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Attachment 1

Nuclear Safety Culture Assessment

(69 pages to follow)

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NUCLEAR SAFETY CULTURE ASSESSMENT

OF

NUCLEAR FUEL SERVICES

June 19, 2013

We are pleased to submit the results of our assessment of the Nuclear Safety Culture of Nuclear Fuel Services

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Executive Summary:

In March and April 2013, a safety culture assessment was conducted at the Nuclear Fuel Services (NFS) site in Erwin, Tennessee by a team from the Center for Executive Solutions (CES). The areas assessed are consistent with the Ten Traits of a Healthy Nuclear Safety Culture specified by the Institute of Nuclear Power Operations (INPO). The assessment included document review; the administration of a "pencil-and-paper" safety culture survey; onsite interviews; and observations of workplace conditions, activities, and meetings.

Respondents completed the survey anonymously. Eight hundred eighty-seven employees and contractors responded to the survey, yielding a response rate of 93 percent. Respondents represented 25 work groups. Over 100 employees (more than10 percent of the workforce) were interviewed.

The assessment results are Acceptable, overall. The overall means of survey responses on each of the ten INPO Traits range from 4.40 to 5.51 on a seven-point Likert-type scale, on which higher scores indicate a healthier nuclear safety culture. Of the ten INPO Nuclear Safety Culture Traits, NFS safety culture survey mean scores are at the Acceptable level on six of the ten. Among these, the Personal Accountability Trait has a particularly high mean indicating that employees feel free and obligated to bring up safety issues.

Three of the remaining means are within 0.1 point of being at the Acceptable level. Given rounding errors, this difference is so small that arguably one could have placed them at the Acceptable level. Only one Trait (Respectful Work Environment) is clearly at the Opportunity for Improvement level. No means are at the Area for Improvement level.

NFS's safety culture shows its greatest strength with regard to the Personal Accountability Trait, especially on the item regarding it being one's responsibility to raise nuclear safety concerns and the item about being personally responsible for the behaviors and work practices that support nuclear safety.

It is important to note that virtually all of the mean Trait scores of the Quality, Safety & Safeguards group are lower than the other three groups that are available for comparison (Engineering, Operations, and "Other"). This difference is important to explore.

On average, respondents agree that the safety culture has improved at the site during the past two years. However, the current (March 2013) survey results do not differ from last year's survey results (March 2012), thus suggesting no change during the past year.

Significant culture change can take a long time (years) to achieve, and even when it has been achieved there is lag time between the achievement of the changes and their being measurable with a survey. Although disappointing, the lack of change between two administrations of a survey that are separated by only one year may reflect that the interventions implemented after the first survey have not had time to have a measurable impact on the organization.

Data from interviews, observations, and document reviews generally are consistent with the survey results. Concerns about an emphasis on production over safety, respect, and staffing levels appeared to arise more frequently during the interviews than did other issues.

Organizations tend either to get better or to get worse; rarely do they maintain the status quo. Although the assessment results are Acceptable, there is room for improvement in the health of NFS's safety culture. Improvement efforts are important in keeping the culture from deteriorating into the INPO Traits having means at the level of Opportunity for Improvement.

Six recommendations are offered that potentially will lead to improvements in NFS's safety culture. The first recommendation addresses continuing with current safety culture improvement efforts, making sure to focus on those which indications suggest have the greatest potential to be beneficial. Other recommendations include conducting a self-assessment of the Problem Identification, Resolution, and Correction (PIRC) system; reviewing individual survey item means, especially those associated with the Respectful Work Environment Trait; capitalizing on the fact that employees are heavily influenced by what they see other employees do; using other employees to teach topics related to safety culture that presently are taught by program managers; and measuring progress periodically.

Acknowledgements:

The assessment team thanks the Assurance Director and his staff, as well as all others who have assisted us throughout this project by providing documents and data, by scheduling our interviews and observations, and by coordinating all other aspects of our site visit.

Context and Objective for the Assessment:

Nuclear Fuel Services, Inc. (NFS), a Babcock and Wilcox (B&W) company is under an United States Nuclear Regulatory Commission (NRC) Confirmatory Order, EA-10-076, to conduct a Nuclear Safety Culture Assessment (NSCA) at least every 24 months, as a result of the findings of the NRC Office of Investigation Report No. 2-2010-001. The Center for Executive Solutions contracted with NFS to provide an independent nuclear safety culture assessment in accordance with an accepted nuclear industry standard, while remaining cognizant of the inherent differences between the fuel industry and the commercial nuclear power generation industry. The assessment was conducted at the NFS facilities in Erwin, TN.

The framework for assessment of nuclear safety culture can be found in the *Traits of a Healthy Nuclear Safety Culture* published by the Institute of Nuclear Power Operations (INPO). Together INPO and the NRC define a nuclear safety culture as the "core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment." The Traits define a "pattern of thinking, feeling, and behaving such that safety is emphasized over competing priorities."

Scope:

The scope of CES's assessment of NFS's safety culture was to provide an accurate assessment of the extent to which the majority of individuals in NFS's culture have beliefs and demonstrate behaviors consistent with a healthy safety culture as of the time of data collection, March and April of 2013. Because NFS was interested additionally in ascertaining whether its nuclear safety culture had improved during the last two years since a previous NSCA in 2010, CES conducted data analyses to address that issue.

The scope was not to ascertain with certainty reasons for the results of the assessment, compliance with NRC regulations, or adequacy of response to previous recommendations arising out of prior safety culture assessments.

Assessment Team Members:

The assessment team comprised four members with diverse backgrounds. Collectively, they provide the skills necessary to conduct a safety culture assessment in an organization in the nuclear fuel industry. All have participated previously in conducting safety culture assessments or their near equivalents.

Philip Berghausen is experienced in assessing leadership and management skills and in a variety of other activities in the nuclear industry, including having chaired the Organizational Effectiveness Committee of a nuclear safety review board and the Human Factors Division of the American Nuclear Society.

Stephen Cowne has over 25 years of nuclear industry experience in power generation and enrichment plant positions, with over 15 years in management. His experience includes nuclear licensing and compliance, operations, project management, quality assurance, emergency preparedness, environmental compliance, safety culture, and management systems.

G. Kenneth Koves has worked for the past nine years for INPO. During that time, he has worked with nuclear power plants and fuel facilities to define validly and measure reliably the construct of safety culture. He is involved in collaboratively creating a common language framework for nuclear safety culture, both domestically and internationally.

Andrew Winzelberg has considerable experience in conducting research in academic and industrial settings, experience that includes developing surveys and statistically analyzing their results, integrating survey data with interview data, and understanding the functioning of complex organizations.

Their biographies appear in Appendix A.

Methodology:

Procedure Overview:

The assessment procedure comprised four components: document review; a safety culture survey; individual and group interviews; and observations of workplace conditions, activities, and meetings. Each of these procedures was designed to capture employees' shared behaviors, beliefs, and attitudes that contribute to ensuring a healthy nuclear safety culture. The assessment procedure relied heavily on the self-report of respondents, both on the survey and through interviews. Although this is the standard procedure for measuring beliefs, values, and attitudes, it must be acknowledged that self-report is not completely accurate. People tend to misperceive their own behaviors and attitudes.

Nevertheless, there is no more efficient way to assess persons' attitudes than to ask them. We make the assumption that respondents reported honestly and carefully for the most part and that those who over-estimate in their positive values and beliefs will be cancelled out by those who underestimate them.

Document Review:

The CES assessment team reviewed a sample of documents relevant to the health of the safety culture at NFS. Included were such documents as written policies, procedures, performance indicator summaries, meeting minutes, training materials, and root cause analysis findings. A complete listing of documents reviewed can be found in Appendix B.

Survey Design and Administration:

At the request of NFS, CES used a safety culture survey devised by INPO and most recently revised in November, 2011—a survey first used by NFS in 2012. In part, NFS made this request in order that results from the current (2013) administration of this survey could be compared to the results of the previous year and to those of future years' administrations of the survey.

The survey items were mapped to the "Traits of a Healthy Nuclear Safety Culture," with a recent mapping update by Kenneth Koves (Program Manager of Organization and Human Performance at INPO) to include items to assess a newly added tenth Trait, "Decision Making." The ten Traits assessed by the survey along with their definitions are as follows (from "Traits of a Healthy Nuclear Safety Culture," INPO 12-012, December 2012). The bold-face text represents the statement of the Trait; the light-face text represents attributes of the Trait.

INPO Trait #1 Leadership Safety Values and Actions: Leaders demonstrate a commitment to safety in their decisions and behaviors. Executive and senior managers are the leading advocates of nuclear safety and demonstrate their commitment both in word and action. The nuclear safety message is communicated frequently and consistently, occasionally as a stand-alone theme. Leaders throughout the nuclear organization set an example for safety. Corporate policies emphasize the overriding importance of nuclear safety.

INPO Trait #2 Problem Identification and Resolution: Issues potentially impacting safety are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance. Identification and resolution of a broad spectrum of problems, including organizational issues, are used to strengthen safety and improve performance.

INPO Trait #3 Personal Accountability: All individuals take personal responsibility for safety. Responsibility and authority for nuclear safety are well defined and clearly understood. Reporting relationships, positional authority, and team responsibilities emphasize the overriding importance of nuclear safety.

INPO Trait #4 Work Processes: The process of planning and controlling work activities is implemented so that safety is maintained. Work management is a deliberate process in which work is identified, selected, planned, scheduled, executed, closed, and critiqued. The entire organization is involved in and fully supports the process.

INPO Trait #5 Continuous Learning: Opportunities to continuously learn are valued, sought out, and implemented. Operating experience is highly valued, and the capacity to learn from experience is well developed. Training, self-assessments, and benchmarking are used to stimulate learning and improve performance. Nuclear safety is kept under constant

scrutiny through a variety of monitoring techniques, some of which provide an independent "fresh look."

INPO Trait #6 Environment for Raising Concerns: A safety-conscious work environment (SCWE) is maintained where personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination. The station creates, maintains, and evaluates policies and processes that allow personnel to freely raise concerns.

INPO Trait #7 Effective Safety Communication: Communications maintain a focus on safety. Safety communication is broad and includes plant-level communication, job-related communication, worker-level communication, equipment labeling, operating experience, and documentation. Leaders use formal and informal communication to convey the importance of safety. The flow of information up the organization is seen as important as the flow of information down the organization.

INPO Trait #8 Respectful Work Environment: Trust and respect permeate the organization, creating a respectful work environment. A high level of trust is established in the organization, fostered, in part, through timely and accurate communication. Differing professional opinions are encouraged, discussed, and resolved in a timely manner. Employees are informed of steps taken in response to their concerns.

INPO Trait #9 Questioning Attitude: Individuals avoid complacency and continuously challenge existing conditions, assumptions, anomalies, and activities in order to identify discrepancies that might result in error or inappropriate action. All employees are watchful for assumptions, values, conditions, or activities that can have an undesirable effect on plant safety.

INPO Trait #10 Decision Making: Decisions that support or affect nuclear safety are systematic, rigorous, and thorough. 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. Senior leaders support and reinforce conservative decisions.

The survey was designed for use at nuclear power plants, but it also has been used successfully at nuclear fuel facilities. The INPO survey contains 60 items. With permission from INPO, NFS modified several items to add clarity, to make them NFS-specific, and to collect data indicating the respondent's position level and the organization in which he/she works. In addition, NFS substituted one item and added one item. Item #59 was substituted for an administration of the survey at NFS in 2012. In 2012, the item read "Nuclear safety has improved at this site during the past year." When the survey was re-administered in 2013 for the present study, item #59 was modified to read: "Nuclear safety has improved at this site during the past two years." Several spelling errors were corrected, some formatting was changed, several items were further clarified, and the list of organizations in which the respondent works was slightly modified. The item that NFS added for both the 2012 and 2013 administrations is #61. It reads: "My supervisor responds to questions and concerns in an open and honest manner."

NFS also added two items to the 2012 and 2013 surveys that require a narrative response. They are: "Are you aware of any unreported safety concern?" and "Do you have any comments that you would like to share about the safety culture at NFS?"

The survey instructions direct the respondent, for the purpose of the survey, to define nuclear safety so as to include all safety disciplines, physical and information security, material safeguards, and compliance with regulations. The survey asks the respondent to rate his/her agreement with each of the 61 items on a 7-point Likert-type scale: Strongly Disagree, Disagree, Somewhat Disagree, Neither Agree nor Disagree, Somewhat Agree, Agree, and Strongly Agree. The respondent also may respond: Not Applicable/No Chance to Observe.

An example of the survey appears in Appendix C. Additional information about the survey can be found in a June 2012 technical paper entitled: "Independent Evaluation of INPO's Nuclear Safety Culture Survey and Construct Validation Study," by Stephanie Morrow et al., at the Division of Risk Analysis in the Office of Nuclear Regulatory Research of the NRC.

