REVISED 09/03/10

July 29, 2010

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	Docket Nos. 50-282-LR
Northern States Power Co.	)	50-306-LR
	)	
(Prairie Island Nuclear Generating Plant, Units 1 and 2)	)	ASLBP No. 08-871-01-LR

TESTIMONY OF SCOTT D. NORTHARD, KURT W. PETERSEN AND ED M. PETERSON II ON SAFETY CULTURE CONTENTION

I. WITNESS BACKGROUND

Scott D. Northard ("SDN")

Q1. Please state your full name.

A1. (SDN) My name is Scott D. Northard.

Q2. By whom are you employed and what is your position?

A2. (SDN) I am employed by Northern States Power Company, a Minnesota corporation ("NSPM") as Recovery Manager – Prairie Island.

Q3. Please summarize your educational and professional qualifications.

A3. (SDN) I have more than thirty years of experience in the nuclear power plant industry, including positions as Plant Manager, Regulatory Affairs Manager, Nuclear Safety Assurance Manager, Business Support Manager, Site Engineering Director, Director Asset Management, and Manager Nuclear Projects. My areas of concentration have included the development and implementation

of plans for improving nuclear power plant safety culture and operational performance.

I earned a Bachelor of Science degree in Nuclear Engineering from the University of Wisconsin in Madison. My formal training on nuclear issues includes attending the Institute of Nuclear Power Operations ("INPO") Senior Nuclear Plant Manager Course, and completing the Nuclear Management Development Course at the University of Minnesota Carlson School of Management. I am also a graduate of the Kellogg School of Management Executive Development Program and also obtained and held a NRC senior reactor operator license at the Prairie Island Nuclear Generating Plant ("PINGP").

A copy of my resume is included as Exhibit 1 (NSP 000019) to this testimony.

Kurt W. Petersen ("KWP")

Q4. Please state your full name.

A4. (KWP) My name is Kurt W. Petersen.

Q5. By whom are you employed and what is your position?

A5. (KWP) I am employed by NSPM as the Business Support Manager responsible for the corrective action program at PINGP.

Q6. Please summarize your educational and professional qualifications.

A6. (KWP) I have substantial experience in the management of the corrective action programs at commercial nuclear power stations. This experience includes implementation of 10CFR50 Appendix B compliance programs, Human Performance Improvement Programs, and related plant performance assessment and improvement programs, having performed management level

work in these areas at the Turkey Point Nuclear Generating Units 3 and 4 and at PINGP. I have also occupied other positions in the electric utility industry including Senior Fuel Coordinator and Site Superintendent. In the nuclear industry, I have held various positions including Lead Production Supervisor and several positions of increasing responsibility in the maintenance area (Work Week Manager, Maintenance Supervisor, Operations Command Center Maintenance Manager, and head of Maintenance Training).

I received a Bachelor of Science degree from Florida Institute of Technology in 1980 and, the following year, completed all courses except the Senior Seminar towards a Bachelor of Science Degree in Mechanical Engineering from Florida International University. In addition, I received a Management Senior Reactor Operators certification in January 2000 and completed a company sponsored Supervisory Development Academy in August 2005.

A summary of my professional experience is included as Exhibit 2 (NSP00020) to this testimony.

Edward M. Peterson II ("EMP")

Q7. Please state your full name.

A7. (EMP) Edward M. Peterson II.

Q8. By whom are you employed and in what capacity?

A8. (EMP) I am employed as Ombudsman by the Wolf Creek Nuclear Operating Company.

Q9. Please summarize your educational and professional qualifications.

A9. (EMP) I have thirty-three years of experience in quality assurance ("QA") related oversight of both the construction and operation phases of nuclear power plants. My experience includes 26 years of work for Wolf Creek Nuclear Operating Company as Ombudsman, Quality Administrator, Operations QA Supervisor, Operations QA Auditor, and Quality Control Supervisor at the Wolf Creek Generating Station. I was previously employed by Daniel International Corporation as Senior Quality Engineer Supervisor at Wolf Creek; by Bechtel Power Corporation as Quality Control Engineer at the South Texas Project; by Brown and Root Inc. as Mechanical Quality Engineer – Documents Supervisor, also at the South Texas Project; and by Daniel International Corporation as Mechanical and Civil Quality Control Inspector at the Wolf Creek Generating Station.

My education includes a Bachelor of Science Degree in Human Resources Management from Friends University in 1995. I am also a Certified Lead Auditor and held a Level II QC Inspector certification in the civil, mechanical, and welding areas.

In addition, I have been actively involved in 13 safety culture assessments since October 2007. Of those, I was site host for two assessments at Wolf Creek, participated as a team member on five assessments, and was team leader on six assessments. The safety culture assessment team is composed of peers from different plants and members from the site being evaluated. In my current capacity as Alternate Team Leader for the Utilities Service Alliance, Nuclear Safety Culture Assessment ("NSCA") II Project Team, I oversee safety culture assessments and support the project team with coordination, maintenance, and improvements to the NSCA process. As part of the process, we take assessment requests from plants, develop a team roster from volunteers within

the industry to support the assessments, and schedule and perform the assessments. The project team coordinates the conduct of surveys and interviews based on NSCA methodology, which in turn was developed to be consistent with INPO's Principles and Attributes of a Strong Nuclear Safety Culture and Nuclear Energy Institute ("NEI") document NEI 09-07, Fostering a Strong Nuclear Safety Culture. We also continue to coordinate our methodology with industry groups such as NEI and INPO, in conjunction with the NRC. Finally, I have been an active participant in two of the three completed NEI 09-07 pilot assessments on further development of the NSCA procedures, serving as team lead on one of such assessments.

A copy of my resume is included as Exhibit 3 (NSP000021) to this testimony.

II. PURPOSE OF TESTIMONY

Q10. What is the purpose of your testimony?

A10. (SDN, KWP, EMP) The purpose of our testimony is to address the Safety Culture Contention submitted by the Prairie Island Indian Community ("PIIC") in this proceeding. As admitted by the Atomic Safety and Licensing Board ("Board"), the Safety Culture Contention reads:

> PINGP's safety culture is not adequate to provide the reasonable assurance required by 10 C.F.R. § 54.29(a)(1) that PINGP can manage the effects of aging during the requested period of extended operation.
>
> Order (Narrowing and Admitting PIIC's Safety Culture Contention) (Jan. 28, 2010), slip op. at 14.

Q11. What is your understanding of the safety culture deficiencies that PIIC alleges exist at PINGP?

A11. (SDN, KWP, EMP) PIIC claims that several White findings made by the U.S. Nuclear Regulatory Commission ("NRC") in regard to PINGP, the identification of a substantive crosscutting issue in the area of human performance, concerns identified by NRC inspectors with NSPM's Corrective Action Program ("CAP"), and the failure of the applicant to address the potential damage to the containment integrity resulting from refueling cavity leaks, are indicative of a weak safety culture at PINGP.

Q12. What aspects of the Safety Culture Contention will you address in your testimony?

A12. (SDN) I will address two aspects of the operating experience of PINGP that have been cited by PIIC as indicative of the existence of a weak safety culture at the plant: (1) the issuance of "White" Findings by the NRC against PINGP with respect to radioactive material shipment deficiencies (both PINGP units), improper valve positioning (Unit 1), and design of the component cooling water system (Unit 2); and (2) the response to "crosscutting" issues in the area of Human Performance. I will also address, more generally, how the various issues that have been raised by PIIC relate to the state of safety culture at PINGP and what actions have been taken by NSPM to evaluate and improve the safety culture at the plant.

(KWP) I will address PIIC's claim that there are concerns with the Corrective Action Program ("CAP") at PINGP that are indicative of the existence of a weak safety culture at the plant.

(EMP) I will describe the results of an assessment of safety culture at PINGP performed in June 2010 by a team of

independent and PINGP experts under my direction, and discuss how they relate to PIIC's contention.

III. DEFINITION AND CHARACTERISTICS OF SAFETY CULTURE

Q13. What is Safety Culture?

A13. (EMP) Safety Culture is defined by the NRC, in a proposed safety culture policy statement ("Draft Safety Culture Policy Statement: Request for Public Comments"), 74 Fed. Reg. 57,525, 57,526 (November 6, 2009) as "that assembly of characteristics, attitudes, and behaviors in organizations and individuals, which establishes that as an overriding priority, nuclear safety and security issues receive the attention warranted by their significance." INPO has a similar definition of safety culture: "An organization's values and behaviors – modeled by its leaders and internalized by its members – that serve to make nuclear safety an overriding priority."

Q14. Is there any NRC or nuclear industry guidance on the characteristics and attitudes that denote the safety culture of an organization?

A14. (EMP) Yes. In the same draft policy statement, the NRC lists (74 Fed. Reg. at 57,528) the following characteristics as being indicative of a positive safety culture:

> • Personnel demonstrate ownership for nuclear safety and security in their day-to-day work activities by, for example, ensuring that their day-to-day work activities and products meet professional standards commensurate with the potential impacts of their work on safety and security. They proceed with caution when making safety- or security-related decisions and question their assumptions, especially when faced with uncertain or unexpected conditions, to ensure that safety and security are maintained.
>
> • Processes for planning and controlling work ensure that individual contributors, supervisors, and work groups communicate, coordinate, and execute their work activities

in a manner that supports safety and security. For example, individuals and work groups communicate and cooperate during work projects and activities to ensure their actions do not interact with those of others to adversely affect safety or security. In addition, managers and supervisors are accessible to oversee work activities, including those of contractors or vendors, and they challenge work activities and work products that do not meet their standards.

• The organization maintains a safety conscious work environment in which personnel feel free to raise safety and security concerns without fear of retaliation. For example, claims of harassment, intimidation, retaliation, and discrimination are investigated consistent with the regulations regarding employee protection. If an instance of harassment, intimidation, retaliation, or discrimination for raising a safety or security concern is identified, corrective actions are taken in a timely manner.

• The organization ensures that issues potentially impacting safety or security are promptly identified, fully evaluated, and promptly addressed and corrected, commensurate with their significance.

• The organization ensures that the personnel, equipment, tools, procedures, and other resources needed to assure safety and security are available. For example, training is developed and implemented or accessed to ensure personnel competence. Procedures, work instructions, design documentation, drawings, databases, and other job aids and reference materials are complete, accurate, and up-to-date.

• The organization's decisions ensure that safety and security are maintained. For example, production, cost, and schedule goals are developed, communicated, and implemented in a manner which demonstrates that safety and security are overriding priorities.

• Roles, responsibilities, and authorities for safety and security are clearly defined and reinforced. For example, personnel understand their roles and responsibilities in maintaining safety and security. Programs, processes, procedures, and organizational interfaces are clearly defined and implemented as designed. Leaders at all levels

of the organization consistently demonstrate that safety and security are overriding priorities.

• The organization maintains a continuous learning environment in which opportunities to improve safety and security are sought out and implemented. For example, individuals are encouraged to develop and maintain current their professional and technical knowledge, skills, and abilities and to remain knowledgeable of industry standards and innovative practices. Personnel seek out and implement opportunities to improve safety and security performance.

In addition to the NRC's draft policy statement, NRC Inspection Manual Chapter ("IMC") 0305, which governs the Reactor Oversight Process (Exhibit 20 (NSP000038)), identifies a number of safety culture components:

Problem Identification & Resolution (PI&R)

P1. Corrective Action Program

P2. Operating experience

P3. Self- and Independent Assessments

Human Performance

H1. Decision-Making

H2. Resources

H3. Work Control

H4. Work Practices

Safety Conscious Work Environment

S1. Environment for Raising Concerns

S2. Preventing, Detecting, and Mitigating Perceptions of Retaliation

Other Safety Culture Components

D1. Accountability

D2. Continuous learning environment

D3. Organizational change management

D4. Safety policies

Exhibit 20 (NSP000038), Appendix A.

