DNFSB Recommendation 2000-2
INEEL Priority Facility Phase I
Safety Class, Ventilation and
Fire Protection Systems
Assessment Report

Executive Summary

The systems assessed at the Idaho National Engineering and Environmental Laboratory (INEEL), Idaho Nuclear Technology and Engineering Center (INTEC) included the Fuel Storage Area (FSA) Above Ground Building Structure, the FSA Pool Structure, the CPP-666 Confinement Ventilation System and the CPP-666 Fire Protection System.

The assessment determined that these systems are operational and personnel and processes are in place to ensure their continued operational readiness.

No systemic, recurring or significant issues or trends were identified which would require corrective actions. However, the Confinement Ventilation System is degrading due to facility aging. This degradation could result in future operational down time, radiological contamination and personnel exposure. Through configuration management programs and procedures deficiencies in configuration management are being identified and corrected.

1.0 Purpose

The Defense Nuclear Facilities Safety Board (DNFSB) issued Recommendation 2000-2 on March 8, 2000. The Department of Energy (DOE) accepted the Board's Recommendation and developed an Implementation Plan, which was transmitted, to the DNFSB on October 31, 2000. In response to a request from the DOE Idaho Operations Office, Bechtel BWXT Idaho, committed to performing assessments of the vital safety systems, ventilation systems and fire protection systems in the facilities at the INEEL identified in the Implementation Plan.

The DNFSB noted, in Recommendation 2000-2, that it was concerned with the fact that many of the DOE's nuclear facilities were constructed years ago and are approaching end-of-life. The DNFSB expressed concern that some degradation of reliability and operability of systems designed to ensure safety can reasonably be expected and recommended specific actions to assess system condition and apply system expertise in managing the configuration of vital safety systems.

This report is the first of three reports that will provide a summary of the findings from the assessments performed on the vital safety systems in the facilities at the INEEL identified in the Implementation Plan for DNFSB Recommendation 2000-2.

2.0 Scope

This assessment is the Phase I Assessment of the Safety Class, Ventilation, and Fire Protection Systems in CPP-666. This facility was identified as a Priority Facility by the DNFSB recommendation 2000-2. The objective of the assessment is to ensure that the identified vital safety systems are operational and personnel and processes are in place that ensure continued operational readiness.

The systems that were assessed include the FSA Above Ground Building Structure, the FSA Pool Structure, the CPP-666 Confinement Ventilation System and the CPP-666 Fire Protection System. The safety classification for these systems was determined using the draft Safety Analysis Report (SAR) for CPP-666. This was done based on direction from DOE-ID. The FSA Above Ground Structure and the FSA Pool Structure have been identified as Safety Class Systems in the draft SAR. The Fire Protection System and the Confinement Ventilation System are not classified as Safety Class, Safety Significant or Defense in Depth. The assessments of all the systems were performed against the current approved authorization basis requirements as identified in the Plant Safety Document, section 5.6. The draft SAR does not derive any additional functional performance requirements for these systems.

3.0 Review Criteria and Approach

Each system was assessed against the criteria developed by DOE-HQ and provided in the Criteria, Review and Approach Document (CRAD) for the Assessment of Operational Readiness of Vital Safety Systems. Appendix A contains the completed CRAD for each of the systems.

The following Review Approach was provided:

1. Using the DOE-approved facility safety analysis (i.e., SAR, BIO, etc.), identify: a) the system safety function(s); b) the normal, abnormal, and accident conditions under which the system is intended to perform its safety function(s); and c) relevant system functional requirements and performance criteria.

2. Identify the acceptance criteria from the surveillance tests used to verify that the system is capable of accomplishing its safety function(s). Review the acceptance criteria against the function(s), conditions, requirements, and performance criteria identified in Question 1 above.

3. At what frequency are the tests identified in Question 2 above performed? Determine whether these tests and inspections are required by Technical Safety Requirements, Operational Safety Requirements (OSRs), or other Authorization Basis or Authorization Agreement requirements.

4. For each of the past three years: a) identify the number of times that the system has failed to meet its test acceptance criteria; b) identify the number of times that the system has failed in response to facility operating conditions (i.e., failed on demand); and c) estimate the percentage of time that the system was not capable of accomplishing its safety function(s) when required to be operable.

