Department of Energy
Washington, DC 20585

August 14, 2002

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

The purpose of this letter is to inform you of the actions taken to address the Defense Nuclear Facilities Safety Board (DNFSB) staff observations of the electrical and instrument and control systems at the Hanford Plutonium Finishing Plant.

The Richland Operations Office (RL) has prepared, and is currently implementing, a corrective action plan (CAP) to address the DNFSB staff observations, which is enclosed for your information. While many of the corrective actions contained in the CAP are completed, there are several corrective actions that have not been completed as scheduled. The current status of these corrective actions is as follows:

- 1.1 Procedure will be finalized by August 30, 2002;
- 1.2 Hanford Site Operations will finalize procedure by August 30, 2002;
- 4.1 The electrical load study should be completed ahead of schedule on September 30, 2002;
- 8.2 Delay in retrieving archived engineering files has pushed the completion date to November 29, 2002;
- 8.3 Delay in corrective action 8.2 will extend completion to 12/31/02; and,
- 10.1 Briefing of back shift personnel will be completed by August 15, 2002.

The Richland Operations Office will perform an assessment to fully verify completion of all corrective actions and to verify that performance has been improved, and will inform me of the results by January 1, 2003.

If you have any questions, please contact me at (202) 586-7709.

Jessie Hill Roberson
Assistant Secretary for
Environmental Management

Enclosure

cc:
K. Klein, RL
M. Whitaker, S-3.1

Corrective Action Plan

Electrical and Instrumentation and Control Systems
Plutonium Finishing Plant

Prepared by:
Richland Operations Office
June 12, 2002

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Acronyms

AHJ	Authority Having Jurisdiction
ANSI	American National Standard Institute
ATP	Acceptance Test Procedure
CAP	Corrective Action Plan
DCS	Distributed Control System
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DTS	Deficiency Tracking System
ES&H	Environment, Safety, and Health
FH	Fluor Hanford, Inc.
FSAR	Facility Safety Analysis Report
IEEE	Institute of Electrical and Electronics Engineers
ISA	Instrumentation, Systems, and Automation Society
MVA	Mega Volt Amps
PFP	Plutonium Finishing Plant
RL	Richland Operations Office
SAR	Safety Analysis Report
UPS	Uninterruptible Power Supplies
USQ	Unreviewed Safety Question

Executive Summary

The Defense Nuclear Facilities Safety Board (DNFSB) visited the Hanford Site in early November 2002 to review electrical and instrumentation and control systems at the Plutonium Finishing Plant. The DNFSB review consisted of documentation reviews, interviews with PFP staff, and a facility walkdown. The DNFSB issued a report documenting this visit to the Assistant Secretary for Environmental Management (EM-1) on February 05, 2002.

This corrective action plan was developed to address specific issues and recommendations made by DNFSB staff for improving the electrical and instrumentation and control systems and equipment at the Plutonium Finishing Plant (PFP). RL and FH evaluations of DNFSB issues/observations concluded that the facility is operating within the approved safety authorization basis. However, opportunities exist for improvements in the reliability of PFP electrical and instrumentation and control systems.

Where broader crosscutting issues were identified, corrective actions were developed to address similar issues at other Fluor Hanford (FH) facilities. Specific FH actions focus on developing procedures for adequately responding to a ground fault indication on the electrical distribution system, upgrading the FH System Engineer qualification program, and evaluating, in conjunction with RL, conditions where safety-significant electrical load isolation criteria have not been fully applied. In addition, PFP has upgraded the electrical engineering study software to the most recent version and has started the process of updating the load coordination and short-circuit studies. PFP is committed to completing this study as soon as practicable, but no later than December 2002.

1. Introduction

Defense Nuclear Facilities Safety Board (DNFSB) staff performed a review of the electrical and instrumentation and control (I&C) systems of the Plutonium Finishing Plant (PFP) at the Hanford Site. The staff reviewed the design, operation and maintenance of the electrical and instrumentation and control systems. Related safety-significant systems were reviewed in detail. In addition, the staff walked down PFP to evaluate the configuration maintenance of the electrical distribution systems and observed the installed condition of equipment related to electrical and instrumentation and control systems.

The report issued by the DNFSB staff contained several observations. The U.S. Department of Energy (DOE), Richland Operations Office (RL) transmitted the report to FH and requested FH to review the plan and develop a corrective action plan (CAP) to address the observations in the report.

This document provides the CAP for the DNFSB report.