INPO also has developed a set of standards on behalf of the nuclear industry called the "Principles for a Strong Nuclear Safety Culture" ("INPO Principles") which are used throughout the industry to perform independent assessments of safety culture at operating reactors in the United States. Although worded somewhat differently, the INPO Principles have a close correlation with the Safety Culture Components defined by the NRC. The INPO Principles are:

> Principle 1. Everyone is personally responsible for nuclear safety.
>
> Principle 2. Leaders demonstrate commitment to safety.
>
> Principle 3. Trust permeates the organization.
>
> Principle 4. Decision-making reflects safety first.
>
> Principle 5. Nuclear technology is recognized as special and unique.
>
> Principle 6. A questioning attitude is cultivated.
>
> Principle 7. Organizational learning is embraced.
>
> Principle 8. Nuclear safety undergoes constant examination.

Exhibit 4 (NSP000022) at 1.

Both IMC 0305/IMC 310 and INPO define attributes and behaviors that expand on the safety culture components and principles. Exhibit 4 (NSP000022) provides a comparison between the two sets of attributes and behaviors.

IV. SAFETY CULTURE PROGRAMS AT PINGP

Q15. What has been your involvement with safety culture issues at PINGP?

A15. (SDN) I became involved with safety culture issues at PINGP when I became the head of the Performance Recovery Plan in March 2009. I have remained the plant official principally

responsible for safety culture improvement initiatives since that time.

(KWP) I was the Performance Assessment Supervisor responsible for the administration of the CAP program at PINGP from May 2006 until August 2009. Since that time, I have remained responsible for the management oversight of the CAP at PINGP. I was the team lead for NSPM's Focused Self Assessment of the CAP's effectiveness in January 2009, and also led the actions taken to address the results of the NRC 71152 inspection in August 2009.

Q16. Please describe NSPM's commitment to safety.

A16. (SDN) Safety is a core value of PINGP, to which NSPM is absolutely committed. This fundamental commitment is reflected in our nuclear organization's statement of Vision, Mission and Values:

> Vision: Work together to provide safe, reliable and cost effective nuclear energy for the communities we serve.
>
> Mission: Foster a learning environment that promotes safe operations, continually enhances operational performance, promotes accountability for strong financial stewardship and demonstrates leadership within the nuclear industry and the communities we serve.
>
> Values: Maintain a defense in depth strategy to protect employees, the public, and the environment from the inherent nuclear, radiological, environmental and industrials safety risks associated with operations. Be honest, ethical, and accountable, treating people with respect as we work toward our common goals.

Exhibit 5 (NSP000023) (Nuclear 2010 Business Plan Overview).

In every one of these principles, safety is first. NSPM's commitment to safety is also reflected and demonstrated in its sustained performance. NSPM has 112 reactor years of safe reactor operating experience.

Q17. How does NSPM instill this commitment to safety?

A17. (SDN) NSPM instills this commitment to safety in its employees and at its nuclear plants through its policies, programs, and training at every level. At the highest level, Corporate Policy CP 0017 – Nuclear Safety Culture and Risk Management Principles (Exhibit 6 (NSP000024) hereto) identifies the essential attributes of a healthy nuclear safety culture with the goal of creating a framework for open discussion and continuing evolution of safety culture. This policy adopts and incorporates the Principles established by the INPO:

- Nuclear safety is everyone's responsibility
- Leaders demonstrate commitment to safety
- Trust permeates the organization
- Decision making represents safety first
- Nuclear is recognized as "different"
- A "what if" approach is cultivated
- Organizational learning is embraced
- Nuclear Safety undergoes constant examination

(Exhibit 6 (NSP000024) at 1).

This same Corporate Policy establishes core risk management principles:

- Nothing is routine
- Take the time to challenge uncertainty
- Risk significant activities will be made visible
- Risk activities will be planned, challenged, and controlled
- No risk option – first choice
- Prioritization to minimize operational challenges

Id. at 2.

Further, the Corporate Policy sets forth NSPM's expectations for a safety conscious work environment ("SCWE"), which are that:

- Workers at NSPM have the responsibility to ensure that they promptly raise nuclear safety concerns
- NSPM has the obligation to provide the following:
    - A work environment that encourages workers to raise concerns without a fear of retaliation
    - Efficient methods and options for raising concerns
    - Appropriate safety conscious work environment information to workers
- NSPM will not tolerate acts of harassment, intimidation, retaliation, or discrimination toward workers that raise concerns.

Id.

Q18. Who is responsible for implementing this Corporate Policy?

A18. (SDN) All of NSPM's nuclear employees. NSPM Officers and Site Vice Presidents are responsible for promoting, cultivating, and assessing the nuclear safety culture at their sites and within

NSPM. NSPM nuclear employees are expected to follow the risk management principles, to demonstrate risk management behaviors, to promptly raise nuclear safety concerns, and to treat nuclear safety as their primary responsibility.

Q19. What are the programs that NSPM implements to instill a commitment to safety in its employees and at its plants?

A19. (SDN) There are numerous programs that NSPM implements to instill the commitment to safety. One such program, established by Corporate Directive 3.4 (Exhibit 7 (NSP000025)), is the Picture of Xcellence. The Picture of Xcellence is a model for changing and sustaining workforce behaviors through a union of management structure, procedures, and process that result in continuous performance improvement. It uses integrated plans that drive workforce behaviors and structured meetings to monitor performance and provide practical feedback, recognizing that individual behaviors
can have an impact on organizational success.

The Picture of Xcellence is based on the premise that performance of any organization is the result of the behaviors exhibited by the individuals who make up the organization. Sustained good performance requires daily good behaviors. The Picture of Xcellence provides the structure to develop and sustain a work environment that provides repeatable behaviors resulting in excellence. This work environment requires establishing and maintaining the following four principles:

- Select and retain the Right People in the Right Jobs
- Communicate and Enforce the Right Picture
- Verify effective implementation of the Right Processes

- Provide the Right Management Coaching and ensure effective Employee Engagement

Exhibit 7 (NSP000025) at 5-6.

Q20. What is meant by the "Right Picture"?

A20. (SDN) The Right Picture is an accurate perspective of excellence with regard to the standards applied to conduct NSPM's business. Having that perspective on the high standard of excellence gives an individual and the organization a benchmark from which to measure their own performance. Getting the Right Picture is achieved by:

- Clearly and credibly communicating the right expectations
- Modeling the right behaviors
- Understanding and demonstrating the right performance
- Understanding and aligning with the right vision, goals, strategy and plan
- Demonstrating the right passion
- Providing timely and effective performance feedback

Id. at 20.

Q21. How is the Picture of Xcellence process structured?

A21. (SDN) The Picture of Xcellence is organized by pillars: Nuclear Xcellence, Organizational Xcellence, Training Xcellence, and Equipment Xcellence. Each pillar is described in terms of attributes which characterize the pillar and the behaviors which define those attributes. In addition, each pillar contains objective performance measures, developed based upon benchmarking nuclear industry leaders, which are used to measure progress or the need for improvement.

Q22. Would you give an example of the attributes and behaviors identified for a pillar?

A22. (SDN) As an example, the Operational Xcellence Pillar is characterized by the following attributes and behaviors:

Operational Xcellence Attributes	**Defined Behavior**
Safety	• Make operational decisions based on safety as our highest priority • Make risk-informed decisions • Use procedures that are technically accurate, easily understood, and consistently used • Eliminate work-arounds and operator challenges
Configuration Control	• Link all work activities to improving plant performance • Understand and operate plants within design basis
Teamwork	• Hold ourselves accountable to the highest industry standards • Be our own toughest critic

Exhibit 7 (NSP000025) at 8.

Q23. How are the results of this program measured and communicated?

A23. (SDN) The program includes a number of "forcing functions" to apply the Picture of Xcellence to our work activities, making it the responsibility of every employee to "coach and engage" other employees toward improving site performance. For example, meetings are conducted at the fleet, site, and individual level to ensure alignment with the Picture of Xcellence, to reinforce expectations, and to ensure appropriate resource allocations. One such type of meeting is the daily "D-15" meetings that are held between the members of each department and their front line supervisor to review identified focus areas, discuss the results of the Picture of Xcellence, and reinforce appropriate behaviors. An example of the daily D-15 meeting results, as reported in the

PINGP daily "Team Notes," is provided in Exhibit 8 (NSP000026).

The Picture of Xcellence also focuses on individual Xcellence, identifying a set of performance measures, actions that are necessary as enablers of excellence, a Human Performance Observation Program, and a set of Human Performance Tools. Collectively, these activities comprise NSPM's Human Performance Program.

Q24. Please describe NSPM's Human Performance Program.

A24. (SDN) The Human Performance Program, governed by Fleet Procedure FP-PA-HU-01 (Exhibit 9 (NSP000027)) encompasses a number of activities, which include 1) regular meetings of a human performance improvement team ("HUIT") consisting of members from key departments to discuss human performance trends and corrective actions and monitor performance efforts; 2) a human performance improvement plan, prepared by the HUIT; 3) requirements for each organization to promote appropriate culture and create a learning organization; 4) training and coaching to promote error prevention; 5) a human performance event identification and investigation process; 6) communication of human performance information; and 7) recognition of good human performance practices, including individual recognition and lessons learned.

An important element of the Human Performance Program is NSPM's Human Performance Observation Program, governed by Fleet Procedure FP-PA-HU-03 (Exhibit 10 (NSP000028)). The purpose of this program is to promote a leadership presence in the field on a regular basis to demonstrate the high level of commitment toward improving human performance by

establishing, communicating and reinforcing clear expectations for behavior, continuous improvement, appropriate policies, efficient and effective processes, and common values. Under this program, leadership teams conduct observations of selected activities in the field on a monthly basis, followed by timely coaching and feedback to promote continuous performance improvement and reinforce use of the Human Performance Tools. The program is designed to contribute to a robust safety culture, enhance direct management involvement in site activities, improve management awareness of strengths and areas for improvement, and allow for reinforcement of expectations and standards.

Q25. You have mentioned NSPM's Human Performance Tools. Could you describe them?

A25. (SDN) NSPM's Human Performance Tools, contained in Fleet Procedure FP-PA-HU-02 (Exhibit 11 (NSP000029)), establish a specific set of practices for individuals and a specific set of practices for supervisors that are intended to reduce errors. The basic purpose of these tools is to help the individual worker maintain positive control of a work situation – that is, "Do the job right the first time." A pocket sized summary of the information from this procedure is provided as the Human Performance Handbook for use in the field.

Q26. What other programs are in place at PINGP to assure that a strong safety culture exists at the plant?

A26. (SDN) There are a number of other programs in place that assure that strong nuclear safety culture is maintained at PINGP. These programs include the Employee Concerns Program (Exhibit 12 (NSP000030)), the Differing Professional Opinions program and the PEACH process (Exhibit 6 (NSP000024) at 7), the Corrective

Action Program (described by Kurt Petersen later in this testimony), and the use of periodic Safety Culture Surveys and other assessment tools.

The Employee Concerns Program ("ECP") is a program that supports a Safety Conscious Work Environment by providing site workers with an alternative and independent avenue for raising nuclear safety concerns (as well as workplace concerns), which they may do anonymously if they wish. The ECP program ensures that the issues are addressed in a timely, effective, respectful, objective and technically intrusive manner regardless of the source of that issue, and the members of the ECP organization serve as advocates for issue resolution. If an employee is dissatisfied with the resolution of a nuclear safety concern, or feels that an unresolved nuclear safety concern exists, he or she may appeal the findings of the ECP investigation to NSPM's Chief Nuclear Officer. The Differing Professional Opinions program and the PEACH process are additional means whereby employees may bring issues forward for resolution. Of course, any PINGP employee is free to bring any concern to the NRC's attention.

Taken together, these programs and tools promote a strong safety culture in all aspects of PINGP's operations.

In addition, these programs have been augmented since December 2009 with initiatives that address a substantive cross-cutting issue in the area of human performance identified by the NRC last year. I will describe these programs later on in my testimony.

Q27. Is awareness of these safety culture programs part of employee training?

