Assessment of Operational Readiness

Facility Structure

Site: Pantex Plant, Amarillo, TX

Facility: Buildings 12-84, 12-85, 12-98, and 12-104

System: Facility Structure

System Classification: Safety Class

System Safety Function: Functional requirements for these facilities are:

- Provide a fire barrier to withstand the design basis external fire, including those caused by external explosions and aircraft crashes, without progressing to an internal fire event.
- Provide a physical barrier to withstand the shock wave and missiles from an external explosion without progressing to an impact event.
- Provide a physical barrier to withstand the impact force from an aircraft crash without progressing to an impact event.
- Provide a physical barrier to withstand the wind forces and the missiles from a PC-3 tornado/high wind event without progressing to an impact event.
- Provide a design that will withstand forces from a PC-3 Seismic event without resulting in facility damage or facility component damage that would progress to an impact event.
- Provide a filtration of the release following a high explosive detonation with dispersion event that has sufficient force to exercise the gravel gertie. Filtration shall limit the consequences to within the evaluation guidelines. (Cells only.)
- Provide a limited leak path following a high explosive detonation with dispersion event that does not have sufficient force to exercise the gravel gertie. The maximum cell leak areas, not including the filtration through the gravel gertie, shall limit the consequences to within the evaluation guidelines. (Cells only.)
- Provide a physical barrier or physical separation to limit the shock wave and fragments resulting from an internal high explosive detonation to adjacent facilities.
- Provide a fire door for the staging cubicles. (Building 12-98 Only.)
- The facility structure shall limit the maximum differential voltage inside the facility from a design basis lightning strike to no more than the bonded voltage.

OBJECTIVE

VSS-1 This vital safety system is operational and personnel and processes are in place that ensure its continued operational readiness.

Criteria and Discussion of Results

VSS-1.1 VSS safety functions are defined and understood by responsible line managers, and supporting information/documentation is available and adequate. System testing is adequate to ensure operability.

VSS-1.1 Review Approach 1

The following Pantex Plant Authorization Basis Documents identify safety class, safety significant, and important-to-safety systems, their safety functions, the normal, abnormal, and accident conditions under which the system is intended to perform, and system functional requirements and performance.

- *RPT-SAR-199801, Technical Safety Requirements (TSR) for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation (BIO)*
- Weapons Programs' Activity Based Control Documents (ABCDs).

Due to the large number of facilities, their diverse functions and age, it is possible that some analytical basis documentation has not been retrievable. In those situations, new analysis is performed and documented by Pantex Plant and, sometimes by the appropriate Design Agency. The current TSR documents, listed above, have supportive, formally controlled analytical basis documents.

VSS-1.1 Review Approach 2

The following Pantex Plant documents provide for incorporation of surveillance and in-service inspection (SR/ISI) requirements into implementing procedures.

- STD-9050, *Surveillance/In-Service Inspection Programs*
- MNL-00037, *Index of Technical Safety Requirement Surveillance & In-Service Inspection Procedures*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures.*

At Pantex Plant, the TSRs are compiled facility-by-facility and provide action, basis, mode, surveillance and inspection requirements and frequencies. The requirements are flowed into plant procedures and are listed in MNL-00037. The listing identifies the specific procedures that fulfill the SR/ISI requirements for operability promulgated by the TSRs.

The following describes the roles and responsibilities of those involved in the SR/ISI process:

1. According to technical expertise, System Engineers are assigned SSCs; and as custodians, System Engineers provide the following:

   - Technical basis including acceptance criteria, as appropriate, required for incorporation into SR/ISIs
   - Assistance to organizations in performing SR/ISIs
   - Establish and maintain a system deficiency tracking and trending program so that action may be taken to maximize system performance and minimize downtime
   - Review and approve SR/ISI procedures using a checklist
   - Identify SR/ISI steps within the procedures
   - Technical support for MNL-00037.

2. Facility Managers maintain a facility preventive maintenance tracking board and include the SR/ISI requirements, frequency, applicable procedure, completion date, and next due date.

3. Organizations responsible for performing the SR/ISIs provide procedures, and trained and qualified personnel to perform work and document results.

4. The Maintenance Work Control Department manages the preparation, revision, verification, validation, approval and distribution of SR/ISI procedures performed by crafts personnel. Reference IOP-FO-1015, *Controlled Document Process.*

VSS-1.1 Review Approach 3

MNL-00037 is used as an index to identify those test, inspection and calibration processes or procedures that satisfy the SR/ISI requirements that are outlined in the TSRs. The information contained includes the facility number (Nuclear, and Nuclear Explosives Areas), a listing of the Vital Safety Systems within the facility, minimum SR/ISI requirements for operability, the frequency that the SR/ISI must be performed, and the number of the procedure. The requirements are extrapolated from the TSRs.

VSS-1.1 Review Approach 7

The System Engineer determines the System Codes, and the drawings are annotated by System Codes and clearly stamped in red “Controlled Copy.”

Drawings are entered into the configuration control system by an Engineering Data Transmittal (EDT) (Ref. RA8) or a Design Change Proposal (DCP). The EDT is used during system walkdowns, in which case the drawing is identified as Current Condition. A DCP documents the modification process for systems currently under control. Changes to the drawings are tracked via a Design Change Notice (DCN).

Types of drawings vary according to the system. All are reviewed and approved according to requirements in STD-9045, STD-9046, and MNL-00054 (Ref. RA8). Listings are available by System Codes. As a supplement to drawings, System Design Descriptions are documents that reflect additional system information, such as system boundaries, functional requirements, and reflect other TSR and Authorization Basis requirements. They are also a source for listing controlled drawings applicable to the systems and facility.

Controlled drawings have controlled, limited distribution, and are tracked during the process of revisions. The drawings are housed in a controlled area and are displayed according to facility numbers.

VSS-1.1 Summary for Facility Structure

The safety functions of the Facility Structure are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, and related documents implemented in March 2000. The subsequent readiness assessments by the Management and Operating (M&O) Contractor and the Department of Energy validated the implementation process described in this section including adequacy of flowdown, knowledge of line management and support personnel, availability of documentation, and adequacy of system testing to verify system operability. Actions have been taken to address deficiencies identified during the readiness assessment, and procedures are in place to correct newly discovered deficiencies. This criterion is met for the Facility Structure.

VSS-1.2 The backlog for surveillances, tests, inspections, maintenance, repair, upgrades, or other work on the system is managed and kept to an appropriate minimum.

VSS-1.2 Review Approach 6

There is no backlog for in-service inspections applicable to facility structures. Surveillances and in-service inspections are scheduled by the responsible organization in accordance with STD-9050, *Surveillance/In-service Inspection Program*, and are coordinated with the Facility Manager or applicable scheduling representative. Surveillances and inspections are tracked via facility status boards by Facility Management. Allowable variance periods for performance of inspections are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*. Corrective maintenance, when required, receives priority in accordance with the safety system classification. However, funding for preventive and corrective maintenance of roofs is currently uncertain, and continued deterioration is expected. The estimated cost to repair the 12-84 roof is $2.4 million and FY 01 funding is expected from Defense Authorization Funding (DAF).

The maintenance program places emphasis on maintaining reliability of site VSS. Greater than 20% of maintenance resources (approximately $22 million) available for facility and plant equipment upkeep is applied to nuclear facility maintenance. Approximately 12% of the total is required for performance of nuclear surveillances, in-service inspections, and preventive maintenance actions in nuclear facilities. Concomitantly, the Work Control System applies greater rigor in the performance of nuclear facility maintenance and provides: precise scheduling and tracking of surveillance and in-service inspections to satisfy the TSRs, priority for corrective maintenance to minimize production downtime and maintain system reliability, formal interface with

facility management for communication of status, and increased controls on review and approval of work packages.

In the later part of FY-99 and throughout FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities required numerous modifications to facilities and related documents to meet new AB requirements, which meant an abnormally high level of change control activity. Statistics are maintained on the backlog of Design Change Proposals (DCPs), which are discussed under VSS-1.3, Review Approach 8. Review of the 1999 and 2000 DCP "cycle" time indicates a positive trend to shorten closure time. From 1999 to 2000, the average cycle time for work completion notification has reduced from 5.93 months to 2.15 months. Average cycle time for System Engineer to submit Design Change Notice (DCN) following notification of work completion has reduced from 7.11 to 2.6 months. A modification is

not complete until the work is completed and all documentation has been updated. The importance of accurate documentation is evidenced in the current effort to close DCPs at a faster rate and reducing the DCN backlog.

VSS-1.2 Summary for Facility Structure

Required nuclear surveillances for the Facility Structure are current and procedures provide for their completion at the required frequency consistent with the variance interval described in the TSRs. Backlog of other preventive maintenance, inspections, corrective maintenance, upgrades and other work is managed and receives priority in the Work Control System based on the system safety classification. However, there is a substantial shortfall in funding required to cover deferred maintenance identified for the roof infrastructure, indicating that this criterion is not fully met.

VSS-1.3 Configuration Management and Maintenance programs effectively ensure operational availability of the system.

VSS-1.3 Review Approach 5

Preventive maintenance actions are evaluated and implemented according to STD-5100, *Maintenance Management,* and STD-5016, *Maintenance Work Control System*. Safety walkdowns are scheduled according to STD-3190, *Safety Surveys of Facilities*. Formal readiness reviews are scheduled following implementation of changed conditions, including authorization basis changes and system modifications. In particular, the implementation of RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, in March 2000 was followed by a rigorous assessment of all safety class and safety significant systems.

VSS-1.3 Review Approach 8

Configuration Management processes for Nuclear Facilities Vital Safety Systems are based on a graded approach, governed by the following Authorization Basis Documents:

- RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation* (including addendums)

- Weapon Programs Activity Based Control Documents (ABCDs).

The specific Nuclear Facilities at Pantex Plant are delineated in MNL-207300, *Unreviewed Safety Question (USQ)/Nuclear Explosive Safety (NES) Process*, Appendix A. All modifications to Vital Safety Systems and related procedures affecting their operation or evaluation of their performance are required to be evaluated through the USQ/NES Program according to STD-3014, *Unreviewed Safety Question/Nuclear Explosive Safety Program.*

The change control classification for Vital Safety Systems are Class 1 (Safety Class and Safety Significant Systems) and Class 2 (Important-to-Safety Systems). The Class 1 and 2 configuration and control procedures are described in the following documents:

- STD-9045, *Change Control for Class 1 Facility Related Systems, Structures, & Components*

- STD-9046, *Class 2 Configuration Control for Facility Related Systems, Structures & Components*

- MNL-00054, *Facilities Configuration Management - Conduct of Operations.*

Nuclear Facilities change control includes a formal process for submitting, receiving, evaluating, documenting, amending, and archiving "technical baseline" information for safety related structure, systems, anc components (SSCs). MNL-00054, Chapter 11, describes the process. The technical baseline establishes the actual physical configuration of the SSC, the design documents associated
with the SSC, the boundaries and interfaces of the SSC to other systems, applicable Authorization Basis or operating regulations, various flow down shop floor documents, and the formal processes established to maintain and control this information.

- An Engineering Data Transmittal (EDT) and Technical Baseline Checklist are the forms used in the baselining process.

- The EDT is the formal method for accepting responsibility for controlling engineering documentation and is used to transmit information to be included in the technical baseline. All EDTs are approved by the Facility Change Control Manager (FCCM), System Engineering Manager, and Technical Basis Control Manager.

- The EDT is used as the formal (internal to Facilities CM) mechanism to establish facility or system readiness. Promulgation of readiness is a legal commitment to the DOE. As such, the requirements for establishing a Facility CM baseline are more stringent and are established by the FCCM. Any modifications to systems or equipment after the approval date are required to be processed through formal change control according to STD-9045 or STD-9046.

Changes or modifications to safety class and safety significant systems are accomplished through a maintenance work order, or outside construction project. STD-9045 establishes the configuration and change control procedure for Safety Class and Safety Significant SSCs, which are designated Class 1 change control. This procedure includes formalities such as a dedicated FCCM who is responsible for, among other things, managing activities associated with the Facility Configuration Control Board (FCCB).

- The FCCB, chaired by a permanent Chairman, consists of management level representatives from numerous organizations who are responsible for reviewing Design Change Proposal (DCP) packages and providing recommendations (concur as written/concur with comments, do not concur, or defer with comments) to the Chairman, who approves, disapproves, or defers the DCP.

- Class 1 DCPs contain information needed to justify a modification in a Nuclear Facility. The DCP process ensures impacted documents are identified, USQ screening has occurred, evidence of good design practices (i.e., independent reviews) have been instituted.

- A Design Change Notice (DCN) is generated as a result of required actions from a DCP. The DCN is a transmittal sent to groups or individuals affected by the modification. Actions identified on the DCN must be completed. If controlled documents or drawings are affected by the modification, a copy of the DCN is attached to the documents or drawings, removed when the change process has been completed and the revised documents or drawings replaced.

- STD-9046 establishes the procedure for Class 2 Important-to-Safety SSCs' change control. The requirements and change control processes are essentially the same as STD-9045 with the exception that the FCCB approval is not required for Class 2 DCPs. The FCCB Chairman approves the DCP.

MNL-00054 establishes the infrastructure for Nuclear Facilities change control. The following describes the manual contents:

Chapter 1 - Construction/Project File Processing
Chapter 2 - Drawing Processing and Control for Systems Not Under CM
Chapter 3 - Walkdown Drawing/Package Processing and Control for Systems Under CM
Chapter 4 - Design Recovery and Systems Engineering Controlled Document Submittal Processing
Chapter 5 - System Design Description (SDD) Distribution and Change Control
Chapter 6 - Manual/Document Distribution and Control
Chapter 7 - Drawing Processing and Control of Configuration Management Controlled Drawings
Chapter 8 - Vendor Manual Process
Chapter 9 - Class 1 Design Change Proposal Process
Chapter 10 - Class 2 Design Change Proposal Process
Chapter 11 - Technical Baseline Documentation - Engineering Data Transmittal

Nuclear Facility change control requires the input from System Engineers (SEs). System Engineering responsibilities are detailed in the following Internal Operating Procedures (IOPs):

- IOP-366, *Design Recovery*

- IOP-367, *System Engineering Review Process*

- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures*

- IOP-448, *Engineering & Operability Evaluations*

- IOP-465, *Safety and Plant Reviews*

- IOP-551, *Item Equivalency Evaluations*

- IOP-631, *Classification of Sub-systems*

- IOP-637, *System Engineering Support of Design Change Proposal Closures*

- IOP-731, *Methodology Requirements*

- IOP-686, *Cell Door Leak Area Validation*

- IOP-FO-1116, *System Engineering Review of New Crane Vendor Manual Information*

STD-5016, *Maintenance Work Control System*, establishes the procedure for modifications performed by Pantex Plant craft personnel. STD-5016 establishes the required activities and types of documents that are eventually included in a DCP package described in STD-9045 and STD-9046.

- A work request is initiated through Facility Management Integration (FMI)/Passport, generally by the Facility Manager. If the request is not generated by the FM, the FM must be notified and be included in the process. The facility term, used in Passport to differentiate Nuclear Facility Safety Class, Safety Significant, and Important-to-Safety SSCs is "CM-listed." In change control terms, CM-listed SSCs are either Class 1 or Class 2. Work requests in Nuclear Facilities, are required to be reviewed and concurred with by System Engineering.

- The Unreviewed Safety Question Evaluation is initiated according to STD-3014.

- A DCP is initiated.

- All documentation required by STD-5016 is included in the work request and is submitted to Maintenance Work Control for consideration and approval.

- If the work request is authorized and approved, the Maintenance Work Control Department assigns the Work Order a to designer. The design is completed, a DCP package assembled (STD-9045 AND STD-9046 APPENDIX A), appropriate signatures obtained, and submitted to the FCCM for review.

- The DCP is processed and approved.

- When work has been accomplished, the FCCM is notified by Maintenance Work Control.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

STD-9027, *Facility Project Requests,* establishes the initial project request for modifications requiring outside construction contracts.

- A requestor submits a form, *Project Information Sheet for Construction Projects*, and required information to the appropriate Infrastructure Division coordinator.

- The coordinator signs, prioritizes the request, and submits the package to Engineering and Construction, Scheduling and Cost Control Estimating Section.

- The Estimating Section performs a planning cost estimate that ultimately determines the project scope.

- The Site Planning organization, with assistance from Engineering and Construction and Technical Resources Departments evaluate the request and prioritize it according to STD-9027.

- The Engineering and Construction Department assigns a Project Manager and Project Engineer(s) who develop the design modification according to MNL-FO-1009, *LCAM Implementation Manual*.

- A DCP package is prepared, reviewed, and approved according to STD-9045 and STD-9046, APPENDIX A.

- When work has been accomplished, the FCCM is notified by receiving a copy of Beneficial Occupancy.

- Project records, technical baseline documentation, are submitted to Technical Basis Control by the Project Engineer.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

VSS-1.3 Review Approach 9

The document control process for Vital Safety Systems is governed by STD-9045, STD-9046, and MNL-00054. (Refer to RA8.) Documents that can be affected as a result of a modification are identified on the DCP form. Pending changes are promulgated by a DCN which is posted on the document that will be revised:

Controlled Drawings
Vendor Manuals
System Design Description(s) (System Engineering Document)
Passport Data Base (Electronic data base - Component Information (System Engineering)

If external calibration, operations, training, or preventive maintenance procedures are affected by a modification, the applicable organization is notified with a DCN. Acknowledgment of the DCN is made and returned to Facilities Change Control.

