

U.S. Department of Energy
Office of River Protection

P.O. Box 450, MSIN H6-60
 Richland, Washington 99352

MAR 28 2007

07-ESQ-044

Mr. C. M. Albert, Project Director
 Bechtel National, Inc.
 2435 Stevens Center Place
 Richland, Washington 99354

Dear Mr. Albert:

CONTRACT NO. DE-AC27-01RV14136 – ASSESSMENT REPORT A-07-ESQ-RPPWTP-001
 - FIRE PROTECTION PROGRAM IMPLEMENTATION ONE YEAR FOLLOW UP,
 FEBRUARY 5 THROUGH 16, 2007

- References:
1. ORP letter from R. J. Schepens to J. P. Henschel, BNI, "Assessment Report A-06-ESQ-RPPWTP-001 Fire Protection Program Implementation, February 6 through 17, 2006," 06-ESQ-033, dated April 17, 2006.
 2. ORP letter from J. R. Eschenberg to C. M. Albert, BNI, "Fire Protection Issues with the Waste Treatment and Immobilization Plant (WTP) Project Warehouse Facilities," 07-WTP-062, dated March 7, 2007.

This letter forwards the results of the U.S. Department of Energy, Office of River Protection (ORP), assessment of the Bechtel National, Inc. (BNI) Fire Protection Program Implementation one year follow up, conducted from February 6 through 17, 2006 (attached). The purpose of the assessment was to evaluate improvements in the BNI Fire Protection Program and its implementation since the 2006 ORP assessment, conducted in the same area, provided in Reference 1.

The Team identified progress in BNI's oversight of facilities by fire protection personnel, including formalized assessments, which are now being conducted, locating fire protection personnel on the construction site, and revisions to fire protection program documents.

Despite progress in oversight and improvements to program documents, the Team concluded BNI has been slow to implement corrective actions to previously identified fire protection deficiencies, including concerns for inadequate fire protection in the Waste Treatment and Immobilization Plant (WTP) Site T-52 and Marshalling Yard Warehouse facilities, the lack of a formalized strategy and identification for which fire systems will go into lay-up or maintenance mode, and fire watch requirements which have yet to be fully implemented on the construction site.

Due to the seriousness of the inadequate fire protection in the WTP Site T-52 and Marshalling Yard Warehouse facilities, ORP directed BNI to develop a cost and schedule based plan to address deficiencies in Reference 2. Your response to Reference 2 should address open Findings A-06-ESQ-RPPWTP-001-F01 and A-06-ESQ-RPPWTP-001-F05.

Mr. C. M. Albert
07-ESQ-044

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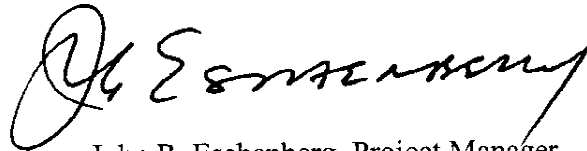
MAR 28 2007

You are also requested to provide ORP with your formalized strategy and identification for which fire systems will go in lay-up or operational modes as discussed in Observation A-06-ESQ-RPPWTP-001-O04. Additionally, due to the fact BNI has yet to implement a robust fire watch program on the construction site a response to A-06-ESQ-RPPWTP-001-O05 is required. Your responses must include your detailed plan and schedule to address these issues. A response to these Observations is requested within 30 days from the date of this letter. A response to the other Observation is not required.

This letter is not considered to constitute a change to the Contract. In the event the Contractor disagrees with this interpretation, it must immediately notify the Contracting Officer orally, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, "Notification of Changes."

If you have any questions, please contact me, or your staff may call Craig P. Christenson, Fire Protection Engineer, (509) 376-5367.

Sincerely,



John R. Eschenberg, Project Manager
Waste treatment and Immobilization Plant

ESQ:CPC

Attachment

cc w/attach:
W. M. Linzau, DNFSB
R. G. Quirk, DNFSB
S. W. Sanders, PAC
C. R. Ungerecht, PAC
BNI Correspondence

Attachment
07-ESQ-044
A-07-ESQ-RPPWTP-001

U.S. DEPARTMENT OF ENERGY
Office of River Protection
Environmental Safety and Quality

ASSESSMENT: Fire Protection Program Implementation – One Year Follow Up

REPORT: A-07-ESQ-RPPWTP-001

FACILITY: Bechtel National, Inc. Waste Treatment
and Immobilization Plant Facilities

LOCATION: Hanford Site

Dates: February 5 through 16, 2007

ASSESSORS: Craig P. Christenson, Lead Assessor
Brian A. Harkins, Assessor

APPROVED BY: Patrick P. Carier, Team Lead
Verification and Confirmation

Executive Summary

The U.S. Department of Energy (DOE), Office of River Protection (ORP) conducted an assessment of the Bechtel National, Inc. (BNI) Fire Protection Program from February 7 through 16, 2006. The purpose of the assessment was to evaluate improvements in the BNI Fire Protection Program and its implementation made since the 2006 ORP assessment was conducted in the same area.

The Team identified progress BNI has made in the oversight of BNI facilities by fire protection personnel, including formalized assessments, which are now being conducted, locating fire protection personnel on the construction site to assist in program implementation, and revisions to fire protection program documents.

Despite progress in oversight and improvements to program documents, the Team concluded BNI has been slow to implement corrective actions to previously identified fire protection deficiencies. BNI has also yet to provide a formalized strategy and identification for which fire systems will go into lay-up or maintenance mode, and BNI has not fully implemented fire watch requirements necessary to minimize facility fire risks and fire loss potential.

BNI has developed some controls to address some of the warehouse facility deficiencies and self-identified serious deficiencies with the sprinkler systems in the onsite T-52 warehouse. However, the Team concluded these controls would not necessarily be effective to address a working fire in the T-52 warehouse because the fire sprinkler systems are not designed to deliver the water necessary to control a high challenge rapidly developing fires involving materials presently stored in the warehouse. Therefore, the sprinkler systems in the T-52 warehouse may not prevent a catastrophic facility fire which could destroy the warehouse and its contents. The Team also identified compensatory storage controls, which are not fully implemented, and the continued lack of qualified inspection, testing, and maintenance of fire protection equipment in the Marshalling Yard Warehouse facility.

Insufficient management involvement in the warehouse fire protection corrective actions is putting the project at a higher than necessary risk which is below ORP expectations. A serious fire in these storage facilities with impaired fire systems or systems which cannot control a high challenge commodity fire could result in total facility and contents loss, monetary dollar loss in the multi-millions to DOE, programmatic and schedule impacts to install plant equipment and loss of public and stakeholder confidence to operate the future planned nuclear processing plants.

As a result, the Team identified the following Findings from the 2006 assessment remain open:

A-06-ESQ-RPPWTP-001-F01 -- Storage controls have not been established for the Marshalling Yard & Waste Treatment and Immobilization Plant Site T-52 Warehouses to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems. (Requirement NFPA 13, Chapter 5)

A-06-ESQ-RPPWTP-001-F05 -- Inspection, testing, and maintenance of exit signs, emergency lighting, fire alarm systems, sprinkler systems in Marshalling Yard Warehouse is not conducted as required by National Fire Protection Association Codes. (Requirement NFPA 25, Chapter 10; NFPA72, Chapter 10; and NFPA 101, Section 4.6.12)

BNI is requested to respond to the open Findings with appropriate corrective actions and schedule for completion.

The Team also identified two Observations from the 2006 assessment which have not been completed. Observations are typically issues based on DOE fire protection guidelines rather than regulatory or contractual noncompliances. However, due to the significance of the lack of a formalized strategy and identification for which fire systems will go into lay-up or maintenance mode (**A-06-ESQ-RPPWTP-001-O04**) and the fact BNI has yet to implement a robust fire watch program (**A-06-ESQ-RPPWTP-001-O05**), a response to these Observations is required.

In addition, the Team identified one Observations indicating a need for improvement in the in the development and execution of fire system maintenance work packages. A response to this new Observation (**A-07-ESQ-RPPWTP-001-O01**) is not required.

Details are contained in the attached report.

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List of Acronyms

BNI	Bechtel National, Inc.
BOF	Balance of Facilities
DOE	U.S. Department of Energy
MPFL	Maximum Possible Fire Loss
MYW	Marshall Yard Warehouse
NFPA	National Fire Protection Association
ORP	Office of River Protection
PFHA	Preliminary Fire Hazard Analyses
WTP	Waste Treatment and Immobilization Plant

NFPA Standards

NFPA 13	Standard for the Installation of Sprinkler Systems 1999 Edition
NFPA 25	Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2002 Edition
NFPA 51B	Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, 2003 Edition
NFPA 72	National Fire Alarm Code®, 2002 Edition
NFPA 80	Standard for Fire Doors and Fire Windows, 1999 Edition
NFPA 101	Life Safety Code®, 2003 Edition

Bechtel National, Inc, (BNI)
Fire Protection Program Implementation
One Year Follow Up
Program Assessment

1.0 Details

The Team investigated various performance objectives, using evaluation of documentation and interviews with the Contractor as the primary methods of data gathering to evaluate key fire protection assessment elements. The elements included programmatic and facility implementation areas within fire protection as specified in the U.S. Department of Energy (DOE) G 420.1/B-0, "DOE Implementation Guide for use with DOE Order 420.1 and 440.1 Fire Safety Program."

To evaluate fire protection program implementation improvement, the Team conducted physical tours of select Waste Treatment and Immobilization Plant (WTP) operating facilities, including the Marshalling Yard Building, Energy Northwest Leased Facilities, T-52 Warehouse, T-15 Site Fabrication Shop ("Combo Shop"), Low-Activity Waste Building, the WTP T-43 and T-47 "Extended Storage" Buildings, and the WTP Balance of Facilities Switchgear Building 91 and Switchgear Building 87.

The assessment focused on corrective actions and implementation of fire protection requirements resulting from identified deficiencies from DOE Office of River Protection's (ORP) 2006 assessment of BNI fire protection program.

1.1 Performance Objective FPI

This performance object was to determine if the contractor has improved the basic fire protection program elements as required by contractual requirements.

To evaluate this area, the Assessment Team:

- BNI Management policy for fire protection to determine if the policy includes offsite WTP support facilities.
- Evaluated the Contractor preliminary fire hazard analyses to determine if DOE Fire Hazard Analyses Guidance is fully incorporated.

Overall the Team concluded BNI met the performance objective because contractor has improved the basic fire protection program elements as required by contractual requirements.

Fire Protection Policy

In the 2006 assessment of BNI Fire Protection program implementation ORP identified a programmatic weakness where the essential BNI Management policy for fire protection did not include offsite WTP support facilities. DOE fire related liabilities exist in offsite WTP support facilities, such as in the Marshalling Yard Warehouse Building, Energy Northwest Lease Warehouse, and other temporary/non-permanent facilities. Since a fire in any of these facilities could negatively impact on personnel life safety, property loss, or schedule to complete the WTP facility, ORP identified an Observation for BNI to widen their policies and procedures to clearly include any areas for the project where DOE liability or risk exists as a result of fire.

The Team conducted a review of the revised BNI Fire Protection Policy Statement issued August 28, 2006, and concluded the revised policy clearly incorporates the DOE fire protection program objectives required by DOE, including the WTP offsite support facilities. The Team also reviewed the fire protection management assessment plan and an assessment of the WTP Storage Facilities under Performance Objective FP.2 and concluded BNI fire protection engineers are also conducting formalized fire protection facility assessments in their oversight of the WTP offsite support facilities.

2006 Assessment Observation, **A-06-ESQ-RPPWTP-001-O01, BNI Management policy for fire protection does not include offsite WTP support facilities**, is closed.

Incorporation of DOE fire hazard analyses guidance

In the 2006 assessment of BNI Fire Protection program implementation ORP identified a programmatic weakness with draft Preliminary Fire Hazard Analyses (PFHA). While the PFHAs contained descriptions and the analyses that were generally consistent with the requirements and guidance from applicable DOE directives and industry codes and standards, the analyses did not include descriptions for every specific technical area specified in the DOE fire protection guidance contained in DOE G 420.1/B-0. This includes analyses and description of fire hazards created by direct flame impingement, hot gases, fire-fighting water damage, and document the technical bases for determining recovery potential following a fire.

In March and April 2006, BNI reissued the PFHAs as part of the preliminary safety analysis report update. The Team also conducted a review of the six PFHAs submitted to ORP in March and April 2006 as part of the preliminary safety analysis report update. The result was the DOE Fire Hazard Analyses Guidance which specifies incorporation of direct flame impingement, hot gases, fire-fighting water damage, and document the technical bases for determining recovery potential following a fire into the fire hazard analysis is addressed. Although these elements are not fully developed in current PFHA documentation the Team determined these issues will be expanded by the 2008 PFHA updated as documented in ORPs 2006 Safety Evaluation Report of the WTP preliminary safety evaluation report.

2006 Assessment Observation, **A-06-ESQ-RPPWTP-001-O02, DOE Fire Hazard Analyses Guidance is not fully incorporated by BNI**, is closed.

Conclusions for Performance Objective FP.1

The performance objective of this area was fully met because the contractor has improved the basic fire protection program elements as required by contractual requirements.

- The following 2006 Assessment items are closed:

2006 Assessment Observation, **A-06-ESQ-RPPWTP-001-O01, BNI Management policy for fire protection does not include offsite WTP support facilities.**

2006 Assessment Observation, **A-06-ESQ-RPPWTP-001-O02, DOE Fire Hazard Analyses Guidance is not fully incorporated by BNI.**

1.2 Performance Objective FP2

This performance object was to evaluate whether fire protection program commitment implementation has been improved at a level expected by ORP.

To evaluate this area, the Team:

- Reviewed storage controls for the Marshalling Yard and WTP Site T-52 Warehouses to determine if the storage types and arrangements are being maintained within the hydraulic delivery capabilities of the fire sprinkler systems.
- Conducted physical facility tours of select WTP operating facilities to determine the level of effective implementation of the fire protection program.
- Reviewed contractor assessments to determine if impaired fire barriers in the Marshalling Yard Warehouse have been analyzed to address the spread of fire throughout the facility.
- Conducted review of fire alarm system work packages, procedures, and personnel to determine if fire alarm system equipment testing is being performed by qualified and experience personnel and tests are documented as required by National Fire Protection Association (NFPA) 72.
- Conducted review of fire related procedures to determine if a fire system impairment program has been implemented consistent with the requirements of NFPA 25.
- Evaluated inspection, testing, and maintenance of exit signs, emergency lighting, fire alarm systems, and sprinkler systems in Marshalling Yard Warehouse to determine if work is conducted as required by NFPA Codes.
- Reviewed contractor completed facility assessments to evaluate whether BNI fire protection engineers are conducting formalized fire protection facility assessments on all facilities expected by ORP.