2. Corrective Action Methodology

A process based on DOE Order 414.1A, *Quality Assurance*, and on DOE Guide 450.4-1B, *Integrated Safety Management System Guide*, was used to develop the appropriate corrective actions to address the identified safety issues and areas of concern. This process is consistent with the following DOE guidelines and expectations:

- DOE implementation plan for Defense Nuclear Facility Safety Board (DNFSB) Recommendation 98-1, *Department of Energy Plan to Address and Resolve Safety Issues Identified by Internal Independent Oversight*;
- DOE memorandum from the Assistant Secretary for Environmental Management to Field Office Managers, *Policy for Content and Implementation of Corrective Action Plans,* dated October 4, 2001; and

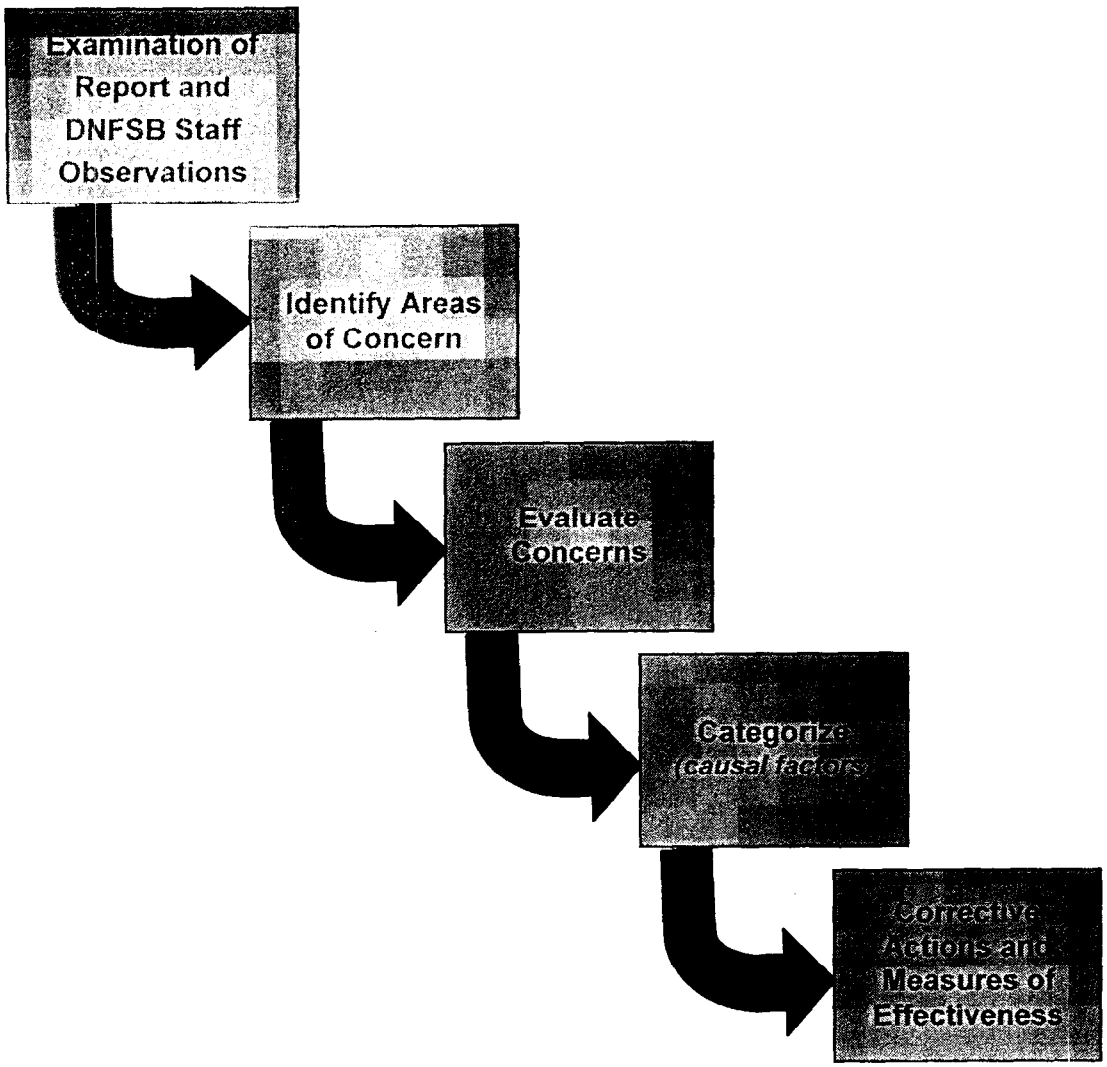
The key steps below define the process used to evaluate the DNFSB report and develop this CAP are listed below:

- Examination of the observations in the report to identify and capture the areas of concern.
- Determination of the causal factors for each identified program element or specified statement of concern, including the identification of management and systemic causal factors.
- Identification of performance expectations, and measures to monitor corrective action effectiveness, including near-term measures of performance.
- Performance of management review for acceptance of the corrective actions, completion date, and measures of effectiveness.

This process is formalized in FH's Corrective Action Management procedure HNF-PRO-052.