A27. (SDN) Yes. All employees are provided training on maintaining a strong safety culture at PINGP. General Access Training, which

is provided to all new employees and is conducted annually for all current employees, includes safety culture and the various programs that serve to enhance it as one of the training topics. Classroom training is used for the new employee training, and computer-based training is utilized for the annual requalification. Each course requires that the employee take a knowledge test on the topic, with a minimum 80% of the answers needing to be answered correctly in order to pass the test. Finally, Safety Conscious Work Environment training is provided annually to the plant employees; this training summarizes all the safety culture programs described above.

Q28. In what other ways are the safety culture programs communicated to the PINGP personnel?

A28. (SDN) Information on the safety culture programs is posted on bulletin boards throughout the plant, and is included on the Prairie Island home page, creating easy and continued access to them. Numerous posters are hung in hallways, conference rooms, training rooms, and other common spaces, emphasizing safety culture and human performance tools. These posters include, for example, the Risk Management Principles, the Risk Management Behaviors, and the Principles for a Strong Nuclear Safety Culture. These posters also emphasize the various methods that can be used to report workplace concerns. Newsletters, such as the Team Notes covering the daily D-15 meetings, continually reinforce appropriate safety culture and behavior.

V. NRC WHITE FINDINGS

Q29. What is a White finding?

A29. (SDN) When the NRC performs an inspection of an operating reactor, any discrepancies that are found are evaluated and given a color designation based on their safety significance. Green

inspection findings indicate a deficiency in licensee performance that has very low risk significance and therefore has little or no impact on safety. Green inspection findings allow for licensee initiatives to correct performance issues before increased regulatory involvement is warranted. White, Yellow, or Red inspection findings each, respectively, represent a greater degree of safety significance, resulting in a corresponding increase in regulatory attention. White findings are findings of low to moderate safety significance. Exhibit 13 (NSP000031) (IMC 0612 at 4). The significance of findings in colors other than Green is associated with the potential risk that the condition will result in an increased core damage frequency (ΔCDF). Performance deficiencies having a ΔCDF in a risk range of greater than one in a million (10^{-6} ΔCDF) are assigned the colors White (10^{-6} to 10^{-5}), Yellow (10^{-5} to 10^{-4}), or Red (>10^{-4}) for assessment purposes.

Q30. What is the result of having a White finding assessed against an operating nuclear power plant?

A30. (SDN) The NRC determines its regulatory response in accordance with an Action Matrix that provides for a range of actions commensurate with the significance of the inspection results. Findings "greater than Green" trigger increased regulatory attention. If a plant has all inspection findings characterized as Green, it will be listed in the "Licensee Response Column" of the Action Matrix and the NRC will implement its baseline inspection program, typically consisting of approximately 2,700 inspection hours a year per site. For plants that do not have all Green inspection findings, the NRC will perform additional inspections beyond the baseline program and initiate other actions commensurate with the safety significance of the issues. As

stated above, White findings have the least safety significance of the greater than Green findings, being classified as having "low to moderate" significance.

Q31. What White findings have been assessed against PINGP in the last three years?

A31. (SDN) There have been three White findings since January 2008. First, on July 31, 2008, both Unit 1 auxiliary feedwater pumps ("AFW Pumps") auto-started following a Unit 1 reactor trip. One of the pumps, the 11 turbine-driven auxiliary feedwater pump, tripped 42 seconds later. A subsequent investigation found that the instrument manifold isolation valve for the discharge pressure switch was out of position (closed instead of open), which caused the pump to trip on a low discharge pressure. This occurrence resulted in a White finding against Unit 1.

Second, on October 29, 2008, NSPM shipped nuclear fuel inspection tooling containing radioactive material that was not adequately surveyed or packaged to assure that, under conditions normally encountered with over-the road transportation, the radiation level on the external surface of the package would not exceed allowable limits set in the U.S. Department of Transportation regulations for radioactive material shipments. This resulted in a White finding against both Units 1 and 2.

Third, on July 31, 2008, NSPM identified that a failure of a Unit 1 or a Unit 2 turbine building high energy line could impact the continued operability of the Unit 2 component cooling water ("CCW") system. This condition rendered the Unit 2 CCW system inoperable because a high energy line break could cause a complete loss of CCW inventory, if the CCW piping was severed.

This condition resulted in a White finding being assessed against Unit 2.

Q32. Has the existence of the conditions resulting in these White findings compromised the overall safe operation of PINGP?

A32. (SDN) No. In its Annual Assessment letter for the calendar year 2009 (Exhibit 14 (NSP000032)) the NRC, while making reference to these White findings, concluded: "Overall, Prairie Island Nuclear Generating Plant, Units 1 and 2, operated in a manner that preserved public health and safety and fully met all cornerstone objectives." Exhibit 14 (NSP000032) at 1.

A. MISPOSITIONED MANIFOLD ISOLATION VALVE SWITCH

Q33. Was a root cause evaluation performed of the AFW trip event?

A33. (SDN) Yes. A comprehensive evaluation was made, and a Root Cause Evaluation (RCE) Report, RCE 01146005, 11 Turbine-Driven Auxiliary Feedwater Pump Discharge Pressure Switch Manifold Isolation Mispositioning (Exhibit 15 (NSP000033)), was prepared and issued.

Q34. Please summarize the evaluation's findings.

A34. (SDN) The evaluation determined that an I&C technician or plant operator erroneously operated the manifold block isolation valve for Pressure Switch PS-17700 (11 TDAFWP Lo Discharge Pressure Trip Pressure Switch). During that time period, there were seven surveillance procedures completed that operated valves in the vicinity of the PS-17700 manifold isolation valve. These valves are identical in design to the PS-17700 manifold valve and are in close proximity to the valve. There were no steps in these procedures to check the position of PS-17700 manifold

isolation valve because none of the procedures calls for operating this valve.

The Technical Specification required checking the functionality of PS-17700 during every refueling outage. This check was completed during 1R25. However, the PS-17700 manifold isolation valve had insufficient configuration controls, for it did not have a locking device. Also, the valve was not included in the equipment database, the complete valve lineups, or relevant drawings, and was not provided with an identification label. For that reason, the inappropriate manipulation of the pressure switch was not prevented or detected. Thus, the root cause of the event was identified as inadequate configuration controls for components that have the potential to adversely impact the design function of safety-related structures, systems and components.

Q35. Were there any programmatic implications to this event?

A35. (SDN) NSPM's investigation revealed no programmatic concerns with respect to the safety culture at Prairie Island. On the other hand, several human performance deficiencies were identified, including: (1) the operator's failure to pay adequate attention to the valve manipulations he was performing; (2) the existence of multiple, unlabeled block valves in close proximity; (3) a potentially confusing layout of the discharge pressure switch and the suction pressure gauge in that the manifold for these components is not located below the associated piece of equipment, as it typically is with other components of this type, and (4) the requirement to unisolate the suction pressure gauge to take a reading, then re-isolate the gauge.

Q36. Why are these human performance deficiencies not indicative of a weak safety culture?

A36. (SDN) Because upon review of all elements of the event, it was determined that the event was the result of poor human factors involving the instrument sensing line, which propitiated the failure. In addition, it was an isolated, self-revealing event that was promptly corrected and effectively addressed.

Q37. What actions were taken to address the valve mispositioning event?

A37. (SDN) NSPM took several actions to prevent the event's recurrence. Those actions included revision of site configuration control procedures to put in place correct configuration control methodologies. Also, a project team was formed to evaluate all safety-related systems to determine if there are other components that, if mispositioned, might prevent a safety-related system from performing its design function. The type of component for which the mispositioning occurred (level "B" components) has been included in the equipment database and drawings, and locking devices have been installed in those components.

Also, level B components have been labeled in the field. This was a significant effort, because many original plant components had never been labeled. A large number of temporary and permanent tags were attached as components which were identified in the course of plant operation. Over two thousand manifold valves are now newly labeled with permanent valve tags.

While these actions were implemented, interim measures were taken to mitigate the configuration control issue by installing locking devices on all of the Auxiliary Feed Water system discharge and suction pressure switch manifold isolation valves.

More generally, NSPM formed a cross-functional team under my supervision in March 2009 to develop a comprehensive

Performance Recovery Plan to address performance issues at the plant and improve station human performance.

Q38. Was the NRC made aware of the valve mispositioning event?

A38. (SDN) Yes. The event was promptly reported to the NRC and on January 27, 2009 the agency issued a final risk determination and finding that concluded that the event should be classified as a White finding. Once the root cause evaluation report RCE 01146005 (Exhibit 15 (NSP000033)) had been prepared and submitted to the NRC, the NRC conducted an inspection to examine the analysis performed by NSPM and the corrective actions to prevent recurrence that had been taken.

Q39. What was the result of the NRC's inspection?

A39. (SDN) In Supplemental Inspection Report 05000282/2009011 issued on October 15, 2009 (Exhibit 16 (NSP000034)), the NRC noted that a plant component labeling, blocking and locking program had been initiated to address the configuration control issue, and that NSPM had a Performance Recovery Project underway to broadly address performance issues at the plant. The NRC judged these actions to be an acceptable way of addressing the valve mispositioning issue and removed the White finding on that basis.

B. RADIOACTIVE MATERIAL TRANSPORTATION

Q40. What events led to the issuance of a White finding with respect to the transportation of radioactive materials from the PINGP site?

A40. (SDN) On October 29, 2008, PINGP shipped contaminated fuel sipping equipment to a vendor in Pennsylvania following decontamination of the equipment after its removal from the spent fuel pool. The equipment was packaged by both NSPM and contractor staff and shipped in an open transport vehicle. Upon

receipt by the vendor, package surface dose rates were found to exceed applicable U.S. Department of Transportation ("DOT") limits, primarily due to a radioactive particle being embedded in the fuel sipping equipment, which was located near the outside wall of the shipping container. The fuel sipping equipment was found not to be properly braced or secured and shifted within the package during transport. Based on the results of a radiological risk assessment, a final significance determination for a White finding was issued by the NRC on May 6, 2009.

Q41. Did NSPM perform an evaluation of this incident?

A41. (SDN) Yes. NSPM conducted a root cause evaluation of the incident and issued a report, Root Cause Evaluation Report No. 01157726; Radioactive Material Shipment Exceeded DOT Limits (Exhibit 17 (NSP000035)).

Q42. What were the results of the root cause evaluation?

A42. (SDN) The evaluation made the factual determination that, during Unit 2's refueling outage in the fall of 2008, potentially degraded fuel assemblies were tested for cladding integrity with vendor fuel sipping equipment. That equipment was decontaminated, demobilized, and packaged for shipment back to the vendor. Upon receipt at the vendor's facility, elevated radiation levels were detected. Opening of the shipment package revealed that a small radioactive particle was embedded into the umbilical cable to the lid of the fuel sipping canister. The fuel sipping equipment (lid and umbilical cable) was found to be not properly braced, nor secured as required; apparently, the lid and the umbilical cable shifted from the time of the PINGP shipping package departure to its arrival at the vendor. Additionally, two other radioactive particles were detected inside the shipping box. These facts

indicated that the on-site radiological surveys prior to shipment were not sufficient for detecting highly radioactive small particles, and that the fuel sipping equipment was not properly braced nor secured in its package for shipment under conditions normally incident to transport.

Station procedures required that formal job planning be conducted before removing items from the spent fuel pool. However, this requirement was not fulfilled in this instance, thus there was not adequate planning and evaluation to assess the hazard and the potential radiological impact to the workers.

Q43. What were the root causes of this incident?

A43. (SDN) NSPM determined that the incident had two root causes: (1) inadequate procedures and methods to successfully evaluate, package and ship radioactive materials in accordance with NRC and DOT regulations; and (2) an inadequate risk management process leading to inadequate management oversight of the radioactive material shipment program. In addition, there was ineffective incorporation of industry operating experience into the radioactive material shipment program, and deficient training and certification programs for radiation protection personnel that perform shipment-related activities. Exhibit 17 (NSP000035) at 7.

