs Company LLC, Contract DE-AC05-98OR22700, *FY 1999 Baseline Program Plan*, letter to George W. Benedict, U.S. Department of Energy, April 22, 1999.

# APPENDIX A

## WBS Dictionary

The WBS tree is provided in Sect. 3 of the PMP. The dictionary includes a short narrative of the work scope for each WBS element. Following this description the applicable SEMP activities are sorted by current Project priority. Other information contained in the dictionary includes the SEMP activity number, related WBS elements), and allocation of the SEMP activity to the EDP or PMP for implementation.

**WBS Element 1.1: Operations**

Activities within this element include the execution of four primary operational functions: Surveillance and Maintenance, Handling and Stacking, Contents Transfer, and Off-Site Transport.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1 | 1.2.1.3.4 | 1 | Implement controls. [1.2.1.a, 1.2.1.b, 1.2.1.c, 1.2.1.d, 1.2.1.e, 1.2.1.f] | P |
| 1.1 | 1.2.1.3.5 | 1 | Train personnel. | P |
| 1.1 | 1.2.1.3.6 | 1 | Implement risk control maintenance. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.1 | 1 | Verify the industrial hazard controls to be administered by the industrial hygiene program. [1.2.1.a] | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.2.1 | 1 | Develop a training program for personnel on program risks and subsequent controls. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.3 | 1 | Determine required maintenance of risk controls. | P |
| 1.1, 1.2, 1.3, 1.4.1, 1.4.2 | 3.1.2.3.2 | 1 | Implement work control process(es). [3.1.2.a] | P |
| 1.1, 1.3.2, 1.4.1, 1.4.2 | 4.1.2.2.3 | 2 | Identify factors that make cylinders non-conforming and identify constraints necessary to maintain compliance with the safety envelope (non-conformance may be based on non-certified volumes, exceedence of fill limits, etc.) [4.1.2.a] | E |
| 1.1, 1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.1 | 3 | Specify the degree of training (certification, qualification, etc.) for performing personnel (inspectors) who determine cylinder condition. (continued below) | P |
| 1.1, 1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.1 (continued) | 3 | The quality of which cylinder conditions are determined impacts the functional and inter-functional risks within the system. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 4.1.1.2.3 | 4 | Determine the required frequency for performing the monitoring methods, and for periodic assessments of methods and data. [4.1.1.b] | P |

**WBS Element 1.1.1: Handling and Stacking**

This element consists of the personnel, equipment, and materials necessary to lift cylinders, transport them on site, and place them in static storage. Included in this element are the associated authorizations, inspections, and support operations to complete cylinder handling and stacking.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5 | 4.1.2.3.3 | 1 | Implement constraints for non-conforming cylinders. | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.3.1 | 1 | Define acceptable cylinder integrity, incorporating cylinder degradation concerns, for handling, processing, and transport. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.1 | 1 | Perform laboratory studies and other analyses to support the definition of cylinder integrity criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.2 | 1 | Perform structural analysis in support of the developing functional acceptance criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2 | 1 | Define cylinder functional acceptance criteria based upon applicable industrial standards and cylinder performance objectives. [4.1.2.a, 4.1.2.b] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.3 | 1 | Verify criticality controls including mitigative alarms and inventory segregation to be administered by the Nuclear Criticality Safety program. [1.2.1.c] | P |
| 1.1.1, 1.1.3, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.2 | 1 | Verify the inventory controls including movement and processing authorization to be administered by the NMC&A program. [1.2.1.b] | P |
| 1.1.1, 1.4.1, 1.4.2 | 2.2.1.3.2 | 1 | Implement a safe move program. [2.2.1.c, 2.2.1.g] | P |
| 1.1.1, 1.4.1, 1.4.2 | 2.2.1.3.2.1 | 1 | Implement administrative controls. [2.2.1.c] | P |
| 1.1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.5 | 1 | Verify operational controls to prevent cylinder placement in ground contact beyond a specified duration. Specify duration. [1.2.1.e] | P |
| 1.1.1 | 2.1.1.3.3 | 2 | Adjust physical array of cylinders as necessary to maintain coating. | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.1 | 2.1.5.2.3 | 2 | Determine inspection/acceptance requirements for transitioning from one function to another if one valve and plug baseline configuration is not implemented. [2.1.5.a, 2.1.5.b] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2.1 | 2 | Develop code case(s) to demonstrate compliance with industry standards. [4.1.2.b, 4.1.2.c] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4 | 2 | Establish inspection/evaluation methods for determining the acceptability of cylinders relative functional criteria. [4.1.2.d] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.1 | 2 | Determine a technically acceptable risk-based periodicity to perform inspections and evaluations for determining the acceptability of cylinders' relative functional criteria. [4.1.2.e] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.4 | 2 | Define ultrasonic thickness techniques and their application i.e., how many points, and extent of area to measure thickness to verify compliance with functional criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.7 | 2 | Perform laboratory studies to support the cylinder functional acceptance criteria and the cylinder monitoring evaluation techniques. | E |

**WBS Element 1.1.1: Handling and Stacking**

This element consists of the personnel, equipment, and materials necessary to lift cylinders, transport them on site, and place them in static storage. Included in this element are the associated authorizations, inspections, and support operations to complete cylinder handling and stacking.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.1 | 2.1.5.2.1 | 2 | Identify performance objectives for cylinder valve and plugs for each system function under the anticipated operational states. Define performance in terms of industry standards to the extent possible. | E |
| 1.1.1, 1.1.2, 1.1.4, 1.3.2 | 2.1.4.2.4 | 2 | Identify and evaluate modifications to the cylinder storage array to meet system performance objectives. | E |
| 1.1.1, 1.1.2, 1.2.2 | 4.1.2.2.4.6 | 2 | Integrate the periodic inspection performance objectives with cylinder accessibility. [4.1.2.f] | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.1 | 2 | Analyze options that would prevent cylinder damage (including new or modified equipment) during handling, processing, and transporting operations. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.2.3 | 2 | Identify performance objectives for cylinders, support structures, and storage facilities relative to handling, processing, and transporting methods and equipment. [2.2.1.f] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.4 | 2 | Identify engineered control(s) for each function that are needed to prevent, reduce, and mitigate cylinder and coating damage. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.5.1 | 2 | Define methods for handling, processing and transporting cylinders and corroded cylinders to meet system performance objectives. [2.2.1.a, 2.2.1.g] | E |
| 1.1.1, 1.1.4, 1.3.2 | 1.1.1.2.2.2 | 2 | Integrate the functional flow of cylinder inspections, degradation studies, degradation factor monitoring, and cylinder maintenance. | E |
| 1.1.1, 1.3.2 | 2.2.1.2.4.3 | 2 | Evaluate engineered controls to mitigate damage to cylinders and coatings from the use of existing equipment. [2.2.1.e] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 1.1.1.2.2.1 | 3 | Integrate the purpose of cylinder inspection functions including code inspections, periodic visual inspections, handling, transport, maintenance, and contents transfer functional acceptance inspections. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.2 | 2.2.1.2.2 | 3 | Identify methods and equipment to be used to handle, process, and transport cylinders and their contents. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 | 3 | Specify the degree of training (certification, qualification, etc.) for performing personnel (operators) who perform work (handle, transport, transfer contents, maintenance) on cylinders. (continued below) | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 (continued) | 3 | The quality for which this work is performed can directly impact the immediate and long-term functional risks within the system. | P |
| 1.1.1, 1.1.4, 1.3.2 | 2.3.2.1 | 3 | Analyze option to automate operations involving deteriorated cylinders. | E |

**WBS Element 1.1.1.1: Cylinder Handling and Stacking**

This element consists of the personnel, equipment, and materials to support relocation and restacking of cylinders from the old yards to new yards and within existing yards for the purpose of improving storage and cylinder accessibility.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1.1 | 2.1.3.3.1 | 1 | Implement immediate actions to meet performance objectives. [2.1.3.a, 2.1.3.b] | P |
| 1.1.1.1 | 2.1.4.3.1 | 1 | Implement immediate actions to reduce cylinder time of wetness (remove from ground contact, improve drainage of existing yards). | P |
| 1.1.1.1, 1.1.2.1, 1.1.3, 1.1.4.1, 1.1.4.2, 1.1.4.3, 1.1.4.4, 1.1.5 | 2.2.1.3.3 | 1 | Perform the necessary inspection and maintenance on equipment and operations including the verification actions to compensate for non-conforming and potentially non-compliant cylinders. [2.2.1.b] | P |

**WBS Element 1.1.2: Surveillance**

This element consists of the surveillance operations (on cylinders, storage yards, and the environment) associated with cylinders in long-term storage.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5 | 4.1.2.3.3 | 1 | Implement constraints for non-conforming cylinders. | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.3.1 | 1 | Define acceptable cylinder integrity, incorporating cylinder degradation concerns, for handling, processing, and transport. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.1 | 1 | Perform laboratory studies and other analyses to support the definition of cylinder integrity criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.2 | 1 | Perform structural analysis in support of the developing functional acceptance criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2 | 1 | Define cylinder functional acceptance criteria based upon applicable industrial standards and cylinder performance objectives. [4.1.2.a, 4.1.2.b] | E |
| 1.1.2 | 4.1.1.3.1 | 1 | Monitor cylinders and the environment for releases to the environment and the effects of such releases. [4.1.1.b] | P |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.5 | 1 | Determine cylinder inspection/acceptance requirements for transitioning cylinders from one function to another if one cylinder acceptance criteria is not adopted for all functions. | E |
| 1.1.2, 1.1.4 | 2.1.2.3.4 | 1 | Implement baseline maintenance. | P |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.2.2.4 | 1 | Develop a structural feature inspection and maintenance plan to maintain compliance with this requirement, and integrate the plan with the program. | E |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.5.2.4.1 | 1 | Determine the necessary periodic surveillance and preventive maintenance of valves and plugs. [2.1.5.a, 2.1.5.b] | E |
| 1.1.2, 1.1.4, 1.3.2, 1.5.2 | 2.1.5.2.4 | 1 | Develop a valve and plug management program to ensure that performance objectives are met. [2.1.5.a] | E |
| 1.1.2, 1.1.4, 1.3.2, 1.5.2 | 2.1.5.2.4.2 | 1 | Determine methods and when valves and plugs should be repaired/replaced as corrective maintenance. [2.1.5.b] | E |
| 1.1.2, 1.4.1, 1.4.2 | 4.1.2.2.1 | 1 | Identify all cylinder monitoring performance objectives. | P |
| 1.1.2, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.4 | 1 | Verify the safeguards and security controls including periodic patrols, physical boundaries, and facility lighting to be administered by the Safeguards and Security program. | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.1 | 2.1.5.2.3 | 2 | Determine inspection/acceptance requirements for transitioning from one function to another if one valve and plug baseline configuration is not implemented. [2.1.5.a, 2.1.5.b] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2.1 | 2 | Develop code case(s) to demonstrate compliance with industry standards. [4.1.2.b, 4.1.2.c] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4 | 2 | Establish inspection/evaluation methods for determining the acceptability of cylinders relative functional criteria. [4.1.2.d] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.1 | 2 | Determine a technically acceptable risk-based periodicity to perform inspections and evaluations for determining the acceptability of cylinders' relative functional criteria. [4.1.2.e] | E |

**WBS Element 1.1.2: Surveillance**

This element consists of the surveillance operations (on cylinders, storage yards, and the environment) associated with cylinders in long-term storage.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.4 | 2 | Define ultrasonic thickness techniques and their application i.e., how many points, and extent of area to measure thickness to verify compliance with functional criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.7 | 2 | Perform laboratory studies to support the cylinder functional acceptance criteria and the cylinder monitoring evaluation techniques. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.1 | 2.1.5.2.1 | 2 | Identify performance objectives for cylinder valve and plugs for each system function under the anticipated operational states. Define performance in terms of industry standards to the extent possible. | E |
| 1.1.1, 1.1.2, 1.1.4, 1.3.2 | 2.1.4.2.4 | 2 | Identify and evaluate modifications to the cylinder storage array to meet system performance objectives. | E |
| 1.1.1, 1.1.2, 1.2.2 | 4.1.2.2.4.6 | 2 | Integrate the periodic inspection performance objectives with cylinder accessibility. [4.1.2.f] | P |
| 1.1.2, 1.1.4 | 2.1.4.2.2 | 2 | Identify storage facility features that retain water beyond acceptable time of wetness performance objectives. | P |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.3.2.4 | 2 | Determine inspection and maintenance methods to maintain compliance with this requirement. | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.1 | 2 | Define performance objectives of cylinder support structures with respect to system functions including the interface with cylinder coatings, periodic inspections, and water drainage. [2.1.3.a, 2.1.3.b] | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3 | 2 | Identify and evaluate modifications to cylinder support structures to meet cylinder time of wetness performance objectives. | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3.1 | 2 | Assess current designs to determine their capacity to drain water. | E |
| 1.1.2, 1.5.3 | 4.1.2.2.4.3 | 2 | Develop the visual inspection/quantitative evaluation integration (the use of visual inspections to select cylinders and general surface areas for obtaining quantitative data to verify compliance with functional criteria). | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 1.1.1.2.2.1 | 3 | Integrate the purpose of cylinder inspection functions including code inspections, periodic visual inspections, handling, transport, maintenance, and contents transfer functional acceptance inspections. | E |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.2.2 | 3 | Integrate the structural feature performance for the surveillance and maintenance function with performance objectives for the other system functions. | E |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.2.2.2.1 | 3 | Define performance objectives of the cylinder structural features relative to the surveillance and maintenance function. | E |
| 1.1.2, 1.1.4, 1.4.1, 1.4.2 | 2.1.4.2.4.1 | 3 | Integrate storage array design with system functions including anticipated surveillance and maintenance of cylinders. [2.1.4.c] | P |
| 1.1.2, 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.3 | 3 | Identify which collected data will be used in the forecasting. Integrate forecasting with monitoring efforts. [4.2.2.a] | E |
| 1.1.2, 1.4.1, 1.3.2, 1.4.2 | 4.1.1.2.4 | 3 | Determine a method to verify that all potential pathways of exposure to the environment are being monitored. | E |
| 1.1.2, 1.5.3 | 4.1.3.2.3 | 3 | Develop methods to monitor the degradation factors for the collection of timely and reliable data that is useful in forecasting cylinder condition. Monitoring method is based on applicable degradation factor. [4.1.3.b] | P |

**WBS Element 1.1.2.1: Cylinder Inspections**

This element consists of the personnel and materials necessary to monitor cylinder integrity. This includes performing annual and quadrennial visual inspections, monitoring cylinder valves and plugs, and taking non-destructive measurements of wall thickness on selected cylinders to characterize the conditions of the cylinder population and to verify compliance with system requirements.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1.1, 1.1.2.1, 1.1.3, 1.1.4.1, 1.1.4.2, 1.1.4.3, 1.1.4.4, 1.1.5 | 2.2.1.3.3 | 1 | Perform the necessary inspection and maintenance on equipment and operations including the verification actions to compensate for non-conforming and potentially non-compliant cylinders. [2.2.1.b] | P |
| 1.1.2.1 | 2.1.3.2.2 | 1 | Identify cylinder support structures that do not meet performance objectives. | P |
| 1.1.2.1 | 2.1.5.3.3 | 1 | Periodically inspect the cylinders to detect failed valves and plugs. [2.1.5.b] | P |
| 1.1.2.1 | 4.1.1.3.2 | 1 | Implement actions to maintain compliance with this requirement. | P |
| 1.1.2.1 | 4.1.2.3.1 | 1 | Identify existing cylinder conditions. | P |
| 1.1.2.1 | 4.1.2.3.1.1 | 1 | Determine the baseline condition of each cylinder with respect to functional criteria to the extent visual inspections are applicable. | P |
| 1.1.2.1 | 4.1.2.3.1.2 | 1 | Statistically determine the baseline condition of cylinder populations by obtaining quantitative data. | P |
| 1.1.2.1 | 4.1.2.3.2 | 1 | Identify non-compliant and non-conforming cylinders. | P |
| 1.1.2.1 | 4.1.2.3.4 | 1 | Periodically monitor cylinder conditions. [4.1.2.e] | P |
| 1.1.2.1, 1.1.4.3 | 2.1.2.3.3 | 1 | Perform inspection and maintenance of cylinder structural features. [2.1.2.a] | P |
| 1.1.2.1, 1.1.4.3 | 2.1.3.3.3 | 1 | Perform inspection and maintenance of cylinder support structures to ensure meeting this requirement. | P |
| 1.1.2.1, 1.1.4.3, 1.3.2 | 2.1.1.2.7 | 1 | Determine the coating inspection and maintenance intent, method and frequency. | E |
| 1.1.4.4, 1.1.2.1 | 2.1.4.3.5 | 1 | Perform inspection and maintenance of the storage facilities to ensure that this requirement is met. | P |
| 1.1.2.1 | 2.3.3.2.4 | 2 | Identify non-compliant cylinders. | P |
| 1.1.4.3, 1.1.2.1 | 2.1.1.3.4 | 2 | Implement coating inspection and maintenance. | P |
| 1.1.4.4, 1.1.2.1 | 4.1.3.3.1 | 2 | Monitor the cylinder degradation factors. [4.1.3.b] | P |
| 1.1.2.1 | 4.1.3.3.2 | 3 | Record the cylinder degradation factor information in the developed database. | P |
| 1.1.2.1 | 4.2.1.3.1 | 3 | Categorize the cylinders and storage environments. | P |
| 1.1.2.1 | 4.2.1.3.2 | 3 | Record the categorization information to allow tracking. | P |

**WBS Element 1.1.3: Contents Transfer**

This element consists of the personnel, equipment, and other resources necessary to remove the contents of a cylinder. Included in this element are the full cycle of actions necessary to establish the capability to transfer the contents, execute the transfer, and decontaminate and dispose of cylinder heel materials and the cylinders themselves if they are being removed from service.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5 | 4.1.2.3.3 | 1 | Implement constraints for non-conforming cylinders. | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.3.1 | 1 | Define acceptable cylinder integrity, incorporating cylinder degradation concerns, for handling, processing, and transport. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.1 | 1 | Perform laboratory studies and other analyses to support the definition of cylinder integrity criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.2 | 1 | Perform structural analysis in support of the developing functional acceptance criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2 | 1 | Define cylinder functional acceptance criteria based upon applicable industrial standards and cylinder performance objectives. [4.1.2.a, 4.1.2.b] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.3 | 1 | Verify criticality controls including mitigative alarms and inventory segregation to be administered by the Nuclear Criticality Safety program. [1.2.1.c] | P |
| 1.1.1, 1.1.3, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.2 | 1 | Verify the inventory controls including movement and processing authorization to be administered by the NMC&A program. [1.2.1.b] | P |
| 1.1.1.1, 1.1.2.1, 1.1.3, 1.1.4.1, 1.1.4.2, 1.1.4.3, 1.1.4.4, 1.1.5 | 2.2.1.3.3 | 1 | Perform the necessary inspection and maintenance on equipment and operations including the verification actions to compensate for non-conforming and potentially non-compliant cylinders. [2.2.1.b] | P |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.5 | 1 | Determine cylinder inspection/acceptance requirements for transitioning cylinders from one function to another if one cylinder acceptance criteria is not adopted for all functions. | E |
| 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.4.1, 1.4.2 | 4.2.2.3.1.1 | 1 | Project the number of non-compliant cylinders. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.1 | 2.1.5.2.3 | 2 | Determine inspection/acceptance requirements for transitioning from one function to another if one valve and plug baseline configuration is not implemented. [2.1.5.a, 2.1.5.b] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2.1 | 2 | Develop code case(s) to demonstrate compliance with industry standards. [4.1.2.b, 4.1.2.c] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4 | 2 | Establish inspection/evaluation methods for determining the acceptability of cylinders relative functional criteria. [4.1.2.d] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.1 | 2 | Determine a technically acceptable risk-based periodicity to perform inspections and evaluations for determining the acceptability of cylinders' relative functional criteria. [4.1.2.e] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.4 | 2 | Define ultrasonic thickness techniques and their application i.e., how many points, and extent of area to measure thickness to verify compliance with functional criteria. | E |

**WBS Element 1.1.3: Contents Transfer**

This element consists of the personnel, equipment, and other resources necessary to remove the contents of a cylinder. Included in this element are the full cycle of actions necessary to establish the capability to transfer the contents, execute the transfer, and decontaminate and dispose of cylinder heel materials and the cylinders themselves if they are being removed from service.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.7 | 2 | Perform laboratory studies to support the cylinder functional acceptance criteria and the cylinder monitoring evaluation techniques. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.1 | 2.1.5.2.1 | 2 | Identify performance objectives for cylinder valve and plugs for each system function under the anticipated operational states. Define performance in terms of industry standards to the extent possible. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.1 | 2 | Analyze options that would prevent cylinder damage (including new or modified equipment) during handling, processing, and transporting operations. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.2.3 | 2 | Identify performance objectives for cylinders, support structures, and storage facilities relative to handling, processing, and transporting methods and equipment. [2.2.1.f] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.4 | 2 | Identify engineered control(s) for each function that are needed to prevent, reduce, and mitigate cylinder and coating damage. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.5.1 | 2 | Define methods for handling, processing and transporting cylinders and corroded cylinders to meet system performance objectives. [2.2.1.a, 2.2.1.g] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 1.1.1.2.2.1 | 3 | Integrate the purpose of cylinder inspection functions including code inspections, periodic visual inspections, handling, transport, maintenance, and contents transfer functional acceptance inspections. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.2 | 2.2.1.2.2 | 3 | Identify methods and equipment to be used to handle, process, and transport cylinders and their contents. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 | 3 | Specify the degree of training (certification, qualification, etc.) for performing personnel (operators) who perform work (handle, transport, transfer contents, maintenance) on cylinders. (continued below) | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 (continued) | 3 | The quality for which this work is performed can directly impact the immediate and long-term functional risks within the system. | P |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.2.2 | 3 | Integrate the structural feature performance for the surveillance and maintenance function with performance objectives for the other system functions. | E |

**WBS Element 1.1.4: Maintenance**

This element consists of the operational activities necessary to maintain cylinders, equipment, and storage yards to Project standards.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5 | 4.1.2.3.3 | 1 | Implement constraints for non-conforming cylinders. | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.3.1 | 1 | Define acceptable cylinder integrity, incorporating cylinder degradation concerns, for handling, processing, and transport. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.1 | 1 | Perform laboratory studies and other analyses to support the definition of cylinder integrity criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.2 | 1 | Perform structural analysis in support of the developing functional acceptance criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2 | 1 | Define cylinder functional acceptance criteria based upon applicable industrial standards and cylinder performance objectives. [4.1.2.a, 4.1.2.b] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.3 | 1 | Verify criticality controls including mitigative alarms and inventory segregation to be administered by the Nuclear Criticality Safety program. [1.2.1.c] | P |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.5 | 1 | Determine cylinder inspection/acceptance requirements for transitioning cylinders from one function to another if one cylinder acceptance criteria is not adopted for all functions. | E |
| 1.1.2, 1.1.4 | 2.1.2.3.4 | 1 | Implement baseline maintenance. | P |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.2.2.4 | 1 | Develop a structural feature inspection and maintenance plan to maintain compliance with this requirement, and integrate the plan with the program. | E |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.5.2.4.1 | 1 | Determine the necessary periodic surveillance and preventive maintenance of valves and plugs. [2.1.5.a, 2.1.5.b] | E |
| 1.1.2, 1.1.4, 1.3.2, 1.5.2 | 2.1.5.2.4 | 1 | Develop a valve and plug management program to ensure that performance objectives are met. [2.1.5.a] | E |
| 1.1.2, 1.1.4, 1.3.2, 1.5.2 | 2.1.5.2.4.2 | 1 | Determine methods and when valves and plugs should be repaired/replaced as corrective maintenance. [2.1.5.b] | E |
| 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.4.1, 1.4.2 | 4.2.2.3.1.1 | 1 | Project the number of non-compliant cylinders. | E |
| 1.1.4 | 2.1.4.3.4 | 1 | Adjust cylinder storage array. [2.1.4.c] | P |
| 1.1.4 | 2.3.3.3.1 | 1 | Perform immediate actions on cylinders when found to be non-compliant. | P |
| 1.1.4 | 2.3.3.3.3 | 1 | Implement baseline maintenance. | P |
| 1.1.4, 1.3.2 | 2.1.2.2.3 | 1 | Identify and evaluate modifications to cylinder structural features that retain water to allow drainage. | E |
| 1.1.4, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.6 | 1 | Verify in the authorization of cylinder repair/replacement through contracted services the validation of a safety envelope for specified operations. [1.2.1.f] | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.1 | 2.1.5.2.3 | 2 | Determine inspection/acceptance requirements for transitioning from one function to another if one valve and plug baseline configuration is not implemented. [2.1.5.a, 2.1.5.b] | E |