The safety culture assessment initially was announced in February 2013 by Mr. Joe Henry, NFS President, at an all-employee meeting. He explained that the assessment would be conducted using a combination of a survey and interviews. During his announcement at the all-employee meeting, he emphasized the importance of the assessment and of employee input and assured employees that their responses would be confidential. Employees also were informed about the assessment at Supervisor and Management Meetings in February and March. Via a memo on March 11, 2013, distributed company-wide to those with computer access, Mr. Henry reiterated his comments about the safety culture assessment and stated that beginning on March 17, employees would be asked to participate in an NFS nuclear safety culture survey. He indicated that the survey was being conducted and analyzed by an independent third party (CES) and repeated the assurance that the results would be confidential. He issued a reminder on March 25 about the surveying finishing that week. In response to one or more concerns expressed about the confidentiality of the survey answer sheets, he yet again reaffirmed the confidentiality of the survey, assured that copies of answer sheets were made only as a back-up in the event of their loss in transit to being scored, and that copies were destroyed as soon as there was confirmation that the original answer sheets had been received at their intended destinations.

The survey was administered in a paper-and-pencil format, using Scantron™ sheets on which respondents recorded their answers to objective items. Respondents were provided with blank sheets of paper on which to write their responses to the two narrative questions. For both hourly and salary employees (as opposed to "permanent" contractors), administration took place in group sessions. (The survey was administered differently to "permanent" contractors—see below.) The sessions were held in conjunction with an ergonomics class, some participants attending the class first and some completing the survey first.

Hourly employees primarily attended survey sessions held March 17-19. Each department had a number of slots for each of these sessions, and the supervisors would release their employees from the work area to fill those slots. This ensured seat availability both in the ergonomics class and in the survey sessions and prevented employees from being sent back to the work area due to seats not being available. Salary employees primarily attended sessions held March 21, March 25 and 26. These salary employees signed up with the Training Department administrative assistant, who allowed a maximum of 50 employees to sign up for any particular session, so as not to overfill the sessions.

For contractor employees, the survey was conducted in the first portion of the contractor's all-employee meetings in March. The contractor all-employee meetings were held in the evenings of March 19 and 20.

The surveys were proctored. Proctors worked from a detailed, multi-page checklist that provided step-by-step instructions for administration of the survey, as well as answers to questions that they would be most likely to receive from survey respondents.

In order to ensure the confidentiality that the President promised, survey respondents did not put their names or other identifying information on their surveys, their Scantron™ answer sheets, or on the sheets of paper used as answer sheets for their narrative responses.

Survey responses were collected by allowing respondents to put their answer sheets into large envelopes, such that the proctor could not see their responses as they were being inserted into the envelope.

In order to avoid the risk of losing data because of answer sheets being lost in transit (one set was sent to the Scantron Company and the other to a transcriptionist hired by CES), the answer sheets were photocopied. The originals were mailed to the Scantron Company and to the transcriptionist. As soon as their receipt was confirmed, the photocopied back-up copies were destroyed.

As one other step to protect confidentiality, no data from sub-organizations with ten or fewer respondents was reported to the company in any analyses at the sub-organization level.

The transcribed narrative responses were forwarded to CES for categorization into themes that emerged from reviewing the responses

Sample Characteristics:

Of 956 hourly and salary employees and "permanent" contractors, 887 (93 percent) completed at least some portion of the written surveys. Detailed information regarding the position level, work organization (department), and sub-organization (sub-department) composition of the sample may be found in Appendix D. Note that 27 respondents failed to indicate their position level (hourly, supervisor, etc.)—too few to distort any results. However, many more respondents (206) did not provide information that allowed them to be categorized by work organization affiliation. It is not possible to ascertain why some respondents failed to identify their work organization affiliation or position level, but it should be noted that the survey items designed to allow the respondent to identify his/her work organization affiliation were complex relative to all other survey items and the instructions may have been misunderstood by respondents. Additional comments about these 206 respondents appear in the section entitled, "Results: Data from Respondents who Did Not Indicate their Work Organization Affiliation," on p. 27.

Interviews:

Interviews were conducted in two formats: individual (one-on-one) interviews and group interviews. Group interviews were attended generally by 10 or more individuals. All interviews were structured to some extent. Standard sets of questions were used, but interviewees were allowed to provide any input that they wanted to provide. Questions for the interviews were formulated so as to pursue information about survey responses. Those who were selected for interviews ranged in position level from the top levels of the organization to the shop floor and across virtually all organizations.

The interviews were conducted after the surveys had been completed and preliminarily analyzed. The interviews were conducted between April 14 and 26. The interviews were

designed to help generate tentative hypotheses with regard to why survey scores were as high as they were and why they were not higher—particularly with regard to themes that emerged from the lowest rated survey items. Interviews were conducted one-on-one (by Philip Berghausen, Stephen Cowne, and Kenneth Koves) and in groups (by Philip Berghausen, usually accompanied by Kenneth Koves). Discrepancies between interview data and survey data were of particular interest.

Employees were contacted to inform them of their selection as interviewees (see below regarding methods of selection). The nature of the interviews was explained and meeting times and locations were communicated. Supervisors/managers of the interviewees were contacted in advance of contacting the interviewees. It was communicated clearly to the supervisors/managers that they were expected to provide interviewees with release time for participation in the interviews.

Interviews (with the exception of those by Stephen Cowne—see below) began with a question about the general state of the NFS safety culture, whether it has changed in the past two years and in what ways it changed if it did change (including both improvements and degradations). That question was followed with questions about the Employee Concerns Program (ECP). Following the ECP questions were questions about presence at NFS of a questioning attitude, freedom to challenge one another, and good communication and coordination between work groups—all areas of some concern given responses to individual survey items on those topics.

INDIVIDUAL/ONE-ON-ONE INTERVIEWS:

Individual interviewees were selected on the bases of their being members of senior management, having informal leadership responsibilities, or having key functional responsibilities below the level of senior management. About 15 management employees were selected for individual interviews. Fifteen supervisors/managers were interviewed because of key functional responsibilities associated with the observations that were conducted (see section below regarding observations). Ten employees were selected for individual interviews on the basis of their being informal leaders.

The informal leaders were selected with the assistance of four managers and one ombudsperson, all of whom are perceived by their peers and/or upper management to have a good knowledge of the workforce. Each of these four managers and the ombudsperson provided names of individuals to be interviewed as informal leaders. From those employees whose names appeared on multiple lists, ten were selected for one-on-one interviews.

The individual (one-on-one interviews) typically were of 30-45 minutes duration. They were somewhat less structured than the group interviews, but followed the same general format of exploring themes from low-scoring survey items—with the exception of the interviews by Stephen Cowne that were focused on the interviewees' functional responsibilities. The interviewers began the interviews by introducing themselves, explaining the purpose of the interviews, describing how information from the interviews would be used, and providing assurance of confidentiality (that no comments would be forwarded with attribution).

GROUP INTERVIEWS:

There were eight interview groups that generally comprised 10 to 12 individuals. Systematic efforts were made to ensure that group interviewees included a broad cross-section of the company. To ensure that the various sub-organizations were represented within the group interview sessions, a target number for each sub-organization was established and then that number of slots was filled by using a randomized list of employees. (Because of the characteristics of their work, contractor employees were not assigned randomly; rather they were assigned on the basis of their availability.) A distribution of group interviewees by position level and sub-organization (sub-department) appears in Appendix E.

Interview groups were comprised so as to be homogeneous with regard to major work organization in which interviewees work and with regard to position level in the organization. Thus, interviewees were never in meetings with their superiors. The group interviews were of approximately 90 minutes duration.

Observations:

Stephen Cowne conducted the majority of observations, and Kenneth Koves conducted several. Stephen Cowne observed a variety of meetings and activities, including department, production, pre-job briefs, safety discussions, and problem screening meetings. When possible, follow-up interviews were conducted with participants in the meetings. Documents related to the meetings were reviewed when appropriate and readily available (e.g., meeting agendas). A list of meetings and activities that Stephen Cowne and Kenneth Koves observed may be found in Appendix F.

Results:

RESULTS: GENERAL COMMENTS

The survey results represent the responses of 887 employees, whereas the comments from the more than 100 individuals interviewed potentially represent the beliefs of only a relatively small number of employees. Similar limitations apply to the observations and document review. Accordingly, the assessment team gave considerably more weight to the survey results, when reaching conclusions regarding the safety culture at NFS, than it did to data from interviews, observation, and document review. Nevertheless, in addition to the presentation of survey data, information from the interviews, observations, and document review is presented below for each of the ten Traits. The assessment team, however, urges NFS to respond to this information in context and not to assume that one or two interview themes, observations, or document review findings necessarily indicates a trend. The information from interviews, observations, and document review provides data for NFS management to consider pursuing in the future.

A note regarding the salient themes arising from interviews:

- Themes include both those from one-on-one interviews and from group interviews. No attempt was made to separate the themes from the two types of sources.
- Because data from the narrative responses on the survey (Items 62 and 63) overlapped with the interview themes, the narrative response data has been integrated into the listings of interview themes.

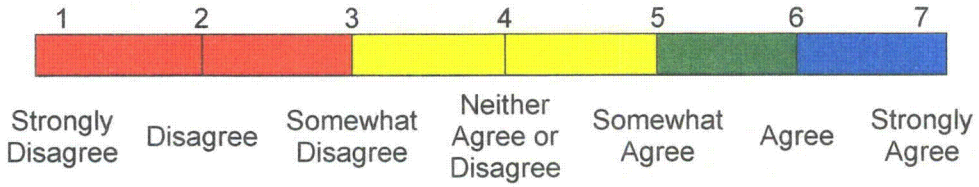
- Occasionally, interviewees contradicted one another. When they did, a theme may be listed under both "Positive Indications" and "Comments for Potential Exploration and Opportunities for Possible Improvement."

A note regarding significance of differences:

Because of large number of employees from whom data was obtained, many of the differences that result from various comparisons between groups are statistically significant. However, differences that are statistically significant, when obtained from a large pool of employees, often have no practical meaning. For the purposes of this assessment, the assessment team decided that survey differences less than 0.5 points were not likely to have any practical meaning.

A note regarding presentation of survey data:

NFS uses this color-coding system for displaying and interpreting means when presented in tables. The assessment team followed this color-coding system in the presentation of means in the tables below.



Color	Rating (1-7 scale)	Descriptor
Blue	≥6 to 7	Strength
Green	≥5 to <6	Acceptable
Yellow	≥3 to <5	Opportunity for Improvement
Red	≥1 to <3	Area for Improvement

NFS survey means were analyzed by major work organization (department) and by position level. The work organizations are Engineering; Quality, Safety & Safeguards; Operations; and "Other." These groups comprise the following:

Engineering includes Project Engineering and Construction, Fuel Process Engineering (Fuel, Fuel Development and Developmental Lab), Downblending Process Engineering, Electrical and Instrumentation and Facilities Support, Yard, Configuration Management and Drafting, Other Engineering Services (Senior Advisory Engineering, Senior Engineering Watch, and Engineering Management Staff), and Information Technology.

Quality, Safety & Safeguards includes Nuclear Criticality Safety, Radiological Protection and Health Physics (including Nuclear Measurements), Licensing and Integrated Safety Analysis, Regulatory and Records Management, Environmental Safety, Decommissioning Environmental, Industrial Safety,

Emergency Preparedness, BLEU Environmental & Industrial Safety, Analytical Services, MC&A, Quality Control and Security, and Contractor.

Operations includes Work Management (Work Control, Maintenance, Electronics, Calibration), Fuel Manufacturing Operations, BPF Manufacturing Operations, Decommissioning, WWTF/GWTF and Plant Utilities, T&WM, and Other Operations Departments (Training, Operational Excellence, Plant Superintendent).

Other includes executive and administrative: Human Resources, Legal, Communication, Assurance, Finance and Accounting, Program Management (including Program/Project Managers and Administrators, Planning, Purchasing and Warehouse Services and Business Development).

The five position levels (work levels) are: Unit Manager and Above, First Line Supervisor, Individual Contributor (Salaried Professional Staff), Technician/Operator/Craft Personnel (Hourly Staff), and Contractor.

The following results sections begin with Trait-by-Trait presentations of data from the survey, interviews, observations, and document review. Following the Trait-by-Trait presentations are additional sections: Data and thematic comments specifically about the improvement (or lack of improvement) in the NFS safety culture in the past year and two years; data and thematic comments specifically about the Employee Concerns Program (a program believed by the assessment team to be particularly critical to safety culture), and comments about the percentage of respondents who chose survey response items above and below what NFS deems the Acceptable level.