Within the Facilities change control process, documents other than design basis documents, are controlled using a Document Change Request. These internal documents include procedures, and instruction type manuals. The change control infrastructure is governed by MNL-00054, which is described in RA8. Review and approval requirements for all documents controlled by facilities change control are listed and described in MNL-00054.

In the later part of FY-99 and early FY-00, major Authorization Basis (AB) implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities had significant impact on the Facilities configuration and change control processes.

VSS-1.3 Summary for Facility Structure

The configuration management and maintenance programs are well defined and formally implemented to control changes to the Facility Structure. There is a significant backlog in open Design Change Notices (DCNs). This backlog is tracked and managed by procedure. However, the significant number of DCNs, which is an interim or temporary document, has the potential to impact operational availability of the system. Therefore, this criterion is not fully met.

VSS-1.4 The system is operable and available to fulfill its safety function when required.

VSS-1.4 Review Approach 4

After surveillance activities have been completed by crafts personnel, the cognizant System Engineer receives data from the craft's supervisor and prepares data for internal tracking and trending purposes. Inspections of the Facility Structure Critical Safety Components are completed annually for signs of wear and erosion and related fire barrier integrity measures. Tasks required in the procedure include cleaning and verifying integrity of personnel door seal, inspecting the facility structure leak area, annually, ensuring the Facility structure provides a Faraday cage, as required, by low voltage testing, completed every 5 years. For these buildings a single bay or cell is selected for testing, pending low voltage testing issue resolution. Due to the condition of the 12-84 roof and depending on weather conditions, leaks have resulted in suspension of operations.

VSS-1.4 Review Approach 10

The rigor of documentation and change control of items under Nuclear Facilities CM reflects the levels of hazard classification. New VSS (Safety Class/Safety Significant) SSCs are determined through hazard and accident analysis, and are promulgated through Authorization Basis Documents. Resulting AB Implementation Plans promulgate required activities such as modifications, facility walkdowns, or design recovery as described in Plant Standard STD-3073, Implementation of Authorization Basis changes. As described in RA8, the technical baseline for

VSS SSCs is established and subsequently managed by the Class 1 change control and Important-to-Safety SSCs are managed by Class 2 change control.

A list of available controls (for an event) is identified during the *hazard* and *accident analysis* process. This list of controls is then classified based on the unmitigated consequences and frequency of an event to determine which controls are classified as Safety-Class, Safety-Significant, and Important-to-Safety.

VSS-1.4 Summary of Facility Structure

In-service inspections, which verify that the functional requirements of the facility structure are met, have been improved through the use of more comprehensive inspection criteria developed by Engineering. In addition, a more formal tracking and trending program has been developed and very recently implemented by System Engineering. Thus, inspections have improved. However, the deteriorating condition of the 12-84 roof, in particular, has resulted in suspension of operations during inclement weather conditions. This criterion is not fully met.

Conclusion for Facility Structure The facility structure meets the functional requirements of the TSR and personnel and procedures are in place to ensure its safety function is maintained. Summary status is:

System Engineer - **Assigned and knowledgeable**
Configuration Management - Yellow ⇑
Some controlled documentation may not be verified or complete, but it is known that none of these affect the operability of the Vital Safety Systems.
Maintenance - Yellow ⇓
Funding and plant infrastructure to perform ongoing maintenance and repair of roofs is uncertain. Potential deterioration and degradation is expected. Some maintenance has not been completed or has an uncertain schedule. However, the facility is still operational.
Operations - Yellow ⇒
Facility conditions (i.e., leaking roofs) have interrupted operations.
Overall Status - Yellow ⇒

Arrows slant upward if conditions are improving, are horizontal when conditions are stable, and slant downward if conditions are deteriorating.

These conclusions are based on the pre-determined criteria and assessment process prescribed by the five member team of subject matter experts. Interviews with personnel experienced in nuclear facility management, authorization basis, system engineering, configuration management, maintenance management, maintenance work control, and performance of nuclear surveillances and in-service inspections were performed. Research of the Recapitalization Plan which considers facility specific assessment data, maintenance backlog data including deferred maintenance, Technical Safety Requirements, occurrence data, recent readiness assessment findings, budget, and correspondence/reports addressing specific facility needs, and current processes were also conducted. Conclusions by the original five team members were used when applicable to the bays and cells.

DOE employee who reviewed this assessment____Terry Zimmerman____Date____2/21/01___

Hours required to complete assessment. DOE:___3___Hrs. Contractor:__22___Hrs.

Assessment of Operational Readiness
Emergency Lighting System

Site: Pantex Plant, Amarillo, TX

Facility: Buildings 12-84, 12-85, 12-98, and 12-104

System: Emergency Lighting System

System Classification: Safety Class

System Safety Function: The Emergency Lighting System provides sufficient lighting to place high explosives in a safe and stable configuration following a loss of normal power to lighting. This function reduces the frequency of a high explosive detonation caused by mishandling due to insufficient illumination. The Emergency Lighting System consists only of those lights located in the Bay Operation/Staging Area or Cell Round Room that have a back up power supply.

OBJECTIVE

VSS-1 This vital safety system is operational and personnel and processes are in place that ensure its continued operational readiness.

Criteria and Discussion of Results

VSS-1.1 VSS safety functions are defined and understood by responsible line managers, and supporting information/documentation is available and adequate. System testing is adequate to ensure operability.

VSS-1.1 Review Approach 1

The following Pantex Plant Authorization Basis Documents identify safety class, safety significant, and important-to-safety systems, their safety functions, the normal, abnormal, and accident conditions under which the system is intended to perform, and system functional requirements and performance.

- *RPT-SAR-199801, Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation (BIO)*
- Weapons Programs' Activity Based Control Documents (ABCDs).

Due to the large number of facilities, their diverse functions and age, it is possible that some analytical basis documentation has not been retrievable. In those situations, new analysis is performed and documented by Pantex Plant and, sometimes by the appropriate Design Agency. The current TSR documents, listed above, have supportive, formally controlled analytical basis documents.

VSS-1.1 Review Approach 2

The following Pantex Plant documents provide for incorporation of surveillance and in-service inspection (SR/ISI) requirements into implementing procedures.

- STD-9050, *Surveillance/In-Service Inspection Programs*
- MNL-00037, *Index of Technical Safety Requirement Surveillance & In-Service Inspection Procedures*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures.*

At Pantex Plant, the TSRs are compiled facility-by-facility and provide action, basis, mode, surveillance and inspection requirements and frequencies. The requirements are flowed into plant procedures and are listed in MNL-00037. The listing identifies the specific procedures that fulfill the SR/ISI requirements for operability promulgated by the TSRs.

The following describes the roles and responsibilities of those involved in the SR/ISI process:

1. According to technical expertise, System Engineers are assigned SSCs; and as custodians, System Engineers provide the following:
   - Technical basis including acceptance criteria, as appropriate, required for incorporation into SR/ISIs
   - Assistance to organizations in performing SR/ISIs
   - Establish and maintain a system deficiency tracking and trending program so that action may be taken to maximize system performance and minimize downtime
   - Review and approve SR/ISI procedures using a checklist
   - Identify SR/ISI steps within the procedures
   - Technical support for MNL-00037.
2. Facility Managers maintain a facility preventive maintenance tracking board and include the SR/ISI requirements, frequency, applicable procedure, completion date, and next due date.
3. Organizations responsible for performing the SR/ISIs provide procedures, and trained and qualified personnel to perform work and document results.
4. The Maintenance Work Control Department manages the preparation, revision, verification, validation, approval and distribution of SR/ISI procedures performed by crafts personnel. Reference IOP-FO-1015, *Controlled Document Process.*

VSS-1.1 Review Approach 3

MNL-00037 is used as an index to identify those test, inspection and calibration processes or procedures that satisfy the SR/ISI requirements that are outlined in the TSRs. The information contained includes the facility number (Nuclear, and Nuclear Explosives Areas), a listing of the Vital Safety Systems within the facility, minimum SR/ISI requirements for operability, the frequency that the SR/ISI must be performed, and the number of the procedure. The requirements are extrapolated from the TSRs.

VSS-1.1 Review Approach 7

The System Engineer determines the System Codes, and the drawings are annotated by System Codes and clearly stamped in red "Controlled Copy."

Drawings are entered into the configuration control system by an Engineering Data Transmittal (EDT) (Ref. RA8) or a Design Change Proposal (DCP). The EDT is used during system walkdowns, in which case the drawing is identified as Current Condition. A DCP documents the modification process for systems currently under control. Changes to the drawings are tracked via a Design Change Notice (DCN).

Types of drawings vary according to the system. All are reviewed and approved according to requirements in STD-9045, STD-9046, and MNL-00054 (Ref. RA8). Listings are available by System Codes. As a supplement to drawings, System Design Descriptions are documents that reflect additional system information, such as system boundaries, functional requirements, and reflect other TSR and Authorization Basis requirements. They are also a source for listing controlled drawings applicable to the systems and facility.

Controlled drawings have controlled, limited distribution, and are tracked during the process of revisions. The drawings are housed in a controlled area and are displayed according to facility numbers.

VSS-1.1 Summary for Emergency Lighting System

The safety functions of the Emergency Lighting System are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, and related documents implemented in March 2000. The subsequent readiness assessments by the Management and Operating (M&O) Contractor and the Department of Energy validated the implementation process described in this section including adequacy of flowdown, knowledge of line management and support personnel, availability of documentation, and adequacy of system testing to verify system operability. Actions have been taken to address deficiencies identified during the readiness assessment, and procedures are in place to correct newly discovered deficiencies. This criterion is met.

VSS-1.2 The backlog for surveillances, tests, inspections, maintenance, repair, upgrades, or other work on the system is managed and kept to an appropriate minimum.

VSS-1.2 Review Approach 6

There is no backlog for surveillances applicable to emergency lights. Surveillances and in-service inspections are scheduled by the responsible organization in accordance with STD-9050, *Surveillance/In-service Inspection Program*, and are coordinated with the Facility Manager or applicable scheduling representative. Surveillances and inspections are tracked via facility status boards by Facility Management. Allowable variance periods for performance of inspections are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*. Corrective maintenance, when required, receives priority in accordance with the safety system classification. There are no planned modifications. A major upgrade to the emergency lighting systems in nuclear facilities was completed in FY 2000.

The maintenance program places emphasis on maintaining reliability of site VSS. Greater than 20% of maintenance resources (approximately $22 million) available for facility and plant equipment upkeep is applied to nuclear facility maintenance. Approximately 12% of the total is required for performance of nuclear surveillances, in-service inspections, and preventive maintenance actions in nuclear facilities. Concomitantly, the Work Control System applies greater rigor in the performance of nuclear facility maintenance and provides: precise scheduling and tracking of surveillance and in-service inspections to satisfy the TSRs, priority for corrective maintenance to minimize production downtime and maintain system reliability, formal interface with facility management for communication of status, and increased controls on review and approval of work packages.

In the later part of FY-99 and throughout FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities required numerous modifications to facilities and related documents to meet new AB requirements, which meant an abnormally high level of change control activity. Statistics are maintained on the backlog of Design Change Proposals (DCPs), which are discussed under VSS-1.3, Review Approach 8. Review of the 1999 and 2000 DCP “cycle” time indicates a positive trend to shorten closure time. From 1999 to 2000, the average cycle time for work completion notification has reduced from 5.93 months to 2.15 months. Average cycle time for System Engineer to submit Design Change Notice (DCN) following notification of work completion has reduced from 7.11 to 2.6 months. A modification is not complete until the work is completed and all documentation has been updated. The importance of accurate documentation is evidenced in the current effort to close DCPs at a faster rate and reducing the DCN backlog.

VSS-1.2 Summary for Emergency Lighting System

Required nuclear surveillances for the Emergency Lighting System are current and procedures provide for their completion at the required frequency consistent with the variance interval described in the TSRs. Backlog of other preventive maintenance, inspections, corrective maintenance, upgrades and other work is managed and receives priority in the Work Control System based on the system safety classification. The Emergency Lighting System upgrade project was completed in FY 2000. This criterion is met.

VSS-1.3 Configuration Management and Maintenance programs effectively ensure operational availability of the system.

VSS-1.3 Review Approach 5

Preventive maintenance actions are evaluated and implemented according to STD-5100, *Maintenance Management,* and STD-5016, *Maintenance Work Control System*. Safety walkdowns are scheduled according to STD-3190, *Safety Surveys of Facilities*. Formal readiness reviews are scheduled following implementation of changed conditions, including authorization basis changes and system modifications. In particular, the implementation of RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, in March 2000 was followed by a rigorous assessment of all safety class and safety significant systems.

VSS-1.3 Review Approach 8

Configuration Management processes for Nuclear Facilities Vital Safety Systems are based on a graded approach, governed by the following Authorization Basis Documents:

- RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation* (including addendums)
- Weapon Programs Activity Based Control Documents (ABCDs).

The specific Nuclear Facilities at Pantex Plant are delineated in MNL-207300, *Unreviewed Safety Question (USQ)/Nuclear Explosive Safety (NES) Process*, Appendix A. All modifications to Vital Safety Systems and related procedures affecting their operation or evaluation of their performance are required to be evaluated through the USQ/NES Program according to STD-3014, *Unreviewed Safety Question/Nuclear Explosive Safety Program.*

The change control classification for Vital Safety Systems are Class 1 (Safety Class and Safety Significant Systems) and Class 2 (Important-to-Safety Systems). The Class 1 and 2 configuration and control procedures are described in the following documents:

- STD-9045, *Change Control for Class 1 Facility Related Systems, Structures, & Components*
- STD-9046, *Class 2 Configuration Control for Facility Related Systems, Structures & Components*
- MNL-00054, *Facilities Configuration Management - Conduct of Operations.*

Nuclear Facilities change control includes a formal process for submitting, receiving, evaluating, documenting, amending, and archiving "technical baseline" information for safety related structures, systems, and components (SSCs). MNL-00054, Chapter 11, describes the process. The technical baseline establishes the actual physical configuration of the SSC, the design documents associated with the SSC, the boundaries and interfaces of the SSC to other systems, applicable Authorization Basis or operating regulations, various flow down shop floor documents, and the formal processes established to maintain and control this information.

- An Engineering Data Transmittal (EDT) and Technical Baseline Checklist are the forms used in the baselining process.

- The EDT is the formal method for accepting responsibility for controlling engineering documentation and is used to transmit information to be included in the technical baseline. All EDTs are approved by the Facility Change Control Manager (FCCM), System Engineering Manager, and Technical Basis Control Manager.

- The EDT is used as the formal (internal to Facilities CM) mechanism to establish facility or system readiness. Promulgation of readiness is a legal commitment to the DOE. As such, the requirements for establishing a Facility CM baseline are more stringent and are established by the FCCM. Any modifications to systems or equipment after the approval date are required to be processed through formal change control according to STD-9045 or STD-9046.

Changes or modifications to safety class and safety significant systems are accomplished through a maintenance work order, or outside construction project. STD-9045 establishes the configuration and change control procedure for Safety Class and Safety Significant SSCs, which are designated Class 1 change control. This procedure includes formalities such as a dedicated FCCM who is responsible for, among other things, managing activities associated with the Facility Configuration Control Board (FCCB).

- The FCCB, chaired by a permanent Chairman, consists of management level representatives from numerous organizations who are responsible for reviewing Design Change Proposal (DCP) packages and providing recommendations (concur as written/concur with comments, do not concur, or defer with comments) to the Chairman, who approves, disapproves, or defers the DCP.

- Class 1 DCPs contain information needed to justify a modification in a Nuclear Facility. The DCP process ensures impacted documents are identified, USQ screening has occurred, evidence of good design practices (i.e., independent reviews) have been instituted.

- A Design Change Notice (DCN) is generated as a result of required actions from a DCP. The DCN is a transmittal sent to groups or individuals affected by the modification. Actions identified on the DCN must be completed. If controlled documents or drawings are affected by the modification, a copy of the DCN is attached to the documents or drawings, removed when the change process has been completed and the revised documents or drawings replaced.

- STD-9046 establishes the procedure for Class 2 Important-to-Safety SSCs' change control. The requirements and change control processes are essentially the same as STD-9045 with the exception that the FCCB approval is not required for Class 2 DCPs. The FCCB Chairman approves the DCP.

MNL-00054 establishes the infrastructure for Nuclear Facilities change control. The following describes the manual contents:

Chapter 1 - Construction/Project File Processing
Chapter 2 - Drawing Processing and Control for Systems Not Under CM
Chapter 3 - Walkdown Drawing/Package Processing and Control for Systems Under CM
Chapter 4 - Design Recovery and Systems Engineering Controlled Document Submittal Processing
Chapter 5 - System Design Description (SDD) Distribution and Change Control
Chapter 6 - Manual/Document Distribution and Control
Chapter 7 - Drawing Processing and Control of Configuration Management Controlled Drawings
Chapter 8 - Vendor Manual Process
Chapter 9 - Class 1 Design Change Proposal Process
Chapter 10 - Class 2 Design Change Proposal Process
Chapter 11 - Technical Baseline Documentation - Engineering Data Transmittal

Nuclear Facility change control requires the input from System Engineers (SEs). System Engineering responsibilities are detailed in the following Internal Operating Procedures (IOPs):

- IOP-366, *Design Recovery*
- IOP-367, *System Engineering Review Process*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures*
- IOP-448, *Engineering & Operability Evaluations*
- IOP-465, *Safety and Plant Reviews*
- IOP-551, *Item Equivalency Evaluations*
- IOP-631, *Classification of Sub-systems*
- IOP-637, *System Engineering Support of Design Change Proposal Closures*
- IOP-731, *Methodology Requirements*
- IOP-686, *Cell Door Leak Area Validation*
- IOP-FO-1116, *System Engineering Review of New Crane Vendor Manual Information*

STD-5016, *Maintenance Work Control System*, establishes the procedure for modifications performed by Pantex Plant craft personnel. STD-5016 establishes the required activities and types of documents that are eventually included in a DCP package described in STD-9045 and STD-9046.