**WBS Element 1.1.4: Maintenance**

This element consists of the operational activities necessary to maintain cylinders, equipment, and storage yards to Project standards.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2.1 | 2 | Develop code case(s) to demonstrate compliance with industry standards. [4.1.2.b, 4.1.2.c] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4 | 2 | Establish inspection/evaluation methods for determining the acceptability of cylinders relative functional criteria. [4.1.2.d] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.1 | 2 | Determine a technically acceptable risk-based periodicity to perform inspections and evaluations for determining the acceptability of cylinders' relative functional criteria. [4.1.2.e] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.4 | 2 | Define ultrasonic thickness techniques and their application i.e., how many points, and extent of area to measure thickness to verify compliance with functional criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.7 | 2 | Perform laboratory studies to support the cylinder functional acceptance criteria and the cylinder monitoring evaluation techniques. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.1 | 2.1.5.2.1 | 2 | Identify performance objectives for cylinder valve and plugs for each system function under the anticipated operational states. Define performance in terms of industry standards to the extent possible. | E |
| 1.1.1, 1.1.2, 1.1.4, 1.3.2 | 2.1.4.2.4 | 2 | Identify and evaluate modifications to the cylinder storage array to meet system performance objectives. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.1 | 2 | Analyze options that would prevent cylinder damage (including new or modified equipment) during handling, processing, and transporting operations. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.2.3 | 2 | Identify performance objectives for cylinders, support structures, and storage facilities relative to handling, processing, and transporting methods and equipment. [2.2.1.f] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.4 | 2 | Identify engineered control(s) for each function that are needed to prevent, reduce, and mitigate cylinder and coating damage. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.5.1 | 2 | Define methods for handling, processing and transporting cylinders and corroded cylinders to meet system performance objectives. [2.2.1.a, 2.2.1.g] | E |
| 1.1.1, 1.1.4, 1.3.2 | 1.1.1.2.2.2 | 2 | Integrate the functional flow of cylinder inspections, degradation studies, degradation factor monitoring, and cylinder maintenance. | E |
| 1.1.2, 1.1.4 | 2.1.4.2.2 | 2 | Identify storage facility features that retain water beyond acceptable time of wetness performance objectives. | P |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.3.2.4 | 2 | Determine inspection and maintenance methods to maintain compliance with this requirement. | E |
| 1.1.4, 1.2.2, 1.3.2 | 2.1.4.2.3 | 2 | Identify and evaluate modifications to existing storage facilities and new storage facility designs so that performance objectives are met. | E |
| 1.1.4, 1.3.2 | 2.3.3.1 | 2 | Analyze alternatives to repairing/replacing breached, thinned, and other expected non-conforming cylinder conditions? | E |
| 1.1.4, 1.3.2, 1.5.1, 1.5.2 | 2.1.2.2.1 | 2 | Define acceptable cylinder time of wetness in a manner such that it is technically meaningful and can be verified. | E |
| 1.1.4, 1.4.1, 1.4.2 | 2.3.3.2.6 | 2 | Develop repair/replacement capabilities and capacities with projected demand. [2.3.3.a] | P |

**WBS Element 1.1.4: Maintenance**

This element consists of the operational activities necessary to maintain cylinders, equipment, and storage yards to Project standards.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 1.1.1.2.2.1 | 3 | Integrate the purpose of cylinder inspection functions including code inspections, periodic visual inspections, handling, transport, maintenance, and contents transfer functional acceptance inspections. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.2 | 2.2.1.2.2 | 3 | Identify methods and equipment to be used to handle, process, and transport cylinders and their contents. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 | 3 | Specify the degree of training (certification, qualification, etc.) for performing personnel (operators) who perform work (handle, transport, transfer contents, maintenance) on cylinders. (continued below) | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 (continued) | 3 | The quality for which this work is performed can directly impact the immediate and long-term functional risks within the system. | P |
| 1.1.1, 1.1.4, 1.3.2 | 2.3.2.1 | 3 | Analyze option to automate operations involving deteriorated cylinders. | E |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.2.2 | 3 | Integrate the structural feature performance for the surveillance and maintenance function with performance objectives for the other system functions. | E |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.2.2.2.1 | 3 | Define performance objectives of the cylinder structural features relative to the surveillance and maintenance function. | E |
| 1.1.2, 1.1.4, 1.4.1, 1.4.2 | 2.1.4.2.4.1 | 3 | Integrate storage array design with system functions including anticipated surveillance and maintenance of cylinders. [2.1.4.c] | P |
| 1.1.4, 1.1.5, 1.3.2 | 2.1.4.2.1 | 3 | Define, using technical basis, storage facility performance objectives including retention of moisture, operational use, and expected life. [2.1.4.a, 2.1.4.b] | E |
| 1.1.4, 1.2.2, 1.5.2 | 2.1.4.2.3.2 | 3 | Assess current facility design and construction methods to performance objectives. | P |
| 1.1.4, 1.3.2 | 2.1.2.2.2 | 3 | Identify all cylinder structural features that retain water beyond acceptable time of wetness. | E |

**WBS Element 1.1.4.1: Management of Substandard Cylinders (DAD I.02.2)**

This element consists of the personnel, equipment, and materials needed to respond to breached or severely degraded cylinders to stabilize the condition.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1.1, 1.1.2.1, 1.1.3, 1.1.4.1, 1.1.4.2, 1.1.4.3, 1.1.4.4, 1.1.5 | 2.2.1.3.3 | 1 | Perform the necessary inspection and maintenance on equipment and operations including the verification actions to compensate for non-conforming and potentially non-compliant cylinders. [2.2.1.b] | P |
| 1.1.4.1 | 2.3.3.3.2 | 1 | Repair or replace cylinders based on risk-determined, prioritized schedule. | P |
| 1.1.4.1, 1.1.4.3 | 2.3.1.2.1 | 2 | Determine service life and other performance objectives of replacement parts. | P |

**WBS Element 1.1.4.2: Cylinder Recoating (DAD I.02.6)**

This element consists of the personnel, equipment, and materials needed to recoat the full bodies of cylinders at PGDP within the existing subcontract. Coating of cylinder skirted regions is also included.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1.1, 1.1.2.1, 1.1.3, 1.1.4.1, 1.1.4.2, 1.1.4.3, 1.1.4.4, 1.1.5 | 2.2.1.3.3 | 1 | Perform the necessary inspection and maintenance on equipment and operations including the verification actions to compensate for non-conforming and potentially non-compliant cylinders. [2.2.1.b] | P |
| 1.1.4.2 | 2.1.1.2.6 | 1 | Determine method to verify baseline meets requirement. [2.1.1.c] | P |
| 1.1.4.2 | 2.1.1.3.1 | 1 | Initiate immediate temporary actions to mitigate the deterioration from worst case corrosion rates (paint skirts). [2.1.1.a] | P |
| 1.1.4.2, 1.3.2 | 2.1.1.2.5 | 1 | Test coating method. | E |
| 1.1.4.2 | 2.1.1.3.2 | 2 | Coat all cylinders per work plan and schedule. [2.1.1a, 2.1.1.b] | P |
| 1.1.4.2, 1.3.2 | 2.1.1.2.1 | 2 | Define performance objectives for coating (toughness, adhesion, porosity, repairability, life expectancy). [2.1.1.a, 2.1.1.c] | E |
| 1.1.4.2, 1.3.2 | 2.1.1.2.2 | 2 | Select coating. | E |
| 1.1.4.2, 1.2.1, 1.2.2, 1.3.2 | 2.2.1.2.4.1 | 3 | Integrate the protection of cylinder coatings into the saddle design. [2.2.1.f] | E |
| 1.1.4.2, 1.3.1, 1.3.2 | 2.1.1.2.3 | 3 | Develop coating method including surface preparation, coating application, and curing. | E |
| 1.1.4.2, 1.3.2, 1.4.1, 1.4.2 | 2.1.1.2.4 | 3 | Establish a coating work plan and schedule that prioritizes cylinders on the basis of condition. | E |

**WBS Element 1.1.4.3: General Cylinder Maintenance (DAD I.02.7)**

This element consists of the personnel, equipment, and materials necessary to maintain the cylinders, including valve and plug management, nameplate management, cylinder coating maintenance, and skirt cleaning.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1.1, 1.1.2.1, 1.1.3, 1.1.4.1, 1.1.4.2, 1.1.4.3, 1.1.4.4, 1.1.5 | 2.2.1.3.3 | 1 | Perform the necessary inspection and maintenance on equipment and operations including the verification actions to compensate for non-conforming and potentially non-compliant cylinders. [2.2.1.b] | P |
| 1.1.2.1, 1.1.4.3 | 2.1.2.3.3 | 1 | Perform inspection and maintenance of cylinder structural features. [2.1.2.a] | P |
| 1.1.2.1, 1.1.4.3 | 2.1.3.3.3 | 1 | Perform inspection and maintenance of cylinder support structures to ensure meeting this requirement. | P |
| 1.1.2.1, 1.1.4.3, 1.3.2 | 2.1.1.2.7 | 1 | Determine the coating inspection and maintenance intent, method and frequency. | E |
| 1.1.4.3 | 2.1.2.3.1 | 1 | Implement immediate actions to reduce cylinder time of wetness (clear debris from skirts). [2.1.2.a] | P |
| 1.1.4.3 | 2.1.5.3.2 | 1 | Implement the valve and plug management program. [2.1.5.a] | P |
| 1.1.4.3 | 2.1.5.3.4 | 1 | Repair/replace failed valves and plugs so that the performance criteria are met. [2.1.5.b] | P |
| 1.1.4.3, 1.1.4.4 | 2.2.1.3.4 | 1 | Implement baseline maintenance. | P |
| 1.1.4.3, 1.3.2 | 2.1.2.1 | 1 | Analyze options to reduce cylinder time of wetness caused by cylinder structural features. | E |
| 1.1.4.3, 1.3.2 | 2.1.5.2.4.3 | 1 | Determine methods and frequencies for valve and plug surveillance and preventive maintenance. [2.1.5.a] | E |
| 1.1.4.1, 1.1.4.3 | 2.3.1.2.1 | 2 | Determine service life and other performance objectives of replacement parts. | P |
| 1.1.4.3 | 2.1.2.3.2 | 2 | Modify structural features to meet acceptable cylinder time of wetness. [2.1.2.a] | P |
| 1.1.4.3 | 2.1.5.3.1 | 2 | Replace or repair of all missing or damaged cylinder valve or plug protective measures. (This is restricted to only those measures that were installed or recommended by the cylinder manufacturer.) [2.1.5.c] | P |
| 1.1.4.3 | 2.3.1.2.2 | 2 | Identify required spare parts inventory and procurement capacity and duration. | P |
| 1.1.4.3 | 2.3.1.3.1 | 2 | Obtain a spare parts inventory in accordance with projected demand. | P |
| 1.1.4.3, 1.1.2.1 | 2.1.1.3.4 | 2 | Implement coating inspection and maintenance. | P |
| 1.1.4.3 | 4.1.3.3.3 | 3 | Implement baseline maintenance. | P |

**WBS Element 1.1.4.4: General Yard and Equipment (DAD I.02.8)**

This element consists of the personnel and equipment necessary to satisfactorily maintain yards and cylinder handling equipment.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1.1, 1.1.2.1, 1.1.3, 1.1.4.1, 1.1.4.2, 1.1.4.3, 1.1.4.4, 1.1.5 | 2.2.1.3.3 | 1 | Perform the necessary inspection and maintenance on equipment and operations including the verification actions to compensate for non-conforming and potentially non-compliant cylinders. [2.2.1.b] | P |
| 1.1.4.3, 1.1.4.4 | 2.2.1.3.4 | 1 | Implement baseline maintenance. | P |
| 1.1.4.4, 1.1.2.1 | 2.1.4.3.5 | 1 | Perform inspection and maintenance of the storage facilities to ensure that this requirement is met. | P |
| 1.1.4.4, 1.2.1, 1.3.2 | 2.2.1.2.1 | 1 | Identify equipment performance objectives relative to handling, processing, and transport operations. [2.2.1.e] | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.1 | 2 | Define performance objectives of cylinder support structures with respect to system functions including the interface with cylinder coatings, periodic inspections, and water drainage. [2.1.3.a, 2.1.3.b] | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3 | 2 | Identify and evaluate modifications to cylinder support structures to meet cylinder time of wetness performance objectives. | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3.1 | 2 | Assess current designs to determine their capacity to drain water. | E |
| 1.1.4.4, 1.1.2.1 | 4.1.3.3.1 | 2 | Monitor the cylinder degradation factors. [4.1.3.b] | P |
| 1.1.4.4, 1.2.2, 1.3.2, 1.4.1 | 2.1.4.2.3.1 | 2 | Assess current storage facilities for deficiencies in meeting performance objectives. | E |
| 1.1.4.4, 1.2.1 | 2.2.1.3.1 | 3 | Modify existing equipment to add additional engineered controls. [2.2.1.d] | P |

**WBS Element 1.1.5: Off-Site Transport**

This element consists of personnel, equipment and other resources necessary to transport cylinders off-site. Included in this element are the full cycle of actions necessary to establish the capability to ship cylinders (degraded and otherwise), execute the shipment operations at the originating site, transport the cylinders off site, and reciept of cylinders at the destination site.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5 | 4.1.2.3.3 | 1 | Implement constraints for non-conforming cylinders. | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.3.1 | 1 | Define acceptable cylinder integrity, incorporating cylinder degradation concerns, for handling, processing, and transport. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.1 | 1 | Perform laboratory studies and other analyses to support the definition of cylinder integrity criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.2 | 1 | Perform structural analysis in support of the developing functional acceptance criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2 | 1 | Define cylinder functional acceptance criteria based upon applicable industrial standards and cylinder performance objectives. [4.1.2.a, 4.1.2.b] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.3 | 1 | Verify criticality controls including mitigative alarms and inventory segregation to be administered by the Nuclear Criticality Safety program. [1.2.1.c] | P |
| 1.1.1, 1.1.3, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.2 | 1 | Verify the inventory controls including movement and processing authorization to be administered by the NMC&A program. [1.2.1.b] | P |
| 1.1.1.1, 1.1.2.1, 1.1.3, 1.1.4.1, 1.1.4.2, 1.1.4.3, 1.1.4.4, 1.1.5 | 2.2.1.3.3 | 1 | Perform the necessary inspection and maintenance on equipment and operations including the verification actions to compensate for non-conforming and potentially non-compliant cylinders. [2.2.1.b] | P |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.5 | 1 | Determine cylinder inspection/acceptance requirements for transitioning cylinders from one function to another if one cylinder acceptance criteria is not adopted for all functions. | E |
| 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.4.1, 1.4.2 | 4.2.2.3.1.1 | 1 | Project the number of non-compliant cylinders. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.1 | 2.1.5.2.3 | 2 | Determine inspection/acceptance requirements for transitioning from one function to another if one valve and plug baseline configuration is not implemented. [2.1.5.a, 2.1.5.b] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2.1 | 2 | Develop code case(s) to demonstrate compliance with industry standards. [4.1.2.b, 4.1.2.c] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4 | 2 | Establish inspection/evaluation methods for determining the acceptability of cylinders relative functional criteria. [4.1.2.d] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.1 | 2 | Determine a technically acceptable risk-based periodicity to perform inspections and evaluations for determining the acceptability of cylinders' relative functional criteria. [4.1.2.e] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.4 | 2 | Define ultrasonic thickness techniques and their application i.e., how many points, and extent of area to measure thickness to verify compliance with functional criteria. | E |

**WBS Element 1.1.5: Off-Site Transport**

This element consists of personnel, equipment and other resources necessary to transport cylinders off-site. Included in this element are the full cycle of actions necessary to establish the capability to ship cylinders (degraded and otherwise), execute the shipment operations at the originating site, transport the cylinders off site, and reciept of cylinders at the destination site.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.7 | 2 | Perform laboratory studies to support the cylinder functional acceptance criteria and the cylinder monitoring evaluation techniques. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.1 | 2.1.5.2.1 | 2 | Identify performance objectives for cylinder valve and plugs for each system function under the anticipated operational states. Define performance in terms of industry standards to the extent possible. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.1 | 2 | Analyze options that would prevent cylinder damage (including new or modified equipment) during handling, processing, and transporting operations. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.2.3 | 2 | Identify performance objectives for cylinders, support structures, and storage facilities relative to handling, processing, and transporting methods and equipment. [2.2.1.f] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.4 | 2 | Identify engineered control(s) for each function that are needed to prevent, reduce, and mitigate cylinder and coating damage. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.5.1 | 2 | Define methods for handling, processing and transporting cylinders and corroded cylinders to meet system performance objectives. [2.2.1.a, 2.2.1.g] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 1.1.1.2.2.1 | 3 | Integrate the purpose of cylinder inspection functions including code inspections, periodic visual inspections, handling, transport, maintenance, and contents transfer functional acceptance inspections. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.2 | 2.2.1.2.2 | 3 | Identify methods and equipment to be used to handle, process, and transport cylinders and their contents. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 | 3 | Specify the degree of training (certification, qualification, etc.) for performing personnel (operators) who perform work (handle, transport, transfer contents, maintenance) on cylinders. (continued below) | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 (continued) | 3 | The quality for which this work is performed can directly impact the immediate and long-term functional risks within the system. | P |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.2.2 | 3 | Integrate the structural feature performance for the surveillance and maintenance function with performance objectives for the other system functions. | E |
| 1.1.4, 1.1.5, 1.3.2 | 2.1.4.2.1 | 3 | Define, using technical basis, storage facility performance objectives including retention of moisture, operational use, and expected life. [2.1.4.a, 2.1.4.b] | E |

**WBS Element 1.2: Capital / Construction**

This element consists of designating and procuring capital equipment and designing and constructing capital improvements that require capital equipment and line item financial control.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1, 1.2, 1.3, 1.4.1, 1.4.2 | 3.1.2.3.2 | 1 | Implement work control process(es). [3.1.2.a] | P |

**WBS Element 1.2.1: Capital Equipment**

This element consists of the full-cycle activities necessary to produce additional equipment. An alternative method for procuring equipment is through the Construction WBS element. Actions within this element include verification that needed equipment meets system specifications, and that the equipment is manufactured to specifications, is delivered, and has been demonstrated to comply with specifications. This element may also include training from the vendor or new equipment.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.4.4, 1.2.1, 1.3.2 | 2.2.1.2.1 | 1 | Identify equipment performance objectives relative to handling, processing, and transport operations. [2.2.1.e] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.1 | 2 | Analyze options that would prevent cylinder damage (including new or modified equipment) during handling, processing, and transporting operations. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.2.3 | 2 | Identify performance objectives for cylinders, support structures, and storage facilities relative to handling, processing, and transporting methods and equipment. [2.2.1.f] | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.1 | 2 | Define performance objectives of cylinder support structures with respect to system functions including the interface with cylinder coatings, periodic inspections, and water drainage. [2.1.3.a, 2.1.3.b] | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3 | 2 | Identify and evaluate modifications to cylinder support structures to meet cylinder time of wetness performance objectives. | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3.1 | 2 | Assess current designs to determine their capacity to drain water. | E |
| 1.2.1, 1.2.2, 1.3.2 | 2.2.1.2.4.2 | 2 | Incorporate into new handling equipment design additional engineered controls to prevent coating damage from the equipment and damage when placing cylinder on support structures. [2.2.1.d] | E |
| 1.1.4.2, 1.2.1, 1.2.2, 1.3.2 | 2.2.1.2.4.1 | 3 | Integrate the protection of cylinder coatings into the saddle design. [2.2.1.f] | E |
| 1.1.4.4, 1.2.1 | 2.2.1.3.1 | 3 | Modify existing equipment to add additional engineered controls. [2.2.1.d] | P |
| 1.2.1, 1.2.2, 1.3.2 | 2.1.3.1 | 3 | Analyze cylinder support structure options to minimize cylinder time of wetness and accomplish other system performance objectives. | E |

**WBS Element 1.2.1.1: Closeout Costs for Cylinder Handler Purchased FY 1996 (DAD I.CE.1)**

This element consists of procuring cylinder handling equipment.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| | | | See WBS Element 1.2.1 | |

**WBS Element 1.2.2: Construction**

The scope of this element is construction of new cylinder yards to facilitate placing cylinders on well-drained concrete yards.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.4.5, 1.2.2 | 2.1.4.3.3 | 1 | Build new or modify storage facilities to meet cylinder performance objectives. Utilize new/modified facilities. [2.1.4.b] | P |
| 1.2.2 | 2.1.3.3.2 | 1 | Procure or modify support structures to meet acceptable cylinder time of wetness. | P |
| 1.1.1, 1.1.2, 1.2.2 | 4.1.2.2.4.6 | 2 | Integrate the periodic inspection performance objectives with cylinder accessibility. [4.1.2.f] | P |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.1 | 2 | Define performance objectives of cylinder support structures with respect to system functions including the interface with cylinder coatings, periodic inspections, and water drainage. [2.1.3.a, 2.1.3.b] | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3 | 2 | Identify and evaluate modifications to cylinder support structures to meet cylinder time of wetness performance objectives. | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3.1 | 2 | Assess current designs to determine their capacity to drain water. | E |
| 1.1.4, 1.2.2, 1.3.2 | 2.1.4.2.3 | 2 | Identify and evaluate modifications to existing storage facilities and new storage facility designs so that performance objectives are met. | E |
| 1.1.4.4, 1.2.2, 1.3.2, 1.4.1 | 2.1.4.2.3.1 | 2 | Assess current storage facilities for deficiencies in meeting performance objectives. | E |
| 1.2.1, 1.2.2, 1.3.2 | 2.2.1.2.4.2 | 2 | Incorporate into new handling equipment design additional engineered controls to prevent coating damage from the equipment and damage when placing cylinder on support structures. [2.2.1.d] | E |
| 1.1.4, 1.2.2, 1.5.2 | 2.1.4.2.3.2 | 3 | Assess current facility design and construction methods to performance objectives. | P |
| 1.1.4.2, 1.2.1, 1.2.2, 1.3.2 | 2.2.1.2.4.1 | 3 | Integrate the protection of cylinder coatings into the saddle design. [2.2.1.f] | E |
| 1.2.1, 1.2.2, 1.3.2 | 2.1.3.1 | 3 | Analyze cylinder support structure options to minimize cylinder time of wetness and accomplish other system performance objectives. | E |

**WBS Element 1.2.2.1: Cylinder Storage Yard Phase VII (89-N-501) (DAD I.L1.1)**

This subproject consists of the construction of X-745-E yard and C-745-S yard. The remaining scope of work includes close-out verification.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| | | | See WBS Element 1.2.2 | |

**WBS Element 1.2.2.2: Cylinder Storage Yard Phase VIII (93-U-200) (DAD I.L1.2)**

This subproject consists of the renovation of the C-745-G cylinder yard from dense grade aggregate to concrete and the procurement of three NCH-35s (cylinder handlers) and 9,000 concrete chocks.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| | | | See WBS Element 1.2.2 | |

**WBS Element 1.2.2.3: Cylinder Storage Yard Phase IX (93-U-201) (DAD I.L1.3)**

This subproject consists of the construction of a new 465,000-sq-ft concrete cylinder yard (C-745-T) and renovation of existing gravel-surfaced cylinder yards C-745-K, L, M, N, and P. This subproject includes installing concrete paving for the five existing yards, improving access roads, upgrading drainage systems, improving lighting systems, and extending the existing patrol road and security fence.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| | | | See WBS Element 1.2.2 | |

**WBS Element 1.3: Development**

This element is a cross matrix within other WBS elements. The breakdown of system development activities is provided for control of these development activities. Typically, development is identified to clarify the technical basis; optimize operations; or resolve deficiencies. In these cases, the benefiting or integrating WBS element is identified so that the product of development fits into execution of the system.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1, 1.2, 1.3, 1.4.1, 1.4.2 | 3.1.2.3.2 | 1 | Implement work control process(es). [3.1.2.a] | P |

**WBS Element 1.3.1: Engineering Development (Site-Specific)**

This element encompasses development and technical operations of the Project at the site level needed to clarify the techncial basis; optimize the operations; resolve deficiencies identified internally or externally through audits, assessments, or reviews.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.1 | 2.1.5.2.3 | 2 | Determine inspection/acceptance requirements for transitioning from one function to another if one valve and plug baseline configuration is not implemented. [2.1.5.a, 2.1.5.b] | E |
| 1.1.4.2, 1.3.1, 1.3.2 | 2.1.1.2.3 | 3 | Develop coating method including surface preparation, coating application, and curing. | E |