RESULTS: TRAIT-BY-TRAIT DATA:

The survey results appear in two tables of means, below, Table 1 and Table 2. Table 1 is entitled: "Work Organization and Overall Means for the Ten NRC Traits of a Healthy Nuclear Safety Culture." As the title indicates, this table presents the overall mean scores for each of the ten Traits. It also indicates the mean Trait scores for each of the ten Traits for the major workgroups: Engineering; Quality, Safety & Safeguards; Operations; and Other.

Table 2, is entitled: "Work Level Means for the Ten NRC Traits of Healthy Nuclear Safety Culture." As its title indicates, this table presents mean scores for each of the ten Traits for five work (position) levels: Unit Manager and Above, First Line Supervisor, Individual Contributor (Salaried Professional Staff), Technician/Operator/Craft Personnel (Hourly Staff), and Contractor.

For each Trait, data is presented as follows: Mean survey score for the Trait, accompanied by comments on the mean and individual item means that contributed to the Trait mean and salient themes from the interviews, observations, and document review. The salient themes are separated into two groups: Positive Indications and Comments for Potential Exploration and Possible Opportunities for Improvement.

Table 1. Work Organization and Overall Means for the Ten NRC Traits of a Healthy Nuclear Safety Culture

NRC Traits	Engineering	Quality, Safety & Safeguards	Operations	Other	Overall
1. Leadership Safety Values & Actions	4.91	4.72	4.90	5.47	4.88
2. Problem Identification & Resolution	4.97	4.83	4.83	5.55	4.92
3. Personal Accountability	5.51	5.41	5.56	5.85	5.51
4. Work Processes	5.56	5.32	5.51	5.94	5.47
5. Continuous Learning	5.07	5.14	5.13	5.66	5.17
6. Environment for Raising Concerns	5.25	4.67	4.99	5.60	4.96
7. Effective Safety Communication	5.22	4.79	5.08	5.44	5.01
8. Respectful Work Environment	4.52	4.11	4.50	5.06	4.40
9. Questioning Attitude	5.21	4.95	5.34	5.51	5.17
10. Decision Making	5.53	5.10	5.29	5.70	5.29
Survey Mean for Traits 1-10 Combined	5.11	4.88	5.09	5.52	5.03

Note: Overall Trait means and overall survey mean include data from respondents who did not identify their work organization affiliation.

Table 2. Work Level Means for the Ten NRC Traits of a Healthy Nuclear Safety Culture

NRC Traits	Unit manager and above	First Line Supervisor	Individual Contributor (Salaried Professional Staff)	Technician/ Operator/ Craft Personnel (Hourly Staff)	Contractor
1. Leadership Safety Values & Actions	5.30	5.02	5.03	4.70	4.60
2. Problem Identification & Resolution	5.36	4.97	5.01	4.70	4.87
3. Personal Accountability	5.78	5.53	5.57	5.45	5.38
4. Work Processes	5.75	5.57	5.58	5.41	5.21
5. Continuous Learning	5.42	5.13	5.16	5.08	5.26
6. Environment for Raising Concerns	5.73	5.16	5.15	4.65	4.63
7. Effective Safety Communication	5.48	5.47	5.23	4.80	4.66
8. Respectful Work Environment	5.07	4.52	4.64	4.13	4.02
9. Questioning Attitude	5.58	5.40	5.25	5.09	4.80
10. Decision Making	6.01	5.51	5.52	4.89	5.04
Survey Mean for Traits 1-10 Combined	5.37	5.27	5.18	4.89	4.86

Note: Trait means were computed by calculating the respondents' average scores for survey items associated with each of the ten Traits. Missing responses for each survey item were replaced by the mean score of all respondents for that item. Replacing missing data is required for calculating mean scores. Imputing missing data with the mean score is one of many acceptable procedures for replacing missing data; 2.6 percent of the data points were imputed, which is well within acceptable limits. Rounding errors account for the slight differences in means that would be expected to be equal.

NFS has a safety culture that is at the Acceptable level, overall. The mean of all responses is 5.03. The means of survey responses on each of the ten INPO Traits range from 4.40 to 5.51. Of the ten INPO Nuclear Safety Culture Traits, mean scores are at the Acceptable level on six of the ten. Three of the remaining means are within 0.1 point of being at the Acceptable level. Given rounding errors, this difference is so small that arguably one could have placed them at the Acceptable level. Only one Trait (Respectful Work Environment) clearly is in the yellow band as an Opportunity for Improvement. Its score is significantly lower than all others. No means are in the red band; i.e., none is an Area for Improvement.

Of the four work organizations, Quality, Safety & Safeguards has the lowest overall mean score for the ten Traits, where as "Other" has the highest. The difference is large enough potentially to have practical meaning.

Of the five work levels, the means of three (Unit Manager and Above, First Line Supervisor, and Individual Contributor) have higher mean scores on the ten Traits than do the other two work groups (Technical/Operator/Craft Personnel and Contractor). Only the difference between the Unit manager and Above group and the Contractor group is large enough to have practical meaning.

Trait #1: Leadership Safety Values and Actions:

Mean survey score for Trait #1 = 4.88

This score is categorized as an Opportunity for Improvement. Respondents from the "Other" group rated this Trait more highly than did respondents from the other three groups. The lowest mean for all 61 items falls under Trait #1: Item #47 reads "Staffing levels are adequate to meet work demands." Other survey items with relatively low ratings concern management awareness of key issues, communication of upcoming changes, and unintended consequences resulting from organizational changes. (Note: the survey item regarding unintended changes is ambiguous and difficult to interpret. It was included because it was in the 2012 survey, and it has heuristic value.) The highest mean for Trait #1 was on the item regarding availability of supervisors.

Salient Comments from Interviews, Observations, and Document Review:

Positive Indications:

Interviews suggest that senior management demonstrates a strong commitment and significant support for such practices as explaining decisions and stopping work when in doubt, as well as a variety of safety programs, such as Human Performance (HuP), SCWE, and the Corrective Action Program (CAP). Observations noted include awareness of INPO teachings, a good shift turnover with an emphasis on safety, and indications of good buy-in by supervisors. The Senior Management Observation program is good, but inclusion of third tier managers would strengthen this program. Document review is consistent with management being committed to devoting significant resources to safety-related programs.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that some leaders fail to model various safety behaviors and that production is emphasized more often than safety in various ways, including unrealistic schedules, long hours, and short staffing. Observations noted that gaps exist in commitment to safety, particularly industrial safety (e.g., failure by a supervisor to wear safety glasses when required), as well as the absence of any mention of safety at two turnover meetings. Hourly staff is not strongly engaged in some important safety issues (e.g., participation in focus area groups). Leadership appears to view average performance as acceptable.

Trait #2: Problem Identification and Resolution:

Mean survey score for Trait #2 = 4.92

The Problem Identification and Resolution (PIR) score is categorized as an Opportunity for Improvement, suggesting that the PIRC system needs attention. Respondents showed the largest concern with regard to problems not being corrected the first time they appear although they very were clear that unusual and expected conditions that may have an impact on nuclear safety are promptly investigated and resolved. Other low scoring items concerned resolution of organizational weaknesses, the effectiveness of the corrective action program, and the usefulness of the performance indicators. A particularly high scoring item, however, was associated with personnel promptly identifying and reporting conditions that could affect nuclear safety.

Salient Comments from Interviews, Observations, and Document Review:

Positive Indications:

Interviews suggest that CAP program has a number of strengths including good screening meetings, supervisors supporting hourly workers in the writing of PIRCs, and collaboration between engineers and operators on problem-solving issues. Observations noted that Problem Screening meetings are good, that they are staffed by experienced individuals, good questions are asked, and there is support for a reward program that encourages the writing of PIRCs. The "Good Catch" program to reward the writing of PIRCs is well liked and well used. Document review noted detailed and thorough PIRC procedures.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that there are some shortcomings in the CAP, including quality of input, evaluation, recommended corrective actions, and possible inadequate staffing. Observations noted a very low threshold for writing PIRCS that may be overloading CAP. Document review noted little documentation of discussion at CARB meetings of root and apparent causes.

INPO Trait #3 Personal Accountability:

Mean survey score = 5.51

This score is categorized as Acceptable. Mean scores were very high with regard to ownership of responsibility to raise nuclear safety concerns and being personally responsible for nuclear safety. Also high was the mean score with regard to always using error prevention techniques when appropriate. The lowest mean involved the item regarding coordination between work groups.

Salient Comments from Interviews, Observations, and Document Review:

Positive Indications:

Interviews suggest that accountability is well promoted by B&W, the Director of Operations, and the Manager of Security and is manifested by employees taking the initiative to correct problems

and not engage in activities they believe are unsafe. Observations noted the Security organization displayed strong ownership of new modifications. Document review noted nothing relevant to this section.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest shortcomings with regard to accountability for communicating important safety-related information, firm commitment to follow-through, and management's enforcement of rules. Observations noted instances of delayed forwarding of information between shifts, failure by any individuals to correct easily correctable leaks, tripping hazards, and unnecessary obstacles in work areas. Document review noted a large number of anonymous PIRCs (>25 percent).

INPO Trait #4 Work Processes:

Mean survey score for Trait #4 = 5.47

This score is categorized as Acceptable. The item with the highest mean score was with regard to workers following procedures. Other highly scored items include equipment labeling, job aids, and human-machine interfaces helping avoid errors; and safety-related equipment being operated and maintained within its design requirements. On the other hand, the lowest rated item under this Trait concerns procedures being up-to-date and easy to use.

Salient Comments from Interviews, Observations, and Document Review

Positive Indications:

Interviews suggest that management promotes good work processes by encouraging safe practices and by providing resources that promote safety: Stand-downs are used appropriately; the "Toolbox" training sessions are valuable; worst-case scenarios are discussed; technical expertise has been made more available through a Senior Engineering Watch; and there is teamwork across disciplines. Observations noted a well done pre-job brief (PJB) with a primary focus on safety and a methodical walk-down. Also noted was a well-run Work Control meeting. Document review noted that the work-control process is rigorous for a fuel facility.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest the presence of problems with procedures, including procedural adherence and complexity of procedures. Reportedly, the work order process is inefficient, adding unnecessary complexity, and not providing parts that are needed—as well as being focused on repairs that affect production more than safety. Observations noted carelessness in executing some work: a very informal PJB, lack of appropriate cautions surrounding a breaker lock-out and use of Letters of Authorization (LOAs) when writing a procedure may be more appropriate. Document review noted nothing relevant to this section.

INPO Trait #5 Continuous Learning:

Mean survey score for Trait #5 = 5.17

This score is categorized as Acceptable. A particularly highly rated item concerns training that reinforces safe worker behaviors and establishes high expectations for maintaining nuclear

safety. Also rated highly were items concerning training providing knowledge needed to perform the job and continuous learning being expected of everyone. The lowest rated items concern the site learning from its mistakes and staying current with the industry.

Salient Comments from Interviews, Observations, and Document Review

Positive Indications:

Interviews suggest that employees view training as the most important part of continuous learning and that they generally are pleased with training. Observations noted engaged students and knowledgeable instructors at two "Toolbox" training sessions. Document review noted thorough, professional, high quality training materials.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that employees believe that they need more cross-training and that it is critical in order to cover for one another, to be able to rotate to other jobs as needed by the company, and to reduce burnout. Document review noted that training has been identified as a primary causal factor in a number of cause evaluations. Observation noted that NFS appears to benchmark to minimum standards rather than to excellence. Additionally, employees have essentially no exposure to other plants and how those plants might perform better than NFS in some ways.

INPO Trait #6 Environment for Raising Concerns:

Mean survey score for Trait #6 = 4.96

This score is categorized as Opportunity for Improvement, though it nearly meets the criterion to be at the Acceptable level. Three of the four items associated with this Trait are rated approximately equally: the items on raising safety concerns without retaliation, not hesitating to take a concern to the ECP, and feeling free to raise a nuclear safety or quality concern to the NRC without fear of retaliation. Rated somewhat lower (and puzzling in light of the other ECP-related item for this Trait) is the item that concerns not having confidence in the ECP.

Salient Comments from Interviews, Observations, and Document Review:

Positive Indications:

Interviews suggest that interviewees are aware of multiple confidential venues available for raising concerns (ECP, NRC, etc.), but their fear of retaliation is sufficiently low and their confidence in their bosses sufficiently high, that in most instances they are comfortable bringing their concern to their boss and prefer to do so. Observation noted that objective evidence refutes a rumor that the Behavior Observation Program is used punitively. Document review notes very detailed procedures for the ECP and that 100 percent of the ECP users in the past two years would recommend the ECP to others.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that inadvertent intimidation sometimes discourages the raising of concerns, especially in a group setting. Some interviewees report that when they raise a concern they can become embarrassed when they are asked detailed questions about their concern that they

cannot answer. Observation noted nothing relevant to this section. Document review noted nothing relevant to this section.