The key process steps are illustrated in Figure 2-1. The CAP is provided in Section 8, *Corrective Action Plan.*

Figure 2-1. Corrective Action Methodology



3. Corrective Action Plan Development

The corrective actions were evaluated to ensure that the specific statements of concern were addressed.

For areas where a programmatic weakness was identified, additional corrective actions have been provided in the CAP. The corrective actions identified in Section 8, *Corrective Action Plan*, are those actions that are necessary to address identified weaknesses, resolve the safety issues, and prevent recurrence.

4. Corrective Action Plan Structure

The CAP structure for Section 8 is as follows:

Identifier: Issue number.

Issue Statement: Observation as stated in the DNFSB Staff Report.

Issue Manager: Individual responsible for closure.

Discussion: Summary of information relevant to the issue.

Corrective Actions: Table showing the issue number, description of corrective action, deliverable, responsible organization, planned completion date/status, and the measures to monitor corrective action effectiveness.

5. Review and Approval of Corrective Actions

RL has determined that the process used by FH was comprehensive and consistent with DOE's methodology. The resulting corrective actions address the identified concerns and weaknesses; therefore resolving the concerns.

6. Corrective Action Plan Status Reporting and Closure

This CAP contains the information to be entered into the FH Deficiency Tracking System (DTS).

FH will enter the observations and associated corrective actions into DTS to monitor implementation progress. FH's corrective actions will be tracked and verified in accordance with HNF-PRO-052, *Corrective Action Management.*

7. Verification of Corrective Action Effectiveness

FH will develop and/or revise performance indicators to monitor effectiveness of corrective action implementation to ensure that performance is meeting expectations. In addition, FH will perform assessments as appropriate that will focus on areas of corrective action implementation to ensure the effectiveness of corrective actions.

RL will assess FH's performance in field implementation of the scheduled corrective actions and ensure appropriate measures are in place to continually monitor performance. RL will perform an assessment with sufficient scope to verify completion of the corrective actions, to ensure FH's corrective actions are implemented in programs and operations, and to verify performance is meeting expectations. This action is listed in Section 8.2 as 02-ESD-003-DNFSB-11.

8. Corrective Action Plan

RL/FH are fully committed to the safety and health of their employees and the public, and to the protection of the environment while accomplishing the Hanford Site mission. Implementation of the corrective actions identified in this CAP will ensure safe operations, continuous feedback, and quality improvement within the RL/FH.

8.1 PFP Electrical System

The electrical distribution system at PFP consists of 230 kV and 13.8 kV transmission lines, transformers, large switchgear units, diesel generators, and a DC battery station. The building distribution system is three-phase 480 V and 208 V/120 V. These components are designated as either safety-significant or general service. Three diesel generators provide backup electrical power to monitoring equipment, alarm and evacuation systems, fire alarm systems, some criticality alarm systems, security systems, emergency lighting, and some building ventilation systems when normal electrical power is not available. PFP also has several uninterruptible power supplies (UPS) that provide continuous power to programmable logic controllers, facility computers, plant monitoring systems, and plant communication systems. Emergency lighting is provided by several self-contained, fully automatic, battery-operated emergency light packs. A circuit breaker controlled by a distributed control system provides power for building emergency loads; exhaust fans; heating, ventilation, and air conditioning control circuits; monitoring circuits; UPS systems; perimeter lighting; and other systems.

8.1.1 Observation 1

Identifier: 02-ESD-0032-DNFSB-O1

Issue Statement: *Existing Ground Fault on a Bus System.*- During a tour of the facility, the Board's staff noticed an existing single line to ground fault of 1.5 amps while observing the ground

fault monitoring equipment of the distribution system. At the time of the review, PFP personnel informed the staff that this fault condition had been present for more than a month. Investigation of the condition would have required bus switching and bus outages to locate and remove the fault. To avoid an outage, PFP chose to delay clearance of the fault. Although Institute of Electrical and Electronics Engineers (IEEE) Standard 142-1991, *Grounding of Industrial and Commercial Power Systems*, does not require immediate clearing of a ground fault for systems using a high-resistance grounding method that limits the fault current to a very low level, it would be prudent to clear such a fault as soon as possible, particularly since this condition could lead to severe damage to the system should a second fault occur. The Board's staff encouraged PFP personnel to locate the fault and clear it as soon as possible. As a result, PFP performed a systematic switching of loads during the weekend of November 10, 2001, and was able to locate and clear the ground fault. The fault was traced to a heat pump unit.

Issue Manager: B. J. Gray

Discussion: PFP management and the Electrical Design Authority became aware of the ground fault condition through the facility surveillance program. Preliminary troubleshooting began upon notification. However, the fault condition was intermittent and the condition cleared for a time then reappeared.

