# Maintenance Implementation Plan for B Plant/ WESF



Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Westinghouse
Hanford Company Richland, Washington

Management and Operations Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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# MAINTENANCE IMPLEMENTATION PLAN
# FOR
# B PLANT/WESF

## WHC-SP-0858 Rev 4

Prepared by: _____ 12/28/95
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B Plant Maintenance

Approved by: _____ 1/2/95
R. E. Heineman, Jr., Director Date

## 1.0 EXECUTIVE SUMMARY

This Maintenance Implementation Plan (MIP) has been developed for maintenance functions associated with the B Plant/WESF (Waste Encapsulation Storage Facility) complex. This plan is developed from the guidelines presented by Department of Energy (DOE) Order 4330.4B, Maintenance Management Program (DOE 1994), Chapter II.

The objective of this plan is to provide baseline information for establishing and identifying WHC conformance programs and policies applicable to implementation of DOE order 4330.4B guidelines. In addition, this maintenance plan identifies the actions necessary to develop a cost-effective and efficient maintenance program at B Plant/WESF.

Maintenance activities are mainly going to be performed by existing maintenance organizations within Westinghouse Hanford Company (WHC). Maintenance performed at B Plant/WESF is performed by the Maintenance organization.

This B Plant/WESF MIP provides the interface requirements and responsibilities as they apply specifically to B Plant/WESF. This document provides a proposed implementation schedule that has been developed for items considered to be deficient or in need of improvement. It will be considered during FY 1996 MYPP preparation

Biennial review and additional reviews are conducted as significant programmatic and mission changes are made. This document is revised as necessary.

In this document, the essential equipment list represented by the Safety Equipment List (SEL).

# 2.0 INTRODUCTION

## 2.1 Facility Complex Description

The B Plant/WESF facility complex consists of three main facilities and several support structures located in the 200 East Area of the Hanford site. B Plant is a transition facility that is required to ensure safe storage and management of WESF (operating facility) cesium and strontium capsules. B Plant/WESF also contains substantial radiological inventory from previous campaigns. There are no production activities at B Plant, but several of its operating systems are required to accomplish the current B Plant/WESF mission. B Plant/WESF are each considered a nuclear facility due to the storage of cesium and strontium capsules at WESF and the large radiological inventory from past processing.

The Main facility consists of:

1. 221B is a process building containing a canyon and craneway, 40 process cells, a hot pipe trench, a ventilation tunnel, and a railroad tunnel. The service and operating portion of the building consists of an operating gallery, pipe gallery, and electrical gallery.

2. 271B is a service and office building with a basement and three floors consisting of: instrument shop, air compressor room, building ventilation air supply filters, electrical motor control centers for the building, office spaces, locker rooms, rest rooms, aqueous makeup rooms (2), lunch room, dispatcher's office, dry chemical storage, and a portable breathing-air compressor.

3. 225B is the WESF Process building consisting of canyon and craneway, process hot cell area, hot cell service areas, operating areas, building service areas, and capsule storage pool area.

The structures supporting B Plant/WESF are: 207B, 221BB, 221BD, 221BC, 221BG, 291BD, 292B, the stack, the railroad tunnel, K-3 Filter, and K-1-1 filter.

B Plant/WESF Support Facilities:

a. A covered slab for the storage of full and empty compressed gas bottles and general storage.

b. Satellite accumulation area (226B), is the <90 day storage pad for contained waste.

## 2.2 Mission

The B Plant/WESF complex is to be used to provide effective stewardship for safe, cost-effective management of Hanford's cesium and strontium inventory, B Plant and WESF facilities, and the associated workforce.

## 2.3 History/Scheduled Life

The B Plant process canyon building was constructed in 1943 and originally used to recover plutonium from nuclear fuels using the bismuth phosphate process. The process building was reconfigured in the 1960's to separate cesium and strontium from PUREX waste byproducts before shipping the byproducts to tank farms. In 1974, construction of WESF was completed. WESF contains "hot" cells for encapsulation and pool cells for long-term storage of the capsules. The byproducts from the process building were transferred to WESF to be encapsulated for long-term isolation and storage.

# 3.0 DOE ORDER 4330.4B REQUIREMENTS

## 3.1 Maintenance Management Program Scope

The Maintenance Management Program for B Plant/WESF encompasses all facilities and auxiliary buildings associated with the B Plant/WESF Complex. Maintenance activities, whether for building upkeep or for repair, calibration and/or rework of equipment, are provided by the B Plant/WESF maintenance organization. A Safety Equipment List (SEL), reference section 4.5.1, has been developed for B Plant/WESF, as part of the safety boundary definition.

## 3.2 Maintenance Program Requirements

System and component maintenance requirements are established based on analyses that consider safety classifications, programmatic concerns; risk assessments of the facility, system, and component; requirements derived from technical specifications or Operations Safety Requirements (OSR's); and operating experiences and maintenance history. They address the following DOE Order 4330.4B requirements:

*Requirement*: (1) The structures, systems, and components included, using a graded approach and the requirements derived from Operational Safety Requirements.

*Discussion*: Chapter 11, defines Operational Safety Requirements. The B Plant/WESF Master Equipment List (MEL) and Safety Equipment List (SEL) define the included structures, systems, and components. B Plant has prepared an Interim Safety Basis to replace the process based Safety Analysis Report (SAR). WESF is currently operating to an approved SAR.

*Requirement*: (2) The management systems used to control maintenance activities, including the means for monitoring and measuring the effectiveness of the program and the management of maintenance backlog.

*Discussion*: B Plant/WESF maintenance activities are managed and controlled in accordance with WHC-CM-1-8, "Work Management." WHC-CM-1-8 includes means for monitoring and measuring program effectiveness and backlog management through the Job Control System (JCS).

*Requirement*: (3) The assignment of responsibilities and authority for all levels of the maintenance organization.

*Discussion*: The Work Control Manager is responsible for maintaining a trained, qualified staff to support the maintenance needs of B Plant/WESF. The First Line Maintenance Manager is responsible for directing field work activities.

*Requirement*: (4) Mechanisms for feedback of relevant information, such as trend analysis and instrumentation performance/reliability data, to identify necessary program modifications.

*Discussion*: Addressed in WHC-CM-1-8.

*Requirement*: (5) Provisions for identification, evaluation, and correction of possible component, system design, quality assurance, or other relevant problems.

*Discussion*: Addressed in WHC-CM-1-8.

*Requirement*: (6) Performance indicators and criteria to be utilized to measure equipment, systems, and personnel effectiveness in maintenance activities.

*Discussion*: Addressed in WHC-CM-1-8.

*Requirement*: (7) Interfaces between maintenance and other organizations (i.e., operations, engineering, quality, training, environment, safety, and health).

*Discussion*: Defined in WHC-CM-5-6, *B Plant Administration*.

*Requirement*: (8) A self-assessment program to monitor the effectiveness and efficiency of the maintenance program.

*Discussion*: A self assessment program has been developed for B Plant/WESF maintenance. This self-assessment program is to be utilized at B Plant/WESF on an as needed basis to evaluate the maintenance program. Assessments of the maintenance activities are performed when deemed appropriate or when major changes to maintenance policy and practice so warrants or as required by the Order (every two years).

*Requirement*: (9) Provisions for planning, scheduling, and coordination of maintenance activities.

*Discussion*: Addressed by WHC-CM-1-8 and the JCS.

## 3.3 Graded Approach Strategy

"Graded Approach" is defined as the depth of detail required for implementation and the magnitude of resources expended for a particular maintenance management element. The USQ screening identifies graded approach potential for B Plant. This is not applicable to WESF.

### 3.3.1 Overall Strategy and Basis

A graded approach. as it pertains to B Plant, is used to identify the depth of detail and the level of commitment required to ensure safe and reliable operations, environmental compliance, programmatic mission, and facility preservation. Personnel and public safety, availability of funding, operational safety/reliability, environmental safety/compliance, safeguards and security, programmatic mission, and other facility specific requirements are to be considered when work is prioritized and performed.

At B Plant/WESF an MEL and an SEL have been developed to provide designation and categorization of equipment and components as they apply to safe operation and shutdown of the facility. The MEL and SEL are maintained to ensure all appropriate equipment has been identified. Maintenance activities initiated and procedures developed as a result of the safety classification ensure appropriate levels of maintenance are applied.

### 3.3.2 Strategy for Safety Related Items

System and equipment safety classification and risk categories are assigned in accordance with established Westinghouse Hanford procedures and criteria. The philosophy for assignment of work priorities and allocation of resources to facility maintenance activities is for correction of discrepancies having a direct impact on facility and personnel safety prior to maintenance on items not required for safe operation, or on items considered enhancements or plant betterment.

WHC-CM-3-5, "Document Control and Records Management Manual", Section 12.7, "Approval of Environmental, Safety, and Quality Affecting Documents" provides guidance for organizational approval requirements for maintenance activities.