INPO Trait #7 Effective Safety Communication:

Mean survey score for Trait #7 = 5.01

This score is categorized as Acceptable. A particularly highly rated item concerns NFS leadership frequently communicating the importance of nuclear safety. Also relatively highly rated is the item that concerns being informed of current safety concerns or issues that affect one's job. The lowest-rated item on this Trait concerns information being shared freely between work groups. It is interesting to note a related item on Trait 3, Personal Accountability, that is rated low; it concerns coordination issues between work groups not being effectively resolved.

Salient Comments from Interviews, Observations, and Document Review:

Positive Indications:

Interviews suggest that several effective steps have been taken to improve communication. The Roundtables were mentioned particularly frequently and enthusiastically, particularly those that are held in Operations. Other effective steps include the HuP and better and more frequent meetings of various types. Observation noted hourly personnel discussing safety issues related to SCWE and Conduct of Operations. Document review noted very good written communication regarding safety programs, values, and behaviors.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that production pressure and being short-staffed may inhibit safety communication. There sometimes does not seem to be enough time to communicate. This applies to management employees as well as to hourly employees, which may be why management is so infrequently seen on the shop floor. Also noted were the communication problems caused by the new computer system, particularly with regard to receiving email from external sources and doing online research related to safety issues. Observation noted a wide-spread lack of awareness of important safety statistics, such as Lost Time Accidents (LTAs) and Recordable Injuries (RIs) and noted no presentation of this information at any meetings. Document review noted nothing relevant to this section.

INPO Trait #8: Trust and Respect Permeate the Organization, Creating a Respectful Work Environment.

Mean survey score for Trait #8 = 4.40

This score is categorized as Opportunity for Improvement. None of the three survey items associated with this Trait score as Acceptable. Particularly low are the items concerning being treated with dignity and respect by NFS leadership and differing opinions being welcomed and respected. Somewhat better is the item related to one's supervisor providing useful feedback about how to improve one's performance.

Salient Comments from Interviews, Observations, and Document Review:

Positive Indications:

Interviews suggest that the two most significant changes that increase the respect that interviewees perceive are the improvements to the physical plant that include much safer walkways and upgraded bathroom and eating areas. Also appreciated is the establishment of "house rules" that make clear that an operator has authority over his/her work area. Observation noted a new covered walkway. Document review noted that *respect* is a focus area for 2013.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that a lack of respect primarily is demonstrated by lack of consideration, very broadly defined to include management's failure to provide critical information, to keep commitments, to listen to the input employees are encouraged to give (especially from hourly employees), to honor "house rules," to improve work/life balance, to provide an environment free of industrial hazards, to provide performance feedback, and to define policies. Two areas of particular dissatisfaction are a reportedly ill-defined sick-leave policy and difficulty obtaining medical benefits. Additionally, there are reports of lack of trust, upward and downward in the organization. Observations noted, relative to consideration for providing a safe work environment, that there were many tripping hazards (as mentioned above). Document review noted nothing relevant to this section.

INPO Trait #9 Questioning Attitude:

Mean survey score for Trait #9 = 5.17

This score is categorized as Acceptable. Particularly highly rated are the item concerning workers maintaining a "questioning attitude" and the item concerning a rigorous approach to problem-solving. In contrast to these highly rated items is the item concerning employees being comfortable challenging each other regardless of level when they feel something is not correct.

Salient Comments from Interviews, Observations, and Document Review:

Positive Indications:

Interviews suggest that there is a questioning attitude (particularly a technical curiosity—not just challenging others) and that it is increasing—to the point that there is interest in learning about other fuel facilities. There were no reports of questioning being responded to with any sort of hostility; the worst reported consequences were being ignored, getting an unsatisfying response (e.g., regarding the sick-leave policy), or being "grilled" for more information. Observation noted multiple instances of skillfully executed questioning at a Problem Screening meeting (as mentioned previously). Also noted was that a HuP team review resulted in identifying and implementing enhancements to the respirator washing system—enhancements which management approved and supported. Document review noted nothing relevant to this section.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that the success of displaying a questioning attitude is variable and is a function of several factors including individual personality differences (in the questioner and in

the person questioned), how diplomatically the questions are asked, whether the recipient of the question has higher position level than the questioner, and more. Observation noted not much questioning at Plan of the Day (POD) meetings and a lack of curiosity about safety statistics. Document review noted nothing relevant to this section.

INPO Trait #10 Decision Making:

Mean survey score for Trait #10 = 5.29

This score is categorized as Acceptable. Rated particularly highly in the Acceptable range is the item regarding decision-making at the site reflecting a conservative approach to nuclear safety. Respondents score at the "Opportunity for Improvement" level on the item concerning knowing who is responsible for making an important nuclear safety decision.

Salient Comments from Interviews, Observations, and Document Review:

Positive Indications:

Interviews suggest that employees think more about safety when making decisions and that their decisions are more conservative than they once were. Observations noted nothing relevant to this section. Document review noted nothing relevant to this section.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that lower-level employees believe that higher-level employees make more bad decisions, and higher level employees say that the reverse is true. The "bad" decisions perceived to be made at higher levels in the organization for the most part are not directly safety-related and are closely tied to the items listed, above, as examples of lack of consideration. However, there is some concern that upper management sets unrealistic production goals that are an unintentional inducement to compromise safety. Observation noted nothing relevant to this section. Document review noted nothing relevant to this section.

RESULTS: CHANGE IN THE SAFETY CULTURE OVER THE PAST YEAR AND PAST TWO YEARS:

On average, respondents agree that the safety culture has improved at the site during the past two years. As Table 3 below indicates, overall means for this item generally increase with position level. The mean for unit managers and above is meaningfully higher than the mean for contractors. And, the mean for Quality, Safety & Safeguards is meaningfully lower than the "Other" group.

Table 3. Mean Responses by Work Organization and Level to Item #59: Nuclear safety has improved at this site during the past two years.

Position in the Organization	Work Organization				
	Engineering	Quality, Safety & Safeguards	Operations	Other	Overall
Unit manager and above (Unit Manager, Section Manager, Director, President)	5.60	5.80	5.90	6.30	5.90
First Line Supervisor	6.30	5.90	5.70	N/A	5.87
Individual Contributor (Salaried Professional Staff)	5.40	5.20	5.80	5.80	5.51
Technician/Operator/Craft Personnel (Hourly Staff)	5.70	5.30	5.70	6.00	5.55
Contractor	N/A	5.40	N/A	N/A	5.39
Overall Means	5.60	5.40	5.70	6.00	5.57

Note: "N/A" indicates that there were no respondents in this category or that there were fewer than 10 in the category. "Overall" means column includes data from respondents who did not identify their organization affiliation. "Overall Means" row includes data from respondents who did not identify their position level in the organization.

A comparison of mean Trait scores between 2012 and 2013, shown in Table 4 below, indicates that no significant change occurred between 2012 and 2013. Thus, although employees on average agree that there has been improvement in the past two years, their responses do not indicate that there has been any significant change in the past year.

Table 4. NFS Means by Trait Comparison Chart 2012/2013

NRC Trait	NFS 2012 Means	NFS 2013 Means	Difference
1. Leadership Safety Values & Actions	5.06	4.88	-0.18
2. Problem Identification & Resolution	5.01	4.92	-0.09
3. Personal Accountability	5.59	5.51	-0.08
4. Work Processes	5.48	5.47	-0.01
5. Continuous Learning	5.30	5.17	-0.13
6. Environment for Raising Concerns	5.20	4.96	-0.24
7. Effective Safety Communication	4.93	5.01	0.08
8. Respectful Work Environment	4.64	4.40	-0.24
9. Questioning Attitude	5.32	5.17	-0.15
10. Decision Making	5.30	5.29	-0.01
Total	5.17	5.03	-0.14

As shown in Table 5, below, 63 percent of respondents Agree or Strongly Agree with the statement: "Nuclear safety has improved at this site during the past two years." NFS reports that in 2012 the percentage was the same, further bolstering the conclusion that there was no change during the past year.

Table 5. Percentages and Cumulative Percentages of Respondents who Chose Each of the Seven Response Options to Item 59: Nuclear safety has improved at this site during the past two years.

	Percent	Cumulative Percent
Strongly Disagree	2.1	2.1
Disagree	1.6	3.8
Somewhat Disagree	3.1	6.8
Neither Agree nor Disagree	9.8	16.6
Somewhat Agree	20.1	36.7
Agree	41.9	78.7
Strongly Agree	21.3	100.0

Positive indications:

Interviews suggest that there has been significant improvement in the NFS safety culture. Many interviewees commented that the improvements began in the past five to six years, and that the lessons of 2009 and 2010, including the plant shutdown, were very persuasive with regard to the importance of sustaining and increasing the improvements. Interviewees reported improvements in a wide variety of areas, naming many behaviors associated with the ten INPO Traits. Perhaps the two most frequently cited improvements were the emphasis on safety being more important than production and the encouragement to stop work when there is any doubt about the appropriateness of proceeding.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that some employees do not believe that there has been improvement in the safety culture, saying that the company either has made no genuine, meaningful efforts to improve or that the improvement efforts (combined with increasing bureaucracy) have not been effective and even may have worsened the safety culture. There is concern that the safety culture is fragile and that it will become significantly less healthy when NRC pressure relents. Too few employees have sufficiently bought into a healthy safety culture.

Initiatives that NFS Reports that It Has Designed and Implemented in the Past Two Years to Improve Safety

The company reports that the lack of measurable, positive change has not been for lack of effort. It has designed and successfully implemented a variety of substantial initiatives in response to findings of previous assessments and in particular to the 2010 Independent Safety Culture Assessment. Examples of these programs/actions are the establishment of a Work Control department and program, Plan of the Day schedules/meetings, Observation programs, an Employee Concerns Program Manager, an Ombudsman program, a shift Senior Engineering

Watch, a Metrics program, an active Human Performance process, a Nuclear Safety Review Board, and expansion of CAP investigations to cultural implications. There were also facility material condition improvements put in place such as the construction of a new Entry/Exit Control Point Facility, a new warehouse, new parking areas, and security equipment upgrades.

RESULTS: EMPLOYEE CONCERNS PROGRAM

Two survey items relate to the Employee Concerns Program (ECP). They are Items #36 and 38. They and their means are found in Table 6, below. The Quality, Safety & Safeguard group and the Operations group view the ECP less favorably than do the Engineering and "Other" groups.

Table 6. Employee Concerns Program Survey Item Means by Work Organization

Survey Items	Engineering	Quality, Safety & Safeguards	Operations	Other	Overall
36. I would not hesitate to take a concern to our Employee Concerns Program *	5.16	4.83	4.87	5.37	4.92
38. I have confidence in our Employee Concerns Program *	5.06	4.41	4.62	5.28	4.64

Note: Overall means column contains data from respondents who did not identify their organization affiliation.

Positive indications:

Interviews suggest that the ECP is both well-known and generally well regarded. Positive comments include good reports about the management of the program, it being a good alternative to an anonymous PIRC, and the objectivity and confidentiality of the program. When criticisms arise, they often are related to an employee not receiving the finding that he or she sought, not to the ECP process itself.

Comments for Potential Exploration and Possible Opportunities for Improvement:

Interviews suggest that despite the many ways in which the program is publicized, many employees remain unaware of the program. There is concern that in spite of all of the precautions that might be taken, confidentiality cannot be maintained in an organization in which so many employees are related to one another and socialize together. There is confusion as to when to use the ECP, as opposed to the many other options for reporting a concern.

RESULTS: DATA FROM RESPONDENTS WHO DID NOT INDICATE THEIR WORK ORGANIZATION AFFILIATION

A review of the responses from respondents who did not identify their work organization affiliation suggests that they are representative of the general workforce. Their mean responses are within the response ranges of the respondents who did indicate their work

organization affiliation, including responses to survey Item 26 (I can raise safety concerns without fear of retaliation) and survey Item 59: (Nuclear safety has improved at this site during the past two years). See Appendix G for a comparison of scores between respondents who did not indicate their work organization affiliation and those who did.

RESULTS: NOTES ABOUT PERCENTAGES OF RESPONDENTS CHOOSING EACH OF THE SEVEN SURVEY RESPONSE OPTIONS

Survey items are stated such that the stronger the respondents' agreement with the item, the more indicative their responses are of a healthy safety culture. Data that shows arithmetic means can be misleading when distributions are skewed. An examination of the percentage of respondents who choose each of the seven response options can be more revealing than an examination of mean scores. With the current survey administration, on 55 of the 61 items 30 percent or more of the respondents rate their agreement with the item as "Somewhat Agree" with the item or less. There are only six of the 61 items on which 70 percent or more of the respondents rate the item "Agree" or higher. In a healthy safety culture, recognizing that there always are outliers, the assessment team would expect that at least half of the survey items are endorsed as Agree or Strongly Agree by more than 70 percent of the respondents. NFS falls short of this standard. Instead of having 30 such items, NFS has six.