- Conducted physical plant walk downs and interview personnel to determine if installed fire systems at the WTP have been put into service or the contractor has developed and issued a lay up plan for specific systems not in service.

Overall, the Team concluded BNI did not meet the performance objective mainly due to deficiencies in inadequate fire suppression necessary to protect the storage of permanent plant and construction equipment in project warehouses, the lack of a formalized strategy and identification for which fire systems will go into lay-up or maintenance mode, and deficiencies to fully implemented fire watch requirements necessary to minimize facility fire risks and fire loss potential.

Warehouse Fire Controls

During the 2006 assessment of the BNI Fire Protection program, ORP identified a fire protection programmatic implementation deficiency associated with the Marshalling Yard and WTP Site T-52 Warehouses. Although the Marshalling Yard and T-52 Warehouses have installed sprinkler systems, it was identified these systems are not designed to control fires for all the commodities stored in these facilities and controls have not been established for building management and operations to maintain the commodity within the hydraulic delivery capabilities of the sprinkler systems.

To address this issue and other fire protection issues with the warehouses, BNI initiated a separate comprehensive Management Assessment of the WTP Storage facilities from March 8 through May 12, 2006, to validate the ORP Finding and to develop guidelines to change storage arrangement necessary to ensure sprinkler system capacity in the storage warehouses were not exceeded. The BNI assessment was conducted by a multidiscipline team which included representatives from safety assurance, fire protection engineering, and fire safety and the BNI team issued a full report by the end of June 2006. Overall the BNI assessment concluded storage types and arrangement heights exceeded the hydraulic capacity of the installed fire sprinkler systems in the Marshalling Yard and T-52 warehouses per NFPA 13 requirements. However, the BNI assessment concluded the warehouse risk from fire could be improved in both warehouses by implementing storage controls, including lowering height of combustibles, removing full encapsulation (e.g. plastic shrink wrap from top) from storage and pallets loads, removing aisle space storage between rack and shelving storage, and reducing flammable liquid storage.

The BNI assessment also identified corrective actions to modify the T-52 sprinkler system, including the installation of in-rack sprinkler heads and sprinkler to the T-52 shipping and receiving area canopy, and the identification of inspection, testing, and maintenance requirements for work systems in these facilities. These items were identified for corrective action.

Later in 2006 BNI initiated engineering activities to modify the T-52 sprinkler system. However, by October 2007, a BNI fire protection engineer concluded the T-52 sprinkler system had so many technical deficiencies with the overhead sprinkler system, including over spaced sprinkler heads, inadequate sized piping for storage commodities, incorrectly applied sprinkler 'K-factors,' and the lack of sprinkler under exterior loading dock, a system addition, as

originally conceived, would not allow the sprinkler system to meet the hydraulic demands required by NFPA 13, necessary to control fires involving warehouse stored materials, in a cost effective manner. The BNI fire protection engineer recommended to remove the T-52 system and install it with a system which would meet the hydraulic demands of the materials needed to be stored in the warehouse. BNI developed a schedule to currently replace the T-52 sprinkler system by May 2008.

In the interim BNI has implemented a roving hourly fire patrol to detect a fire early in the T-52 warehouse as a compensatory measure until the fire sprinkler systems is replaced.

During the facility walk downs the Team also observed compensatory controls required by the BNI management assessment had not been fully implemented for the Marshalling Yard Warehouse (MYW) and WTP Site T-52 Warehouse to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems. The Team noted some compensatory controls have been implemented to reduce the overall facility fire severity. However, all controls from BNI Management Assessment Corrective Action Reports in Marshalling Yard and Energy Northwest Warehouses are not fully implemented, including but not limited to, flammable liquid storage cabinet number exceeded (MYW), excessive Class 'A' combustibles in old dynamometers/wheel alignment shop area (MYW), storage height too close (<18 inches) to sprinkler heads (MYW), pallet storage of encapsulated plastics/computers in facility (MYW and ENW 2-4), and allowable storage height exceeded (ENW 2-4) was observed.

The Team determined BNI has implemented a compensatory measure of an hourly fire patrol to account for the deficient T-52 warehouse sprinkler system. The Team concluded while this compensatory measure may provide early warning for life safety, it would not necessarily provide an equivalent level of fire protection for the type and arrangement of commodities currently stored in T-52 since an aggressive fire in T-52, even if detected during the one hour fire patrol with current storage arrangement, may not prevent a total facility loss.

The Team also concluded insufficient management involvement in the warehouse fire protection corrective actions is putting the project at a higher than necessary risk which is below ORP expectations. A serious fire in these storage facilities with impaired fire systems or systems which cannot control a high challenge commodity fire could result in total facility and contents loss, monetary dollar loss in the multi-millions to DOE, programmatic and schedule impacts to install plant equipment and loss of public and stakeholder confidence to operate future planed nuclear processing plants.

The Team also concluded the storage controls would not necessarily be effective to address fire in the T-52 warehouse because the fire sprinkler systems are not designed to deliver the water necessary to control a high challenge rapidly developing fires involving materials presently stored in the warehouse. Therefore, the sprinkler systems in the T-52 warehouse may not prevent a catastrophic facility fire which could destroy the warehouse and its contents. The Team also identified compensatory storage controls, which are not fully implemented, and the continued lack of qualified inspection, testing, and maintenance of fire protection equipment in the MYW facility.

2006 Assessment Finding, **A-06-ESQ-RPPWTP-001-F01, Storage controls have not been established for the Marshalling Yard and WTP Site T-52 Warehouses to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems, remains open.**

Marshalling Yard Warehouse Fire Barrier Evaluation

In the 2006 ORP assessment of BNI, ORP observed fire barriers with fire doors which would not automatically close in a fire and unprotected openings in the barriers in the MYW. ORP recommended BNI evaluate the MYW fire barriers as a control method consistent with warehouse storage control considerations. To address this and other fire protection issues with the warehouses, from March 8 through May 12, 2006, BNI initiated a separate comprehensive Management Assessment of the WTP Storage facilities.

The BNI assessment determined the MYW estimated a \$21 million Maximum Possible Fire Loss (MPFL) in the warehouse without the fire barriers. The MPFL would result if a fire completely destroyed the MYW building contents considering the fire sprinkler system is not functional. In calculating this fire loss the BNI management assessment considered the entire building to be one fire area. Since the MPFL for the entire facility fire area is less than \$50 million, DOE requirements do not mandate the building to be separated by fire barriers.

2006 Assessment Finding, **A-06-ESQ-RPPWTP-001-F02, Impaired fire barriers in the MYW would allow a fire to spread rapidly throughout the facility, is closed.**

Fire Alarm System Testing Qualifications

To address the 2006 ORP Finding of fire alarm system testing not being conducted by qualified and experienced personnel and tests not being documented by NFPA, BNI developed and implemented maintenance procedures that meet the requirements of NFPA 72. BNI hired a fire alarm subcontractor to oversee and supervise fire alarm and detection system testing. The Team reviewed employee training profiles and contractor site qualification log for numerous personnel qualified for fire alarm system inspection, testing and maintenance against the NFPA standards and determined site personnel conducting the work are trained and qualified to perform the fire system inspection and maintenance they are responsible to conduct. Therefore the fire alarm maintenance work is being conducted or overseen by qualified personnel in accordance with the NFPA Standards.

The Team reviewed recent work orders for fire alarm testing activities of Buildings T-1 and T-47. The Team found the BNI work packages and test procedures met the requirements of NFPA 72 and NFPA 25. However, in reviewing this area, the Team noted a number of new deficiencies, including fire system testing frequencies being exceeded, smoke detector sensitivity testing not being conducted, work package documentation incorrectly recorded, and BNI procedures do not define a process for evaluating impairments after fire system testing is completed (New Observation: **A-07-ESQ-RPPWTP-001-O01**).

Although some new issues associated with work packages were identified with fire alarm system equipment testing, the Contractor has made significant progress since ORP conducted oversight

in this area last year. The Team was able to verify that fire system testing was being performed by qualified and experience personnel and tests are being documented as required by NFPA 72. The Contractor should make necessary changes to address the issues above to improve program performance.

2006 Assessment Finding, A-06-ESQ-RPPWTP-001-F03, Fire alarm system equipment testing is not performed by qualified and experience personnel and tests are not documented as required by NFPA 72, is closed.

Fire System Impairment Program

To address the fire system impairment program deficiency identified by ORP in 2006, BNI issued an impairment procedure and appointed an impairment coordinator. The Team reviewed the procedure and determined it addresses impairment tagging, impairment planning and actions, and restoring systems to service consistent with the requirements of NFPA 25 and 72. The Team also determined recent activities impairing fire systems are being reviewed by the contractor fire protection safety organization and impairments are logged in accordance with the procedure by the Central Utility Group.

2006 Assessment Finding, A-06-ESQ-RPPWTP-001-F04, A fire system impairment program has not been implemented consistent with the requirements of NFPA 25, is closed.

Fire System and Equipment Testing in MYW

To address the lack of fire protection system and equipment testing in the MYW identified by ORP in 2006, in June 2006, BNI notified the MYW building owner, Tri-City Railroad Company, of the lease agreement for the Building Owner to comply with inspection, testing, and maintenance requirements contained in NFPA 25, 72, and 101. BNI also requested copies of the written tests.

In July 2006 the Tri-City Railroad Company provided BNI a Cascade Fire Protection Company's inspection report of the MYW sprinkler system and a maintenance report from Fire Protection Specialists, Limited Liability Company for the Marshalling Yard fire alarm system. However, in November 2006 BNI notified the Tri-City Railroad Company that the inspection and maintenance records provided to them demonstrated the sprinkler and fire alarm systems were not tested in accordance with the NFPA standards and some deficiencies identified during the testing had yet to be corrected.

Following identification of these issues, BNI declared the MYW sprinkler and fire alarm systems as impaired systems under 24590-WTP-GPP-SIND-059, Fire Protection System Impairment, and initiated a fire patrol for the facility as a compensatory measure. The Team reviewed the MYW fire patrol log and determined that fire patrol has been conducted since December 2006 on an hourly basis. The Team determined since December 2006 this issue has yet to be corrected indicating both the fire alarm and sprinkler systems in the MYW continues to be impaired.

The Team also reviewed work orders for conducting the MYW monthly emergency lighting tests. The assessment determined the monthly emergency lighting testing had been done, but because the preventive maintenance group started the monthly testing less than a year ago, no annual testing had been done (note: there were also no records available indicating when the lights were installed or when the last annual test was done). No records were also available for emergency lighting installed by Tri-City Railroad Company.

The Team found that BNI continues not to conduct the inspection, testing, and maintenance for sprinklers and fire alarms and other life safety features in the MYW in accordance with NFPA Standards.

2006 Assessment Finding, A-06-ESQ-RPPWTP-001-F05, Inspection, testing, and maintenance of exit signs, emergency lighting, fire alarm systems, sprinkler systems in MYW is not conducted as required by NFPA Codes, remains open.

Fire Protection Facility Assessments

In 2006 ORP reviewed a large number of Environmental and Nuclear Safety Program Assessments and BNI Fire Safety Walk downs from 2002 through 2006 to evaluate whether fire protection program oversight commitments are implemented by BNI. The result was BNI did not integrate fire protection engineers in routinely scheduled facility assessments following the DOE fire protection guidance.

To respond to this issue, BNI issued a new Fire Protection Facility Management Assessment Plan to conduct and document fire protection facility assessments. The ORP Team reviewed the Management Assessment Plan and determined while the assessments plan generally incorporates the facility elements specified in DOE G 420.1/B-0, the plan did not include assessment elements of a combine program, specified in DOE G 420.1/B-0, including, but not limited to, conformance with DOE Orders, codes, and standard applicable to the facility, inspection, testing and maintenance features of the facility, administrative controls of the facility, and status of Findings from previous facility assessments.

The Team also reviewed a number of recently completed facility assessments and determined fire protection engineers are conducting scheduled facility assessments in accordance with the procedure and the assessments are actually including elements of a combine program, as specified in DOE G 420.1/B-0.

2006 Assessment Observation A-06-ESQ-RPPWTP-001-O03, BNI fire protection engineers do not conduct formalized fire protection facility assessments, is closed.

Formalized Strategy for Fire System Lay-up or Operational Service

In the 2006 assessment of the BNI fire protection program ORP identified BNI had substantially completed installations of fire systems in the steam plant, fire water pump house, and Balance of Facilities (BOF) switchgear facilities. However, these systems had not been put into service consistent with BNI procedure Section 3.2.3 of 24590-WTP-GPP-SIND-026, Revision 3, Housekeeping and Fire Prevention. ORP forwarded the 2006 assessment with a requested to

provide ORP with a strategy and identification for which fire systems will go in lay-up or operational modes.

In BNI's May 2006 response to the 2006 ORP assessment report BNI stated they agreed with the ORP Observation. Furthermore BNI stated the timing for activation of currently installed fire protection systems would be re-evaluated and criteria was being developed for identification of which systems will be laid up until the scheduled test and turnover date, and which systems will be put in service on a more near term basis.

The Team observed BOF Switchgear Building 91 and Switchgear Building 87 Sprinkler systems continued not to be put into service. Interviews with BNI determined the preaction system fire alarm equipment in both Switchgear buildings contained punch list items which are not yet completed. The Team also observed the fire water pump house diesel drivers and pumps are not yet in service although two short term maintenance lay-up procedures have been conducted since September 2006.

In interviews with BNI staff the Team determined BNI has been conducting internal dialogue to address this issue, however, BNI has yet to complete a formalized documented strategy and identification for which fire systems will go in lay-up or operational modes.

2006 Assessment Observation A-06-ESQ-RPPWTP-001-O4, Installed fire systems at the WTP have not put into service, remains open.

Conclusions for Performance Objective FP2

The performance objective of this area was not met because the contractor has not improved implemented the fire protection program commitments in all areas at the level expected by ORP. Despite progress in oversight and improvements to program documents, the Team concluded BNI has been slow to implement corrective actions to previously identified fire protection deficiencies of inadequate fire suppression necessary to protect the storage of permanent plant and construction equipment in project warehouses and BNI has yet to provide a formalized strategy and identification for which fire systems will go into lay-up or maintenance mode.

- The following 2006 Assessment items remain open:

2006 Assessment Finding, A-06-ESQ-RPPWTP-001-F01, Storage controls have not been established for the Marshalling Yard and WTP Site T-52 Warehouses to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems.