**WBS Element 1.3.2: Engineering Development (Three-Site)**

This element encompasses development and technical operations of the Project needed to clarify the technical basis; optimize the configuration; and resolve deficiencies identified internally or externally through audits, assessments, or reviews.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.3.2 | 1.1.1.1 | | An analysis of optional methods to meet this requirement is not applicable | E |
| 1.3.2 | 1.1.2.1 | | An analysis of optional methods to meet this requirement is not applicable | E |
| 1.3.2 | 1.2.2.1 | | An analysis of optional methods is not applicable. | E |
| 1.3.2 | 2.1.1.1 | | An analysis of optional methods for meeting this requirement is not applicable. | E |
| 1.3.2 | 2.1.4.1 | | An analysis of optional methods to meet this requirement is not applicable | E |
| 1.3.2 | 2.1.5.1 | | An analysis of optional methods for meeting this requirement is not applicable. | E |
| 1.3.2 | 2.2.2.1 | | Analysis of optional methods for meeting this requirement is not applicable. | E |
| 1.3.2 | 2.3.1.1 | | An analysis of optional methods to meet this requirement is not applicable | E |
| 1.3.2 | 3.3.1.1 | | An analysis of optional methods to meet this requirement is not applicable | E |
| 1.3.2 | 4.1.1.1 | | An analysis of optional methods for meeting this requirement is not applicable. | E |
| 1.3.2 | 4.2.1.1 | | An analysis of optional methods to meet this requirement is not applicable | E |
| 1.3.2 | 4.2.2.1 | | An analysis of optional methods to meet the requirement is not applicable. | E |
| 1.3.2 | 5.1.1.1 | | An analysis of optional methods to meet the requirement is not applicable. | E |
| 1.3.2 | 5.2.1.1 | | An analysis of optional methods to meet the requirement is not applicable. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.3.1 | 1 | Define acceptable cylinder integrity, incorporating cylinder degradation concerns, for handling, processing, and transport. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.1 | 1 | Perform laboratory studies and other analyses to support the definition of cylinder integrity criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.1.2 | 1 | Perform structural analysis in support of the developing functional acceptance criteria. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2 | 1 | Define cylinder functional acceptance criteria based upon applicable industrial standards and cylinder performance objectives. [4.1.2.a, 4.1.2.b] | E |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.5 | 1 | Determine cylinder inspection/acceptance requirements for transitioning cylinders from one function to another if one cylinder acceptance criteria is not adopted for all functions. | E |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.2.2.4 | 1 | Develop a structural feature inspection and maintenance plan to maintain compliance with this requirement, and integrate the plan with the program. | E |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.5.2.4.1 | 1 | Determine the necessary periodic surveillance and preventive maintenance of valves and plugs. [2.1.5.a, 2.1.5.b] | E |
| 1.1.2, 1.1.4, 1.3.2, 1.5.2 | 2.1.5.2.4 | 1 | Develop a valve and plug management program to ensure that performance objectives are met. [2.1.5.a] | E |

**WBS Element 1.3.2: Engineering Development (Three-Site)**

This element encompasses development and technical operations of the Project needed to clarify the technical basis; optimize the configuration; and resolve deficiencies identified internally or externally through audits, assessments, or reviews.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.2, 1.1.4, 1.3.2, 1.5.2 | 2.1.5.2.4.2 | 1 | Determine methods and when valves and plugs should be repaired/replaced as corrective maintenance. [2.1.5.b] | E |
| 1.1.2.1, 1.1.4.3, 1.3.2 | 2.1.1.2.7 | 1 | Determine the coating inspection and maintenance intent, method and frequency. | E |
| 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.4.1, 1.4.2 | 4.2.2.3.1.1 | 1 | Project the number of non-compliant cylinders. | E |
| 1.1.4, 1.3.2 | 2.1.2.2.3 | 1 | Identify and evaluate modifications to cylinder structural features that retain water to allow drainage. | E |
| 1.1.4.2, 1.3.2 | 2.1.1.2.5 | 1 | Test coating method. | E |
| 1.1.4.3, 1.3.2 | 2.1.2.1 | 1 | Analyze options to reduce cylinder time of wetness caused by cylinder structural features. | E |
| 1.1.4.3, 1.3.2 | 2.1.5.2.4.3 | 1 | Determine methods and frequencies for valve and plug surveillance and preventive maintenance. [2.1.5.a] | E |
| 1.1.4.4, 1.2.1, 1.3.2 | 2.2.1.2.1 | 1 | Identify equipment performance objectives relative to handling, processing, and transport operations. [2.2.1.e] | E |
| 1.3.2 | 4.1.3.2.1 | 1 | Identify, and grade for severity, factors that could degrade cylinder integrity [4.1.3.a]. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.2.3.1 | 1 | Forecast cylinder conditions using the parameters identified. [4.2.2.b] | E |
| 1.3.2, 1.4.2 | 1.2.2.2.1.2 | 1 | Model corrosion to project cylinder integrity. | E |
| 1.3.2, 1.4.2 | 1.2.2.2.2 | 1 | Define standards for when and how these risk monitoring and evaluation tools will be used. | E |
| 1.3.2, 1.5 | 1.2.2.2.4 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.2 | 1 | Determine controls necessary to decrease the probability of occurrence for accidents with unacceptable consequences to a tolerable level (ALARA). Controls are determined for anticipated operational states. [1.1.3.a, 1.1.3.b, 1.1.3.f] | E |
| 1.3.2, 1.5.5 | 2.2.1.2.5 | 1 | Identify operational control(s) for each function that are needed to prevent, reduce, and mitigate cylinder damage during test/demonstration, start-up, routine, emergency, off-normal, and standby states of operation. | E |
| 1.1, 1.3.2, 1.4.1, 1.4.2 | 4.1.2.2.3 | 2 | Identify factors that make cylinders non-conforming and identify constraints necessary to maintain compliance with the safety envelope (non-conformance may be based on non-certified volumes, exceedence of fill limits, etc.) [4.1.2.a] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.2.1 | 2 | Develop code case(s) to demonstrate compliance with industry standards. [4.1.2.b, 4.1.2.c] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4 | 2 | Establish inspection/evaluation methods for determining the acceptability of cylinders relative functional criteria. [4.1.2.d] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.1 | 2 | Determine a technically acceptable risk-based periodicity to perform inspections and evaluations for determining the acceptability of cylinders' relative functional criteria. [4.1.2.e] | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.4 | 2 | Define ultrasonic thickness techniques and their application i.e., how many points, and extent of area to measure thickness to verify compliance with functional criteria. | E |

**WBS Element 1.3.2: Engineering Development (Three-Site)**

This element encompasses development and technical operations of the Project needed to clarify the technical basis; optimize the configuration; and resolve deficiencies identified internally or externally through audits, assessments, or reviews.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 4.1.2.2.4.7 | 2 | Perform laboratory studies to support the cylinder functional acceptance criteria and the cylinder monitoring evaluation techniques. | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.1 | 2.1.5.2.1 | 2 | Identify performance objectives for cylinder valve and plugs for each system function under the anticipated operational states. Define performance in terms of industry standards to the extent possible. | E |
| 1.1.1, 1.1.2, 1.1.4, 1.3.2 | 2.1.4.2.4 | 2 | Identify and evaluate modifications to the cylinder storage array to meet system performance objectives. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.1 | 2 | Analyze options that would prevent cylinder damage (including new or modified equipment) during handling, processing, and transporting operations. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.3.2 | 2.2.1.2.3 | 2 | Identify performance objectives for cylinders, support structures, and storage facilities relative to handling, processing, and transporting methods and equipment. [2.2.1.f] | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.4 | 2 | Identify engineered control(s) for each function that are needed to prevent, reduce, and mitigate cylinder and coating damage. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.2.1.2.5.1 | 2 | Define methods for handling, processing and transporting cylinders and corroded cylinders to meet system performance objectives. [2.2.1.a, 2.2.1.g] | E |
| 1.1.1, 1.1.4, 1.3.2 | 1.1.1.2.2.2 | 2 | Integrate the functional flow of cylinder inspections, degradation studies, degradation factor monitoring, and cylinder maintenance. | E |
| 1.1.1, 1.3.2 | 2.2.1.2.4.3 | 2 | Evaluate engineered controls to mitigate damage to cylinders and coatings from the use of existing equipment. [2.2.1.e] | E |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.3.2.4 | 2 | Determine inspection and maintenance methods to maintain compliance with this requirement. | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.1 | 2 | Define performance objectives of cylinder support structures with respect to system functions including the interface with cylinder coatings, periodic inspections, and water drainage. [2.1.3.a, 2.1.3.b] | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3 | 2 | Identify and evaluate modifications to cylinder support structures to meet cylinder time of wetness performance objectives. | E |
| 1.1.2, 1.1.4.4, 1.2.1, 1.2.2, 1.3.2 | 2.1.3.2.3.1 | 2 | Assess current designs to determine their capacity to drain water. | E |
| 1.1.4, 1.2.2, 1.3.2 | 2.1.4.2.3 | 2 | Identify and evaluate modifications to existing storage facilities and new storage facility designs so that performance objectives are met. | E |
| 1.1.4, 1.3.2 | 2.3.3.1 | 2 | Analyze alternatives to repairing/replacing breached, thinned, and other expected non-conforming cylinder conditions? | E |
| 1.1.4, 1.3.2, 1.5.1, 1.5.2 | 2.1.2.2.1 | 2 | Define acceptable cylinder time of wetness in a manner such that it is technically meaningful and can be verified. | E |
| 1.1.4.2, 1.3.2 | 2.1.1.2.1 | 2 | Define performance objectives for coating (toughness, adhesion, porosity, repairability, life expectancy). [2.1.1.a, 2.1.1.c] | E |
| 1.1.4.2, 1.3.2 | 2.1.1.2.2 | 2 | Select coating. | E |
| 1.1.4.4, 1.2.2, 1.3.2, 1.4.1 | 2.1.4.2.3.1 | 2 | Assess current storage facilities for deficiencies in meeting performance objectives. | E |

**WBS Element 1.3.2: Engineering Development (Three-Site)**

This element encompasses development and technical operations of the Project needed to clarify the technical basis; optimize the configuration; and resolve deficiencies identified internally or externally through audits, assessments, or reviews.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.2.1, 1.2.2, 1.3.2 | 2.2.1.2.4.2 | 2 | Incorporate into new handling equipment design additional engineered controls to prevent coating damage from the equipment and damage when placing cylinder on support structures. [2.2.1.d] | E |
| 1.3.2, 1.4.1, 1.4.2 | 5.2.2.1 | 2 | Trade study alternatives/options of life-cycle projections. | E |
| 1.3.2, 1.5.1 | 2.1.5.2.2 | 2 | Integrate these performance objectives with the required configuration of the valve and plug. (packing, port and packing nut condition, valve body, threads showing, stem seat, torque, thread to boss interface including the presence of tape). | E |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 1.1.1.2.2.1 | 3 | Integrate the purpose of cylinder inspection functions including code inspections, periodic visual inspections, handling, transport, maintenance, and contents transfer functional acceptance inspections. | E |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.2 | 2.2.1.2.2 | 3 | Identify methods and equipment to be used to handle, process, and transport cylinders and their contents. | E |
| 1.1.1, 1.1.4, 1.3.2 | 2.3.2.1 | 3 | Analyze option to automate operations involving deteriorated cylinders. | E |
| 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2 | 2.1.2.2.2.2 | 3 | Integrate the structural feature performance for the surveillance and maintenance function with performance objectives for the other system functions. | E |
| 1.1.2, 1.1.4, 1.3.2 | 2.1.2.2.2.1 | 3 | Define performance objectives of the cylinder structural features relative to the surveillance and maintenance function. | E |
| 1.1.2, 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.3 | 3 | Identify which collected data will be used in the forecasting. Integrate forecasting with monitoring efforts. [4.2.2.a] | E |
| 1.1.2, 1.4.1, 1.3.2, 1.4.2 | 4.1.1.2.4 | 3 | Determine a method to verify that all potential pathways of exposure to the environment are being monitored. | E |
| 1.1.4, 1.1.5, 1.3.2 | 2.1.4.2.1 | 3 | Define, using technical basis, storage facility performance objectives including retention of moisture, operational use, and expected life. [2.1.4.a, 2.1.4.b] | E |
| 1.1.4, 1.3.2 | 2.1.2.2.2 | 3 | Identify all cylinder structural features that retain water beyond acceptable time of wetness. | E |
| 1.1.4.2, 1.2.1, 1.2.2, 1.3.2 | 2.2.1.2.4.1 | 3 | Integrate the protection of cylinder coatings into the saddle design. [2.2.1.f] | E |
| 1.1.4.2, 1.3.1, 1.3.2 | 2.1.1.2.3 | 3 | Develop coating method including surface preparation, coating application, and curing. | E |
| 1.1.4.2, 1.3.2, 1.4.1, 1.4.2 | 2.1.1.2.4 | 3 | Establish a coating work plan and schedule that prioritizes cylinders on the basis of condition. | E |
| 1.2.1, 1.2.2, 1.3.2 | 2.1.3.1 | 3 | Analyze cylinder support structure options to minimize cylinder time of wetness and accomplish other system performance objectives. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.1.3.1 | 3 | Analyze optional storage configuration to reduce or eliminate degradation factors. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.1.2.2 | 3 | Define and describe categories in terms of cylinder functional criteria and/or factors that could adversely impact cylinder integrity. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.2 | 3 | Identify which cylinder condition elements are to be forecasted. Elements are to be selected based on intended future use of the cylinders. [4.2.2.a] | E |

**WBS Element 1.3.2: Engineering Development (Three-Site)**

This element encompasses development and technical operations of the Project needed to clarify the technical basis; optimize the configuration; and resolve deficiencies identified internally or externally through audits, assessments, or reviews.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.4 | 3 | Define procedures for forecasting cylinder condition. Using these procedures will identify specific cylinders in need of specific surveillance and maintenance. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.6 | 3 | Establish a process to periodically review forecasting results with the performance objectives through the use of performance indicators. [4.2.2.b] | E |
| 1.3.2, 1.5.1, 1.5.2, 1.5.3 | 4.1.3.2.4 | 3 | Develop a monitoring plan, incorporating the methods and frequencies for performing those methods. | E |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.1.1 | 3 | Identify plausible accident scenarios given identified functional hazards. Plausible accident scenarios to be identified will include scenarios stemming from cylinder breaches (continued below) | E |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.1.1 (continued) | 3 | into the ullage space and degraded cylinder conditions as possible initiators. [1.1.3.b] | E |
| 1.3.2, 1.5.3 | 4.1.3.2.2 | 3 | Develop a database for tracking degradation factor monitoring data. | E |
| 1.3.2, 1.5.5 | 1.1.2.2.1 | 3 | Identify the industrial, chemical, and radiological hazards within the program configuration (see requirement 1.1.1). [1.1.2.a] | E |
| 1.3.2, 1.5.5 | 1.1.2.2.2 | 3 | Perform process hazards analysis (see requirement 1.1.1). [1.1.2.a] | E |
| 1.3.2, 1.5.5 | 1.1.2.2.3 | 3 | Grade hazards to identify program emphasis areas for detailed analysis and development of controls. [1.1.2.a] | E |
| 1.3.2, 1.5.5 | 1.1.2.2.3.1 | 3 | Record the hazard analyses in the safety envelope documentation. [1.1.2.a] | E |
| 1.3.2, 1.5.5 | 1.1.3.2.1.2 | 3 | Determine the probability of accidents scenarios occurring. [1.1.3.b] | E |
| 1.3.2, 1.5.5 | 1.1.3.2.3 | 3 | Complete the risk analysis and risk control sections of the SAR relative to the program. [1.1.3.b] | E |

**WBS Element 1.3.3: DU Use Development**

The scope of work for this directive will be supplied in correspondence from DOE.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| | | | No Action | |

**WBS Element 1.4: System Administration**

This element consists of the planning, controlling, and monitoring activities of the system to ensure progress toward the mission of the Project.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.4.1, 1.4.2 | 1.1.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 1.1.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 1.1.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 1.1.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 1.1.3.3 | | Implement baseline configuration. (see 1.1.1 configuration management) | P |
| 1.4.1, 1.4.2 | 1.1.3.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 1.2.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 1.2.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 1.2.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 1.2.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.1.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.1.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.1.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.1.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.1.3.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.1.3.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.1.4.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.1.4.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.1.5.3 | | Implement the baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.1.5.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.2.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.2.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.2.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.2.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.3.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.3.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.3.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.3.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 2.3.3.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 2.3.3.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 3.1.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 3.1.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 3.1.2.3 | | Implement baseline configuration. | P |

**WBS Element 1.4: System Administration**

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| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.4.1, 1.4.2 | 3.1.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 3.2.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 3.2.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 3.3.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 3.3.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 4.1.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 4.1.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 4.1.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 4.1.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 4.1.3.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 4.1.3.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 4.2.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 4.2.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 4.2.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 4.2.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 5.1.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 5.1.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 5.1.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 5.1.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 5.2.1.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 5.2.1.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.4.1, 1.4.2 | 5.2.2.3 | | Implement baseline configuration. | P |
| 1.4.1, 1.4.2 | 5.2.2.5 | | Adjust baseline as necessary to meet the program requirement. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.1 | 1 | Verify the industrial hazard controls to be administered by the industrial hygiene program. [1.2.1.a] | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.2.1 | 1 | Develop a training program for personnel on program risks and subsequent controls. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.3 | 1 | Determine required maintenance of risk controls. | P |
| 1.1, 1.2, 1.3, 1.4.1, 1.4.2 | 3.1.2.3.2 | 1 | Implement work control process(es). [3.1.2.a] | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.3 | 1 | Verify criticality controls including mitigative alarms and inventory segregation to be administered by the Nuclear Criticality Safety program. [1.2.1.c] | P |

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| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.1.1, 1.1.3, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.2 | 1 | Verify the inventory controls including movement and processing authorization to be administered by the NMC&A program. [1.2.1.b] | P |
| 1.1.1, 1.4.1, 1.4.2 | 2.2.1.3.2 | 1 | Implement a safe move program. [2.2.1.c, 2.2.1.g] | P |
| 1.1.1, 1.4.1, 1.4.2 | 2.2.1.3.2.1 | 1 | Implement administrative controls. [2.2.1.c] | P |
| 1.1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.5 | 1 | Verify operational controls to prevent cylinder placement in ground contact beyond a specified duration. Specify duration. [1.2.1.e] | P |
| 1.1.2, 1.4.1, 1.4.2 | 4.1.2.2.1 | 1 | Identify all cylinder monitoring performance objectives. | P |
| 1.1.2, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.4 | 1 | Verify the safeguards and security controls including periodic patrols, physical boundaries, and facility lighting to be administered by the Safeguards and Security program. | P |
| 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.4.1, 1.4.2 | 4.2.2.3.1.1 | 1 | Project the number of non-compliant cylinders. | E |
| 1.1.4, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.6 | 1 | Verify in the authorization of cylinder repair/replacement through contracted services the validation of a safety envelope for specified operations. [1.2.1.f] | P |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.2.3.1 | 1 | Forecast cylinder conditions using the parameters identified. [4.2.2.b] | E |
| 1.3.2, 1.4.2 | 1.2.2.2.1.2 | 1 | Model corrosion to project cylinder integrity. | E |
| 1.3.2, 1.4.2 | 1.2.2.2.2 | 1 | Define standards for when and how these risk monitoring and evaluation tools will be used. | E |
| 1.4.1, 1.4.2 | 1.1.3.1 | 1 | An analysis of optional methods includes the analysis of eliminating the risk(s) or controlling the risk(s). | P |
| 1.4.1, 1.4.2 | 1.2.2.3.2 | 1 | Implement the risk monitoring subsystem. | P |
| 1.4.1, 1.4.2 | 2.1.2.2.6 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2 | 3.2.1.3.1 | 1 | Select personnel per criteria in the management plan. | P |
| 1.4.1, 1.4.2 | 3.3.1.3.1 | 1 | Implement the structured process to monitor system functions per the performance objectives. This requires active participation in system functions at all levels. [3.3.1.b] | P |
| 1.4.1, 1.4.2 | 3.3.1.3.2 | 1 | Evaluate assessment results to provide the basis for system improvements, to include the following: evaluate results, define issues, develop mitigating actions, (continued below) | P |
| 1.4.1, 1.4.2 | 3.3.1.3.2 (continued) | 1 | prioritize actions and cost/benefit analysis of highest priority actions, develop and implement action plan. | P |
| 1.4.1, 1.4.2 | 3.3.1.3.4 | 1 | Develop and use performance indicators for the system functions to demonstrate that performance objectives and mission are met to identify trends, and to identify areas requiring improvement. [3.3.1.b] | P |
| 1.4.1, 1.4.2 | 4.2.2.2.1 | 1 | Review the data collected as a result of monitoring containment integrity. | P |
| 1.4.1, 1.4.2 | 5.1.1.2.1 | 1 | Develop a standard, systematic method for estimating level of effort within the system to support standard cost estimates. | P |

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|---|---|---|---|---|
| 1.4.1, 1.4.2 | 5.1.1.2.2 | 1 | Identify the critical path of system activities (tasks). | P |
| 1.4.1, 1.4.2 | 5.1.1.2.4 | 1 | Develop a funds allocation and accounting system reflective of the WBS. | P |
| 1.4.1, 1.4.2 | 5.1.1.2.4.1 | 1 | Obtain accurate accounting of costs (funds committed to date) as needed at the single site and 3-site level to effectively control financial resources. | P |
| 1.4.1, 1.4.2 | 5.1.1.2.5 | 1 | Define and develop financial management methods (review periods, reallocation processes, financial configuration control, etc.). | P |
| 1.4.1, 1.4.2 | 5.1.1.3.1 | 1 | Define task (WBS) elements with accounts. | P |
| 1.4.1, 1.4.2 | 5.1.1.3.2 | 1 | Define budget requirements with identified activities (tasks). | P |
| 1.4.1, 1.4.2 | 5.1.1.3.3 | 1 | Obtain budget authorization. | P |
| 1.4.1, 1.4.2 | 5.1.1.3.4 | 1 | Gather accurate costs. | P |
| 1.4.1, 1.4.2 | 5.1.1.3.5 | 1 | Control costs to the progress of activities (tasks). | P |
| 1.4.1, 1.4.2 | 5.1.2.2.2 | 1 | Establish a program organization reflective of the system functions, subsystems, and activities. | P |
| 1.4.1, 1.4.2 | 5.1.2.2.3 | 1 | Define roles, responsibilities and qualifications reflective of the organizational structure. | P |
| 1.4.1, 1.4.2 | 5.1.2.3.1 | 1 | Obtain and allocate intellectual resources necessary to operate the system and accomplish activities. | P |
| 1.4.1, 1.4.2 | 5.1.2.3.2 | 1 | Monitor personnel performance. | P |
| 1.4.1, 1.4.2 | 5.2.2.2.1 | 1 | Define the projected life-cycle including phase durations and operating parameters that impact current phase objectives and criteria. [5.2.2.a, 5.2.2.b] | P |
| 1.4.1, 1.4.2 | 5.2.2.2.3 | 1 | Identify the factors for triggering an assessment of the configuration, i.e., revisions to the life-cycle and duration projections, substandard performance, identification of new technologies. (continued below) | P |
| 1.4.1, 1.4.2 | 5.2.2.2.3 (continued) | 1 | New technologies include methods for reducing cylinder corrosion. [5.2.2.c] | P |
| 1.4.1, 1.4.2 | 5.2.2.2.4 | 1 | Develop methods/sub-systems for identifying when a configuration assessment is necessary. Methods are to include interaction with corrosion experts, literature on state-of-the-art technolog, and attending corrosion engineering conferences. | P |
| 1.4.1, 1.4.2 | 5.2.2.3.4 | 1 | Control the interfaces within the system. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.2 | 1 | Develop implementation means for all program risk controls. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.4 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.4.1 | 1 | Determine the effectiveness of controls for reducing, eliminating, and mitigating risks. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.1 | 1 | Identify current risks that are above acceptable program risks. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.1 | 1 | Implement the configuration change process. [3.1.1.a] | P |

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|---|---|---|---|---|
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.4 | 1 | Implement the document control and records management system. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.5 | 1 | Conduct audits and independent assessments of configuration control, document control, and records management process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.2.3.3 | 1 | Manage system documents and records per the document control and records management process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.1 | 1 | Select and develop performance objectives for the system functions; consider customer expectations and long-range plans. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.3.3 | 1 | Train line-management to use the assessment process for monitoring and improving work activities, including observation skills, performance objectives selection and use, evaluation process skills, and action plan development process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.1 | 1 | Develop the requirement structure and traceability method(s). | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.2 | 1 | Develop a method for controlling and maintaining requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.3 | 1 | Develop a method for ensuring system tasks are based on requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.1 | 1 | Identify requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.2 | 1 | Trace requirements to the mission and implementing documentation. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.3 | 1 | Utilize requirements in identifying and developing system activities (tasks). | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.2.2.2 | 1 | Develop the system configuration and change control based on life-cycle and phase duration projections. [5.2.2.a] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.3 | 1.2.1.2.1.7 | 1 | Verify integration of program hazards with site emergency preparedness. | P |
| 1.4.1, 1.4.2, 1.5.5 | 1.1.2.3.1 | 1 | Obtain authorization of the safety basis (SAR). [1.1.2.a] | P |
| 1.4.1, 1.4.2, 1.5.5 | 1.1.3.3.1 | 1 | Obtain authorization of safety basis (Safety Analysis Report). [1.1.3.b] | P |
| 1.1, 1.3.2, 1.4.1, 1.4.2 | 4.1.2.2.3 | 2 | Identify factors that make cylinders non-conforming and identify constraints necessary to maintain compliance with the safety envelope (non-conformance may be based on non-certified volumes, exceedence of fill limits, etc.) [4.1.2.a] | E |
| 1.1.4, 1.4.1, 1.4.2 | 2.3.3.2.6 | 2 | Develop repair/replacement capabilities and capacities with projected demand. [2.3.3.a] | P |
| 1.1.4.4, 1.2.2, 1.3.2, 1.4.1 | 2.1.4.2.3.1 | 2 | Assess current storage facilities for deficiencies in meeting performance objectives. | E |
| 1.3.2, 1.4.1, 1.4.2 | 5.2.2.1 | 2 | Trade study alternatives/options of life-cycle projections. | E |
| 1.4.1, 1.4.2 | 1.1.3.2.4.1 | 2 | Identify intent and periodicity of risk re-assessments. [1.1.3.c, 1.1.3.d] | P |
| 1.4.1, 1.4.2 | 2.1.5.2.5 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2 | 2.3.1.2.5 | 2 | Identify qualified vendors. | P |