Conclusions and Recommendations:

NFS has a safety culture that is Acceptable, overall. Of the ten INPO Safety Culture Traits, NFS safety culture survey mean scores are at the Acceptable level (in the green band) on six of the ten Traits. Among these, Personal Accountability Trait has a particularly high mean (5.51).

The four remaining Traits are in the Opportunity for Improvement band. Of those three are within 0.1 point of being at the Acceptable level. Given rounding errors, this difference is so small that arguably one could have placed them at the Acceptable level.

No means are at the Strengths level. Although the means on nine of the ten Traits are at or near the Acceptable level, only two are high enough to be at the midpoint of the Acceptable level; all others are lower. One Trait (Respectful Work Environment) is clearly in the yellow band as an Opportunity for Improvement. No Trait means are at the Area for Improvement level.

Data from interviews, observations, and document reviews generally are consistent with the survey results. Concerns about an emphasis on production over safety, shortcomings in respect, and adequate staffing appeared to arise more frequently during the interviews than did other issues.

The current (March 2013) survey results do not differ from last year's results (March 2012). Significant culture change can take a long time (years) to achieve, and even when it has been achieved there is lag time for changes to be measurable on a survey. Although disappointing, the lack of change between two administrations of a survey that are separated by only one year may reflect that the interventions implemented after the first assessment have not had time to make a measurable impact on the organization—as opposed to indicating that they lack the potential to produce beneficial, measurable impact.

The overall mean Trait score of the Quality, Safety & Safeguards group is lower than the other three groups that are available for comparison—significantly lower than the mean for the "Other" group. This finding merits investigation.

The mean score for Trait #8 (Respectful Work Environment) is at the Opportunity for improvement level for all groups except "Other." This finding is important to explore, as it could reflect a deficiency that has a harmful effect on all other Traits. Employees who do not feel respected tend not to do the best work that they can. More significantly, employees who do not feel respected in the workplace are not likely to have a great deal of respect for their leaders. When leaders are not respected, their ability to be a constructive influence is diminished.

Ascertaining the causes of the issues involving respect and the relatively lower scores of the Quality, Safety & Safeguards group will require that the (PIRC) process be functioning very well. The PIRC system can be useful in improving the means of all other nine Traits. However, data suggest that the PIRC system needs to function better. Given that there are shortcomings in the PIRC system and given that it is a valuable tool for improvement of safety culture, there is likely to be a good return on investment for improving the PIRC system.

On the basis of the preceding comments, the assessment team makes the following recommendations:

1) Continue with the safety culture improvement efforts that are part of the 2011 Safety Culture Improvement Plan, as well as the initiatives that have been implemented since 2012. These efforts, as reported to the assessment team by NFS, are listed in the section above entitled, "NFS Initiatives that Have Been Designed and Implemented in the Past Two Years to Improve Safety." However, some efforts are likely to be more helpful than others. To ensure that the company is putting its resources into the programs with the greatest beneficial effect, it may want to evaluate the effectiveness of each of the programs and eliminate or improve those that are less effective than others.

2) Consider conducting a self-assessment of the PIRC system. Possibly include industry peers or INPO staff on the self-assessment team. Review the individual survey item means that resulted in the low mean on the PIR Trait. Explore the causes for respondents' unfavorable responses.

3) Review the individual survey item means that resulted in the low mean on the Respectful Work Environment Trait. Explore the causes for employees' negative beliefs. Avoid assuming that management knows what needs to be done to create a work environment that employees will feel is more respectful.

4) Capitalize on the fact that people are influenced to do what they see others do, more than they are influenced by positive reinforcement, punishment, facts, threats, warnings, etc. Work groups, particularly those which do not do well at displaying behaviors and attitudes consistent with a healthy safety culture, need to observe other work groups that do display these behaviors and attitudes. There are a variety of ways to do this. Some of them are: (a) send employees on benchmarking trips, (b) send employees to training where they can observe current standards, (c) send employees to industry meetings where they meet peers with higher standards, and (d) publicize the number of employees who demonstrate the desired norm rather than highlighting the outliers who do not demonstrate the desired norm.

5) Consider recruiting employees to teach others about behaviors and attitudes characteristic of a healthy safety culture. Those they teach may not benefit a great deal, but the teacher is likely to benefit. It is difficult to teach something and not come to

understand and believe it. NFS may rely too much on those responsible for programs (e.g., the ECP or Industrial Safety) to teach about their programs.

6) Measure progress periodically, particularly with groups or behaviors that have been a particular focus of efforts. Consider conducting group interviews every three to six months to assess progress and remove obstacles.

Appendices

APPENDIX A: BIOGRAPHIES OF ASSESSMENT TEAM MEMBERS

APPENDIX B: DOCUMENTS REVIEWED FOR ASSESSMENT

APPENDIX C: EXAMPLE OF SAFETY CULTURE SURVEY

APPENDIX D: NUMBER OF SURVEY RESPONDENTS WHO SELF-IDENTIFIED BY POSITION LEVEL AND SUB-DEPARTMENT

APPENDIX E: GROUP INTERVIEWEES: NUMBERS BY SUB-DEPARTMENT AND POSITION LEVEL

APPENDIX F: OBSERVATIONS: MEETINGS, TRAINING, OPERATIONS, PLANT TOUR

APPENDIX G: DATA REGARDING RESPONDENTS WHO DID NOT IDENTIFY THEIR WORK ORGANIZATION AFFILIATION

APPENDIX A: BIOGRAPHIES OF ASSESSMENT TEAM MEMBERS

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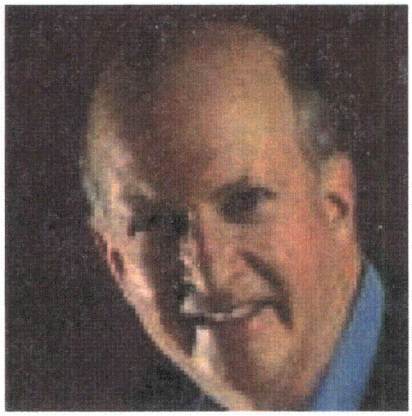

Philip E. Berghausen, Jr., Ph.D., is the Founder and Executive Director of the Center for Executive Solutions (formerly Berghausen Consulting, Inc). His 30-year practice focuses on organizational consultation, including executive selection and coaching, leadership and management training, team building, strategic planning facilitation, human performance, and incident analysis. He focuses his efforts on the commercial nuclear power generation industry, having served more than 10 utility companies and their vendors in the U. S. and Canada. His other area of concentration is on the needs of local governments.

His management experience includes having operated his own corporation as well as having been Vice President and co-owner of Behaviordyne Psychological Corporation, a consulting firm that specializes in pre-employment and fitness-for-duty screening. Additionally, he has served as Dean of Clinical Training at Palo Alto University (formerly the Pacific Graduate School of Psychology), the Clinic Coordinator for the Health Psychology Clinic at the San Francisco Veterans Administration Medical Center, and a student personnel administrator at Marquette University.

Phil has conducted research regarding stress reduction, psychosocial risk factors for illness, clinical decisions pertaining to emotional instability in the workplace, and efficacy of psychiatric aftercare. He has taught at Stanford University and the Palo Alto University. His publications and presentations have been in the areas of executive assessment, selection, and coaching, professional

development, succession planning, behavioral management, error prevention, stress, anxiety, ethical use of psychological tests, and emotional stability screening for the commercial nuclear power generation industry,

In 2000, he served as an examiner for the Malcolm Baldrige National Quality award given by the U. S. Department of Commerce. He was a member of a site visit team. That same year, he attended the Leadership Education Workshop at Harvard's Kennedy School of Government. More recently, he completed "Reactor Technology for Utility Executives" at MIT.

In 1989, he traveled to the USSR for an inspection of the Chernobyl Nuclear Power Plant, where he was an invited delegate to the First International Workshop on Past Severe Accidents and their Consequences. He contributed a human factors and management analysis to the conference's examination of the causes and consequences of the Chernobyl incident.

Phil is a past Secretary of the Society of Consulting Psychology and a past Chair of the Human Factors Division of the American Nuclear Society. He is a member of the American Association of University Professors. For several years, he sat on the Corporate Nuclear Safety Review Board for Energy Northwest's Columbia Generating Station.

He received his masters and doctoral degrees, both in psychology, from Colorado State University. His bachelor's degree, in Slavic Linguistics and Russian Area Studies, is from Lawrence University.

(rev 2011)

STEPHEN R. COWNE
1519 Pecan Place
Andrews, TX 79714
(432) 523-9944 (Home)

PROFESSIONAL PROFILE

- Over 25 years of nuclear industry experience in power generation and enrichment plant positions with over 15 years in management.
- Work experience includes nuclear licensing & compliance, operations, project management, quality assurance, emergency preparedness, environmental compliance, safety culture and management systems.
- Experienced in changing culture at nuclear facilities.
- Recent experience in a nuclear construction environment under a COL.

EXPERIENCE

LOUISIANNA ENERGY SERVICES
URENCO USA

Director, Operations – July 2010 to Present
Responsible for efficient and safe operation of the enrichment plant along with the packaging and transportation of product material. In addition, responsible for chemistry, plant commissioning and cylinder storage activities. Manages over 115 personnel in five departments: Shift Operations, Logistics, Chemistry Services, Training, and Operations Support/Commissioning. Reports directly to the President and CEO.

Deputy Director, Operations – January to June 2010
Currently training as a replacement for the Director, Operations. Responsible for learning plant systems and operations. Performs staff work for Director, Operations, as assigned. Acts as alternate for Director, Operations, in his absence.

Director, Quality and Regulatory Affairs – May 2008 to December 2009
Manages the quality assurance, licensing/compliance, corrective action and employee concerns programs at a nuclear facility under construction. Department is comprised of 36 personnel including four managers. Responsible for the site safety culture program. Reports to the Chief Operating Officer.

Licensing Manager/Director – March 2007 to May 2008
Responsible for the licensing and compliance activities associated with the construction of a centrifuge enrichment plant under a COL. Manages the licensing basis documents. Coordinates NRC inspections and communications with the NRC. Responsible for preparation of regulatory correspondence. Advises senior management on regulatory matters.

UNITED STATES ENRICHMENT CORPORATION
PADUCAH GASEOUS DIFFUSION PLANT

Regulatory Affairs Manager – January 2002 to March 2007
Managed functional areas of licensing, regulatory compliance, emergency management, environmental compliance, employee concerns and corrective actions program. Lead manager onsite for safety culture initiatives and safety conscious work environment training. Emergency Management included responsibilities for plant emergency preparedness and program support. Environmental Compliance includes responsibility for water, air and waste regulatory functions. Position included collateral duty of shift oversight of operations. During plant labor strike of 2005, position had several responsibilities in the supervision of plant operation. Advised plant manager on change management and culture issues. Position reported directly to senior USEC official on site.

Regulatory Compliance Manager – July 1999 to January 2002
Managed day-to-day site regulatory activities at gaseous diffusion plant. Supervised regulatory engineers. Responsible for site regulatory correspondence and documents. Advised plant management on change management. Worked directly with NRC Senior Resident Inspector and NRC Project Manager. Participated in site regulatory decisions as member of management.

Senior Regulatory Engineer - March 1996 to June 1999
Lead compliance engineer for team of regulatory engineers responsible for solving plant regulatory problems. Supported plant activities by interfacing daily with inspectors from NRC, interpreting regulations, conducting investigations, and responding to NRC correspondence. Responsible for managing plant regulatory issues. Assisted plant managers in regulatory problem resolution. Advised management on transitioning former DOE plant to new regulatory environment under NRC.

CONSTELLATION ENERGY/BALTIMORE GAS & ELECTRIC COMPANY
CALVERT CLIFFS NUCLEAR POWER PLANT

Project Manager - Seismic Verification Project - July 1993 to March 1996
Managed project team tasked with resolving complex seismic engineering and regulatory issues. Coordinated plant effort to inspect and upgrade approximately 1700 plant components. Supervised team of employees and consultants used in walkdowns and analyses. Coordinated modification activities with engineering and maintenance organizations. Knowledgeable in basic seismic engineering and NRC requirements. Attended SQUG walkdown training.

Assistant to the Vice President - Nuclear Energy - August 1991 to July 1993
Performed as technical assistant to the vice president. Investigated and recommended solutions to plant issues and management systems problems.

Assisted in budgeting, forecasting and cost control processes. Prepared presentations and correspondence for vice president. Planned and facilitated staff meetings.

Senior Engineer - Quality Assurance - September 1989 to August 1991
Conducted internal audits of nuclear program to verify compliance with 10CFR50, Appendix B. Supervised work group of lead auditors and engineers. Developed real-time QA surveillance program. Performed complex investigations of plant and programmatic problems.