# 4.0 DOE ORDER 4330.4B CHAPTER II REQUIREMENTS

## 4.1 Evaluation of Compliance Elements

The Hanford Site has existing programs and administrative guidelines providing for control and implementation of a maintenance program conforming to DOE Order 4330.4B. Maintenance activities at B Plant/WESF are performed in accordance with these existing documents and procedures. This Maintenance Improvement Plan correlates the DOE requirements to the existing program, and where appropriate defines any special maintenance program deviations and/or special program activities analogous to B Plant.

## 4.2 Maintenance Organization and Administration

The organization and administration of the maintenance function ensures a high level of performance is achieved through effective implementation and control of maintenance activities. Facility policies reflect striving for excellence in facility maintenance and operation.

### 4.2.1 Maintenance Organization Policies

*Objective*: To establish and communicate policies, procedures, and standards for the administration, implementation and control of maintenance activities.

*Discussion*: The B Plant/WESF Facility Director is responsible for both maintenance and operational activities at B Plant/WESF. The required maintenance activities are accomplished by the maintenance organization working through the plant work control center.

The Work Control manager and the Maintenance manager provide for the necessary interface within the maintenance organization and to other external organizations involved in maintenance activities. The Plant Surveillance Operations manager is responsible for scheduling and prioritization of maintenance activities. All maintenance is performed per the requirements of applicable site procedures, the JCS program, and standards for the maintenance department.

*Improvement:* The B Plant maintenance program uses existing WHC programs and policies. Existing maintenance policies are in place and a need for any additional policies has not been identified at this time. The Maintenance manager reviews the maintenance program and determines if any changes are necessary to the program. Applicable documents are revised as any additional requirements are identified.

## 4.2.2 Maintenance Strategy

*Objective:* To establish an integrated approach (including all affected organizations) in performance of maintenance activities which uses strategic planning to establish specific goals for the maintenance program.

*Discussion:* **Working Relationships**

The Maintenance manager supervises maintenance activities and coordinates any interface activities between cross discipline organizations required while performing maintenance.

Control of maintenance activities is performed by the Work Control Center and the JCS as directed by the operations and maintenance organization.

*Discussion:* **Long Range Planning**

The Facility Director is responsible for reviewing long-range planning of major maintenance activities and facility outages, as applicable. A scope for funding and staff resources to meet the needs of the maintenance program is provided for through budget requests and additional funding as required.

The Maintenance and Work Control managers monitor staffing and resource requirements to assure all maintenance tasks can be supported. If any additional training is required to support a task, the Maintenance manager allocates time for training identified on the training matrix (TMX).

The Maintenance manager reviews scheduling requirements of facility activities to ensure adequate staffing is available during periods of anticipated facility needs. The Maintenance manager also provides justification for additional personnel and training to higher management.

*Improvement:* A program identifies and establishes long-range goals for Maintenance. The current program meets the intent of DOE Order 4330.4B.

## 4.2.3 Staffing Resources

*Objective:* To assemble and maintain a maintenance organization staff selected to prescribed qualification criteria commensurate with the facility mission(s), and maintaining the level of skill for maintenance personnel through training and incentive programs.

*Discussion:* The Maintenance manager screens personnel to assure the skill level of the individual craftsman is commensurate with the risk and complexity of the assigned activities. The

Maintenance manager provides for assessment of maintenance personnel in accordance with existing site procedures.

A periodic review of maintenance personnel training and performance is performed by the Maintenance manager using the TMX.

The qualifications for maintenance personnel are defined by existing site procedures and ensure personnel are trained and capable of performing work at nuclear facilities.

The Maintenance, Work Control, and Surveillance Operations managers review staff augmentation requirements to support outages and assigns individuals to review the qualifications of augmentation personnel to assure they adequately provide the necessary and timely support to the facility.

The Work Control manager and the Maintenance manager review personnel performance and productivity, along with manager recommendations, to ensure qualified maintenance personnel are utilized. Training designed to assist individuals in career progression assignments and activities is made available through existing WHC training programs.

*Improvement:* Current personnel resource requirements are being met. If additional resources are required, the Maintenance manager obtains temporary support for ICF KH or other WHC organization so appropriate resources are available.

### 4.2.4 Goals, and Objectives

*Objective:* Establish maintenance goals to monitor maintenance activity progress, detect development of trends (favorable and unfavorable),improve performance, create a safe working environment, and measure the overall maintenance program effectiveness.

*Discussion:* Maintenance goals and objectives are defined for the maintenance organization through milestones, schedules, and system performance requirements. B Plant/WESF is committed to supporting the goals and objectives of the maintenance organization.

*Improvement:* Specific goals for the maintenance department and established performance indicators for continued monitoring are periodically reviewed and updated for B Plant.

### 4.2.5 Accountability

*Objective:* To monitor personnel in the performance of their assigned responsibilities and administer recognition or disciplinary actions as appropriate to individual performance.

*Discussion:* Existing site procedures provide for performance reviews and critiques of maintenance personnel. Maintenance supervision and other facility organizations perform this task on a timely basis.

*Improvement:* The existing WHC program satisfies the intent of the DOE order. Periodic reviews are performed and additional requirements are identified and incorporated into the performance feedback and performance appraisal program.

## 4.3 Training and Qualification

A maintenance training and qualification program consistent with DOE Orders 5480.20A, and 5480.18A are established and controlled by the Training Implementation Matrix (TIMs). Maintenance personnel are trained and qualified under the Maintenance training program requirements.

### 4.3.1 Responsibilities

*Objective:* Establish a maintenance training program with a clear definition of requirements and responsibilities for development and implementation. Program development includes input from maintenance and Engineering managers and be closely coordinated with the training organizations.

*Discussion:* The responsibility for establishing, maintaining, and implementing the maintenance training is defined in the TMX. The Maintenance manager is responsible for coordinating the training program between the Maintenance organization and the B Plant Training organization.

*Improvement:* The existing WHC program satisfies the intent of the DOE Order. Periodic review is performed and any enhancements made.

### 4.3.2 Maintenance Training Programs

*Objective:* Maintenance training programs include courses for all functional aspects of the maintenance activity (e.g., management, supervisory, work control, operations, planning, engineering, support functions) goals for the maintenance program.

*Discussion:* Maintenance training programs pertaining to managerial, supervisory, planner/scheduler, engineering, warehousing, craft positions, contractor personnel, and other positions, as deemed necessary, are accomplished in accordance with TMX.

*Improvement:* The current program satisfies the intent of the DOE Order. Personnel training records are reviewed and any additional training is provided.

4.3.3 Training Schedules and Support

*Objective*: Training lessons are provided compatible with an individual's skills and abilities. Activity based schedules are coordinated between Maintenance managers and training organizations to ensure availability of instructors, facilities, and support requirements, as well as availability of trainees.

*Discussion*: The Maintenance manager ensures training implementation is coordinated between the maintenance and the training organization, and the Training Coordinator to prepare training schedules, determine attendance, and ensure qualified instructors are available to teach the courses.

*Improvement:* The current program satisfies the intent of the DOE Order. The Maintenance manager reviews the training records and schedules any additional required training.

4.3.4 On-the-Job Training

*Objective*: Formal OJT programs defining specific requirements for final qualification of personnel are being developed. The OJT program is conducted by qualified OJT trainers in accordance with approved training plans.

*Discussion*: An informal program of on-the-job training (OJT) is in existence. As equipment is identified for OJT the Maintenance manager ensures personnel satisfactorily complete OJT prior to being assigned work on that equipment.

*Improvement:* The B Plant OJT program is evolving on an as-needed basis as it is determined what equipment and which facility items need additional OJT requirements. This training is implemented and controlled by the Maintenance manager.

4.3.5 Qualifications

*Objective*: Maintenance management review training records and verify that all appropriate testing and/or interviews have been successfully completed before qualification of individuals for a given task.

*Discussion*: The Maintenance manager establishes adequate records to verify qualification standards and evaluation methods to guarantee trainee competence.

The Maintenance manager is directly involved in approving and periodically reviewing the maintenance training program.

*Improvement:* The program for the Maintenance organization complies with existing DOE Order requirements. B Plant management

continues to periodically monitor this program for conformance. There is no improvement required at this time.

4.3.6 Training in Root Cause Analysis

*Objective*: An appropriate number of individuals are trained in principles and methods of root cause analysis and various approaches to cause and effect analysis. Individuals are able to support maintenance needs and schedules.

*Discussion*: Representative WHC Maintenance managers, supervisors and others trained in the principles and the methods of root cause analysis are called upon to perform this service. When needed, this team assembles and provides an independent determination of cause and effect. Personnel from other WHC organizations with the requisite training are called upon when necessary. Results are documented and a resolution is presented for further review.