5. Identify formally scheduled activities, in addition to those addressed in item 2 above that are intended to help ensure reliable performance of the system. Include preventive maintenance, walkdowns, inspections, and assessments as appropriate.

6. Identify the current backlog for the system for items such as preventive maintenance, corrective maintenance, modifications, surveillances, tests, inspections, and corrective actions.

7. Are drawings that document the system configuration available? If so, identify the types of drawings (e.g., piping and instrumentation diagrams, electrical one-line, wiring, or schematic diagrams, installation drawings).

8. Review the processes used to ensure that work on the system and changes to the system are properly controlled (i.e., formally reviewed, approved, implemented, tested, USQ review performed if required, documents updated, and work/change accepted).

9. Determine whether the procedures identified in items 2 and 5 above, and the drawings identified in item 7 above, are controlled under a formal document control process, and indicate whether the process requires that documents be updated as necessary to maintain their accuracy.

10. Identify any systems and equipment (e.g., electric power, instrument or control air, diesel fuel transfer, vacuum, heat tracing, etc.) that directly support the operation of the vital safety system being assessed (i.e., where the support systems/equipment are essential for the safety system to perform its safety functions) that are not included within the defined system boundary.

4.0 Assessment Results

The objective of the assessment is to ensure that the identified vital safety systems are operational and personnel and processes are in place that ensure continued operational readiness.

4.1 Criterion 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.

Conclusions:

The VSS safety functions and intended functions for the FSA Above Ground Structure, the FSA Pool Structure and the Confinement Ventilation System are adequately defined in the Plant Safety Document, section 5.6. The Fire Protection system does not have any required safety functions. Line management is required to be familiar with the safety documents for their facilities through the Facility Managers qualification training program.

All systems with the exception of the fire alarm system have adequate documentation. The desire to develop a more complete set of drawings for the fire alarm system has previously been identified in the Life Safety System Configuration Management Plan. These drawings are currently being developed and as-built.

The FSA Above Ground Structure and the FSA Pool Structure have been analyzed to ensure they meet the requirements. The Ventilation and Fire Protection systems are tested and maintained

in accordance with company procedures which implement industry standards and DOE requirements.

Strengths:
The desire to develop a more complete set of drawings for the fire alarm system has previously been identified. Physical walkdowns are performed prior to work being performed on systems that may not have drawings.

4.2 Criterion 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.

Conclusions:
There is no backlog of safety or compliance related maintenance activities. The fire protection and ventilation systems require the most testing and maintenance. The fire protection system is being adequately maintained. However, the ventilation system is experiencing some degradation. There is no system testing required for the FSA Above Ground Structure or FSA Pool Structure since the systems are passive design features, with no credible challenge to their function.

Recommendations for Improvement:
Even though criterion 1.2 was met for all the systems the following recommendation is given. Obtain funding to ensure that the ventilation system does not degrade to a point at which it can no longer perform its intended function.

4.3 Criterion VSS-1.3

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

Conclusions:
Adequate programs and procedures have been implemented at a company level to ensure proper configuration management and to ensure operational availability. Through these programs and procedures deficiencies are being identified and corrected.
Strengths:
The company level programs and procedures have been developed using the Integrated Safety Management principles. INTEC also implements the configuration management program per a TSR-level administrative control, AC 5.0.12, "Configuration Control." Accordingly, the program ensures the continued effectiveness of safety SSCs.

4.4 Criterion VSS-1.4

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

Conclusions:

The FSA Pool Structure and the FSA Above Ground Structure have been operable since they were started in 1984. The ventilation system failed to perform the required safety function once in 1998 resulting in an ORPS Report (ID-LITC-FUELRCSTR-1998-0006). The Fire Protection system has been highly reliable over the past three years.

Appendix A

System Criteria Review and Approach Documents

Criteria, Review, and Approach Document
for the Assessment of Operational Readiness of Vital Safety Systems (VSS)

Site: INTEC

Facility: INTEC-666 (FAST)

System: FSA Building Above Ground Structures

System Classification: Reliability Class A per the PSD, Section 5.6. Safety Class SSC per SAR 2.1 (not approved by DOE-ID)

System Safety Function (list): Prevent facility failures that could affect the fuel storage array or the cask receiving area following a DBE, extreme wind, or excess snow loading.