- A work request is initiated through Facility Management Integration (FMI)/Passport, generally by the Facility Manager. If the request is not generated by the FM, the FM must be notified and be included in the process. The facility term, used in Passport to differentiate Nuclear Facility Safety Class, Safety Significant, and Important-to-Safety SSCs is "CM-listed." In change control terms, CM-listed SSCs are either Class 1 or Class 2. Work requests in Nuclear Facilities, are required to be reviewed and concurred with by System Engineering.

- The Unreviewed Safety Question Evaluation is initiated according to STD-3014.

- A DCP is initiated.

- All documentation required by STD-5016 is included in the work request and is submitted to Maintenance Work Control for consideration and approval.

- If the work request is authorized and approved, the Maintenance Work Control Department assigns the Work Order a to designer. The design is completed, a DCP package assembled (STD-9045 AND STD-9046 APPENDIX A), appropriate signatures obtained, and submitted to the FCCM for review.

- The DCP is processed and approved.

- When work has been accomplished, the FCCM is notified by Maintenance Work Control.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

STD-9027, *Facility Project Requests,* establishes the initial project request for modifications requiring outside construction contracts.

- A requestor submits a form, *Project Information Sheet for Construction Projects*, and required information to the appropriate Infrastructure Division coordinator.

- The coordinator signs, prioritizes the request, and submits the package to Engineering and Construction, Scheduling and Cost Control Estimating Section.

- The Estimating Section performs a planning cost estimate that ultimately determines the project scope.

- The Site Planning organization, with assistance from Engineering and Construction and Technical Resources Departments evaluate the request and prioritize it according to STD-9027.

- The Engineering and Construction Department assigns a Project Manager and Project Engineer(s) who develop the design modification according to MNL-FO-1009, *LCAM Implementation Manual*.

- A DCP package is prepared, reviewed, and approved according to STD-9045 and STD-9046, APPENDIX A.

- When work has been accomplished, the FCCM is notified by receiving a copy of Beneficial Occupancy.

- Project records, technical baseline documentation, are submitted to Technical Basis Control by the Project Engineer.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

VSS-1.3 Review Approach 9

The document control process for Vital Safety Systems is governed by STD-9045, STD-9046, and MNL-00054. (Refer to RA8.) Documents that can be affected as a result of a modification are identified on the DCP form. Pending changes are promulgated by a Design Change Notice (DCN) which is posted on the document that will be revised:

Controlled Drawings
Vendor Manuals
System Design Description(s) (System Engineering Document)
Passport Data Base (Electronic data base - Component Information (System Engineering)

If external calibration, operations, training, or preventive maintenance procedures are affected by a modification, the applicable organization is notified with a DCN. Acknowledgment of the DCN is made and returned to Facilities Change Control.

Within the Facilities change control process, documents other than design basis documents, are controlled using a Document Change Request. These internal documents include procedures, and instruction type manuals. The change control infrastructure is governed by MNL-00054, which is described in RA8. Review and approval requirements for all documents controlled by facilities change control are listed and described in MNL-00054.

In the later part of FY-99 and early FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities had significant impact on the Facilities configuration and change control processes.

VSS-1.3 Emergency Lighting System

The configuration management and maintenance programs are well defined and formally implemented to control changes to the Emergency Lighting System. There is a significant backlog in open Design Change Notices. This backlog is tracked and managed by procedure. However, the significant number of DCNs, which is an interim or temporary document, has the potential to impact operational availability of the system. This criterion is not fully met.

VSS-1.4 The system is operable and available to fulfill its safety function when required.

VSS-1.4 Review Approach 4

After surveillance activities have been completed by crafts personnel, the cognizant System Engineer receives data from the craft's supervisor and prepares data for internal tracking and trending purposes. Visual inspection of all emergency lights is ongoing. Functional testing of emergency lights and backup power for emergency lights is conducted monthly. An annual test verifies emergency lights operate on backup power.

VSS-1.4 Review Approach 10

The rigor of documentation and change control of items under Nuclear Facilities CM reflects the levels of hazard classification. New VSS (Safety Class/Safety Significant) SSCs are determined through hazard and accident analysis, and are promulgated through Authorization Basis Documents. Resulting AB Implementation Plans promulgate required activities such as modifications, facility walkdowns, or design recovery as described in Plant Standard STD-3073, Implementation of Authorization Basis changes. As described in RA8, the technical baseline for VSS SSCs is established and subsequently managed by the Class 1 change control and Important-to-Safety SSCs are managed by Class 2 change control.

A list of available controls (for an event) is identified during the *hazard* and *accident analysis* process. This list of controls is then classified based on the unmitigated consequences and frequency of an event to determine which controls are classified as Safety-Class, Safety-Significant, and Important-to-Safety.

VSS-1.4 Summary of Emergency Lighting System

Surveillances verify that the operational requirements of the Emergency Lighting System are met. A more formal tracking and trending program has been developed and very recently implemented by System Engineering. There are no identified operability or reliability issues, and this criterion is met.

Conclusion for Emergency Lighting System The emergency lighting system is operational and personnel and procedures are in place to ensure continued operability. Summary status is:

System Engineer - Assigned and knowledgeable
Configuration Management - Yellow ⇑
Some controlled documentation may not be verified or complete, but it is known that none of these affect the operability of the Emergency Lighting System.
Maintenance - Green ⇒
Operations - Green ⇒
Overall Status - Green ⇒

Green means the system is operable and available to fulfill its safety function when required, system testing is adequate to ensure operability, and the system is available for intended missions.

Arrows slant upward if conditions are improving, are horizontal when conditions are stable, and slant downward if conditions are deteriorating.

These conclusions are based on the pre-determined criteria and assessment process prescribed by the five member team of subject matter experts. Interviews with personnel experienced in nuclear facility management, authorization basis, system engineering, configuration management, maintenance management, maintenance work control, and performance of nuclear surveillances and in-service inspections were performed. Research of the Recapitalization Plan which considers facility specific assessment data, maintenance backlog data including deferred maintenance, Technical Safety Requirements, occurrence data, recent readiness assessment findings, budget, and correspondence/reports addressing specific facility needs, and current processes were also conducted. Conclusions by the original five team members were used when applicable to the bays and cells.

DOE employee who reviewed this assessment____Terry Zimmerman_____Date____2/21/01___

Hours required to complete assessment. DOE:___3____Hrs. Contractor:__22___Hrs.

Assessment of Operational Readiness
Facility Crane Assembly

Site: Pantex Plant, Amarillo, TX

Facility: Buildings 12-84, 12-85, 12-98, and 12-104

System: Facility Crane Assembly

System Classification: Safety Class

System Safety Function: The Facility Crane Assembly prevents an impact initiated event by not failing during all operating and credible seismic accident conditions. This function protects the public, the facility worker, and the site worker.

OBJECTIVE

VSS-1 This vital safety system is operational and personnel and processes are in place that ensure its continued operational readiness.

Criteria and Discussion of Results

VSS-1.1 VSS safety functions are defined and understood by responsible line managers, and supporting information/documentation is available and adequate. System testing is adequate to ensure operability.

VSS-1.1 Review Approach 1

The following Pantex Plant Authorization Basis Documents identify safety class, safety significant, and important-to-safety systems, their safety functions, the normal, abnormal, and accident conditions under which the system is intended to perform, and system functional requirements and performance.

- *RPT-SAR-199801, Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation (BIO)*
- Weapons Programs' Activity Based Control Documents (ABCDs).

Due to the large number of facilities, their diverse functions and age, it is possible that some analytical basis documentation has not been retrievable. In those situations, new analysis is performed and documented by Pantex Plant and, sometimes by the appropriate Design Agency. The current TSR documents, listed above, have supportive, formally controlled analytical basis documents.

VSS-1.1 Review Approach 2

The following Pantex Plant documents provide for incorporation of surveillance and in-service inspection (SR/ISI) requirements into implementing procedures.

- STD-9050, *Surveillance/In-Service Inspection Programs*
- MNL-00037, *Index of Technical Safety Requirement Surveillance & In-Service Inspection Procedures*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures.*

At Pantex Plant, the TSRs are compiled facility-by-facility and provide action, basis, mode, surveillance and inspection requirements and frequencies. The requirements are flowed into plant procedures and are listed in MNL-00037. The listing identifies the specific procedures that fulfill the SR/ISI requirements for operability promulgated by the TSRs.

The following describes the roles and responsibilities of those involved in the SR/ISI process:

1. According to technical expertise, System Engineers are assigned SSCs; and as custodians, System Engineers provide the following:
   - Technical basis including acceptance criteria, as appropriate, required for incorporation into SR/ISIs
   - Assistance to organizations in performing SR/ISIs
   - Establish and maintain a system deficiency tracking and trending program so that action may be taken to maximize system performance and minimize downtime
   - Review and approve SR/ISI procedures using a checklist
   - Identify SR/ISI steps within the procedures
   - Technical support for MNL-00037.
2. Facility Managers maintain a facility preventive maintenance tracking board and include the SR/ISI requirements, frequency, applicable procedure, completion date, and next due date.
3. Organizations responsible for performing the SR/ISIs provide procedures, and trained and qualified personnel to perform work and document results.
4. The Maintenance Work Control Department manages the preparation, revision, verification, validation, approval and distribution of SR/ISI procedures performed by crafts personnel. Reference IOP-FO-1015, *Controlled Document Process.*

VSS-1.1 Review Approach 3

MNL-00037 is used as an index to identify those test, inspection and calibration processes or procedures that satisfy the SR/ISI requirements that are outlined in the TSRs. The information contained includes the facility number (Nuclear, and Nuclear Explosives Areas), a listing of the Vital Safety Systems within the facility, minimum SR/ISI requirements for operability, the frequency that the SR/ISI must be performed, and the number of the procedure. The requirements are extrapolated from the TSRs.

VSS-1.1 Review Approach 7

The System Engineer determines the System Codes, and the drawings are annotated by System Codes and clearly stamped in red "Controlled Copy."

Drawings are entered into the configuration control system by an Engineering Data Transmittal (EDT) (Ref. RA8) or a Design Change Proposal (DCP). The EDT is used during system walkdowns, in which case the drawing is identified as Current Condition. A DCP documents the modification process for systems currently under control. Changes to the drawings are tracked via a Design Change Notice (DCN).

Types of drawings vary according to the system. All are reviewed and approved according to requirements in STD-9045, STD-9046, and MNL-00054 (Ref. RA8). Listings are available by System Codes. As a supplement to drawings, System Design Descriptions are documents that reflect additional system information, such as system boundaries, functional requirements, and reflect other TSR and Authorization Basis requirements. They are also a source for listing controlled drawings applicable to the systems and facility.

Controlled drawings have controlled, limited distribution, and are tracked during the process of revisions. The drawings are housed in a controlled area and are displayed according to facility numbers.

VSS-1.1 Summary for Facility Crane Assembly

The safety functions of the Facility Crane Assembly are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, and related documents implemented in March 2000. The subsequent readiness assessments by the Management and Operating (M&O) Contractor and the Department of Energy validated the implementation process described in this section including adequacy of flowdown, knowledge of line management and support personnel, availability of documentation, and adequacy of system testing to verify system operability. Actions have been taken to address deficiencies identified during the readiness assessment, and procedures are in place to correct newly discovered deficiencies. This criterion is met.

VSS-1.2 The backlog for surveillances, tests, inspections, maintenance, repair, upgrades, or other work on the system is managed and kept to an appropriate minimum.

VSS-1.2 Review Approach 6

There is no backlog for in-service inspections applicable to facility crane assemblies. Surveillances and in-service inspections are scheduled by the responsible organization in accordance with STD-9050, *Surveillance/In-service Inspection Program*, and are coordinated with the Facility Manager or applicable scheduling representative. Surveillances and inspections are tracked via facility status boards by Facility Management. Allowable variance periods for performance of inspections are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*. Corrective maintenance, when required, receives priority in accordance with the safety system classification. Four (4) bays in Building 12-84 have manual chain fall hoists installed that pose potential lightning vulnerabilities. Replacements are onsite awaiting bay availability for installation.

The maintenance program places emphasis on maintaining reliability of site VSS. Greater than 20% of maintenance resources (approximately $22 million) available for facility and plant equipment upkeep is applied to nuclear facility maintenance. Approximately 12% of the total is required for performance of nuclear surveillances, in-service inspections, and preventive maintenance actions in nuclear facilities. Concomitantly, the Work Control System applies greater rigor in the performance of nuclear facility maintenance and provides: precise scheduling and tracking of surveillance and in-service inspections to satisfy the TSRs, priority for corrective maintenance to minimize production downtime and maintain system reliability, formal interface with facility management for communication of status, and increased controls on review and approval of work packages.

In the later part of FY-99 and throughout FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities required numerous modifications to facilities and related documents to meet new AB requirements, which meant an abnormally high level of change control activity. Statistics are maintained on the backlog of Design Change Proposals (DCPs), which are discussed under VSS-1.3, Review Approach 8. Review of the 1999 and 2000 DCP “cycle” time indicates a positive trend to shorten closure time. From 1999 to 2000, the average cycle time for work completion notification has reduced from 5.93 months to 2.15 months. Average cycle time for System Engineer to submit Design Change Notice (DCN) following notification of work completion has reduced from 7.11 to 2.6 months. A modification is not complete until the work is completed and all documentation has been updated. The importance of accurate documentation is evidenced in the current effort to close DCPs at a faster rate and reducing the DCN backlog.

VSS-1.2 Summary for Facility Crane Assembly

Required nuclear surveillances for the Facility Crane Assembly are current and procedures provide for their completion at the required frequency consistent with the variance interval described in the TSRs. Backlog of other preventive maintenance, inspections, corrective maintenance, upgrades and other work is managed and receives priority in the Work Control System based on the system safety classification. This criterion is met.

VSS-1.3 Configuration Management and Maintenance programs effectively ensure operational availability of the system.

VSS-1.3 Review Approach 5

Preventive maintenance actions are evaluated and implemented according to STD-5100, *Maintenance Management* and STD-5016, *Maintenance Work Control System*. Safety walkdowns are scheduled according to STD-3190, *Safety Surveys of Facilities*. Formal readiness reviews are scheduled following implementation of changed conditions, including authorization basis changes and system modifications. In particular, the implementation of RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, in March 2000 was followed by a detailed assessment of all safety class and safety significant systems.

VSS-1.3 Review Approach 8

Configuration Management processes for Nuclear Facilities Vital Safety Systems are based on a graded approach, governed by the following Authorization Basis Documents:

- RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation* (including addendums)
- Weapon Programs Activity Based Control Documents (ABCDs).

The specific Nuclear Facilities at Pantex Plant are delineated in MNL-207300, *Unreviewed Safety Question (USQ)/Nuclear Explosive Safety (NES) Process*, Appendix A. All modifications to Vital Safety Systems and related procedures affecting their operation or evaluation of their performance are required to be evaluated through the USQ/NES Program according to STD-3014, *Unreviewed Safety Question/Nuclear Explosive Safety Program.*

The change control classification for Vital Safety Systems are Class 1 (Safety Class and Safety Significant Systems) and Class 2 (Important-to-Safety Systems). The Class 1 and 2 configuration and control procedures are described in the following documents:

- STD-9045, *Change Control for Class 1 Facility Related Systems, Structures, & Components*
- STD-9046, *Class 2 Configuration Control for Facility Related Systems, Structures & Components*
- MNL-00054, *Facilities Configuration Management - Conduct of Operations.*

Nuclear Facilities change control includes a formal process for submitting, receiving, evaluating, documenting, amending, and archiving "technical baseline" information for safety related structures, systems, and components (SSCs). MNL-00054, Chapter 11, describes the process. The technical baseline establishes the actual physical configuration of the SSC, the design documents associated with the SSC, the boundaries and interfaces of the SSC to other systems, applicable Authorization Basis or operating regulations, various flow down shop floor documents, and the formal processes established to maintain and control this information.

- An Engineering Data Transmittal (EDT) and Technical Baseline Checklist are the forms used in the baselining process.

- The EDT is the formal method for accepting responsibility for controlling engineering documentation and is used to transmit information to be included in the technical baseline. All EDTs are approved by the Facility Change Control Manager (FCCM), System Engineering Manager, and Technical Basis Control Manager.

- The EDT is used as the formal (internal to Facilities CM) mechanism to establish facility or system readiness. Promulgation of readiness is a legal commitment to the DOE. As such, the requirements for establishing a Facility CM baseline are more stringent and are established by the FCCM. Any modifications to systems or equipment after the approval date are required to be processed through formal change control according to STD-9045 or STD-9046.

Changes or modifications to safety class and safety significant systems are accomplished through a maintenance work order, or outside construction project. STD-9045 establishes the configuration and change control procedure for Safety Class and Safety Significant SSCs, which are designated Class 1 change control. This procedure includes formalities such as a dedicated FCCM who is responsible for, among other things, managing activities associated with the Facility Configuration Control Board (FCCB).

- The FCCB, chaired by a permanent Chairman, consists of management level representatives from numerous organizations who are responsible for reviewing Design Change Proposal (DCP) packages and providing recommendations (concur as written/concur with comments, do not concur, or defer with comments) to the Chairman, who approves, disapproves, or defers the DCP.

- Class 1 DCPs contain information needed to justify a modification in a Nuclear Facility. The DCP process ensures impacted documents are identified, USQ screening has occurred, evidence of good design practices (i.e., independent reviews) have been instituted.