*Improvement*: The Maintenance program complies with existing DOE Order requirements. B Plant has personnel trained in root cause analysis made available to them through other WHC organizations when required. Additional B Plant personnel are used on an as-needed basis. B Plant management continues to periodically monitor this program for compliance. There is no improvement required at this time.

4.3.7 Training Program Approval, Effectiveness, and Feedback

*Objective*: The Maintenance manager participates in the review and approval of the maintenance training program. Performance of maintenance personnel is monitored for evaluation of training effectiveness, and personnel feedback is used in the effectiveness evaluation.

*Discussion*: The Maintenance manager is responsible for systematically reviewing training programs to ensure trainees develop the required skills and knowledge. The B Plant Training department uses level 1 (class participants) and level 2 (independent evaluation with follow-up) evaluations.

*Improvement*: The existing program satisfies the intent of the DOE Order.

4.3.8 Management and Supervisory Training

*Objective*: A formalized program is in place to develop and maintain management and supervisory skills. Training provided addresses topics (e.g., personnel interfacing, communications, assessments) necessary for effective management and team building. The training program considers support of career progression for entering the supervisory and management field.

*Discussion:* The training department provides management and supervisory training including generic areas such as managerial and supervisory skills, accountability, assessment and observation of routine activities, communication skills, teamwork, and company management philosophies. Position-specific training is provided to first-line supervisors. All training is conducted in accordance with WHC-CM-2-15.

*Improvement:* A review of management and supervisory training is performed, and any additional training identified. Present training conducted by the training department is sufficient to meet the requirements of the DOE Order. No improvement is required at this time.

## 4.4 Maintenance Facilities, Equipment, and Tools

Maintenance facilities, equipment, and tools efficiently support facility maintenance and maintenance training.

### 4.4.1 Facilities

*Objective:* Shop facilities are designed with a high consideration of industrial safety and convenience to the activities they support. Appropriate environmental control systems are provided, adequate support equipment, storage and lay-down areas are available, and controls are in place for facility use.

*Discussion:* **Shops and Satellite Work Areas**

Six maintenance shops are provided for personnel and maintenance activities at B Plant. These shops are equipped with electrical power and pneumatic supplies for bench testing and troubleshooting. The shops are multi-disciplined and support all maintenance personnel. Storage is provided in the work area for tools and test equipment. Specialized tools and test equipment is located in the shop unless size limitations require external facilities or areas. The Maintenance manager assesses shop size and if needed, additional space will be provided by satellite buildings or in other areas.

The Maintenance manager is responsible for assuring shop layout and design is conducive to a safe and efficient working environment.

The amount and type of work being performed in the shop area is normal day-to-day repair and servicing. Any specialized work requiring additional environmental controls (e.g., welding, machining, high voltage, radiation control) is performed at specific designated areas. The Maintenance manager assesses work and determines where and under what controls the work is performed. Additional satellite work

areas and stations will be provided for once a need is determined and funding becomes available.

*Discussion:* **Lay-down and Staging Area**

Lay-down and staging areas are provided by the facility manager once a need for these areas becomes apparent. These areas are segregated according to radiological controls, hazardous materials, application, security requirements, and any other consideration. All areas are clearly marked and administratively controlled.

*Discussion:* **Storage Facilities**

Storage facilities for supplies and parts are provided for within the facility and on the facility grounds.

Specialized storage for radiological control is identified and controlled through HSRCM-1, "Hanford Site Radiological Control Manual."

Storage of flammable and hazardous materials is performed in accordance with WHC-CM-4-3, "Industrial Safety Manual," and other existing site procedures.

*Discussion:* **Temporary Facilities**

No temporary facilities are in use at this time, but may be provided on an as-needed basis.

*Discussion* **Decontamination Facilities**

Decontamination of equipment and tools is performed on an as-needed basis. All contaminated equipment and tools is controlled by HSRCM-1.

*Improvement:* Present facilities are sufficient to meet requirements of the DOE Order. No improvement is required at this time.

## 4.4.2 Tool and Equipment Storage

*Objective:* Storage facilities are in appropriate proximity to shops and work areas to support maintenance efficiency. Appropriate environmental controls are in place for personnel and equipment protection.

*Discussion:* Tool and equipment storage is provided for by the Maintenance organization. Special tool and equipment storage has been identified. The Maintenance manager addresses any need for additional storage space to the facility manager. The facility manager evaluates the need, and if appropriate, provides the maintenance department with additional storage facilities.

*Improvement:* Spare material and hand tool storage was consolidated in the tool crib on the first floor of the office and storage building. Tool and equipment storage is sufficient to meet the DOE Order requirements. No improvement is required at this time.

### 4.4.3 Office Equipment

*Objective:* Office equipment necessary to support an efficient maintenance program is available (e.g., furniture, computers, communications, reproduction).

*Discussion:* Adequate communication, calculation, reproduction, and other office equipment is provided by B Plant facility management.

The Boeing Computer Services (BCSR) ensures adequate terminal and interface hardware are provided at B Plant. LAN systems and file server requirements are provided.

*Improvement:* Office equipment is sufficient to meet DOE Order requirements. No improvements required at this time.

## 4.5 Types of Maintenance

A proper balance of corrective and preventative maintenance should be employed to provide a high degree of confidence facility equipment degradation is identified and corrected, that equipment life is optimized, and the maintenance program is cost effective.

### 4.5.1 Master Equipment List

*Objective:* Develop and maintain an MEL for use in identifying equipment safety classifications and maintenance program scope, and development of the equipment history file.

*Discussion:* The facility is currently developing a limited MEL based on an existing essential equipment list. The current list is system based and addresses only those systems essential for safe operation of the facility. In the interim, the SEL will be used.

Special tools and equipment are included in the Safety Equipment List as required. The cognizant engineer reviews any additions to the MEL and controls additions through the ECN program.

*Improvement:* An MEL that supports current and future operational requirements for B Plant and WESF will be developed and implemented.

## 4.5.2 Types of Maintenance

*Objective*: Develop a maintenance program that establishes an appropriate, and cost effective, balance of preventive, predictive, and corrective maintenance to minimize equipment downtime and provide a high degree of confidence that facility equipment degradation is identified and corrected.

*Discussion*: **Corrective Maintenance**

Maintenance personnel perform corrective maintenance activities in accordance with existing site procedures. Corrective maintenance is documented and controlled in accordance with WHC-CM-1-8, "Work Management." Feedback to the cognizant engineer is through the JCS program and maintenance supervision. The cognizant engineer evaluates the preventive maintenance program for effectiveness and changes it where necessary.

*Discussion*: **Preventive Maintenance**

The Maintenance manager implements an effective preventive maintenance program including systems and equipment affecting safe and reliable facility operation. As part of the maintenance surveillance program, the Maintenance manager ensures functional tests of installed equipment and/or systems (such as standby equipment or non-operating equipment scheduled for rotation) are conducted and documented. This is performed as part of post-maintenance testing activities and documented on the JCS.

Preventive maintenance is performed at predetermined and scheduled intervals, as prescribed by the cognizant engineer, and seeks to maximize equipment availability. Preventive maintenance documentation provides a record of activities performed, data collected, and, where appropriate, the "as-found" and "as-left" condition of the equipment, and supplies this information to the JCS and Component Based Recall System.

The Maintenance organization acquires trending data as part of the maintenance surveillance program for long-term performance evaluations, such as bearing temperatures, pump speed, and vibration data.

The cognizant engineer is responsible for determining the type of PM and the frequency for performance.

*Discussion*: **Predictive Maintenance**

Through the JCS status and equipment history records, the need for preventive maintenance is identified in advance of equipment failure. The Maintenance manager has a program of data gathering that provides information for analysis,

trending, and actions needed in advance of equipment failure.

The predictive maintenance program uses the equipment history program and provides information to the preventive maintenance program. B Plant's own predictive maintenance program is currently being developed. Maintenance personnel are being trained to perform vibration analysis and thermal analysis with their own predictive maintenance equipment.

The cognizant engineer analyzes and reviews predictive maintenance data to ensure the data collected may be successfully used to predict and address incipient failures.

*Improvement:* Incorporate predictive maintenance as a critical part of the PM program and provide a system for analyzing problems identified in PM procedures. Problem identification causes appropriate modifications and upgrades to the program.

### 4.5.3 Maintenance Action and Frequency Selection

*Objective:* Maintenance frequencies are established to satisfy code and specification requirements, and to ensure optimum equipment operating life and performance.

*Discussion:* The balance between preventive maintenance and corrective maintenance is being considered. Preventive maintenance frequency is determined by engineering based on safety class manufacturer's recommendation, past performance, and engineering judgment.

*Improvement:* Revise the current preventive maintenance schedule system so that critical structures, systems, and components listed in the MEL are evaluated based on the consequence of failure. Revise existing preventive maintenance procedures so they will reduce the amount of corrective maintenance required for specific pieces of equipment. Provide documentation that supports preventive maintenance frequencies that are different from the manufacturer recommendations.