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.**

<u>Discussion of Results</u> – Criterion Met
The FSA Building Above Ground Structures is a passive design feature of the FAST facility. There are no credible challenges to the system to prevent it from performing its function, which is to withstand the forces imposed by natural phenomena events of seismic, high winds, or snow loading.

Additional calculations beyond the original design calculations were performed to increase the allowable floor loading to support the FSA Reracking Project. These calculations indicated that the above ground structure is able to withstand PC-3 seismic events. Numerous studies have been performed and are available to qualify the structural adequacy of the facility to at least PC-3 criteria.

The seismic clamps for the bridge cranes are included as part of the building structure since they are located above the FSA Pool Structures and dropping a crane from its supports has the same potential to damage stored fuel and pool structures as does failure of the building and walls. As a best management practice, the annual PM and inspection of the bridge cranes, required to implement the institutional program to ensure excellence in hoisting and rigging practices, does visually inspect all structural aspects of the bridge cranes, including the seismic clamps. The seismic clamps do not ordinarily receive any wear, and are expected to last as long as the crane lasts.

Responsible line managers for the FAST facility are aware that the structure and bridge cranes are required to withstand natural phenomena events. The authorization basis, (both the existing PSD, section 5.6, and the new, unapproved SAR) clearly indicates this.

Plant drawings are available and maintained in the company computerized document control system and copies of the numerous calculations are available.

There is no system testing required since the system is a passive design feature, with no credible challenge to its function.

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.

<u>Discussion of Results</u> – Criterion Met

The FSA Building Above Ground Structure is a passive design feature with no credible challenge to its performance. There is no backlog of surveillances, tests, inspections, maintenance, upgrades, or other work on the system.

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

<u>Discussion of Results</u> – Criterion Met

A System Engineer (SE) has been assigned to this system. The SE is responsible for ensuring the physical configuration of the system is consistent with the system's design basis requirements and the system's documentation. This is done by following the company configuration management (CM) program. The CM program was developed using the guidance provided in DOE-STD-1073-93, "Guide for Operational Configuration Management Program". The main company procedure that implements this program is MCP-2811, Design and Engineering Change Control. This program provides direction for obtaining the necessary reviews and approvals for the proposed change. All changes to systems

in Nuclear, Moderate-Hazard or High-Hazard facilities are screened for Unreviewed Safety Questions (USQ's) using MCP-123, Unreviewed Safety Questions. The Technical and Functional Requirements for the modification as well as the design are reviewed and approved as outlined in MCP-2811. Changes to drawings are made in accordance with MCP-2377, Development, Assessment and Maintenance of Drawings. Other affected documents are modified in accordance with MCP-135, Creating, Modifying, and Canceling Procedures and other DMCS-Controlled Documents. INTEC also implements the configuration management program per a TSR-level administrative control, AC 5.0.12, "Configuration Control." Accordingly, the program ensures the continued effectiveness of safety SSCs.

The SE is also responsible for evaluating the systems performance and determining the necessary corrective and preventative maintenance required to ensure the system performs design and safety basis functions. The SE also provides support and technical assistance for operational and maintenance activities.

All work on the system is performed in accordance with STD-101, Integrated Work Control Process (IWCP). The IWCP is the method by which the Integrated Safety Management Program (ISMS), Enhanced Work Planning (EWP) and Voluntary Protection Program (VPP) are implemented for maintenance and construction activities.

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

Discussion of Results – Criterion Met

The FSA Building Above Ground Structures are a passive design feature with no credible challenge to its performance. The system has been operable and available since the time it was started in 1984. There are no other systems or equipment that must be available for the FSA Above Ground Structures to perform its function.

Conclusion – Objective Met

The FSA Above Ground Building Structure is a passive design feature with no credible challenge to performing its function. Administrative controls are in place to ensure the system remains in a configuration that meets the systems required safety function. The assigned system engineer assures that the configuration management and maintenance programs are followed. The backlog of work on the system is kept to a minimum. The system has been operable and available since it was started in 1984.

Provide an estimate of the number of hours needed to complete the data gathering, assessment, and documentation: 35 hours

of Vital Safety Systems (VSS)

Site: INTEC

Facility: INTEC-666 (FAST)

System: FSA Pool Structures

System Classification: Reliability Class A per the PSD, Section 5.6. Safety Class SSC per SAR 2.1 (not approved by DOE-ID)

System Safety Function (list): Maintain pool water following a DBE
Resist failure due to the drop of a cask onto the unloading pool floors.