Q44. What corrective actions were taken to address these deficiencies?

A44. (SDN) Corrective actions included the development of new shipping procedures and enhancement of existing ones, improvements to the training and qualification program for staff involved in shipment activities, and the implementation of an integrated risk management program to assure management engagement and adequate oversight of potentially risk-significant shipments.

Q45. What were the safety culture implications of this incident?

A45. (SDN) The root cause evaluation determined that several safety culture discrepancies contributed to the occurrence of this incident: there were human performance deficiencies in the areas of decision making, resource allocation, work control, and work practices. There was also insufficient consideration of operating experience with radioactive material shipment issues. Exhibit 17 (NSP000035) at 29.

Q46. What did NSPM do to address these identified safety culture issues?

A46. (SDN) Each of these safety culture issues was addressed in the corrective actions taken in response to this incident. For example, more active engagement by management in shipment activities, including required reviews for higher risk shipments, has been added to the program requirements. Also, appropriate training for workers involved in shipping activities is required and verified, and the use of specified radiation monitoring equipment is prescribed in the procedures. Finally, the Radiation Protection Manager's review of the plant staff's evaluation of shipping-related operating experience throughout the industry is mandated.

Q47. Was the NRC made aware of this event?

A47. (SDN) Yes. The event was promptly reported to the NRC and on May 6, 2009 the agency issued a final risk determination and finding that concluded that the event should be classified as a White finding applicable to both units. Once the RCE had been prepared and submitted to the NRC, the NRC conducted on December 4, 2009 an inspection to examine the analysis performed by NSPM and the corrective actions to prevent recurrence that had been taken.

Q48. What was the result of the NRC's inspection?

A48. (SDN) In Supplemental Inspection Report 05000282/2009015 and 05000306/2009015 issued on January 12, 2010 (Exhibit 18 (NSP000036)), the NRC reviewed the root and contributory cause analyses and corrective actions taken, which the NRC identified as including significant modification to existing procedures along with the development of new procedures, enhancements of the training and qualification program for staff involved in shipment activities, and the development of an integrated risk management process to ensure the proper level of management engagement in shipment- related activities. The NRC judged these actions to be an acceptable way of addressing the issue and removed the White finding on that basis.

C. CCW SYSTEM VULNERABILITY

Q49. What did the CCW System vulnerability issue involve?

A49. (SDN) The design of the Unit 2 component cooling water ("CCW") system, a safety-related system, includes piping routed through the turbine building. While the CCW system is safety-related, the particular CCW piping in the turbine building served only non-safety related loads. An evaluation by NSPM issued on July 31, 2008, identified that a failure of a turbine building high energy piping line could sever the adjacent CCW piping, thereby impacting the continued operability of the Unit 2 CCW system. An additional operability review determined that this scenario could cause a complete loss of CCW inventory, because operators might not have sufficient time to isolate the CCW piping in the turbine building from the portion of the CCW system that performs safety-related functions prior to the loss of suction to the operating component cooling pumps. NSPM also determined that the operators' ability to bring Unit 2 to a cold shutdown condition

following a high energy line break ("HELB") and a failure of the CCW system was adversely impacted.

Q50. What actions did NSPM take when this vulnerability was discovered?

A50. (SDN) Operations personnel immediately declared both trains of the Unit 2 CCW system inoperable and entered a Technical Specification requiring a Unit 2 shutdown. In the process of preparing to shut down the unit, operations personnel closed multiple CCW system manual isolation valves, isolating the non-safety related CCW piping in the turbine building from the rest of the system. That allowed the safety-related portion of the CCW system to be returned to an operable status, leaving the non-safety related CCW piping located in the turbine building isolated. The CCW piping in the turbine building has now been capped and is no longer used.

Q51. Was the NRC advised of this event?

A51. (SDN) Yes. The HELB vulnerability finding was promptly reported to the NRC, and on September 3, 2009 the agency issued a final risk determination that concluded that the condition should be classified as a White finding applicable to Unit 2.

Q52. Did NSPM perform a root cause evaluation of the condition?

A52. (SDN) Yes. NSPM performed such an evaluation and issued a report, RCE 01145695, "Component Cooling Piping Adjacent to HELB Location in Turbine Building," ("CCW RCE"), Exhibit 19 (NSP000037) hereto.

Q53. What were the findings of the root cause evaluation?

A53. (SDN) The CCW RCE evaluation determined that, while there were a number of analyses of HELB interaction events in the Auxiliary Building (where the safety-related piping for the CCW

is contained), no comparable analysis had been performed for the Turbine Building, even though the potential need for such an analysis had been identified several years earlier. From 2000 through 2008, several opportunities existed for the CCW/HELB interaction in the Turbine Building to be identified and referred to the Corrective Action Program. For a variety of reasons (including a lack of prioritization attributable in large measure to the non-safety related nature of the CCW piping in the Turbine Building and a failure to appreciate the possible effect of its failure on the balance of the system), those opportunities were missed. While the need to update the design was known, the site failed to properly prioritize it.

In July 2008, a walkdown of the CCW/HELB interaction was conducted and a Corrective Action Program document, CAP 01145695, was initiated. Under this new CAP, the site addressed operability issues related to a HELB event in the Turbine Building and their impact on CCW piping, which led to a fuller understanding of the significance of the issue.

The investigation concluded that a number of failures occurred at PINGP that prevented the site from ensuring measures were in place and actions were taken to maintain the safety-related functions of the CCW system during initiating events in the Turbine Building. The main failure was that the site did not address the issue through the rigorous identification and timely resolution of design basis deficiencies that might result from studies or analyses being conducted to update the design basis analyses. Exhibit 19 (NSP000037) at 6-8.

Q54. Were there any safety culture implications to the CCW design deficiency?

A54. (SDN) Yes. Weaknesses in the following Safety Culture components were identified as either root causes or contributing causes: human performance, work practices, management and supervisory oversight; problem identification and resolution; Corrective Action Program; complete, accurate and timely identification of issues; and systematic evaluation of relevant internal and external operating experience.

Q55. What is the meaning of these weaknesses?

A55. (SDN) The principal weaknesses involved in this incident were (1) the failure to update the original HELB analysis of the Turbine Building, and (2) the failure to properly assess and investigate comments in a vendor report that indirectly suggested that a safety concern may be posed by the design configuration in the building. With respect to the second weakness, there were statements from a draft study prepared by a vendor examining options to resolve cold chemistry laboratory piping issues which, if followed up through a detailed review, could have identified the CCW vulnerability. However, because this study was concerned with non-safety related modifications to the Turbine Building, it was not reviewed in a timely manner with a focus on potential plant operability issues.

Q56. What actions have been taken to address the design deficiency?

A56. (SDN) The piping line whose failure could affect CCW operability has been permanently disconnected from the Turbine Building and capped. A HELB design basis document and program document are being prepared and implemented. This effort will establish the HELB requirements at PIGNP and complete actions necessary to ensure the site is in compliance with the requirements. Also, the short term and long term

personnel resource requirements for sustainability of the HELB program have been established.

Q57. What did NSPM do to address the identified safety culture issues?

A57. (SDN) Many of the corrective actions recommended in the Root Cause Evaluation have already been implemented, and in so doing have addressed many of the Safety Culture weaknesses. For example, a timely review of project studies completed by vendors is now required, to ensure potential issues are reviewed for plant impacts. A new procedural requirement calls for the assignment of a Project Manager for all significant plant projects. The requirements and expectations for CAP initiation by Engineering have been strengthened. Human Performance training has been provided to Engineering using this issue as a specific example.

D. CURRENT STATUS OF WHITE FINDINGS

Q58. What is the current status of these three White findings?

A58. (SDN) All findings against Unit 1 have been resolved and the unit is back in the "Licensee Response Column," meaning that NSPM will be subject to only the NRC baseline inspection program, and identified deficiencies will be addressed through NSPM's corrective action program. Unit 2 remains in the Regulatory Response Column due to the above discussed White finding with respect to the CCW system. The NRC performed an inspection in June 2010 which identified that some additional extent of condition reviews are needed to ensure no additional HELB interactions exist for the CCW system. Once these reviews are completed, a follow-up inspection will be scheduled later in 2010 to close the CCW/HELB White Finding, which may return Unit 2 to the normal Licensee Response Column level.

Q59. What does it mean to be in the Regulatory Response Column?

A59. (SDN) Under the Action Matrix of the NRC's Reactor Oversight Process, if a plant has no more than one White input in any cornerstone and no more than two White inputs in any strategic performance area during a review cycle, it is placed in the Regulatory Response column (sometimes referred to as Column 2), which signifies that the NRC will increase the regulatory attention given to that plant. This increased regulatory attention typically involves a public meeting to discuss the findings and a supplemental NRC inspection. Being in the Regulatory Response column does not signify that a plant is unsafe, or that there is a lack of reasonable assurance that the plant will meet NRC requirements. At any given time, there are typically a number of operating units in the Regulatory Response column (for example, there were 13 units in that column as of the date on which this testimony was prepared).

There are additional columns in the NRC's Action Matrix reflecting increased degrees of NRC concern, including the Degraded Cornerstone column (Column 3), the Multiple/Repetitive Degraded Cornerstone column (Column 4), and the Unacceptable Performance column (Column 5). As the NRC Inspection Manual specifically indicates, it is only the "Unacceptable Performance" column (Column 5) that represents situations in which the NRC lacks reasonable assurance that the licensee can or will conduct its activities so as to ensure protection of the public health and safety, and thus the plant is not permitted to operate. IMC 0305 (Exhibit 20 (NSP000038)) at E4-1.

VI. CROSS-CUTTING ISSUES

Q60. What are cross-cutting issues?

A60. (SDN) There are certain fundamental attributes of an operating plant licensee's performance that cut across all of the NRC reactor oversight process cornerstones of safety. These cross-cutting attributes are human performance, problem identification and resolution, and safety conscious work environment.

Q61. How do these cross-cutting attributes relate to a plant's safety culture?

A61. (SDN) Certain components of safety culture are directly related to one or more of the cross-cutting attributes. These are: Corrective Action Program; decision-making; environment for raising concerns; operating experience; preventing, detecting, and mitigating perceptions of retaliation; resources; self and independent assessments; work control; and work practices.

In turn, issues relating to these cross-cutting attributes can be characterized as "substantive cross-cutting issues" if they become recurring aspects of a licensee's performance. If the agency identifies four or more inspection findings for a facility with the same cause in one year and the cause relates to a cross-cutting attribute, the agency determines that a substantive cross-cutting issue exists.

Q62. How does the NRC go about assessing whether cross-cutting issues are present at an operating reactor?

A62. (SDN) The NRC evaluates whether a substantive cross-cutting issue exists at each operating reactor twice a year. If the NRC determines that a substantive cross-cutting issue exists at a given plant, the mid-cycle and end-of-cycle assessment letters issued by the NRC summarize the specific substantive cross-cutting issue to include the actions that should be taken to resolve the issue. The next mid-cycle or annual assessment letter will either state that the

issue has been satisfactorily resolved or summarize the agency's assessment and licensee's progress in addressing the issue.

Q63. What is the consequence of having a substantive cross-cutting issue identified?

A63. (SDN) The NRC alerts the licensee to the need to address this area and may conduct meetings with the licensee to ensure that the issue is being properly addressed. No specific enforcement action by the NRC results from the identification of a substantive cross-cutting issue.

Q64. Does the identification of a cross-cutting substantive issue have any plant safety implications?

A64. (SDN) Identification of a substantive cross-cutting issue does not mean that the plant is unsafe, but rather that there is a performance trend that deserves attention.

Q65. Have cross-cutting issue assessments been conducted at PINGP in recent years?

A65. (SDN) Yes. On August 20, 2009, there was a mid-year performance review report of PINGP covering the period July 1, 2008 through June 30, 2009, and on February 11, 2010, the NRC performed an end-of-cycle performance review covering the period January 1, 2009 through December 31, 2009. These reviews included cross-cutting issue identifications and assessments.

Q66. What were the findings of the mid-2009 performance review?