### 4.5.4 Scheduling

*Objective:* Preventive maintenance activities are scheduled according to assigned frequencies and in conjunction with corrective maintenance of the same equipment or with other activities related to the equipment.

*Discussion:* Preventive maintenance procedures are scheduled individually according to assigned frequencies. They are tracked to completion as part of the daily schedule feedback process. Outage scheduling is used at this plant.

*Improvement:* The preventive maintenance scheduling is sufficient to meet the requirements of the DOE Order.

## 4.6 Maintenance Procedures

Maintenance procedures and other work-related documents (e.g., drawings and instructions) are prepared and used to provide appropriate work direction and to ensure that maintenance is performed safely and efficiently. A balance of written guidance, craftsman's skills, and work-site supervision (graded approach) is required to achieve the quality workmanship essential to safe and reliable facility operation.

### 4.6.1 Procedure Development and Writing

*Objective*: Procedures are provided for performance of maintenance activities to any facility or equipment component designated as safety-related, has complex maintenance tasks, is beyond the skills possessed by the craftsman, or that presents a personnel or equipment hazard.

*Discussion*: The B Plant manager establishes guidelines for when a procedure needs to be developed to support testing. Procedures are developed by facility engineering and the cognizant engineer, or by other WHC procedure development resources. The procedures are used for all work that could result in a significant process transient, degraded facility reliability, personnel or equipment hazard, or when the complexity of the work deems a procedure appropriate. Procedures also define preventive maintenance activities.

The Maintenance manager ensures all procedures are developed and formatted in accordance with site standards, and departmental desk instructions.

*Improvement:* Maintenance procedures for preventive, predictive, and corrective maintenance are developed. Procedures have been developed, using the graded approach for B Plant, before associated maintenance activities are to be performed. Periodic assessment of procedure use based upon recall is performed and any unnecessary maintenance procedures identified and the appropriate action taken. A recent program review was performed and there is an action plan to bring procedures into compliance with WHC-CM-3.5, Section 12.5, "Technical Procedure Standard."

### 4.6.2 Procedure Verification

*Objective*: Procedures are reviewed for format and technical accuracy. Format used incorporates human factors principles and other administrative policies. Reviews are conducted by other than the procedure writer.

*Discussion*: The Maintenance manager ensures all procedures are verified in accordance with WHC-CM-3-5, *Document Control and Records Management Manual*, Section 12.7, "Approval of Environmental, Safety, and Quality Affecting Documents."

*Improvement:* A recent program review was performed and there is an action plan to bring procedures into compliance with WHC-CM-3.5, Section 12.5, "Technical Procedure Standard."

4.6.3 Procedure Validation

*Objective:* Procedures are reviewed for usability and correctness to ensure sufficient and understandable instructions are provided and are compatible to the equipment and task specified.

*Discussion:* The Maintenance manager ensures all procedures are field validated in accordance with WHC-IP-1140 and WHC-CM-1-8.

*Improvement:* A recent program review was performed and there is an action plan to bring procedures into compliance with WHC-CM-3.5, Section 12.5, "Technical Procedure Standard."

4.6.4 Procedure Approval

*Objective:* Procedures are reviewed to applicable specifications and administrative procedures, and are approved by appropriate levels of management.

*Discussion:* The Maintenance manager and Facility Engineering ensure all procedures are approved in accordance with WHC-CM-3-5, Section 12.7.

*Improvement:* All procedure approvals are made in accordance with WHC-CM-3-5, Section 12.7. There are no improvements identified or required at this time.

4.6.5 Procedure Use

*Objective:* Procedure control is established ensuring availability and currency of the procedures to be used. Procedure compliance requirements are clearly stated, communicated, and understood by users.

*Discussion:* The Maintenance manager and the JCS ensure procedures used in the field are the most current and correct revision for use. Maintenance issues and controls maintenance procedures per existing plant procedures.

The Maintenance manager ensures a graded approach is used to provide the need for work procedures used by the maintenance organization and in accordance with the requirements of WHC-IP-1140 and WHC-CM-1-8.

The Maintenance manager ensures all procedures are changed and revised in accordance with WHC-IP-1140.

*Improvement:* A recent program review was performed and there is an action plan to bring procedures into compliance with WHC-CM-3.5, Section 12.5, "Technical Procedure Standard."

## 4.7 Planning, Scheduling, and Coordination of Maintenance

An effective system for planning, scheduling, and coordinating maintenance activities are implemented in order to ensure that maintenance is accomplished in a timely manner, improve maintenance efficiency, reduce radiation exposure, and increase equipment availability.

### 4.7.1 Planning for Maintenance Activities

*Objective:* Establish a planning program that provides work instructions, identifies resource requirements, and coordinates support functions.

*Discussion:* **Planning Group Organization**

The planning activities for B Plant is performed by the Work Control group and the Maintenance organization utilizing the JCS in accordance with WHC-CM-1-8, *Work Management*.

*Discussion:* **Planning Group Responsibilities**

The Work Control group is responsible for all planning activities at B Plant. The planning organization performs work activities in accordance with existing site procedures.

*Improvement:* The JCS and applicable site procedures comply with the DOE Order. As upgrades and enhancements to the JCS and applicable site procedures are implemented, changes are made to maintenance procedures and practices to reflect those changes.

### 4.7.2 Scheduling Maintenance Activities

*Objective:* All maintenance activities are performed using a clearly defined schedule, supported by all affected organizations, tracked to maintain status, and performed according to priorities established by operations.

*Discussion:* **Control of Work Backlog**

The Operations managers expedite work packages to assure work is performed on schedule. Work backlog is tracked and controlled within the JCS in accordance with the requirements of WHC-CM-1-8, *Work Management*. The Operations manager is responsible for reviewing Backlog work status and problem areas. The scheduling of work packages and work activities is performed through the JCS, the Work Control Group, and the Operations manager.

B Plant JCS activities are performed in accordance with applicable sections of WHC-CM-5-6, *"B Plant Administration"*.

*Discussion:* **Work Priority**

The Work Control Group assigns work priorities on the basis of safety and operational requirements, using the graded approach. This is controlled by the requirements of WHC-CM-1-8, *"Work Management."*

The facility manager may increase specific task work priority if deemed necessary and appropriate.

The Plan-of-the-Month, Plan-of-the-week, and Plan-of-the-Day are used for integrating work priorities with the long range schedule.

*Improvement:* The present work backlog process needs improvement to assure prioritization of backlog to meet the intent of the DOE Order.

### 4.7.3 Coordination of Maintenance Activities

*Objective:* Coordinate maintenance activities to ensure that work can be effectively accomplished.

*Discussion:* Routine planning meetings are held to ensure coordination of activities. The Maintenance manager provides the necessary supervision to assure all maintenance activities are performed in cooperation and coordination with other departments.

*Improvement:* The current process meets the requirements of the applicable DOE Orders.

### 4.7.4 Outage Planning, Scheduling, and Coordination

*Objective:* Establish program for identifying maintenance activities to be performed during a defined facility or equipment outage and develop schedule for planning and performance of those activities.

*Discussion:* Outage planning is applied to critical safety systems based on backlog of work packages.

*Improvement:* There is no improvement required at this time.

## 4.8 Control of Maintenance Activities

Management directed and delegated involvement in control of maintenance activities ensure maintenance practices are effective in maintaining safe, efficient, and reliable facility operation.

4.8.1 Work Control Procedure

*Objective*: Work control is accomplished in accordance with a formal program which defines the requirements and controls for performing work. The program is used to identify all facility deficiencies, modifications, preventive maintenance and surveillance testing, avoid redundant identification of deficiencies, and post-maintenance activities.

*Discussion*: WHC-CM-1-8 is the administrative procedure describing work control requirements. Additional work control requirements are provided for in WHC-CM-5-6.

*Improvement:* The WHC administrative policies and procedures applying to work control are adequate to comply with the DOE Order. There is no need for improvement at this time. Periodic review of the program is performed and any cost effective changes or enhancements will be made to the work control program as required.

4.8.2 Work Request

*Objective*: All maintenance activities performed are controlled by the facility work control program. Work request documents clearly define work to be performed, equipment on which work is to be performed, pre- (and post-) requisites, and documentation requirements. Work requests are reviewed by affected organizations before release for work and upon completion of work.

*Discussion*: The work request process is controlled through the application of the JCS program in accordance with WHC-CM-1-8.

Work requests are reviewed in accordance with the requirements of WHC-CM-1-8 and WHC-CM-3-5, Section 12.7.

*Improvement:* The present JCS complies with the DOE Orders. Periodic reviews ensure the present system remains in compliance with DOE Orders and site policies.

4.8.3 Supervision of Maintenance Activities

*Objective*: Maintenance managers routinely monitor work in progress to ensure maintenance activities are conducted in accordance with facility procedures and work package instructions. Problems observed are analyzed and feedback is provided to prevent recurrence.