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.**

<u>Discussion of Results</u> – Criterion Met

The FSA Pool Structures is a passive design feature of the FAST facility. There are no credible challenges to the system, with the exception that the original design feature to install a pool gate and drain the water from a pool has been restricted, until or unless additional calculations have been performed to prove that draining a pool does not result in structural overloads. Additional calculations performed to increase the allowable floor loading to support the FSA Reracking Project indicated that the original design objective to allow an empty pool to be adjacent to a water filled pool resulted in overstresses during the DBE. Numerous studies have been performed and are available to qualify the structural adequacy of the facility to at least PC-3 criteria. The pool gates have been removed from the facility, except for the cutting pool gate, which is stored in the facility. Installing a pool gate and draining a pool is not allowed and is administratively controlled through a Technical Safety Requirement. It

would be a complex operation and is not likely to occur without considerable preparation.

The pool structure is to maintain its safety significant function to withstand the accidental drop of a cask into unloading pool without significant leakage. This was included in the original design criteria. Technical Specification level administrative controls are used to control cask handling activities.

Responsible line managers for the FAST facility are well aware of the safety functions of the FSA Pool Structure. The authorization basis, (both the existing PSD, chapter 5.6, and the new, unapproved SAR) clearly indicates this.

Plant drawings are available and maintained in the company computerized document control system and copies of the numerous calculations are available.

There is no system testing required since the system is a passive design feature, with no credible challenge to its function. Pool water level is monitored and controlled. Changes in these values would provide an indication of structural degradation.

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.**

Discussion of Results – Criterion Met

The FSA Pool Structure is a passive design feature with no credible challenge to its performance, with the exception that there be no empty pools. The presence of an empty pool is readily obvious and no surveillance requirement is necessary to ensure that there are no empty pools. There is no backlog of surveillances, tests, inspections, maintenance, upgrades, or other work on the system.

VSS-1.3 **Configuration Management and Maintenance programs effectively ensure operational availability of the system.** (See Review Approach items 5, 8, and 9)

Discussion of Results – Criterion Met

A System Engineer (SE) has been assigned to this system. The SE is responsible for ensuring the physical configuration of the system is consistent with the system's design basis requirements and the system's documentation. This is done by following the company Configuration Management (CM) program. The CM program was developed using the guidance provided in DOE-STD-1073-93, "Guide for Operational Configuration Management Program". The main company procedure that

implements this program is MCP-2811, Design and Engineering Change Control. This program provides direction for obtaining the necessary reviews and approvals for the proposed change. All changes to systems in Nuclear, Moderate-Hazard or High-Hazard facilities are screened for Unreviewed Safety Questions (USQ's) using MCP-123, Unreviewed Safety Questions. The Technical and Functional Requirements for the modification as well as the design are reviewed and approved as outlined in MCP-2811. Changes to drawings are made in accordance with MCP-2377, Development, Assessment and Maintenance of Drawings. Other affected documents are modified in accordance with MCP-135, Creating, Modifying, and Canceling Procedures and other DMCS-Controlled Documents. INTEC also implements the configuration management program per a TSR-level administrative control, AC 5.0.12, "Configuration Control." Accordingly, the program ensures the continued effectiveness of safety SSCs.

The SE is also responsible for evaluating the systems performance and determining the necessary corrective and preventative maintenance required to ensure the system performs design and safety basis functions. The SE also provides support and technical assistance for operational and maintenance activities.

All work on the system is performed in accordance with STD-101, Integrated Work Control Process (IWCP). The IWCP is the method by which the Integrated Safety Management Program (ISMS), Enhanced Work Planning (EWP) and Voluntary Protection Program (VPP) are implemented for maintenance and construction activities.

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

<u>Discussion of Results</u> –Criterion Met

The FSA Pool Structures are a passive design feature with no credible challenge to its performance. The system has been operable and available since the time it was started in 1984. There are no other systems or equipment that must be available for the FSA Pool Structures to perform its function.

<u>Conclusion</u> – Objective Met

The FSA Pool Structures is a passive design feature with no credible challenge to performing its function. Administrative controls are in place to ensure the system remains in a configuration that meets the systems required safety function. The assigned system engineer assures that the configuration management and maintenance programs are followed. The backlog of work on the system is kept to a minimum. The system has been operable and available since it was started in 1984.