RL shares the DNFSB's concern, and recognizes the importance to identify and correct ground faults in an expeditious manner. After the DNFSB raised this concern, the source of the ground fault was identified and corrected. The causal factor identified was management problem, inadequate administrative control. FH is developing procedures to address electrical faults in a systematic and timely manner. Electricians and maintenance personnel on site have been sensitized to the importance of correcting ground faults in a timely manner through the Electrical Safety Council.

8.1.2 Observation 2

Identifier: 02-ESD-0032-DNFSB-O2

Issue Statement: *Technical Capabilities of an Electrical System Engineer* - During a review of the design and installation of storage batteries, the Board's staff observed that the contractor's system engineer for PFP's electrical systems was not aware of the existence of the *National Electric Safety Code* (American National Standards Institute Standard C2). This standard covers basic provisions for safeguarding of personnel from hazards arising from the installation, operation, or maintenance of electrical systems. The same system engineer was unable to explain PFP's existing electrical calculations. He was neither familiar with the software used for the electrical calculations nor capable of explaining the data or recommendations therein.

Issue Manager: L. F. Perkins

Discussion: Although the Electrical System Engineer meets the minimum training and experience requirements established by FH for a system Design Authority, due to the short time in the position, he was not familiar with the content of the existing calculations for PFP. He has experience at other facilities in developing and maintaining the engineering studies and in using the subject software.

RL identified systemic weaknesses in FH's System Engineer training, qualification, and succession programs as causal factors. FH has committed to RL to strengthen these programs in the near term. Chief Engineers for FH projects are reminded/encouraged to use the FH Project Operations Center (POC), the FH central engineering function to enhance field/project/facility subject matter expertise, and this will continue during the upgrading process of the System Engineering programs.

8.1.3 Observation 3

Identifier: 02-ESD-0032-DNFSB-O3

Issue Statement: *Non Safety Loads on Safety-Significant Busses* - The staff noted that several non-safety loads are connected to the safety-significant busses. IEEE Standard 384, *Standard Criteria for Independence of Class IE Equipment and Circuits*, requires that non-safety loads be appropriately isolated from safety-significant busses to ensure that failure of a non-safety component will not cause failure of the safety-significant power system. PFP personnel stated that they will evaluate this condition.

Issue Manager: B. J. Gray

Discussion: RL evaluated the condition of non-safety loads connected to safety significant busses. Although it could be argued/interpreted that IEEE Standard 384, *Standard Criteria for Independence of Class IE Equipment and Circuits*, does not apply (e.g. applies to equipment categorized as *Safety Class* and not equipment categorized as *Safety Significant*, or that the standards and design criteria at the time of construction did not require such isolation), such an argument fails to acknowledge the importance of the present day concern of non-safety and safety significant loads on the same buss. RL shares the DNFSB's concern, and recognizes the importance to review the vulnerabilities of the current configuration.

History: The safety related buss at PFP was the 400 Buss, sometimes referred to as the Emergency Buss in Building 234-5Z (PFP's main building). The 400 Buss was originally designed to receive back-up power from a 2400/480VAC step-down transformer, in addition to another alternate source coming from the diesel generators. The 2400VAC supply came directly from turbine generators located at the 200-West Area Power House (steam plant).

Hanford's centralized steam plants in the 200-East, 200-West, and 300 Areas were taken out of service in 1997 and replaced by package boilers, resulting in the loss of the 2400VAC power and

this capability. The 400 Buss receives power from being connected with the 300 Buss, a non-safety related buss. On a loss of normal power, the 300-400 Buss Tie Breaker trips, allowing the 400 Buss to be powered by the diesel generators.

Evaluation: Currently, only two *Safety Significant* loads are powered from the 400 Buss;1) the vast majority of PFP Evacuation Sirens; and 2) the Room Continuous Air Monitors (CAMs) in 234-5Z.

The Evacuation Alarms have an alternate source of power (switchgear batteries) should the 400 Buss become damaged or lose power. Any initiation of the Evacuation Alarm is followed by a Public Address (PAX) announcement. The PAX system also has an Uninterrupted Power Supply (UPS).

The Room CAMs in 234-5Z do not have an alternate power source other than the 400 Buss. If normal power is lost, the CAMs will stop operating. The consequence of this is lessened by the fact that the Room CAMs will not be operable anyway since the 17 inch Vacuum System, which provides sampling suction for the CAMs, also shut down on a loss of normal power. Even if standby power from the diesel generators reenergize the 400 Buss, the CAMs will not be operable due to the 17 inch vacuum system being inoperable, which are powered from the 500 and 600 Busses.

The Room CAMs are powered by dedicated circuits from the 400 Buss and stepped down to 115VAC. These circuits/panels do not contain any non-safety loads. Room CAMs are equipped with special plugs so that only Room CAMs can be plugged into the dedicated circuit receptacles.