2006 Assessment Finding, A-06-ESQ-RPPWTP-001-F05, Inspection, testing, and maintenance of exit signs, emergency lighting, fire alarm systems, sprinkler systems in MYW is not conducted as required by NFPA Codes.

2006 Assessment Observation A-06-ESQ-RPPWTP-001-O4, Installed fire systems at the WTP have not put into service.

- The following 2006 Assessment items are closed:

2006 Assessment Finding, **A-06-ESQ-RPPWTP-001-F02, Impaired fire barriers in the MYW would allow a fire to spread rapidly throughout the facility.**

2006 Assessment Finding, **A-06-ESQ-RPPWTP-001-F03, Fire alarm system equipment testing is not performed by qualified and experience personnel and tests are not documented as required by NFPA 72.**

2006 Assessment Finding, **A-06-ESQ-RPPWTP-001-F04, A fire system impairment program has not been implemented consistent with the requirements of NFPA 25.**

2006 Assessment Observation **A-06-ESQ-RPPWTP-001-O03, BNI fire protection engineers do not conduct formalized fire protection facility assessments.**

New Observation:

A-07-ESQ-RPPWTP-001-O01, Improvement is needed in the development and execution of fire system maintenance work packages. The Team noted a number of deficiencies in the development and execution of fire system related maintenance work packages, including fire system testing frequencies being exceeded, smoke detector sensitivity testing not being conducted, work package documentation incorrectly recorded, and BNI procedures not defining a process for evaluating impairments after fire system testing is completed.

1.3 Performance Objective FP3

This performance object was to determine if the contractor has completed implementation of the comprehensive elements into the fire protection program identified in the 2006 assessment, necessary to minimize facility fire risks and fire loss potential.

To evaluate this area, the Team:

- Reviewed fire watch procedures and training and interviewed construction personnel.
- Conducted physical facility tours of the Marshalling Yard review contractors evaluation for wood construction.

Overall, the Team concluded BNI did not fully meet this performance objective because a functioning fire watch program has not been implemented and BNI procedures do not identify requirements when a fire watch must be conducted, as specified in NFPA 51B requirements.

Implementation of Robust Fire Watch Requirements

In the 2006 ORP Assessment of the BNI Fire Protection Program Implementation, ORP reviewed procedural implementation of the fire watch program and determined there was no evidence BNI had formally implemented a fire watch program at the construction site. ORP determined the training requirements for performing the duties of a fire watch were not defined

and interviews with field personnel determined most construction site personnel did not know the qualifications and duties of a person performing fire watch. Finally ORP determined personnel in the field do not know the requirements of a fire watch, including the responsibilities and who can perform the actual duties of a fire watch.

To address these issues BNI has developed training materials for fire watch personnel. The Team reviewed the training materials, BNI procedures, and interviewed BNI personnel and determined no personnel on the construction site have been actually trained to perform the duties of a fire watch. In reviewing this area the Team also reviewed NFPA 51B, National Fire Protection Association Standard for Fire Prevention During Welding, Cutting, and Other Hot Work. NFPA 51B, Section 5.4.1, specifies a fire watch shall be required by the permit authorizing individual when hot work is performed in a location where other than a minor fire might develop or where the following conditions exist:

- Combustible materials in building construction or contents are closer than 11 m (35 ft) to the point of operation.
- Combustible materials are more than 11 m (35 ft) away from the point of operation but are easily ignited by sparks.
- Wall or floor openings within an 11-m (35 ft) radius expose combustible materials in adjacent areas, including concealed spaces in walls or floors.
- Combustible materials are adjacent to the opposite side of partitions, walls, ceilings, or roofs and are likely to be ignited.

The Team reviewed BNI's Housekeeping and Fire Prevention, Safety Watches, September 28, 2005, and, Hazardous Work Permit, procedures, interviewed contractor personnel, and walked down the T-15 facility "combo shop," concluding the requirements specified in Section 5.4 of NFPA 51B are not contained in BNI procedures. For example, Section 5.4.1(1) requires a fire watch when hot work is conducted inside a building where combustible materials are within 35 ft of the work. A good example of where NFPA 52B, Section 5.4.1 requirements is applicable involves welding and cutting activities in the T-15 facility. A walk down of the combo shop found that there was a welding table and welder located 13 feet from the rigging loft, and more importantly, located within 8 feet of the welding bench and adjacent to the rigging loft were several cardboard boxes. Both of these situations require a fire watch to prevent combustible materials from igniting during hot work operations.

Because there are no trained fire watch personnel, and the requirements for when a fire watch are not specified, the 2006 Observation cannot be closed.

2006 Assessment Observation, **A-06-ESQ-RPPWTP-001-O05, BNI has not implemented robust fire watch requirements, remains open.**

Evaluation Wood Construction in MYW

In 2006 ORP observed interior office spaces including walls, ceilings, and other locations such as tool storage area walls throughout the MYW which were constructed out of untreated plywood and other wooden materials. ORP determined the construction may not meet requirements of NFPA 101, which requires interior finish to have a flame spread rating of less than 200 and a smoke development less than 450 and recommended BNI evaluate the actual plywood material installed in the warehouse against NFPA 101, Life Safety requirements.

To address this issue BNI conducted an assessment of the WTP MYW by BNI Fire Protection Engineers. The assessment determined an exposed plywood wall was located in the M5 storage area and an exposed plywood office area with a plywood roof was located on the west side of the warehouse in the M4 storage area inside the MYW. The office area had no sprinklers installed under the roof and BNI determined the roof created an obstruction to the sprinkler system. BNI initiated work and removed the roof from the office space to bring this portion of the warehouse into compliance with NFPA 13 requirements. BNI evaluated the remaining wood and determined the plywood and 2 x 4 framing lumber materials are rated as Underwriters Laboratory FR-S (flame spread and smoke developed values are 25 or less). BNI evaluated this rating and against NFPA requirements and determined the material to be acceptable for use in exits, access to exits, and other spaces in storage occupancies under NFPA 101 so the removal of this remaining plywood and 2 x 4 framing was not necessary.

The Team conducted a review of BNI's evaluation in the assessment of the WTP MYW and toured the MYW and a number of WTP site facilities. Based on BNI's evaluation of the flame spread and smoke developed values of the wood materials contained in the MYW the Team concluded BNI has evaluated the wood materials necessary for Observation A-06-ESQ-RPPWTP-001-O06 to be closed.

During the tour of the WTP combo shop the Team noted the combo shop rigging loft contained a plywood office with some sheets of plywood and storage materials covering the ceiling which would prevent the fire sprinklers from operating effectively. Interviews with BNI personnel determined personnel working inside the combo shop placed the plywood to prevent dirt and bird droppings from falling in to their work space. BNI corrected the deficiency by removing the plywood cover to allow sprinkler head operation and plans to lower a sprinkler head into the area so a suitable cover could be permanently installed in this space. The Team verified BNI removed the plywood cover.

2006 Assessment Observation, A-06-ESQ-RPPWTP-001-O06, Wood construction in the MYW has not been evaluated for interior finish use under the Life Safety Code, is closed.

Conclusions for Performance Objective FP3

Overall, the Team concluded BNI did not fully meet this performance objective because a functioning fire watch program has not been implemented and BNI procedures do not identify requirements when a fire watch must be conducted, as specified in NFPA 51B requirements.

BNI's evaluation of the flame spread and smoke developed values of the wood materials contained in the MYW the Team concluded BNI has evaluated the wood materials necessary for Observation A-06-ESQ-RPPWTP-001-O06 to be closed.

- The following 2006 Assessment item remains open:

2006 Assessment Observation, **A-06-ESQ-RPPWTP-001-O05, BNI has not implemented robust fire watch requirements.**

- The following 2006 Assessment item is closed:

2006 Assessment Observation, **A-06-ESQ-RPPWTP-001-O06, Wood construction in the MYW has not been evaluated for interior finish use under the Life Safety Code.**

2.0 Conclusion

Following the review of procedures and records, completion of interviews, and tours of select WTP facilities, the Team concluded BNI has made progress in the oversight of BNI facilities by fire protection personnel including formalized assessments which are now being conducted and revisions to fire protection program documents. Despite progress in oversight and improvements to program documents, the Team concluded BNI has been slow to implement corrective actions to previously identified fire protection deficiencies, BNI has yet to provide a formalized strategy and identification for which fire systems will go into lay-up or maintenance mode, and BNI has not fully implemented fire watch requirements necessary to minimize facility fire risks and fire loss potential.

These deficiencies are identified above in the Findings and Observations, as discussed above.

3.0 Items Opened, Closed, and Discussed

Opened

A-07-ESQ-RPPWTP-001-O01 Observation Improvement is needed in the development and execution of fire system maintenance work packages.

Closed

The Team evaluated BNI actions and closed the following Observations and Finding as discussed in this report:

A-06-ESQ-RPPWTP-001-F02	Finding	Impaired fire barriers in the MYW would allow a fire to spread rapidly throughout the facility.
A-06-ESQ-RPPWTP-001-F03	Finding	Fire alarm system equipment testing is not performed by qualified and experience personnel and tests are not documented as required by NFPA 72.
A-06-ESQ-RPPWTP-001-F04	Finding	A fire system impairment program has not been implemented consistent with the requirements of NFPA 25.
A-06-ESQ-RPPWTP-001-O01	Observation	BNI Management policy for fire protection does not include offsite WTP support facilities.
A-06-ESQ-RPPWTP-001-O02	Observation	DOE Fire Hazard Analyses Guidance is not fully incorporated by BNI.
A-06-ESQ-RPPWTP-001-O03	Observation	BNI fire protection engineers do not conduct formalized fire protection facility assessments.
A-06-ESQ-RPPWTP-001-O06	Observation	Wood construction in the MYW has not been evaluated for interior finish use under the Life Safety Code.

Discussed

The Team discussed the urgent need to implement corrective action necessary to close the following assessment Findings and Observations identified in previous assessment:

A-06-ESQ-RPPWTP-001-F01	Finding	Storage controls have not been established for the Marshalling Yard & WTP Site T-52 Warehouses to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems.
A-06-ESQ-RPPWTP-001-F05	Finding	Inspection, testing, and maintenance of exit signs, emergency lighting, fire alarm systems, sprinkler systems in MYW is not conducted as required by National Fire Protection Association Codes.
A-06-ESQ-RPPWTP-001-O04	Observation	Installed fire systems at the WTP have not put into service; no formalized strategy and identification for which fire systems will go into lay-up or maintenance mode.
A-06-ESQ-RPPWTP-001-O05	Observation	BNI has not implemented robust fire watch requirements.

Task# ORP-ESQ-2007-0045

E-STARS™ Report
 Task Detail Report
 03/28/2007 0230

TASK INFORMATION			
Task#	ORP-ESQ-2007-0045		
Subject	CONCUR:07-ESQ-044; ASSESSMENT REPORT A-07-ESQ-RPPWTP-001 - FIRE PROTECTION PROGRAM IMPLEMENTATION ONE YEAR FOLLOW-UP FEBRUARY 5 - 16, 2007		
Parent Task#		Status	CLOSED
Reference	07-ESQ-044	Due	
Originator	Gano, Becky	Priority	High
Originator Phone	(509) 376-6004	Category	None
Origination Date	03/16/2007 1018	Generic1	
Remote Task#		Generic2	
Deliverable	None	Generic3	
Class	Long Term	View Permissions	Normal
Instructions	<p>Correspondence is being routed for concurrence via hard copy instead of electronically. Once you receive the correspondence, please approve or disapprove electronically via E-STARS and route to next person on the routing/concurrence list.</p> <p>BCC: ESQ OFF FILE ESQ RDG FILE MGR RDG FILE M.K.BARRETT, AMD C.M.FETTO, DEP P.P.CARIER, ESQ C.P.CHRISTENSON, ESQ J.L.POLEHN, ESQ W.J.TAYLOR, ESQ J.R.ESCHENBERG, WTP P.T.FURLONG, WTP B.A.HARKINS, WTP</p> <p>RECORD NOTE:</p>		
ROUTING LISTS			
1	Route List		Inactive
	<ul style="list-style-type: none"> ● Christenson, Craig P - Review - Concur - 03/19/2007 1047 <i>Instructions:</i> ● Carrier, Patrick P - Review - Concur - 03/20/2007 0702 <i>Instructions:</i> ● Harkins, Brian A - Review - Concur - 03/19/2007 0932 <i>Instructions:</i> ● Barrett, Michael K - Review - Cancelled - 03/28/2007 1430 <i>Instructions:</i> ● Olinger, Shirley J - Review - Concur - 03/27/2007 0946 <i>Instructions:</i> ● Eschenberg, John R - Approve - Cancelled - 03/28/2007 1430 <i>Instructions:</i> 		
ATTACHMENTS			

RECEIVED

MAR 28 2007

DOE-ORP/ORPCC

Task# ORP-ESQ-2007-0045	
Attachments	<ol style="list-style-type: none"> 1. 07-ESQ-044 Assessment NOTES A-07-ESQ-RPPWTP-001.doc 2. 07-ESQ-044 att Assessment Report A-07-ESQ-RPPWTP-001.doc 3. 07-ESQ-044 BNI LTR Assessment Report A-07-ESQ-RPPWTP-001.doc
COLLABORATION	
COMMENTS	
Poster	Gano, Becky (Gano, Becky) - 03/28/2007 0203
	CLOSED
	Michael Barrett concurred on 3/22/07.
TASK DUE DATE HISTORY	
<i>No Due Date History</i>	
SUB TASK HISTORY	
<i>No Subtasks</i>	

-- end of report --

Task# ORP-ESQ-2007-0045

E-STARSTM Report
 Task Detail Report
 03/19/2007 0926

TASK INFORMATION			
Task#	ORP-ESQ-2007-0045		
Subject	CONCUR:07-ESQ-044; ASSESSMENT REPORT A-07-ESQ-RPPWTP-001 - FIRE PROTECTION PROGRAM IMPLEMENTATION ONE YEAR FOLLOW-UP FEBRUARY 5 - 16, 2007		
Parent Task#		Status	Open
Reference	07-ESQ-044	Due	
Originator	Gano, Becky	Priority	High
Originator Phone	(509) 376-6004	Category	None
Origination Date	03/16/2007 1018	Generic1	
Remote Task#		Generic2	
Deliverable	None	Generic3	
Class	Long Term	View Permissions	Normal

Instructions
 Correspondence is being routed for concurrence via hard copy instead of electronically. Once you receive the correspondence, please approve or disapprove electronically via E-STARS and route to next person on the routing/concurrence list.