Provide an estimate of the number of hours needed to complete the data gathering, assessment, and documentation: 35 hours

Criteria, Review, and Approach Document
for the Assessment of Operational Readiness
of Vital Safety Systems (VSS)

Site: INTEC

Facility: CPP-666

System: FAST Heating, Ventilation, and Air Conditioning System – part of system considered here is containment ventilation for radiological contamination control

System Classification: FAST HVAC (The FAST HVAC system is not classified as a safety class system, a safety significant system, or a defense in depth system)

System Safety Function (list): Engineered Safety Feature – The systems intended function is to provide increasing negative pressure gradients from areas of no radiological contamination to areas of increasing potential or actual radiological contamination. (per PSD Section 5.6)

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

<u>Discussion of Results</u> – Criterion Met

The FAST HVAC system is not classified as a safety class system, a safety significant system, or a Defense in Depth system. However, PSD 5.6 Vol. I and III, define it as a confinement ventilation system that provides increasing negative pressure gradients from areas of no radiological contamination to areas of increasing potential or actual radiological contamination. Line management is required to be familiar with the safety documents for their facilities through the Facility Managers qualification training program.

The system is operated using approved operating procedures. The system is maintained within limits through automatic control, alarms and

routine monitoring. Abnormal conditions are documented and appropriate corrective action is taken. System settings are controlled by approved documentation.

An Idaho Department of Environmental Quality Permit to Construct 023-00001 gives requirements for pressure drop, annual HEPA filter efficiency testing, and reporting requirements for the final exhaust HEPA filters. All in-service HEPA filters in the facility also have to meet the requirements of MCP 2746, Purchasing, Maintaining and Using HEPA Filters

Technical Specification TS 5.6B5 specifies requirements for the radiation monitoring instruments that measure the radiation levels of the FAST main ventilation system final HEPA filters. The instruments shall be operable whenever the exhaust fans are operating. If any instrument is not operating, then radiation measurements shall be made for that instrument once per shift using a portable radiation monitoring device, or the filter bank corresponding to that instrument shall be taken out of service. Technical Specification 5.6B6 gives limiting control settings and limiting conditions of operation for the radiation levels on the final exhaust HEPA filter banks.

There are ten drawings that are Flow and Control Drawings (designated as P&ID drawings) that are essential drawings for the HVAC system. These are all active drawings and are available on the Electronic Document Management Control System. Two of the drawings have previously been identified as containing inadequate information stemming from legacy issues. These drawings are listed on an open Engineering Change Form (ECF) as needing a revision to show current air flows from the cutting pool to the fuel storage pools and HEPA filters that are blocked off. The portions of these drawings needing corrections are not used for operational purposes and therefore do not effect the systems ability to meet Its intended function.

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.**

<u>Discussion of Results</u> – Criterion Met

HEPA filters are required to be tested after installation or modification and at least annually thereafter (MCP 2746 and Idaho Department of Environmental Quality Permit to Construct 023-00001).

For the years of 1998 and 1999, Industrial Hygiene kept track of the HEPA filter testing program and tested all in-service HEPA filters in the FAST facility. For the year of 2000, the HEPA filter testing has been incorporated into the preventative maintenance program controlled by the STD-101 process, and as such the HEPA filters are tracked to make sure they are tested within the annual deadlines.

All HEPA filters in the FAST Facility have been tested and passed a 99.97 percent removal efficiency for the past three years within the annual deadline each year except for the following filters in 1999:

a). Dissolution Cell Off-Gas Filters were in operation even though they were not tested within the annual deadline for HEPA filter efficiency testing for these filters. However, the following reasoning can be applied to this event to show that the system was still in a safe condition even if a cell off gas filter had failed.

(1). Filters consist of three parallel banks of HEPA filters, with each bank consisting of two sets of four filters in series. The complete assembly of the three banks of filters is inline and upstream of the final exhaust filters for CPP-666.

(a). The final filters would still remove 99.97 percent of all upstream radioactive contamination even if the cell off gas filters failed.

(b). Continuous monitoring of the exhaust stack would detect any contamination exceeding the operating limits.

(2). No emissions over operating limits were detected, therefore the system was still in safe condition and there was no violation of emissions to the environment.