Senior Engineer - Licensing - November 1986 to August 1989
Managed regulatory issues and licensing submittals. Supervised work group of licensing engineers. Coordinated site license amendment requests and requests for relief from ASME Codes. Negotiated commitments and priorities with NRC representatives. Developed solutions to complex regulatory problems. Screened events for reportability.

Engineer - Licensing - April 1984 to October 1986
Wrote plant responses to NRC Inspection Reports, Generic Letters and Bulletins. Developed and drafted license amendment requests for plant Technical Specifications. Investigated and prepared Licensee Event Reports. Participated in various industry groups and committees.

UNITED STATES NAVY

Naval Officer/Nuclear Watch Officer - June 1979 to March 1984
Supervised operation of naval reactor plant as qualified Watch Officer and responsible for management of shift crews. Managed complex nuclear plant maintenance during shipyard periods. Division Officer (manager) for auxiliary systems division responsible for operation and maintenance of ship-board equipment. Attended various U.S. Navy schools, including Nuclear Prototype Training Unit and Nuclear Power School.

TRAINING, SKILLS AND ACHIEVEMENTS

- Managed quality & regulatory affairs activities under a COL.
- Significant involvement in transitioning plant from government ownership and DOE regulation to private ownership and NRC oversight.
- Member of site safety review committee at two fuel facilities.
- Trained to do 10 CFR 50.59 safety evaluations, 10 CFR 76.68 Unreveiwed Safety Question Determinations and 10 CFR 70.72 Evaluations.
- Trained in TapRoot, HPES, MORT and other root cause analysis methods.
- Trained quality assurance auditor in accordance with ANSI N45.2.23.
- Completed Homeland Security emergency preparedness courses.
- Very knowledgeable of nuclear industry regulations (10 CFR Parts 50, 70 and 76), codes and standards, and INPO Performance Criteria.

- Negotiated gaseous diffusion plant Security Interim Compensatory Measures with NRC.
- Completed Seismic Verification (SQUG) Project at Calvert Cliffs Nuclear Power Plant under budget and ahead of schedule.
- Developed real-time surveillance program at power plant.
- Coordinated power plant project to change Tech Spec Surveillance Requirements from 18-month to 24-month frequency to support new fuel cycle.

EDUCATION

Master of Engineering Administration, 1988 - *George Washington University*

Bachelor of Science in Civil Engineering, 1979 - *Virginia Tech*

Bio for Ken Koves

G. Kenneth Koves, Ph.D. is a thought leader, researcher, and global resource regarding nuclear safety culture. He is currently a principle program manager in Organization and Human Performance at the Institute for Nuclear Power Operations (INPO). He received his B.A. in Psychology from Wheaton College in Illinois and his M.S. and Ph.D. in Industrial/Organizational Psychology from the Georgia Institute of Technology in Atlanta.

During his seven year tenure at Sprint as a Sr. Organization Development Consultant, Dr. Koves specialized in the areas of organization culture assessment and change, strategic direction and alignment, organization structure design, and survey development/administration.

During the past nine years at the Institute of Nuclear Power Operations (INPO), he has worked with nuclear power plants to validly define and reliably measure the construct of safety culture. He is a leader and group facilitator who is collaboratively creating a common language framework for nuclear safety culture both domestically and internationally. His current research efforts are targeted at more effectively defining the relationship between nuclear safety culture and power plant safety and performance. Recent presentations on nuclear safety culture have been to the G8 Nuclear Safety and Security Group and the Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards subcommittee on Reliability and Probabilistic Risk Assessment. He has been working with the IAEA on safety culture related projects since 2009.

He leads domestic and international workshops on defining and assessing safety culture both within the USA and around the world. Within the past 24 months he has presented to groups in China, Austria, Spain, India, and the US with additional webinars in Russia and Switzerland.

Andrew Winzelberg, Ph.D.

Dr. Andrew Winzelberg, founder and Director of the Center for Executive Solutions, has applied his understanding of social and emotional intelligence, human behavior and organizational dynamics to help organizations maximize workforce productivity since 1996. His practice areas include workplace culture assessments, program evaluation, change management, leadership and management training, organizational effectiveness enhancement, succession planning, and leadership assessment and development.

Andrew has focused in efforts in the nuclear industry working in the area of organizational effectiveness and human performance. Andrew has participated in a number of nuclear safety culture assessments and investigated allegations presented to Employee Concerns Programs. He has helped organizations create their succession planning programs that ensure the continuity of the leadership team as well as keeping the "pipeline" of new leaders full.

Andrew has led organization wide assessments of leadership talent and competencies. He has developed customized 360-degree assessments with data mining technology that enhances the effectiveness both of individual managers and of organization-wide professional development programs. His knowledge of research methodology has helped decision-makers collect and understand complex datasets that include quantitative and qualitative data.

For several years, Andrew held a research appointment in the School of Medicine at Stanford University. He has taught undergraduate and graduate courses at Stanford University, the University of California, Santa Barbara, and Santa Clara University. Andrew has authored over sixty articles and book chapters that have published in psychology and medical journals, and he has presented at numerous scientific conferences worldwide. He serves as an associate editor and peer-reviewer for several professional journals. Andrew received his Ph.D. in Counseling Psychology from Stanford University and his B.A. in Economics and Psychology from the University of California, Santa Barbara.

APPENDIX B: DOCUMENTS REVIEWED FOR ASSESSMENT

DOCUMENTS REVIEWED FOR NFS ASSESSMENT

1. CAP Metrics as of 12-31-12
2. CAP Procedure List
3. CARB Meeting Minutes for 02-06-2012
4. CARB Meeting Minutes for 03-05-2012
5. CARB Meeting Minutes for 03-28-2012
6. CARB Meeting Minutes for 06-04-2012
7. CARB Meeting Minutes for 08-06-2012
8. CARB Meeting Minutes for 08-29-2012
9. Disciplinary Actions Log as of January 31 2013
10. NFS-HR-04-005-A Rev 1
11. 2012 ECP Matrix
12. ECP Procedure NFS-ECP-002 Rev 2
13. ECP Procedure NFS-ECP-003 Rev 1
14. HuP Fundamentals Training Lesson Plan
15. HuP Handbook Toolbox
16. BPF Common Technical Training Lesson Plan
17. Operator SX Training Lesson Plan
18. Operator UAIx Training Lesson Plan
19. Safety Culture Improvement Plan (SCIP), Rev 4
20. SCUBA Report 2010
21. NFS KPI workbook
22. Initial Supervisor Training Lesson Plan
23. Situational Frontline Leadership Training Presentation
24. Metrics Monthly Review Meeting Minutes 03-27-12
25. Metrics Monthly Review Meeting Minutes 05-29-12
26. Metrics Monthly Review Meeting Minutes 07-31-12

27. Employee Newsletter-2012-08August
28. Employee Newsletter-2012-09September
29. Employee Newsletter-2012-October
30. Employee Newsletter – 2012-November
31. Employee Newsletter –2012-December
32. Employee Newsletter – 2013-January
33. 2012 NRC Inspection Summary
34. NRC OnSite Allegations Report
35. 2011 Audit Schedule Results
36. 2012 Audit Schedule Results
37. 2012 Safety Culture Brochure
38. SSRC Meeting Minutes
    a. 12/11/12 mins
    b. 12/13/12 mins
    c. 12/20/12 mins
39. Annual Safety Refresher (SA-GET-2013) Training Plan
40. Initial General Employee Training (GET) Lesson Plan

41. SCWE for Supervisors Training Lesson Plan
42. SCWE General Audience Training Lesson Plan
43. SCWE Guide for Managers and Supervisors
44. Org Chart Jan 2013
45. Investigation I14808 Snapchart
46. ISA Evaluation of I14808 Event 7-17-12
47. Small Team Root Cause Investigation I14808
48. Technical Team Evaluation of I14808 Event
49. Investigation I14873 SnapChart
50. Small Team Root Cause Investigation Report for I14873
51. Small Team Root Cause Investigation I15018
52. Safety Culture Review for Investigation I15018
53. Apparent Cause Analysis I15465
54. NFS-MGT-04-006 Rev 4 SCWE policy
55. NFS-GH-65 Rev 7 and NFS-CAP-009 Rev 1 (especially since Steve had commented on the PIRCS procedures)
56. NFS-TN-008 Rev 12
57. NFS-OPS-001 Rev 4 Conduct of Operations

APPENDIX C: EXAMPLE OF SAFETY CULTURE SURVEY

INPO Nuclear Safety Culture Survey for Nuclear Fuel Services

NOTE: In the context of this survey nuclear safety is broadly defined to include all safety disciplines, physical and information security, material safeguards and compliance with regulations.

For all questions fill in one choice on the provided "bubble sheet"

1. Decision-making at this site reflects a conservative approach to nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

2. Personnel promptly identify and report conditions that can affect nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

3. People are treated with dignity and respect by the NFS leadership

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

4. Dialogue and debate are encouraged when evaluating nuclear safety issues

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

5. When I need a decision, my management is usually available

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

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6. NFS management really knows what goes on around here

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

7. Employees are well informed of lessons learned from significant industry and plant events

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

8. NFS site management gives us clear direction

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

9. Contractors/vendors understand our expectations for performing work that can affect nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

10. Training provides me with the knowledge I need to perform my job

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

11. Information is freely shared between work groups

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

12. We adopt innovative ideas to improve nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

13. Organizational weaknesses (underlying causes of human error; weaknesses in organizational processes such as change management, procedures, corrective action program, etc...) are identified and resolved

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

14. When an important nuclear safety decision must be made, I know who is responsible to make it

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

15. At this site, differing opinions are welcomed and respected

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

16. People here are comfortable challenging each other, regardless of level, when they feel something is not correct

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

17. I have confidence in the nuclear safety decisions made higher in the organization

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

18. Unusual or unexpected conditions that may have an impact on nuclear safety are promptly investigated and resolved

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

19. My supervisor is usually available when I have a question or problem

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

20. Overall, workers maintain a "questioning attitude" and a rigorous approach to problem-solving

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

21. NFS leadership frequently communicates the importance of nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

22. It is my responsibility to raise nuclear safety concerns

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

23. We have a strong quality assurance process and organization

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

24. Continuous learning is expected of everyone

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

25. We correct problems the first time they appear

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

26. I can raise safety concerns without fear of retaliation

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

27. NFS management acts decisively when a nuclear safety concern is raised

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

28. Supervisors are responsive to employee questions

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

29. Personnel do not proceed in the face of uncertainty

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

30. We stay current with what's going on in the industry and adopt new ideas when they will improve our performance

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

31. I understand that I am personally responsible for the behaviors and work practices that support nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

32. Equipment labeling, job aids, and human-machine interfaces help me to avoid errors

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

33. I am always informed of current safety concerns or issues that affect my job.

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

34. Training reinforces safe worker behaviors and establishes high expectations for maintaining nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

35. Our corrective action program is effective

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

36. I would not hesitate to take a concern to our NFS Employee Concerns Program

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

37. Safety related equipment is operated and maintained within its design requirements

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

38. I have confidence in our NFS Employee Concerns Program

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

39. My supervisor periodically observes me working

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

40. Workers at this site usually follow procedures

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

41. Our performance indicators and trending programs help us to detect problems early

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

42. I understand our improvement focus areas for this year

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

43. Peers coach each other on behaviors that promote nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

44. Upcoming changes are clearly and effectively communicated

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

45. There is good communication about nuclear safety issues that affect my job

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

46. Our procedures are generally up-to-date and easy to use

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

47. Staffing levels are adequate to meet work demands

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

48. People are often recognized or appreciated for identifying and reporting nuclear safety issues

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

49. I feel free to raise a nuclear safety or quality concern to the NRC without fear of retaliation

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

50. My supervisor discusses safety with me before I start work on a new or infrequent job

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

51. Co-workers at this site hold one another to high standards

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

52. Work documents and procedures tell me what to do if something unexpected occurs

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

53. I always use human error prevention techniques when my work could affect nuclear safety

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

54. I have the tools, equipment, and facilities I need to do my job

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

55. My supervisor gives me useful feedback about how to improve my performance

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

56. Organizational changes rarely result in unintended consequences

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

57. Personnel are recognized for performance that supports nuclear safety and a safety conscious work environment

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

58. This site learns from its mistakes

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

59. Nuclear safety has improved at this site during the past two years.

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

60. Coordination issues between work groups are effectively resolved

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

61. My supervisor responds to questions and concerns in an open and honest manner

A	B	C	D	E	F	G	H
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable/ No chance to observe

62. Are you aware of any unreported safety concern?

A= Yes
(NOTE: IF YOU ANSWERED YES, PLEASE USE THE SEPARATE SHEET OF PAPER PROVIDED TO YOU FOR YOUR COMMENTS TO RESPOND TO THIS QUESTION)
B= No