- A Design Change Notice (DCN) is generated as a result of required actions from a DCP. The DCN is a transmittal sent to groups or individuals affected by the modification. Actions identified on the DCN must be completed. If controlled documents or drawings are affected by the modification, a copy of the DCN is attached to the documents or drawings, removed when the change process has been completed and the revised documents or drawings replaced.

- STD-9046 establishes the procedure for Class 2 Important-to-Safety SSCs' change control. The requirements and change control processes are essentially the same as STD-9045 with the exception that the FCCB approval is not required for Class 2 DCPs. The FCCB Chairman approves the DCP.

MNL-00054 establishes the infrastructure for Nuclear Facilities change control. The following describes the manual contents:

Chapter 1 - Construction/Project File Processing
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Chapter 3 - Walkdown Drawing/Package Processing and Control for Systems Under CM
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Chapter 5 - System Design Description (SDD) Distribution and Change Control
Chapter 6 - Manual/Document Distribution and Control
Chapter 7 - Drawing Processing and Control of Configuration Management Controlled Drawings
Chapter 8 - Vendor Manual Process
Chapter 9 - Class 1 Design Change Proposal Process
Chapter 10 - Class 2 Design Change Proposal Process
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Nuclear Facility change control requires the input from System Engineers (SEs). System Engineering responsibilities are detailed in the following Internal Operating Procedures (IOPs):

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- IOP-465, *Safety and Plant Reviews*
- IOP-551, *Item Equivalency Evaluations*
- IOP-631, *Classification of Sub-systems*
- IOP-637, *System Engineering Support of Design Change Proposal Closures*
- IOP-731, *Methodology Requirements*
- IOP-686, *Cell Door Leak Area Validation*
- IOP-FO-1116, *System Engineering Review of New Crane Vendor Manual Information*

STD-5016, *Maintenance Work Control System*, establishes the procedure for modifications performed by Pantex Plant craft personnel. STD-5016 establishes the required activities and types of documents that are eventually included in a DCP package described in STD-9045 and STD-9046.

- A work request is initiated through Facility Management Integration (FMI)/Passport, generally by the Facility Manager. If the request is not generated by the FM, the FM must be notified and be included in the process. The facility term, used in Passport to differentiate Nuclear Facility Safety Class, Safety Significant, and Important-to-Safety SSCs is “CM-listed.” In change control terms, CM-listed SSCs are either Class 1 or Class

2. Work requests in Nuclear Facilities, are required to be reviewed and concurred with by System Engineering.

- The Unreviewed Safety Question Evaluation is initiated according to STD-3014.

- A DCP is initiated.

- All documentation required by STD-5016 is included in the work request and is submitted to Maintenance Work Control for consideration and approval.

- If the work request is authorized and approved, the Maintenance Work Control Department assigns the Work Order a to designer. The design is completed a DCP package assembled (STD-9045 AND STD-9046 APPENDIX A), appropriate signatures obtained, and submitted to the FCCM for review.

- The DCP is processed and approved.

- When work has been accomplished, the FCCM is notified by Maintenance Work Control.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

STD-9027, *Facility Project Requests,* establishes the initial project request for modifications requiring outside construction contracts.

- A requestor submits a form, *Project Information Sheet for Construction Projects*, and required information to the appropriate Infrastructure Division coordinator.

- The coordinator signs, prioritizes the request, and submits the package to Engineering and Construction, Scheduling and Cost Control Estimating Section.

- The Estimating Section performs a planning cost estimate that ultimately determines the project scope.

- The Site Planning organization, with assistance from Engineering and Construction and Technical Resources Departments evaluate the request and prioritize it according to STD-9027.

- The Engineering and Construction Department assigns a Project Manager and Project Engineer(s) who develop the design modification according to MNL-FO-1009, *LCAM Implementation Manual*.

- A DCP package is prepared, reviewed, and approved according to STD-9045 and STD-9046, APPENDIX A.

- When work has been accomplished, the FCCM is notified by receiving a copy of Beneficial Occupancy.

- Project records, technical baseline documentation, are submitted to Technical Basis Control by the Project Engineer.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

VSS-1.3 Review Approach 9

The document control process for Vital Safety Systems is governed by STD-9045, STD-9046, and MNL-00054. (Refer to RA8.) Documents that can be affected as a result of a modification are identified on the DCP form. Pending changes are promulgated by a Design Change Notice (DCN) which is posted on the document that will be revised:

Controlled Drawings
Vendor Manuals
System Design Description(s) (System Engineering Document)
Passport Data Base (Electronic data base - Component Information (System Engineering)

If external calibration, operations, training, or preventive maintenance procedures are affected by a modification, the applicable organization is notified with a DCN. Acknowledgment of the DCN is made and returned to Facilities Change Control.

Within the Facilities change control process, documents other than design basis documents, are controlled using a Document Change Request. These internal documents include procedures, and instruction type manuals. The change control infrastructure is governed by MNL-00054, which is described in RA8. Review and approval requirements for all documents controlled by facilities change control are listed and described in MNL-00054.

In the later part of FY-99 and early FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities had significant impact on the Facilities configuration and change control processes.

VSS-1.3 Facility Crane Assembly

The configuration management and maintenance programs are well defined and formally implemented to control changes to the Facility Crane Assembly. There is a significant backlog in open Design Change Notices (DCNs). This backlog is tracked and managed by procedure. However, the significant number of DCNs, which is an interim or temporary document, has the potential to impact operational availability of the system. In addition, there is an active project to complete the "as-installed" baseline for the Facility Crane Assemblies. This criterion is not fully met.

VSS-1.4 The system is operable and available to fulfill its safety function when required.

VSS-1.4 Review Approach 4

During assessment of TSR implementation, a programmatic deficiency was observed in the configuration management of facility crane assemblies. Cranes became classified as Safety Class/Significant in March, 2000. Prior to that date, cranes were classified as Balance-of-Plant and later as Important-to-Safety. The cranes were not under configuration management and documentation had not been baselined. To support the reclassification of the cranes as critical systems, an "as-installed" baseline was required to be developed which included determination of acceptance criteria based on manufacturing tolerances and measurements, updating and correcting data sheets, preparation of new SR/ISI procedures, drawing and manual updates. In total there were fifteen corrective actions resulting from this finding. All actions have been completed; and processes are established to collect additional configuration data.

VSS-1.4 Review Approach 10

The rigor of documentation and change control of items under Nuclear Facilities CM reflects the levels of hazard classification. New VSS (Safety Class/Safety Significant) SSCs are determined through hazard and accident analysis, and are promulgated through Authorization Basis Documents. Resulting AB Implementation Plans promulgate required activities such as modifications, facility walkdowns, or design recovery as described in Plant Standard STD-3073, Implementation of Authorization Basis changes. As described in RA8, the technical baseline for VSS SSCs is established and subsequently managed by the Class 1 change control and Important-to-Safety SSCs are managed by Class 2 change control.

A list of available controls (for an event) is identified during the *hazard* and *accident analysis* process. This list of controls is then classified based on the unmitigated consequences and frequency of an event to determine which controls are classified as Safety-Class, Safety-Significant, and Important-to-Safety.

VSS-1.4 Summary of Facility Crane Assembly

In-service inspections verify that the functional requirements of the Facility Crane Assembly are met. A more formal tracking and trending program has been developed and very recently implemented by System Engineering. There are potential vulnerabilities with the use of manual chain fall hoists in Building 12-84. This issue is being work, but at this time the criterion is not fully met.

Conclusion for Facility Crane Assembly The facility crane assembly is operational and personnel and procedures are in place to ensure continued operability. Summary status is:

System Engineer - Assigned and knowledgeable
Configuration Management - Yellow ⇑
Currently collecting non-critical component data. Some controlled documentation may not be verified or complete, but it is known that none of these affect the operability of the Vital Safety Systems.
Maintenance - Green ⇒

Preventive maintenance and in-service inspections are current; corrective backlog is managed and kept to an appropriate minimum.

Operations - Yellow ⇑

Four bays in Building 12-84 currently have manual chain fall hoists installed that pose potential lightning vulnerability. Replacements are onsite awaiting bay availability for installation.

Overall Status - Yellow ⇑

Arrows slant upward if conditions are improving, are horizontal when conditions are stable, and slant downward if conditions are deteriorating.

These conclusions are based on the pre-determined criteria and assessment process prescribed by the five member team of subject matter experts. Interviews with personnel experienced in nuclear facility management, authorization basis, system engineering, configuration management, maintenance management, maintenance work control, and performance of nuclear surveillances and in-service inspections were performed. Research of Recapitalization Plan which considers facility specific assessment data, maintenance backlog data including deferred maintenance, Technical Safety Requirements, occurrence data, recent readiness assessment findings, budget, and correspondence/reports addressing specific facility needs, and current processes were also conducted. Conclusions by the original five team members were used when applicable to the bays and cells.

DOE employee who reviewed this assessment____Terry Zimmerman_____Date____2/21/01___

Hours required to complete assessment. DOE:___3____Hrs. Contractor:__22____Hrs.

Assessment of Operational Readiness
Equipment Blast Door Interlock System

Site: Pantex Plant, Amarillo, TX

Facility: Buildings 12-85, 12-96, and 12-98

System: Equipment Blast Door Interlock System

System Classification: Safety Class

System Safety Function: A steel Equipment Blast Door is located at each end of a cell equipment passage way. The Equipment Blast Doors are considered part of the Facility Structure and are in place to limit the leak past following an explosive detonation inside the cell. The Equipment Blast Door Interlock (BDI) System supports the critical safety function of the facility structure by ensuring that at least one Equipment Blast Door is closed at all times when the system is operable and when greater than residual quantities of Pu and HE are both present within the facility. By supporting the Facility Structure, the system mitigates the consequences of a high explosive detonation with dispersion event by limiting the leak path. The Equipment BDI System also ensures the Blast Door Floor Gasket on a closed door is in the lowered position. The Blast Door Floor Gasket in the lowered position is credited with reducing the leak area around the equipment doors.

OBJECTIVE

VSS-1 This vital safety system is operational and personnel and processes are in place that ensure its continued operational readiness.

Criteria and Discussion of Results

VSS-1.1 VSS safety functions are defined and understood by responsible line managers, and supporting information/documentation is available and adequate. System testing is adequate to ensure operability.

VSS-1.1 Review Approach 1

The following Pantex Plant Authorization Basis Documents identify safety class, safety significant, and important-to-safety systems, their safety functions, the normal, abnormal, and accident conditions under which the system is intended to perform, and system functional requirements and performance.

- *RPT-SAR-199801, Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation (BIO)*
- Weapons Programs' Activity Based Control Documents (ABCDs).

Due to the large number of facilities, their diverse functions and age, it is possible that some analytical basis documentation has not been retrievable. In those situations, new analysis is performed and documented by Pantex Plant and, sometimes by the appropriate Design Agency.

The current TSR documents, listed above, have supportive, formally controlled analytical basis documents.

VSS-1.1 Review Approach 2

The following Pantex Plant documents provide for incorporation of surveillance and in-service inspection (SR/ISI) requirements into implementing procedures.

- STD-9050, *Surveillance/In-Service Inspection Programs*
- MNL-00037, *Index of Technical Safety Requirement Surveillance & In-Service Inspection Procedures*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures.*

At Pantex Plant, the TSRs are compiled facility-by-facility and provide action, basis, mode, surveillance and inspection requirements and frequencies. The requirements are flowed into plant procedures and are listed in MNL-00037. The listing identifies the specific procedures that fulfill the SR/ISI requirements for operability promulgated by the TSRs.

The following describes the roles and responsibilities of those involved in the SR/ISI process:

1. According to technical expertise, System Engineers are assigned SSCs; and as custodians, System Engineers provide the following:
   - Technical basis including acceptance criteria, as appropriate, required for incorporation into SR/ISIs
   - Assistance to organizations in performing SR/ISIs
   - Establish and maintain a system deficiency tracking and trending program so that action may be taken to maximize system performance and minimize downtime
   - Review and approve SR/ISI procedures using a checklist
   - Identify SR/ISI steps within the procedures
   - Technical support for MNL-00037.
2. Facility Managers maintain a facility preventive maintenance tracking board and include the SR/ISI requirements, frequency, applicable procedure, completion date, and next due date.
3. Organizations responsible for performing the SR/ISIs provide procedures, and trained and qualified personnel to perform work and document results.
4. The Maintenance Work Control Department manages the preparation, revision, verification, validation, approval and distribution of SR/ISI procedures performed by crafts personnel. Reference IOP-FO-1015, *Controlled Document Process.*

VSS-1.1 Review Approach 3

MNL-00037 is used as an index to identify those test, inspection and calibration processes or procedures that satisfy the SR/ISI requirements that are outlined in the TSRs. The information contained includes the facility number (Nuclear, and Nuclear Explosives Areas), a listing of the Vital Safety Systems within the facility, minimum SR/ISI requirements for operability, the frequency that the SR/ISI must be performed, and the number of the procedure. The requirements are extrapolated from the TSRs.

VSS-1.1 Review Approach 7

The System Engineer determines the System Codes, and the drawings are annotated by System Codes and clearly stamped in red "Controlled Copy."

Drawings are entered into the configuration control system by an Engineering Data Transmittal (EDT) (Ref. RA8) or a Design Change Proposal (DCP). The EDT is used during system walkdowns, in which case the drawing is identified as Current Condition. A DCP documents the modification process for systems currently under control. Changes to the drawings are tracked via a Design Change Notice (DCN).

Types of drawings vary according to the system. All are reviewed and approved according to requirements in STD-9045, STD-9046, and MNL-00054 (Ref. RA8). Listings are available by System Codes. As a supplement to drawings, System Design Descriptions are documents that reflect additional system information, such as system boundaries, requirements, and reflect other TSR and Authorization Basis requirements. They are also a source for listing controlled drawings applicable to the systems and facility.

Controlled drawings have controlled, limited distribution, and are tracked during the process of revisions. The drawings are housed in a controlled area and are displayed according to facility numbers.

VSS-1.1 Summary for Equipment Blast Door Interlock System

The safety functions of the Equipment Blast Door Interlock System are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, and related documents implemented in March 2000. The subsequent readiness assessments by the Management and Operating (M&O) Contractor and the Department of Energy validated the implementation process described in this section including adequacy of flowdown, knowledge of line management and support personnel, availability of documentation, and adequacy of system testing to verify system operability. Actions have been taken to address deficiencies identified during the readiness assessment, and procedures are in place to correct newly discovered deficiencies. This criterion is met.

VSS-1.2 The backlog for surveillances, tests, inspections, maintenance, repair, upgrades, or other work on the system is managed and kept to an appropriate minimum.

VSS-1.2 Review Approach 6

There is no backlog for in-service inspections applicable to equipment blast door interlock systems. Surveillances and in-service inspections are scheduled by the responsible organization in accordance with STD-9050, *Surveillance/In-service Inspection Program*, and are coordinated with the Facility Manager or applicable scheduling representative. Surveillances and inspections are tracked via facility status boards by Facility Management. Allowable variance periods for performance of inspections are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*. Corrective maintenance, when required, receives priority in accordance with the safety system classification. There are no planned modifications.

The maintenance program places emphasis on maintaining reliability of site VSS. Greater than 20% of maintenance resources (approximately $22 million) available for facility and plant equipment upkeep is applied to nuclear facility maintenance. Approximately 12% of the total is required for performance of nuclear surveillances, in-service inspections, and preventive maintenance actions in nuclear facilities. Concomitantly, the Work Control System applies greater rigor in the performance of nuclear facility maintenance and provides: precise scheduling and tracking of surveillance and in-service inspections to satisfy the TSRs, priority for corrective maintenance to minimize production downtime and maintain system reliability, formal interface with facility management for communication of status, and increased controls on review and approval of work packages.

In the later part of FY-99 and throughout FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities required numerous modifications to facilities and related documents to meet new AB requirements, which meant an abnormally high level of change control activity. Statistics are maintained on the backlog of Design Change Proposals (DCPs), which are discussed under VSS-1.3, Review Approach 8. Review of the 1999 and 2000 DCP “cycle” time indicates a positive trend to shorten closure time. From 1999 to 2000, the average cycle time for work completion notification has reduced from 5.93 months to 2.15 months. Average cycle time for System Engineer to submit Design Change Notice (DCN) following notification of work completion has reduced from 7.11 to 2.6 months. A modification is not complete until the work is completed and all documentation has been updated. The importance of accurate documentation is evidenced in the current effort to close DCPs at a faster rate and reducing the DCN backlog.

VSS-1.2 Summary for Equipment Blast Door Interlock System

Required nuclear surveillances for the Equipment Blast Door Interlock System are current and procedures provide for their completion at the required frequency consistent with the variance interval described in the TSRs. Backlog of other preventive maintenance, inspections, corrective maintenance, upgrades and other work is managed and receives priority in the Work Control System based on the system safety classification. This criterion is met.

VSS-1.3 Configuration Management and Maintenance programs effectively ensure operational availability of the system.

VSS-1.3 Review Approach 5

Preventive maintenance actions are evaluated and implemented according to STD-5100, *Maintenance Management*, and STD-5016, *Maintenance Work Control System*. Safety walkdowns are scheduled according to STD-3190, *Safety Surveys of Facilities*. Formal readiness reviews are scheduled following implementation of changed conditions, including authorization basis changes and system modifications. In particular, the implementation of RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, in March 2000 was followed by a rigorous assessment of all safety class and safety significant systems.