Conclusion: The Evacuation Alarm has an alternate power source should trouble develop on the 400 Buss. This design is considered acceptable for the remaining mission life because a short circuit, loss of power, etc. on the 400 Buss would result in the Evacuation Alarm being powered from its UPS.

The Room CAMs have no back-up power source for the 17 inch Vacuum System, so on a loss of normal power or similar electrical casualty, the Room CAMs would remain inoperable regardless of the condition of the 400 Buss. Since numerous compensatory measures are taken during such a casualty (e.g. evacuation, stopping radiological work, radiological surveys during power restoration and prior to resuming occupancy, etc.), and the electrical circuitry from the 400 Buss to the CAMs is isolated from other equipment, the probability of an electrical failure between the 400 Buss and the Room CAMs is lessened, and meets the intent of isolating the CAMs from non-safety loads for this portion of the circuitry. This design is considered acceptable for the remaining mission life because of compensatory measures in place for the loss of power and loss of Room CAMs, and the Room CAM circuitry is isolated from non-safety loads minimizing electrical casualties

USQ Evaluation PFP-2002-10 is attached for additional information. RL will consider the applicability of IEEE 384 and the Flour Hanford Implementation Plan for DOE Order 420.1 and its

associated Guides for general applicability to new construction activities and potential upgrades to existing facilities with an extended mission life as stated in the Corrective Action Plan (CAP).

8.1.4 Observation 4

Identifier: 02-ESD-0032-DNFSB-O4

Issue Statement: *Electrical Calculations* - The Board's staff reviewed the electrical calculations, such as comprehensive short-circuit, voltage profile, and coordination studies, that are essential to safeguard personnel and maintain a safe and reliable power system. Such studies are performed in accordance with IEEE Standard 141, *IEEE Recommended Practice for Electric Power Distribution for Industrial Plants*, and Standard 242, *IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems*. The existing calculation was performed in 1992 using the commercially available SKM (vendor) system analysis model. Since then, many system design and equipment modifications have occurred, such as the installation of four 1000 kVA transformers 2 years ago in a new configuration to replace the old transformers. The calculations have not been revised using the electrical parameters of the modified system and equipment to determine whether any design modifications are needed.

Issue Manager: **B. J. Gray**

Discussion: RL agrees with the DNFSB and recognizes the need to conduct periodic electrical load calculations. PFP installed four new 1000 KVA transformers two years ago to replace the five existing 50 year old transformers, which were well beyond their design life, and started breaking down the transformer oil generating explosive gases trapped inside the transformer casing. Replacement of these transformers was considered essential for safety and continued operation. The new transformers have a higher impedance, so the available fault current is less than allowed previously.

Although this design change is viewed as a safety upgrade and no imminent hazard exists, RL concurs with PFP's plans to conduct load testing in the near future to maintain an accurate description of the system, and a safe and reliable power system. FH has already purchased new software to conduct revised load calculations, and PFP personnel have commenced field walkdowns to verify system configuration and nameplate data for these calculations. PFP will complete these load calculations as soon as practicable, but no later than December 2002. In addition, FH recognizes inadequate administrative control as a causal factor, and FH is developing a plan to ensure load calculations are performed for nuclear facilities as part of a major electrical change/upgrade.

8.1.5 Observation 5

Identifier: 02-ESD-0032-DNFSB-O5

Issue Statement: *Adequacy of Diesel Generator Load Test* - The diesel generators are tested by running them synchronized with the utility system once a month for approximately an hour to verify the proper operation of the generators. After reviewing one of the test reports, the Board's staff observed that the test method does not indicate the loads on the generator during the test. Measuring and recording the power demand of the load is typically performed to confirm the adequacy of the generator to support the required full load. The test as performed could not verify that the diesel generator could support all required loads.

Issue Manager: B. J. Gray

Discussion: Diesel Generators are tested periodically (monthly) to verify proper operation of the generators. RL agrees with the DNFSB that it is important to measure and record the load on the diesel to confirm the adequacy of the generator to support the required full load, and to run the diesel fully loaded at operating temperature for approximately one hour to ensure operability of the diesel and prevent the build up of carbon deposits and residues in the diesel engine. Since no imminent hazard exists, and the data is captured elsewhere, RL accepts continued operation of the diesel generators until procedure data sheets are updated as described in the Corrective Action Plan (CAP).

8.1.6 Observation 6

Identifier: 02-ESD-0032-DNFSB-O6

Issue Statement: *Turbine-Driven Exhaust Fans* - These exhaust fans are classified as safety-significant components and are required to function during all activities of Building 234-52 (Analytical and Developmental Laboratory). However, the adequacy of these fans to meet the requirements of a safety-significant system could not be verified. Furthermore, the staff observed that the steam supply system that drives the fans is not safety-significant.