(3). Filters were tested in April of 2000 and passed the 99.97 percent removal efficiency test.

(4). During this time frame no activities were performed that could have resulted in significant radioactive particulate.

Exhaust fans for the FAST CPP-666 building produce the air flow necessary to provide one of the methods of containment ventilation between the various areas of the building.

a). An annual and semi-annual PM on the main exhaust fans has been performed each year to ensure they remain in operation. During the year 2000, an evaluation was made based on equipment history to roll the semi-annual PM into the annual PM. This annual PM will come due in February of 2001.

b). The annual PM's on the dissolution cell exhaust fans was cancelled in the year 2000 due to budget reductions. However, these are intermediate exhaust fans, and the system is designed with a bypass in case neither fan is operating.

c). During 1999, one of the water treatment exhaust fans was out-of-service for an extended time while a work order was approved to replace bearings. Bearings were replaced in 1999. The system is designed to be able to operate with only one of the two water treatment exhaust fans, or with a bypass if neither fan is operating.

There is currently a work order to install new bearings, a new high speed coupling, and rebalance one of the dissolution cell exhaust fans. This is on hold until the end of January 2001 due to availability of craft resources. The other dissolution cell exhaust fan is operating and supplying adequate system air flow.

Administrative controls are in place to prevent inadvertent degradation of the system by personnel. For example doors are signed to ensure they remain closed and hatch movement is controlled through work processes.

Other than noted in VSS 1.4 the system has been able to meet the intended function requirements. There is no backlog of safety or compliance related maintenance activities. However, the system is experiencing some degradation. The system does not always function as designed. Some examples are as follows:

a). Since the middle of 1997, the flow element for flow controller F-FV-982-651 has been corroded.
b). The control damper D-FV-982-65 is suspected of being defective so that it prevents full design flow through the fans.
c). After a loss of electrical power in 1999, a problem was encountered where the negative pressure in the Fuel Storage Basin area more than doubled from the normal. The controller has been checked, and the problem seems to stem from worn linkage on the supply damper D-FV-982-50 to the basin rather than in the controller.
d). The controllers are experiencing increasing problems maintaining the exact set points to which they are set. While the variances from the set points have not been enough to cause any problems with contamination control between areas, the controllers have been an increasing maintenance burden.
e). Aging of D/P Photohelic alarms for HVAC System Funding levels and priorities have not allowed these problems to be corrected.

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

<u>Discussion of Results</u> – Criterion Met

A System Engineer (SE) has been assigned to this system. The SE is responsible for ensuring the physical configuration of the system is consistent with the system's design basis requirements and the system's documentation. This is done by following the company configuration management (CM) program. The CM program was developed using the guidance provided in DOE-STD-1073-93, "Guide for Operational Configuration Management Program". The main company procedure that implements this program is MCP-2811, Design and Engineering Change Control. This program provides direction for obtaining the necessary reviews and approvals for the proposed change. All changes to systems in Nuclear, Moderate-Hazard or High-Hazard facilities are screened for Unreviewed Safety Questions (USQ's) using MCP-123, Unreviewed Safety Questions. The Technical and Functional Requirements for the modification as well as the design are reviewed and approved as outlined in MCP-2811. Changes to drawings are made in accordance with MCP-2377, Development, Assessment and Maintenance of Drawings. Other affected documents are modified in accordance with MCP-135, Creating, Modifying, and Canceling Procedures and other DMCS-Controlled Documents. INTEC also implements the configuration

management program per a TSR-level administrative control, AC 5.0.12, "Configuration Control." Accordingly, the program ensures the continued effectiveness of safety SSCs.

The SE is also responsible for evaluating the systems performance and determining the necessary corrective and preventative maintenance required to ensure the system performs design and safety basis functions. The SE also provides support and technical assistance for operational and maintenance activities.

All work on the system is performed in accordance with STD-101, Integrated Work Control Process (IWCP). The IWCP is the method by which the Integrated Safety Management Program (ISMS), Enhanced Work Planning (EWP) and Voluntary Protection Program (VPP) are implemented for maintenance and construction activities.