VSS-1.3 Review Approach 8

Configuration Management processes for Nuclear Facilities Vital Safety Systems are based on a graded approach, governed by the following Authorization Basis Documents:

- RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation* (including addendums)
- Weapon Programs Activity Based Control Documents (ABCDs).

The specific Nuclear Facilities at Pantex Plant are delineated in MNL-207300, *Unreviewed Safety Question (USQ)/Nuclear Explosive Safety (NES) Process*, Appendix A. All modifications to Vital Safety Systems and related procedures affecting their operation or evaluation of their performance are required to be evaluated through the USQ/NES Program according to STD-3014, *Unreviewed Safety Question/Nuclear Explosive Safety Program.*

The change control classification for Vital Safety Systems are Class 1 (Safety Class and Safety Significant Systems) and Class 2 (Important-to-Safety Systems). The Class 1 and 2 configuration and control procedures are described in the following documents:

- STD-9045, *Change Control for Class 1 Facility Related Systems, Structures, & Components*
- STD-9046, *Class 2 Configuration Control for Facility Related Systems, Structures & Components*
- MNL-00054, *Facilities Configuration Management - Conduct of Operations.*

Nuclear Facilities change control includes a formal process for submitting, receiving, evaluating, documenting, amending, and archiving "technical baseline" information for safety related structures, systems, and components (SSCs). MNL-00054, Chapter 11, describes the process. The technical baseline establishes the actual physical configuration of the SSC, the design documents associated with the SSC, the boundaries and interfaces of the SSC to other systems, applicable Authorization Basis or operating regulations, various flow down shop floor documents, and the formal processes established to maintain and control this information.

- An Engineering Data Transmittal (EDT) and Technical Baseline Checklist are the forms used in the baselining process.

- The EDT is the formal method for accepting responsibility for controlling engineering documentation and is used to transmit information to be included in the technical baseline. All EDTs are approved by the Facility Change Control Manager (FCCM), System Engineering Manager, and Technical Basis Control Manager.

- The EDT is used as the formal (internal to Facilities CM) mechanism to establish facility or system readiness. Promulgation of readiness is a legal commitment to the DOE. As such, the requirements for establishing a Facility CM baseline are more stringent and are established by the FCCM. Any modifications to systems or equipment after the approval date are required to be processed through formal change control according to STD-9045 or STD-9046.

Changes or modifications to safety class and safety significant systems are accomplished through a maintenance work order, or outside construction project. STD-9045 establishes the configuration and change control procedure for Safety Class and Safety Significant SSCs, which are designated Class 1 change control. This procedure includes formalities such as a dedicated FCCM who is responsible for, among other things, managing activities associated with the Facility Configuration Control Board (FCCB).

- The FCCB, chaired by a permanent Chairman, consists of management level representatives from numerous organizations who are responsible for reviewing Design Change Proposal (DCP) packages and providing recommendations (concur as written/concur with comments, do not concur, or defer with comments) to the Chairman, who approves, disapproves, or defers the DCP.

- Class 1 DCPs contain information needed to justify a modification in a Nuclear Facility. The DCP process ensures impacted documents are identified, USQ screening has occurred, evidence of good design practices (i.e., independent reviews) have been instituted.

- A Design Change Notice (DCN) is generated as a result of required actions from a DCP. The DCN is a transmittal sent to groups or individuals affected by the modification. Actions identified on the DCN must be completed. If controlled documents or drawings are affected by the modification, a copy of the DCN is attached to the documents or drawings, removed when the change process has been completed and the revised documents or drawings replaced.

- STD-9046 establishes the procedure for Class 2 Important-to-Safety SSCs' change control. The requirements and change control processes are essentially the same as STD-9045 with the exception that the FCCB approval is not required for Class 2 DCPs. The FCCB Chairman approves the DCP.

MNL-00054 establishes the infrastructure for Nuclear Facilities change control. The following describes the manual contents:

Chapter 1 - Construction/Project File Processing
Chapter 2 - Drawing Processing and Control for Systems Not Under CM
Chapter 3 - Walkdown Drawing/Package Processing and Control for Systems Under CM
Chapter 4 - Design Recovery and Systems Engineering Controlled Document Submittal Processing
Chapter 5 - System Design Description (SDD) Distribution and Change Control
Chapter 6 - Manual/Document Distribution and Control
Chapter 7 - Drawing Processing and Control of Configuration Management Controlled Drawings
Chapter 8 - Vendor Manual Process
Chapter 9 - Class 1 Design Change Proposal Process
Chapter 10 - Class 2 Design Change Proposal Process
Chapter 11 - Technical Baseline Documentation - Engineering Data Transmittal

Nuclear Facility change control requires the input from System Engineers (SEs). System Engineering responsibilities are detailed in the following Internal Operating Procedures (IOPs):

- IOP-366, *Design Recovery*
- IOP-367, *System Engineering Review Process*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures*
- IOP-448, *Engineering & Operability Evaluations*
- IOP-465, *Safety and Plant Reviews*
- IOP-551, *Item Equivalency Evaluations*
- IOP-631, *Classification of Sub-systems*
- IOP-637, *System Engineering Support of Design Change Proposal Closures*
- IOP-731, *Methodology Requirements*
- IOP-686, *Cell Door Leak Area Validation*
- IOP-FO-1116, *System Engineering Review of New Crane Vendor Manual Information*

STD-5016, *Maintenance Work Control System*, establishes the procedure for modifications performed by Pantex Plant craft personnel. STD-5016 establishes the required activities and types of documents that are eventually included in a DCP package described in STD-9045 and STD-9046.

- A work request is initiated through Facility Management Integration (FMI)/Passport, generally by the Facility Manager. If the request is not generated by the FM, the FM must be notified and be included in the process. The facility term, used in Passport to differentiate Nuclear Facility Safety Class, Safety Significant, and Important-to-Safety SSCs is "CM-listed." In change control terms, CM-listed SSCs are either Class 1 or Class 2. Work requests in Nuclear Facilities, are required to be reviewed and concurred with by System Engineering.

- The Unreviewed Safety Question Evaluation is initiated according to STD-3014.

- A DCP is initiated.

- All documentation required by STD-5016 is included in the work request and is submitted to Maintenance Work Control for consideration and approval.

- If the work request is authorized and approved, the Maintenance Work Control Department assigns the Work Order a to designer. The design is completed, a DCP package assembled (STD-9045 AND STD-9046 APPENDIX A), appropriate signatures obtained, and submitted to the FCCM for review.

- The DCP is processed and approved.

- When work has been accomplished, the FCCM is notified by Maintenance Work Control.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

STD-9027, *Facility Project Requests,* establishes the initial project request for modifications requiring outside construction contracts.

- A requestor submits a form, *Project Information Sheet for Construction Projects*, and required information to the appropriate Infrastructure Division coordinator.

- The coordinator signs, prioritizes the request, and submits the package to Engineering and Construction, Scheduling and Cost Control Estimating Section.

- The Estimating Section performs a planning cost estimate that ultimately determines the project scope.

- The Site Planning organization, with assistance from Engineering and Construction and Technical Resources Departments evaluate the request and prioritize it according to STD-9027.

- The Engineering and Construction Department assigns a Project Manager and Project Engineer(s) who develop the design modification according to MNL-FO-1009, *LCAM Implementation Manual*.

- A DCP package is prepared, reviewed, and approved according to STD-9045 and STD-9046, APPENDIX A.

- When work has been accomplished, the FCCM is notified by receiving a copy of Beneficial Occupancy.

- Project records, technical baseline documentation, are submitted to Technical Basis Control by the Project Engineer.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

VSS-1.3 Review Approach 9

The document control process for Vital Safety Systems is governed by STD-9045, STD-9046, and MNL-00054. (Refer to RA8.) Documents that can be affected as a result of a modification are identified on the DCP form. Pending changes are promulgated by a Design Change Notice (DCN) which is posted on the document that will be revised:

Controlled Drawings
Vendor Manuals
System Design Description(s) (System Engineering Document)
Passport Data Base (Electronic data base - Component Information (System Engineering)

If external calibration, operations, training, or preventive maintenance procedures are affected by a modification, the applicable organization is notified with a DCN. Acknowledgment of the DCN is made and returned to Facilities Change Control.

Within the Facilities change control process, documents other than design basis documents, are controlled using a Document Change Request. These internal documents include procedures, and instruction type manuals. The change control infrastructure is governed by MNL-00054, which is described in RA8. Review and approval requirements for all documents controlled by facilities change control are listed and described in MNL-00054.

In the later part of FY-99 and early FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities had significant impact on the Facilities configuration and change control processes.

VSS-1.3 Equipment Blast Door Interlock System

The configuration management and maintenance programs are well defined and formally implemented to control changes to the Equipment Blast Door Interlock System. There is a significant backlog in open Design Change Notices (DCNs). This backlog is tracked and managed by procedure. However, the significant number of DCNs, which is an interim or temporary document, has the potential to impact operational availability of the system. This criterion is not fully met.

VSS-1.4 The system is operable and available to fulfill its safety function when required.

VSS-1.4 Review Approach 4

After surveillance activities have been completed by crafts personnel, the cognizant System Engineer receives data from the craft's supervisor and prepares data for internal tracking and trending purposes. In the case of the Blast Door Interlocks, there are preoperational functional testing on each shift, semi-annual functional testing on the cell equipment, BDI system, and annual visual inspection of the floor gasket assembly and the latching air assembly. If the trending pattern indicates a deviation from the established norm, the System Engineer requests inspections be performed before the next scheduled inspection activity.

VSS-1.4 Review Approach 10

The rigor of documentation and change control of items under Nuclear Facilities CM reflects the levels of hazard classification. New VSS (Safety Class/Safety Significant) SSCs are determined through hazard and accident analysis, and are promulgated through Authorization Basis Documents. Resulting AB Implementation Plans promulgate required activities such as modifications, facility walkdowns, or design recovery as described in Plant Standard STD-3073, Implementation of Authorization Basis changes. As described in RA8, the technical baseline for VSS SSCs is established and subsequently managed by the Class 1 change control and Important-to-Safety SSCs are managed by Class 2 change control.

A list of available controls (for an event) is identified during the *hazard* and *accident analysis* process. This list of controls is then classified based on the unmitigated consequences and frequency of an event to determine which controls are classified as Safety-Class, Safety-Significant, and Important-to-Safety.

VSS-1.4 Summary of Equipment Blast Door Interlock System

Surveillances verify that the operational requirements of the Equipment Blast Door Interlock System are met. A more formal tracking and trending program has been developed and very recently implemented by System Engineering. Reliability issues have been identified with the recently installed personnel/equipment doors and an evaluation is in progress. This criterion is not fully met.

Conclusion for Equipment Blast Door Interlock System The Equipment Blast Door Interlock System meets the functional requirements of the TSR and personnel and procedures are in place to ensure its safety function is maintained. Summary status is:

System Engineer - Assigned and knowledgeable
Configuration Management - Yellow ⇑
Some controlled documentation may not be verified or complete, but it is known that none of these affect the operability of the Vital Safety Systems.
Maintenance - Green ⇒

Preventive maintenance and surveillance actions are current. Other work on the system is managed and kept to an appropriate minimum.

Operations **- Yellow** ⇒

Experiencing reliability issues with newly installed personnel/equipment doors. Evaluation in progress.

Overall Status **- Yellow** ⇑

Arrows slant upward if conditions are improving, are horizontal when conditions are stable, and slant downward if conditions are deteriorating.

These conclusions are based on the pre-determined criteria and assessment process prescribed by the five member team of subject matter experts. Interviews with personnel experienced in nuclear facility management, authorization basis, system engineering, configuration management, maintenance management, maintenance work control, and performance of nuclear surveillances and in-service inspections were performed. Research of Recapitalization Plan which considers facility specific assessment data, maintenance backlog data including deferred maintenance, Technical Safety Requirements, occurrence data, recent readiness assessment findings, budget, and correspondence/reports addressing specific facility needs, and current processes were also conducted. Conclusions by the original five team members were used when applicable to the bays and cells.

DOE employee who reviewed this assessment____Terry Zimmerman____Date____2/21/01___

Hours required to complete assessment. DOE:___3___Hrs. Contractor:__22___Hrs.

Assessment of Operational Readiness
Contaminated Waste Isolation Valve

Site: Pantex Plant, Amarillo, TX

Facility: Buildings 12-85 and 12-98

System: Contaminated Waste Isolation Valve

System Classification: Safety Class

System Safety Function: Contaminated Waste Isolation Valves (CWIVs) are provided in the contaminated waste sump drain lines for cells in Buildings 12-85 and 12-98. The CWIVs are required to isolate these lines to limit the leak path following a high explosive detonation with dispersion event. The CWIVs are designed as wafersphere, high performance, 6 inch, butterfly valves and are normally closed. The valve is designed to automatically open when the water level in the facility sump exceeds a predetermined level.

OBJECTIVE

VSS-1 This vital safety system is operational and personnel and processes are in place that ensure its continued operational readiness.

Criteria and Discussion of Results

VSS-1.1 VSS safety functions are defined and understood by responsible line managers, and supporting information/documentation is available and adequate. System testing is adequate to ensure operability.

VSS-1.1 Review Approach 1

The following Pantex Plant Authorization Basis Documents identify safety class, safety significant, and important-to-safety systems, their safety functions, the normal, abnormal, and accident conditions under which the system is intended to perform, and system functional requirements and performance.

- *RPT-SAR-199801, Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation (BIO)*
- Weapons Programs' Activity Based Control Documents (ABCDs).

Due to the large number of facilities, their diverse functions and age, it is possible that some analytical basis documentation has not been retrievable. In those situations, new analysis is performed and documented by Pantex Plant and, sometimes by the appropriate Design Agency. The current TSR documents, listed above, have supportive, formally controlled analytical basis documents.

VSS-1.1 Review Approach 2

The following Pantex Plant documents provide for incorporation of surveillance and in-service inspection (SR/ISI) requirements into implementing procedures.

- STD-9050, *Surveillance/In-Service Inspection Programs*
- MNL-00037, *Index of Technical Safety Requirement Surveillance & In-Service Inspection Procedures*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures.*

At Pantex Plant, the TSRs are compiled facility-by-facility and provide action, basis, mode, surveillance and inspection requirements and frequencies. The requirements are flowed into plant procedures and are listed in MNL-00037. The listing identifies the specific procedures that fulfill the SR/ISI requirements for operability promulgated by the TSRs.

The following describes the roles and responsibilities of those involved in the SR/ISI process:

1. According to technical expertise, System Engineers are assigned SSCs; and as custodians, System Engineers provide the following:
   - Technical basis including acceptance criteria, as appropriate, required for incorporation into SR/ISIs
   - Assistance to organizations in performing SR/ISIs
   - Establish and maintain a system deficiency tracking and trending program so that action may be taken to maximize system performance and minimize downtime
   - Review and approve SR/ISI procedures using a checklist
   - Identify SR/ISI steps within the procedures
   - Technical support for MNL-00037.
2. Facility Managers maintain a facility preventive maintenance tracking board and include the SR/ISI requirements, frequency, applicable procedure, completion date, and next due date.
3. Organizations responsible for performing the SR/ISIs provide procedures, and trained and qualified personnel to perform work and document results.
4. The Maintenance Work Control Department manages the preparation, revision, verification, validation, approval and distribution of SR/ISI procedures performed by crafts personnel. Reference IOP-FO-1015, *Controlled Document Process.*

VSS-1.1 Review Approach 3

MNL-00037 is used as an index to identify those test, inspection and calibration processes or procedures that satisfy the SR/ISI requirements that are outlined in the TSRs. The information contained includes the facility number (Nuclear, and Nuclear Explosives Areas), a listing of the Vital Safety Systems within the facility, minimum SR/ISI requirements for operability, the frequency that the SR/ISI must be performed, and the number of the procedure. The requirements are extrapolated from the TSRs.

VSS-1.1 Review Approach 7

The System Engineer determines the System Codes, and the drawings are annotated by System Codes and clearly stamped in red "Controlled Copy."

Drawings are entered into the configuration control system by an Engineering Data Transmittal (EDT) (Ref. RA8) or a Design Change Proposal (DCP). The EDT is used during system walkdowns, in which case the drawing is identified as Current Condition. A DCP documents the modification process for systems currently under control. Changes to the drawings are tracked via a Design Change Notice (DCN).

Types of drawings vary according to the system. All are reviewed and approved according to requirements in STD-9045, STD-9046, and MNL-00054 (Ref. RA8). Listings are available by System Codes. As a supplement to drawings, System Design Descriptions are documents that reflect additional system information, such as system boundaries, functional requirements, and reflect other TSR and Authorization Basis requirements. They are also a source for listing controlled drawings applicable to the systems and facility.

Controlled drawings have controlled, limited distribution, and are tracked during the process of revisions. The drawings are housed in a controlled area and are displayed according to facility numbers.

VSS-1.1 Summary for Contaminated Waste Isolation Valve

The safety functions of the Contaminated Waste Isolation Valve are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, and related documents implemented in March 2000. The subsequent readiness assessments by the Management and Operating (M&O) Contractor and the Department of Energy validated the implementation process described in this section including adequacy of flowdown, knowledge of line management and support personnel, availability of documentation, and adequacy of system testing to verify system operability. Actions have been taken to address deficiencies identified during the readiness assessment, and procedures are in place to correct newly discovered deficiencies. This criterion is met.

VSS-1.2 The backlog for surveillances, tests, inspections, maintenance, repair, upgrades, or other work on the system is managed and kept to an appropriate minimum.