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|---|---|---|---|---|
| 1.4.1, 1.4.2 | 2.3.3.2.5 | 2 | Prioritize and schedule cylinders in need of repair/replacement according to risk. | P |
| 1.4.1, 1.4.2 | 2.3.3.2.7 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2 | 4.2.1.2.1 | 2 | Review the cylinder functional criteria and degradation factors. | E |
| 1.4.1, 1.4.2 | 5.1.1.2.3 | 2 | Define budgeting cycle activities and schedules. | P |
| 1.4.1, 1.4.2 | 5.1.2.1 | 2 | Analyze optional methods for obtaining intellectual resources (contract, subcontract, direct employment). | P |
| 1.4.1, 1.4.2 | 5.1.2.2.1 | 2 | Define how disciplines necessary to accomplish system activities and objectives are identified, secured, and allocated. | P |
| 1.4.1, 1.4.2 | 5.2.2.2.5 | 2 | Develop a method for identifying and controlling the interfaces between organizations, functions, subsystems, components and activities. | P |
| 1.4.1, 1.4.2 | 5.2.2.3.1 | 2 | Assess the configuration for efficiency, reliability, and maintainability. [5.2.2.a] | P |
| 1.4.1, 1.4.2 | 5.2.2.3.1.1 | 2 | Determine the three-site aspects of the system configuration. Specifically, determine whether the K-25 cylinder inventory should be relocated to PGDP and PORTS or the long-term maintainability functions should be implemented at K-25. | P |
| 1.4.1, 1.4.2 | 5.2.2.3.2 | 2 | Implement methods for identifying when a configuration assessment is necessary. | P |
| 1.4.1, 1.4.2 | 5.2.2.3.3 | 2 | Identify the interfaces within the system configuration. | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.4.1 | 2 | Develop a baseline configuration management system. [1.1.1.b, 1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.4.2 | 2 | Determine the intent and periodicity of configuration audits. [1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.5 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.3.1 | 2 | Implement configuration management system for system baseline. [1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.2.2.1 | 2 | Identify risk monitoring and evaluation tools to be used in the program. These tools will include technical and operational performance monitoring, company, corporate and industry lessons learned sharing, and investigations of occurrences. [1.2.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.2.2.1.1 | 2 | Establish a facility safety walk-through program with the intent of identifying risk initiators. [1.2.2.a] | P |
| 1.4.1, 1.4.2, 1.5.3 | 1.1.1.2.3.4 | 2 | Improve the database that provides cylinder location, condition, content, maintenance, and history necessary to manage actions and constraints related to maintaining cylinder integrity. | P |
| 1.1, 1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.1 | 3 | Specify the degree of training (certification, qualification, etc.) for performing personnel (inspectors) who determine cylinder condition. (continued below) | P |
| 1.1, 1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.1 (continued) | 3 | The quality of which cylinder conditions are determined impacts the functional and inter-functional risks within the system. | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 | 3 | Specify the degree of training (certification, qualification, etc.) for performing personnel (operators) who perform work (handle, transport, transfer contents, maintenance) on cylinders. (continued below) | P |

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|---|---|---|---|---|
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.2 (continued) | 3 | The quality for which this work is performed can directly impact the immediate and long-term functional risks within the system. | P |
| 1.1.2, 1.1.4, 1.4.1, 1.4.2 | 2.1.4.2.4.1 | 3 | Integrate storage array design with system functions including anticipated surveillance and maintenance of cylinders. [2.1.4.c] | P |
| 1.1.2, 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.3 | 3 | Identify which collected data will be used in the forecasting. Integrate forecasting with monitoring efforts. [4.2.2.a] | E |
| 1.1.2, 1.4.1, 1.3.2, 1.4.2 | 4.1.1.2.4 | 3 | Determine a method to verify that all potential pathways of exposure to the environment are being monitored. | E |
| 1.1.4.2, 1.3.2, 1.4.1, 1.4.2 | 2.1.1.2.4 | 3 | Establish a coating work plan and schedule that prioritizes cylinders on the basis of condition. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.1.3.1 | 3 | Analyze optional storage configuration to reduce or eliminate degradation factors. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.1.2.2 | 3 | Define and describe categories in terms of cylinder functional criteria and/or factors that could adversely impact cylinder integrity. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.2 | 3 | Identify which cylinder condition elements are to be forecasted. Elements are to be selected based on intended future use of the cylinders. [4.2.2.a] | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.4 | 3 | Define procedures for forecasting cylinder condition. Using these procedures will identify specific cylinders in need of specific surveillance and maintenance. | E |
| 1.3.2, 1.4.1, 1.4.2 | 4.2.2.2.6 | 3 | Establish a process to periodically review forecasting results with the performance objectives through the use of performance indicators. [4.2.2.b] | E |
| 1.4.1, 1.4.2 | 1.2.2.2.3 | 3 | Develop a risk monitoring subsystem as necessary to maintain compliance with requirements in Action 2.2 above. | P |
| 1.4.1, 1.4.2 | 2.1.4.3.2 | 3 | Determine demand for modifications and new facilities. | P |
| 1.4.1, 1.4.2 | 2.3.1.2.4 | 3 | Establish a procurement quality control program to ensure specifications are met. | P |
| 1.4.1, 1.4.2 | 3.1.2.1 | 3 | Analyze the options for what level(s) of management should control and authorize work controls. | P |
| 1.4.1, 1.4.2 | 3.3.1.2.3 | 3 | Develop line management process to evaluate assessment results and improve system performance. (continued below) | P |
| 1.4.1, 1.4.2 | 3.3.1.2.3 (continued) | 3 | The process is to include the method for keeping program personnel and customers informed of the status of the system performance to performance objectives and program mission. | P |
| 1.4.1, 1.4.2 | 4.1.2.1 | 3 | Analyze the integration of cylinder storage array with periodic monitoring to determine system configuration options | P |
| 1.4.1, 1.4.2 | 4.1.2.2.5 | 3 | Determine method to verify that the baseline configuration meets the requirement. | P |
| 1.4.1, 1.4.2 | 4.1.3.2.6 | 3 | Determine methods to verify the baseline meets the requirement. | P |
| 1.4.1, 1.4.2 | 4.2.1.2.5 | 3 | Determine a method to verify the baseline configuration. | P |
| 1.4.1, 1.4.2 | 4.2.2.2.2.1 | 3 | Integrate cylinder condition elements to be forecasted with cylinder categorization. [4.2.2.a] | P |
| 1.4.1, 1.4.2 | 4.2.2.2.7 | 3 | Determine a method to verify the baseline configuration. | P |

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|---|---|---|---|---|
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.1 | 3 | Identify and document all flow-down from the program objectives to components, activities, and subsystems. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.2 | 3 | Identify and document all functions, subfunctions, and interfaces needed to meet objectives. (Develop functional flow diagrams and interface diagrams.) [1.1.1.a] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.2.2.4.1 | 3 | Determine the periodicity of hazards re-assessment of program operations/conditions. [1.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.2.2.4.2 | 3 | Identify controls for triggering hazards assessment for new/modified operations. [1.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1 | 3 | Develop all program risk controls in accordance with the system configuration (see requirement 1.1.1). Integrate the development of risk controls with site requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.2 | 3 | Develop risk reduction actions. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.3 | 3 | Prioritize and implement risk reduction actions utilizing a risk reduction matrix for guidance. [1.2.1.g] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.2.2.3 | 3 | Develop the intent and periodicity of reviews and audits of the work controls and work control authorization and implementation process(es). Intent is to include 3-site consistency and uniform risk management with the system. [3.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 4.1.3.2.5 | 3 | Determine the intent and frequency for audits, assessments, and reviews of degradation factor monitoring. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.3 | 1.1.2.2.5 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.4 | 1.1.3.2.4 | 3 | Determine required baseline maintenance. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.5 | 1.1.3.2.4.2 | 3 | Identify controls for triggering risk assessments for new/modified operations. [1.1.3.c, 1.1.3.d, 1.1.3.e] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.5 | 1.1.3.2.5 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.3 | 4.2.1.2.4 | 3 | Develop a method for tracking cylinders and storage environments according to their categories. | P |
| 1.4.1, 1.4.2, 1.5.5 | 1.1.3.2.3.1 | 3 | Document the risk management matrix. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 4.1.1.2.3 | 4 | Determine the required frequency for performing the monitoring methods, and for periodic assessments of methods and data. [4.1.1.b] | P |
| 1.4.1, 1.4.2 | 5.1.2.2.4 | 4 | Define the personnel performance monitoring system. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.2 | 4 | Develop an assessment process based on guidelines in Order to evaluate system performance against the objectives, to include observation of work in the field, (continued below) | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.2 (continued) | 4 | review of other audits/assessments, operating experience, document reviews, interviews of key personnel, facility condition inspections. [3.3.1.a] | P |

**WBS Element 1.4.1: System Administration (Site-Specific) (DAD I.02.1a)**

This element provides the site specific management of the UF6 Cylinder Project. The UF6 Cylinder Site Project Managers provide direction and oversight for the respective site portions of the UF6 Cylinder Project. This includes Project control to be accomplished through participation in the Systems Engineering process. Specific activities/responsibilities funded through this element are:

Risk Management:
* Ensure the project operates within the authorized safety basis via monitoring yard and operational safety; initiating safety basis preservation activities (USQD, USQ, JCO, SAR revisions); and initiating performance assessments to demonstrate compliance with the authorization basis.
* Use risk reduction emphasis in planning and controlling specific activities.

Work Control:
* Direct the execution of planned activities.
* Direct the development and execution of compensatory measures.
* Verify completion of activities at the site.
* Establish contractual agreements (I.e., MOU) with performing organizations that clarify expectations including schedule; method of accomplishment (I.e., procedure); and funds for a specifically defined site-specific scope of work.
* Provide leadership and guidance to the implementing supervisor.
* Institute the use of three-site Systems Engineering documents.
* Secure resources (expertise, funds, materials, capital equipment, etc…) to accomplish authorized site-specific work.

Work Planning:
* Establish priorities based on DOE, LMES, and three-site Project input.
* Establish verification methods (scope and completion) and verify scope of site specific activities.
* Establish budget and activities baseline for the specific site.
* Sequence, integrate, prioritize and schedule site-specific activities.
* Facilitate the fiscal year budget exercises for the Project and participate in three-site reviews.

System Integration:
* Integrate and coordinate between various site and program organizations to accomplish site specific actions.
* Integrate DOE, LMES, and three-site Project guidance into work planning, control and performance measurement.
* Distribute Project documentation to appropriate site personnel for comment, review, and use.
* Support negotiations with regulators and oversight organizations (e.g., OEPA, DNFSB).
* Maintain cognizance of three-site activities and methods for the purpose of ensuring consistent use of best available technology.
* Establish and maintain status of site-specific performance indicators.
* Communicate issues and concerns in a timely manner to supervision and the three-site Project Manager, and other project personnel.

Performance Measurement:
* Monitor site-specific status to the baseline time-phased budget at the cost acccount level.
* Monitor status to the baseline schedule of site-specific actions.
* Report cost and action status to site-specific project management consistently and within specified monthly schedule including Functional Area Monthly Status Report, weekly highlights, and monthly reviews.

Configuration Management Oversight:
* Maintain site-specific budget and activities baseling documentation.
* Ensure use, refinement, and accuracy of the UCLIM database at the site-specific level.
* Identify and document system and technical requirements for authorized activities.
* Facilitate configuration control activities at the site level.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| | | | See WBS Element 1.4 | |

**WBS Element 1.4.2: System Administration (Three-Site) (DAD I.02.1b)**

This element consists of the resources and funds necessary to manage, direct, and administer the three-site UF6 Cylinder Project. This includes Project control to be accomplished through the institutionalization and maintenance of Systems Engineering for the Project. The three-site System Administration focuses on establishing the overall Project direction including priorities, maintaining consistency among the sites and leading the interface with the DNFSB. The three-site System Administration also directs the actions undertaken to benefit all sites. Specific activities/responsibilities funded through this element are:

Risk Management:
* Use risk reduction emphasis in planning and controlling activities at the three-site level.

Work Control:
* Verify completion of three-site activities. Extablish contractual agreements (I.e., MOU) with performing organizations that clarify expectations including schedule, method of accomplishment (I.e.procedure), and funds for a specifically defined three-site scope of work.
* Provide leadership and guidance to the implementing supervisor.
* Institute the use of three-site Systems Engineering documents.
* Integrate site plans into a three-site plan.
* Secure resources (expertise, funds, materials, capital equipment, etc…) to accomplish authorized three-site work.

Work Planning:
* Establish priorities based on DOE, LMES and three-site Project input.
* Establish verification methods (scope and completion) and verify scope of three-site activities.
* Establish budget and activities baseline for three-site activities and for the overall Project.
* Sequence, integrate, prioritize and schedule activities.
* Provides to the sites direction to sequence, integrate, prioritize, and schedule site-specific activities.
* Facilitate the fiscal year budget exercises for the Project and participate in reviews.

System Integration:
* Integrate and coordinate between various site and Project organizations to accomplish three-site actions.
* Integrate DOE and LMES guidance into work planning, control, and performance measurement.
* Distribute Project documentation to Project personnel for comment, review, and use.
* Support negotiations with regulators and oversight orgainzations (e.g., OEPA, DNFSB).
* Maintain cognizance of three-site activities and methods for the purpose of ensuring consistent use of best available technology.
* Establish and maintain status of performance indicators at the three-site level.
* Communicate issues and concerns in a timely manner to supervision and other Project personnel.

Performance Measurement:
* Monitor three-site status to the baseline time-phased budget at the cost account level.
* Monitor status to the baseline schedule of three-site actions.
* Monitor status, at a summary level, to the baseline schedule of site-specific actions.
* Report cost and action status to site and three-site Project management consistently and within specified monthly schedule including Functional Area Monthly Status Report, weekly highlights, and monthly reviews.

Configuration Management Oversight:
* Maintain budget and activities baseline documentation.
* Ensure use, refinement, and accuracy of the UCLIM database.
* Identify and document system and technical requirements for authorized activities.
* Facilitate configuration control activities at the site level and three-site level.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| | | | See WBS Element 1.4 | |

**WBS Element 1.4.3: Environmental Impact Statement (EIS) Support (DAD I.01.1)**

DOE is in the process of developing a Preliminary Environmental Impact Statement (PEIS)for the ultimate disposition of the DUF6 inventory. In support of the development of PEIS, specific requests from DOE are addressed through this work element. These requests rely on the experience and knowledge with managing the DUF6 inventory.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| | | | See WBS Element 1.4 | |

**WBS Element 1.5: Configuration Management**

This element consists of the activities necessary to establish and maintain a baseline of the physical and functional system configuration.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.3.2, 1.5 | 1.2.2.2.4 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.1, 1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.1 | 3 | Specify the degree of training (certification, qualification, etc.) for performing personnel (inspectors) who determine cylinder condition. (continued below) | P |
| 1.1, 1.5, 1.4.1, 1.4.2 | 3.2.1.2.2.1 (continued) | 3 | The quality of which cylinder conditions are determined impacts the functional and inter-functional risks within the system. | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 1.1.1.2 | | Define baseline configuration | P |
| 1.5.1, 1.5.2 | 1.1.1.4 | | Verify compliance with this requirement | P |
| 1.5.1, 1.5.2 | 1.1.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 1.1.2.4 | | Verify compliance with this requirement | P |
| 1.5.1, 1.5.2 | 1.1.3.2 | | Define baseline configuration | P |
| 1.5.1, 1.5.2 | 1.1.3.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 1.2.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 1.2.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 1.2.2.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 1.2.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.1.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.1.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.1.3.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.3.4 | | Verify compliance with requirement. | P |
| 1.5.1, 1.5.2 | 2.1.4.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.4.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.1.5.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.5.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.2.1.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.2.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.2.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.2.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.3.1.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.3.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.3.2.2 | | Define baseline configuration. | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 2.3.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.3.3.2 | | Define baseline configuratin. | P |
| 1.5.1, 1.5.2 | 2.3.3.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 3.1.1.2 | | Define baseline configuration. Note: The physical and finctional baselines defined under Requirement 1.1.1. | P |
| 1.5.1, 1.5.2 | 3.1.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 3.1.2.2 | | Define the baseline configuration. The physical, functional, and document baselines are defined under Requirement 1.1.1 actions. | P |
| 1.5.1, 1.5.2 | 3.1.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 3.2.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 3.2.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 3.3.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 3.3.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 4.1.1.2 | | Define baseline configuratin. | P |
| 1.5.1, 1.5.2 | 4.1.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 4.1.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 4.1.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 4.1.3.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 4.1.3.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 4.2.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 4.2.1.4 | | Verify compliance with requirement. | P |
| 1.5.1, 1.5.2 | 4.2.2.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 4.2.2.4 | | Verify compliance with requirement. | P |
| 1.5.1, 1.5.2 | 5.1.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 5.1.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 5.1.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 5.1.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 5.2.1.2 | | Define baseline configuration. | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 5.2.1.4 | | Verify compliance with requirement. | P |
| 1.5.1, 1.5.2 | 5.2.2.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 5.2.2.4 | | Verify compliance with this requirement. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.1 | 1 | Verify the industrial hazard controls to be administered by the industrial hygiene program. [1.2.1.a] | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.2.1 | 1 | Develop a training program for personnel on program risks and subsequent controls. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.3 | 1 | Determine required maintenance of risk controls. | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.3 | 1 | Verify criticality controls including mitigative alarms and inventory segregation to be administered by the Nuclear Criticality Safety program. [1.2.1.c] | P |
| 1.1.1, 1.1.3, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.2 | 1 | Verify the inventory controls including movement and processing authorization to be administered by the NMC&A program. [1.2.1.b] | P |
| 1.1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.5 | 1 | Verify operational controls to prevent cylinder placement in ground contact beyond a specified duration. Specify duration. [1.2.1.e] | P |
| 1.1.2, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.4 | 1 | Verify the safeguards and security controls including periodic patrols, physical boundaries, and facility lighting to be administered by the Safeguards and Security program. | P |
| 1.1.4, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.6 | 1 | Verify in the authorization of cylinder repair/replacement through contracted services the validation of a safety envelope for specified operations. [1.2.1.f] | P |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.2 | 1 | Determine controls necessary to decrease the probability of occurrence for accidents with unacceptable consequences to a tolerable level (ALARA). Controls are determined for anticipated operational states. [1.1.3.a, 1.1.3.b, 1.1.3.f] | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.2 | 1 | Develop implementation means for all program risk controls. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.4 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.4.1 | 1 | Determine the effectiveness of controls for reducing, eliminating, and mitigating risks. | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.1 | 1 | Identify current risks that are above acceptable program risks. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.1 | 1 | Implement the configuration change process. [3.1.1.a] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.4 | 1 | Implement the document control and records management system. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.5 | 1 | Conduct audits and independent assessments of configuration control, document control, and records management process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.2.3.3 | 1 | Manage system documents and records per the document control and records management process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.1 | 1 | Select and develop performance objectives for the system functions; consider customer expectations and long-range plans. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.3.3 | 1 | Train line-management to use the assessment process for monitoring and improving work activities, including observation skills, performance objectives selection and use, evaluation process skills, and action plan development process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.1 | 1 | Develop the requirement structure and traceability method(s). | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.2 | 1 | Develop a method for controlling and maintaining requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.3 | 1 | Develop a method for ensuring system tasks are based on requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.1 | 1 | Identify requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.2 | 1 | Trace requirements to the mission and implementing documentation. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.3 | 1 | Utilize requirements in identifying and developing system activities (tasks). | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.2.2.2 | 1 | Develop the system configuration and change control based on life-cycle and phase duration projections. [5.2.2.a] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.3 | 1.2.1.2.1.7 | 1 | Verify integration of program hazards with site emergency preparedness. | P |
| 1.5.1, 1.5.2 | 1.1.2.3.2 | 1 | Periodically re-assess hazards. [1.1.2.b] | P |
| 1.5.1, 1.5.2 | 1.1.3.3.2 | 1 | Periodically re-assess risk within the program. [1.1.3.c, 1.1.3.d] | P |
| 1.5.1, 1.5.2 | 1.2.2.3.1 | 1 | Train personnel. | P |
| 1.5.1, 1.5.2 | 2.1.3.2.5 | 1 | Determine method to verify baseline meets requirement. | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 2.2.2.3.1 | 1 | Train the operators to the skill level as determined by the task to be performed. | P |
| 1.5.1, 1.5.2 | 2.2.2.3.1.1 | 1 | Evaluate student performance against objectives and recognized performance standards. | P |
| 1.5.1, 1.5.2 | 2.3.2.2.5 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.3.2.3.2 | 1 | Notify performing personnel of degraded cylinder hazards through training, procedures, contracts, and other command media. [2.3.2.a] | P |
| 1.5.1, 1.5.2 | 2.3.3.2.1 | 1 | Document program cylinder standards. | P |
| 1.5.1, 1.5.2 | 2.3.3.2.2 | 1 | Develop immediate response methods for expected non-compliant cylinders. | P |
| 1.5.1, 1.5.2 | 2.3.3.2.3 | 1 | Develop repair/replacement and disposition methods and procedures that are commensurate with cylinder program risks, standards, and where applicable industry standards. [2.3.3.b] | P |
| 1.5.1, 1.5.2 | 3.1.1.2.1 | 1 | Develop a configuration change process that includes a review by qualified individuals of changes against the design basis and performance requirement documents. (continued below) | P |
| 1.5.1, 1.5.2 | 3.1.1.2.1 (continued) | 1 | The change process is to include defined levels of authority and corresponding change categories. [3.1.1.a] | P |
| 1.5.1, 1.5.2 | 3.1.1.3.2 | 1 | Review temporary modifications to facilities and equipment for potential unreviewed safety questions. | P |
| 1.5.1, 1.5.2 | 3.1.1.3.3 | 1 | Review procedures and training to ensure that changes in operational activities do not create an unreviewed safety question. | P |
| 1.5.1, 1.5.2 | 3.1.2.2.2 | 1 | Develop a process(es) for authorizing and implementing work controls including responsible personnel and positions. This process includes the work control structure. | P |
| 1.5.1, 1.5.2 | 3.1.2.2.2.1 | 1 | Develop a work control process description and implementing procedures including the integration of safety documentation, emergency response, lessons learned, and site specific requirements. [3.1.2.a, 3.1.2.c] | P |
| 1.5.1, 1.5.2 | 3.1.2.2.2.3 | 1 | Incorporate verification and validation steps in the authorization of work controls to ensure the control will accomplish the intent of the task(s). | P |
| 1.5.1, 1.5.2 | 3.1.2.3.1 | 1 | Train personnel on process controls. | P |
| 1.5.1, 1.5.2 | 3.1.2.3.4 | 1 | Review and audit work controls and authorization and implementation process(es). [3.1.2.b] | P |
| 1.5.1, 1.5.2 | 3.1.2.4.1 | 1 | Conduct independent performance based assessments. [3.1.2.d] | P |
| 1.5.1, 1.5.2 | 3.2.1.2.6.1 | 1 | Revise job hazard analyses as necessary. | P |
| 1.5.1, 1.5.2 | 3.2.1.3.2 | 1 | Perform required training, qualification, and certification. [3.2.1.a] | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 3.2.1.3.2.1 | 1 | Train cylinder inspectors. | P |
| 1.5.1, 1.5.2 | 3.2.1.3.4 | 1 | Perform retraining as required by line management and training personnel. [3.2.1.b] | P |
| 1.5.1, 1.5.2 | 3.2.1.3.5 | 1 | Conduct periodic reviews of selection and training process effectiveness. [3.2.1.f] | P |
| 1.5.1, 1.5.2 | 5.2.1.3.2.1 | 1 | Reconcile requirements against the results of the necessary and sufficient closure process. | P |
| 1.5.1, 1.5.2, 1.5.3 | 4.1.2.3.5 | 1 | Examine justification of inspection frequency and evaluate the need to adjust. | P |
| 1.5.1, 1.5.2, 1.5.5 | 1.2.1.1 | 1 | An analysis of optional methods includes the analysis of engineered controls, administrative controls, and/or multiple controls for making risk(s) acceptable. | P |
| 1.5.1, 1.5.5 | 2.3.2.3.1 | 1 | Periodically update documents reporting cylinder conditions and associated hazards. | P |
| 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.1 | 2.1.5.2.1 | 2 | Identify performance objectives for cylinder valve and plugs for each system function under the anticipated operational states. Define performance in terms of industry standards to the extent possible. | E |
| 1.1.4, 1.3.2, 1.5.1, 1.5.2 | 2.1.2.2.1 | 2 | Define acceptable cylinder time of wetness in a manner such that it is technically meaningful and can be verified. | E |
| 1.3.2, 1.5.1 | 2.1.5.2.2 | 2 | Integrate these performance objectives with the required configuration of the valve and plug. (packing, port and packing nut condition, valve body, threads showing, stem seat, torque, thread to boss interface including the presence of tape). | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.4.1 | 2 | Develop a baseline configuration management system. [1.1.1.b, 1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.4.2 | 2 | Determine the intent and periodicity of configuration audits. [1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.5 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.3.1 | 2 | Implement configuration management system for system baseline. [1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.2.2.1 | 2 | Identify risk monitoring and evaluation tools to be used in the program. These tools will include technical and operational performance monitoring, company, corporate and industry lessons learned sharing, and investigations of occurrences. [1.2.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.2.2.1.1 | 2 | Establish a facility safety walk-through program with the intent of identifying risk initiators. [1.2.2.a] | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1 | 2.3.1.2.3 | 2 | Document design specifications for replacement parts that include materials, tolerances, and manufacturing procedures that are acceptable in meeting the expected service life, reliability, and performance objectives. (continued below) | P |
| 1.5.1 | 2.3.1.2.3 (continued) | 2 | Incorporate industry standards into design specifications. | P |
| 1.5.1, 1.5.2 | 1.1.1.2.3 | 2 | Document the technical basis for design of components, activities, and subsystems that comprise the technical configuration. Incorporate into the technical basis the anticipated operational states i.e., (continued below) | P |
| 1.5.1, 1.5.2 | 1.1.1.2.3 (continued) | 2 | test/demonstration, start-up, steady-state, off-normal, emergency, and standby. | P |
| 1.5.1, 1.5.2 | 1.1.1.2.4 | 2 | Determine required baseline maintenance. | P |
| 1.5.1, 1.5.2 | 1.1.1.3.2 | 2 | Implement configuration audits. | P |
| 1.5.1, 1.5.2 | 2.1.4.2.6 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.2.1.2.5.4 | 2 | Develop operational procedures for handling, processing, and transporting cylinders. Integrate hoisting and rigging handbook guidelines into cylinder movement procedures. [2.2.1.a] | P |
| 1.5.1, 1.5.2 | 2.2.1.2.6 | 2 | Identify necessary inspection and maintenance of equipment and operations to ensure compliance with this requirement and ensure non-conforming and non-compliant cylinders are managed safely. [2.2.1.b] | P |
| 1.5.1, 1.5.2 | 2.2.2.3.2 | 2 | Perform evaluation and requalification according to the training program. [2.2.2.a] | P |
| 1.5.1, 1.5.2 | 2.3.1.2.6 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.3.2.2.3 | 2 | Integrate training and command media revisions with cylinder condition data processing. [2.3.2.a] | P |
| 1.5.1, 1.5.2 | 4.1.2.3.6 | 2 | Conduct independent assessments of the evaluation of cylinder condition. | P |
| 1.3.2, 1.5.1, 1.5.2, 1.5.3 | 4.1.3.2.4 | 3 | Develop a monitoring plan, incorporating the methods and frequencies for performing those methods. | E |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.1.1 | 3 | Identify plausible accident scenarios given identified functional hazards. Plausible accident scenarios to be identified will include scenarios stemming from cylinder breaches (continued below) | E |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.1.1 (continued) | 3 | into the ullage space and degraded cylinder conditions as possible initiators. [1.1.3.b] | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.1 | 3 | Identify and document all flow-down from the program objectives to components, activities, and subsystems. | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.2 | 3 | Identify and document all functions, subfunctions, and interfaces needed to meet objectives. (Develop functional flow diagrams and interface diagrams.) [1.1.1.a] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.2.2.4.1 | 3 | Determine the periodicity of hazards re-assessment of program operations/conditions. [1.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.2.2.4.2 | 3 | Identify controls for triggering hazards assessment for new/modified operations. [1.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1 | 3 | Develop all program risk controls in accordance with the system configuration (see requirement 1.1.1). Integrate the development of risk controls with site requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.2 | 3 | Develop risk reduction actions. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.3 | 3 | Prioritize and implement risk reduction actions utilizing a risk reduction matrix for guidance. [1.2.1.g] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.2.2.3 | 3 | Develop the intent and periodicity of reviews and audits of the work controls and work control authorization and implementation process(es). Intent is to include 3-site consistency and uniform risk management with the system. [3.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 4.1.3.2.5 | 3 | Determine the intent and frequency for audits, assessments, and reviews of degradation factor monitoring. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.3 | 1.1.2.2.5 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.4 | 1.1.3.2.4 | 3 | Determine required baseline maintenance. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.5 | 1.1.3.2.4.2 | 3 | Identify controls for triggering risk assessments for new/modified operations. [1.1.3.c, 1.1.3.d, 1.1.3.e] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.5 | 1.1.3.2.5 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 1.1.1.2.3.1 | 3 | Resurrect/redocument the technical basis for components, activities, and subsystems. Include in this technical basis the identification of cylindrs not manufactured to ASME standards and what standards to which these cylinders were manufactured. [1.1.1.b] | P |
| 1.5.1, 1.5.2 | 1.1.1.2.3.2 | 3 | Revise specifications (drawings, etc.) to reflect current configuration of components. [1.1.1.b] | P |
| 1.5.1, 1.5.2 | 1.1.2.2.4 | 3 | Determine required baseline maintenance including methods for keeping the hazards analysis current. [1.1.2.b] | P |
| 1.5.1, 1.5.2 | 1.1.3.3.3 | 3 | Assess risks of new/modified operations. [1.1.3.c, 1.1.3.d, 1.1.3.e] | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 2.1.4.2.5 | 3 | Determine inspection and maintenance of storage facilities to maintain compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.2.1.2.5.2 | 3 | Establish movement and processing authorization requirements. [2.2.1.h] | P |
| 1.5.1, 1.5.2 | 2.2.1.2.5.3 | 3 | Determine handling route specifications. [2.2.1.c] | P |
| 1.5.1, 1.5.2 | 2.2.1.2.5.5 | 3 | Integrate degraded cylinder conditions into operational procedures. Utilize hoisting and rigging handbook guidelines where applicable. [2.2.1.g] | P |
| 1.5.1, 1.5.2 | 2.2.1.2.7 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.1 | 3 | Identify all handling, processing, and transporting equipment and the tasks to be performed. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.2 | 3 | Perform a job task analysis for each operation. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.2.1 | 3 | Define the training objectives and their relationship to operational procedures. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.3 | 3 | Identify potential consequences associated with each operation. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.3.1 | 3 | Define the necessary operator proficiency in terms of identified standards. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.4 | 3 | Establish training program for cylinder handling, processing, and transporting equipment operators and support crews. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.4.1 | 3 | Develop the training material. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.4.2 | 3 | Develop procedures to maintain training and qualification documentation. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.6 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 3.1.1.1 | 3 | Analyze the options for what level(s) of program management should control the system configuration. | P |
| 1.5.1, 1.5.2 | 3.1.1.2.2 | 3 | Develop a document control and records management process. [3.1.1.a] | P |
| 1.5.1, 1.5.2 | 3.1.1.2.3 | 3 | Develop the intent and periodicity of configuration assessment process and documentation audits. | P |
| 1.5.1, 1.5.2 | 3.1.1.3.1.1 | 3 | Identify configuration items for configuration control. | P |
| 1.5.1, 1.5.2 | 3.1.2.2.1 | 3 | Identify the work controls to be used by the system and their intent including the specification of resources, responsibilities, work methods, work performance, and verification. | P |
| 1.5.1, 1.5.2 | 3.2.1.1 | 3 | Analyze the options for determining the integration of procedures with training and determine criteria for an integrated development based on tasks. | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 3.2.1.3.3 | 3 | Develop and maintain a database to include the following: job and task analysis results, learning objectives, linking of test items, task-to-training data, instructor qualifications, (continued below) | P |
| 1.5.1, 1.5.2 | 3.2.1.3.3 (continued) | 3 | training material identification data, training delivery data, employee training history, and training intervals. [3.2.1.c] | P |
| 1.5.1, 1.5.2 | 3.3.1.4.1 | 3 | Conduct independent assessments of the evaluation process. | P |
| 1.5.1, 1.5.2 | 4.1.3.3.3.1 | 3 | Perform self-assessments and other quality control measures to ensure that the degradation factors are being monitored according to the developed plan. | P |
| 1.5.1, 1.5.2 | 4.2.1.2.3 | 3 | Develop procedures for grouping cylinders and storage environments in the defined categories. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 4.1.1.2.3 | 4 | Determine the required frequency for performing the monitoring methods, and for periodic assessments of methods and data. [4.1.1.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.2 | 4 | Develop an assessment process based on guidelines in Order to evaluate system performance against the objectives, to include observation of work in the field, (continued below) | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.2 (continued) | 4 | review of other audits/assessments, operating experience, document reviews, interviews of key personnel, facility condition inspections. [3.3.1.a] | P |
| 1.5.1 | 4.1.1.2.1 | 4 | Identify potential pathways of exposure to the environment due to failure of containment integrity. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.5 | 4 | Determine operator and support crew evaluation and retraining methods and frequencies. | P |
| 1.5.1, 1.5.2 | 2.3.2.2.1 | 4 | Identify and document hazards of cylinders for identified conditions and the level of skill and knowledge necessary to perform tasks on or around those cylinders. | P |
| 1.5.1, 1.5.2 | 2.3.2.2.2 | 4 | Include cylinder conditions, associated hazards, and required experience and training as a part of project command media, including: training, procedures, contracts, etc. | E |
| 1.5.1, 1.5.2 | 2.3.2.2.4 | 4 | Determine required retraining frequency. [2.3.2.a] | P |
| 1.5.1, 1.5.2 | 3.1.2.2.2.2 | 4 | Develop a database to track work controls currently authorized. | P |
| 1.5.1, 1.5.2 | 3.2.1.2.1 | 4 | Develop a personnel selection and training management plan and implementing procedures based on the complexity of tasks, severity of consequences, and human factors. (continued below) | P |
| 1.5.1, 1.5.2 | 3.2.1.2.1 (continued) | 4 | Training plan is to include qualification specifications of trainers and training of safety documentation. [3.2.1.a, 3.2.1.b] | P |