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

<u>Discussion of Results</u> –Criterion Met

The FAST HVAC system has prevented the spread of radiological contamination from areas of higher contamination to areas of lesser contamination or no contamination as designed except for the following occurrence in 1998, and even this occurrence was mostly due to other factors:

a). Based on ORPS Report ID-LITC-FUELRCSTR-1998-0006, an ion exchange resin transfer process was performed in May of 1998 to remove spent resin from the ion exchange vessels in the anion/cation vaults of Rooms 212 and 215. During this process, the floor drain loop seal in Room 213 was empty of water, and the room air pressure in the common B-2 sump vault ended up being higher than the pressure in Room 213. Contamination from the B-2 sump vault was pushed through the drain system into Room 213. HVAC air flow through the anion/cation vaults was increased temporarily to increase negative pressure with respect to Room 213. Also, the loop seal in the floor drain was filled.

(1). While the main problem was inadequate loop seals in the drain system, the ORPS report did identify weaknesses with the HVAC system, notably that infiltration through roof hatches in the vault B-2 could cause it to have a higher pressure than Room 213.

(2). The original HVAC system design used flow controllers to maintain flow through these various areas, which in turn was intended to also maintain the correct differential pressures between these various areas. However, since pressure controllers were never installed in this area, there is no guarantee that the controlled flows will always result in the correct differential pressures. There are no plans to add pressure controllers in this area.

Plant air and electrical power are required for normal operation. However, loss of these support systems will not result in any significant safety consequences.

<u>Conclusion</u> – Objective Met

The FAST HVAC system is not classified as a safety class system, a safety significant system, or a Defense in Depth system. However, PSD 5.6 Vol. I and III define it as a confinement ventilation system that provides increasing negative pressure gradients from areas of no radiological contamination to areas of increasing potential or actual radiological contamination. The HEPA filters in this building are adequately inspected, tested, and maintained in accordance with MCP-2746. The FAST HVAC system has met the PSD requirements except for the isolated occurrence in May of 1998 that was tied to the ion exchange resin transfer as noted above. The assigned system engineer assures that the configuration management and maintenance programs are followed. The only trend that is of increasing concern is the aging of the HVAC equipment other than the filters themselves such as the controllers and differential pressure photohelic alarms. Budgets have been proposed to upgrade the HVAC controllers, but have been disapproved for the past two fiscal years. This trend could lead to the HVAC system not being able to perform its intended function. However, back flow filters are in place in most areas and various operations would need to be curtailed until the system is repaired.

<u>Provide an estimate of the number of hours needed to complete the data gathering, assessment, and documentation: 45 hours</u>

Criteria, Review, and Approach Document
for the Assessment of Operational Readiness
of Vital Safety Systems (VSS)

Site: INTEC

Facility: 666 (FAST)

System: Fire Protection

System Classification: Fire Protection (The fire protection systems in this building are not Safety Class, Safety Significant, or Defense In Depth as defined by Plant Safety Documents)

System Safety Function (list): None per current plant safety documents.

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.

<u>Discussion of Results</u> – Criterion Partially Met

The fire protection systems in this building are not Safety Class, Safety Significant, or Defense In Depth as defined by Plant Safety Documents. A Fire Hazards Analysis/Fire Safety Assessment (HAD-82) was developed for this facility in September of 2000. Line management is required to be familiar with the safety documents for their facilities through the Facility Managers qualification training program.

Inspection Testing and Maintenance is performed on the fire protection systems at CPP 666 in accordance with PRD-158, Inspection, Testing and Maintenance of Fire Protection Systems and Equipment. NFPA 72 and NFPA 25 are the national standards by which fire systems are maintained. PRD-158 is the implementing document for these 2 standards. Fire alarm system integrity is monitored at the Fire Alarm Control Panel and also at the Central Alarm Room (CFA-666). Monthly

surveillance and routine maintenance is performed on the fire alarms and fire suppression systems per PRD-158.

The acceptance criteria for fire alarm system testing can be found in NFPA 72 Chapter 7 (Inspection, Testing, and Maintenance). The acceptance criteria for fire suppression systems testing can be found in NFPA 13 Chapter 10 (System Acceptance). The testing frequency varies according to the system being tested. Devices are tested on a quarterly, semi-annual, and annual, 3 year, and 5 year schedule as defined in PRD-158, NFPA 72 and NFPA 25.