VSS-1.2 Review Approach 6

There is no backlog for in-service inspections applicable to contaminated waste isolation valves. Surveillances and In-service inspections are scheduled by the responsible organization in accordance with STD-9050, *Surveillance/In-service Inspection Program*, and are coordinated with the Facility Manager or applicable scheduling representative. Surveillances and Inspections are tracked via facility status boards by Facility Management. Allowable variance periods for performance of inspections are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*. Corrective maintenance, when required, receives priority in accordance with the safety system classification. There are no planned modifications.

The maintenance program places emphasis on maintaining reliability of site VSS. Greater than 20% of maintenance resources (approximately $22 million) available for facility and plant equipment upkeep is applied to nuclear facility maintenance. Approximately 12% of the total is required for performance of nuclear surveillances, in-service inspections, and preventive maintenance actions in nuclear facilities. Concomitantly, the Work Control System applies greater rigor in the performance of nuclear facility maintenance and provides: precise scheduling and tracking of surveillance and in-service inspections to satisfy the TSRs, priority for corrective maintenance to minimize production downtime and maintain system reliability, formal interface with facility management for communication of status, and increased controls on review and approval of work packages.

In the later part of FY-99 and throughout FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities required numerous modifications to facilities and related documents to meet new AB requirements, which meant an abnormally high level of change control activity. Statistics are maintained on the backlog of Design Change Proposals (DCPs), which are discussed under VSS-1.3, Review Approach 8. Review of the 1999 and 2000 DCP "cycle" time indicates a positive trend to shorten closure time. From 1999 to 2000, the average cycle time for work completion notification has reduced from 5.93 months to 2.15 months. Average cycle time for System Engineer to submit Design Change Notice (DCN) following notification of work completion has reduced from 7.11 to 2.6 months. A modification is not complete until the work is completed and all documentation has been updated. The importance of accurate documentation is evidenced in the current effort to close DCPs at a faster rate and reducing the DCN backlog.

VSS-1.2 Summary for Contaminated Waste Isolation Valve

Required nuclear surveillances for the Contaminated Waste Isolation Valves are current and procedures provide for their completion at the required frequency consistent with the variance interval described in the TSRs. Backlog of other preventive maintenance, inspections, corrective maintenance, upgrades and other work is managed and receives priority in the Work Control System based on the system safety classification. This criterion is met for Contaminated Waste Isolation Valves.

VSS-1.3 Configuration Management and Maintenance programs effectively ensure operational availability of the system.

VSS-1.3 Review Approach 5

Preventive maintenance actions are evaluated and implemented according to STD-5100, *Maintenance Management* and STD-5016, *Maintenance Work Control System*. Safety walkdowns are scheduled according to STD-3190, *Safety Surveys of Facilities*. Formal readiness reviews are scheduled following implementation of changed conditions, including authorization basis changes and system modifications. In particular, the implementation of RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, in March 2000 was followed by a rigorous assessment of all safety class and safety significant systems.

VSS-1.3 Review Approach 8

Configuration Management processes for Nuclear Facilities Vital Safety Systems are based on a graded approach, governed by the following Authorization Basis Documents:

- RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation* (including addendums)
- Weapon Programs Activity Based Control Documents (ABCDs).

The specific Nuclear Facilities at Pantex Plant are delineated in MNL-207300, *Unreviewed Safety Question (USQ)/Nuclear Explosive Safety (NES) Process*, Appendix A. All modifications to Vital Safety Systems and related procedures affecting their operation or evaluation of their performance are required to be evaluated through the USQ/NES Program according to STD-3014, *Unreviewed Safety Question/Nuclear Explosive Safety Program.*

The change control classification for Vital Safety Systems are Class 1 (Safety Class and Safety Significant Systems) and Class 2 (Important-to-Safety Systems). The Class 1 and 2 configuration and control procedures are described in the following documents:

- STD-9045, *Change Control for Class 1 Facility Related Systems, Structures, & Components*
- STD-9046, *Class 2 Configuration Control for Facility Related Systems, Structures & Components*
- MNL-00054, *Facilities Configuration Management - Conduct of Operations.*

Nuclear Facilities change control includes a formal process for submitting, receiving, evaluating, documenting, amending, and archiving "technical baseline" information for safety related structures, systems, and components, (SSCs). MNL-00054, Chapter 11, describes the process. The technical baseline establishes the actual physical configuration of the SSC, the design documents associated with the SSC, the boundaries and interfaces of the SSC to other systems, applicable Authorization Basis or operating regulations, various flow down shop floor documents, and the formal processes established to maintain and control this information.

- An Engineering Data Transmittal (EDT) and Technical Baseline Checklist are the forms used in the baselining process.
- The EDT is the formal method for accepting responsibility for controlling engineering documentation and is used to transmit information to be

included in the technical baseline. All EDTs are approved by the Facility Change Control Manager (FCCM), System Engineering Manager, and Technical Basis Control Manager.

- The EDT is used as the formal (internal to Facilities CM) mechanism to establish facility or system readiness. Promulgation of readiness is a legal commitment to the DOE. As such, the requirements for establishing a Facility CM baseline are more stringent and are established by the FCCM. Any modifications to systems or equipment after the approval date are required to be processed through formal change control according to STD-9045 or STD-9046.

Changes or modifications to safety class and safety significant systems are accomplished through a maintenance work order, or outside construction project. STD-9045 establishes the configuration and change control procedure for Safety Class and Safety Significant SSCs, which are designated Class 1 change control. This procedure includes formalities such as a dedicated FCCM who is responsible for, among other things, managing activities associated with the Facility Configuration Control Board (FCCB).

- The FCCB, chaired by a permanent Chairman, consists of management level representatives from numerous organizations who are responsible for reviewing Design Change Proposal (DCP) packages and providing recommendations (concur as written/concur with comments, do not concur, or defer with comments) to the Chairman, who approves, disapproves, or defers the DCP.

- Class 1 DCPs contain information needed to justify a modification in a Nuclear Facility. The DCP process ensures impacted documents are identified, USQ screening has occurred, evidence of good design practices (i.e., independent reviews) have been instituted.

- A Design Change Notice (DCN) is generated as a result of required actions from a DCP. The DCN is a transmittal sent to groups or individuals affected by the modification. Actions identified on the DCN must be completed. If controlled documents or drawings are affected by the modification, a copy of the DCN is attached to the documents or drawings, removed when the change process has been completed and the revised documents or drawings replaced.

- STD-9046 establishes the procedure for Class 2 Important-to-Safety SSCs' change control. The requirements and change control processes are essentially the same as STD-9045 with the exception that the FCCB approval is not required for Class 2 DCPs. The FCCB Chairman approves the DCP.

MNL-00054 establishes the infrastructure for Nuclear Facilities change control. The following describes the manual contents:

Chapter 1 - Construction/Project File Processing
Chapter 2 - Drawing Processing and Control for Systems Not Under CM
Chapter 3 - Walkdown Drawing/Package Processing and Control for Systems Under CM

Chapter 4 - Design Recovery and Systems Engineering Controlled Document Submittal Processing
Chapter 5 - System Design Description (SDD) Distribution and Change Control
Chapter 6 - Manual/Document Distribution and Control
Chapter 7 - Drawing Processing and Control of Configuration Management Controlled Drawings
Chapter 8 - Vendor Manual Process
Chapter 9 - Class 1 Design Change Proposal Process
Chapter 10 - Class 2 Design Change Proposal Process
Chapter 11 - Technical Baseline Documentation - Engineering Data Transmittal

Nuclear Facility change control requires the input from System Engineers (SEs). System Engineering responsibilities are detailed in the following Internal Operating Procedures (IOPs):

- IOP-366, *Design Recovery*
- IOP-367, *System Engineering Review Process*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures*
- IOP-448, *Engineering & Operability Evaluations*
- IOP-465, *Safety and Plant Reviews*
- IOP-551, *Item Equivalency Evaluations*
- IOP-631, *Classification of Sub-systems*
- IOP-637, *System Engineering Support of Design Change Proposal Closures*
- IOP-731, *Methodology Requirements*
- IOP-686, *Cell Door Leak Area Validation*
- IOP-FO-1116, *System Engineering Review of New Crane Vendor Manual Information*

STD-5016, *Maintenance Work Control System*, establishes the procedure for modifications performed by Pantex Plant craft personnel. STD-5016 establishes the required activities and types of documents that are eventually included in a DCP package described in STD-9045 and STD-9046.

- A work request is initiated through Facility Management Integration (FMI)/Passport, generally by the Facility Manager. If the request is not generated by the FM, the FM must be notified and be included in the process. The facility term, used in Passport to differentiate Nuclear Facility Safety Class, Safety Significant, and Important-to-Safety SSCs is “CM-listed.” In change control terms, CM-listed SSCs are either Class 1 or Class 2. Work requests in Nuclear Facilities, are required to be reviewed and concurred with by System Engineering.

- The Unreviewed Safety Question Evaluation is initiated according to STD-3014.

- A DCP is initiated.

- All documentation required by STD-5016 is included in the work request and is submitted to Maintenance Work Control for consideration and approval.

- If the work request is authorized and approved, the Maintenance Work Control Department assigns the Work Order a to designer. The design is completed, a DCP package assembled (STD-9045 AND STD-9046 APPENDIX A), appropriate signatures obtained, and submitted to the FCCM for review.

- The DCP is processed and approved.

- When work has been accomplished, the FCCM is notified by Maintenance Work Control.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

STD-9027, *Facility Project Requests,* establishes the initial project request for modifications requiring outside construction contracts.

- A requestor submits a form, *Project Information Sheet for Construction Projects*, and required information to the appropriate Infrastructure Division coordinator.

- The coordinator signs, prioritizes the request, and submits the package to Engineering and Construction, Scheduling and Cost Control Estimating Section.

- The Estimating Section performs a planning cost estimate that ultimately determines the project scope.

- The Site Planning organization, with assistance from Engineering and Construction and Technical Resources Departments evaluate the request and prioritize it according to STD-9027.

- The Engineering and Construction Department assigns a Project Manager and Project Engineer(s) who develop the design modification according to MNL-FO-1009, *LCAM Implementation Manual*.

- A DCP package is prepared, reviewed, and approved according to STD-9045 and STD-9046, APPENDIX A.

- When work has been accomplished, the FCCM is notified by receiving a copy of Beneficial Occupancy.

- Project records, technical baseline documentation, are submitted to Technical Basis Control by the Project Engineer.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

VSS-1.3 Review Approach 9

The document control process for Vital Safety Systems is governed by STD-9045, STD-9046, and MNL-00054. (Refer to RA8.) Documents that can be affected as a result of a modification are identified on the DCP form. Pending changes are promulgated by a Design Change Notice (DCN) which is posted on the document that will be revised:

Controlled Drawings
Vendor Manuals
System Design Description(s) (System Engineering Document)
Passport Data Base (Electronic data base - Component Information (System Engineering)

If external calibration, operations, training, or preventive maintenance procedures are affected by a modification, the applicable organization is notified with a DCN. Acknowledgment of the DCN is made and returned to Facilities Change Control.

Within the Facilities change control process, documents other than design basis documents, are controlled using a Document Change Request. These internal documents include procedures, and instruction type manuals. The change control infrastructure is governed by MNL-00054, which is described in RA8. Review and approval requirements for all documents controlled by facilities change control are listed and described in MNL-00054.

In the later part of FY-99 and early FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities had significant impact on the Facilities configuration and change control processes.

VSS-1.3 Contaminated Waste Isolation Valve

The configuration management and maintenance programs are well defined and formally implemented to control changes to the Contaminated Waste Isolation Valve. There is a significant backlog in open Design Change Notices (DCNs). This backlog is tracked and managed by procedure. However, the significant number of DCNs, which is an interim or temporary document, has the potential to impact operational availability of the system. Therefore, this criterion is not fully met.

VSS-1.4 The system is operable and available to fulfill its safety function when required.

VSS-1.4 Review Approach 4

After surveillance activities have been completed by crafts personnel, the cognizant System Engineer receives data from the craft's supervisor and prepares data for internal tracking and trending purposes. In the case of the contaminated waste isolation valves there are pre-operational visual inspections to verify closure indicator lights are on, semi-annual inspections to verify valve closed position indication system indicates proper position of CWIV, and a two year inspection of the valve interior. If the trending pattern indicates a deviation from the established norm, the System Engineer requests inspections be performed before the next scheduled inspection activity.

VSS-1.4 Review Approach 10

The rigor of documentation and change control of items under Nuclear Facilities CM reflects the levels of hazard classification. New VSS (Safety Class/Safety Significant) SSCs are determined through hazard and accident analysis, and are promulgated through Authorization Basis Documents. Resulting AB Implementation Plans promulgate required activities such as modifications, facility walkdowns, or design recovery as described in Plant Standard STD-3073, Implementation of Authorization Basis changes. As described in RA8, the technical baseline for VSS SSCs is established and subsequently managed by the Class 1 change control and Important-to-Safety SSCs are managed by Class 2 change control.

A list of available controls (for an event) is identified during the *hazard* and *accident analysis* process. This list of controls is then classified based on the unmitigated consequences and frequency of an event to determine which controls are classified as Safety-Class, Safety-Significant, and Important-to-Safety.

VSS-1.4 Summary of Contaminated Waste Isolation Valve

Surveillance procedures verify operability requirements of the Contaminated Waste Isolation Valves are met. A more formal tracking and trending program has been developed and very recently implemented by System Engineering. There are no identified operability or reliability issues. The criterion is met for Contaminated Waste Isolation Valves.

Conclusion for Equipment Blast Door Interlock System The contaminated waste isolation valves are operational and personnel and procedures are in place to ensure continued operability. Summary status is:

System Engineer - Assigned and knowledgeable
Configuration Management - Yellow ⇑
Some controlled documentation may not be verified or complete, but it is known that none of these affect the operability of the Vital Safety Systems.
Maintenance - Green ⇒
Preventive maintenance and surveillance tasks are current. Other work is managed and kept to an appropriate minimum.
Operations - Green ⇒
The system is operable and available to fulfill its safety function.
Overall Status - Green ⇒

Arrows slant upward if conditions are improving, are horizontal when conditions are stable, and slant downward if conditions are deteriorating.

These conclusions are based on the pre-determined criteria and assessment process prescribed by the five member team of subject matter experts. Interviews with personnel experienced in nuclear facility management, authorization basis, system engineering, configuration management, maintenance management, maintenance work control, and performance of nuclear surveillances and in-service inspections were performed. Research of Recapitalization Plan which considers facility specific assessment data, maintenance backlog data including deferred maintenance, Technical Safety Requirements, occurrence data, recent readiness assessment findings, budget, and correspondence/reports addressing specific facility needs, and current processes were also conducted. Conclusions by the original five team members were used when applicable to the bays and cells.

DOE employee who reviewed this assessment____Terry Zimmerman____Date____2/21/01___

Hours required to complete assessment. DOE:___3___Hrs. Contractor:___22___Hrs.

Assessment of Operational Readiness
Blast Valve

Site: Pantex Plant, Amarillo, TX

Facility: Buildings 12-85 and 12-98

System: Blast Valve

System Classification: Safety Class

System Safety Function: Blast valves mitigate releases to the public and site workers following a high explosive detonation with dispersion by isolating the ventilation inlet and exhaust.

OBJECTIVE

VSS-1 This vital safety system is operational and personnel and processes are in place that ensure its continued operational readiness.

Criteria and Discussion of Results

VSS-1.1 VSS safety functions are defined and understood by responsible line managers, and supporting information/documentation is available and adequate. System testing is adequate to ensure operability.

VSS-1.1 Review Approach 1

The following Pantex Plant Authorization Basis Documents identify safety class, safety significant, and important-to-safety systems, their safety functions, the normal, abnormal, and accident conditions under which the system is intended to perform, and system functional requirements and performance.

- *RPT-SAR-199801, Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation (BIO)*
- Weapons Programs' Activity Based Control Documents (ABCDs).

Due to the large number of facilities, their diverse functions and age, it is possible that some analytical basis documentation has not been retrievable. In those situations, new analysis is performed and documented by Pantex Plant and, sometimes by the appropriate Design Agency. The current TSR documents, listed above, have supportive, formally controlled analytical basis documents.

VSS-1.1 Review Approach 2

The following Pantex Plant documents provide for incorporation of surveillance and in-service inspection (SR/ISI) requirements into implementing procedures.

- STD-9050, *Surveillance/In-Service Inspection Programs*
- MNL-00037, *Index of Technical Safety Requirement Surveillance & In-Service Inspection Procedures*
- IOP-368, *System Engineering Evaluation of Preventive/Predictive Maintenance Procedures.*

At Pantex Plant, the TSRs are compiled facility-by-facility and provide action, basis, mode, surveillance and inspection requirements and frequencies. The requirements are flowed into plant procedures and are listed in MNL-00037. The listing identifies the specific procedures that fulfill the SR/ISI requirements for operability promulgated by the TSRs.

The following describes the roles and responsibilities of those involved in the SR/ISI process:

1. According to technical expertise, System Engineers are assigned SSCs; and as custodians, System Engineers provide the following:
   - Technical basis including acceptance criteria, as appropriate, required for incorporation into SR/ISIs
   - Assistance to organizations in performing SR/ISIs
   - Establish and maintain a system deficiency tracking and trending program so that action may be taken to maximize system performance and minimize downtime
   - Review and approve SR/ISI procedures using a checklist
   - Identify SR/ISI steps within the procedures
   - Technical support for MNL-00037.
2. Facility Managers maintain a facility preventive maintenance tracking board and include the SR/ISI requirements, frequency, applicable procedure, completion date, and next due date.
3. Organizations responsible for performing the SR/ISIs provide procedures, and trained and qualified personnel to perform work and document results.
4. The Maintenance Work Control Department manages the preparation, revision, verification, validation, approval and distribution of SR/ISI procedures performed by crafts personnel. Reference IOP-FO-1015, *Controlled Document Process.*

VSS-1.1 Review Approach 3

MNL-00037 is used as an index to identify those test, inspection and calibration processes or procedures that satisfy the SR/ISI requirements that are outlined in the TSRs. The information contained includes the facility number (Nuclear, and Nuclear Explosives Areas), a listing of the Vital Safety Systems within the facility, minimum SR/ISI requirements for operability, the frequency that the SR/ISI must be performed, and the number of the procedure. The requirements are extrapolated from the TSRs.