A66. (SDN) In the mid-2009 performance review report (Exhibit 21 (NSP000039)) the NRC noted that it had identified a substantive cross-cutting issue ("SCCI") in the area of human performance ("HU") with cross-cutting themes in the aspects of systematic process, conservative assumptions, procedural adequacy, and

procedural compliance. The NRC determined that there were 25 findings in the previous 4 calendar quarters documented with cross-cutting aspects in the HU area, and indicated that the SCCI would remain open until all HU cross-cutting themes have been satisfactorily addressed. Exhibit 21 (NSP000039) at 2.

Q67. What did NSPM do in response to these findings?

A67. (SDN) NSPM took actions to improve human performance through a Target Zero Human Performance Improvement Plan (Exhibit 22 (NSP000040)) and increased measures for management's assessment of the plant staff's performance. The Target Zero Human Performance Improvement Plan was implemented in early 2009, and successfully reversed the negative trend that existed on Human Performance-related events. It included actions in the areas of Human Performance Fundamentals, Risk Management, Effective Solutions, Management Engagement and Oversight, and Behaviors. All actions under the plan were completed by September 2009.

In addition, NSPM developed a Performance Recovery Plan (Exhibit 23 (NSP000041)) and established a Recovery Team, which I lead, to implement the plan. The Performance Recovery Plan implemented Human Performance improvement initiatives in the areas of Systematic Processes, Conservative Assumptions, Procedural Adequacy and Procedural Compliance. This effort is yielding further improvements in the Human Performance area, as evidenced by the reduction in the number of Human Performance-related NRC findings in 2010 as compared to the number of findings in 2009.

Q68. What did NSPM do in the area of systematic processes?

A68. (SDN) There were several actions taken to address the area of systematic processes. Training on Operability and Functionality decision-making was provided to all Operations Senior Reactor Operator license-holders, Engineers, and Managers. Integrated Plant Knowledge training was established for engineering to aid in better operability recommendations to Operations. Risk Management Principles and Behaviors were also introduced to improve and develop more conservative behaviors (Exhibit 6 (NSP000024)). Finally, the nuclear industry's Principles for a Strong Nuclear Safety Culture, as published by INPO, were adopted in our corporate policy and are used daily at meetings to coach workers on safe and conservative plant operations.

Q69. What improvements were made with respect to the quality of decision making and conservative assumptions?

A69. (SDN) An "Operational Decision-Making" tool has been developed to include two types of decision-making situations: Type 1, to address emergent challenges faced by operators; and Type 2, to address the larger, more significant decisions involving multiple departments (Exhibit 24 (NSP000042)). These tools employ a systematic approach to decision-making and require that all of the relevant facts be obtained and considered in the final decision. They were established in a fleet procedure applicable to both PlNGP and the Monticello Nuclear Generating Plant. Also, the nuclear industry's Principles were publicized at PINGP, and posters of these principles were placed in the main conference rooms. Managers have been provided pocket-sized books of the principles and their attributes. The safety culture principles are emphasized every day, from the time workers walk into the "explosives monitors" in the Security Building and hear the recorded messages, in daily D-15 meetings, through required

safety moments at meetings, in weekly Leadership Alignment meetings, as well as in Pre-Job Briefs and other daily interactions.

The station has introduced "Risk Management Principles" (Exhibit 6 (NSP000024)) as a tool to coach workers on using low risk options and managing risk. The focus of these principles is to change the station's culture from "we have always done it this way" to "what can we do to minimize risk?" and "are we aligned to industry best practices?"

A major focus has been placed on use of the "STOP When Unsure" HU tool (Exhibit 25 (NSP000043)) (FP-PA-HU-02). Workers who apply the STOP tool and involve their supervisor in decision-making are formally recognized, to encourage such behavior. A monthly Employee Recognition Luncheon is held where the senior leadership team, including the Site Vice President and the Chief Nuclear Officer, recognize employees for their behaviors among other positive achievements. Additionally, we recognize employees weekly for situations where risk was recognized, avoided and documented in the corrective action process through the site's "Good Catch" program (Exhibit 26 (NSP000044), Attachment 5) and the Risk Prevention/Mitigation program. (Exhibit 27 (NSP000045), FP-OP-IRM-01).

The station is also now consistently assessing all work order tasks for risk, and requiring specific oversight and mitigation measures to be taken for all identified medium and high risk tasks.

Thousands of new valve tags and procedure revisions have been made to reduce errors in operating previously unlabeled equipment. These results demonstrate a new attitude by employees to "STOP When Unsure" and correct the procedure, or add a label, before proceeding with the work. Management further encourages

the behavior by recognizing workers, by name, in site publications who demonstrated the correct behaviors.

Q70. What initiatives were carried out regarding the resources and documentation aspect of human performance?

A70. (SDN) New standards governing the quality of plant procedures and work packages have been adopted. These include prescribed templates for the development of work packages, a thorough and rigorous review process before procedures and work orders are finalized, and specific mitigating measures identified for medium- and high-risk work activities. Procedures associated with the specific findings in this area were also revised to reduce steps and instructions likely to result in errors.

Q71. What was done to improve performance with respect to work practices and procedural compliance?

A71. (SDN) Expectations were created and communicated to all site workers on procedure use and adherence. Critical steps (i.e. those that are irreversible and consequential) are discussed in pre-job briefings, and the specific HU tool(s) for the critical steps are identified and agreed to by the workers to prevent errors. Supervisors have been provided stamps to mark the critical steps in procedures. Procedure levels of usage have been reviewed and several procedures have been adjusted, where appropriate.

Q72. How do you measure the effectiveness of these various measures in improving human performance?

A72. (SDN) We use performance indicator data to measure the status of and improvements in human performance. Metrics to measure human performance effectiveness include site and department human performance clock reset rate, percent of work order tasks screened for risk, number of significant and noteworthy events per month, number of critical observations per month, and number of

risk situations prevented per month. These indicators show that, overall, PINGP's human performance is improving.

For example, the plant runs a "clock" that registers the occurrence of a significant human performance error, as defined through specified criteria such as worker injuries, reactivity changes, and loss of foreign material control. When such a deficiency occurs, the clock is reset to zero days. The longer the plant operates between clock resets, the better (quantitatively) the human performance can be said to be. The average time between clock resets significantly improved at the end of 2009 (>90 days) as compared to that at the beginning of 2009 (<30 days). The most recent time between clock resets has been registered as 65 days.

Also improved (that is, decreased) are the numbers of lost/restricted injuries and OSHA-recordable injuries. For example, in 2010, there have been no Lost or Restricted injuries. In 2009, there was 1 Lost Time injury and 1 Restricted case injury. In 2008, there were 2 Lost Time and 4 Restricted case injuries. Similarly, OSHA Recordable injuries have decreased from 15 in 2008 to 9 in 2009 and 5 so far in 2010. Additionally, the Components out of Position index value improved from a value of 80 at the end of 2008 to a value of 90.5 at the end of 2009. (This index is measured as 100 minus the number of instances of out of position indicators, so the higher the index, the fewer the number of instances and the better the plant's performance.)

Another measure of improved human performance is the number of NRC findings issued with HU cross-cutting aspects. In 2008, there were 12 findings with HU crosscutting aspects, 26 in 2009 (14 in the first half of the year), and 5 in the first half of 2010.

Q73. What were the NRC findings in the next performance assessment?

A73. (SDN) As noted earlier, in its end-of-year performance assessment for 2009, the NRC determined: "Overall, Prairie Island Nuclear Generating Plant, Units 1 and 2, operated in a manner that preserved public health and safety and fully met all cornerstone objectives." Exhibit 14 (NSP000032) at 1. The NRC referred to the actions that NSPM had described in a December 1, 2009 public meeting to address the ongoing HU SCCI and noted that some improvement has been observed, but concluded that these actions have not yet proven effective in mitigating the cross-cutting themes. "Therefore, the NRC has concluded that the SCCI will remain open until all cross-cutting themes have been cleared in the area of [HU]." Id. at 2.

Q74. What was NSPM's response to this assessment?

A74. (SDN) We reiterated that PINGP is committed to continuing to provide the attention and resources needed to further reduce the number of occurrences and significance of human performance related events and described the actions that NSPM has taken and continues to take to achieve this goal. Exhibit 28 (NSP000046), Enclosure. We also reiterated the plant's commitment to maintain strong oversight of the improvement actions and to monitor HU effectiveness metrics through the Performance Assessment Review Board ("PARB") and through individual manager and supervisor accountability.

In addition to the ongoing human performance improvement programs I described earlier, we responded to the NRC's assessment by holding a number of meetings to discuss human performance issues. A Human Performance Exposition ("EXPO") was held for all site employees, including contractors,

prior to Unit 1 Cycle 26 Refueling Outage (1R26). The EXPO included many booths, staffed by plant employees, where the use of the HU tools was explained and reinforced, teaching employees on the use of the tools and how to apply them in the field. Dynamic Learning Activities were also developed to reinforce correct behaviors and a case study of a large refinery accident where multiple HU barriers were broken was reviewed. The EXPO concluded with a senior manager discussion of the significant takeaways from the day's activities.

Along the same lines, Site All-Hands meetings were conducted in February and March 2010 where the station's performance was compared to industry performance. A major focus of the meeting was on human performance improvement, with a strong employee emphasis on accountability, coaching and behaviors; use of Human Performance tools; risk management principles and behaviors; and procedure use and adherence.

Monthly department meetings were started in March 2010 to improve communication of site performance and department improvement focus areas. A common message has been and will be promulgated at each department meeting that emphasizes that the site's number one performance objective is to improve human performance. This message is also conveyed through postings of supervisors and individual contributors using human performance tools. This is another step taken to shift the responsibility for use of error reduction tools down to the worker level. As evidenced by an increased number of disciplinary cases, personnel who choose not to use and/or enforce the use of error reduction practices face adverse consequences.

At the managerial level, continuing leadership training is being provided, focusing on reviews of the coaching tools. Managers then were required to conduct a number of "Coach the Coach" observations.

In short, we are committed to continue providing the attention and resources needed to further reduce the number of occurrences and significance of human performance-related events.

Q75. Do you have any indication that these additional initiatives are proving successful in improving human performance at PINGP?

A75. (SDN) The frequency and severity of human performance-related events have decreased. This is evidenced by an improving trend in the number of NRC violations and the increase in the number of days between site clock resets, as well as the other metrics I discussed earlier.

VII. CORRECTIVE ACTION PROGRAM

Q76. Please describe the objectives and organization of the Corrective Action Program at PINGP.

A76. (KWP) The Prairie Island Corrective Action Program ("CAP") is designed to meet the requirements of 10 CFR 50 Appendix B Criteria XV and XVI and applicable NRC and industry guidance (NRC Standard Review Plan (NUREG 0800) Section 17.3; Regulatory Guide 1.33, Revision 2; and ASME NQA-1, 1994), as set forth in the NSPM Quality Assurance Topical Report (Exhibit 29 (NSP000047)). Through the execution of specific procedures, NSPM has established a process for documenting and tracking the resolution of issues. The framework instituted through this process provides reasonable assurance that potential deviations from performance expectations, including conditions adverse to quality, employee concerns, operability issues, functionality

issues and potentially reportable conditions are promptly identified, evaluated and corrected as appropriate.

Implementation of the CAP involves taking the following actions:

- Identification and documentation of problems, issues, and concerns of all types
- Defining the work processes necessary to resolve open issues
- Defining the safety and/or economic severity of the issues
- Prioritizing work activities to resolve issues
- Assigning the appropriate person and due date
- Planning, executing and managing oversight of work activities
- Reviewing the work performed to assure adequate resolution of open issues
- Providing data to effectively identify declining performance.

Procedure FP-PA-ARP-01 (Exhibit 26 (NSP000044)) at 3-4.