**WBS Element 1.5.1: Configuration Management (Site-Specific) (DAD I.02.3a)**

This element consists of activities necessary to manage the physical and functional configuration of the project at the sites. Activities include:

* change control of site configuration items;
* site-specific development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* implementation of WSS;
* Support to change control of three-site configuration items;
* support to development of three-site training and procedures (development starts with a job task analysis);
* document control including records management;
* operational assessments to verify compliance to command media (training, procedures, MOUs);
* field verification to ensure Project expectations are being met;

facility safety walk-throughs to ensure compliance with the safety authorization basis;

* practice participation in safety review when compliance to authorization basis is in question; and
* support maintenance of safety authorization basis.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 3.2.1.2.2 | 4 | Determine the performance-based training, qualification, and certification specifications for performing personnel. [3.2.1.d] | P |
| 1.5.1, 1.5.2 | 3.2.1.2.3 | 4 | Develop training documents (modules, etc.) to train performing personnel based on learning objectives. (continued below) | P |
| 1.5.1, 1.5.2 | 3.2.1.2.3 (continued) | 4 | Modules are to include safety precautions, hazards, emergency response, lessons learned, and site specific requirements. [3.2.1.e] | P |
| 1.5.1, 1.5.2 | 3.2.1.2.4 | 4 | Develop systems to maintain baseline of trained personnel. Systems are to include training records retention and ready access to current training by authorizing and implementing personnel. [3.2.1.c] | P |
| 1.5.1, 1.5.2 | 3.2.1.2.5 | 4 | Develop the intent and periodicity of audits, assessments, and reviews of the training program. | P |
| 1.5.1, 1.5.2 | 3.2.1.2.6 | 4 | Develop a training revision process to accommodate changes in tasks, and improvements to training. The process is to include line and training personnel to determine the extent and frequency of retraining. | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 1.1.1.2 | | Define baseline configuration | P |
| 1.5.1, 1.5.2 | 1.1.1.4 | | Verify compliance with this requirement | P |
| 1.5.1, 1.5.2 | 1.1.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 1.1.2.4 | | Verify compliance with this requirement | P |
| 1.5.1, 1.5.2 | 1.1.3.2 | | Define baseline configuration | P |
| 1.5.1, 1.5.2 | 1.1.3.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 1.2.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 1.2.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 1.2.2.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 1.2.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.1.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.1.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.1.3.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.3.4 | | Verify compliance with requirement. | P |
| 1.5.1, 1.5.2 | 2.1.4.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.4.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.1.5.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.1.5.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.2.1.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.2.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.2.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.2.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.3.1.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 2.3.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.3.2.2 | | Define baseline configuration. | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 2.3.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.3.3.2 | | Define baseline configuratin. | P |
| 1.5.1, 1.5.2 | 2.3.3.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 3.1.1.2 | | Define baseline configuration. Note: The physical and finctional baselines defined under Requirement 1.1.1. | P |
| 1.5.1, 1.5.2 | 3.1.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 3.1.2.2 | | Define the baseline configuration. The physical, functional, and document baselines are defined under Requirement 1.1.1 actions. | P |
| 1.5.1, 1.5.2 | 3.1.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 3.2.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 3.2.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 3.3.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 3.3.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 4.1.1.2 | | Define baseline configuratin. | P |
| 1.5.1, 1.5.2 | 4.1.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 4.1.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 4.1.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 4.1.3.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 4.1.3.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 4.2.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 4.2.1.4 | | Verify compliance with requirement. | P |
| 1.5.1, 1.5.2 | 4.2.2.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 4.2.2.4 | | Verify compliance with requirement. | P |
| 1.5.1, 1.5.2 | 5.1.1.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 5.1.1.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 5.1.2.2 | | Define the baseline configuration. | P |
| 1.5.1, 1.5.2 | 5.1.2.4 | | Verify compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 5.2.1.2 | | Define baseline configuration. | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 5.2.1.4 | | Verify compliance with requirement. | P |
| 1.5.1, 1.5.2 | 5.2.2.2 | | Define baseline configuration. | P |
| 1.5.1, 1.5.2 | 5.2.2.4 | | Verify compliance with this requirement. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.1 | 1 | Verify the industrial hazard controls to be administered by the industrial hygiene program. [1.2.1.a] | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.2.1 | 1 | Develop a training program for personnel on program risks and subsequent controls. | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.3 | 1 | Determine required maintenance of risk controls. | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.3 | 1 | Verify criticality controls including mitigative alarms and inventory segregation to be administered by the Nuclear Criticality Safety program. [1.2.1.c] | P |
| 1.1.1, 1.1.3, 1.1.5, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.2 | 1 | Verify the inventory controls including movement and processing authorization to be administered by the NMC&A program. [1.2.1.b] | P |
| 1.1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.5 | 1 | Verify operational controls to prevent cylinder placement in ground contact beyond a specified duration. Specify duration. [1.2.1.e] | P |
| 1.1.2, 1.1.4, 1.3.2, 1.5.2 | 2.1.5.2.4 | 1 | Develop a valve and plug management program to ensure that performance objectives are met. [2.1.5.a] | E |
| 1.1.2, 1.1.4, 1.3.2, 1.5.2 | 2.1.5.2.4.2 | 1 | Determine methods and when valves and plugs should be repaired/replaced as corrective maintenance. [2.1.5.b] | E |
| 1.1.2, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.4 | 1 | Verify the safeguards and security controls including periodic patrols, physical boundaries, and facility lighting to be administered by the Safeguards and Security program. | P |
| 1.1.4, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1.6 | 1 | Verify in the authorization of cylinder repair/replacement through contracted services the validation of a safety envelope for specified operations. [1.2.1.f] | P |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.2 | 1 | Determine controls necessary to decrease the probability of occurrence for accidents with unacceptable consequences to a tolerable level (ALARA). Controls are determined for anticipated operational states. [1.1.3.a, 1.1.3.b, 1.1.3.f] | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.2 | 1 | Develop implementation means for all program risk controls. | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.4 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.4.1 | 1 | Determine the effectiveness of controls for reducing, eliminating, and mitigating risks. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.1 | 1 | Identify current risks that are above acceptable program risks. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.1 | 1 | Implement the configuration change process. [3.1.1.a] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.4 | 1 | Implement the document control and records management system. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.1.3.5 | 1 | Conduct audits and independent assessments of configuration control, document control, and records management process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.2.3.3 | 1 | Manage system documents and records per the document control and records management process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.1 | 1 | Select and develop performance objectives for the system functions; consider customer expectations and long-range plans. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.3.3 | 1 | Train line-management to use the assessment process for monitoring and improving work activities, including observation skills, performance objectives selection and use, evaluation process skills, and action plan development process. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.1 | 1 | Develop the requirement structure and traceability method(s). | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.2 | 1 | Develop a method for controlling and maintaining requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.2.3 | 1 | Develop a method for ensuring system tasks are based on requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.1 | 1 | Identify requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.2 | 1 | Trace requirements to the mission and implementing documentation. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.1.3.3 | 1 | Utilize requirements in identifying and developing system activities (tasks). | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 5.2.2.2.2 | 1 | Develop the system configuration and change control based on life-cycle and phase duration projections. [5.2.2.a] | P |
| 1.5.1, 1.5.2 | 1.1.2.3.2 | 1 | Periodically re-assess hazards. [1.1.2.b] | P |
| 1.5.1, 1.5.2 | 1.1.3.3.2 | 1 | Periodically re-assess risk within the program. [1.1.3.c, 1.1.3.d] | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 1.2.2.3.1 | 1 | Train personnel. | P |
| 1.5.1, 1.5.2 | 2.1.3.2.5 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.2.2.3.1 | 1 | Train the operators to the skill level as determined by the task to be performed. | P |
| 1.5.1, 1.5.2 | 2.2.2.3.1.1 | 1 | Evaluate student performance against objectives and recognized performance standards. | P |
| 1.5.1, 1.5.2 | 2.3.2.2.5 | 1 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.3.2.3.2 | 1 | Notify performing personnel of degraded cylinder hazards through training, procedures, contracts, and other command media. [2.3.2.a] | P |
| 1.5.1, 1.5.2 | 2.3.3.2.1 | 1 | Document program cylinder standards. | P |
| 1.5.1, 1.5.2 | 2.3.3.2.2 | 1 | Develop immediate response methods for expected non-compliant cylinders. | P |
| 1.5.1, 1.5.2 | 2.3.3.2.3 | 1 | Develop repair/replacement and disposition methods and procedures that are commensurate with cylinder program risks, standards, and where applicable industry standards. [2.3.3.b] | P |
| 1.5.1, 1.5.2 | 3.1.1.2.1 | 1 | Develop a configuration change process that includes a review by qualified individuals of changes against the design basis and performance requirement documents. (continued below) | P |
| 1.5.1, 1.5.2 | 3.1.1.2.1 (continued) | 1 | The change process is to include defined levels of authority and corresponding change categories. [3.1.1.a] | P |
| 1.5.1, 1.5.2 | 3.1.1.3.2 | 1 | Review temporary modifications to facilities and equipment for potential unreviewed safety questions. | P |
| 1.5.1, 1.5.2 | 3.1.1.3.3 | 1 | Review procedures and training to ensure that changes in operational activities do not create an unreviewed safety question. | P |
| 1.5.1, 1.5.2 | 3.1.2.2.2 | 1 | Develop a process(es) for authorizing and implementing work controls including responsible personnel and positions. This process includes the work control structure. | P |
| 1.5.1, 1.5.2 | 3.1.2.2.2.1 | 1 | Develop a work control process description and implementing procedures including the integration of safety documentation, emergency response, lessons learned, and site specific requirements. [3.1.2.a, 3.1.2.c] | P |
| 1.5.1, 1.5.2 | 3.1.2.2.2.3 | 1 | Incorporate verification and validation steps in the authorization of work controls to ensure the control will accomplish the intent of the task(s). | P |
| 1.5.1, 1.5.2 | 3.1.2.3.1 | 1 | Train personnel on process controls. | P |
| 1.5.1, 1.5.2 | 3.1.2.3.4 | 1 | Review and audit work controls and authorization and implementation process(es). [3.1.2.b] | P |
| 1.5.1, 1.5.2 | 3.1.2.4.1 | 1 | Conduct independent performance based assessments. [3.1.2.d] | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 3.2.1.2.6.1 | 1 | Revise job hazard analyses as necessary. | P |
| 1.5.1, 1.5.2 | 3.2.1.3.2 | 1 | Perform required training, qualification, and certification. [3.2.1.a] | P |
| 1.5.1, 1.5.2 | 3.2.1.3.2.1 | 1 | Train cylinder inspectors. | P |
| 1.5.1, 1.5.2 | 3.2.1.3.4 | 1 | Perform retraining as required by line management and training personnel. [3.2.1.b] | P |
| 1.5.1, 1.5.2 | 3.2.1.3.5 | 1 | Conduct periodic reviews of selection and training process effectiveness. [3.2.1.f] | P |
| 1.5.1, 1.5.2 | 5.2.1.3.2.1 | 1 | Reconcile requirements against the results of the necessary and sufficient closure process. | P |
| 1.5.1, 1.5.2, 1.5.3 | 4.1.2.3.5 | 1 | Examine justification of inspection frequency and evaluate the need to adjust. | P |
| 1.5.1, 1.5.2, 1.5.5 | 1.2.1.1 | 1 | An analysis of optional methods includes the analysis of engineered controls, administrative controls, and/or multiple controls for making risk(s) acceptable. | P |
| 1.1.4, 1.3.2, 1.5.1, 1.5.2 | 2.1.2.2.1 | 2 | Define acceptable cylinder time of wetness in a manner such that it is technically meaningful and can be verified. | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.4.1 | 2 | Develop a baseline configuration management system. [1.1.1.b, 1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.4.2 | 2 | Determine the intent and periodicity of configuration audits. [1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.5 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.3.1 | 2 | Implement configuration management system for system baseline. [1.1.1.c] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.2.2.1 | 2 | Identify risk monitoring and evaluation tools to be used in the program. These tools will include technical and operational performance monitoring, company, corporate and industry lessons learned sharing, and investigations of occurrences. [1.2.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.2.2.1.1 | 2 | Establish a facility safety walk-through program with the intent of identifying risk initiators. [1.2.2.a] | P |
| 1.5.1, 1.5.2 | 1.1.1.2.3 | 2 | Document the technical basis for design of components, activities, and subsystems that comprise the technical configuration. Incorporate into the technical basis the anticipated operational states i.e., (continued below) | P |
| 1.5.1, 1.5.2 | 1.1.1.2.3 (continued) | 2 | test/demonstration, start-up, steady-state, off-normal, emergency, and standby. | P |
| 1.5.1, 1.5.2 | 1.1.1.2.4 | 2 | Determine required baseline maintenance. | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 1.1.1.3.2 | 2 | Implement configuration audits. | P |
| 1.5.1, 1.5.2 | 2.1.4.2.6 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.2.1.2.5.4 | 2 | Develop operational procedures for handling, processing, and transporting cylinders. Integrate hoisting and rigging handbook guidelines into cylinder movement procedures. [2.2.1.a] | P |
| 1.5.1, 1.5.2 | 2.2.1.2.6 | 2 | Identify necessary inspection and maintenance of equipment and operations to ensure compliance with this requirement and ensure non-conforming and non-compliant cylinders are managed safely. [2.2.1.b] | P |
| 1.5.1, 1.5.2 | 2.2.2.3.2 | 2 | Perform evaluation and requalification according to the training program. [2.2.2.a] | P |
| 1.5.1, 1.5.2 | 2.3.1.2.6 | 2 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.3.2.2.3 | 2 | Integrate training and command media revisions with cylinder condition data processing. [2.3.2.a] | P |
| 1.5.1, 1.5.2 | 4.1.2.3.6 | 2 | Conduct independent assessments of the evaluation of cylinder condition. | P |
| 1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.3.2, 1.5.2 | 2.2.1.2.2 | 3 | Identify methods and equipment to be used to handle, process, and transport cylinders and their contents. | E |
| 1.1.4, 1.2.2, 1.5.2 | 2.1.4.2.3.2 | 3 | Assess current facility design and construction methods to performance objectives. | P |
| 1.3.2, 1.5.1, 1.5.2, 1.5.3 | 4.1.3.2.4 | 3 | Develop a monitoring plan, incorporating the methods and frequencies for performing those methods. | E |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.1.1 | 3 | Identify plausible accident scenarios given identified functional hazards. Plausible accident scenarios to be identified will include scenarios stemming from cylinder breaches (continued below) | E |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.1.1 (continued) | 3 | into the ullage space and degraded cylinder conditions as possible initiators. [1.1.3.b] | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.1 | 3 | Identify and document all flow-down from the program objectives to components, activities, and subsystems. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.1.2.2 | 3 | Identify and document all functions, subfunctions, and interfaces needed to meet objectives. (Develop functional flow diagrams and interface diagrams.) [1.1.1.a] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.2.2.4.1 | 3 | Determine the periodicity of hazards re-assessment of program operations/conditions. [1.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.1.2.2.4.2 | 3 | Identify controls for triggering hazards assessment for new/modified operations. [1.1.2.b] | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.2.1 | 3 | Develop all program risk controls in accordance with the system configuration (see requirement 1.1.1). Integrate the development of risk controls with site requirements. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.2 | 3 | Develop risk reduction actions. | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 1.2.1.3.3 | 3 | Prioritize and implement risk reduction actions utilizing a risk reduction matrix for guidance. [1.2.1.g] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.1.2.2.3 | 3 | Develop the intent and periodicity of reviews and audits of the work controls and work control authorization and implementation process(es). Intent is to include 3-site consistency and uniform risk management with the system. [3.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 4.1.3.2.5 | 3 | Determine the intent and frequency for audits, assessments, and reviews of degradation factor monitoring. | P |
| 1.5.1, 1.5.2 | 1.1.1.2.3.1 | 3 | Resurrect/redocument the technical basis for components, activities, and subsystems. Include in this technical basis the identification of cylindrs not manufactured to ASME standards and what standards to which these cylinders were manufactured. [1.1.1.b] | P |
| 1.5.1, 1.5.2 | 1.1.1.2.3.2 | 3 | Revise specifications (drawings, etc.) to reflect current configuration of components. [1.1.1.b] | P |
| 1.5.1, 1.5.2 | 1.1.2.2.4 | 3 | Determine required baseline maintenance including methods for keeping the hazards analysis current. [1.1.2.b] | P |
| 1.5.1, 1.5.2 | 1.1.3.3.3 | 3 | Assess risks of new/modified operations. [1.1.3.c, 1.1.3.d, 1.1.3.e] | P |
| 1.5.1, 1.5.2 | 2.1.4.2.5 | 3 | Determine inspection and maintenance of storage facilities to maintain compliance with this requirement. | P |
| 1.5.1, 1.5.2 | 2.2.1.2.5.2 | 3 | Establish movement and processing authorization requirements. [2.2.1.h] | P |
| 1.5.1, 1.5.2 | 2.2.1.2.5.3 | 3 | Determine handling route specifications. [2.2.1.c] | P |
| 1.5.1, 1.5.2 | 2.2.1.2.5.5 | 3 | Integrate degraded cylinder conditions into operational procedures. Utilize hoisting and rigging handbook guidelines where applicable. [2.2.1.g] | P |
| 1.5.1, 1.5.2 | 2.2.1.2.7 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.1 | 3 | Identify all handling, processing, and transporting equipment and the tasks to be performed. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.2 | 3 | Perform a job task analysis for each operation. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.2.1 | 3 | Define the training objectives and their relationship to operational procedures. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.3 | 3 | Identify potential consequences associated with each operation. | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.1, 1.5.2 | 2.2.2.2.3.1 | 3 | Define the necessary operator proficiency in terms of identified standards. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.4 | 3 | Establish training program for cylinder handling, processing, and transporting equipment operators and support crews. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.4.1 | 3 | Develop the training material. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.4.2 | 3 | Develop procedures to maintain training and qualification documentation. | P |
| 1.5.1, 1.5.2 | 2.2.2.2.6 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.5.1, 1.5.2 | 3.1.1.1 | 3 | Analyze the options for what level(s) of program management should control the system configuration. | P |
| 1.5.1, 1.5.2 | 3.1.1.2.2 | 3 | Develop a document control and records management process. [3.1.1.a] | P |
| 1.5.1, 1.5.2 | 3.1.1.2.3 | 3 | Develop the intent and periodicity of configuration assessment process and documentation audits. | P |
| 1.5.1, 1.5.2 | 3.1.1.3.1.1 | 3 | Identify configuration items for configuration control. | P |
| 1.5.1, 1.5.2 | 3.1.2.2.1 | 3 | Identify the work controls to be used by the system and their intent including the specification of resources, responsibilities, work methods, work performance, and verification. | P |
| 1.5.1, 1.5.2 | 3.2.1.1 | 3 | Analyze the options for determining the integration of procedures with training and determine criteria for an integrated development based on tasks. | P |
| 1.5.1, 1.5.2 | 3.2.1.3.3 | 3 | Develop and maintain a database to include the following: job and task analysis results, learning objectives, linking of test items, task-to-training data, instructor qualifications, (continued below) | P |
| 1.5.1, 1.5.2 | 3.2.1.3.3 (continued) | 3 | training material identification data, training delivery data, employee training history, and training intervals. [3.2.1.c] | P |
| 1.5.1, 1.5.2 | 3.3.1.4.1 | 3 | Conduct independent assessments of the evaluation process. | P |
| 1.5.1, 1.5.2 | 4.1.3.3.3.1 | 3 | Perform self-assessments and other quality control measures to ensure that the degradation factors are being monitored according to the developed plan. | P |
| 1.5.1, 1.5.2 | 4.2.1.2.3 | 3 | Develop procedures for grouping cylinders and storage environments in the defined categories. | P |
| 1.5.2, 1.5.3 | 1.1.1.2.3.3 | 3 | Document pertinent history of component use. [1.1.1.b] | P |
| 1.1, 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 4.1.1.2.3 | 4 | Determine the required frequency for performing the monitoring methods, and for periodic assessments of methods and data. [4.1.1.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.2 | 4 | Develop an assessment process based on guidelines in Order to evaluate system performance against the objectives, to include observation of work in the field, (continued below) | P |