63. Do you have any comments that you would like to share about the safety culture at NFS?

A= Yes
(NOTE: IF YOU ANSWERED YES, PLEASE USE THE SEPARATE SHEET OF PAPER PROVIDED TO YOU FOR YOUR COMMENTS TO RESPOND TO THIS QUESTION)
B= No

64. **Position in Organization:**

A= Unit Manager and above (Unit Manager, Section Manager, Director, President)
B= First Line Supervisor
C= Individual Contributor (Salaried Professional Staff)
D=Technician/ Operator/Craft personnel (Hourly Staff)
E= Contractor

65 Organizational Department – Engineering (Please choose answer A – "Not Applicable" if you are not in this department)

A = Not Applicable
B = Project Engineering and Construction
C = Fuel Process Engineering (Fuel, Fuel Development and Developmental Lab)
D = Downblending Process Engineering
E = Electrical & Instrumentation and Facilities Support
F = Yard
G = Configuration Management and Drafting
H = Other Engineering Services (Senior Advisory Engineering, Senior Engineering Watch, and Engineering Management Staff)
I = Information Technology

66. **Organizational Department - Quality, Safety & Safeguards** (Please choose answer A – "Not Applicable" if you are not in this department)

A = Not Applicable
B = Nuclear Criticality Safety
C = Radiological Protection & Health Physics (including Nuclear Measurements)
D = Licensing & Integrated Safety Analysis, Regulatory & Records Management
E = Environmental Safety, Decommissioning Environmental, Industrial Safety, Emergency Preparedness, BLEU Environmental & Industrial Safety
F = Analytical Services
G = MC&A, Quality Control and Security
H = Contractor

67. **Organizational Department – Operations** (Please choose answer A – "Not Applicable" if you are not in this department)

A= Not Applicable
B = Work Management (Work Control, Maintenance, Electronics, Calibration)
C = Fuel Manufacturing Operations
D = BPF Manufacturing Operations
E = Decommissioning
F = WWTF/GWTF and Plant Utilities
G = T&WM
H = Other Operations Departments (Training, Operational Excellence, Plant Superintendent)

68. **Organizational Department - Other Executive & Administrative Services** – this includes the following:

(Please choose answer A – "Not Applicable" if you are not in this department)

A = Not Applicable
B = Human Resources, Legal, and Communication
C= Assurance and Finance & Accounting
D= Program Management (including Program/Project Managers and Administrators, Planning, Purchasing and Warehouse Services and Business Development)

We appreciate your time and efforts in completing this survey!

THANK YOU!

APPENDIX D: NUMBER OF SURVEY RESPONDENTS WHO SELF-IDENTIFIED BY POSITION LEVEL AND SUB-DEPARTMENT

NUMBER OF SURVEY RESPONDENTS WHO SELF-IDENTIFIED BY POSITION LEVEL AND SUB-DEPARTMENT

	Unit Manager and above (Unit Manager, Section Manager, Director, President)	First Line Supervisor	Individual Contributor (Salaried Professional Staff)	Technician/ Operator/Craft personnel (Hourly Staff)	Contractor	total
Engineering						
Project Engineering and Construction	1	4	16	1	0	22
Fuel Process Engineering (Fuel, Fuel Development and Developmental Lab)	3	2	22	1	0	28
Downblending Process Engineering	1	0	4	0	0	5
Electrical & Instrumentation and Facilities Support	1	1	13	6	0	21
Yard	0	3	0	14	0	17
Configuration Management and Drafting	2	0	7	1	0	10
Other Engineering Services (Senior Advisory Engineering, Senior Engineering Watch, and Engineering Management Staff)	5	1	9	0	0	15
Information Technology	0	0	0	0	0	0
Quality, Safety & Safeguards						
Nuclear Criticality Safety	0	0	4	0	0	4
Radiological Protection & Health Physics (including Nuclear Measurements)	0	2	16	25	0	43
Licensing & Integrated Safety Analysis, Regulatory & Records Management	1	1	11	1	0	14
Environmental Safety, Decommissioning Environmental, Industrial Safety, Emergency Preparedness, BLEU Environmental & Industrial Safety	1	0	12	1	0	14
Analytical Services	4	3	5	22	0	34
MC&A, Quality Control and Security	4	6	13	3	0	26
Contractor	3	2	1	3	129	138

	Unit Manager and above (Unit Manager, Section Manager, Director, President)	First Line Supervisor	Individual Contributor (Salaried Professional Staff)	Technician/ Operator/Craft personnel (Hourly Staff)	Contractor	total
Operations						
Work Management (Work Control, Maintenance, Electronics, Calibration)	1	3	12	14	0	30
Fuel Manufacturing Operations	4	9	1	68	0	82
BPF Manufacturing Operations	2	8	1	25	0	36
Decommissioning	1	2	4	5	0	12
WWTF/GWTF and Plant Utilities	0	4	0	8	0	12
T&WM	3	5	0	18	0	26
Other Operations Departments (Training, Operational Excellence, Plant Superintendent)	6	4	0	1	0	11
Other Executive & Administrative Services						
Human Resources, Legal, and Communication	5	0	7	2	0	14
Assurance and Finance & Accounting	8	0	15	0	0	23
Program Management (including Program/Project Managers and Administrators, Planning, Purchasing and Warehouse Services and Business Development)	5	1	14	3	0	23
total	61	61	187	222	129	660

*Note: Respondents who did not indicate their position in the organization and/or organizational department are not included in the table, above.

APPENDIX E: GROUP INTERVIEWEES: NUMBERS BY SUB-DEPARTMENT AND POSITION LEVEL

GROUP INTERVIEWEES: NUMBERS BY SUB-DEPARTMENT AND POSITION LEVEL

Department	# of Attendees	Position			
		Hourly	Salary ind. contributor	First line supervisor	Manager
"Other" Departments					
Assurance	2		2		
Human Resources	3		2		1
Legal, Communications	1		1		
Finance & Administration	2		1		1
Program Mgmt. /Corporate Services/Business Development	2		2		
Purchasing	2		2		
Warehouse (Supply Chain)	1		1		
Program Planning/Project Controls	1		1		
Operations Departments					
Fuel Operations	9	6		1	2
Downblending (BLEU Preparation Facility) Operations	6	5		1	
Waste Water Treatment Facility Operations	3	2		1	
Transportation & Waste Management Operations	6	4		1	1
Decommissioning Operations	3	1		1	1
Training	2		1	1	
Operations Excellence	1		1		
Plant Superintendent	2			1	1
Maintenance	5	5			
Work Control	1		1		
Calibration	1	1			
Quality, Safety & Safeguards Departments					
Clerk	2	2			
Radiation Monitoring	6	6			
Laboratory	5	3		1	1
Quality Control	1		1		
Nuclear Criticality Safety	2		1		1

Department	# of Attendees	Position			
		Hourly	Salary ind. contributor	First line supervisor	Manager
Environmental Protection	1		1		
Industrial Safety	1		1		
Material Control & Accountability	2		1		1
Security	2		1		1
Integrated Safety Analysis/ Licensing/Regulatory	1		1		
Contractor	9	8		1	
Engineering Departments					
Information Technology	1		1		
Construction	1		1		
Facilities Utilization/Yard	4	3		1	
Configuration Management/Drafting	3		2		1
Fuel Process Engineering	1		1		
Downblending Process Engineering	2		1		1
Facilities Engineering	2		1		1
Electrical Engineering	1		1		
Development Laboratory	2		1		1
Fuel Development & Variability Reduction	1		1		
Advisory Engineering	1		1		
Project Engineering	1		1		
Totals:	**105**	46	**34**	**10**	**15**

* Of the 105, 28 work off-shift schedule:
  15 work second shift schedule
  13 work third shift schedule

APPENDIX F: OBSERVATIONS: MEETINGS, TRAINING, OPERATIONS, PLANT TOUR

OBSERVATIONS & MEETING ATTENDANCE LIST

April 15, 17-19, 23, 24 and 25, 2013

Observations and Meetings on April 15, 2013

1. Work Control Turnover Meeting
2. Observed Maintenance work

Observations and Meetings on April 17, 2013

1. Work Control Turnover
2. Decommissioning Area
3. Problem Screening Meeting
4. Plan Of the Week (POW) Meeting

Observations and Meetings on April 18, 2013

1. Problem Screening Meeting
2. Plan Of the Day (POD) Meeting

Observations and Meetings on April 19, 2013

1. Observed operations in Waste Water Treatment Facility (WWTF)

Observations and Meetings on April 23, 2013

1. Problem Screening Meeting
2. Plan Of the Day (POD) Meeting
3. NFS Overview
4. Plant Tour
5. Fuel Supervisor Shift Turnover (1430)
6. Observed operations in 700 & 800 Areas
7. Observed Security Operations Turnover

Observations and Meetings on April 24, 2013

1. Transportation & Waste Management Daily Planning Meeting
2. Problem Screening Meeting
3. POD Meeting
4. Work Control Turnover Meeting
5. Maintenance Shop Turnover Meeting (1430)
6. Maintenance Pre-Job Brief and subsequent work (Swagelock valve replacement in 200 Area)
7. Training Toolbox in warehouse for new waste packaging system
8. BPF Operations Turnover Meeting (2230)

Observations and Meetings on April 25, 2013

1. Training Toolbox in Respirator Facility on new respirator washing LOA (procedure)
2. Outbrief

APPENDIX G: DATA REGARDING RESPONDENTS WHO DID NOT IDENTIFY THEIR WORK ORGANIZATION AFFILIATION

Table A. Work Organization and Overall Means for the Ten NRC Traits of a Healthy Nuclear Safety Culture: Comparison of Four Organizations to Respondents who Failed to Identify their Organization Affiliation

NRC Traits	Engineering	Quality, Safety & Safeguards	Operations	Other	Affiliation Not Identified
1. Leadership Safety Values & Actions	4.91	4.72	4.90	5.47	4.75
2. Problem Identification & Resolution	4.97	4.83	4.83	5.55	4.84
3. Personal Accountability	5.51	5.41	5.56	5.85	5.48
4. Work Processes	5.56	5.32	5.51	5.94	5.44
5. Continuous Learning	5.07	5.14	5.13	5.66	5.14
6. Environment for Raising Concerns	5.25	4.67	4.99	5.60	4.81
7. Effective Safety Communication	5.22	4.79	5.08	5.44	5.03
8. Respectful Work Environment	4.52	4.11	4.50	5.06	4.31
9. Questioning Attitude	5.21	4.95	5.34	5.51	5.06
10. Decision Making	5.53	5.10	5.29	5.70	5.13

Table B: Comparison of Mean Responses by Respondents Who Did Indicate Organization Affiliation to Those who Did Not on Item# 26: I can raise safety concerns without fear of retaliation

Work Organization	Mean
Engineering	5.42
Quality, Safety, Safeguards	4.62
Operations	5.14
Other	5.95
No Affiliation Identified	4.88
Total	5.01

Table C: Mean Responses by Level and by Organization, Including those who Did Not Identify their Organization, to Item #59: Nuclear safety has improved at this site during the past two years

Position in the Organization	Engineering	Quality, Safety & Safeguards	Operations	Other	Affiliation Not Identified
Unit manager and above (Unit Manager, Section Manager, Director, President)	5.60	5.80	5.90	6.30	5.71
First Line Supervisor	6.30	5.90	5.70	N/A	N/A
Individual Contributor (Salaried Professional Staff)	5.40	5.20	5.80	5.80	5.61
Technician/Operator/Craft Personnel (Hourly Staff)	5.70	5.30	5.70	6.00	5.36
Contractor	N/A	5.40	N/A	N/A	5.35

Note: Respondents who did not indicate their position in the organization and/or work organization are not included in the table, above. N/A indicates there were no respondents in this category or fewer than ten.

Table D. Comparison of Percentage and Cumulative Percentage of Respondents who Did and Did Not Identify their Work Organization Affiliation on Item 59 Nuclear safety has improved at this site during the past two years

	Affiliation Identified Valid Percent	Affiliation Identified Cumulative Percent	Affiliation Not Identified Valid Percent	Affiliation Not Identified Cumulative Percent
Strongly Disagree	2.1	2.1	3.6	3.6
Disagree	1.6	3.8	2	5.6
Somewhat Disagree	3.1	6.8	5.1	10.7
Neither Agree nor Disagree	9.8	16.6	7.6	18.3
Somewhat Agree	20.1	36.7	19.8	38.1
Agree	41.9	78.7	41.1	79.2
Strongly Agree	21.3	100	20.8	100

Table E. Employee Concerns Program Survey Item Means by Work Organization and Respondents who Did not Identify their Work Organization Affiliation

Survey Items	Engineering	Quality, Safety & Safeguards	Operations	Other	Affiliation Not Identified
36. I would not hesitate to take a concern to our Employee Concerns Program *	5.16	4.83	4.87	5.37	4.83
38. I have confidence in our Employee Concerns Program *	5.06	4.41	4.62	5.28	4.55

Attachment 2

Safety Culture Improvement Plan

(17 pages to follow)

Nuclear Fuel Services' Safety Culture Improvement Plan
August 2013

Joseph G. Henry, President

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Nuclear Fuel Services' Safety Culture Improvement Plan
August 2013

The NFS Safety Culture Improvement Plan August 2013 (SCIP)[1] provides a brief history of the NFS safety culture improvement journey, describes our current place on this journey and efforts underway, and establishes actions for continued safety culture improvement.