BCC:
 ESQ OFF FILE
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 W.J.TAYLOR, ESQ
 J.R.ESCHENBERG, WTP
 P.T.FURLONG, WTP
 B.A.HARKINS, WTP

RECORD NOTE:

ROUTING LISTS

1	Route List	Active
	<ul style="list-style-type: none"> Eschenberg, John R. - APPROVE - Review 	
	<ul style="list-style-type: none"> Christenson, Craig P - Review - Awaiting Response Instructions: 	APR 3-19-07
	<ul style="list-style-type: none"> Carier, Patrick P - Review - Awaiting Response Instructions: 	3/19/07
	<ul style="list-style-type: none"> Harkins, Brian A - Review - Awaiting Response Instructions: 	CONCURRED VIA ESTARS
	<ul style="list-style-type: none"> Barrett, Michael K - Review - Awaiting Response Instructions: 	MB 3-22-07, add COR Disclaimer
	<ul style="list-style-type: none"> Olinger, Shirley J - Review - Awaiting Response Instructions: 	3/26 Oly w/ comment
	<ul style="list-style-type: none"> Eschenberg, John R - Approve - Awaiting Response Instructions: 	
	<ul style="list-style-type: none"> Taylor, William J WPT 3/20/07 	

Rec'd 3/26
ATTACHMENTS

Task# ORP-ESQ-2007-0045

Attachments

1. 07-ESQ-044 att Assessment Report A-07-ESQ-RPPWTP-001.doc
2. 07-ESQ-044 BNI LTR Assessment Report A-07-ESQ-RPPWTP-001.doc

COLLABORATION**COMMENTS***No Comments***TASK DUE DATE HISTORY***No Due Date History***SUB TASK HISTORY***No Subtasks**-- end of report --*

BACKGROUND

(PLEASE SCAN)

LETTER # 07-ESG-044

Assessment Note Number: A-07-ESQ-RPPWTP-001

**Assessors: Craig P. Christenson, Lead Assessor
Brian A. Harkins, Assessor**

Dates of Assessment: February 5 through 16, 2007

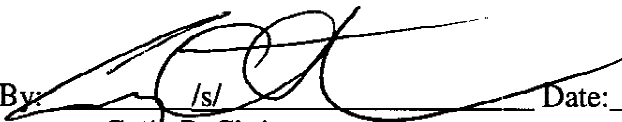
Areas/Items Inspected: Fire Protection Program Implementation One Year Follow-up

The DOE Office of River Protection (ORP) assessors evaluated improvements in the BNI Fire Protection Program and its implementation made since the 2006 ORP assessment was conducted in the same area.

Scope:

- The Contractor has improved the basic fire protection program elements as required by contractual requirements.
- Implementation of the Contractors fire protection program commitments have improved at the level expected by ORP.
- The Contractor has completed implemented of the comprehensive elements into the fire protection program necessary to minimize facility fire risks and fire loss potential.

The assessors documented the results of the assessment in Attached Performance Objective Criteria.

Submitted By:  /s/ _____ Date: 02/22/07

Craig P. Christenson

Attachment

Performance Objective Criteria

Fire Protection Program Implementation

One Year Follow-up

Bechtel National, Inc. (BNI), Waste Treatment Plant (WTP) Facilities

February 5 through 16, 2007

PERFORMANCE OBJECTIVE FP.1

The Contractor has improved the basic fire protection program elements as required by contractual requirements.

Criteria:

1. BNI Management policy for fire protection includes offsite Waste Treatment and Immobilization Plant support facilities. (A-06-ESQ-RPPWTP-001-O01)
2. The DOE Fire Hazard Analyses Guidance is fully incorporated by the Contractor. (A-06-ESQ-RPPWTP-001-O02)

Approach:

Record Review:

Site contract list; Site Contractor fire protection program policy and implementing documentation; Records of any fire safety equivalencies and exemptions.

Interviews:

WTP fire protection program managers, professional engineers, and FP system engineers. Line managers through whom fire protection program personnel report.

Observations:

Verify that the implementation are current compared to existing hazards and basis documents. Existing hazards for which the administrative controls or compensatory measures should be field verified.

PROCESS:

Records Reviewed:

DOE Documents:

- ORP Letter 06-ESQ-003, Assessment Report A-06-ESQ-RPPWTP-001 Fire Protection Program Implementation, February 6 through 17, 2006, dated April 17, 2006
- ORP Assessment Report A-06-ESQ-RPPWTP-001 Fire Protection Program Implementation, February 6 through 17, 2006
- U.S. Department of Energy, DOE O 420.1A, Facility Safety, Contract Requirements Document, Attachment 2, May 20, 2002

- U.S. Department of Energy, DOE O 420.1B, Facility Safety, Contract Requirements Document, Attachment 2, December 22, 2005
- U.S. Department of Energy, DOE G-420.1/B-0, Implementation Guide for use with DOE Orders 420.1 and 440.1 Fire Safety Program, September 30, 1995
- DOE-STD-1066-97, DOE Standard Fire Protection Design Criteria, July 1999
- DOE-STD-1088-95, DOE Standard Fire Protection for Relocatable Structures, June 1995
- U. S. Department of Energy, Richland Operations Office, A-05-SED-FH-025, Report on the Assessment of Fluor Hanford, Inc. Fire Protection Program, November 2005
- U. S. Department of Energy Contract No. DE-AC27-01RL14136, Waste Treatment and Immobilization Plant Contract, December 2005
- 06-WTP-091, Safety Evaluation Report (SER) for the Hanford Waste Treatment and Immobilization Plant Preliminary Safety Evaluation Report Update, dated August 16, 2006

BNI Documents:

- 24590-WTP-SRD-ESH-01-001-02, Rev. 4g, Safety Requirements Document Volume II, December 12, 2006
- BNI letter CCN:138410, Response to Assessment Report A-06-ESQ-RPPWTP-001, Fire Protection Program Implementation, dated May 17, 2006
- 24590-WTP-MAR-ENS-06-0010, Rev. 1, BNI Management Assessment of WTP Storage Vulnerability to Fire Loss, March 8-11, 2006
- 24590-WTP-CAR-QA-06-136, Rev. 0, Corrective Action Report Number for Impaired Fire Barriers in Warehouse from A-06-ESQ-RPPWTP-001 (F02), dated August 2, 2006
- 24590-WTP-PL-ENS-06-0010, Rev. 0, Analysis of WTP Storage Vulnerability to Fire Loss-Management Assessment Plan, March 8, 2006
- 24590-WTP-CAR-QA-06-136, Rev. 0, Corrective Action Report Number for Personnel Fire Alarm Testing Qualifications from A-06-ESQ-RPPWTP-001 (F03), dated December 18, 2006
- 24590-WTP-CAR-QA-06-191, Rev. 0, Corrective Action Report Number for Fire System Impairment Program from A-06-ESQ-RPPWTP-001 (F04), dated September 19, 2006
- 24590-WTP-GPP-SIND-059, Rev. 0, Fire Protection System Impairment, September 5, 2006

- 24590-WTP-CAR-QA-06-143, Rev. 0, Corrective Action Report Number for Inspection, Testing, and Maintenance in Marshaling Yard Warehouse from A-06-ESQ-RPPWTP-001 (F05), dated August 9, 2006
- BNI letter CCN-141845 to Tri-City railroad Company, Marshaling Yard, NFPA Requirements, dated June 29, 2006
- 24590-WTP-RITS-QAIS-06-471, BNI Recommendations and Issues Tracking System (RITS) for BNI Management Policy for Fire Protection to Offsite Facilities in response to A-06-ESQ-RPPWTP-001 (O01), dated January 23, 2007
- 24590-WTP-G63-MGT-007, Rev. 0, Fire Protection Policy Statement, August 28, 2006
- 24590-WTP-RITS-QAIS-06-472, BNI Recommendations and Issues Tracking System (RITS) for Fire Hazard Analysis Guidance, in response to A-06-ESQ-RPPWTP-001 (O02), dated January 23, 2007
- 24590-BOF-RPT-ESH-01-002, Rev. 2, Preliminary Fire Hazards Analysis for the Balance of Facilities, March 31, 2006
- 24590-HLW-RPT-ESH-01-001, Rev. 2, Preliminary Fire Hazards Analysis for the High-Level Waste Facility, April 11, 2006
- 24590-LAB-RPT-ESH-02-001, Rev. 2, Preliminary Fire Hazards Analysis for the Analytical Laboratory, March 31, 2006
- 24590-LAW-RPT-ESH-01-001, Rev. 2, Preliminary Fire Hazards Analysis for the Low-Activity Waste Facility, March 31, 2006
- 24590-PTF-RPT-ESH-02-001, Rev. 2, Preliminary Fire Hazards Analysis for the Pretreatment Facility, March 31, 2006
- 24590-WTP-RPT-ENS-05-005, Rev. 0, Preliminary Fire Hazards Analysis for the General Information, March 31, 2006
- 24590-WTP-RITS-QAIS-06-474, BNI Recommendations and Issues Tracking System (RITS) for Formalized Fire Protection Assessments, in response to A-06-ESQ-RPPWTP-001 (O03), dated January 23, 2007
- 24590-WTP-PL-ENS-06-0002, Rev. 0, Fire Protection Facility Assessments-Management Assessment Plan, July 12, 2006
- 24590-WTP-RITS-QAIS-06-476, BNI Recommendations and Issues Tracking System (RITS) for Fire Watch Requirements, in response to A-06-ESQ-RPPWTP-001 (O05), dated January 23, 2007

- 24590-WTP-RITS-QAIS-06-477, BNI Recommendations and Issues Tracking System (RITS) for Wood Construction in Marshaling Yard Warehouse, in response to A-06-ESQ-RPPWTP-001 (O06), dated January 23, 2007

Personnel/ Positions Interviewed:

BNI Fire Protection Engineers
 BNI Radiological and Fire Safety Manager
 ORP Facility Representatives
 Warehouse Managers
 Material Specialist
 WTP Construction Utility Group Manager
 WTP Field Safety Assurance Manager
 Area Safety Representative
 Area Superintendents
 Warehouse Supervisors
 Property Administrator
 Safety Assurance Manager
 Contract Manager

Contract Manager
 Safety Assurance Manager
 Property Administrator
 Warehouse Supervisors
 Area Superintendents
 Area Safety Representative
 WTP Field Safety Assurance Manager
 WTP Construction Utility Group Manager
 Material Specialist
 Warehouse Managers
 ORP Facility Representatives
 BNI Radiological and Fire Safety Manager
 BNI Fire Protection Engineers

Evolutions/Operations/Shift Performance Observed:

Toured the following facilities to observe overall fire protection program implementation:

Marshaling Yard Warehouse
 Energy Northwest Leased Facility Warehouses, including Building 2-4 (currently under lease), and Buildings 1-3 and 5 (considered for a potential lease).
 WTP T-52 Warehouse
 WTP Site Fabrication Shop (“Combo-shop”)
 WTP Low Activity Waste Facility
 WTP T-43 and T-47 Buildings (e.g. “Clayton Buildings” or “Extended Storage”).
 WTP Balance of Facilities Switchgear Building 91 and Switchgear Building 87

RESULTS:

Discussion of Results:

The purpose of this performance objective area was to verify if the Contractor has improved the basic fire protection program elements since the ORP fire protection implementation assessment completed in 2006 in the following areas:

- BNI Management policy for fire protection includes offsite Waste Treatment and Immobilization Plant support facilities. (A-06-ESQ-RPPWTP-001-O01)
- The DOE Fire Hazard Analyses Guidance is fully incorporated by the Contractor. (A-06-ESQ-RPPWTP-001-O02)

BNI Management Policy

In the 2006 assessment of BNI Fire Protection program implementation ORP identified a programmatic weakness where the essential BNI Management policy for fire protection did not include off site WTP support facilities. DOE fire related liabilities exist in off site WTP support facilities, such as in the Marshalling Yard Warehouse Building, Energy Northwest Lease Warehouse, and other temporary/non-permanent facilities. Since a fire in any of these facilities could negatively impact on personnel life safety, property loss, or schedule to complete the WTP facility, ORP identified an observation for BNI to widen their policies and procedures to clearly include any areas for the project where DOE liability or risk exists as a result of fire.

The assessors conducted a review of the revised BNI Fire Protection Policy Statement issued August 28, 2006 and concluded the revised policy clearly incorporates the DOE fire protection program objectives required by DOE, including the WTP offsite support facilities. The assessors also reviewed the fire protection management assessment plan and an assessment of the WTP Storage Facilities under Performance Objective FP.2 and concluded BNI fire protection engineers are also conducting formalized fire protection facility assessments in their oversight of the WTP offsite support facilities.

Fire Hazard Analysis Guidance

In the 2006 assessment of BNI Fire Protection program implementation ORP identified a programmatic weakness with draft preliminary fire hazard analyses (PFHAs). While the FHAs contained descriptions and the analyses that were generally consistent with the requirements and guidance from applicable DOE directives and industry codes and standards, the analyses did not include descriptions for every specific technical area specified in the DOE fire protection guidance contained in DOE G 420.1A. This includes analyses and description of fire hazards created by direct flame impingement, hot gases, fire-fighting water damage, and document the technical bases for determining recovery potential following a fire.

In March and April 2006, BNI reissued the PFHAs as part of the preliminary safety analysis report update. The assessment team reviewed the PFHA and determined the DOE Fire Hazard Analyses Guidance, which specifies incorporation of direct flame impingement, hot gases, fire-fighting water damage, and document the technical bases for determining recovery potential following a fire is incorporated (although not fully developed) in the revised preliminary fire hazards analyses.

Conclusion:

The performance objective of this CRAD was fully met because contractor has improved the basic fire protection program elements as required by contractual requirements. The Assessment Team conducted a review of the revised BNI Fire Protection Policy Statement issued August 28, 2006 and concluded the revised policy clearly incorporates the DOE fire protection program objectives required by DOE, including the WTP offsite support facilities. The assessors also reviewed the fire protection management assessment plan and an assessment

of the WTP Storage Facilities under Performance Objective FP.2 and concluded BNI fire protection engineers are also conducting formalized fire protection facility assessments in their oversight of the WTP offsite support facilities. Therefore assessment Observation A-06-ESQ-RPPWTP-001-001, BNI Management policy for fire protection does not include offsite WTP support facilities, is considered closed.

The Assessment Team conducted a review of the six preliminary fire hazard analyses submitted to ORP in March and April 2006 are part of the preliminary safety analysis report update. The result was the DOE Fire Hazard Analyses Guidance which specifies incorporation of direct flame impingement, hot gases, fire-fighting water damage, and document the technical bases for determining recovery potential following a fire into the fire hazard analysis is addressed (although not fully developed). Therefore assessment Observation A-06-ESQ-RPPWTP-001-002, "DOE Fire Hazard Analyses Guidance is not fully incorporated by BNI" is closed.