While the program calls for additional steps (described in procedure FP-PA-ARP-01) (Exhibit 26 (NSP000044)), a summary level sequence of the handling of an issue by the CAP is as follows:

- Issue identification (an Action Request [AR] is generated)
- AR is screened for, among other attributes:
    - Severity Level (significance of issue)
    - Evaluation Level – to establish corrective action(s)
    - Due Date
    - Assignee
- Assignee completes evaluation determining "Why" the condition exists
- Corrective actions are defined to correct the condition
- Corrective actions are completed
- Supervisory review of the AR documentation to ensure all actions are complete and approves closure of that issue.

Exhibit 26 (NSP000044) at 12.

The above steps provide an insight as to how the CAP thrusts itself into day-to-day station activities.

The AR screening is a formal meeting in which a specified quorum must be met, including the Plant Manager. One meeting attendee should hold a SRO license at the facility or be designated by the Plant Manager and must have specific knowledge of Plant Technical Specifications. This diversity provides critical inputs for the evaluation of those ARs that identify operational and risk-significant issues. The AR program utilizes a graded approach to the evaluation of conditions, so that those issues that have greater significance receive a more rigorous evaluation.

Q77. How is the adequacy of the CAP at PINGP reviewed?

A77. (KWP) The overall CAP is audited by the Nuclear Oversight Department on a quarterly basis. The Nuclear Oversight Department's function is to conduct independent reviews of the execution of PINGP programs. This group has a separate reporting structure that inspects, observes, and compares program and process execution against the PINGP implementing procedures, ensuring compliance. These comparisons and assessments are documented in reports and formally delivered to senior station management (Exhibit 30 (NSP000048)).

An additional audit of the overall CAP is performed through the Focused Self-Assessment ("FSA") process. This is a formal process that:

- includes among its participants at least one representative from outside the company
- has a formal plan and checklist of investigation focus areas

- requires that the plan be reviewed and approved by the senior management team prior to execution, and

- results in a formal report that includes areas for improvement, enhancements and strengths, that is reviewed and graded by the senior management team.

The most recent FSA on the CAP was completed on June 11, 2010 (Exhibit 31 (NSP000049)).

A similar audit is performed under the auspices of the Utilities Service Alliance (a consortium of nuclear power generating stations). It reviews and assesses the Nuclear Safety Culture of the plant, of which the CAP is a part. This audit has been performed two separate times, the first in August 2008 and most recently in June 2010. The June 2010 audit is described by Mr. Ed M. Peterson II in this testimony.

The NRC performs an inspection of the Problem Identification and Resolution ("PI&R") programs under Inspection Procedure 71152. The PI&R inspection objectives are to: 1) provide an early warning of potential performance issues, 2) help the NRC gauge supplemental response should future action matrix thresholds be crossed, 3) provide insights into whether licensees have established a safety conscious work environment, 4) allow for follow-up on previously identified issues, 5) provide additional information related to cross-cutting issues, and 6) determine whether a licensee is complying with the NRC regulations regarding corrective action programs. The PI&R inspections at PINGP focus on the CAP for the station.

The commercial nuclear power industry has as one of its core principles: "Nuclear safety undergoes constant examination." In

accordance with that principle, the PINGP CAP program described above is constantly under evaluation. The evaluations by a variety of internal and external groups, as listed above, are a reflection of the value we place on the CAP program. The results of these evaluations are documented in the CAP program, are analyzed, and any needed corrective actions are established. This is a never-ending process that reflects our desire to constantly improve the CAP's performance.

PINGP's assessment of its CAP program is that it is procedurally sound and is effective in identifying, analyzing, and resolving our issues. As shown through our past actions, we will not stop reviewing, grading, and improving the execution of this program.

Q78. Please summarize the recent history of the CAP issue at PINGP.

A78. (KWP) As part of the Focused Self-Assessment process, NSPM initiated and completed an internal review of the effectiveness of the Corrective Action Program at PINGP in late January 2009. From that evaluation, Areas for Improvement ("AFIs") were identified. The AFIs can be summarized as follows:

- There was a lack of effective issue evaluation, such that issues were repeated
- Indicators were not providing management with an accurate picture of CAP health
- Corrective actions were not generated for all causal factors and some actions were not logically tied to any causal factor
- Implementing procedures were not always followed, and
- The root cause template did not address all of the requirements found in the NRC Inspection Procedure 95002.

Exhibit 32 (NSP000050) at 1-2.

The FSA analysis identifies gaps between a given performance standard and the conditions found. It does not identify why those conditions exist. Determination of the "why" is the function of a (root) causal analysis. Accordingly, upon the identification of the above AFIs for the CAP, an Action Request (AR) was generated. (Exhibit 33 (NSP000051)). This AR led to the initiation of a Root Cause Evaluation ("RCE") in order to establish the causal factors and develop corrective actions to address the identified causal factors. RCE01166830-01, "SCAQ-Inadequate CAP Resolution of Significant Issues" (January 26, 2009) (CAP RCE) (Exhibit 34 (NSP000052)) was then issued.

The RCE process is a regimented process described in procedure FG-PA-RCE-01, attached as Exhibit 35 (NSP000053) hereto. The RCE process includes the development of a formal charter approved by the screening team. It uses a team approach, requiring at least one team member with formal RCE training. In the case of the CAP RCE, an independent industry expert was also added to the team to ensure independent analysis was performed during this investigation.

The RCE process is designed to identify one (or more) root cause(s) that, when corrected, will eliminate the condition found. The RCE process also identifies contributing causes, that is, other causes that may directly or indirectly impact, but not cause, the condition found. The RCE final report is submitted to the Performance Assessment Review Board for grading and approval.

In the case of the CAP root cause investigation, the resulting RCE Report (Exhibit 34 (NSP000052)) provided a comprehensive assessment of the CAP as it existed at PINGP in early 2009.

Q79. What were the conclusions of the CAP RCE?

A79. (KWP) The RCE team determined the root cause of the AFIs was: "Management has failed to consistently enforce quality standards and set work priorities based upon procedural requirement and risk/benefit to the plant." Exhibit 34 (NSP000052) at 3. Other contributing causes were also identified.

Q80. Did the CAP RCE recommend actions that should be taken to remedy the identified problems with the CAP?

A80. (KWP) Yes. Two main corrective actions to prevent recurrence were identified, as called for by Criterion XVI of 10 CFR 50 Appendix B. They were:

- Develop and implement a CAP priority matrix designed to interface with work management processes and engineering work management system.
- Develop and implement a department CAP health indicator.

Exhibit 34 (NSP000052) at 3-4.

The CAP RCE also recommended the following actions:

- Develop and implement a Site CAP resolution quality and timeliness Key Performance Indicator.
- Establish management expectations and accountability for CAP process implementation and timeliness of resolution.
- Revise the CAP procedure, FP-PA-ARP-01, to address identified issues and enhancements.
- Provide Root Cause Evaluation refresher training to all qualified RCE personnel.
- Complete successive Focused Self-Assessments ("FSAs") on CAP process effectiveness in early 2010 and then at the

end of the year. (Exhibit 34 (NSP000052) at 3-4 and 26-27).

In accordance with PINGP procedures, effectiveness measures were established to measure the success of these actions.

Q81. Have the corrective actions recommended in the CAP RCE been taken?

A81. (KWP) Yes. All corrective actions for this RCE have been completed. To ensure that these corrective actions were taken, we are performing an Effectiveness Review. This is a formal assessment of the results of a particular set of corrective actions completed. This review is a self-assessment of the progress made to ensure that we have sustainable improvements with respect to those actions. While the Effectiveness Review will be completed at the end of this year, it is my opinion that the review will show that the CAP RCE corrective actions have achieved the desired improvements.

Q82. Has NSPM's implementation of the CAP RCE recommendations resulted in CAP program improvements?

A82. (KWP) Yes. Implementation of the RCE recommendations has resulted in a number of performance improvements. These improvements include:

- Improved performance in the quality of our causal evaluations.
- Creation of corrective actions that are focused on correcting the identified problem.
- Increased management oversight of evaluations and significant corrective actions to ensure a quality product.

Q83. Has the NRC evaluated the adequacy of the PINGP CAP program?

A83. (KWP) Yes. As noted above, once every two years, the NRC performs a team inspection of the Problem Identification and Resolution program at each operating reactor. These inspections are conducted under NRC Inspection Procedure IP 71152 and cover four areas of licensee PI&R performance: (1) the effectiveness of the licensee's corrective action program in identifying, evaluating, and correcting problems, (2) the licensee's use of operating experience information, (3) the adequacy of completed licensee audits and self-assessments, and (4) the existence of a safety conscious work environment to determine whether there are any indications of reluctance to report safety issues by licensee personnel.

The NRC conducted such a team inspection at PINGP in August 2009. The results of the inspection were presented in a September 25, 2009 Inspection Report, IR 05000282/2009009; 05000306/2009009 (Exhibit 36 (NSP000054)). The NRC is scheduled for another PI&R inspection in September 2010 as part of its inspection processes.

Q84. What were the results of the 2009 PI&R inspection?

A84. (KWP) In its report on the inspection, the NRC concluded that "in general, problems were properly identified, evaluated, and corrected." Exhibit 36 (NSP000054), cover letter at 1. The report also concluded that:

- The licensee had a low threshold for identifying problems
- Most items… were screened and prioritized in a timely manner
- Most issues … were properly evaluated commensurate with their safety significance
- Corrective actions were generally implemented in a timely manner

- Audits and self assessments were determined to be performed at an appropriate level to identify deficiencies, but the station was not taking full advantage of the processes and results.
- Workers at the site were willing to enter safety concerns into the CAP.

Id., Report at 1.

The NRC also identified some concerns along with the above favorable conclusions:

- … implementation was lacking in rigor resulting in inconsistent and undesirable results.
- …some significant issues went unrecognized and therefore CAPs were not issued for these.
- … inconsistency and lack of rigor in the screening process.
- … the inspectors identified significant examples of issues with evaluation and corrective action shortcomings….

Id.

Q85. Was NSPM aware of these concerns prior to the NRC inspection?

A85. (KWP) Yes. These issues were previously recognized by the station, and ARs had been generated in May 2009 to address them. These were AR01183116 (Corrective Action Implementation Resolution) (Exhibit 37 (NSP000055)) and AR01183117 (Thorough Evaluation of Problem Resolution) (Exhibit 38 (NSP000056)).

Q86. Did the NRC inspectors review the CAP RCE?

A86. (KWP) Yes. The NRC evaluated the CAP RCE and generally agreed with the issues identified in NSPM's self-assessment, which were "consistent with the conclusions of the inspectors."

Exhibit 36 (NSP000054), Report at 16. In fact, the NRC observations in its PI&R inspection were essentially the same as those already identified by NSPM.

The NRC inspectors also acknowledged that PINGP has implemented improvement programs and efforts toward improving the CAP since the last PI&R inspection, although recognizable improvement in most areas had not been observed. Id. This is attributable to the fact that at the time the inspection was performed (August 2009) implementation of the improvement programs was only in its initial stages.

Q87. What was PINGP's response to the NRC audit observations?

A87. (KWP) As I stated, the NRC's inspection findings did not reveal any new information because we had previously identified those issues and had initiated actions to address them. Nonetheless, following the NRC inspection, PINGP conducted an internal review of all of the individual issues and associated actions in the CAP and those relating to Human Performance. This was done to provide an aggregate view of our overall performance and actions to address identified performance gaps. NSPM hired an outside expert in the review. The NRC Inspection Manual Chapter 0305, Operating Reactor Assessment Program (Exhibit 20 (NSP000038)) was used as the basis for this review. The review focused on three elements of the CAP:

- Thoroughly evaluating identified problems such that the resolutions address causes and extent of conditions, as necessary.

- Properly classifying, prioritizing, and evaluating for operability and reportability conditions adverse to quality.

- Taking appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity.

The review identified a significant number of actions that had previously been initiated to address these three CAP performance components. A gap analysis was performed to determine if there were any gaps between our performance in these areas and what could be considered as "excellent performance." From this gap analysis, some pending corrective actions were consolidated and additional corrective actions were defined. These actions are compiled under AR01183116 (Exhibit 37 (NSP000055)) and AR01183117 (Exhibit 38 (NSP000056)).