*Discussion*: Maintenance managers and supervisors routinely monitor work in progress to help ensure maintenance activities are conducted in accordance with DOE and Site policies and procedures, per WHC job descriptions and standard industry practice.

*Improvement:* The present supervisory and management overview of work activities complies with the DOE Orders. Periodic review and re-assessment is performed to assure compliance is maintained.

4.8.4 Review of Completed Work Requests

*Objective:* Completed work packages are reviewed to verify all work items, including post-maintenance testing and inspections, have been completed in an acceptable manner before returning system or equipment to service.

*Discussion:* When maintenance work is performed, the Operations manager compares the rework performed to the post-maintenance testing or inspection result to determine work is acceptable prior to returning the equipment or system to normal service.

The cognizant engineer, Operations, and/or Maintenance manager may request post-maintenance testing in addition to post-maintenance tests already specified on the work package if the scope of the work performed deems additional retesting.

The PIC and Operations recommends closure of the work package after review.

*Improvement:* The present program and policies affecting completed work packages complies with the intent of the DOE Order 4330.4B. Periodic reviews of the program are performed to ensure continued compliance.

4.8.5 Temporary Repairs

*Objective:* Temporary repairs are accomplished and controlled to the same level as permanent repairs.

*Discussion:* Temporary changes and modifications are performed in accordance with the requirements of WHC-CM-6-1, *Standard Engineering Practices*, and JCS. Temporary repairs or changes are converted to permanent repairs or official design modifications in a timely manner, as required by applicable site procedures.

*Improvement:* The present program for changes complies with the DOE Order. There is no need for improvement at this time. Periodic reviews are performed to ensure continued compliance.

4.8.6 Control of Nonfacility Contractor and Subcontractor Personnel

*Objective:* Nonfacility contract and subcontract personnel who perform maintenance or modification work on B Plant facility systems

are qualified for the work performed and trained in accordance with access requirements.

*Discussion*: Site procedures provide for access control and general employee training of contractor and subcontractor personnel. The Operations organization assures any additional training required for contractor or subcontractor personnel is performed and documented in accordance with site procedure. Qualification of contractor personnel is certified by the contractor; and verified and documented by the cognizant engineer before commencement of work activities.

*Improvement:* This existing policy is adequate to meet the intent of the DOE Order. Periodic reviews and assessments are performed to ensure this policy is in compliance with DOE Orders and site policies.

## 4.9 Post-Maintenance Testing

Post-Maintenance testing is performed to verify components can fulfill their design function when returned to service after maintenance.

### 4.9.1 Post-Maintenance Test Requirements

*Objective*: The work completion and retest process at WHC addresses control and documentation of retest requirements. Work requests provide specific instructions for test and acceptance criteria when maintenance work is performed.

*Discussion*: Post-maintenance testing is conducted in accordance with WHC-CM-1-8 when maintenance work has been performed and when specified by the cognizant engineer or Operations. Most repair work performed does not require any post-maintenance testing other than an operability test, as applicable.

*Improvement*: Periodic review of post-maintenance testing is performed. Any identified problems are addressed and program changes implemented to correct any deficiencies. There is no need for improvement.

### 4.9.2 Post-Maintenance Test Program Scope

*Objective*: All maintenance activities are reviewed for applicability of post-maintenance testing and appropriate testing instructions (and acceptance criteria) are provided.

*Discussion*: Post-Maintenance testing at B Plant is performed when the work instructions specify the requirement.

*Improvement*: Periodic review of post-maintenance testing is performed. Any identified problems are addressed and program changes implemented to correct any deficiencies. There is no need for improvement.

4.9.3 Post-Maintenance Test Control

*Objective*: The work control program addresses control of post-maintenance testing that covers all conditions of single or multiple organization involvement and testing that is deferred until a later date.

*Discussion*: During work package closeout and review, retesting may be specified by operations before work package completion. If the retest can not be performed immediately and needs to be tracked, Work Control statuses and tracks the retest requirement per WHC-CM-1-8.

*Improvement*: Periodic review of post-maintenance testing is performed. Any identified problems are addressed and changes implemented to correct any deficiencies. There is no need for improvement.

4.9.4 Post-Maintenance Test Performance Documentation, and Acceptance

*Objective*: Post-maintenance testing is performed in accordance with approved work package instructions (or preventive maintenance procedure) and completion is documented.

*Discussion*: The JCS is used for documenting post-maintenance testing instructions unless specific test requirements are identified. Documentation is performed in accordance with work package closeout and WHC-CM-1-8 requirements. Test results are documented and retained as part of the maintenance history. All entries should be complete, legible and accurate.

Upon completion, the work package is reviewed for completion in accordance with WHC-CM-1-8 before closure.

*Improvement*: The existing program is adequate to meet the intent of the DOE Order. Periodic reviews and assessments are performed to ensure this program is in compliance with DOE Orders and site policies.

4.10 Procurement of Parts, Materials, and Services

Controls and assessment of procurement activities are used to help ensure that proper parts, materials, and services are purchased to support maintenance activities and to meet the requirements for safe and reliable facility operation.

4.10.1 Procurement Policy and Procedures

*Objective*: Policies and procedures are in place governing the procurement of parts, materials, equipment, and services. Personnel responsible for procurement activities are conversant to, and comply with, defined requirements.

*Discussion*: Mechanisms are in place to provide for the expeditious procurement of parts and material on a high priority basis when needed, as specified in WHC-CM-6-1 and WHC-CM-2-1, *Procurement Manual and Procedures*. WHC-CM-2-2, *Materials Management Manual*, prescribes methods to acquire replacement parts not available through the original supplier.

The Work Control Center or cognizant engineer is responsible for procurement of parts and materials associated with B Plant maintenance activities. The Maintenance manager is responsible for procuring parts associated with shop activities and equipment.

Equipment specified in the limited SEL is assessed for spare parts requirements and recommended spare parts procured in accordance with applicable procedures.

*Improvement*: The existing program is adequate to meet the intent of the DOE Order. Periodic reviews and assessments are performed to ensure this program is in compliance with DOE Orders and site policies.

4.10.2 Procurement Initiation

*Objective*: Procurement activities are conducted in a timely fashion. The procurement program addresses the pre-selection and qualification of procurement sources, spare parts inventory, and cross facility use of inventories.

*Discussion*: Lessons learned from experience, such as lead times, parts usage, and supplier reliability, are factored into materials management and included in existing site procedures.

Topics such as storage, in-storage preventive maintenance, and shelf-life requirements are addressed in WHC-CM-2-2.

Warehouse and procurement activities such as inventory, rotation, and other warehouse functions are specifically addressed in existing site procedures.

*Improvement*: The existing program is adequate to meet the intent of the DOE Order. Periodic reviews and assessments are performed to ensure this program is in compliance with DOE Orders and site policies.

4.10.3 Procurement Control

*Objective*: The procurement program provides for documentation and controls applicable to obtaining parts, materials, equipment, and services in accordance with the technical and quality requirements.

*Discussion*: The cognizant engineer approves any deviation from design specifications for parts or materials.

Warehouse personnel review material and parts activity to determine possible new additions to be included in spare parts or site stores catalog.

Procurement documents (WHC-CM-2-1) provide clear and adequate technical and quality assurance requirements consistent with design specifications.

Deficient or nonconforming items are resolved in an effective and timely manner as specified by procedure.

Quality assurance records are controlled and maintained per WHC-CM-3-5, Section 9 and WHC-CM-4-2 to provide documentation for qualified parts and materials and to ensure traceability. The QA department performs inspections or surveillances of suppliers according to QA requirements.

*Improvement*: The existing program is adequate to meet the intent of the DOE Orders. Periodic reviews and assessments are performed to ensure this program is in compliance with DOE Orders and site policies.

4.10.4 Services

*Objective*: A program for selection and procurement of service contracts is in place and a renewal process may be initiated to prevent periods of non-coverage. Service contracts include provisions for emergency or short notice support.

*Discussion*: Identification of the need for specialized services from vendors is made by the Maintenance and Engineering managers to provide for timely submittal of bidding on, and awarding of contracts.

*Improvement*: This area along with impacts are addressed in existing procedures. There is no need for improvement at this time. Periodic reviews are performed to ensure compliance.

## 4.11 Material Receipt, Inspection, Handling, Storage, Retrieval, and Issuance

All phases of receiving, inspecting, handling, storing, retrieving, and issuing equipment, parts, and materials for maintenance are covered by effectively implemented policies and procedures consistent with the Quality Assurance Requirements of the facility.

### 4.11.1 Receipt and Inspection

*Objective*: Receipt inspections of materials and equipment are performed before acceptance for use or storage, verifying items delivered conform to all procurement documentation requirements and are in good condition.