Issues:

No new issues.

The revised BNI policy incorporates the DOE fire protection program objectives BNI fire protection engineers are also conducting formalized fire protection facility assessments in their oversight of the WTP offsite support facilities. Therefore, A-06-ESQ-RPPWTP-001-001 is verified as closed.

The revised BNI preliminary fire hazards analyses incorporate the DOE Fire Hazard Analyses Guidance. Therefore assessment Observation A-06-ESQ-RPPWTP-001-002, "DOE Fire Hazard Analyses Guidance is not fully incorporated by BNI" is closed.

PERFORMANCE OBJECTIVE FP.2

Implementation of the Contractors fire protection program commitments have improved at the level expected by ORP.

Criteria:

1. Storage controls have been established for the Marshalling Yard and WTP Site T-52 Warehouses to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems. (A-06-ESQ-RPPWTP-001-F01)
2. Impaired fire barriers in the Marshalling Yard Warehouse have been analyzed to address the spread of fire throughout the facility. (A-06-ESQ-RPPWTP-001-F02)
3. Fire alarm system equipment testing is being performed by qualified and experience personnel and tests are documented as required by NFPA 72. (A-06-ESQ-RPPWTP-001-F03)
4. A fire system impairment program has been implemented consistent with the requirements of NFPA 25. (A-06-ESQ-RPPWTP-001-F04)
5. Inspection, testing, and maintenance of exit signs, emergency lighting, fire alarm systems, and sprinkler systems in Marshalling Yard Warehouse are being conducted as required by NFPA Codes. (A-06-ESQ-RPPWTP-001-F05)
6. BNI fire protection engineers are conducting formalized fire protection facility assessments on all facilities expected by ORP. (A-06-ESQ-RPPWTP-001-O03).
Note: The 2006 assessment required response for this Observation.
7. Installed fire systems at the WTP have been put into service or the contractor has developed and issued a lay up plan for specific systems not in service. (A-06-ESQ-RPPWTP-001-O04) Note: The 2006 assessment required response for this Observation.

Approach:

Record Review:

Selected contractor fire protection assessments and fire safety survey results; Maintenance records for fire protection systems; and Corrective action records for fire protection related issues.

Interviews:

Contractor fire protection professional engineers, system engineers, and managers; facility managers and selected operators; Maintenance personnel, including managers who work on fire protection systems. Line managers through whom fire protection personnel report.

Observations:

Fire Protection system surveillances and preventive maintenance activities associated with selected facilities; Contractor fire protection self assessments if available; Walk down selected

facilities with emphasis on installation and operability of all elements of the fire protection systems including physical systems and components and combustion control and storage programs.

PROCESS:

Records Reviewed:

DOE Documents:

- ORP Letter 06-ESQ-003, Assessment Report A-06-ESQ-RPPWTP-001 Fire Protection Program Implementation, February 6 through 17, 2006, dated April 17, 2006
- ORP Assessment Report A-06-ESQ-RPPWTP-001 Fire Protection Program Implementation, February 6 through 17, 2006
- U.S. Department of Energy, DOE O 420.1A, Facility Safety, Contract Requirements Document, Attachment 2; May 20, 2002
- U.S. Department of Energy, DOE O 420.1B, Facility Safety, Contract Requirements Document, Attachment 2, December 22, 2005
- U.S. Department of Energy, DOE G-420.1/B-0, Implementation Guide for use with DOE Orders 420.1 and 440.1 Fire Safety Program, September 30, 1995
- DOE-STD-1066-97, DOE Standard Fire Protection Design Criteria, July 1999
- DOE-STD-1088-95, DOE Standard Fire Protection for Relocatable Structures, June 1995
- U. S. Department of Energy, Richland Operations Office, A-05-SED-FH-025, Report on the Assessment of Fluor Hanford, Inc. Fire Protection Program, November 2005
- U. S. Department of Energy Contract No. DE-AC27-01RL14136, Waste Treatment and Immobilization Plant Contract, December 2005

National Fire Protection Association (NFPA) Documents:

- NFPA 13, Standard for the Installation of Fire sprinkler Systems, 1999 Edition
- NFPA 25, Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, 2002 Edition
- NFPA 72, National Fire Alarm Code©, 2002 Edition
- NFPA 101, Life Safety Code©, 2003 Edition

BNI Documents:

- 24590-WTP-SRD-ESH-01-001-02, Rev. 4g, Safety Requirements Document Volume II, December 12, 2006
- BNI letter CCN:138410, Response to Assessment Report A-06-ESQ-RPPWTP-001, Fire Protection Program Implementation, dated May 17, 2006
- 24590-WTP-MAR-ENS-06-0010, Rev. 1, BNI Management Assessment of WTP Storage Vulnerability to Fire Loss, March 8-11, 2006
- 24590-WTP-CAR-QA-06-136, Rev. 0, Corrective Action Report Number for Impaired Fire Barriers in Warehouse from A-06-ESQ-RPPWTP-001 (F02), dated August 2, 2006
- 24590-WTP-PL-ENS-06-0010, Rev. 0, Analysis of WTP Storage Vulnerability to Fire Loss-Management Assessment Plan, March 8, 2006
- 24590-WTP-CAR-QA-06-136, Rev. 0, Corrective Action Report Number for Personnel Fire Alarm Testing Qualifications from A-06-ESQ-RPPWTP-001 (F03), dated December 18, 2006
- 24590-WTP-CAR-QA-06-191, Rev. 0, Corrective Action Report Number for Fire System Impairment Program from A-06-ESQ-RPPWTP-001 (F04), dated September 19, 2006
- 24590-WTP-GPP-SIND-059, Rev. 0, Fire Protection System Impairment, September 5, 2006
- 24590-WTP-CAR-QA-06-143, Rev. 0, Corrective Action Report Number for Inspection, Testing, and Maintenance in Marshaling Yard Warehouse from A-06-ESQ-RPPWTP-001 (F05), dated August 9, 2006
- BNI letter CCN-141845 to Tri-City Railroad Company, Marshaling Yard, NFPA Requirements, dated June 29, 2006
- BNI letter CCN-148672 to Tri-City Railroad Company, Fire Protection Deficiencies at Marshaling Yard, dated November 30, 2006
- Cascade Fire protection Company Report of Inspection on Tri-City Railroad (Marshaling Yard Warehouse) Sprinkler System dated March 17, 2005
- Cascade Fire protection Company Report of Inspection on Tri-City Railroad (Marshaling Yard Warehouse) Sprinkler System dated July 7, 2006
- Tri-City Railroad Company Letter to Bechtel National, Inc. In response to BNI letter (CCN-148672) Fire Protection Deficiencies at Marshaling Yard, dated December 3, 2006.

- Fire Protection Specialists, LLC of Spokane Washington, Maintenance Report for Electrical Supervised Fire Alarm Systems for Tri City Railroad Warehouse (Marshalling Yard Warehouse) dated July 17, 2006.
- 24590-WTP-RITS-QAIS-06-471, BNI Recommendations and Issues Tracking System (RITS) for BNI Management Policy for Fire Protection to Offsite Facilities in response to A-06-ESQ-RPPWTP-001 (O01), dated January 23, 2007
- 24590-WTP-G63-MGT-007, Rev. 0, Fire Protection Policy Statement, August 28, 2006
- 24590-WTP-RITS-QAIS-06-472, BNI Recommendations and Issues Tracking System (RITS) for Fire Hazard Analysis Guidance, in response to A-06-ESQ-RPPWTP-001 (O02), dated January 23, 2007
- 24590-BOF-RPT-ESH-01-002, Rev. 2, Preliminary Fire Hazards Analysis for the Balance of Facilities, March 31, 2006
- 24590-HLW-RPT-ESH-01-001, Rev. 2, Preliminary Fire Hazards Analysis for the High-Level Waste Facility, April 11, 2006
- 24590-LAB-RPT-ESH-02-001, Rev. 2, Preliminary Fire Hazards Analysis for the Analytical Laboratory, March 31, 2006
- 24590-LAW-RPT-ESH-01-001, Rev. 2, Preliminary Fire Hazards Analysis for the Low-Activity Waste Facility, March 31, 2006
- 24590-PTF-RPT-ESH-02-001, Rev. 2, Preliminary Fire Hazards Analysis for the Pretreatment Facility, March 31, 2006
- 24590-WTP-RPT-ENS-05-005, Rev. 0, Preliminary Fire Hazards Analysis for the General Information, March 31, 2006
- 24590-WTP-RITS-QAIS-06-474, BNI Recommendations and Issues Tracking System (RITS) for Formalized Fire Protection Assessments, in response to A-06-ESQ-RPPWTP-001 (O03), dated January 23, 2007
- 24590-WTP-PL-ENS-06-0002, Rev. 0, Fire Protection Facility Assessments-Management Assessment Plan, July 12, 2006
- 24590-WTP-MAR-ENS-06-0032, Lower Tier/Special Management Assessment Report for the Switchgear Building 87 and 91, Fire Assessment, October 10, 2006
- WTP Project Fire Safety Inspection Checklist for Switchgear Building 87, September 26, 2006

- WTP Project Fire Safety Inspection Checklist for Switchgear Building 91, September 26, 2006
- 24590-WTP-MAR-ENS-06-0028, Lower Tier/Special Management Assessment Report for the Simulator Building, Fire Assessment, September 1, 2006
- WTP Project Fire Safety Inspection Checklist for the Simulator Building, August 30, 2006
- 24590-WTP-MAR-ENS-06-0026, Lower Tier/Special Management Assessment Report for the Wildland Fire Assessment, August 3, 2006
- 24590-WTP-MAR-ENS-06-0023, Lower Tier/Special Management Assessment Report for the T-1 Building, Fire Assessment, September 20, 2006
- WTP Project Fire Safety Inspection Checklist for T-1, July 27, 2006
- 24590-WTP-MAR-ENS-06-0041, Lower Tier/Special Management Assessment Report for the T-15 Building, Fire Assessment, November 29, 2006
- WTP Project Fire Safety Inspection Checklist for T-15, November 29, 2006
- 24590-WTP-RITS-QAIS-06-476, BNI Recommendations and Issues Tracking System (RITS) for Fire Watch Requirements, in response to A-06-ESQ-RPPWTP-001 (O05), dated January 23, 2007
- 24590-WTP-RITS-QAIS-06-477, BNI Recommendations and Issues Tracking System (RITS) for Wood Construction in Marshaling Yard Warehouse, in response to A-06-ESQ-RPPWTP-001 (O06), dated January 23, 2007
- Marshaling Yard and T-52 Fire Surveillance Log books
- Work Order 24590-WTP-TWO-CMNT-05-0677, *Fire Protection System – Main Construction Site Office*
- Work Order 24590-WTP-TWO-CMNT-06-0401, *Fire Protection System – Main Construction Site Office*
- Work Order 24590-WTP-TWO-CMNT-06-0433, *Fire Protection System – 2652 WTP Warehouse*
- Work Order 24590-WTP-TWO-CMNT-06-0674, *Fire Protection System – Main Construction Site Office*
- Work Order 24590-WTP-TWO-CMNT-06-0211, *Fire Protection System – 2652 WTP Warehouse*

- Work Order 24590-WTP-TWO-CMNT-06-0934, *Fire Protection System – Main Construction Site Office*
- Work Order 24590-WTP-TWO-CMNT-06-0907, *Fire Protection System – Main Construction Site Office*
- Work Order 24590-WTP-TWO-CMNT-06-0183, *Fire Protection System – Main Construction Site Office*
- Work Order 24590-WTP-TWO-CMNT-05-0349, *Fire Protection System – Main Construction Site Office*
- Work Order 24590-WTP-TWO-CMNT-05-0677, *Fire Protection System – Main Construction Site Office*
- Work Order 24590-WTP-TWO-CMNT-06-1052, *Fire Protection System – 2652 WTP Warehouse*
- Work Order 24590-WTP-TWO-CMNT-06-0435, *Fire Protection System – 2652 WTP Warehouse*
- Qualification for Inspection & Testing of Fire Alarm and Water Based Fire Protection Systems – *Site Qualification Log*
- Employee Training Profiles for numerous personnel qualified for Inspection & Testing of Fire Alarm systems
- 24590-WTP-IMPL-CON-06-0001, *Fire System Impairment Log*
- Work Instruction, FQSRV001 Rev. 1, *Quarterly Fire Protection System Inspection*
- Work Instruction, F5SRV001 Rev. 2, *5-Yr Sprinkler System Maintenance Building T-01*
- Work Instruction, F1SRV002 Rev. 0, *Annual Sprinkler System Inspection*
- Work Instruction, F1SRV001 Rev. 0, *Annual Fire Alarm System Inspection*
- 24590-WTP-GPP-SIND-059, Rev. 0, *Fire Protection System Impairment*
- Corrective Action Report Number 24590-WTP-CAR-QA-06-091, Rev 0, *Fire System Impairment Program*
- Corrective Action Report Number 24590-WTP-CAR-QA-06-066, Rev 0, *Fire System Testing Qualifications*

- 24590-WTP-RITS-QAIS-06-476, *ORP Assessment Report on Fire Protection Program Implementation Observation*
- Work Order 24590-WTP-TWO-CMNT-07-0095, Marshalling Yard Monthly Emergency Light test

Personnel/ Positions Interviewed:

BNI Fire Protection Engineers
BNI Radiological and Fire Safety Manager
ORP Facility Representatives
Warehouse Managers
Material Specialist
WTP Construction Utility Group Manager
WTP Field Safety Assurance Manager
Area Safety Representative
Area Superintendents
Warehouse Supervisors
Property Administrator
Safety Assurance Manager
Contract Manager
Planners
Schedulers
Central Utilities Group Manager
Impairment Coordinator

Evolutions/Operations/Shift Performance Observed:

Toured the following facilities to observe overall fire protection program implementation:

Marshalling Yard Warehouse
Energy Northwest Leased Facility Warehouses, including Building 2-4 (currently under lease), and Buildings 1-3 and 5 (considered for a potential lease).
WTP T-52 Warehouse
WTP Site Fabrication Shop (“Combo-shop”)
WTP Low Activity Waste Facility
WTP T-43 and T-47 Buildings (e.g. “Clayton Buildings” or “Extended Storage”).
WTP Balance of Facilities Switchgear Building 91 and Switchgear Building 87

RESULTS:

Discussion of Results:

The purpose of this performance objective area was to verify if the Contractor has improved implementation of the fire protection program commitments since the ORP fire protection implementation assessment completed in 2006 in the following areas:

- Storage controls have been established for the Marshalling Yard and WTP Site T-52 Warehouses to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems. (A-06-ESQ-RPPWTP-001-F01)
- Impaired fire barriers in the Marshalling Yard Warehouse have been analyzed to address the spread of fire throughout the facility. (A-06-ESQ-RPPWTP-001-F02)
- Fire alarm system equipment testing is being performed by qualified and experience personnel and tests are documented as required by NFPA 72. (A-06-ESQ-RPPWTP-001-F03)
- A fire system impairment program has been implemented consistent with the requirements of NFPA 25. (A-06-ESQ-RPPWTP-001-F04)
- Inspection, testing, and maintenance of exit signs, emergency lighting, fire alarm systems, and sprinkler systems in Marshalling Yard Warehouse are being conducted as required by NFPA Codes. (A-06-ESQ-RPPWTP-001-F05)
- BNI fire protection engineers are conducting formalized fire protection facility assessments on all facilities expected by ORP. (A-06-ESQ-RPPWTP-001-O03).
- Installed fire systems at the WTP have been put into service or the contractor has developed and issued a lay up plan for specific systems not in service. (A-06-ESQ-RPPWTP-001-O04)

Marshalling Yard and T-52 Storage Warehouses

During the 2006 assessment of BNI Fire Protection program ORP identified a programmatic implementation deficiency associated with the Marshalling Yard and WTP Site T-52 Warehouses. Although the Marshalling Yard and T-52 Warehouses have installed sprinkler systems, it was identified these systems are not designed to control fires for all the commodities stored in these facilities (see NFPA 13) and controls have not been established for building management and operations to maintain the commodity within the hydraulic delivery capabilities of the sprinkler systems.