Issue Manager: L. F. Perkins

Discussion: RL agrees with the DNFSB and recognizes the need to further evaluate the adequacy of the fans and the associated steam supply. The loss of ventilation accident is discussed in the original Safety Evaluation Report (DOE/DP-0130) in section 9.1.8. In this analysis, it is assumed that both electricity and steam are both lost, and the steam turbines are not required to mitigate this accident. RL concurs with FH that the operational significance of these steam turbines should be evaluated using the current PFP Authorization Basis for potential upgrade of the system components, or downgrade the classification from *Safety Significant* to *General Service*.

8.1.7 Observation 7

Identifier: 02-ESD-0032-DNFSB-O7

Issue Statement: Instrumentation and Control Systems - *Distributed Control System* - The distributed control system (DCS) controls a number of process functions from the PFP control room and is classified as general service. However, the staff learned that a portion of the DCS controls the safety-significant diesel generator control system. Furthermore, the DCS has the capability to override certain interlock functions associated with the normal electrical distribution and diesel generator busses. The staff is concerned that adequate separation may not exist between these systems, and that the DCS could adversely affect the operation of the diesel generators or their bus. It would be prudent for PFP personnel to verify that electrical and software separation exists between these systems and to identify potential DCS failures that could affect the startup, operation, or interlocking features of the safety-significant system.

Issue Manager: B. J. Gray

Discussion: This situation is similar to Observation 3 above. RL shares the DNFSB's concern, and recognizes the importance to review the vulnerabilities of the current configuration. The same logic applies to the Instrumentation and Control components as to the electrical systems. A failure modes and effects analysis evaluation will be performed to determine the acceptability of this condition.

USQ Evaluation PFP-2002-10 is attached for additional information. RL will consider the applicability of IEEE 384 and the Flour Hanford Implementation Plan for DOE Order 420.1 and its associated Guides for general applicability to new construction activities and potential upgrades to existing facilities with an extended mission life as stated in the Corrective Action Plan (CAP).

8.1.8 Observation 8

Identifier: 02-ESD-0032-DNFSB-08

Issue Statement: Instrumentation and Control Systems - *Design of Safety-Significant Instrumentation and Control Systems* - At PFP, the design of safety-significant instrumentation systems is similar to that of general-service systems. The staff encouraged PFP personnel to incorporate lessons learned from the process industry in the design and analysis of safety-related process control systems. Instrumentation, Systems, and Automation Society Standard (ISA) S84.01, *Application of Safety Instrumented Systems for the Process Industries*, presents good fundamental guidelines for the system architecture of safety systems whose primary function is protection of workers or property. This standard consists of a reliability-based approach to the design of safety instrumented systems used in the process industries and also contains a number of useful deterministic guidelines. In the case of existing safety-significant systems used in the recently

installed plutonium stabilization and packaging system (W-460 Project), the Board's staff suggested the use of ISA S84.01 to identify areas of weak design in safety-significant systems. The staff also suggested the application of a failure analysis method to safety-significant instrumentation and control systems to correct any potential design deficiencies. In addition, the staff noted that the Hanford guidance on software quality assurance was not used for the design of the software for the W-460 software systems (e. g., the programmable logic controller for process operations).

Issue Manager: L. F. Perkins

Discussion: RL concurs with the DNFSB staff recommendation that various analysis techniques should be considered. FH recognized inadequate administrative control as a causal factor and issued procedures HNF-PRO-309 and HNF-PRO-2778 to ensure that the requirements of ISA standard ANSI/ISA-S84.01 (Application of Safety Instrumented Systems for the Process Industries) were incorporated into FH software quality assurance. FH will perform a "gap analysis" against these documents to identify and correct any required missing documentation.

8.1.9 Observation 9

Identifier: 02-ESD-0032-DNFSB-O9

Issue Statement: Instrumentation and Control Systems - *Design Process Hazard Reviews* - Although systems classified as general service are not relied upon in the safety basis to prevent known hazards, some method of design process hazard review would be expected. A system hazard review would confirm that general-service systems as designed do not present unforeseen hazards. The staff mentioned that an opportunity for improvement for the W-460 project would be to evaluate these systems with an analytical technique such as a system hazard operability study or what-if checklist. On November 21, 2001, a heater failure in the nitrogen generation system resulted in a fire in the system. The cause of this failure has yet to be determined. However, this failure supports the need for analysis of this and other systems in the W-460 project, including the DCS that controls process operations. The staff also believes a root-cause investigation would be prudent to determine the conditions that led to the heater failure. After subsequent discussions with the Board's staff, PFP personnel agreed to further investigate the failure mechanism.