VSS-1.1 Review Approach 7

The System Engineer determines the System Codes, and the drawings are annotated by System Codes and clearly stamped in red "Controlled Copy."

Drawings are entered into the configuration control system by an Engineering Data Transmittal (EDT) (Ref. RA8) or a Design Change Proposal (DCP). The EDT is used during system walkdowns, in which case the drawing is identified as Current Condition. A DCP documents the modification process for systems currently under control. Changes to the drawings are tracked via a Design Change Notice (DCN).

Types of drawings vary according to the system. All are reviewed and approved according to requirements in STD-9045, STD-9046, and MNL-00054 (Ref. RA8). Listings are available by System Codes. As a supplement to drawings, System Design Descriptions are documents that reflect additional system information, such as system boundaries, functional requirements, and reflect other TSR and Authorization Basis requirements. They are also a source for listing controlled drawings applicable to the systems and facility.

Controlled drawings have controlled, limited distribution, and are tracked during the process of revisions. The drawings are housed in a controlled area and are displayed according to facility numbers.

VSS-1.1 Summary for Blast Valves

The safety functions of the Blast Valves are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, and related documents implemented in March 2000. The subsequent readiness assessments by the Management and Operating (M&O) Contractor and the Department of Energy validated the implementation process described in this section including adequacy of flowdown, knowledge of line management and support personnel, availability of documentation, and adequacy of system testing to verify system operability. Actions have been taken to address deficiencies identified during the readiness assessment, and procedures are in place to correct newly discovered deficiencies. This criterion is met.

VSS-1.2 The backlog for surveillances, tests, inspections, maintenance, repair, upgrades, or other work on the system is managed and kept to an appropriate minimum.

VSS-1.2 Review Approach 6

There is no backlog for in-service inspections applicable to facility blast valves. Surveillances and in-service inspections are scheduled by the responsible organization in accordance with STD-9050, *Surveillance/In-service Inspection Program*, and are coordinated with the Facility Manager or applicable scheduling representative. Surveillances and inspections are tracked via facility status boards by Facility Management. Allowable variance periods for performance of inspections are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*. Corrective maintenance, when required, receives priority in accordance with the safety system classification. There are no planned modifications.

The maintenance program places emphasis on maintaining reliability of site VSS. Greater than 20% of maintenance resources (approximately $22 million) available for facility and plant equipment upkeep is applied to nuclear facility maintenance. Approximately 12% of the total is required for performance of nuclear surveillances, in-service inspections, and preventive maintenance actions in nuclear facilities. Concomitantly, the Work Control System applies greater rigor in the performance of nuclear facility maintenance and provides: precise scheduling and tracking of surveillance and in-service inspections to satisfy the TSRs, priority for corrective maintenance to minimize production downtime and maintain system reliability, formal interface with facility management for communication of status, and increased controls on review and approval of work packages.

In the later part of FY-99 and throughout FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities required numerous modifications to facilities and related documents to meet new AB requirements, which meant an abnormally high level of change control activity. Statistics are maintained on the backlog of Design Change Proposals (DCPs), which are discussed under VSS-1.3, Review Approach 8. Review of the 1999 and 2000 DCP "cycle" time indicates a positive trend to shorten closure time. From 1999 to 2000, the average cycle time for work completion notification has reduced from 5.93 months to 2.15 months. Average cycle time for System Engineer to submit Design Change Notice (DCN) following notification of work completion has reduced from 7.11 to 2.6 months. A modification is not complete until the work is completed and all documentation has been updated. The importance of accurate documentation is evidenced in the current effort to close DCPs at a faster rate and reducing the DCN backlog.

VSS-1.2 Summary for Blast Valves

Required nuclear surveillances for the Blast Valves are current and procedures provide for their completion at the required frequency consistent with the variance interval described in the TSRs. Backlog of other preventive maintenance, inspections, corrective maintenance, upgrades and other work is managed and receives priority in the Work Control System based on the system safety classification. This criterion is met.

VSS-1.3 Configuration Management and Maintenance programs effectively ensure operational availability of the system.

VSS-1.3 Review Approach 5

Preventive maintenance actions are evaluated and implemented according to STD-5100, *Maintenance Management*, and STD-5016, *Maintenance Work Control System*. Safety walkdowns are scheduled according to STD-3190, *Safety Surveys of Facilities.* Formal readiness reviews are scheduled following implementation of changed conditions, including authorization basis changes and system modifications. In particular, the implementation of RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, in March 2000 was followed by a rigorous assessment of all safety class and safety significant systems.

VSS-1.3 Review Approach 8

Configuration Management processes for Nuclear Facilities Vital Safety Systems are based on a graded approach, governed by the following Authorization Basis Documents:

- RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation* (including addendums)
- Weapon Programs Activity Based Control Documents (ABCDs).

The specific Nuclear Facilities at Pantex Plant are delineated in MNL-207300, *Unreviewed Safety Question (USQ)/Nuclear Explosive Safety (NES) Process*, Appendix A. All modifications to Vital Safety Systems and related procedures affecting their operation or evaluation of their performance are required to be evaluated through the USQ/NES Program according to STD-3014, *Unreviewed Safety Question/Nuclear Explosive Safety Program.*

The change control classification for Vital Safety Systems are Class 1 (Safety Class and Safety Significant Systems) and Class 2 (Important-to-Safety Systems). The Class 1 and 2 configuration and control procedures are described in the following documents:

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- An Engineering Data Transmittal (EDT) and Technical Baseline Checklist are the forms used in the baselining process.
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Changes or modifications to safety class and safety significant systems are accomplished through a maintenance work order, or outside construction project. STD-9045 establishes the configuration and change control procedure for Safety Class and Safety Significant SSCs, which are designated Class 1 change control. This procedure includes formalities such as a dedicated FCCM who is responsible for, among other things, managing activities associated with the Facility Configuration Control Board (FCCB).

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- Class 1 DCPs contain information needed to justify a modification in a Nuclear Facility. The DCP process ensures impacted documents are identified, USQ screening has occurred, evidence of good design practices (i.e., independent reviews) have been instituted.

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- STD-9046 establishes the procedure for Class 2 Important-to-Safety SSCs' change control. The requirements and change control processes are essentially the same as STD-9045 with the exception that the FCCB approval is not required for Class 2 DCPs. The FCCB Chairman approves the DCP.

MNL-00054 establishes the infrastructure for Nuclear Facilities change control. The following describes the manual contents:

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STD-5016, *Maintenance Work Control System*, establishes the procedure for modifications performed by Pantex Plant craft personnel. STD-5016 establishes the required activities and types of documents that are eventually included in a DCP package described in STD-9045 and STD-9046.

- A work request is initiated through Facility Management Integration (FMI)/Passport, generally by the Facility Manager. If the request is not generated by the FM, the FM must be notified and be included in the process. The facility term, used in Passport to differentiate Nuclear Facility Safety Class, Safety Significant, and Important-to-Safety SSCs is “CM-listed.” In change control terms, CM-listed SSCs are either Class 1 or Class 2. Work requests in Nuclear Facilities, are required to be reviewed and concurred with by System Engineering.

- The Unreviewed Safety Question Evaluation is initiated according to STD-3014.

- A DCP is initiated.

- All documentation required by STD-5016 is included in the work request and is submitted to Maintenance Work Control for consideration and approval.

- If the work request is authorized and approved, the Maintenance Work Control Department assigns the Work Order a to designer. The design is completed, a DCP package assembled (STD-9045 AND STD-9046 APPENDIX A), appropriate signatures obtained, and submitted to the FCCM for review.

- The DCP is processed and approved.

- When work has been accomplished, the FCCM is notified by Maintenance Work Control.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

STD-9027, *Facility Project Requests,* establishes the initial project request for modifications requiring outside construction contracts.

- A requestor submits a form, *Project Information Sheet for Construction Projects*, and required information to the appropriate Infrastructure Division coordinator.

- The coordinator signs, prioritizes the request, and submits the package to Engineering and Construction, Scheduling and Cost Control Estimating Section.

- The Estimating Section performs a planning cost estimate that ultimately determines the project scope.

- The Site Planning organization, with assistance from Engineering and Construction and Technical Resources Departments evaluate the request and prioritize it according to STD-9027.

- The Engineering and Construction Department assigns a Project Manager and Project Engineer(s) who develop the design modification according to MNL-FO-1009, *LCAM Implementation Manual*.

- A DCP package is prepared, reviewed, and approved according to STD-9045 and STD-9046, APPENDIX A.

- When work has been accomplished, the FCCM is notified by receiving a copy of Beneficial Occupancy.

- Project records, technical baseline documentation, are submitted to Technical Basis Control by the Project Engineer.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

VSS-1.3 Review Approach 9

The document control process for Vital Safety Systems is governed by STD-9045, STD-9046, and MNL-00054. (Refer to RA8.) Documents that can be affected as a result of a modification are identified on the DCP form. Pending changes are promulgated by a Design Change Notice (DCN) which is posted on the document that will be revised:

Controlled Drawings
Vendor Manuals
System Design Description(s) (System Engineering Document)
Passport Data Base (Electronic data base - Component Information (System Engineering)

If external calibration, operations, training, or preventive maintenance procedures are affected by a modification, the applicable organization is notified with a DCN. Acknowledgment of the DCN is made and returned to Facilities Change Control.

Within the Facilities change control process, documents other than design basis documents, are controlled using a Document Change Request. These internal documents include procedures, and instruction type manuals. The change control infrastructure is governed by MNL-00054, which is described in RA8. Review and approval requirements for all documents controlled by facilities change control are listed and described in MNL-00054.

In the later part of FY-99 and early FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities had significant impact on the Facilities configuration and change control processes.

VSS-1.3 Summary of Blast Valves

The configuration management and maintenance programs are well defined and formally implemented to control changes to the Blast Valves. There is a significant backlog in open Design Change Notices (DCNs). This backlog is tracked and managed by procedure. However, the significant number of DCNs, which is an interim or temporary document, has the potential to impact operational availability of the system. Therefore, this criterion is not fully met.

VSS-1.4 The system is operable and available to fulfill its safety function when required.

VSS-1.4 Review Approach 4

After surveillance activities have been completed by crafts personnel, the cognizant System Engineer receives data from the craft's supervisor and prepares data for internal tracking and trending purposes. In the case of the Blast Valves, there are annual and 3 year surveillance on the force to close and latch the blast valve. If the trending pattern indicates a deviation from the established norm, the System Engineer requests that the valves be removed and inspections be performed before the next scheduled inspection activity.

Surveillances for Building 12-98 cells 1 - 4 require that the force required to close and latch the Blast Valves be recorded. The force values are tracked by the System Engineer and compared to the average of the past values to determine if degradation of the Blast Valve is occurring. If an indication is determined, the Blast Valve is removed and inspected for the cause. This tracking is done for all Blast Valves in operation. Currently there is no evidence of system degradation (difficulty in closing or latching) for Building 12-98. The last recorded incident of closure or latching for Building 12-98 was in May 1996. A problem with water seepage into the duct work of Building 12-85 was determined and corrected. The correction consisted of replacing the existing underground carbon steel duct work with stainless steel piping. Although not included in this assessment, corrective action has been taken in Building 12-44 cells 2 - 6. Rust particles were discovered in the Blast Valve and the Blast Valve latching mechanism causing a steady increase in the amount of force to close and latch. The cause was determined to be in the underground duct work. The corrective action included cleaning the inside of the underground duct work and painting it with a protective coating. Other corrective action on Blast Valves included discontinuing the use of liquid soap to install "O" rings in the Blast Valves (originally a manufacturer's recommendation). It was determined that the liquid soap would dry out and cause excessive friction when the Blast Valve was closed and latched. An alternate method of installation of the "O" ring, without the use of liquid soap, was recommend by the manufacturer. This consisted of a detailed cleaning and inspecting of the groove area where the "O" ring is installed. Based on the above actions, system performance continues to improve.

VSS-1.4 Review Approach 10

The rigor of documentation and change control of items under Nuclear Facilities CM reflects the levels of hazard classification. New VSS (Safety Class/Safety Significant) SSCs are determined through hazard and accident analysis, and are promulgated through Authorization Basis Documents. Resulting AB Implementation Plans promulgate required activities such as modifications, facility walkdowns, or design recovery as described in Plant Standard STD-3073, Implementation of Authorization Basis changes. As described in RA8, the technical baseline for VSS SSCs is established and subsequently managed by the Class 1 change control and Important-to-Safety SSCs are managed by Class 2 change control.

A list of available controls (for an event) is identified during the *hazard* and *accident analysis* process. This list of controls is then classified based on the unmitigated consequences and frequency of an event to determine which controls are classified as Safety-Class, Safety-Significant, and Important-to-Safety.

VSS-1.4 Summary of Blast Valves

Surveillances verify that the operational requirements of the Blast Valves are met. A more formal tracking and trending program has been developed and very recently implemented by System Engineering. There are no identified operability or reliability issues. This criterion is met.

Conclusion for Blast Valves The blast valves are operational and personnel and procedures are in place to ensure continued operability. Summary status is:

System Engineer - Assigned and knowledgeable
Configuration Management - Yellow ⇑
Some controlled documentation may not be verified or complete, but it is known that none of these affect the operability of the Vital Safety Systems.
Maintenance - Green ⇒
Preventive maintenance and surveillance tasks are current. Other work is managed and backlog kept to an appropriate minimum.
Operations - Green ⇒
The system is operable and available to fulfill its safety function when required.
Overall Status - Green ⇒

Arrows slant upward if conditions are improving, are horizontal when conditions are stable, and slant downward if conditions are deteriorating.

These conclusions are based on the pre-determined criteria and assessment process prescribed by the five member team of subject matter experts. Interviews with personnel experienced in nuclear facility management, authorization basis, system engineering, configuration management, maintenance management, maintenance work control, and performance of nuclear surveillances and in-service inspections were performed. Research of Recapitalization Plan which considers facility specific assessment data, maintenance backlog data including deferred maintenance, Technical Safety Requirements, occurrence data, recent readiness assessment findings, budget, and correspondence/reports addressing specific facility needs, and current processes were also conducted. Conclusions by the original five team members were used when applicable to the bays and cells.

DOE employee who reviewed this assessment Terry Zimmerman Date 2/21/01

Hours required to complete assessment. DOE: 3 Hrs. Contractor: 22 Hrs.

Assessment of Operational Readiness

Fire Protection

Site: Pantex Plant, Amarillo, TX

Facility: Buildings 12-84,12-85,12-98, and 12-104

System: Fire Protection (Wet Pipe Fire Suppression, Deluge Fire Suppression & Fire Detection and Alarm)

System Classification: Safety Class and Safety Significant

System Safety Function: A) Mitigates the consequences of fires in facilities by spraying water on fires; B) Mitigates the consequences of fires by notifying facility workers to evacuate the facility in the event of a fire and by transmitting a fire alarm signal to the Fire Department when a fire alarm is present at the Fire Alarm Control Panel.

OBJECTIVE

VSS-1 This vital safety system is operational and personnel and processes are in place that ensure its continued operational readiness.

Criteria and Discussion of Results

VSS-1.1 VSS safety functions are defined and understood by responsible line managers, and supporting information/documentation is available and adequate. System testing is adequate to ensure operability.

VSS-1.1 Review Approach 1

The following Pantex Plant Authorization Basis Documents identify safety class, safety significant, and important-to-safety systems, their safety functions, the normal, abnormal, and accident conditions under which the system is intended to perform, and system functional requirements and performance.

- *RPT-SAR-199801, Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation (BIO)*
- Weapons Programs' Activity Based Control Documents (ABCDs).

Due to the large number of facilities, their diverse functions and age, it is possible that some analytical basis documentation for Fire Protection Systems has not been retrievable. In those situations, new analysis is performed and documented by Pantex Plant and, sometimes by the appropriate Design Agency. The current TSR documents, listed above, have supportive, formally controlled analytical basis documents. In addition, basis information was retrieved or created during the Fire Protection Upgrade project.

VSS-1.1 Review Approach 2

The following Pantex Plant documents provide for incorporation of surveillance and in-service inspection (SR/ISI) requirements into implementing procedures.

- STD-9050, *Surveillance/In-Service Inspection Programs*
- MNL-00037, *Index of Technical Safety Requirement Surveillance & In-Service Inspection Procedures*

At Pantex Plant, the TSRs are compiled facility-by-facility and provide action, basis, mode, applicability, surveillance and inspection requirements and frequencies. The requirements are flowed into plant procedures and are listed in MNL-00037. The listing identifies the specific procedures that fulfill the SR/ISI requirements for operability promulgated by the TSRs.