To address this issue and other fire protection issues with the warehouses,, from March 8 though May 12, 2006 BNI initiated a separate comprehensive Management Assessment of the WTP Storage facilities to validate the ORP finding and to develop guidelines to change storage arrangement necessary to ensure sprinkler system capacity in the storage warehouses were not exceeded. The BNI assessment was conducted by a multidiscipline team which included representatives from safety assurance, fire protection engineering and fire safety and the team issued a full report by the end of June 2006. Overall the BNI assessment concluded storage types and arrangement heights exceeded the hydraulic capacity of the installed fire sprinkler systems in the Marshalling Yard and T-52 warehouses per NFPA 13 requirements. However, the BNI assessment concluded the warehouse risk from fire could be improved in both warehouses by implementing storage controls, including lowing height of combustibles, removing full encapsulation (e.g. plastic shrink wrap from top) from storage and pallets loads, removing aisle space storage between rack and shelving storage, and reducing flammable liquid storage. These items were identified for corrective action.

Additionally, the BNI assessment identified corrective actions to modify the T-52 sprinkler system, including, the installation of in-rack sprinkler heads and sprinkler to the T-52 shipping and receiving area canopy, and the identification of inspection, testing and maintenance requirements for work systems in these facilities.

Later in 2006 BNI initiated engineering activities to modify the T-52 sprinkler system. However, by October 2007, a BNI fire protection engineer concluded the T-52 sprinkler system had so many technical deficiencies with the overhead system, including over spaced sprinkler heads, inadequate sized piping for storage commodities, incorrectly applied sprinkler 'K-factors', and the lack of sprinkler under exterior loading dock, a system addition, as originally conceived, would not allow the sprinkler system to meet the hydraulic demands required by NFPA 13, necessary to control fires involving warehouse stored materials, in a cost effective manner. The BNI fire protection engineer recommended to remove the T-52 system and install it with a system which would meet the hydraulic demands of the materials needed to be stored in the warehouse. BNI developed a schedule to currently replace the T-52 sprinkler system by the summer of 2008.

In the interim BNI has implemented a roving hourly fire patrol to detect a fire early in the T-52 warehouse as a compensatory measure until the fire sprinkler systems is replaced. By reviewing the logs and interviewing the personnel performing the patrol, the assessment team determined the fire patrol is being conducted. However, the assessment team determined while the compensatory measure of an hourly fire patrol may provide early warning for life safety, it does not necessarily provide an equivalent level of fire protection for the type and arrangement of commodities currently stored in T-52 since an aggressive fire in T-52, even if detected during the one hour fire patrol with current storage arrangement, may not prevent a total facility loss.

During the facility walkdowns the Assessment Team also observed compensatory controls required by the BNI management assessment which are not been fully implemented, including but not limited to, flammable liquid storage cabinet number exceeded in the Marshalling Yard Warehouse (no greater than 3 total), excessive Class 'A' combustibles in the old dynamometers/wheel alignment shop area in the Marshalling Yard Warehouse, storage height too close to sprinkler heads in the Marshalling Yard Warehouse (<18 inches), pallet storage of encapsulated plastics/computers in facility (in the Marshalling Yard Warehouse and Energy Northwest Leased Facility 2-4), and allowable storage height exceeded at the Energy Northwest Leased Facility 2-4.

Impaired fire barriers in the Marshalling Yard Warehouse

In the 2006 ORP assessment of BNI, ORP observed fire barriers with fire doors which will not all automatically close in a fire and unprotected openings in the barriers in the Marshalling Yard Warehouse. ORP recommended BNI evaluate the Marshalling Yard Warehouse fire barriers as a control method consistent with warehouse storage control considerations. To address this and other fire protection issues with the warehouses, from March 8 through May 12, 2006 BNI initiated a separate comprehensive Management Assessment of the WTP Storage facilities. The BNI assessment estimated a \$21 million maximum possible fire loss (MPFL) in the Marshalling

Yard warehouse without the fire barriers (the MPFL considers the fire sprinkler system to be non-functional and contents only a project loss since the building is leased and not a DOE liability) from damaged permanent plant materials, components and equipment from the WTP facilities. In calculating this fire loss the BNI management assessment considered the entire building to be one fire area. Since the MPFL is less than \$50 million DOE requirements do not mandate fire area to be separated by fire barriers. Therefore Finding A-06-ESQ-RPPWTP-001-F02 is considered closed.

Fire alarm system equipment testing - Qualifications and Documentation

In 2006, ORP identified fire alarm system equipment testing is not performed by qualified and experience personnel and tests are not documented as required by NFPA 72. Specifically, NFPA 72, Section 10.2.2.5 requires fire alarm maintenance personnel to be qualified and experienced in the inspection, testing, maintenance of fire alarms systems, and NFPA 72, Section 10.6.2.3, requires a record of all inspections, testing, and maintenance to be provided following NFPA 72.

To address this deficiency BNI has implemented extensive changes. Maintenance procedures that meet the requirements of NFPA 72 have been developed and implemented. BNI hired a subcontractor to oversee and supervise fire alarm and detection system testing. The Assessment Team determined site personnel conducting the work are trained and qualified to perform the fire system inspection and maintenance they are conducting.

The Assessment Team reviewed the recent work packages for testing activities of Buildings T-1 and T-47. Training and qualification records were reviewed by the Assessment Team and all of the work is being conducted or overseen by qualified personnel in accordance with the NFPA Standards.

Generally, work packages and test procedures reviewed also met the requirements of NFPA 72 and NFPA 25. However, the Assessment Team noted the following deficiencies with the work packages:

1. Fire System Testing is not be conducted in accordance with the frequencies specified in NFPA 72 section 10.4.3 – At the current time the following systems are overdue (including an 25% grace period):
 - a. Building T1 - Quarterly, Simi-annual, Annual
 - b. Building T-52 - Quarterly, Annual

Note: This is exacerbated by combining tests and using the grace period from the longest test as the grace period for all tests.

2. Smoke detector sensitivity test have not been conducted as required by NFPA 72, section 10.4.3.2. The annual fire alarm system inspection work instruction step 7.27 states that sensitivity testing will be covered under a separate contract, but no evidence was found that a contract has been implemented.
3. Work package documentation of HFD dispatcher notification is not being recorded correctly. Issues:

- The times in packages 06-0401 & 06-0433 are the same but the work could not have been done at the same time. RFAR should only be placed in test mode while work is being conducted.
- Multiple entry's but only one set of calls recorded in the work procedure.

For example:

Work Package #	WP RFAR Notification	HFD Log Time	WP RFAR restored	HFD Log Restored
06-0401	8/28/06 @ 16:17	8/30/06 @ 7:54	8/30/06 @ 15:30	8/30/06 @ 15:22
06-0433	8/28/06 @ 16:17	Not found	8/30/06 @ 15:30	Not found
06-0674	1/10/07 @ 7:00	1/10/07 @ 8:44 1/11/07 @ 10:12	1/11/07 @ 13:00	1/10/07 @ 11:07 1/11/07 @ 13:19

4. Process for evaluating system impairment after fire system testing (NFPA 72 section 10.2.1.2(C)) is not defined or addressed in the procedure. The issue is that after a system test there needs to be a technical review to determine if the system will still perform its intended function. Based on the technical review decisions should be made on scheduling corrective maintenance activities and on system impairment status until the corrective actions are completed.
5. There is no evidence of a process to technically review the acceptability of not meeting the Inspection, Testing, and Maintenance frequencies specified in NFPA 72 section 10.4 or for continuing beyond grace periods.

Although some new issues associated with work packages were identified with fire alarm system equipment testing, the Contractor has made significant progress since ORP conducted oversight in this area last year. The Assessment Team was able to verify that fire system testing was being performed by qualified and experience personnel and tests are being documented as required by NFPA 72. The Contractor should make necessary changes to address the issues above to improve program performance. Finding A-06-ESQ-RPPWTP-001-F03 is considered closed.

Fire system impairment program

In 2006, ORP identified the BNI fire system impairment program had not been implemented consistent with the requirements of NFPA 25. Specifically, NFPA 25, Chapter 14 requires measures which must be taken during the impairment of a suppression system to ensure increased risks are minimized and the duration of the impairment is limited. Such measures include:

- Impairment Coordinator;

- Impairment Tag System (Not the same as lock and tag);
- Preplanning Impairment actions and procedures including compensatory measures, fire watches, management and worker notifications, fire department notifications, etc.; and
- Verification of System Working Order and restoration of system to service.

In 2006, ORP determined some measures are in place to address fire hydrant impairments but there was no overall program in place to address impairments for all fire systems within the WTP.

To address this deficiency, BNI issued an impairment procedure and appointed an impairment coordinator. The procedure addresses impairment tagging, impairment planning and actions, and restoring systems to service.

The Assessment Team reviewed the Fire Protection System Impairment procedure (25905-WTP-GPP-SIND-059, Rev. 0) and the impairment log (24590-WTP-IMPL-CON-06-001) and determined the procedure met the requirements of NFPA 25 and 72. Recent activities impairing fire systems have been reviewed by fire protection and impairments are logged in accordance with the procedure by the Central Utility Group (CUG). Finding A-06-ESQ-RPPWTP-001-F04 is considered closed.

Inspection, testing, and maintenance of exit signs, emergency lighting, fire alarm systems, and sprinkler systems in Marshalling Yard Warehouse

In 2006, ORP reviewed inspection, testing, and maintenance (IT&M) records for fire protection features of the Marshalling Yard Warehouse and determined that fire sprinkler and alarm systems are not be conducted at the frequencies required by NFPA. A quick review of the sprinkler and fire alarm records and interviews with BNI indicate the monthly, semi-annual, quarterly IT&M for sprinklers and fire alarms are not being done and the records for the annual maintenance were not of adequate quality because the records noted "operational system defects" without identifying what the defects were and whether they were corrected.

The assessors also determined that IT&M of the Marshalling Yard Warehouse life safety systems, including, exit signs and emergency lighting, are not being conducted as required by NFPA 101.

To address this issue, in June 2006 BNI notified the Marshalling Yard Warehouse building owner, Tri-City Railroad Company, of the lease agreement for the Building Owner to comply with inspection, testing, and maintenance requirements contained in NFPA 25, 72, and 101. BNI also requested copies of the written tests.

By July 2006 the Tri-City Railroad Company provided BNI a Cascade Fire Protection Company's inspection report of the Marshalling Yard Warehouse sprinkler system and a maintenance report from Fire Protection Specialists, LCC for the Marshalling Yard fire alarm system. By November 2006 BNI notified the Tri-City Railroad Company that the inspection

and maintenance records provided to them demonstrated the sprinkler and fire alarm systems were not tested in accordance with the NFPA standards and some deficiencies identified during the testing had yet to be corrected.

Required testing not completed included:

- Some main drain tests were not completed
- No evidence that visual inspection of hangars and bracing was completed
- No evidence that private fire service mains inspection and maintenance was completed
- No evidence that control valves were exercised
- No evidence that OS&Y valves were lubricated

Repairs and modifications needed include:

- Corrosion was identified on sprinklers in System 1
- Sprinkler heads were found taped in railroad heavy equipment shop and 1 sprinkler head off of main hallway
- Sprinkler heads found too close together in small office of heavy equipment shop and in room 13
- Main drain piping for systems 2 and 4B is not run adequately to perform a main drain test
- Inspectors Test location for System 3A was found blocked
- Light fixture blocking the spray discharge of a sprinkler head
- System 6 requires replacement of the retard chamber
- Antifreeze needs to be added to antifreeze loop
- The spare sprinkler head box for system 6 is missing 6 spare sprinkler heads

Following identification of these issues, BNI declared the Marshalling Yard Warehouse sprinkler and fire alarm systems as impaired systems under 24590-WTP-GPP-SIND-059, Fire Protection System Impairment, and initiated a fire patrol for the facility as a compensatory measure. The Assessment Team reviewed the Marshalling Yard Warehouse fire patrol log and determined the fire patrol is being conducted since December 2006 on an hourly basis in accordance with the impairment procedure. The Assessment team determined since December 2006 this issue has yet to be corrected indicating both the fire alarm and sprinkler systems in the Marshalling Yard Warehouse continues to be impaired.

The Assessment Team concluded the inspection, testing and maintenance for sprinklers and fire alarm systems and life safety features (e.g. exit signs and emergency lighting) in the Marshalling Yard Warehouse continue not to be conducted in accordance with NFPA Standards. Therefore A-06-ESQ-RPPWTP-001-F05 is not closed.

Formalized fire protection facility assessments

In 2006 ORP reviewed a large number of E&NS Program Assessments and BNI Fire Safety Walk downs from 2002 through 2006 to evaluate whether fire protection program oversight commitments are implemented by BNI. The result was BNI did not integrate fire protection engineers in routinely scheduled facility assessments following the DOE fire protection guidance.