**WBS Element 1.5.2: Configuration Management (Three-Site) (DAD I.02.3b)**

This element consists of activities necessary to perform configuration and management of the project at the three-site level. Activities include:

* change control of three-site configuration items;
* three-site development of training and procedures where a three-site procedure is not appropriate (development starts with a job task analysis);
* support implementation of WSS;
* support to change control of site-specific configuration items;
* support to development of site-specific training and procedures (development starts with a job task analysis);
* practice participation in operational assessments to verify compliance to command media (training, procedures);
* practice participation in field verification to ensure Project expectations are being met; and
* three-site document control including records management.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.4.1, 1.4.2, 1.5.1, 1.5.2 | 3.3.1.2.2 (continued) | 4 | review of other audits/assessments, operating experience, document reviews, interviews of key personnel, facility condition inspections. [3.3.1.a] | P |
| 1.5.1, 1.5.2 | 2.2.2.2.5 | 4 | Determine operator and support crew evaluation and retraining methods and frequencies. | P |
| 1.5.1, 1.5.2 | 2.3.2.2.1 | 4 | Identify and document hazards of cylinders for identified conditions and the level of skill and knowledge necessary to perform tasks on or around those cylinders. | P |
| 1.5.1, 1.5.2 | 2.3.2.2.2 | 4 | Include cylinder conditions, associated hazards, and required experience and training as a part of project command media, including: training, procedures, contracts, etc. | E |
| 1.5.1, 1.5.2 | 2.3.2.2.4 | 4 | Determine required retraining frequency. [2.3.2.a] | P |
| 1.5.1, 1.5.2 | 3.1.2.2.2.2 | 4 | Develop a database to track work controls currently authorized. | P |
| 1.5.1, 1.5.2 | 3.2.1.2.1 | 4 | Develop a personnel selection and training management plan and implementing procedures based on the complexity of tasks, severity of consequences, and human factors. (continued below) | P |
| 1.5.1, 1.5.2 | 3.2.1.2.1 (continued) | 4 | Training plan is to include qualification specifications of trainers and training of safety documentation. [3.2.1.a, 3.2.1.b] | P |
| 1.5.1, 1.5.2 | 3.2.1.2.2 | 4 | Determine the performance-based training, qualification, and certification specifications for performing personnel. [3.2.1.d] | P |
| 1.5.1, 1.5.2 | 3.2.1.2.3 | 4 | Develop training documents (modules, etc.) to train performing personnel based on learning objectives. (continued below) | P |
| 1.5.1, 1.5.2 | 3.2.1.2.3 (continued) | 4 | Modules are to include safety precautions, hazards, emergency response, lessons learned, and site specific requirements. [3.2.1.e] | P |
| 1.5.1, 1.5.2 | 3.2.1.2.4 | 4 | Develop systems to maintain baseline of trained personnel. Systems are to include training records retention and ready access to current training by authorizing and implementing personnel. [3.2.1.c] | P |
| 1.5.1, 1.5.2 | 3.2.1.2.5 | 4 | Develop the intent and periodicity of audits, assessments, and reviews of the training program. | P |
| 1.5.1, 1.5.2 | 3.2.1.2.6 | 4 | Develop a training revision process to accommodate changes in tasks, and improvements to training. The process is to include line and training personnel to determine the extent and frequency of retraining. | P |

**WBS Element 1.5.3: Data Tracking (DAD I.02.10)**

This element consists of the personnel and equipment necessary to upgrade and maintain the UF6 Cylinder Location Inventory and Management (UCLIM) database and perform the routine Nuclear Material Control and Accountability (NMC&A) inventory requirements. The personnel needed to perform data entry to UCLIM are included as part of this directive. The three-site effort to upgrade and maintain UCLIM is pro-rated to the sites based on the number of cylinders at each site.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.4.1, 1.4.2, 1.5.1, 1.5.3 | 1.2.1.2.1.7 | 1 | Verify integration of program hazards with site emergency preparedness. | P |
| 1.5.1, 1.5.2, 1.5.3 | 4.1.2.3.5 | 1 | Examine justification of inspection frequency and evaluate the need to adjust. | P |
| 1.5.3 | 4.1.2.2.4.5 | 1 | Integrate inspection/evaluation methods and resultant data with risk controls such as inventory accountability, cylinder maintenance, and contamination control. | P |
| 1.1.2, 1.5.3 | 4.1.2.2.4.3 | 2 | Develop the visual inspection/quantitative evaluation integration (the use of visual inspections to select cylinders and general surface areas for obtaining quantitative data to verify compliance with functional criteria). | P |
| 1.4.1, 1.4.2, 1.5.3 | 1.1.1.2.3.4 | 2 | Improve the database that provides cylinder location, condition, content, maintenance, and history necessary to manage actions and constraints related to maintaining cylinder integrity. | P |
| 1.5.3 | 4.1.2.2.4.2 | 2 | Specify the extent to which cylinder anomalies identified during inspections will be documented. The extent of documentation includes the precision for which anomalies will be measured and their location defined (continued below) | P |
| 1.5.3 | 4.1.2.2.4.2 (continued) | 2 | (i.e., a dent on the right side of the cylinder versus a 1/2" deep, 3" circumferential dent located 5" from the valve side of the valve-end stiffener at the 3 o'clock position). | P |
| 1.1.2, 1.5.3 | 4.1.3.2.3 | 3 | Develop methods to monitor the degradation factors for the collection of timely and reliable data that is useful in forecasting cylinder condition. Monitoring method is based on applicable degradation factor. [4.1.3.b] | P |
| 1.3.2, 1.5.1, 1.5.2, 1.5.3 | 4.1.3.2.4 | 3 | Develop a monitoring plan, incorporating the methods and frequencies for performing those methods. | E |
| 1.3.2, 1.5.3 | 4.1.3.2.2 | 3 | Develop a database for tracking degradation factor monitoring data. | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.3 | 1.1.2.2.5 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.3 | 4.2.1.2.4 | 3 | Develop a method for tracking cylinders and storage environments according to their categories. | P |
| 1.5.2, 1.5.3 | 1.1.1.2.3.3 | 3 | Document pertinent history of component use. [1.1.1.b] | P |
| 1.5.3 | 4.2.2.2.5 | 3 | Develop a database system to capture the forecasting information. [4.2.2.b] | P |
| 1.5.3 | 4.2.2.3.2 | 3 | Record forecasting information in the developed database. [4.2.2.b] | P |

**WBS Element 1.5.4: Safety Evaluation Report for SARs (DAD C.02.1)**

DOE is in the process of reviewing the SAR and developing the Safety Evaluation Report (SER). This element provides the resources to respond to the SER and other comments on the SAR. This activity is expected to achieve approved SARs for each site.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.5.4 | 1.1.2.3.2.1 | 1 | Assess hazards for new/modified operations. [1.1.2.b] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.4 | 1.1.3.2.4 | 3 | Determine required baseline maintenance. | P |
| 1.5.4, 1.5.5 | 4.1.1.2.2 | 3 | Develop methods for identifying and quantifying releases to the environment and the effects of releases. The extent of these methods for determining releases is to be commensurate with decontamination and decommissioning of the system. [4.1.1.a, 4.1.1.b] | P |

**WBS Element 1.5.5: SAR Support Due to Safety Evaluation Report (DAD C.02.2)**

This element consists of modifications to the SARs submitted to DOE for approval. Modifications are necessary to obtain approval.

| WBS # | SEMP # | Pri. | Action | (E)DP or (P)MP |
|---|---|---|---|---|
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.2 | 1 | Determine controls necessary to decrease the probability of occurrence for accidents with unacceptable consequences to a tolerable level (ALARA). Controls are determined for anticipated operational states. [1.1.3.a, 1.1.3.b, 1.1.3.f] | E |
| 1.3.2, 1.5.5 | 2.2.1.2.5 | 1 | Identify operational control(s) for each function that are needed to prevent, reduce, and mitigate cylinder damage during test/demonstration, start-up, routine, emergency, off-normal, and standby states of operation. | E |
| 1.4.1, 1.4.2, 1.5.5 | 1.1.2.3.1 | 1 | Obtain authorization of the safety basis (SAR). [1.1.2.a] | P |
| 1.4.1, 1.4.2, 1.5.5 | 1.1.3.3.1 | 1 | Obtain authorization of safety basis (Safety Analysis Report). [1.1.3.b] | P |
| 1.5.1, 1.5.2, 1.5.5 | 1.2.1.1 | 1 | An analysis of optional methods includes the analysis of engineered controls, administrative controls, and/or multiple controls for making risk(s) acceptable. | P |
| 1.5.1, 1.5.5 | 2.3.2.3.1 | 1 | Periodically update documents reporting cylinder conditions and associated hazards. | P |
| 1.5.5 | 1.1.2.3.2.2 | 1 | Obtain approval of changes in the safety basis. | P |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.1.1 | 3 | Identify plausible accident scenarios given identified functional hazards. Plausible accident scenarios to be identified will include scenarios stemming from cylinder breaches (continued below) | E |
| 1.3.2, 1.5.1, 1.5.2, 1.5.5 | 1.1.3.2.1.1 (continued) | 3 | into the ullage space and degraded cylinder conditions as possible initiators. [1.1.3.b] | E |
| 1.3.2, 1.5.5 | 1.1.2.2.1 | 3 | Identify the industrial, chemical, and radiological hazards within the program configuration (see requirement 1.1.1). [1.1.2.a] | E |
| 1.3.2, 1.5.5 | 1.1.2.2.2 | 3 | Perform process hazards analysis (see requirement 1.1.1). [1.1.2.a] | E |
| 1.3.2, 1.5.5 | 1.1.2.2.3 | 3 | Grade hazards to identify program emphasis areas for detailed analysis and development of controls. [1.1.2.a] | E |
| 1.3.2, 1.5.5 | 1.1.2.2.3.1 | 3 | Record the hazard analyses in the safety envelope documentation. [1.1.2.a] | E |
| 1.3.2, 1.5.5 | 1.1.3.2.1.2 | 3 | Determine the probability of accidents scenarios occurring. [1.1.3.b] | E |
| 1.3.2, 1.5.5 | 1.1.3.2.3 | 3 | Complete the risk analysis and risk control sections of the SAR relative to the program. [1.1.3.b] | E |
| 1.4.1, 1.4.2, 1.5.1, 1.5.5 | 1.1.3.2.4.2 | 3 | Identify controls for triggering risk assessments for new/modified operations. [1.1.3.c, 1.1.3.d, 1.1.3.e] | P |
| 1.4.1, 1.4.2, 1.5.1, 1.5.5 | 1.1.3.2.5 | 3 | Determine method to verify baseline meets requirement. | P |
| 1.4.1, 1.4.2, 1.5.5 | 1.1.3.2.3.1 | 3 | Document the risk management matrix. | P |
| 1.5.4, 1.5.5 | 4.1.1.2.2 | 3 | Develop methods for identifying and quantifying releases to the environment and the effects of releases. The extent of these methods for determining releases is to be commensurate with decontamination and decommissioning of the system. [4.1.1.a, 4.1.1.b] | P |
| 1.5.5 | 1.1.3.2.1 | 3 | Identify program risks relative to the configuration defined in requirement 1.1.1. Use identified standards for determining the relevance of program risks to other DOE and industry risks. [1.1.3.b] | P |

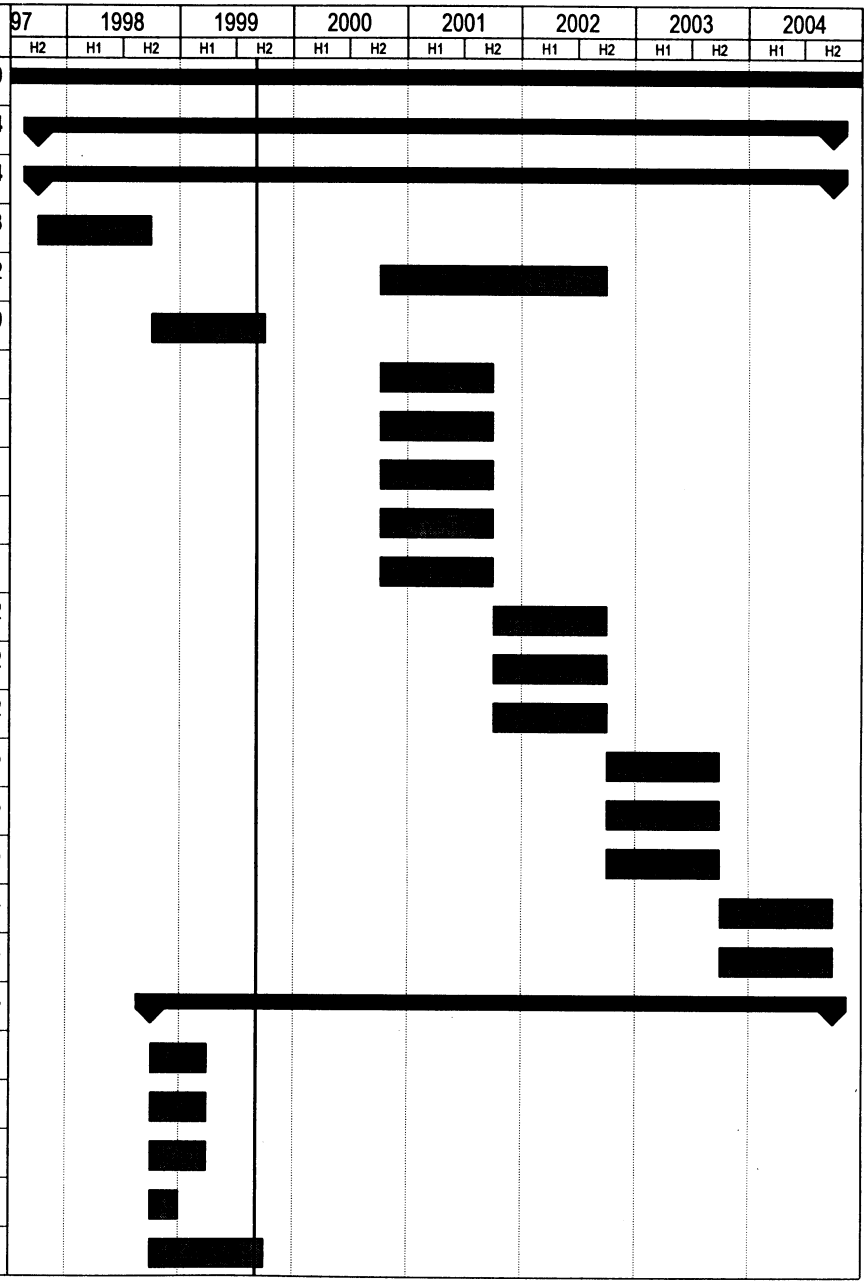
## APPENDIX B

### Schedule

This schedule is reflective of the FY 1999 authorized budget for the Project and required budgets for out-year activities as provided in the DADs.[14] As funding for years beyond FY 1999 is authorized, the schedule will be adjusted.

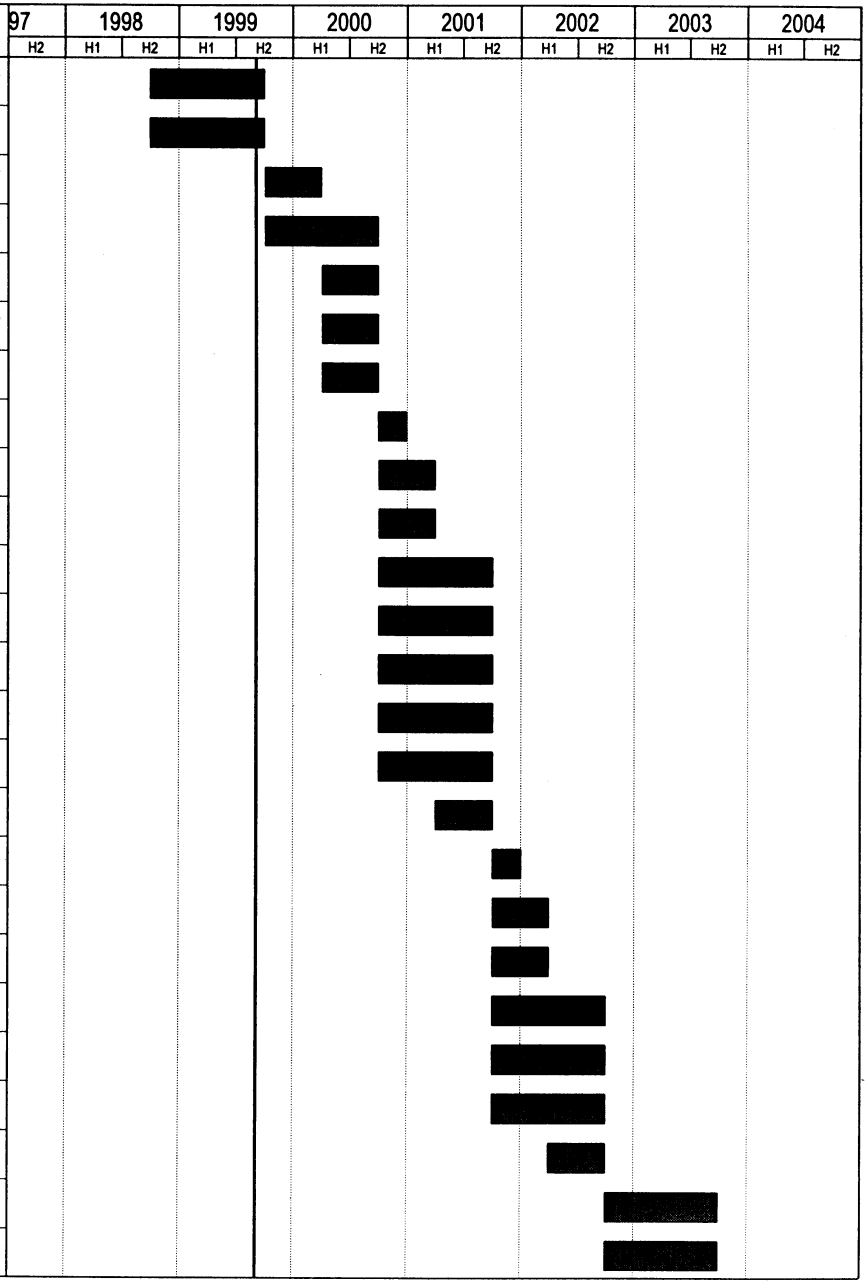
# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 2 | | **Mon 10/2/95** | **Fri 1/29/10** |
| 3 | **1.1.1 Handling and Stacking** | **Wed 10/1/97** | **Thu 9/30/04** |
| 4 | **ETTP** | **Wed 10/1/97** | **Thu 9/30/04** |
| 5 | Move 273 cylinders | Wed 10/1/97 | Wed 9/30/98 |
| 6 | Procure 2,500 saddles | Fri 10/6/00 | Mon 9/30/02 |
| 7 | Move 236 cyls from K-1066-J to K-1066-L | Thu 10/1/98 | Thu 9/30/99 |
| 8 | Move 800 cyls from K-1066-K to K-1066-L | Fri 10/6/00 | Sun 9/30/01 |
| 9 | Move 100 cyls from K-1066-B to K-1066-F | Fri 10/6/00 | Sun 9/30/01 |
| 10 | Move 1077 cyls from K-1066-L to K-1066-F | Fri 10/6/00 | Sun 9/30/01 |
| 11 | Move 800 cyls from K-1066-K to K-1066-E | Fri 10/6/00 | Sun 9/30/01 |
| 12 | Move 300 cyls from K-1066-K to K-1066-L | Fri 10/6/00 | Sun 9/30/01 |
| 13 | Move 412 small diam. cyls from K-1066-K to PORTS | Tue 10/2/01 | Mon 9/30/02 |
| 14 | Move 1,477 empties from K-1066-F to recycler | Tue 10/2/01 | Mon 9/30/02 |
| 15 | Move 1,027 cyls. from K-1066-K to K-1066-K | Tue 10/2/01 | Mon 9/30/02 |
| 16 | Move 100 heel cylinders to PORTS | Tue 10/1/02 | Tue 9/30/03 |
| 17 | Move 800 K-1066-E Yard cylinders to PORTS | Tue 10/1/02 | Tue 9/30/03 |
| 18 | Move 422 K-1066 E Yard cyls to K-1066-E Yard (painted) | Tue 10/1/02 | Tue 9/30/03 |
| 19 | Move 100 heel cylinders to PORTS | Wed 10/1/03 | Thu 9/30/04 |
| 20 | Move 800 E Yard cylinders to PORTS | Wed 10/1/03 | Thu 9/30/04 |
| 21 | **PGDP** | **Thu 10/1/98** | **Thu 9/30/04** |
| 22 | Move 809 cyls. from C745Q to C-745-T | Thu 10/1/98 | Wed 3/31/99 |
| 23 | Move 930 cyls. from C-745-L) to C-745-Q/D/G/T | Thu 10/1/98 | Wed 3/31/99 |
| 24 | Move 161 cyls. from C-745-G to C-745-D | Thu 10/1/98 | Wed 3/31/99 |
| 25 | Move 1,050 cyls. from C-745-G to C-745-Q/D/U | Thu 10/1/98 | Thu 12/31/98 |
| 26 | Move 1,700 cyls. from C-745-A to C-745-T | Thu 10/1/98 | Thu 9/30/99 |