Actions taken in response to these two ARs included:

- Improvement of problem statement during CAP initiation.
- Formal vs. informal Apparent Cause training.
- Formalizing what constitutes an effective corrective action.
- Improving CAP screening through using risk/consequence/uncertainty considerations.
- Formalizing the requirement to perform AR closure review ensuring the issue(s) were resolved.

All CAP-related procedures for oversight and execution were reviewed to validate and changed, if necessary, to reflect upgrades and improvements identified in this review.

Q88. What is the current status of these corrective actions?

A88. (KWP) At this time, all corrective actions are complete. The completion of these efforts has resulted in a solid corrective action program consistent with industry standards. NSPM has also created a new senior level position, Recovery Manager, to manage the Recovery Plan and subsequent resolution of these issues. The Recovery Manager is Mr. Scott Northard.

VIII. EVALUATIONS OF SAFETY CULTURE AT PINGP

Q89. Have there been recent assessments of the status of safety culture at PINGP?

A89. (SDN) Yes. These include a Common Cause Evaluation, which examined NRC findings, Nuclear Oversight Department findings, an independent HU assessment, the site 2008 Mid-Cycle Evaluation, the 2008 Management and Safety Review Committee assessments and assessments of the Corrective Action Program. The results of these assessments were used to develop the station Target Zero Human Performance Improvement Plan in December 2008 and the station Performance Recovery Plan in March 2009.

(EMP) In addition, a nuclear safety culture assessment ("NSCA") was conducted at PINGP on June 21 -25, 2010 under the auspices of, and in accordance with, the process established by the Utilities Service Alliance ("USA") (a consortium of nuclear power generating stations). The NSCA was performed by a team, which I led, of independent industry experts and PINGP personnel.

Q90. Please describe the PINGP internal assessments.

A90. (SDN) The assessments included specific audits and inspection conducted by the site Nuclear Oversight organization. The station also contracted an outside firm to conduct an independent assessment of Human Performance at both Prairie Island and Monticello. This assessment reviewed station events and issues,

determined discernable trends in Human Performance, and made recommendations for improvement. Additionally, a mid-cycle assessment of station performance was conducted to assess progress on areas noted as needing improvement in the 2007 INPO Evaluation and Assistance Visit. Finally, the Management and Safety Review Committee held regularly scheduled meetings to review station performance and provide recommendations for areas of focus and benchmarking on station initiatives.

Q91. Please describe how the USA 2010 NSCA was conducted.

A91. (EMP) The objective of the assessment was to evaluate the health of the station's nuclear safety culture, identify areas of strengths and weaknesses, and provide recommendations to station management to improve or sustain this health in terms of the INPO principles and attributes of a strong nuclear safety culture. The NSCA process focuses primarily on the evaluation of the perceptions and beliefs held by the station's workforce regarding nuclear safety and leadership attributes. The assessment's model of safety culture, the structure of the assessment process, and the results of the assessment are expressed in terms of INPO's Principles. The assessment process also incorporates guidance provided in NEI 09-07, Fostering a Strong Nuclear Safety Culture. The assessment results are based on a pre-assessment survey of station personnel, a site assessment involving direct interviews with randomly selected station personnel, and observations of selected site meetings and activities.

In accordance with that process, the NSCA team conducted a pre-assessment written survey that was provided to all PINGP employees, based on a standard set of questions common to all assessments. The PINGP pre-assessment survey had a response rate of 88 percent, which is the highest of any of those on which I

have been involved and substantially higher than the NSCA average of approximately 65 percent. This high response rate reflects strong engagement of the work force with safety culture. As part of the pre-assessment process, the team also reviewed key plant documents in preparation for its visit to the plant site.

Second, the team selected and scheduled 62 employees for interviews. These employees were chosen at random from site organization charts. The team aimed to select interviewees from the following groups of PINGP personnel: 60 to 65 percent at the individual contributor level, 20 to 25 percent at the mid-level manager level, and the remaining 10 to 20 percent at the senior management level. The team conducted interviews on-site at PINGP in accordance with the NSCA process, posing a standard series of questions at each employee level, corresponding to the INPO Principles.

Third, the NSCA team attended routine plant meetings and activities and recorded 6 observations relevant to safety culture principles.

As an additional component of the assessment, the team members met daily as a group to compare their observations and interview responses, and to discuss general trends and themes. This team meeting helps to provide a balanced perspective on the developing assessment results.

In order to compile and evaluate the results of interviews, observations, and document reviews, the team rated the interviewees' perceptions based on the INPO Principles and attributes. The scoring of each response and observation is done on a subjective basis by the team members and is based largely on a comparison of a received response or observation to the

expected organization's value or behavior (industry norms) as defined by the applicable INPO Principle or attribute. The scored responses and observations are then entered into a database and reviewed in the aggregate by the team for themes and trends. In addition, the assessment reviewed the issues identified in PINGP's previous assessment of nuclear safety culture performed in August 2008 against the results of the 2010 assessment. The results of the assessment are summarized and discussed in the NSCA team's report, Prairie Island Station Nuclear Safety Culture Assessment ("USA Report") (Exhibit 39 (NSP000057)).

Q92. Please summarize the results of the USA 2010 NSCA.

A92. (EMP) The main conclusion of the USA 2010 NSCA was that "the PINGP nuclear safety culture supports all of the INPO *Principles for a Strong Nuclear Safety Culture* and has a healthy respect for nuclear safety. Additionally, . . . Prairie Island personnel feel that they can raise any nuclear safety concern, without fear of retaliation." Exhibit 39 (NSP000057) at 2.

The USA Report contains tabulated summaries of the PIGNP personnel perceptions of the plant's degree of adherence to the eight INPO Principles. The data support the following assessments:

- **Principle 1: Everyone is Personally Responsible for Nuclear Safety.** The data collected by the assessment team reflected that responsibility and authority for nuclear safety are well established; employees have a healthy respect for nuclear technology and nuclear safety, and understand their role in promoting nuclear safety and how their actions impact nuclear safety. However, some employees believe management addresses personnel errors in a harsh and

punitive manner. Also, some employees are not aware of how the rewards and recognition system supports desired nuclear safety behaviors. Exhibit 39 (NSP000057) at 9-11.

- **Principle 2: Leaders Demonstrate Commitment to Safety.** The prevailing perception reflected in the assessment was that informal (non-supervisory) opinion leaders in the organization are having a positive impact at Prairie Island. Some station personnel believe that Managers and Supervisors are not spending enough time in the field coaching and observing work activities. Also, some personnel indicated that production priorities lead decision-making, especially during refueling outages, and that operations decisions and their bases are infrequently and inconsistently communicated. Id. at 13-14.

- **Principle 3: Trust Permeates the Organization.** The training department, in the opinion of the plant personnel, exhibits a very positive attitude that is engaged with the supporters of nuclear safety and displays strong leadership, teamwork and support for the priorities of the station. However, the site organization is felt to be ineffective at communicating changes, either organizational or program-related. Id. at 15-16.

- **Principle 4: Decision-Making Reflects Safety First.** Some personnel are concerned that with pending attrition and retirements, there is no visible legacy plan to address knowledge transfer and retention at the station. High turnover is perceived to be challenging the station's ability to perform timely and effective work. Id. at 19.

- **Principle 5: Nuclear Technology is Recognized as Special and Unique.** The assessment found that PINGP personnel firmly believe that reactivity control and the design features and margins associated with protection of critical safety functions are well implemented. However, some personnel are concerned that long-standing and repeat equipment issues persist at the station. Examples of contributing causes to this belief are ineffective application of rigorous problems solving, root cause analysis, and project management. Id. at 21-22.

- **Principle 6: A Questioning Attitude is Cultivated.** While personnel believe that management encourages the use of the Condition Report System, many do not believe the CAP system is effectively resolving problems in a timely manner. Therefore, they may not use the system consistently to resolve issues unless it is a nuclear safety significant issue. Personnel indicated that problem identification is strong; however, problem resolution lacks accountability and rigor to drive issues to completion. Id. at 24.

- **Principle 7: Organizational Learning is Embraced.** The assessment determined that employees do not believe that the Root Cause Analyses provide consistent resolution to prevent problems from recurring. Also, although there are sufficient processes to identify organizational weaknesses, they are not effectively utilized and implemented to resolve these identified weaknesses. Id. at 26-27.

- **Principle 8: Nuclear Safety Undergoes Constant Examination.** Most station personnel believe that nuclear safety culture has improved over the last two years. Some station personnel do not believe the results of previous safety

culture assessments are communicated or used to drive improvement. Also, some personnel believe that Key Performance Indicators and Program Health reports are not being effectively used to detect trends and initiate action prior to self-revelation of issues. Id. at 29-30.

In addition to these assessments, the review team was able to make certain observations and draw some additional insights. The most noteworthy were:

- Principle 1: The most recent Staffing Review indicates 29 open positions with only 5 planned to be filled, and the remaining 24 are on budget hold; open positions in some functional areas are not allowed to be filled due to budget concerns. (Id. at 10).

  Personnel understand the importance of adherence to nuclear safety standards. All levels of the organization exercise healthy accountability for shortfalls in meeting standards. (Id. at 11).

- Principle 2: Longtime employees are very good at trying to do the right thing; this was noted as a strong point in the engineering groups. There are many leaders at PINGP who, regardless of their position, provide a positive example for others and coach others when necessary. There is a site-wide expectation that everyone is responsible for safety and can freely coach anyone else. (Id. at 13).

- Principle 3: The site has a process for [organizational/process] Change Management. Unfortunately, the process is seldom used, or if being used is not communicated as such. Change

Management and the associated plans should be more visible. (Id. at 17).

Personnel can raise nuclear safety concerns without fear of retribution and have confidence their concerns will be addressed. Overall, feedback from the workforce represents a healthy safety conscious work environment. (Id. at 18).

- Principle 4: Personnel are systematic and rigorous in making decisions that support safe, reliable plant operation. Operators are vested with the authority and understand the expectation, when faced with unexpected or uncertain conditions, to place the plant in a safe condition. Conservative actions are taken when understanding is incomplete. Senior leaders support and reinforce conservative decisions. (Id. at 20).

- Principle 5: Some personnel indicated that the station work control process does not fully utilize workers to correct Maintenance items as scheduled. Personnel are concerned that work packages are not of adequate detail to complete job assignments without errors. (Id. at 22).

- Principle 6: There are a significant number of Operator Burdens and Work Orders open on Control Room associated equipment. Issues might be investigated promptly, but then not fixed for many months or years. (Id. at 24).

- Principle 7: Root cause evaluations have been ineffective. Also, there are multiple root cause evaluations that have long-standing open corrective actions that have not been effectively implemented. Since the original root cause evaluations were conducted, repeat events have occurred. (Id. at 26).

Some station personnel believe processes to identify weaknesses exist but the resolutions are not timely and/or effective. (Id. at 27).

The organization avoids complacency and cultivates a continuous learning environment. The attitude that "it can happen here" is encouraged. (Id.)

- Principle 8: There is a perception among some individuals that they have yet to see changes made that directly addressed a concern identified in the safety culture surveys. (Id. at 29).

Q93. Do you have any additional observations about the state of the safety culture at PINGP based on USA 2010 NSCA?

A93. (EMP) The concerns voiced by PINGP personnel about the effectiveness of station processes and programs appear to be driven by their desire for the station to achieve higher levels of performance. One of the major themes voiced by PINGP personnel during the assessment is a desire for increased employee communications. Employees at the individual contributor level are highly engaged with safety culture and performance issues, and they want additional information about what the leadership team is doing to further improve performance. The vast majority of PINGP respondents believe that safety culture has improved over the last two years, and the assessment results provide evidence that the members of the PINGP staff know and understand the nuclear safety culture principles and practices required to maintain that improvement.

Q94. Messrs. Northard and Petersen, are there any clarifications or additional information that would assist in understanding the results of the USA 2010 NSCA?