To respond to this issue, BNI issued a Fire Protection Facility Management Assessment Plan to conduct and document fire protection facility assessments. The ORP Assessment Team reviewed the Management Assessment Plan and determined while the assessments plan generally incorporates the facility elements specified in DOE G 420.1, the plan did not include assessment elements of a combine program, specified in DOE G 420.1, including, but not limited to, conformance with DOE Orders, codes and standard applicable to the facility, inspection, testing and maintenance features of the facility, administrative controls of the facility, and status of findings from previous facility assessments.

The Assessment Team also reviewed a number of recently completed facility assessment and determined fire protection engineers are conducting scheduled facility assessments in accordance with the procedure and the assessment are including elements of a combine program, as specified in DOE G 420.1. Therefore Observation A-06-ESQ-RPPWTP-001-O03 is considered completed.

Installed fire systems at the WTP have been put into service

In the 2006 assessment of the BNI fire protection program ORP identified BNI had completed installations of fire systems in the steam plant, fire water pump house, and Balance of Facilities (BOF)/Important-to-Safety (ITS) switchgear facilities. However, these systems had not been put into service consistent with BNI procedure Section 3.2.3 of 24590-WTP-GPP-SIND-026, Revision 3, Housekeeping and Fire Prevention and BNI lacks clear strategy and identification for which systems will go in lay-up or operational modes.

ORP also forwarded the 2006 assessment with a requested to provide ORP with a strategy and identification for which fire systems will go in lay-up or operational modes.

In BNI's May 2006 response to the 2006 ORP assessment report BNI stated they agreed with the ORP Observation. Furthermore BNI stated the timing for activation of currently installed fire protection systems would be re-evaluated and criteria was being developed for identification of which systems will be laid up until the scheduled test and turnover date, and which systems will be put in service on a more near term basis.

The Assessment Team observed BOF Switchgear Building 91 and Switchgear Building 87 Sprinkler systems continued not to be put into service. Interviews with BNI determined the preaction system fire alarm equipment in both Switchgear buildings contained punch list items which are not yet completed. The Assessment Team also observed the fire water pump house diesel drivers and pumps are not yet in service although two short term maintenance lay-up procedures have been conducted since September 2006.

In interviews with BNI staff the Assessment Team determined BNI has been conducting internal dialogue to address this issue, however, BNI has yet to complete this task and has not completed a formalized a documented strategy and identification for which fire systems will go in lay-up or operational modes.

Therefore the Assessment team concluded Observation A-06-ESQ-RPPWTP-001-O4 has not been completed.

Conclusion:

The performance objective of this CRAD was not met because contractor has not improved implemented the fire protection program commitments in all areas at the level expected by ORP. Overall, BNI has been slow to implement previously identified fire protection deficiencies in the project warehouse facilities and insufficient management involvement in this area is putting the project at a higher than necessary risk, which is below ORP expectations.

Storage controls have not been fully implemented for the Marshalling Yard (MYW) and WTP Site T-52 Warehouses to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems. The Assessment Team noted some compensatory controls have been implemented to reduce the overall facility fire severity. However, all controls from BNI Management Assessment CARS in Marshalling Yard and Energy Northwest Warehouses are not fully implemented, including but not limited to, flammable liquid storage cabinet number exceeded (MYW), excessive Class 'A' combustibles in old dynamometers/wheel alignment shop area (MYW), storage height too close (<18 inches) to sprinkler heads (MYW), pallet storage of encapsulated plastics/computers in facility (MYW and ENW 2-4), and allowable storage height exceeded (ENW 2-4) was observed. The BNI Engineering Assessment of T-52 Warehouse Sprinkler System indicates significant deficiencies with sprinkler system for current storage and the system needs to be replaced. BNI developed a schedule to currently replace the T-52 sprinkler system by the summer of 2008.

The assessment team determined while the compensatory measure of an hourly fire patrol may provide early warning for life safety, it does not necessarily provide an equivalent level of fire protection for the type and arrangement of commodities currently stored in T-52 since an aggressive fire in T-52, even if detected during the one hour fire patrol with current storage arrangement, may not prevent a total facility loss.

The Assessment Team also concluded these controls would not necessarily be effective to address fire in the T-52 warehouse because the fire sprinkler systems are not designed to deliver the water necessary to control a high challenge rapidly developing fires involving materials presently stored in the warehouse. Therefore, the sprinkler systems in the T-52 warehouse may not prevent a catastrophic facility fire which could destroy the warehouse and its contents. The Assessment Team also identified compensatory storage controls, which are not fully implemented, and the continued lack of qualified inspection, testing, and maintenance of fire protection equipment in the Marshalling Yard Warehouse facility.

Insufficient management involvement in the warehouse fire protection corrective actions is putting the project at a higher than necessary risk which is below ORP expectations. A serious fire in these storage facilities with impaired fire systems or systems which cannot control a high challenge commodity fire could result in total facility and contents loss, monetary dollar loss in the multi-millions to DOE, programmatic and schedule impacts to install plant equipment and loss of public and stakeholder confidence to operate future planned nuclear processing plants.

The BNI assessment of the Marshalling Yard Warehouse estimated a \$21 million maximum possible fire loss (MPFL) in the warehouse without the fire barriers (the MPFL considers the fire sprinkler system to be non-functional) from damaged permanent plant materials, components and

equipment for the WTP facilities. In calculating this fire loss the BNI management assessment considered the entire building to be one fire area. Since the MPFL for the entire facility fire area is less than \$50 million DOE requirements do not mandate the building to be separated by fire barriers. Therefore Finding A-06-ESQ-RPPWTP-001-F02 is considered closed.

To address the ORP Finding of fire alarm system testing not being conducted by qualified and experienced personnel and tests not being documented by NFPA BNI developed and implemented maintenance procedures that meet the requirements of NFPA 72. BNI also hired a fire alarm subcontractor to oversee and supervise fire alarm and detection system testing. The Assessment Team also determined site personnel conducting this work are trained and qualified to perform the fire system inspection and maintenance they are conducting.

The Assessment Team reviewed recent work orders for fire alarm testing activities of Buildings T-1 and T-47. Training and qualification records were reviewed by the Assessment Team and all of the work is being conducted or overseen by qualified personnel in accordance with the NFPA Standards. It was noted by the Assessment Team the BNI work packages and test procedures met the requirements of NFPA 72 and NFPA 25. However, in reviewing this area, the Assessment Team noted a number of new deficiencies, including fire system testing frequencies required by NFPA 72 being exceeded, smoke detector sensitivity testing not being conducted, work package documentation incorrectly recorded, and BNI procedures do not define a process for evaluating impairments after fire system testing is completed.

To address the fire system impairment program deficiency, BNI issued an impairment procedure and appointed an impairment coordinator. The procedure addresses impairment tagging, impairment planning and actions, and restoring systems to service.

The Assessment Team reviewed the Fire Protection System Impairment procedure (25905-WTP-GPP-SIND-059, Rev. 0) and the impairment log (24590-WTP-IMPL-CON-06-001) and determined the procedure met the requirements of NFPA 25 and 72. Recent activities impairing fire systems have been reviewed by fire protection and impairments are logged in accordance with the procedure by the Central Utility Group (CUG). Finding A-06-ESQ-RPPWTP-001-F04 is considered closed.

To address the lack of fire protection system and equipment testing in the Marshalling Yard Warehouse identified by ORP in 2006, in June 2006, BNI notified the Marshalling Yard Warehouse building owner, Tri-City Railroad Company, of the lease agreement for the Building Owner to comply with inspection, testing, and maintenance requirements contained in NFPA 25, 72, and 101. BNI also requested copies of the written tests.

By July 2006 the Tri-City Railroad Company provided BNI a Cascade Fire Protection Company's inspection report of the Marshalling Yard Warehouse sprinkler system and a maintenance report from Fire Protection Specialists, LCC for the Marshalling Yard fire alarm system. However, by November 2006 BNI notified the Tri-City Railroad Company that the inspection and maintenance records provided to them demonstrated the sprinkler and fire alarm systems were not tested in accordance with the NFPA standards and some deficiencies identified during the testing had yet to be corrected.

Following identification of these issues, BNI declared the Marshalling Yard Warehouse sprinkler and fire alarm systems as impaired systems under 24590-WTP-GPP-SIND-059, Fire Protection System Impairment, and initiated a fire patrol for the facility as a compensatory measure. The Assessment Team reviewed the Marshalling Yard Warehouse fire patrol log and determined the fire patrol is being conducted since December 2006 on an hourly basis in accordance with the impairment procedure. The Assessment team determined since December 2006 this issue has yet to be corrected indicating both the fire alarm and sprinkler systems in the Marshalling Yard Warehouse continues to be impaired.

The Assessment Team also reviewed work orders for conducting the Marshalling Yard Warehouse monthly emergency lighting tests. The Team determined the monthly emergency lighting testing had been done, but because the preventive maintenance group started the monthly testing less than a year ago, no annual testing has been done. There were also no records available indicating when the lights were installed or when the last annual test was done. No records were also available for emergency lighting installed by Tri-City Railroad Company.

The Assessment Team concluded the inspection, testing and maintenance for sprinklers and fire alarms and other life safety features in the Marshalling Yard Warehouse continue not to be conducted in accordance with NFPA Standards. Therefore A-06-ESQ-RPPWTP-001-F05 is not closed.

Team reviewed the Management Assessment Plan and determined while the assessments plan generally incorporates the facility elements specified in DOE G 420.1, the plan did not include assessment elements of a combine program, specified in DOE G 420.1, including, but not limited to, conformance with DOE Orders, codes and standard applicable to the facility, inspection, testing and maintenance features of the facility, administrative controls of the facility, and status of findings from previous facility assessments. However, a review of a number of recently completed assessments conducted by BNI fire protection staff indicates these items are being incorporated into the assessments, Therefore Observation A-06-ESQ-RPPWTP-001-O03 is considered completed.

The Assessment Team determined BNI has yet to complete a formalized a documented strategy and identification for which fire systems will go in lay-up or operational modes. Therefore the Assessment team concluded Observation A-06-ESQ-RPPWTP-001-O4 has not been completed.

Issues:

1. Storage controls have not been fully implemented in the Marshalling Yard and WTP Site T-52 Warehouses to maintain the storage types and arrangements within the hydraulic delivery capabilities of the fire sprinkler systems. Therefore, A-06-ESQ-RPPWTP-001-F01 remains open.
2. The MPFL in the Marshalling Yard Warehouse is less than \$50 million so DOE requirements do not mandate the building to be separated by fire barriers. Therefore Finding A-06-ESQ-RPPWTP-001-F02 is considered closed.

3. The Assessment Team was able to verify that fire system testing was being performed by qualified and experience personnel and tests are being documented as required by NFPA 72. The Contractor should make necessary changes to address the observations above to improve program performance. Therefore Finding A-06-ESQ-RPPWTP-001-F03 is considered closed. However, in reviewing this area, the Assessment Team noted a number of new deficiencies, including fire system testing frequencies required by NFPA 72 being exceeded, smoke detector sensitivity testing not being conducted, work package documentation incorrectly recorded, and BNI procedures do not define a process for evaluating impairments after fire system testing is completed.

These include the following Issues:

- Fire System Testing is not be conducted in accordance with the frequencies specified in NFPA 72 section 10.4.3 – At the current time the following systems are overdue (including an 25% grace period):

- Building T1 - Quarterly, Semi-annual, Annual
- Building T-52 - Quarterly, Annual

Note: This is exacerbated by combining tests and using the grace period from the longest test as the grace period for all tests.

- Smoke detector sensitivity test have not been conducted as required by NFPA 72, section 10.4.3.2. The annual fire alarm system inspection work instruction step 7.27 states that sensitivity testing will be covered under a separate contract, but no evidence was found that a contract has been implemented.
- Work package documentation of HFD dispatcher notification is not being recorded correctly. Issues:
 - The times in packages 06-0401 & 06-0433 are the same but the work could not have been done at the same time. RFAR should only be placed in test mode while work is being conducted.
 - Multiple entry's but only one set of calls recorded in the work procedure.

For example:

Work Package #	WP RFAR Notification	HFD Log Time	WP RFAR restored	HFD Log Restored
06-0401	8/28/06 @ 16:17	8/30/06 @ 7:54	8/30/06 @ 15:30	8/30/06 @ 15:22
06-0433	8/28/06 @ 16:17	Not found	8/30/06 @ 15:30	Not found
06-0674	1/10/07 @ 7:00	1/10/07 @ 8:44 1/11/07 @ 10:12	1/11/07 @ 13:00	1/10/07 @ 11:07 1/11/07 @ 13:19

- Process for evaluating system impairment after fire system testing (NFPA 72 section 10.2.1.2(C)) is not defined or addressed in the procedure. The issue is that after a system test there needs to be a technical review to determine if the system will still perform its intended function. Based on the technical review decisions should be made on scheduling corrective maintenance activities and on system impairment status until the corrective actions are completed.
 - There is no evidence of a process to technically review the acceptability of not meeting the Inspection, Testing, and Maintenance frequencies specified in NFPA 72 section 10.4 or for continuing beyond grace periods.
4. The Assessment Team reviewed the Fire Protection System Impairment procedure (25905-WTP-GPP-SIND-059, Rev. 0) and the impairment log (24590-WTP-IMPL-CON-06-001) and determined the procedure met the requirements of NFPA 25 and 72. Recent activities impairing fire systems have been reviewed by fire protection and impairments are logged in accordance with the procedure by the Central Utility Group (CUG). Finding A-06-ESQ-RPPWTP-001-F04 is considered closed.
 5. The Assessment Team concluded the inspection, testing and maintenance for sprinklers, fire alarms, and life safety equipment (e.g. emergency lighting, exit signs) in the Marshalling Yard Warehouse continue not to be conducted in accordance with NFPA Standards. Therefore A-06-ESQ-RPPWTP-001-F05 is not closed.
 6. The Assessment Team also reviewed a number of recently completed facility assessment and determined fire protection engineers are conducting scheduled facility assessments in accordance with the procedure and the assessment are including elements of a combine program, as specified in DOE G 420.1. Therefore Observation A-06-ESQ-RPPWTP-001-O03 is considered completed.
 7. The Assessment Team determined BNI has yet to complete a formalized a documented strategy and identification for which fire systems will go in lay-up or operational modes. Therefore the Assessment team concluded Observation A-06-ESQ-RPPWTP-001-O4 (Installed fire systems at the WTP have been put into service or the contractor has developed and issued a lay up plan for specific systems not in service) has not been completed.