*Discussion*: WHC-CM-2-1, *"Procurement Manual and Procedures"* and WHC-CM-2-2, *"Materials Management Manual"* are prepared to specifically describe the responsibilities and techniques for receiving, inspecting, handling, storing, retrieving, and issuing equipment, parts, and materials.

Material is inspected per the requirements of WHC-CM-2-2 to ensure conformance to purchasing requirements prior to release for use and storage.

WHC-CM-4-2, *"Quality Assurance Manual"* specifies nonconforming items are identified with tags or labels and controlled to prevent unauthorized use.

*Improvement*: Site procurement and receipt inspection is presently require no improvement at this time. Review of specific application of site procedures to B Plant receipt inspection and storage are made periodically. No improvement is needed at this time.

### 4.11.2 Handling

*Objective*: Procedures are provided for items requiring special handling. Procedures include all information necessary to prevent damage.

*Discussion*: WHC site procedures/instructions are available for items requiring special handling.

Effective material procurement status is provided, including accurate stock records and tracking of purchase orders.

*Improvement*: There is no need for improvement at this time. Periodic review is performed to ensure compliance.

4.11.3 Storage Material and Equipment

*Objective*: Materials and equipment are stored in a manner to provide maximum protection, but remain readily available for issue. Safety-related equipment is segregated from non-safety items to prevent improper usage.

*Discussion*: Materials are stored, protected, and identified in accordance with WHC-CM-2-2, *"Procurement Manual and Procedures"* in a manner that provides ready availability for its intended use.

A shelf-life control program (WHC-CM-2-2) is provided for store items that are important for safe and reliable facility operation.

Safety related and non-safety related materials and equipment are segregated to prevent inadvertent use of the wrong category item.

The quality of stored equipment, parts, and materials are maintained in accordance with vendor information by appropriate means, such as environmental and shelf-life controls and preventive maintenance activities if necessary.

*Improvement*: No improvement is needed at this time. Periodic review is performed to ensure compliance.

4.11.4 Retrieval and Issuance

*Objective*: Parts, materials, and equipment removed from storage are handled to the same requirements applied at time of receipt. A stores inventory system is in place to identify available materials and equipment and is available to using organizations, such as planning and engineering.

*Discussion*: Parts and materials issued for installation are properly controlled per existing site procedures. Unused parts and materials are promptly returned to a controlled storage area. Completed work requests/orders document material traceability.

*Improvement*: Periodic review of the parts retrieval and issuance system is performed. Unused parts and materials are promptly returned to a controlled area identified by the Maintenance organization. At present the program complies with DOE Order 4330.4B and there is no need for improvement at this time.

## 4.12 Control and Calibration of Measuring and Test Equipment

The program for control and calibration of measuring and test equipment (M&TE) are consistent with quality assurance requirements of DOE 5700.6C to ensure accurate performance of facility instrumentation and equipment for testing, calibration, and repairs.

### 4.12.1 Identification

*Objective*: Establish a program for the assignment of a unique identification number for each item of M&TE which is permanently marked or attached to the equipment and a master M&TE equipment list for use in control of the equipment.

*Discussion*: All M&TE devices used at WHC have unique identification numbers accurately identifying the specific devices and provide positive traceability. A master list identifying all M&TE is developed and kept current by the WHC (Standards Lab) M&TE organization.

*Improvement*: There may be the need for specialized test and calibration equipment. The Maintenance manager and cognizant engineer review M&TE requirements and identify specialized M&TE needs. As these items are identified and their need is required, they are procured, tracked, and controlled through the existing M&TE program. Periodic review is performed to ensure program compliance to DOE Orders and site procedures. There is no need for improvement at this time.

### 4.12.2 Calibration

*Objective*: Calibration of M&TE at WHC is accomplished by qualified personnel using approved procedures and standards having full traceability to the National Institute of Standards and Technology or other nationally recognized standards. Standards utilized are maintained at designated controlled storage locations.

*Discussion:* **Calibration Standards**

The M&TE calibration program is based on standards traceable to a national standard or that are recognized standards unto themselves. All traceability, administrative controls and guidelines are in place as part of the WHC site M&TE program. Records are maintained at the standards lab.

*Discussion:* **Calibration Procedures**

Procedures contained in WHC-CM-4-2, *"Quality Assurance Manual"* are used to calibrate M&TE, control the performance of calibrations, provide repeatable calibrations, and meet acceptance criteria.

M&TE documentation includes records for accountability and traceability of use. A recall system is in place for recalibration of M&TE. This system is controlled by the M&TE Standards lab. All M&TE calibrations are performed through the administrative controls and requirements of the M&TE Standards lab.

*Discussion:* **Calibration Frequency**

A calibration frequency to maintain M&TE accuracy and availability is established through the WHC M&TE administrative program and WHC-CM-4-2, *"Quality Assurance Manual"*, section 12, "Control of instruments."

*Discussion:* **Functional Checks**

WHC site procedures recommend M&TE be functionally checked before use and this is performed on an as-needed basis by Maintenance personnel.

*Improvement:* The present program is in compliance with the DOE Order 4330.4B. Periodic review is performed to ensure program compliance to DOE Orders and site procedures. There is no need for improvement at this time.

4.12.3 **Control**

*Objective:* Control of M&TE is established to ensure equipment used to verify (calibrate) facility instrumentation operates properly.

*Discussion:* **Storage**

Control of M&TE is established by WHC-CM-4-2, Section 12,to ensure equipment used to verify (calibrate) facility instrumentation operates properly.

The facility has provided controlled storage, issuance, and calibration of M&TE. The Maintenance manager has identified storage areas.

Any M&TE with suspected or actual deficiencies are segregated and marked to prohibit its use as required by existing site procedure.

*Discussion*: **Uncalibrated M&TE**

Any new M&TE devices are calibrated prior to use. Uncalibrated M&TE for taking data at WHC facilities are clearly identified and their use is strictly controlled by facility and site procedures.

*Discussion*: **M&TE with Limited Use**

M&TE devices not fully calibrated or usable are clearly marked to indicate their limitations and are not issued for quality work at WHC. This program is also adhered to.

*Discussion*: **Issue and Recall**

Log IN/OUT sheets are kept for traceability by the M&TE custodian at B Plant M&TE issue. The Standards Lab has administrative procedures in place for notification of calibration due dates and M&TE recall. M&TE usage is tracked by the Maintenance organization using the work request or on the calibration data sheet, if applicable.

*Discussion*: **Contaminated M&TE**

Contaminated M&TE is controlled per existing safety and radiological guidelines at WHC. Contaminated M&TE is strictly controlled to minimize the spread of contamination.

*Improvement*: The Maintenance manager reviews the M&TE program periodically for compliance. There are no improvements identified or required at this time.

## 4.12.4 Evaluation

*Objective*: Usage of M&TE is controlled and evaluated to ensure proper utilization, impact/consequence of out-of-tolerance equipment use, and equipment reliability.

*Discussion*: **Out-of-Calibration and Defective M&TE**

M&TE devices found out of calibration or defective receive timely evaluations to determine the validity of all measurements/tests for which they were used. This is accomplished through the review of history files controlled through the Preventive maintenance Program (PMP) program.

*Discussion*: **Performance Trending**

Results of M&TE calibrations are trended by the standards lab and the cognizant engineer, and corrective actions are determined for M&TE reliability problems.

*Improvement*: The maintenance program uses existing WHC programs and policies. The determination for M&TE program improvement is made during routine program assessments. There are no improvements identified or required at this time.

## 4.13 Maintenance Tools and Equipment Control

Procedures are in place to provide for storage, issuance, and maintenance of an adequate and readily available supply of tools and equipment, and also for the development of special tools and equipment needed in the maintenance program.

### 4.13.1 Storage and Issuance

*Objective*: To ensure that an adequate supply of hand tools, common power tools, and equipment is readily available, properly stored, and controlled.

*Discussion*: The Maintenance Manager has overall responsibility for assuring facilities have proper tools to perform maintenance activities and that they are stored properly. The Maintenance manager or designee reviews the B Plant MEL and determines the need for specialized tools and/or equipment. Any specialized requirements are identified and required equipment is procured. Specialized equipment is stored near the work site. The tool crib is used to maintain the tool inventory.

The *"Safety Manual"*, WHC-CM-1-10 identifies controls for disposition of worn and defective tools. The Maintenance organization complies with site guidelines.

*Improvement*: The Maintenance manager reviews the B Plant/WESF MEL and determines the need for specialized tools and/or equipment. There is no need for enhancements or improvements in the program at this time.

### 4.13.2 Tool and Equipment Maintenance

*Objective*: Tools and support equipment are included in the preventive maintenance program to maintain a safe use condition and to provide necessary care to maintain its service life.

*Discussion*: Maintenance tools and other support equipment used at B Plant, if cost effective, are included in the preventive maintenance program.