The following describes the roles and responsibilities of those involved in the SR/ISI process for Fire Protection:

1. Fire Protection Engineers provide the following:
   - Technical basis including acceptance criteria, as appropriate, required for incorporation into SR/ISIs
   - Engineering assistance to organizations in performing SR/ISIs
   - Identify SR/ISI steps within the procedures
   - Review and approve SR/ISI procedures
   - Input to MNL-00037.
2. Facility Managers maintain a facility preventive maintenance tracking board and include the SR/ISI requirements, frequency, applicable procedure, completion date, and next due date.
3. Organizations responsible for performing the SR/ISIs provide procedures, and trained and qualified personnel to perform work and document results.
4. The Maintenance Work Control Department manages the preparation, revision, verification, validation, approval and distribution of SR/ISI procedures performed by crafts personnel. Reference IOP-FO-1015, *Controlled Document Process.*

VSS-1.1 Review Approach 3

MNL-00037 is used as an index to identify those test, inspection and calibration processes or procedures that satisfy the SR/ISI requirements that are outlined in the TSRs. The information contained includes the facility number (Nuclear, and Nuclear Explosives Areas), a listing of the Vital Safety Systems within the facility, minimum SR/ISI requirements for operability, the frequency that the SR/ISI must be performed, and the number of the procedure. The requirements are extrapolated from the TSRs.

VSS-1.1 Review Approach 7

Drawings are entered into the configuration control system by a Design Change Proposal. Changes to the drawings are tracked via a Design Change Notice.

Types of drawings vary according to the type of modification. All drawings are reviewed and approved according to requirements in STD-9045 and MNL-00054 (Ref. RA8). Controlled drawing listings are available by System Codes.

Controlled drawings have controlled, limited distribution, and are tracked during the process of revisions. The drawings are housed in a controlled area and are displayed according to facility numbers.

VSS-1.1 Summary for Fire Protection

The safety functions of the Fire Protection are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, and related documents implemented in March 2000. The subsequent readiness assessments by the Management and Operating (M&O) Contractor and the Department of Energy validated the implementation process described in this section including adequacy of flowdown, knowledge of line management and support personnel, availability of documentation, and adequacy of system testing to verify system operability. Actions have been taken to address deficiencies identified during the readiness assessment, and procedures are in place to correct newly discovered deficiencies. This criterion is satisfied for the Fire Protection System.

VSS-1.2 The backlog for surveillances, tests, inspections, maintenance, repair, upgrades, or other work on the system is managed and kept to an appropriate minimum.

VSS-1.2 Review Approach 6

There is no backlog for nuclear surveillances applicable to Fire Protection. Surveillances and In-service inspections are scheduled by the responsible organization in accordance with STD-9050, *Surveillance/In-service Inspection Program*, and are coordinated with the Facility Manager or applicable scheduling representative. Surveillances and inspections are tracked via facility status boards by Facility Management. Allowable variance periods for performance of inspections are defined in RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*. Corrective maintenance, when required, receives priority in accordance with the safety system classification.

Future scheduled modifications include Smoke Detector Replacement for 12-85 and 12-98, and a Fire Detection System upgrade conversion in 12-104. Implementation will be per the approved project plan.

In the later part of FY-99 and throughout FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities required numerous modifications to facilities and related documents to meet new AB requirements, which meant an

abnormally high level of change control activity. Statistics are maintained on the backlog of Design Change Proposals (DCPs), which are discussed under VSS-1.3, Review Approach 8. Review of the 1999 and 2000 DCP "cycle" time indicates a positive trend to shorten closure time. From 1999 to 2000, the average cycle time for work completion notification has reduced from 5.93 months to 2.15 months. Average cycle time for System Engineer to submit DCN following notification of work completion has reduced from 7.11 to 2.6 months. A modification is not complete until the work is completed and all documentation has been updated. The importance of accurate documentation is evidenced in the current effort to close DCPs at a faster rate and reducing the DCN backlog.

Plant STD-4321, *Fire Protection Assessments*, requires that annual Fire Protection facility and program assessments be performed on all nuclear facilities. The assessments are made against previously developed facility baseline information, such as a Fire Hazard Analysis.

Items required to be evaluated are as follows:

- Construction of the facility
- Fire barrier integrity
- Fire potential
- Occupancy
- Inspection, testing and maintenance
- Fire protection of safety class systems
- Fire protection of vital programs
- Fire protection of high-value property
- Water runoff
- Fire Department response (pre-fire plans, apparatus, accessibility)
- Completeness of fire hazards analysis
- Completeness of fire loss potential Maximum Potential Fire Loss and Maximum Credible Fire Loss determinations
- Fire safety training of occupants
- Conformance with applicable orders, codes, and procedures
- Recommendations
- Status of previous assessment findings
- Fire suppression and detection equipment
- Administrative controls

- Temporary protection and compensatory measures
- Housekeeping

If any serious deficiencies are identified, the Facility Manager is immediately notified. The deficiencies are reported according to Plant STD-3138, *Hazard Abatement Program*. The deficiencies are subsequently entered into the Safety Assessment/Facility Evaluation (SAFE) Report, which is an on-going mechanism that tracks safety issues. There are no outstanding Fire Protection deficiencies in the Safety Assessment/Facility Evaluation (SAFE) Report for the subject facilities.

VSS-1.2 Summary for Fire Protection

Required nuclear surveillances for the Fire Protection System are current and procedures provide for their completion at the required frequency consistent with the variance interval described in the TSRs. Typically, backlog of other preventive maintenance, inspections, corrective maintenance, upgrades and other work is managed and receives priority in the Work Control System based on the system safety classification. However, there is a known vulnerability with the fire alarm and detection system that is being addressed through an approved project plan. Therefore, this criterion is not fully met.

VSS-1.3 Configuration Management and Maintenance programs effectively ensure operational availability of the system.

VSS-1.3 Review Approach 5

Preventive maintenance actions are evaluated and implemented according to STD-5100, *Maintenance Management* and STD-5016, *Maintenance Work Control System*. Safety walkdowns are scheduled according to STD-3190, *Safety Surveys of Facilities.* Formal readiness reviews are scheduled following implementation of changed conditions, including authorization basis changes and system modifications. In particular, the implementation of RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*, in March 2000 was followed by a rigorous assessment of all safety class and safety significant systems.

VSS-1.3 Review Approach 8

Configuration Management processes for Nuclear Facilities Vital Safety Systems are based on a graded approach, governed by the following Authorization Basis Documents:

- RPT-SAR-199801, *Technical Safety Requirements for Pantex Facilities*
- MNL-00076, *Basis for Interim Operation* (including addendums)
- Weapon Programs Activity Based Control Documents (ABCDs).

The specific Nuclear Facilities at Pantex Plant are delineated in MNL-207300, *Unreviewed Safety Question (USQ)/Nuclear Explosive Safety (NES) Process*, Appendix A. All modifications to Vital Safety Systems and related procedures affecting their operation or evaluation of their performance

are required to be evaluated through the USQ/NES Program according to STD-3014, *Unreviewed Safety Question/Nuclear Explosive Safety Program.*

The change control classification for Fire Protection Vital Safety Systems is Class 1 (Safety Class and Safety Significant Systems). The Class 1 configuration and control procedure is described in the following documents:

- STD-9045, *Change Control for Class 1 Facility Related Systems, Structures, & Components*

- MNL-00054, *Facilities Configuration Management - Conduct of Operations.*

Nuclear Facilities change control includes a formal process for submitting, receiving, evaluating, documenting, amending, and archiving "technical baseline" information for safety related structures, systems, and components (SSCs). MNL-00054, Chapter 11, describes the process. The technical baseline establishes the actual physical configuration of the SSC, the design documents associated with the SSC, the boundaries and interfaces of the SSC to other systems, applicable Authorization Basis or operating regulations, various flow down shop floor documents, and the formal processes established to maintain and control this information. During the upcoming Fire Protection BIO Upgrade Readiness Assessment, this process will be utilized to ensure all documentation is in place.

- An Engineering Data Transmittal (EDT) and Technical Baseline Checklist are the forms used in the baselining process.

- The EDT is the formal method for accepting responsibility for controlling engineering documentation and is used to transmit information to be included in the technical baseline. All EDTs are approved by the Facility Change Control Manager (FCCM), Fire Protection Engineering Manager, and Technical Basis Control Manager.

- The EDT is used as the formal (internal to Facilities CM) mechanism to establish facility or system readiness. Promulgation of readiness is a legal commitment to the DOE. As such, the requirements for establishing a Facility CM baseline are more stringent and are established by the FCCM. Any modifications to systems or equipment after the approval date are required to be processed through formal change control according to STD-9045.

Changes or modifications to Fire Protection systems are accomplished through a maintenance work order, or outside construction project. STD-9045 establishes the configuration and change control procedure for Safety Class and Safety Significant SSCs, which are designated Class 1 change control. This procedure includes formalities such as a dedicated FCCM who is responsible for, among other things, managing activities associated with the Facility Configuration Control Board (FCCB).

- The FCCB, chaired by a permanent Chairman, consists of management level representatives from numerous organizations who are responsible for reviewing Design Change Proposal (DCP) packages and providing recommendations (concur as written/concur with comments, do not concur, or defer with comments) to the Chairman, who approves, disapproves, or defers the DCP.

- Class 1 DCPs contain information needed to justify a modification in a Nuclear Facility. The DCP process ensures impacted documents are identified, USQ screening has occurred, evidence of good design practices (i.e., independent reviews) have been instituted.

- A Design Change Notice (DCN) is generated as a result of required actions from a DCP. The DCN is a transmittal sent to groups or individuals affected by the modification. Actions identified on the DCN must be completed. If controlled documents or drawings are affected by the modification, a copy of the DCN is attached to the documents or drawings, removed when the change process has been completed and the revised documents or drawings replaced.

MNL-00054 establishes the infrastructure for Nuclear Facilities change control. The following describes the manual contents applicable to Fire Protection:

Chapter 6 - Manual/Document Distribution and Control
Chapter 7 - Drawing Processing and Control of Configuration Management Controlled Drawings
Chapter 8 - Vendor Manual Process
Chapter 9 - Class 1 Design Change Proposal Process
Chapter 11 - Technical Baseline Documentation - Engineering Data Transmittal

STD-5016, *Maintenance Work Control System*, establishes the procedure for modifications performed by Pantex Plant craft personnel. STD-5016 establishes the required activities and types of documents that are eventually included in a DCP package described in STD-9045.

- A work request is initiated through Facility Management Integration (FMI)/Passport, generally by the Facility Manager. If the request is not generated by the FM, the FM must be notified and be included in the process. The facility term, used in Passport to differentiate Nuclear Facility Safety Class, Safety Significant, and Important-to-Safety SSCs is “CM-listed.” In change control terms, CM-listed SSCs are either Class 1 or Class 2. Work requests in Nuclear Facilities, are required to be reviewed and concurred with System Engineering.

- The Unreviewed Safety Question Evaluation is initiated according to STD-3014.

- A DCP is initiated.

- All documentation required by STD-5016 is included in the work request and is submitted to Maintenance Work Control for consideration and approval.

- If the work request is authorized and approved, the Maintenance Work Control Department assigns the Work Order a to designer. The design is completed, a DCP package assembled (STD-9045 APPENDIX A), appropriate signatures obtained, and submitted to the FCCM for review.

- The DCP is processed and approved.

- When work has been accomplished, the FCCM is notified by Maintenance Work Control.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

STD-9027, *Facility Project Requests,* establishes the initial project request for modifications requiring outside construction contracts.

- A requestor submits a form, *Project Information Sheet for Construction Projects*, and required information to the appropriate Infrastructure Division coordinator.

- The coordinator signs, prioritizes the request, and submits the package to Engineering and Construction, Scheduling and Cost Control Estimating Section.

- The Estimating Section performs a planning cost estimate that ultimately determines the project scope.

- The Site Planning organization, with assistance from Engineering and Construction and Technical Resources Departments evaluate the request and prioritize it according to STD-9027.

- The Engineering and Construction Department assigns a Project Manager and Project Engineer(s) who develop the design modification according to MNL-FO-1009, *Life Cycle Asset Management (LCAM) Implementation Manual*.

- A DCP package is prepared, reviewed, and approved according to STD-9045 and STD-9046, APPENDIX A.

- When work has been accomplished, the FCCM is notified by receiving a copy of Beneficial Occupancy.

- Project records, technical baseline documentation, are submitted to Technical Basis Control by the Project Engineer.

- FCCM tracks open Design Change Notices against documents, affected by the modification, until documents are revised.

VSS-1.3 Review Approach 9

The document control process for Vital Safety Systems is governed by STD-9045, and MNL-00054. (Refer to RA8.) Documents that can be affected as a result of a modification are identified on the DCP form. Pending changes are promulgated by a Design Change Notice (DCN) which is posted on the document that will be revised, such as Fire Protection System controlled drawings.

If external calibration, operations, training, or preventive maintenance procedures are affected by a modification, the applicable organization is notified with a DCN. Acknowledgment of the DCN is made and returned to Facilities Change Control.

Within the Facilities change control process, documents other than design basis documents, are controlled using a Document Change Request (DCR). In the case of Fire Protection, the Fire Hazards Analysis documents are controlled by the DCR. The change control infrastructure is governed by MNL-00054, which is described in RA8. Review and approval requirements for all documents controlled by facilities change control are listed and described in MNL-00054.

In the later part of FY-99 and early FY-00, major Authorization Basis implementation efforts were accomplished. The Pantex Plant Technical Safety Requirements, Lightning Hazards Basis for Interim Operations, Weapons Programs Activity Basis Controlled Documents, and other AB related requirements were approved and implemented. These activities had significant impact on the Facilities configuration and change control processes.

VSS-1.3 Summary of Fire Protection

The configuration management and maintenance programs are well defined and formally implemented to control changes to the Fire Protection System. There is a significant backlog in open Design Change Notices (DCNs). This backlog is tracked and managed by procedure. However, the significant number of DCNs, which is an interim or temporary document, has the potential to impact operational availability of the system. Therefore, this criterion is not fully met.

VSS-1.4 The system is operable and available to fulfill its safety function when required.

VSS-1.4 Review Approach 4

Reference RA6 for additional information.

A review of Nonconformance Reports (NCRs) and occurrences for the subject facilities, indicated that deficiencies are discovered during normal inspection activities. There are procedures in place for other than routine discoveries.

Plant STD-6161 describes the actions required for Nonconformance Reports (NCRs). As an example NCR, a recent incident involving the Wet Pipe Fire Sprinkler System, NCR 29003889, is described as follows:

> A sprinkler head located (in Building 12-85) adjacent to an electrical heater in the cell decon room activated causing Fire Protection System water flow (Date 1/15/01).
>
> The sprinkler head installed adjacent to the electrical heater was determined by Fire Protection Engineers to be the wrong type to be located near a heater. This sprinkler head was rated for Intermediate Temperature and NFPA requires any sprinkler head located within 7 feet of a heater to have a high temperature rating.
>
> Four actions resulted:

- Replace actuated sprinkler head rated for Intermediate Temperature with one recommended by Fire Protection Engineering that is rated for High Temperature per NFPA.

- Fire Protection Engineering walk down of areas which may have similar concerns (heater location to sprinklers).

- Manufacturer contacted to determine if there is a trend in failure rates for the subject sprinkler head-type.

- Replacement of correct sprinkler heads if found in similar locations.

All corrective actions are on schedule but are not complete.

VSS-1.4 Review Approach 10

The rigor of documentation and change control of items under Nuclear Facilities CM reflects the levels of hazard classification. New VSS (Safety Class/Safety Significant) SSCs are determined through hazard and accident analysis, and are promulgated through Authorization Basis Documents. Resulting AB Implementation Plans promulgate required activities such as modifications, facility walkdowns, or design recovery as described in Plant Standard STD-3073, Implementation of Authorization Basis changes. As described in RA8, the technical baseline for VSS SSCs is established and subsequently managed by the Class 1 change control and Important-to-Safety SSCs are managed by Class 2 change control.

A list of available controls (for an event) is identified during the *hazard* and *accident analysis* process. This list of controls is then classified based on the unmitigated consequences and frequency of an event to determine which controls are classified as Safety-Class, Safety-Significant, and Important-to-Safety.

VSS-1.4 Summary of Fire Protection

Surveillances verify that the operational requirements of the Fire Protection Systems are met. Deficiencies are identified and corrected. Due to the number of open corrective actions, including those to address the known vulnerabilities in the fire detection and alarm system, this criterion is not fully met.

Conclusion for Fire Protection The Fire Protection System is operational and personnel and procedures are in place to ensure continued operability. This evaluation does not cover status of the High Pressure Fire Loop which will be addressed on a separate assessment form. Summary status is as follows:

System Fire Protection
Configuration Management - Yellow ⇑
Some controlled documentation may not be verified or complete, but it is known that none of these affect the operability of the Vital Safety Systems.
Maintenance - Yellow ⇒

Preventive maintenance and surveillance tasks are current. The fire detection and alarm system requires upgrading and a project plan is in place to address the issue.

Operations - Yellow ⇓

There is a known vulnerability with the current fire alarm and detection system which could impact system reliability. A project plan is in place to address the situation.

Overall Status - Yellow ⇒

Arrows slant upward if conditions are improving, are horizontal when conditions are stable, and slant downward if conditions are deteriorating.

These conclusions are based on the pre-determined criteria and assessment process prescribed by the five member team of subject matter experts. Interviews with personnel experienced in nuclear facility management, authorization basis, system engineering, configuration management, maintenance management, maintenance work control, and performance of nuclear surveillances and in-service inspections were performed. Research of Recapitalization Plan which considers facility specific assessment data, maintenance backlog data including deferred maintenance, Technical Safety Requirements, occurrence data, recent readiness assessment findings, budget, and correspondence/reports addressing specific facility needs, and current processes were also conducted. Conclusions by the original five team members were used when applicable to the bays and cells.

DOE employee who reviewed this assessment____Terry Zimmerman____Date____2/21/01___

Hours required to complete assessment. DOE:___3___Hrs. Contractor:___42___Hrs.