PERFORMANCE OBJECTIVE FP.3

The Contractor has completed implemented of the comprehensive elements into the fire protection program necessary to minimize facility fire risks and fire loss potential.

Criteria:

1. The Contractor has implemented robust fire watch requirements. (A-06-ESQ-RPPWTP-001-O05)
2. The Contractor has evaluated the wood construction in the Marshalling Yard Warehouse for interior finish use under the Life Safety Code. (A-06-ESQ-RPPWTP-001-O06) Note: The 2006 assessment required response for this Observation.

Approach:

Record Review:

1. Review the Contractor Site orientation and refresher training provided for all employees. Ensure that fire watch requirements are discussed and is adequate.
2. Validate that the Contractor has conducted a technical evaluation of the wood construction in the Marshalling Yard Warehouse consistent with NFPA 101 and building code requirements.

Interviews:

1. Interview Contractor personnel to ensure that the principles taught in the initial and refresher training is retained by Contractor personnel.
2. Interview fire protection engineering to determine the extent of involvement in the technical evaluation of the wood construction in the Marshalling Yard Warehouse.

Observations:

Tour Facilities under contractual obligation to the Contractor (number and location as specified by the team lead) to field verify compliance conditions with NFPA 101, Life Safety Code. Validate that technical evaluations conducted are consistent with facility conditions and assumptions.

PROCESS:

Records Reviewed:

DOE Documents:

- ORP Letter 06-ESQ-003, Assessment Report A-06-ESQ-RPPWTP-001 Fire Protection Program Implementation, February 6 through 17, 2006, dated April 17, 2006
- ORP Assessment Report A-06-ESQ-RPPWTP-001 Fire Protection Program Implementation, February 6 through 17, 2006

- U.S. Department of Energy, DOE O 420.1A, Facility Safety, Contract Requirements Document, Attachment 2, May 20, 2002
- U.S. Department of Energy, DOE O 420.1B, Facility Safety, Contract Requirements Document, Attachment 2, December 22, 2005
- U.S. Department of Energy, DOE G-420.1/B-0, Implementation Guide for use with DOE Orders 420.1 and 440.1 Fire Safety Program, September 30, 1995
- DOE-STD-1066-97, DOE Standard Fire Protection Design Criteria, July 1999
- DOE-STD-1088-95, DOE Standard Fire Protection for Relocatable Structures, June 1995
- U. S. Department of Energy, Richland Operations Office, A-05-SED-FH-025, Report on the Assessment of Fluor Hanford, Inc. Fire Protection Program, November 2005
- U. S. Department of Energy Contract No. DE-AC27-01RL14136, Waste Treatment and Immobilization Plant Contract, December 2005

National Fire Protection Association (NFPA) Documents:

- NFPA 13, Standard for the Installation of Fire sprinkler Systems, 1999 Edition
- NFPA 51B, National Fire Protection Association Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, 2003 Edition.
- NFPA 101, Life Safety Code©, 2003 Edition

BNI Documents:

- 24590-WTP-SRD-ESH-01-001-02, Rev. 4g, Safety Requirements Document Volume II, December 12, 2006
- BNI letter CCN:138410, Response to Assessment Report A-06-ESQ-RPPWTP-001, Fire Protection Program Implementation, dated May 17, 2006
- 24590-WTP-MAR-ENS-06-0010, Rev. 1, BNI Management Assessment of WTP Storage Vulnerability to Fire Loss, March 8-11, 2006
- 24590-WTP-CAR-QA-06-136, Rev. 0, Corrective Action Report Number for Impaired Fire Barriers in Warehouse from A-06-ESQ-RPPWTP-001 (F02), dated August 2, 2006
- 24590-WTP-PL-ENS-06-0010, Rev. 0, Analysis of WTP Storage Vulnerability to Fire Loss-Management Assessment Plan, March 8, 2006

- 24590-WTP-CAR-QA-06-191, Rev. 0, Corrective Action Report Number for Fire System Impairment Program from A-06-ESQ-RPPWTP-001 (F04), dated September 19, 2006
- 24590-WTP-GPP-SIND-059, Rev. 0, Fire Protection System Impairment, September 5, 2006
- 24590-WTP-CAR-QA-06-143, Rev. 0, Corrective Action Report Number for Inspection, Testing, and Maintenance in Marshalling Yard Warehouse from A-06-ESQ-RPPWTP-001 (F05), dated August 9, 2006
- BNI letter CCN-141845 to Tri-City railroad Company, Marshaling Yard, NFPA Requirements, dated June 29, 2006
- 24590-WTP-RITS-QAIS-06-471, BNI Recommendations and Issues Tracking System (RITS) for BNI Management Policy for Fire Protection to Offsite Facilities in response to A-06-ESQ-RPPWTP-001 (O01), dated January 23, 2007
- 24590-WTP-G63-MGT-007, Rev. 0, Fire Protection Policy Statement, August 28, 2006
- 24590-WTP-RITS-QAIS-06-472, BNI Recommendations and Issues Tracking System (RITS) for Fire Hazard Analysis Guidance, in response to A-06-ESQ-RPPWTP-001 (O02), dated January 23, 2007
- 24590-BOF-RPT-ESH-01-002, Rev. 2, Preliminary Fire Hazards Analysis for the Balance of Facilities, April 14, 2006
- 24590-HLW-RPT-ESH-01-001, Rev. 2, Preliminary Fire Hazards Analysis for the High-Level Waste Facility, April 14, 2006
- 24590-LAB-RPT-ESH-02-001, Rev. 2, Preliminary Fire Hazards Analysis for the Analytical Laboratory, April 14, 2006
- 24590-LAW-RPT-ESH-01-001, Rev. 2, Preliminary Fire Hazards Analysis for the Low-Activity Waste Facility, April 14, 2006
- 24590-PTF-RPT-ESH-02-001, Rev. 2, Preliminary Fire Hazards Analysis for the Pretreatment Facility, April 14, 2006
- 24590-WTP-RPT-ENS-05-005, Rev. 0, Preliminary Fire Hazards Analysis for the General Information, April 14, 2006
- 24590-WTP-RITS-QAIS-06-474, BNI Recommendations and Issues Tracking System (RITS) for Formalized Fire Protection Assessments, in response to A-06-ESQ-RPPWTP-001 (O03), dated January 23, 2007
- 24590-WTP-PL-ENS-06-0002, Rev. 0, Fire Protection Facility Assessments-Management Assessment Plan, July 12, 2006

- 24590-WTP-RITS-QAIS-06-476, BNI Recommendations and Issues Tracking System (RITS) for Fire Watch Requirements, in response to A-06-ESQ-RPPWTP-001 (O05), dated January 23, 2007
- 24590-WTP-RITS-QAIS-06-477, BNI Recommendations and Issues Tracking System (RITS) for Wood Construction in Marshaling Yard Warehouse, in response to A-06-ESQ-RPPWTP-001 (O06), dated January 23, 2007
- 24590-WTP-GPP-SIND-026, Rev 3, Housekeeping and Fire Prevention, December 30, 2004
- 24590-WTP-GPP-SIND-009, Rev 3, Safety Watches, September 28, 2005
- 24590-WTP-GPP-SIND-013_3, Hazardous Work Permit, April 30, 2004
- Fire Watch Training Materials from BNI (note although course number 24590-WTP-TNGC-SA-000008 was identified in the BNI CAP, this course number was not included on the materials provided by BNI need to verify course number).

Personnel/ Positions Interviewed:

BNI Fire Protection Engineers
 BNI Radiological and Fire Safety Manager
 ORP Facility Representatives
 Warehouse Managers
 Material Specialist
 WTP Construction Utility Group Manager
 WTP Field Safety Assurance Manager
 Area Safety Representative
 Area Superintendents
 Warehouse Supervisors
 Property Administrator
 Safety Assurance Manager
 Contract Manager
 Construction Training Manager
 Safety Assurance Personnel

Evolutions/Operations/Shift Performance Observed:

Toured the following facilities to observe overall fire protection program implementation:

Marshaling Yard Warehouse
 Energy Northwest Leased Facility Warehouses, including Building 2-4 (currently under lease), and Buildings 1-3 and 5 (considered for a potential lease).
 WTP T-52 Warehouse
 WTP Site Fabrication Shop (“Combo-shop”)

WTP Low Activity Waste Facility

WTP T-43 and T-47 Buildings (e.g. "Clayton Buildings" or "Extended Storage").

WTP Balance of Facilities Switchgear Building 91 and Switchgear Building 87

RESULTS:

Discussion of Results:

Implementation of Robust Fire Watch Requirements

In the 2006 ORP Assessment of the BNI Fire Protection Program Implementation, ORP reviewed procedural implementation of the fire watch program and determined there was no evidence BNI had formally implemented a fire watch program at the construction site. ORP determined the training requirements for performing the duties of a fire watch were not defined and interviews with field personnel determined most construction site personnel did not know the qualifications and duties of a person performing fire watch. Finally ORP determined personnel in the field do not know the requirements of a fire watch, including the responsibilities and who can perform the actual duties of a fire watch.

To address these issues BNI has developed training materials for fire watch personnel. The Assessment Team reviewed the training materials, BNI procedures, and interviewed BNI personnel and determined no personnel on the construction site have been actually trained to perform the duties of a fire watch. In reviewing this area the Assessment Team also reviewed NFPA 51B, National Fire Protection Association Standard for Fire Prevention During Welding, Cutting, and Other Hot Work. NFPA 51B, Section 5.4.1, specifies a fire watch shall be required by the permit authorizing individual when hot work is performed in a location where other than a minor fire might develop or where the following conditions exist:

- (1) Combustible materials in building construction or contents are closer than 11 m (35 ft) to the point of operation.
- (2) Combustible materials are more than 11 m (35 ft) away from the point of operation but are easily ignited by sparks.
- (3) Wall or floor openings within an 11-m (35-ft) radius expose combustible materials in adjacent areas, including concealed spaces in walls or floors.
- (4) Combustible materials are adjacent to the opposite side of partitions, walls, ceilings, or roofs and are likely to be ignited.

The Assessment Team reviewed BNI's Housekeeping and Fire Prevention, Safety Watches, September 28, 2005, and, Hazardous Work Permit, procedures, interviewed contractor personnel, and walked down the T-15 facility "combo shop", concluding the requirements specified in Section 5.4 of NFPA 51B are not contained in BNI procedures. For example, Section 5.4.1(1) requires a fire watch when hot work is conducted inside a building where combustible materials are within 35 feet of the work. A good example of where NFPA 51B, Section 5.4.1 requirements is applicable involves welding and cutting activities in the T-15 facility. A walk down of the combo shop found that there was a welding table and welder located 13 feet from the rigging loft, and more importantly, located within 8 feet of the welding bench and adjacent to the rigging

loft some cardboard boxes. Both of these situations require a fire watch to prevent combustible materials from igniting during hot work operations.

Because there are no trained fire watch personnel, and the requirements for when a fire watch are not specified, the 2006 observation cannot be closed.

Evaluation Wood Construction in Marshalling Yard Warehouse

In 2006 ORP observed interior office spaces including walls, ceilings, and other locations such as tool storage area walls throughout the Marshalling Yard Warehouse which were constructed out of untreated plywood and other wooden materials. ORP determined the construction may not meet requirements of NFPA 101, which requires interior finish to have a flame spread rating of less than 200 and a smoke development less than 450 and recommended BNI evaluate the actual plywood material installed in the warehouse against NFPA 101, Life Safety requirements.

To address this issue BNI conducted an assessment of the WTP Marshalling Yard Warehouse by BNI Fire Protection Engineers. The assessment determined an exposed plywood wall was located in the M5 storage area and an exposed plywood office area with a plywood roof was located on the west side of the warehouse in the M4 storage area inside the Marshalling Yard Warehouse. The office area had no sprinklers installed under the roof and BNI determined the roof created an obstruction to the sprinkler system. BNI initiated work and removed the roof from the office space to bring this portion of the warehouse into compliance with NFPA 13 requirements. BNI evaluated the remaining wood and determined the plywood and 2 x 4 framing lumber materials are rated as Underwriters Laboratory FR-S (flame spread and smoke developed values are 25 or less). BNI evaluated this rating and against NFPA requirements and determined the material to be acceptable for use in exits, access to exits, and other spaces in storage occupancies under NFPA 101 so the removal of this remaining plywood and 2 x 4 framing was not necessary.

The Assessment Team conducted a review of BNI's evaluation in the assessment of the WTP Marshalling Yard Warehouse and toured the Marshalling Yard Warehouse and a number of WTP site facilities. Based on BNI's evaluation of the flame spread and smoke developed values of the wood materials contained in the Marshalling Yard Warehouse the Assessment Team concluded BNI has evaluated the wood materials necessary for Observation A-06-ESQ-RPPWTP-001-006 to be closed.

During the tour of the WTP combo shop the assessment team noted the combo shop rigging loft contained a plywood office with some sheets of plywood and storage materials covering the ceiling which would prevent the fire sprinklers from operating effectively. Interviews with BNI personnel determined personnel working inside the combo shop placed the plywood to prevent dirt and bird droppings from falling in to their work space. BNI corrected the deficiency by removing the plywood cover to allow sprinkler head operation and place to lower a sprinkler head into the area so a suitable cover could be permanent installed in this space. The Assessment Team verified BNI removed the plywood cover.

Conclusion:

The performance objective of this CRAD were partially met because the contractor has not completed implemented of all necessary comprehensive elements into the fire protection program necessary to minimize facility fire risks and fire loss potential.

Specifically, no personnel on the construction site are actually trained to perform the duties of a fire watch and the requirements for when a fire watch must be conducted, as specified in NFPA 51B, is not contained in the BNI procedures.

Because a functioning fire watch program has not been implemented, the 2006 ORP assessment observation, A-06-ESQ-RPPWTP-001-O05, "BNI has not implemented robust fire watch requirements", remains open.

The Assessment Team also conducted a review of BNI's evaluation in the assessment of the WTP Marshalling Yard Warehouse and toured the facility. Based on BNI's evaluation of the flame spread and smoke developed values of the wood materials contained in the Marshalling Yard Warehouse the Assessment Team concluded Observation A-06-ESQ-RPPWTP-001-O06 is closed.

Issues:

1. Observation A-06-ESQ-RPPWTP-001-O05, "BNI has not implemented robust fire watch requirements", remains open.
2. Fire watch requirements specified in Section 5.4 of NFPA 51B are not contained in BNI procedures.
3. Based on BNI's evaluation of the wood materials in the Marshalling Yard Warehouse as meeting NFPA 101 the Assessment Team concluded Observation A-06-ESQ-RPPWTP-001-O06 is closed.