*Improvement*: Existing WHC programs and policies provide for the care and servicing of tools and support equipment. This program is periodically assessed for effectiveness and completeness. Any required improvements are identified and appropriate corrective actions taken. No program improvement is required at this time.

4.13.3 Use of Special Tools and Equipment

*Objective*: Special tools and equipment are available and are clearly marked for their intended use. Work packages include necessary instructions for the proper use of special tools and equipment.

*Discussion*: Special tools, test rigs, special equipment, lifting and rigging equipment, and mockups required for maintenance activities at B Plant, are identified for their intended use by the Maintenance organization.

Specific Instructions to control the use of lifting and rigging equipment in DOE-RL-92-36, *Hanford Site Hoisting and Rigging Manual*. The Maintenance organization complies with these guidelines.

*Improvement*: Continuing assessments determine the requirements and the need for specialized tools and equipment. There is no need for improvement at this time.

## 4.14 Facility Condition Inspection

Management, work teams, and oversight organizations conduct periodic inspections of equipment and facilities to assure excellent facility condition, housekeeping, and safe and reliable operation.

4.14.1 Standards

*Objective*: Management conducts periodic inspections of equipment and facilities to assure excellent facility condition and housekeeping. The condition of a facility is dependent on many factors, including design, fabrication, modifications, ongoing maintenance, the facility work control programs, and day-to-day operation. After initial facility construction, ongoing maintenance and the control of modifications are prime contributors to keeping systems and equipment in optimum condition to support safe and reliable operation.

*Discussion*: Management and ensures inspections of all B Plant facilities on a regular basis through the B Plant "Management Observation and Assessment Program" (MOAP) to ensure standards are maintained.

The procedure for MOAP performance is contained in IP-1182, *"B Plant/WESF Conduct of Operations."*

*Improvement*: Existing facility procedures and programs comply with the intent of the DOE Order 4330.4B. As changes to the standards occur or weaknesses identified, inspectors receive training in the new standards.

4.14.2 Training

*Objective*: Personnel involved in facility inspections receive instructions to establish knowledge of standards and related facility policies. Methods for determining condition status are provided for consistency of inspections and condition reporting.

*Discussion*: The Work Control and Maintenance managers are responsible for communicating inspection criteria and techniques required to perform condition inspections as referenced in WHC-CM-5-6. Safety inspection check sheets are available to the inspectors.

*Improvement*: At the present time the program meets the intent of the DOE Order. Periodic review is conducted to ensure continued compliance.

4.14.3 Procedures

*Objective*: Procedures are provided defining the facility inspection program, methods of implementation, standards of condition, and means for correction of deficiencies found. Deficiencies found are evaluated for changes to the facility maintenance program.

*Discussion*: Existing facility manuals and procedures describe the facility inspection program and good housekeeping requirements. Reporting and tracking deficiencies is provided through the JCS.

*Improvement*: The present system of inspections and identification of deficiencies is well defined and in compliance with the DOE Order 4330.4B. Periodic reviews ensure continued compliance.

4.14.4 Scope of Inspections

*Objective*: Inspections include detailed walkdowns of assigned areas that include remote and limited-access areas as well as the more obvious and available areas. Key individuals are included in the inspection teams with free discussion of techniques and concerns encouraged. Sufficient time is allowed to search for deficiencies rather than a quick walk through. Obvious deficiencies are investigated to the degree necessary to positively identify the source of the problem.

*Discussion*: Inspections are performed following established facility procedures and include walkdowns of maintenance areas. The inspections include all facilities where maintenance activities are performed. The facility manager is responsible for ensuring inspections are on a regular basis.

*Improvement*: The B Plant inspection process uses existing facility procedures and policies. Inspection routes and schedules are created to ensure all areas requiring inspection are being inspected on a routine basis. Develop the proper inspection criteria.

4.14.5 **Inspection Program Elements**

*Objective*: Inspection assignments are scoped to ensure adequate time for thorough inspection and scheduled to minimize impact to ongoing operations of the facility.

*Discussion*: The Maintenance and Operations managers perform scheduled walkdown inspections on a regular basis. These walkdowns identify personnel assigned inspection responsibility, the area to be inspected, and any additional inspection requirements.

*Improvement*: There are no improvements identified or required at this time.

4.14.6 **Reporting Deficiencies**

*Objective*: Deficiencies noted during inspection are entered into the work control program for corrective action. Significant and/or safety related deficiencies are assigned the appropriate priority and reported to the responsible facility manager. Housekeeping deficiencies are reported to the occupying organization for attention.

*Discussion*: MOAP inspection results are documented and presented to the responsible managers. Items identified as deficient are tagged or identified to permit easy identification.

Significant facility condition and safety deficiencies observed are immediately reported to the shift manager for appropriate near-term attention.

*Improvement*: The existing site program is adequate to meet the intent of DOE Order 4330.4B. Periodic reassessment is performed to ensure continued compliance. There is no need for improvement at this time.

4.14.7 **Deficiency Follow-up**

*Objective*: Reported deficiencies are monitored for timely completion of corrective actions. Recurring, generic, or long term

problems are analyzed for identification of root cause. Recommendations are provided for changes to the preventive maintenance program. Periodic evaluation of inspection reports and facility conditions are made to determine program effectiveness.

*Discussion*: Identified deficiencies requiring immediate corrective action have a work order initiated, the deficient equipment is identified, and the JCS tracks the item for corrective action. The Maintenance manager is responsible for informing inspection personnel and concerned parties of deficiency resolutions in a timely manner, and tracking reported deficiencies to completion.

*Improvement*: Periodic review of this program is performed to ensure compliance. The program is adequate to meet the requirements of DOE Order 4330.4B. There is no need for improvement at this time.

## 4.15 Management Involvement

To ensure the safety of DOE facility operations, DOE and contractor corporate and facility managers are sufficiently involved with facility operations to be technically informed and personally familiar with conditions at the operating facility.

### 4.15.1 Management Involvement

*Objective*: Management conducts periodic inspections of equipment and facilities to assure excellent facility condition and housekeeping. The condition of a facility is dependent on many factors, including design, fabrication, modifications, ongoing maintenance, the facility work control programs, and day-to-day operation.

After initial facility construction, ongoing maintenance and the control of modifications are prime contributors to keeping systems and equipment in optimum condition to support safe and reliable operation.

The involvement of facility managers and supervisors in periodic facility walkdowns and inspections clearly displays management standards to all personnel and can significantly improve the condition of the facility. A program for identification and disposition of facility condition deficiencies and housekeeping discrepancies is an important step in maintaining facilities and equipment in a condition of maximum safety, reliability, and availability.

*Discussion*: First-line managers are expected to spend 50 percent of their time monitoring field work. Upper-level managers spend adequate time monitoring field work in progress.

Expectations for management involvement in field work must be communicated.

The Maintenance and Operations managers ensure other appropriate personnel receive inspection techniques training and assign inspection areas to ensure the entire facility is periodically inspected, including areas with difficult access (e.g., high radiation areas and locked areas).

Deficiencies are reported and corrected in a timely manner so personnel can see the positive results of the inspection program.

*Improvement*: The present program meets the requirements of the DOE Order; as changes to the DOE Order and site policies occur impacting management involvement, changes to the inspection program are made.

4.15.2 Performance Indicators, Goals, and Objective Results

*Objective*: Performance indicators are established, maintained, and trended to provide visibility of organizational goals and objectives. Information is used to observe developing trends and formation of corrective action and recovery plans.

*Discussion*: The Maintenance manager uses performance indicators, goals, and objectives to establish trends and provide feedback to the maintenance organization. These trends provide the maintenance organization with a means for assessing maintenance tasking and performance and allow for corrective action recommendations.

*Improvement*: Assessment of performance indicators is made periodically to ensure compliance. The present program meets the requirements of DOE Order 4330.4B. No improvement is required at this time.

4.15.3 Feedback

*Objective*: Feedback systems are in place providing continuous communications between all groups, worker disciplines, and management levels. Methods are in place to apply lessons learned from experiences of others, and in-house, to ensure long-term success. All levels of management are available to discuss problem areas and suggested improvements.

*Discussion*: Programs are in place for employees to address maintenance concerns to management. Employees are encouraged to use the chain of command to voice any concerns. The Maintenance manager follows an open door policy enabling maintenance personnel to have direct access to management when concerns are present.

Employees also chair the Maintenance Safety Board which is a program where employees identify needs and are empowered to correct deficiencies.

*Improvement*: Assessment of programs and policies regarding identification of concerns are made periodically to ensure compliance. At present the existing program meets the requirements of DOE Order 4330.4B. There is no improvement required at this time.

4.15.4 Program Reviews

*Objective*: Managers periodically review and assess all elements of the maintenance program to identify areas requiring improvement or corrective action. Input of managers and supervisors, and other supporting organizations, is utilized in program review. Areas requiring improvement are assigned for corrective action and followup.