Some electrical and device location drawings are available. A complete set of drawings associated with the fire alarm systems in CPP-666 could not be found. Drawings are being developed as part of the LSS Configuration Management Recovery Plan implementation. In the interim, walkdowns of the system are conducted as necessary to determine information that may not be available on the current drawings. A complete set of piping drawings for the fire suppression systems are located in the electronic document management system (EDMS). These are controlled drawings and are maintained as Master Facility Drawings.

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.

Discussion of Results – Criterion Met

There are no current backlog items associated with preventive maintenance, corrective maintenance, tests, inspections or corrective actions associated with the fire protection systems at CPP-666.

There is a CMMS Work Order being generated to remove one smoke detector (SD-08 event # 1145414). This device cannot be accessed safely for preventive or corrective maintenance activities.

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

Discussion of Results – Criterion Met

A System Engineer has been assigned to the fire alarm portion of the fire protection system and a SE has been assigned to the fire suppression portion. The SE's interface with the Facility Fire Protection Engineer (FPE) on the configuration management of the systems. The FPE is responsible to provide an oversight function to the SE's.

The SE's are responsible for ensuring the physical configuration of the system is consistent with the system's design basis requirements and the system's documentation. This is done by following the company

configuration management (CM) program. The CM program was developed using the guidance provided in DOE-STD-1073-93, “Guide for Operational Configuration Management Program”. The main company procedure that implements this program is MCP-2811, Design and Engineering Change Control. This program provides direction for obtaining the necessary reviews and approvals for the proposed change. All changes to systems in Nuclear, Moderate-Hazard or High-Hazard facilities are screened for Unreviewed Safety Questions (USQ’s) using MCP-123, Unreviewed Safety Questions. The Technical and Functional Requirements for the modification as well as the design are reviewed and approved as outlined in MCP-2811. Changes to drawings are made in accordance with MCP-2377, Development, Assessment and Maintenance of Drawings. Other affected documents are modified in accordance with MCP-135, Creating, Modifying, and Canceling Procedures and other DMCS-Controlled Documents. INTEC also implements the configuration management program per a TSR-level administrative control, AC 5.0.12, "Configuration Control." Accordingly, the program ensures the continued effectiveness of safety SSCs.

The SE’s are also responsible for evaluating the systems performance and determining the necessary corrective and preventative maintenance required to ensure the system performs design and safety basis functions. The SE also provides support and technical assistance for operational and maintenance activities.

All work on the system is performed in accordance with STD-101, Integrated Work Control Process (IWCP). The IWCP is the method by which the Integrated Safety Management Program (ISMS), Enhanced Work Planning (EWP) and Voluntary Protection Program (VPP) are implemented for maintenance and construction activities.

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

<u>Discussion of Results</u> – Criterion Met

The fire protection systems in this building are not Safety Class, Safety Significant, or Defense In Depth as defined by Plant Safety Documents. The fire protection systems passed acceptance testing at the time they were installed. This is the only time acceptance testing is performed unless the systems have been modified. None of the fire protection systems have been modified. There is no documentation in the plant of any failures of any type that would affect the normal operability of the fire protection systems in this building. A review of the down time over the past three years was conducted per Review Criteria 4. The fire suppression systems have been 100% operational during the past 3 years with the exception of routine maintenance or planned work. The fire alarm systems have been 99.99% operational during the past 3 years. The smoke detector system for substation 2 and 3 was impaired for 24

hours in order to replace the main control board in the Fire Alarm Control Panel.

Electrical power is required for normal operation of the fire alarm system and control air is required for the normal operation of the dry pipe sprinkler system.**Conclusion – Objective Met**

The fire protection systems in this building are not Safety Class, Safety Significant, or Defense In Depth as defined by Plant Safety Documents. The fire protection systems in this building are adequately inspected, tested, and maintained in accordance with PRD-158. The LSS Configuration Management Plan has identified the desire to have a complete set of drawings for the fire alarm systems. In the interim, walkdowns of the system are conducted as necessary to determine information that may not be available on the current drawings. The assigned system engineer assures that the configuration management and maintenance programs are followed. The backlog of work on the system is kept to a minimum. The fire suppression systems in this building have been fully functional during the last 3 years with the exception of routine maintenance or planned work. With the exception of the unplanned impairment of the fire alarm devices for substation 2 and 3, the fire alarm systems have been fully functional over the last 3 years.

Provide an estimate of the number of hours needed to complete the data gathering, assessment, and documentation: 30 hours