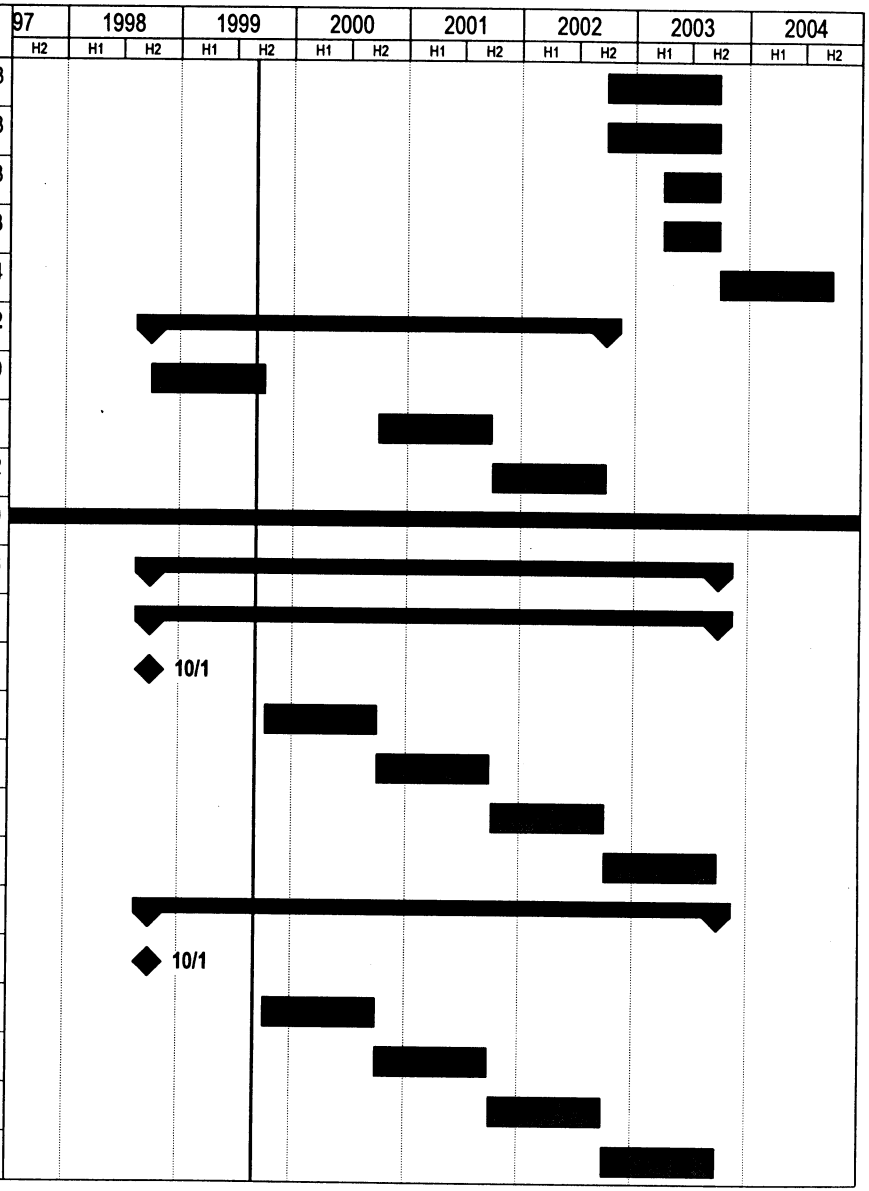
# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 27 | Move 1,500 cyls. from C-745-B to C-745-C | Thu 10/1/98 | Thu 9/30/99 |
| 28 | Move 1,625 cyls from C-745-C to C-745-B | Thu 10/1/98 | Thu 9/30/99 |
| 29 | Move 2,578 cyls. from C-745-K(N) to C-745-L(N) | Mon 10/4/99 | Fri 3/31/00 |
| 30 | Move 1,722 cyls. from C-745-Q to C-745-L(N) | Mon 10/4/99 | Sat 9/30/00 |
| 31 | Move 453 cyls. from C-745-G (Painting) | Mon 4/3/00 | Sat 9/30/00 |
| 32 | Move 18 cyls. from C-745-D to C-745-G (Painting) | Mon 4/3/00 | Sat 9/30/00 |
| 33 | Move 929 cyls. from C-745-F to C-745-G (Painting) | Mon 4/3/00 | Sat 9/30/00 |
| 34 | Move 1,735 cyls. from C-745-P to C-745-L(S) | Sun 10/1/00 | Fri 12/29/00 |
| 35 | Move 540 cyls from C-745-N to C-745-L (S) | Tue 10/3/00 | Sat 3/31/01 |
| 36 | Move 1,089 cyls from C-745-N to C-745-K (S) | Tue 10/3/00 | Sat 3/31/01 |
| 37 | Move 271 cyls from C-745-F to C-745-K (S) | Mon 10/2/00 | Sun 9/30/01 |
| 38 | Move 2,504 cyls from C-745-F to C-745-M | Mon 10/2/00 | Sun 9/30/01 |
| 39 | Move 31 cyls from C-745-F to C-745-K (N) | Mon 10/2/00 | Sun 9/30/01 |
| 40 | Move 1,035 cyls. from C-745-Q to C-745-K(N) | Mon 10/2/00 | Sun 9/30/01 |
| 41 | Move 765 Cyls. from C-745-R to C-745-K(N) | Mon 10/2/00 | Sun 9/30/01 |
| 42 | Move 1,400 cyls. from C745F to C-745K(N) (Painting) | Mon 4/2/01 | Sun 9/30/01 |
| 43 | Move 905 cyls. from C-745-R to C-745-K(N) | Mon 10/1/01 | Mon 12/31/01 |
| 44 | Move 1,204 cyls. from C-745-R to C-745-P | Tue 10/2/01 | Sun 3/31/02 |
| 45 | Move 144 cyls. from C-745-E to C-745-P | Mon 10/1/01 | Sun 3/31/02 |
| 46 | Move 528 cyls. from C-745Q/R to C-745-P | Mon 10/1/01 | Mon 9/30/02 |
| 47 | Move 865 cyls. from C-745Q/R to C-745-N | Mon 10/1/01 | Mon 9/30/02 |
| 48 | Move 800 cyls. from C-745-R to C-745-N | Mon 10/1/01 | Mon 9/30/02 |
| 49 | Move 1,400 cyls. within C-745G (Painting) | Mon 4/1/02 | Mon 9/30/02 |
| 50 | Move 300 cyls. from C-745-R to C-745-F | Tue 10/1/02 | Tue 9/30/03 |
| 51 | Move 2,643 Cyls. from C-745-C to C-745-F | Tue 10/1/02 | Tue 9/30/03 |



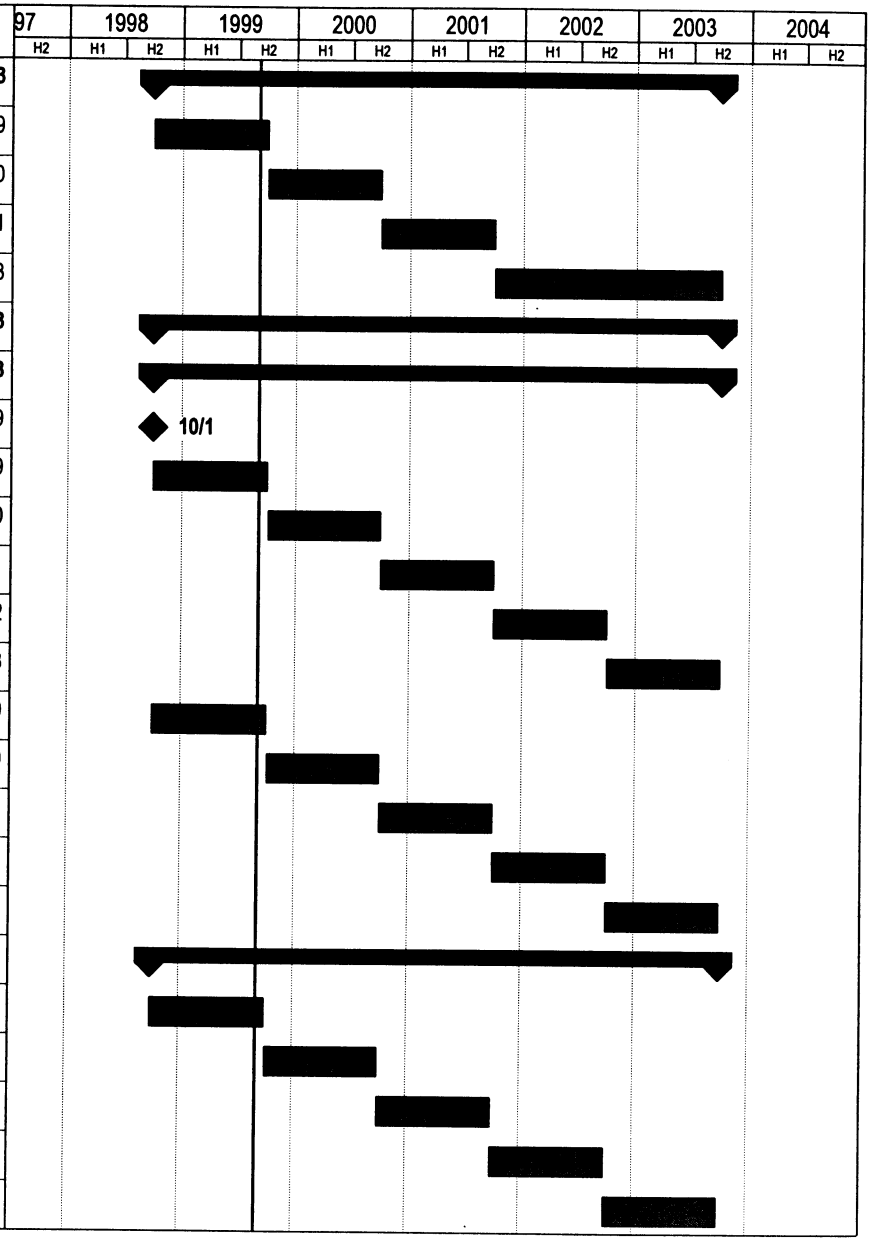
# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 52 | Move 1,092 cyls. from C-745-D to C-745-F | Tue 10/1/02 | Tue 9/30/03 |
| 53 | Move 426 cyls. from C-745-R to C-745-F | Tue 10/1/02 | Tue 9/30/03 |
| 54 | Move 1,050 cyls. within C-745-G (Painting) | Tue 4/1/03 | Tue 9/30/03 |
| 55 | Move 350 cyls.within C-745-T (Painting) | Tue 4/1/03 | Tue 9/30/03 |
| 56 | Move 500 cyls. from C-745-R to C-745-F | Wed 10/1/03 | Thu 9/30/04 |
| 57 | **PORTS** | **Thu 10/1/98** | **Mon 9/30/02** |
| 58 | Move 236 cyls | Thu 10/1/98 | Thu 9/30/99 |
| 59 | Move 2,500 cylinders into new cylinder yard | Sun 10/1/00 | Fri 9/28/01 |
| 60 | Move 2,139 normal feed cyls. from X-745-C (USEC cyls.) | Mon 10/1/01 | Mon 9/30/02 |
| 61 | **1.1.2 Surveillance** | **Tue 10/1/96** | **Fri 1/29/10** |
| 62 | **ETTP** | **Thu 10/1/98** | **Tue 9/30/03** |
| 63 | **Complete annual inspections as required by FS-C-2402** | **Thu 10/1/98** | **Tue 9/30/03** |
| 64 | Complete 2,549 annual inspections | Thu 10/1/98 | Thu 9/30/99 |
| 65 | Complete 2,549 annual inspection | Wed 10/6/99 | Sat 9/30/00 |
| 66 | Complete 2,549 annual inspections | Sun 10/1/00 | Tue 9/25/01 |
| 67 | Complete 2,549 annual inspections | Tue 10/2/01 | Mon 9/30/02 |
| 68 | Complete 949 annual inspections | Tue 10/1/02 | Tue 9/30/03 |
| 69 | **Complete quadrennial inspections as required by FS-C-2402** | **Thu 10/1/98** | **Tue 9/30/03** |
| 70 | Complete 820 quadrenniel inspections | Thu 10/1/98 | Thu 9/30/99 |
| 71 | Complete 820 quadrennial inspections | Tue 10/5/99 | Sat 9/30/00 |
| 72 | Complete 1,095 quadrennial inspections | Sun 10/1/00 | Tue 9/25/01 |
| 73 | Complete 1,352 quadrennial inspections | Mon 10/1/01 | Fri 9/27/02 |
| 74 | Complete 1,457 quadrennial inspections | Tue 10/1/02 | Tue 9/30/03 |



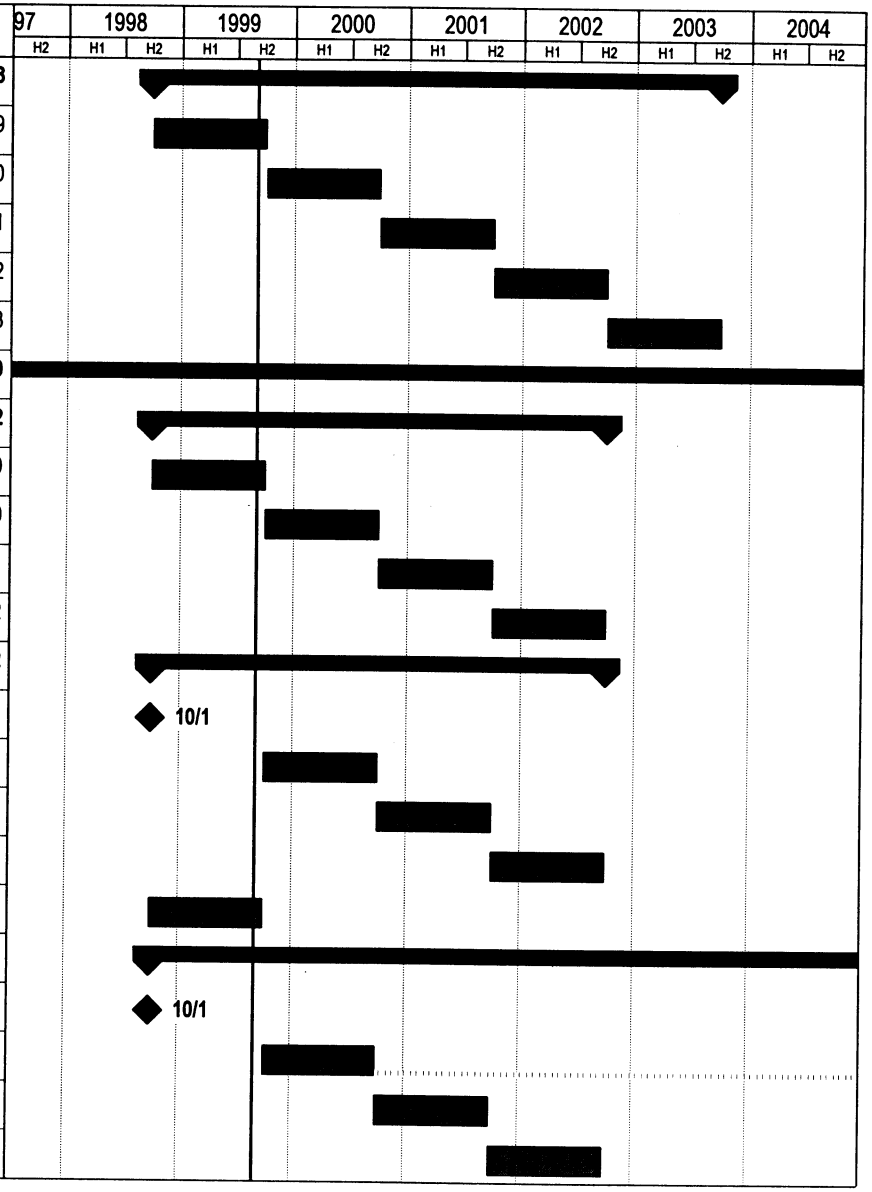
# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 75 | **Perform NDA measurements** | **Thu 10/1/98** | **Tue 9/30/03** |
| 76 | Collect wall thickness data for 25 cyls. | Thu 10/1/98 | Thu 9/30/99 |
| 77 | Collect wall thickness data for 25 cyls. | Fri 10/1/99 | Sat 9/30/00 |
| 78 | Collect wall thickness data for 110 cyls. | Sun 10/1/00 | Sun 9/30/01 |
| 79 | Collect wall thickness data for 145 cyls. | Mon 10/1/01 | Tue 9/30/03 |
| 80 | **PGDP** | **Thu 10/1/98** | **Tue 9/30/03** |
| 81 | **Complete annual inspections as required by FS-C-2402** | **Thu 10/1/98** | **Tue 9/30/03** |
| 82 | Complete 2,460 annual inspections | Thu 10/1/98 | Thu 9/30/99 |
| 83 | Complete 6,629 baseline inspections | Thu 10/1/98 | Thu 9/30/99 |
| 84 | Complete 1,329 annual inspections | Mon 10/4/99 | Sat 9/30/00 |
| 85 | Complete 1,329 annual inspections | Mon 10/2/00 | Sun 9/30/01 |
| 86 | Complete 1,329 annual inspections | Mon 10/1/01 | Mon 9/30/02 |
| 87 | Complete 1,329 annual inspection | Tue 10/1/02 | Tue 9/30/03 |
| 88 | Complete est. 200 post-privatization baseline inspections | Thu 10/1/98 | Thu 9/30/99 |
| 89 | Complete est. 300 post-privatization baseline inspections | Mon 10/4/99 | Sat 9/30/00 |
| 90 | Complete est. 300 post-privatization baselien inspections | Mon 10/2/00 | Sun 9/30/01 |
| 91 | Complete est. 300 post-privatization baseline inspections | Mon 10/1/01 | Mon 9/30/02 |
| 92 | Complete est. 426 post-privatization baseline inspections | Tue 10/1/02 | Tue 9/30/03 |
| 93 | **Complete quadrennial inspections per year as required by FS-C-** | **Thu 10/1/98** | **Tue 9/30/03** |
| 94 | Complete 3,000 quadrennial inspections | Thu 10/1/98 | Thu 9/30/99 |
| 95 | Complete 4,207 quadrennial inspections | Mon 10/4/99 | Sat 9/30/00 |
| 96 | Complete 5,365 quadrennial inspections | Mon 10/2/00 | Sun 9/30/01 |
| 97 | Complete 17,700 quadrennial inspections | Mon 10/1/01 | Mon 9/30/02 |
| 98 | Complete 9,309 quadrennial inspections | Tue 10/1/02 | Tue 9/30/03 |



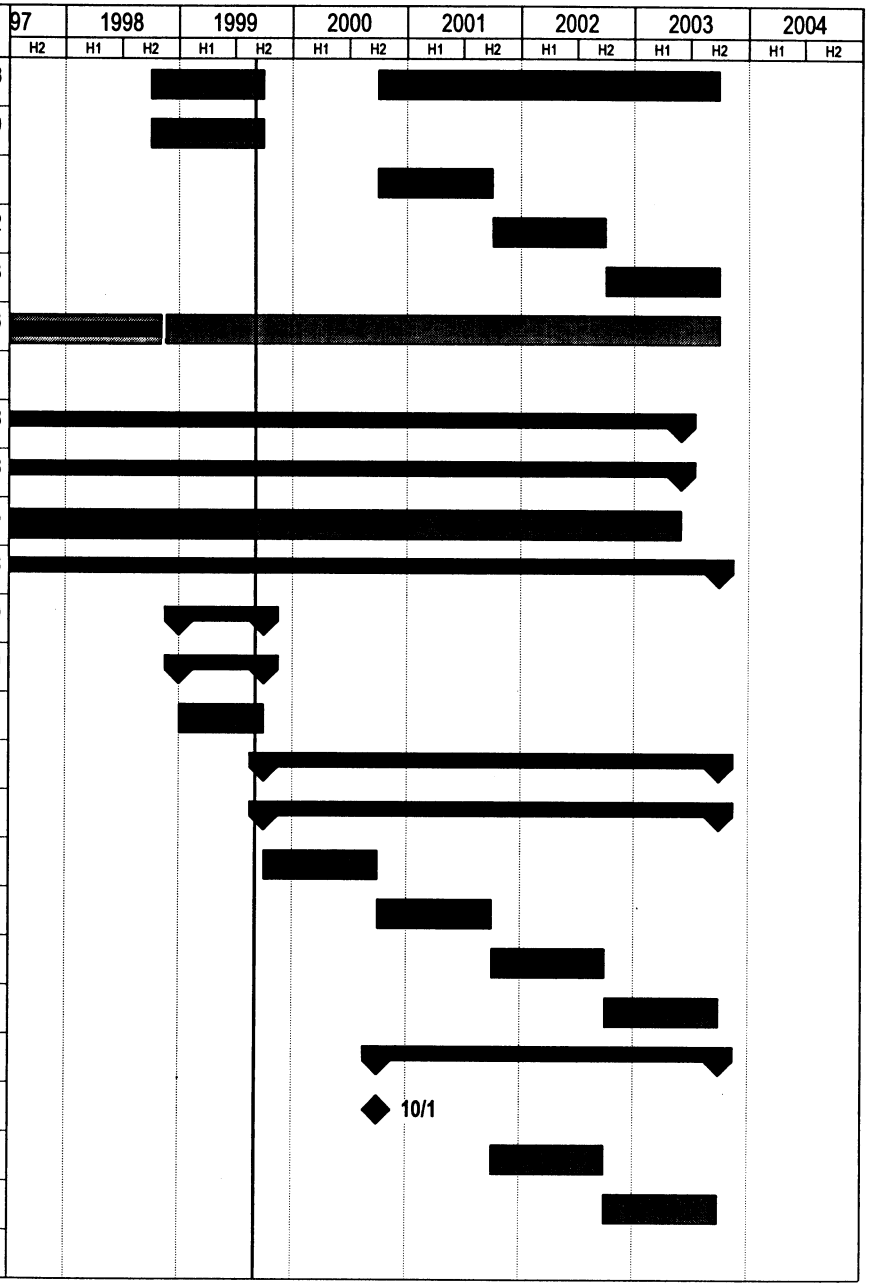
# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 99 | **Perform NDA Measurements** | **Thu 10/1/98** | **Tue 9/30/03** |
| 100 | Complete 200 UT inspections | Thu 10/1/98 | Thu 9/30/99 |
| 101 | Complete 200 UT inspections | Mon 10/4/99 | Sat 9/30/00 |
| 102 | Complete 200 UT inspections | Mon 10/2/00 | Sun 9/30/01 |
| 103 | Complete 200 UT inspections | Mon 10/1/01 | Mon 9/30/02 |
| 104 | Complete 200 UT inspections | Tue 10/1/02 | Tue 9/30/03 |
| 105 | **PORTS** | **Tue 10/1/96** | **Fri 1/29/10** |
| 106 | **Complete annual inspections as required by FS-C-2402** | **Thu 10/1/98** | **Mon 9/30/02** |
| 107 | Complete annual inspection of 16 cyls | Thu 10/1/98 | Thu 9/30/99 |
| 108 | Complete annual inspection of 16 cyls | Fri 10/1/99 | Sat 9/30/00 |
| 109 | Complete annual inspection of 16 cyls | Sun 10/1/00 | Sun 9/30/01 |
| 110 | Complete annual inspection of 16 cyls | Mon 10/1/01 | Mon 9/30/02 |
| 111 | **Complete quadrennial inspections per year as required by FS-C-** | **Thu 10/1/98** | **Mon 9/30/02** |
| 112 | Complete 3,700 quadrennial inspections per year as required by | Thu 10/1/98 | Thu 9/30/99 |
| 113 | Complete 3,700 quadrennial inspections per year as required by | Fri 10/1/99 | Sat 9/30/00 |
| 114 | Complete 3,700 quadrennial inspections per year as required by | Sun 10/1/00 | Sun 9/30/01 |
| 115 | Complete 3,700 quadrennial inspections per year as required by | Mon 10/1/01 | Mon 9/30/02 |
| 116 | **Complete 2,639 baseline inspections** | Thu 10/1/98 | Thu 9/30/99 |
| 117 | **Perform NDA measurements** | **Thu 10/1/98** | **Fri 1/29/10** |
| 118 | Collect wall thickness data for 150 previously tested cyls. | Thu 10/1/98 | Thu 9/30/99 |
| 119 | Collect wall thickness data for 150 previously tested cyls. | Wed 10/6/99 | Fri 1/29/10 |
| 120 | Collect wall thickness data for 150 cyls | Sun 10/1/00 | Sun 9/30/01 |
| 121 | Collect wall thickness data for 150 cyls | Mon 10/1/01 | Mon 9/30/02 |