A94. (SDN) We at PINGP are pleased that the USA 2010 NSCA results confirm the strength of the safety culture at the plant. However, clarifications are pertinent to address some of the comments by plant employees, which generally reflect that perceptions often lag behind the results of the improvements made, and that our communication processes have room for improvement.

With respect to Principle 1 and the comment by some employees that "management addresses personnel errors in a harsh and punitive manner," accountability is a necessary part of the safe operation of a nuclear power plant. The level of management response to errors is commensurate with the degree to which the individual involved did not follow procedures or failed to use the human performance tools that are available to all employees and on which they receive training. In fact, since PINGP has tightened the accountability for errors, the plant performance indicators such as human performance clock reset rates have improved. Most employees actually appreciate that there is high accountability for poor performance.

Regarding the comment that there are 29 open positions with only 5 planned to be filled, and the remaining 24 are on budget hold and that open positions in some functional areas are not allowed to be filled due to budget concerns, the data cited in the comment are obsolete. As reported in PINGP's daily "Team Notes" for July 22, 2010 (Exhibit 40 (NSP000058)) sixty-four positions have been approved for hiring so far this year, there are 17 positions posted and in the process of being filled, and another 15 vacant positions have been identified for filling. Exhibit 40 (NSP000058) at 1. While budget is a consideration, we prioritize filling the vacant positions so that the most critically needed slots are filled first.

On Principle 2, the comment that "some personnel indicated that production priorities lead decision-making, especially during refueling outages, and operations decisions and their bases are infrequently and inconsistently communicated" is correct to the extent that management may have failed to communicate effectively the basis for certain decisions that are made in connection with refueling outages. However, there is a well-established process for making changes to the scope of refueling outage activities. All affected departments must be involved in making changes to the scope of activities during a refueling outage. If the change is developed prior to the outage's initiation, it must be ultimately approved by the Plant Manager. Changes after the start of the outage must be approved by the Site Vice President. The permissible reasons for such changes include a variety of factors, of which production priorities is only one.

On Principle 4, the concerns about pending attrition and retirements reflect an industry-wide problem that affects PINGP as it does all or most nuclear power plants. We are addressing the problem in part by having a number of retired employees return to work on a part-time basis to support operation of the plant and help train new employees. I must emphasize, however, that PINGP has a formal and rigorous training and qualifications program that must be completed successfully by all new employees to assure that they are qualified to perform their duties.

Regarding Principle 5 and the comment by some personnel that "the organization is ineffective at applying a rigorous approach to problem solving, root cause analysis, and project management such that long standing and repeat equipment issues persist," we recently made changes to the root cause evaluation ("RCE") process to make it more effective and conducted a week-long

training session for individuals involved in RCE analyses. We also upgraded our troubleshooting process to enhance our problem-solving ability.

The concern that Maintenance work packages "are not of adequate detail to complete job assignments without errors" has been addressed by reassigning the Work Packages Department to become part of the Maintenance organization so the Maintenance management can see to it that the contents of work packages fully supports maintenance work. While we always try to improve the productivity and efficiency of the Maintenance Department, it does not appear that Maintenance efficiency relates to the plant's safety culture.

With respect to the comment on Principle 6 that there are a significant number of Operator Burdens and Work Orders open on Control Room associated equipment and some of them remain open for a long time, we have instituted a prioritization for open items affecting the Control Room so that those items are addressed more quickly and operator burdens are reduced.

The Principle 7 comment that there are multiple root cause evaluations that have long-standing open corrective actions reflects the fact that some conditions require repeated observations or actions in order to complete the resolution of the problem. For example, PINGP's response to NRC Generic Letter 2008-01 alerting of the possibility of void formation in the Emergency Core Cooling System ("ECCS") is being developed over multiple plant outages spanning several years because it took two outages to identify all ECCS locations where voids might exist, and it will take two more outages to correct the conditions. Other problems whose resolution has required actions over several

years and resulted in multiple or long-standing RCEs include the replacement of underground cables, the labeling of unlabeled valves, and the identification and correction of refueling cavity leakage.

One of the observations made regarding Principle 8 is that some station personnel do not believe the results of previous safety culture assessments and the actions taken as a result of those assessments have been adequately communicated. We acknowledge that this is another area in which our internal communications need to improve. Another observation was that the Key Performance Indicators and Program Health reports are not being effectively used to detect trends and initiate action prior to self-revelation of issues. In reality, there are a number of areas in which key performance indicators are used effectively to address incipient problems before they lead to equipment failures. Three examples of these are the oil analyses, the vibration analyses, and the thermographic analyses.

(KWP) As mentioned earlier, the comment from Principle 5, "..personnel indicate that the organization is ineffective at applying a rigorous approach to problem solving, root cause analysis and project management such that long standing and repeat issues persist" does not accurately reflect the current status of the station's performance. Intensive training and requalification for both Root Cause and Apparent Cause evaluations have been provided within the last year. The focus of the training was to institute a methodical, rigorous approach to causal analysis. The improvement achieved from this effort has not been fully recognized by all of the PINGP staff and this comment is reflective of historical perceptions. The staff's comments reflect their strong desire to support nuclear safety in

every aspect of their work activities but also their desire that all deficiencies be remedied, no matter what impact if any they have on safety.

The station has recently completed three of the equipment reliability projects on the "Top 10 Equipment List". This demonstrates that PINGP is actively managing projects to eliminate equipment issues.

Employee comments on Principle 6 reflect that some plant employees "do not believe the CAP system is effectively used in resolving problems in a timely manner. Therefore, they may not use the system consistently to resolve issues unless it is a nuclear safety significant issue." PINPG employees generate over 11,000 CAPs annually, therefore there should be no concern over the identification of issues. As mentioned in my earlier testimony, the process for evaluating the identified issues proceeds on a graded approach. Employees are encouraged to identify and document in a CAP any and all issues without consideration of their safety significance. PINGP, by design, focuses energies on resolving safety significant issues first and those with no safety significance afterwards; this is recognized in the comments. The employees do not always take into account this graded approach in their comments on the timeliness of completion of corrective actions. This is again a reflection of their high standards and their expectation that all deficiencies be remedied.

There are employee comments regarding Principle 7 to the effect that they "do not believe that the Corrective Action Program Root Cause Analysis provide consistent resolution to prevent problems from recurring." This perception again reflects past conditions that have been or are in the process of being corrected. The

increased rigor in causal analysis, along with more focused management oversight, has resulted in correction of several of the lingering issues. The remaining ones are on track for resolution.

In general, the employee comments on Principles 5-7 reflect a backwards look that reflects a lag in understanding current conditions and plans for the future. As mentioned in Mr. Northard's testimony, we acknowledge that this more of a communications issue. PINGP is aware of this issue and is actively addressing thru a variety of communication tools.

IX. ISSUES RAISED IN SAFETY CULTURE CONTENTION

Q95. Is PIIC's characterization of the White findings as indicative of a substantive cross-cutting issue in the area of human performance correct?

A95. (SDN) No. First of all, both the White findings and the open substantive cross-cutting issue in the area of human performance were mentioned in the same letter from the NRC to NPSM on the agency's mid-cycle performance review for PINGP for the period mid-2008 to mid-2009 (Exhibit 21 (NSP000039)). However, the determination made on that letter of a substantive cross-cutting issue in the area of human performance related to the existence of "25 findings documented with cross-cutting aspects in the HP area," and not to the White findings. As I explained earlier, the classification of a deficiency as a "White" finding relates only to its perceived safety implications and is not in itself indicative of a deficiency in the safety culture at a facility.

To the extent that safety culture problems were raised by some of the White findings (such as the radioactive materials transportation issue), those problems were adequately addressed and measures were taken to avoid their recurrence.

Q96. PIIC also refers to an Information Notice issued by the NRC to the operating license holders alerting to a potential problem with configuration control errors at operating reactors, and citing the PINGP Unit 1 mispositioned manifold isolation valve switch as a recent example. PIIC alleges that several of the potential causal factors cited in the Information Notice are safety culture deficiencies and thus the conclusions in the Notice "are further evidence that there is a safety culture at Prairie Island that potentially fails to achieve four of the ten elements of an effective management program." Is PIIC's interpretation of the Information Notice correct?

A96. (SDN) No. NRC Information Notice 2009-11 cited by PIIC (Exhibit 41 (NSP000059)) does mention several factors as potentially being the causes of configuration control errors. The Information Notice cross-references eighteen other plants where such errors occurred, but does not associate any of the factors with the errors at a given plant. In particular, nowhere does the Information Notice indicate that any of the factors it lists were present at PINGP.

Q97. PIIC identifies the existence of a substantive cross-cutting issue in the area of human performance as indicative of a weak safety culture at PINGP. Do you agree?

A97. (SDN) No. The safety culture at Prairie Island has been assessed through various methods described above and determined to be strong. The actions taken to address the human performance findings have been effective at reducing both the severity and frequency of the human performance-related events. Because the number of human performance-related NRC findings has dropped below three in any one aspect area, we anticipate that the NRC will at a future date close the current Substantive Crosscutting Issue in Human Performance.

Q98. In its contention, PIIC alleges that the NRC has expressed "serious concerns" about the CAP at PINGP, and cites in support of its allegation the NRC findings in its September 25, 2009 Inspection Report that implementation of the CAP "was lacking in rigor, resulting in inconsistent

and undesirable results," and that "[s]ignificant issues went unrecognized." Are PIIC's allegations accurate?

A98. (KWP) No. The conditions that the NRC identified in its September 25, 2009 report represented a backwards look into the CAP program. These conditions do not represent the current conditions at PINGP. The station has taken actions that demonstrate recognition of the importance of the corrective action program. Station management has invested considerable time and focus on ensuring appropriate rigor for analysis, development, and execution of corrective actions. Individual contributors demonstrate their support by actively identifying potential issues through the CAP program. The concerns raised in the NRC report no longer represent the current status of the Corrective Action Program.

Q99. PIIC asserts that "the conclusions in the above Information Notice, the White findings discussed above in regard to PINGP, the identification of a substantive crosscutting issue in the area of human performance, the serious concerns identified by NRC inspectors with the applicant's CAP, and the failure of the applicant to address the potential damage to the containment integrity resulting from the refueling cavity leaks, including the failure to notify the NRC or effectively correct the safety-significant deficiency for a period of 20 years, are all indicative of a weak safety culture at PINGP." Is the combination of these factors indicative of a weak safety culture at PINGP?

A99. (SDN, KWP) No. We have demonstrated though various independent assessments, audits, surveys, causal evaluations and through examination of the performance history that there is a strong safety culture at PINGP. The NSPM staff has responded and addressed each specific operational challenge and occurrence where human performance was a contributing factor and completed actions to correct the condition and/or prevent recurrence. Significant improvement in human performance is indicated in the various metrics used to track organizational and

individual performance, including both nuclear and industrial safety. Employees have continually shown a willingness to identify and correct performance deficiencies, and to change their behaviors as needed to improve work task execution. And, finally, a reduction in the number and significance of employee errors is continuing.

(EMP) Each of the matters identified in PIIC's contention are individual issues that do not necessarily reflect a weak safety culture. Safety culture, at its core, embodies a collective set of characteristics and attitudes that permeate an organization. The USA safety culture assessment performed at PINGP indicates that the PINGP work force has a strong knowledge and understanding of nuclear safety, as well as a healthy respect for nuclear safety at the individual level. In addition, the vast majority of employee respondents (88 percent) believe that nuclear safety has improved over the last two years. PINGP personnel's openness to sharing perceived weaknesses and areas for station improvement reflects a low tolerance for process program and equipment deficiencies and a healthy refusal to accept the status quo. This feedback reflects the engagement of the work force and their desire to see and take part in improved plant performance. These organizational attributes exemplify the type of individual engagement with and commitment to nuclear safety issues that is at the heart of a strong safety culture.

Q100. Does that conclude your testimony?

A100. (SDN, KWP, EMP) Yes.