Issue Manager: L. F. Perkins

Discussion: RL understands the DNFSB's observation is to suggest that formal hazard analysis should not be limited to equipment important to nuclear safety (safety class and safety significant), and that the hazard analysis process should be extended to all equipment including, but not limited to, nuclear safety equipment. RL and FH will determine the best analysis technique for equipment other than equipment important to nuclear safety considering guidance contained in DOE Order Guide 440.1-1 and other sourcesIn addition, RL recognizes the weaknesses related to engineering

design and project management associated with the nitrogen generator heater. The root cause was determined to be management problem, inadequate administrative control. RL will track these issues to closure in Occurrence Report RL--PHMC-PFP-2001-0050.

8.1.10 Observation 10

Identifier: 02-ESD-0032-DNFSB-O10

Issue Statement: *Facility Walkdown* - During a walkdown of the DCS, the Board's staff observed an erratic reading for one of the exhaust fan current indications. The staff discussed with PFP personnel that this might be the result of a failed exhaust fan motor. The staff suggested that if this is a transmitter failure, other instruments should be reviewed for similar conditions. The staff also observed that a number of calibration stickers for safety-significant alarms and several breakers in one of the motor control center rooms indicated overdue calibrations. PFP personnel stated that these calibrations had been performed, but that the maintenance procedure was deficient in requiring placement of the stickers. PFP maintenance personnel instituted a change to the calibration procedure to correct this condition.

Issue Manager: B. J. Gray

Discussion: Motor load current indication on the MICON control panel was "for indication only" and was not used for routine monitoring of equipment. Exhaust fans have a motor failure alarm and in the event of a failed exhaust fan motor, disruption of the ventilation system would occur resulting in operator action. After evaluation, the motor current indication was determined not to be required and was removed using the Engineering Change Notice and the Unreviewed Safety Question process.

Grease markings on breakers provide indication of breaker testing vice calibration. Breaker testing is scheduled using the maintenance management system. The System Engineer extended the testing frequency for these particular breakers because of recently completed modification requiring breaker retest. Although not required when the extension was granted, facility specific procedures currently require that components be marked in the field when calibration or testing frequencies are extended.

RL shares the DNFSB's concern regarding the observed complacency and lack of prompt identification and correction of abnormal conditions. The motor current was checked and the motor was verified to be operating properly. The indication was evaluated as no longer being necessary, and the software was modified to remove the indication. Although no imminent hazard exists, RL concurs with FH's actions to improve operator response to abnormal conditions and improvements to administrative procedures.

8.2 Corrective Action Plan

No	Description	Deliverable	Responsible Actionee	Planned Completion Date/Status	Performance Measurement/Effectiveness Verification
02-ESD-0032-DNFSB-1.1	FH establish procedural requirements for evaluating and correcting ground fault conditions on PFP's electrical system including establishing requirements for the timeliness of corrective actions.	Copy of applicable procedure	B. J. Gray	7/31/02	Ground faults are detected and corrected within the established guidelines.
02-ESD-0032-DNFSB-1.2	Evaluate other FHI facilities to ensure procedural guidance exists or is developed for evaluating and correcting ground fault conditions.	Copy of evaluation results for each facility.	B. J. Gray	7/31/02	Conduct a management assessment to ensure procedural guidance on correcting ground fault conditions exists.
02-ESD-0032-DNFSB-2.1	The facility has updated the version of the referenced load study software so that the System Engineer can revise the load study.	None	L. F. Perkins	complete	NA
02-ESD-0032-DNFSB-2.2	FH is establishing a formal Design Authority training and qualification program for all PHMC facilities as part of implementing the DNFSB 2000-2 recommendation.	Copy of qualification program description.	L. F. Perkins	7/31/02	Conduct a management assessment of Design Authority Training and Qualification.
02-ESD-0032-DNFSB-3.1	An Unreviewed Safety Question Evaluation will be performed for the condition of non-safety loads on safety significant busses and appropriate resulting actions taken. RL will evaluate the applicability of IEEE 384 and other electrical related standards referenced by DOE Order 420.1, and its	Copy of USQ evaluation	B. J. Gray	7/31/02	NA

No	Description	Deliverable	Responsible Actionee	Planned Completion Date/Status	Performance Measurement/Effectiveness Verification
	associated Guides, for general applicability to new construction activities and existing facilities with an extended mission life. The electrical standards selected, and their applicability to RL facilities, will be incorporated in the Flour Hanford Implementation Plan for DOE O 420.1 currently being developed.				
02-ESD-0032-DNFSB-3.2	FH, in conjunction with DOE-RL, will evaluate the applicability of IEEE Standard 384 and the Flour Hanford Implementation Plan for DOE Order 420.1 and its associated Guides for general applicability to and other Electrical Standard guidance to the design of safety-significant busses. Results of this evaluation will be used to establish a path forward for FH facilities.	Copy of Evaluation Results.	B.J.Gray/ J. W. Todd	7/31/02	Establish if any additional contractual direction by RL is required.
02-ESD-0032-DNFSB-4.1	The PFP plant load flow, short-circuit, and breaker coordination study will be updated.	Copy of updated load study	B. J. Gray	12/19/02	NA
02-ESD-0032-DNFSB-4.2	FH will develop a plan to update the Hanford plant load flow, short-circuit, and breaker coordination study for other FH managed facilities during FY-03.	Copy of load study update plan for specified FH facilities	B. J. Gray	7/31/02	Performance to schedule in the update plan.
02-ESD-0032-DNFSB-5	Establish data sheets in the PFP diesel-generator test procedure for recording load data.	Copy of revised procedure	B. J. Gray	complete	Diesel generators meet required parameters