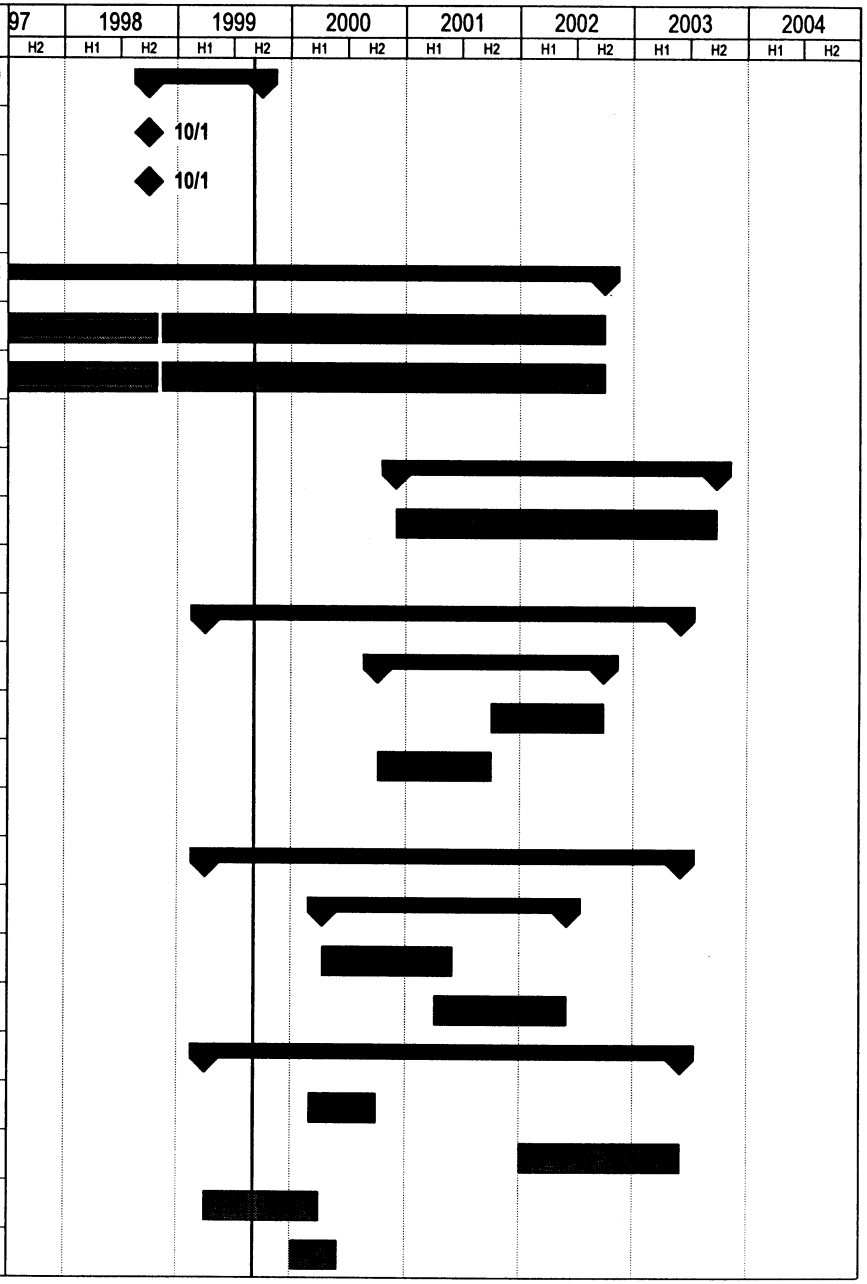
# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 122 | **Complete annual radiological surveys of all cyl. yards (and all cyl** | **Tue 10/1/96** | **Tue 9/30/03** |
| 123 | Complete 17,888 radiological surveys of cyls | Thu 10/1/98 | Thu 9/30/99 |
| 124 | Complete 17,888 radiological surveys of cyls | Sun 10/1/00 | Sun 9/30/01 |
| 125 | Complete 17,988 radiological surveys of cyls | Mon 10/1/01 | Mon 9/30/02 |
| 126 | Complete 17,988 radiological surveys of cyls | Tue 10/1/02 | Tue 9/30/03 |
| 127 | Sample yard runoff at PORTS each month | Tue 10/1/96 | Tue 9/30/03 |
| 128 | | | |
| 129 | **1.1.3 Contents Transfer** | **Thu 10/10/96** | **Fri 5/30/03** |
| 130 | **ETTP** | **Thu 10/10/96** | **Fri 5/30/03** |
| 131 | Develop an agreement to control feed 2 welded cyls. at PORTS | Thu 10/10/96 | Fri 5/30/03 |
| 132 | **1.1.4 Maintenance** | **Mon 10/2/95** | **Tue 9/30/03** |
| 133 | **1.1.4.1 Management of Substandard Cylinders** | **Fri 1/1/99** | **Thu 9/30/99** |
| 134 | **PORTS** | **Fri 1/1/99** | **Thu 9/30/99** |
| 135 | Replace damaged cyl. valve | Fri 1/1/99 | Thu 9/30/99 |
| 136 | **1.1.4.2 Cylinder Recoating** | **Fri 10/1/99** | **Tue 9/30/03** |
| 137 | **PGDP** | **Fri 10/1/99** | **Tue 9/30/03** |
| 138 | Complete full-body coating of 1,400 cyls | Fri 10/1/99 | Sat 9/30/00 |
| 139 | Complete full-body coating of 1,400 cyls. | Sun 10/1/00 | Sun 9/30/01 |
| 140 | Complete full-body coating of 1,400 cyls | Mon 10/1/01 | Mon 9/30/02 |
| 141 | Complete full-body coating of 1,400 cyls. | Tue 10/1/02 | Tue 9/30/03 |
| 142 | **ETTP** | **Sun 10/1/00** | **Tue 9/30/03** |
| 143 | Complete full-body coating of 1,100 cyls | Sun 10/1/00 | Sun 9/30/01 |
| 144 | Complete full-body coating of 1,027 cyls. | Tue 10/2/01 | Mon 9/30/02 |
| 145 | Complete full-body coating of 422 cyls | Tue 10/1/02 | Tue 9/30/03 |
| 146 | | | |



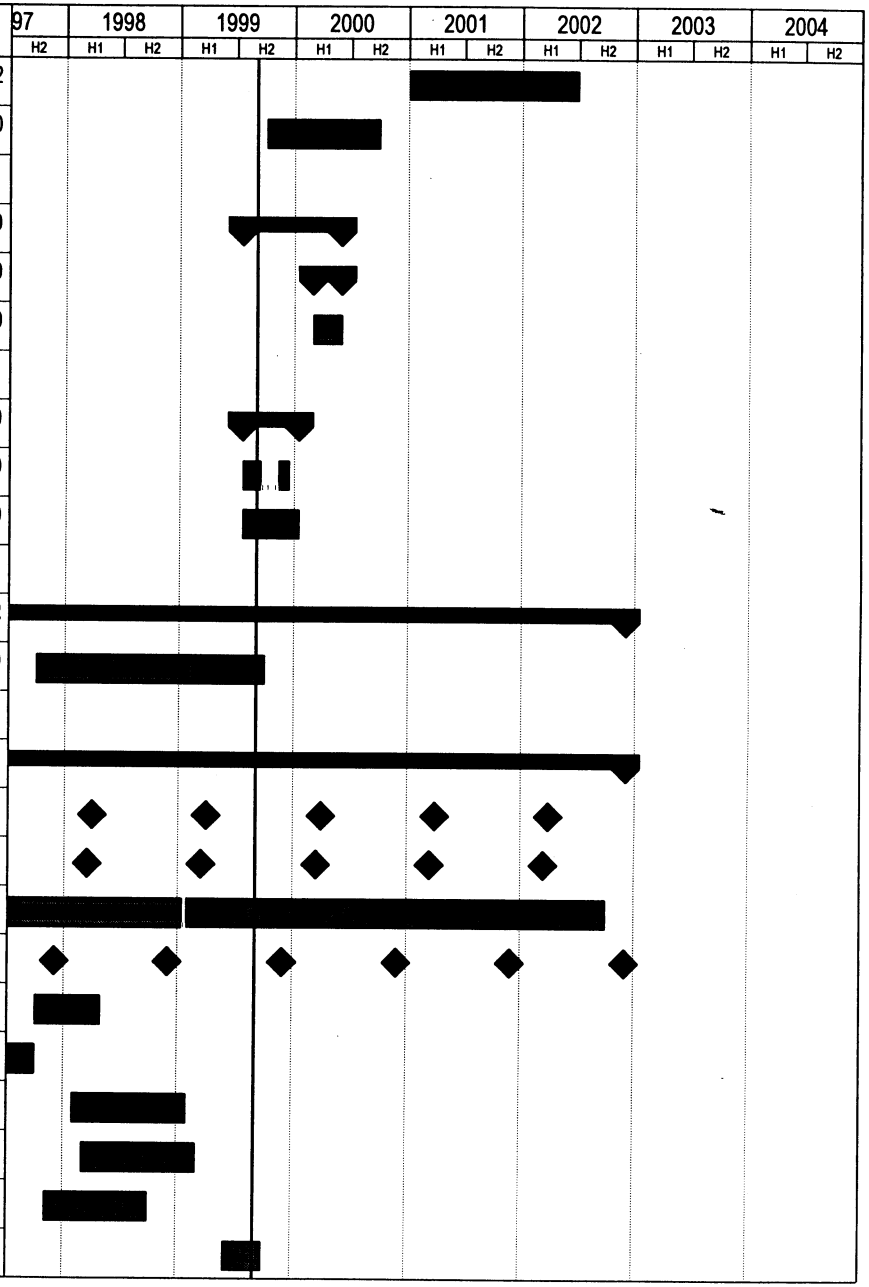
# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 147 | **1.1.4.3 General Cylinder Maintenance** | **Thu 10/1/98** | **Thu 9/30/99** |
| 148 | Clean 5,460 cyl. skirt ends (PGDP) | Thu 10/1/98 | Thu 9/30/99 |
| 149 | Clean 4,100 cyl. skirt ends (ETTP) | Thu 10/1/98 | Thu 9/30/99 |
| 150 | | | |
| 151 | **1.1.4.4 General Yard and Equipment** | **Mon 10/2/95** | **Mon 9/30/02** |
| 152 | Perform routine maintenance of yards | Mon 10/2/95 | Mon 9/30/02 |
| 153 | Maintain lighting, boundary controls, cyl. road conditions | Mon 10/2/95 | Mon 9/30/02 |
| 154 | | | |
| 155 | **1.1.5 Off-site Transport** | **Fri 12/1/00** | **Tue 9/23/03** |
| 156 | Transport ETTP cylinders off site | Fri 12/1/00 | Tue 9/23/03 |
| 157 | | | |
| 158 | **1.2 Capital/Construction** | **Thu 4/1/99** | **Fri 5/30/03** |
| 159 | **1.2.1 Capital** | **Wed 10/4/00** | **Fri 9/27/02** |
| 160 | Procurestraddle carrier for ETTP | Mon 10/1/01 | Fri 9/27/02 |
| 161 | Procure cylinder handling equipment for PORTS | Wed 10/4/00 | Sun 9/30/01 |
| 162 | | | |
| 163 | **1.2.2 Construction** | **Thu 4/1/99** | **Fri 5/30/03** |
| 164 | **Cylinder Storage Yard, Phase IX** | **Tue 4/11/00** | **Fri 5/31/02** |
| 165 | Reconstruct C-745-M and K | Tue 4/11/00 | Thu 5/31/01 |
| 166 | Reconstruct C-745-N and P | Wed 4/4/01 | Fri 5/31/02 |
| 167 | **ETTP/PGDP/PORTS Phase X** | **Thu 4/1/99** | **Fri 5/30/03** |
| 168 | C-745-L(3) North Yard Reconstruction | Wed 3/1/00 | Sat 9/30/00 |
| 169 | C-745-F Yard Reconstruction | Tue 1/1/02 | Fri 5/30/03 |
| 170 | C-745-L(N) Yard Reconstruction | Thu 4/1/99 | Fri 3/31/00 |
| 171 | Complete Title I and II Design of K-1066-M | Tue 1/4/00 | Tue 5/30/00 |



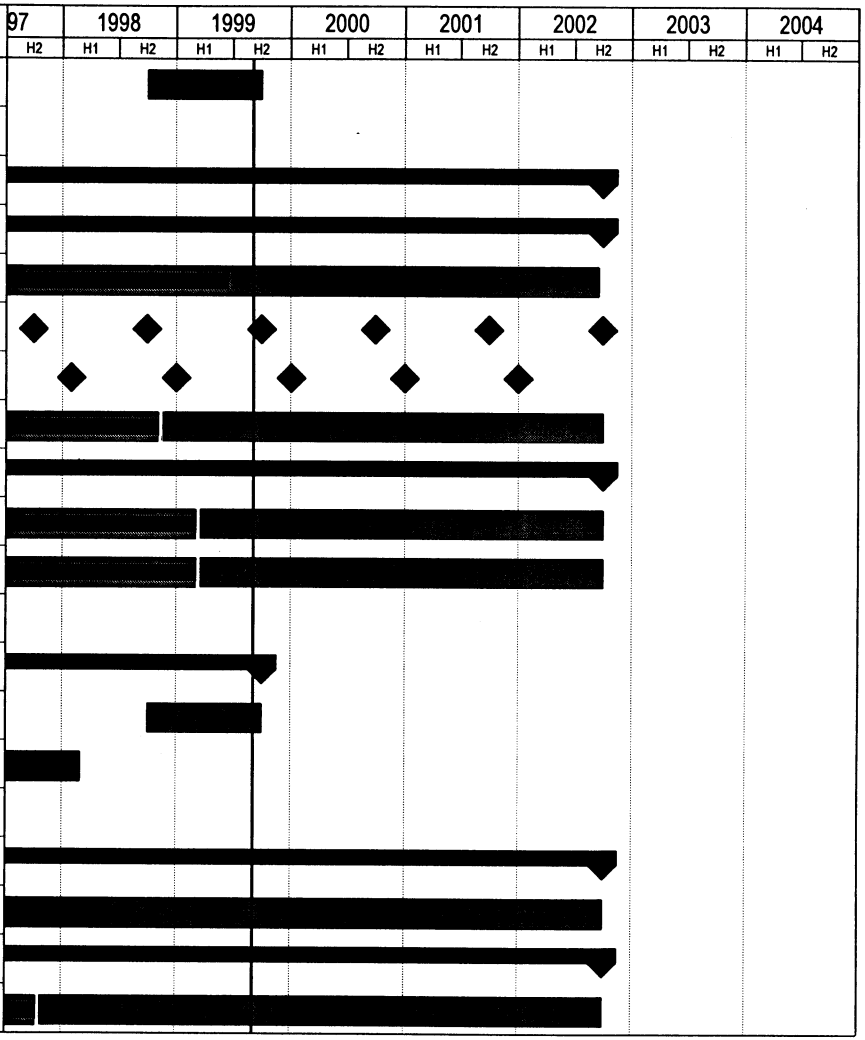
# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 172 | Construct K-1066-M | Wed 1/3/01 | Sun 6/30/02 |
| 173 | Construct new cylinder yard at PORTS | Mon 10/4/99 | Sat 9/30/00 |
| 174 | | | |
| 175 | **1.3 Development** | **Tue 7/20/99** | **Wed 5/31/00** |
| 176 | **1.3.1 Engineering Development (site-specific)** | **Wed 3/1/00** | **Wed 5/31/00** |
| 177 | Analysis of Corrosion on 30A cylinders - PGDP | Wed 3/1/00 | Wed 5/31/00 |
| 178 | | | |
| 179 | **1.3.2 Engineering Development (three-site)** | **Tue 7/20/99** | **Sat 1/15/00** |
| 180 | Maintenance Plan to extend integrity of painted cylinders | Tue 7/20/99 | Wed 12/15/99 |
| 181 | Cylinder whole body paint performance evaluation | Tue 7/20/99 | Sat 1/15/00 |
| 182 | | | |
| 183 | **1.4 System Administration** | **Mon 10/2/95** | **Mon 12/2/02** |
| 184 | **1.4.1 Repost ETTP cyl. yards from C Zone to Fixed Contamination Area** | **Tue 9/30/97** | **Thu 9/30/99** |
| 185 | | | |
| 186 | **1.4.2 System Administration (three-site)** | **Mon 10/2/95** | **Mon 12/2/02** |
| 187 | **Issue annual updates to Project Management Plan** | **Mon 4/1/96** | **Sun 3/31/02** |
| 195 | **Develop fiscal year budget requirements** | **Fri 3/15/96** | **Fri 3/15/02** |
| 203 | Report performance to DOE monthly | Mon 10/2/95 | Mon 9/30/02 |
| 204 | **Generate FY closeout report** | **Thu 11/30/95** | **Mon 12/2/02** |
| 213 | Plan for routine coating at all sites | Wed 10/1/97 | Tue 4/28/98 |
| 214 | Issue strategy for coating schedule and reflect in PMP schedule | Fri 11/29/96 | Tue 9/30/97 |
| 215 | Initiate migration of UCLIM to updated system | Fri 1/30/98 | Sat 1/30/99 |
| 216 | Initiate database to track actions to requirements flowdown | Mon 3/2/98 | Mon 3/1/99 |
| 217 | Upgrade requirement and functional analyses | Mon 11/3/97 | Wed 9/30/98 |
| 218 | Initiate retrieval of UI-A forms | Tue 6/1/99 | Thu 9/30/99 |



# Schedule of Activities
# UF6 Cylinder Project

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 219 | Initiate planning of cylinder deployment | Thu 10/1/98 | Thu 9/30/99 |
| 220 | | | |
| 221 | **1.5 Configuration Management** | **Mon 10/2/95** | **Mon 9/30/02** |
| 222 | **1.5.1 Configuration Management (site-specific)** | **Mon 10/2/95** | **Mon 9/30/02** |
| 223 | Conduct monthly safety walk-throughs | Tue 10/1/96 | Tue 9/17/02 |
| 224 | **Verify and document compliance with safety envelope (annually)** | **Tue 9/30/97** | **Mon 9/30/02** |
| 231 | **Verify and document compliance with system requirements (annually)** | **Fri 1/30/98** | **Tue 1/1/02** |
| 237 | Revise safety envelope documentation as necessary | Tue 10/1/96 | Mon 9/30/02 |
| 238 | **Personnel Training** | **Mon 10/2/95** | **Mon 9/30/02** |
| 239 | Train to revised procedure as necessary | Mon 10/2/95 | Mon 9/30/02 |
| 240 | Establish and approve performance measures | Mon 10/2/95 | Mon 9/30/02 |
| 241 | | | |
| 242 | **1.5.2 Configuration Management (three-site)** | **Mon 10/2/95** | **Thu 9/30/99** |
| 243 | Revise 3-site procedures as needed | Thu 10/1/98 | Thu 9/30/99 |
| 244 | ***Procedure Development ??? which procedures???*** | Mon 10/2/95 | Fri 2/27/98 |
| 245 | | | |
| 246 | **1.5.3 Data Tracking** | **Mon 10/2/95** | **Mon 9/30/02** |
| 247 | Generate periodic reports and data as needed for scheduling inspections, c | Mon 10/2/95 | Mon 9/30/02 |
| 248 | **NMC&A** | **Mon 10/2/95** | **Mon 9/30/02** |
| 249 | Perform annual NMC&A inventories | Mon 10/2/95 | Mon 9/30/02 |



## APPENDIX C

## $UF_6$ Cylinder Project Change Control Items

This appendix identifies change control items essential to the safe and successful performance of the $UF_6$ Cylinder Project work.

**$UF_6$ Cylinder Project Typical Change Control Items**

| Item Number | Item Title | Change Control Method |
|---|---|---|
| **Three-Site Program** | | |
| ***Documents*** | | |
| K/TSO-001 | $UF_6$ Cylinder Project System Requirements Document | Three-site $UF_6$ Cylinder Project Manager and DOE ORO approval as described the SEMP |
| K/TSO-017 | $UF_6$ Cylinder Project Systems Engineering Management Plan | Three-site $UF_6$ Cylinder Project Manager and DOE ORO approval as described the SEMP |
| K/TSO-28 | $UF_6$ Cylinder Project Engineering Development Plan | Three-site $UF_6$ Cylinder Project Manager approval |
| K/TSO-30 | $UF_6$ Cylinder Project Management Plan | Three-site $UF_6$ Cylinder Project Manager approval |
| ***Procedures*** | | |
| FS-C-2400 | DOE 48-Inch-Diameter $UF_6$ Cylinder Handling and Inspection | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| ERWM/EF-P2401 | Fabrication and Installation of Replacement Identification Tags on $UF_6$ Cylinders | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| FS-C-2402 | In-Storage Inspection of $UF_6$ Cylinders | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| EMEF-P2403 | Repair of Heavily Corroded and Potentially Breached $UF_6$ Cylinders | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| EMEF-P2404 | Field Maintenance of $UF_6$ Cylinder Valves and Plugs | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| EMEF-P2406 | Rotation of 48-Inch Diameter $UF_6$ Cylinders | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| EMEF-P2407 | DOE 30-Inch Diameter $UF_6$ Cylinder Handling and Inspection | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |

| Item Number | Item Title | Change Control Method |
|---|---|---|
| **Three-Site Program** | | |
| EMEF-P2408 | Management of $UF_6$ Cylinder Valves and Plugs | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| FS-C-2413 | Handling and Inspection of Small Diameter DOE $UF_6$ Cylinders | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| FS-C-2421 | Measurement of 48-Inch Diameter $UF_6$ Cylinder Wall Thickness-Manual Ultrasonic Test Methods | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| FS-C-2430 | Inspection Checklists for DOE $UF_6$ Cylinders | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| | | |

| Item Number | Item Title | Change Control Method |
|---|---|---|
| **Paducah** | | |
| ***Documents*** | | |
| KY/EM-174 | *Safety Analysis Report, Paducah Gaseous Diffusion Plant* | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| NCSA No. GEN-03<br>Requisition No. 1527 | Handling, Use, and Storage of Cylinders Containing 50 Pounds or More $UF_6$ | $UF_6$ Cylinder Site Program Manager reviews new work per CP4-SH-NS-1101, Evaluation of Requests for Criticality Safety Approvals |
| ***Procedures*** | *Three-site procedures are used* | |
| ***Hardware*** | | |
| [1] | DOE $UF_6$ cylinders and components | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| | | |

[1]Definitive list of $UF_6$ cylinders and content assays is contained in the Paducah Nuclear Material Accountability System (NUMAS) database.

| Item Number | Item Title | Change Control Method |
|---|---|---|
| **Paducah** | | |
| C-900130 | Allied Wagner Cylinder Hauler | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| C-900131 | Allied Wagner Cylinder Hauler | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| C-900132 | Ransom Rotating Fixture | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| C900206 | Allied Wagner Cylinder Hauler | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| C112505 | Cylinder Handling and Transportation System (CHATS) | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |

| Item Number | Item Title | Change Control Method |
|---|---|---|
| **Portsmouth** | | |
| ***Documents*** | | |
| POEF-LMES-89 | *Safety Analysis Report, Portsmouth Gaseous Diffusion Plant* | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| NCSA-PLANT004.001, | Nuclear Criticality Safety Approval, Storing and Handling of Large Cylinders of Uranium Material | Site $UF_6$ Cylinder Program Manager per LMES/ PO-FO- P1514, Nuclear Criticality Safety Evaluation and Approval |
| FCA-475C2 | Criticality Hazards Facility Change Agreement, Use of Vacuum Cleaners and Power Sweepers | Site $UF_6$ Cylinder Program Manager per LMES/ PO-FO-P1514, Nuclear Criticality Safety Evaluation and Approval |
| ***Procedures*** | *Three-site procedures are used* | |
| ***Hardware*** | | |

| Item Number | Item Title | Change Control Method |
|---|---|---|
| **Portsmouth** | | |
| [2] | US DOE $UF_6$ cylinders and components | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| P-910263 | Allied-Wagner Cylinder Stacker | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| | Seismic Chocks | Procedures FS-C-2402 |

| Item Number | Item Title | Change Control Method |
|---|---|---|
| **ETTP** | | |
| ***Documents*** | | |
| K/D-SAR-29 | *K-25 Site $UF_6$ Cylinder Storage Yards Final Safety Analysis Report* | Bechtel Jacobs Procedures Control Process: PQ-A-1100, Procedural Document Process |
| K/D-6572 | *Technical Safety Requirements for the K-25 Site $UF_6$ Cylinder Storage Yards* | Changes to safety documents are controlled using FS1-3 PD "Safety Documentation" |
| ***Procedures*** | *Three-site procedures are used* | |
| ***Hardware*** | | |
| [3] | DOE $UF_6$ cylinders and Components | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| 68-3871 | Raygo-Wagner Cylinder Handler | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| | | Site Configuration Control Board approval with participation from |

[2]Definitive list of $UF_6$ cylinders and content assays is maintained in the Portsmouth Dynamic Nuclear Material Control and Accountancy System (DYMCAS) database.

[3]Definitive list of $UF_6$ cylinders and contents assays is maintained in the Nuclear Materials Inventory System (NUMIS) database.

| Item Number | Item Title | Change Control Method |
|---|---|---|
| 68-5473 | Allied-Wagner Cylinder Handler | three-site Project management as outlined in the SEMP |
| 26-0020<br>26-1708<br>26-1707 | Forklift Fixtures | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| 68-4033 | Saddle Carrier | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| 68-4034 | Saddle Carrier | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
| 26-0007 | Crane Fixture | Site Configuration Control Board approval with participation from three-site Project management as outlined in the SEMP |
|  | Seismic Chocks | Procedures FS-C-2402 |