*Discussion*: The Maintenance manager is currently implementing self assessments on a scheduled basis. The feedback from self assessments and reviews determines changes to the maintenance policy of the Maintenance organization.

*Discussion*: **Assessment of Facility Condition and Worker Practices During Maintenance**

Periodic assessments of specific programs such as the PM program are performed per site procedure. B Plant specific program evaluation is provided for by the Engineering, Work Control, and Maintenance managers as the need for such an evaluation becomes apparent through audits and assessments.

The Operations, Work Control, and Maintenance managers periodically review personnel performance and work practices. These reviews are directed at improving worker performance. Appraisals are performed in accordance with WHC requirements.

Equipment and component maintenance histories are trended through the JCS program. The Cognizant engineers review these history files for maintenance trends and problems.

*Discussion*: **Assessment of Maintenance Training**

The Maintenance organization periodically reviews the maintenance training program for facility impact. Results of these reviews dictate the need, or lack thereof, for training program enhancements and changes.

*Discussion*: **Assessment of Procurement Activities**

Periodic assessments of the procurement process are performed by the facility operations and maintenance management for timeliness and responsiveness.

*Discussion*: **Assessment of Measuring and Test Equipment**

Facility and Maintenance management assess the M&TE organization for availability of M&TE, and safe, reliable operational support.

*Improvement*: Develop and implement self assessment program.

## 4.16 Maintenance History

A maintenance history and trending program is maintained to document data, provide historical information for maintenance planning, and support maintenance and performance trending of facility systems and components.

### 4.16.1 Program Development

*Objective*: A program is in place identifying critical (from the SAR) systems and equipment requiring documentation and retention of historical data.

*Discussion*: **Equipment Identification**

The Master Equipment List provides the identification for major or critical pieces of equipment.

*Discussion*: **Data Identification**

Completed work packages under the JCS program include all relevant maintenance data for critical equipment. Specific data requirements for equipment previously unidentified are provided by the Cognizant Engineer.

*Improvement*: Implement the maintenance history module of the Job Control System (JCS) and MRP 3-5, Section 12.5.

### 4.16.2 Data Collection

*Objective*: Information for systems and equipment identified for record history retention is forwarded to a specified organization for control, reviewed for completeness and correctness, and entered into the equipment history program.

*Discussion*: Data on systems and equipment selected for history retention is controlled through Recall Systems Maintenance Engineering (RSME) and the Preventive Maintenance Program (PMP), Job Control System (JCS), or by data input directly to the cognizant engineer for analysis and trending.

*Improvement*: Implement maintenance history module.

4.16.3 **Program Use**

*Objective*: Equipment history data is readily available to all organizations and is used in the development of work packages and schedules, and is periodically reviewed for developing trends.

*Discussion*: Maintenance history is fragmented among JCS work packages and procedure data sheets. The new maintenance history module will be used for the program. Trending is performed on a limited basis.

*Improvement*: Implement the maintenance history module.

## 4.17 Analysis of Maintenance Problems

Systematic analysis is used to determine and correct root causes of unplanned occurrences related to maintenance.

4.17.1 **Information Collection**

*Objective*: In preparation of event analysis, all applicable logs, records, recordings, and personnel interview statements are gathered.

*Discussion*: When a significant equipment failure occurs, an off-normal report is issued. When a personnel accident occurs, every effort is made to preserve physical conditions, obtain first-hand observations and interviews and obtain all associated documentation relating to the event. Event report requirements and responsibilities are well defined.

*Improvement*: The present program meets DOE order 5000.3B requirements. No improvement is required at this time.

4.17.2 **Event Analysis**

*Objective*: In performing an event analysis a detailed sequence of facts and activities is developed and apparent causal factors identified and categorized.

*Discussion*: Aspects of root-cause-analysis are presently addressed in site procedures. Activities requiring by event analysis are performed in accordance with event reporting procedures and guidelines.

*Improvement*: The present program meets DOE order requirements. No improvement is required at this time.

4.17.3 Cause Determination

*Objective*: Actual or probable causes of a problem are evaluated by one or more techniques to establish a final root cause. Appropriate documentation is developed to aid in the analysis, to record analysis performed, and to document corrective action recommendations.

*Discussion*: B Plant personnel performing cause determination are trained in event reporting analysis and perform activities in accordance with existing site procedures.

*Improvement*: Periodic review is performed to determine program compliance. The present process meets DOE Order requirements. No improvement is required at this time.

4.17.4 Corrective Action

*Objective*: Corrective action plans are developed, initiated, and tracked on HATS to completion. Plans address all applicable activities such as repairs, preventive maintenance procedures, and personnel training.

*Discussion*: Once cause determination has been performed, corrective action is initiated in accordance with WHC site procedure and tracked by responsible organizations to completion.

*Improvement*: Existing site procedures and policies meet DOE Order requirements. No improvement is required at this time.

4.17.5 Corrective Action Follow-up

*Objective*: Corrective action follow-up activities include specific post repair testing and continued monitoring of equipment as positive means to ensure corrective actions taken resolve the problem experience.

*Discussion*: Equipment corrective action is followed by post-maintenance testing and tracked in JCS. Procedural or administrative changes are tracked and field validated by the users.

*Improvement*: Existing site procedures and policies meet DOE Order requirements. No improvement is required at this time.

4.17.6 Generic Follow-up

*Objective*: Analysis program includes considerations of generic corrective actions needed for equipment of the same make and model.

*Discussion*: Actions are taken based on lessons learned and formal event/critique report reviews. Problem areas are categorized and action plans are developed to prevent recurrence.

*Improvement*: No Improvement required.

## 4.18 Modification Work

Facility modification work, including temporary modifications, is accomplished under the same basic administrative controls as those applied to facility maintenance activities so there is no increases in risk to facility equipment, environment, or personnel because of the modifications work.

### 4.18.1 Maintenance Program Interface with Modifications

*Objective*: Modifications are performed in accordance with requirements and limitations of applicable procedures, codes, standards, and specifications.

*Discussion*: Modifications work is performed according to DOE Orders. These orders meet codes and requirements.

*Improvement*: Include Maintenance in all Engineering Change Notice (ECN) reviews, all project reviews, and all JCS document reviews for modifications.

### 4.18.2 Temporary Repairs or Temporary Modifications

*Objective*: Temporary repairs or modifications are reviewed in accordance with the facility modification program prior to implementation. Temporary repairs or modifications are tracked after completion for consideration of permanent corrective action.

*Discussion*: Temporary repairs and modifications are controlled per procedural requirements of WHC-CM-6-1 and tracked by the JCS to completion.

*Improvement*: Include the Maintenance organization in the temporary repair/modification process. Develop and implement a temporary repair/modification log.

## 4.19 Additional Maintenance Management Requirements

A program is in place to prevent equipment and building damage due to cold weather at any nuclear facility that may be at risk.

### 4.19.1 Seasonal Facility Preservation Requirements

*Objective*: Cold weather protection program in place to ensure continued safe facility operations is defined and implemented using approved procedures. Program includes criteria for preparation (and suspension), periodic surveillances, and program effectiveness evaluations. Lessons learned are evaluated and appropriate program changes made to prevent recurrence.

*Discussion*: Seasonal freeze protection at B Plant is performed in accordance with a specific freeze protection plan for the facility. A winterization and a summarization program exist for B Plant.

*Improvement*: Perform continuing assessments for immediate seasonal preservation requirements. Develop a "B Plant/WESF Cold Weather Protection Implementation Plan."

## 5.0 DEVIATIONS REQUESTED WITH SUPPORTING RATIONALE

No deviations from the policy requirements identified by DOE Order 4330.4B (DOE 1994) are requested at this time.

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## 6.0 IMPLEMENTATION SCHEDULE

The following is the schedule of activities that are to be accomplished before re-assessment of B Plant maintenance is performed at the specified two (2) year interval after startup. The activities identified are based upon assessment at the time of the writing of this document. Any changes to this schedule may be made as further activity assessment is performed.

| ACTIVITY | 95 | | | | 96 | | | | 97 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 4.2.4 Goals and Objectives | | | | | | | | | | | | |
| Update goals | | | | | X | | | | | | | |
| 4.5.2 Types of Maintenance | | | | | | | | | | | | |
| Include predictive maintenance as part of preventive maintenance program. | | | | | X | | | | | | | |
| 4.16.1 Maintenance History - program development | | | | | X | | | | | | | |
| Implement maintenance history module. | | | | | | X | | | | | | |
| 4.16.2 Maintenance History - data collection | | | | | X | | | | | | | |
| Implement maintenance history module. | | | | | | X | | | | | | |
| 4.16.3 Maintenance History - program use | | | | | | | | | | | | |
| Implement maintenance history module. | | | | | | X | | | | | | |
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| | | | | | | | | | | | | |

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