No	Description	Deliverable	Responsible Actionee	Planned Completion Date/Status	Performance Measurement/Effectiveness Verification
02-ESD-0032-DNFSB-6.1	Evaluate the significance of the steam driven exhaust fans relative to the facility Safety Analysis Report and submit the requisite page changes to DOE as needed.	Copy of revised SAR and OSR documents	L. F. Perkins	9/30/02	NA
02-ESD-0032-DNFSB-7.1	An Unreviewed Safety Question Evaluation will be performed for the condition of non-safety loads on safety significant busses and appropriate resulting actions taken. RL will evaluate the applicability of IEEE 384 and other electrical related standards referenced by DOE Order 420.1, and its associated Guides, for general applicability to new construction activities and existing facilities with an extended mission life. The electrical standards selected, and their applicability to RL facilities, will be incorporated in the Flour Hanford Implementation Plan for DOE O 420.1 currently being developed.	Copy of USQ evaluation	B. J. Gray/J. W. Todd	7/31/02	NA
02-ESD-0032-DNFSB-7.2	FH, in conjunction with DOE-RL, will evaluate and determine if Distributed Control System electrical and software separation is required for safety significant loads. Results of this determination will be used to establish a path forward for FH facilities.	Copy of Evaluation Results.	B. J. Gray/J. W. Todd	7/31/02	Establish if any additional contractual direction by RL is required.

No	Description	Deliverable	Responsible Actionee	Planned Completion Date/Status	Performance Measurement/Effectiveness Verification
02-ESD-0032-DNFSB-8.1	The programmable logic controller software will be entered into the current software configuration control database maintained by LMSI.	Copy of data base entry	L. F. Perkins	7/31/02	NA
02-ESD-0032-DNFSB-8.2	Review project software documentation for Project W-460 to determine gaps for compliance with FH software requirements.	Copy of gap analysis results	L. F. Perkins	7/31/02	NA
02-ESD-0032-DNFSB-8.3	Establish required software controls documentation to fill identified gaps as required by HNF-PRO-309/2778	Matrix establishing that all required documentation has been provided.	L. F. Perkins	7/31/02	Conduct an independent assessment to verify compliance with software requirements.
02-ESD-0032-DNFSB-8.4	FH, in conjunction with DOE-RL, will evaluate and determine if failure design methodology should be applied to design of instrumentation and control systems designated as safety-significant. Results of this determination will be used to establish a path forward for FH facilities.	Copy of Evaluation results.	L. F. Perkins/J. W. Todd	7/31/02	Establish if any additional contractual direction by RL is required.
02-ESD-0032-DNFSB-9	FH, in conjunction with DOE-RL, will evaluate and determine the best hazard analysis for "Other than Important to Safety" equipment. Results of this determination will be used to establish a path forward for FH facilities.	Copy of evaluation results	Perkins/Todd	7/31/02	Establish if any additional contractual direction by RL is required.

No	Description	Deliverable	Responsible Actionee	Planned Completion Date/Status	Performance Measurement/Effectiveness Verification
02-ESD-0032-DNFSB-10.1	Conduct a briefing with maintenance, surveillance, and engineering personnel on prompt evaluation and correction of abnormal conditions.	Copy of key points discussed and rosters of personnel briefed.	B. J. Gray	7/31/02	Conduct a management assessment of round sheets with a focus on evaluation and correction of abnormal indications.
02-ESD-0032-DNFSB-10.2	Remove current indication from MICON Plant Distributed control System using the USQ process.	Copy of USQ evaluation.	B. J. Gray/J. W. Todd	complete	RL to verify adequacy of USQ evaluation.
02-ESD-0032 DNFSB-11	RL will assess FH's performance in field implementation of the scheduled corrective actions and ensure appropriate measures are in place to continually monitor performance. RL will perform an assessment with sufficient scope to verify completion of the corrective actions, to ensure FH's corrective actions are implemented in programs and operations, and to verify performance is meeting expectations.	RL letter to EM-1 documenting completion of corrective actions.	J. W. Todd	1/1/03	RL will conduct a management self-assessment and track issue resolution accordance with RIMS procedures.