1.0 OVERVIEW OF NFS SCIP

This SCIP provides the NFS workforce with a structured and easily understood plan for sustained improvement of the organizational safety culture. The plan addresses the issues identified in the NFS Nuclear Safety Culture Assessment Report dated June 19, 2013[2] (2013 ISCA).

Our top priority at NFS is the safe operation of our facility. We understand the need for a robust safety culture to ensure the safety of our employees, the public, and the success of our business. NFS has made progress with instilling a strong safety culture at the facility, and we recognize the traits and behaviors necessary to sustain and grow this culture. Accordingly, we have created this SCIP to delineate the actions that are planned, or in progress, that will continue to promote a robust safety culture.

2.0 NFS SAFETY CULTURE COMMITMENT

Nuclear Fuel Services, Inc. (NFS) is committed to maintaining a strong safety culture. Safety culture is defined as the core values and behaviors resulting from a collective commitment by each of us to emphasize safety over competing priorities to ensure the protection of people and the environment.

We understand that the protection of people and the environment is the right thing to do and is fundamental to achieving our business objectives. As described in NFS-MGT-05-007, *Safety Culture Policy*, a strong safety culture must exhibit the following traits:

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[1] The issuance of this document, the Nuclear Fuel Services' Safety Culture Improvement Plan August 2013 (SCIP) supersedes all former documents and plans relating to safety culture improvement at NFS.

[2] Received by NFS on June 24, 2013.

1. **Leadership Safety Values and Actions** – Leaders demonstrate commitment to safety in their decisions and behaviors.
2. **Problem Identification and Resolution** – Issues potentially impacting safety are promptly identified, fully evaluated and promptly addressed and corrected commensurate with their significance.
3. **Personal Accountability** – All individuals are personally responsible for safety.
4. **Work Process** – The process of planning and controlling work activities is implemented so that safety is maintained.
5. **Continuous Learning** – Opportunities to learn about ways to ensure safety are sought out and implemented.
6. **Environment for Raising Concerns** – A safety conscious work environment (SCWE) is maintained where personnel feel free to raise safety concerns without fear of harassment, intimidation, retaliation, or discrimination (HIRD).
7. **Effective Safety Communication** – Communications maintain a focus on safety.
8. **Respectful Work Environment** – Trust and respect permeate the organization.
9. **Questioning Attitude** – Individuals avoid complacency and continuously challenge existing conditions and activities in order to identify discrepancies that might result in error or inappropriate action.
10. **Decision Making** – Decisions that support or affect safety are systematic, rigorous, and thorough.

The first eight traits listed above were adopted in the October 2010 revision of the NFS Safety Culture Policy. The ninth and tenth traits were added in later revisions to the NFS policy in alignment with the NRC policy and commercial nuclear industry terminology. These traits with their associated attributes and behaviors provide a useful framework for safety culture assessments, improvement initiatives and communications with our employees.

3.0 NFS SAFETY CULTURE JOURNEY

BACKGROUND

The past few years have been a journey for NFS, and we have seen a marked change in the way we do business. This includes not only the way we operate machinery or develop products, but also the way in which we look at situations, the way we think about problems, and the way we arrive at decisions. In short, we have become actively engaged

in the emergence of a strong safety culture. In order to understand our culture, it is important to understand our history.

NFS is the sole provider of fuel for the U.S. Naval Nuclear Propulsion Program – a fuel manufacturing process that was created and built at NFS. In addition, we downblend high-enriched uranium to low-enriched uranium for use as commercial fuel. Currently, we employ about 800 people to operate our site.

We began operations in 1957, and since that time have remained the largest employer in our county. The workforce at NFS is multi-generational and close-knit. We have grandparents, parents, and their children who work in the facility. One of the challenges with such a workforce is that it tends to be expert-based, proud of its successes and, therefore, hesitant to adapt to changes. So, a challenge for us has been to take that "culture and pride in work" into consideration when working on safety culture improvement.

The current chapter in NFS' history started in 2009, when the Babcock and Wilcox Company (B&W) purchased NFS from a privately held LLC. As with any acquisition, the long-term workforce experienced a major paradigm shift as B&W integrated its people and practices. During this integration process in the fall of 2009, NFS experienced a series of operational upsets. In response, NFS did what it had always done – it went about fixing the technical problems. Once the basic engineering and process safety issues had been addressed, facility management was ready to get back to work. The problem was that the team did not step back to look at the bigger picture of why the upsets occurred, and as a result, initially failed to realize that the problem was not just a technical one – the engineering and safety solutions were sound, there remained a problem with safety culture implications. These implications led NFS to the many improvement actions noted in the "Recent History: Charting a New Course" section of this document.

B&W had already recognized the need for safety culture improvement. In fact, previous to these process events, a Safety Culture Assessment was already underway by an independent, third-party team. Although their final report was not available by the end of 2009, leadership knew that their assessment would confirm that NFS' Safety Culture required strengthening. In December of 2009, following consultation with the NRC, NFS decided to voluntarily shutdown operations. The shutdown was the beginning of a journey at NFS that continues today – it is a journey to build a strong and long-lasting culture of safety.

RECENT HISTORY: "CHARTING A NEW COURSE"

When we began developing the roadmap to improve the NFS safety culture, we already had employee input as well as third-party recommendations for specific areas of improvement. We began with Conduct of Operations improvements that were developed during the facility shutdown. New procedures and training required a more stringent level of oversight and emphasized "safety culture" behaviors, especially that of a questioning attitude. This began what was to become a cultural shift to emphasize safety-first and a procedure-based versus expert-based approach to all operations.

When we embarked on writing our initial improvement plans, we settled on a number of foundational concepts. These concepts included priorities and expectations that previously had not been formally articulated to the workforce. We described this phase of our safety culture improvement journey as "Charting a New Course" and disseminated the foundational concepts to all employees in various formats and publications.

We knew we needed to codify our priorities for employees in a straightforward, simple manner. To that end, we created our Workplace Priorities: Safety, Quality, Schedule, and Cost – always in that order. We also developed Employee Expectations and Manager Expectations, listing expected behaviors such as "Treat others with Respect" or for managers, "Explain WHY." These concepts served as a positive framework for the improvement actions.

We identified core Conduct of Business Attributes to be demonstrated by employees: Personal Accountability, Procedure Compliance, Technical Inquisitiveness, and Willingness to Stop. We looked for opportunities to recognize employee suggestions, successes and demonstration of these attributes. We continually maintain the drumbeat of a questioning attitude and a willingness to stop work at all levels of the organization.

One of the ongoing challenges of improving Safety Culture is to ensure that appropriate behaviors are supported. We understood early on that we may have "pockets" of workers or even supervision that were stuck in the old behaviors, or who had not yet made the conceptual, or actual, leap to expected behaviors.

We needed to make sure we had appropriate programs in place to provide additional support for these employees and indeed, all employees. These support programs included:

Human Performance – or "HuP"

Employee Concerns Program

Ombudsman

Together they provide a multi-layered – defense-in-depth – safety net for our employees with regard to safety culture expectations or behaviors.

Safety culture improvement is an ongoing journey, and there are numerous other programs and processes that we have created to help us get stronger along the way – a process of improvement that will never stop. A sample listing of programs and processes implemented under the previous improvement plan include:

- Reorganized to provide increased checks and balances
- Established an independent Nuclear Safety Review Board
- Established an Executive Review Board
- Implemented a Senior Engineering Watch
- Established an Operating Experience Program

- Instituted a Work Control Program
- Strengthened the Corrective Actions Program
- Revised CAP procedures to include a Safety Culture Implications Review
- Developed and implemented a standard operating guide for evaluations of Unusual Incidents
- Strengthened Configuration Management
- Implemented a Management Observation Program and Schedule
- Established Plan of the Day/Plan of the Week schedules/meetings
- Strengthened Program to Communicate basis of Significant Decisions (Operational Decision Making)
- Improved Communications
- Established a Senior Training Advisory Committee
- Developed and conducted Refresher SCWE training for all employees
- Conducted additional management training on "Building a Safety & Accountable Workplace" provided by an outside SCWE expert.
- Implemented Metrics program using Key Performance Indicators
- Improved Material Condition with construction of new Warehouse and new Entry/Exit Control Point Facility
- Improved security operations equipment and off-site security training facilities

As a part of NFS continual improvement efforts, these and other programs and processes continue to be modified and improved on to strengthen the NFS safety culture. NFS believes that there is a clear connection between a healthy safety culture and a successful organization or business. All the procedures, processes, behaviors and expectations that comprise a healthy safety culture are what you see practiced in a vibrant, dynamic business. The bottom line is that a healthy safety culture results in a better business…in all areas – Safety, Quality, Schedule, and Cost.

WHERE WE ARE: "ALL HANDS ON DECK...STAYING THE COURSE TOGETHER"

As described, NFS has taken numerous actions to improve safety culture under the previous safety culture improvement plan; however, we know the improvement work is

never done. In late 2012, as most actions under the previous plan were completing, several employee Focus Groups were formed. These groups were formed as part of an effort to continually improve and were focused on four Safety Culture Trait areas identified through a culture survey conducted in early 2012. Recognizing the need to periodically measure safety culture, the 2012 culture survey was conducted primarily to gain experience with an instrument that could be used in on-going years. This survey also helped shape our focus for recent improvement efforts. Each focus group is named and described to indicate the particular Safety Culture Trait attributes/behaviors for improvement. For example, the *Responsiveness* Group is focused on certain attributes/behaviors within the Problem Identification & Resolution Trait, while the *Respect* Group is focused on certain attributes/behaviors within the Respectful Work Environment Trait. These Focus Areas have concise statements describing the aggregate issues from the 2012 survey. The four 2013 Safety Culture Focus Areas identified are:

- *Leadership*
  Improve in the free and open exchange of ideas, questions, requests, and overall transparency, including communication of strategic direction and focus areas for the year.
- *Responsiveness*
  Workforce is engaged in the problem resolution process, such that follow-up input is received, actions are explained, and status/priority is communicated.
- *Respect*
  Respect is evident, opinions are valued, and trust is fostered among individuals and workgroups throughout the organization.
- *Communication*
  Communications focus on Safety and the flow of information up and across the organization is seen as important as the flow of information down the organization.

The focus groups, each championed by a senior manager, began suggesting, planning and implementing improvement actions to strengthen safety culture: each group's work was underway at the time of the 2013 ISCA. One focus group developed a new safety culture goal statement that describes the current phase of our safety culture improvement journey. This effort resulted in a new logo and goal statement of "All Hands on Deck… Staying the Course Together" (shown on SCIP cover page) – which honors our connection to the Navy (both as a customer and our many veterans). It also represents the primary sentiment that we must stay on the course we have worked so hard to get on over the past few years. Another group has been tracking and providing input into planned physical improvements to common areas of the NFS facility and promoting respectful behaviors with periodic communications applying respect themes in our workplace.

Varieties of methods and forums have been and continue to be used to communicate the 2013 Safety Culture Focus Areas. In early 2013, a Safety Culture dashboard was deployed to communicate status and provide a means for management to monitor progress in the 10 Safety Culture Traits and the Safety Culture Focus Areas.

In March and April 2013, an independent, third-party team conducted a safety culture assessment using a variety of assessment tools, as required by the NRC Confirmatory Order EA-10-076. The 2013 ISCA report notes that the assessment results are "Acceptable" overall. The NFS leadership team understands, as noted in the 2013 ISCA report, that "Although the assessment results are Acceptable, there is room for improvement in the health of NFS's safety culture. Improvement efforts are important in keeping the culture from deteriorating…" In the report, four Safety Culture Trait areas were noted as areas providing Opportunities for Improvement. This reinforced the validity of the four Safety Culture Focus Areas that NFS identified for 2013.

The 2013 ISCA results indicated that the majority of NFS employees, with greater than 80% indicating agreement, believe safety culture has improved in the last (2) years. The 2013 ISCA report recommended that NFS "continue with the safety culture improvement

efforts that are part of the 2011 Safety Culture Improvement Plan, as well as the initiatives that have been implemented since 2012" (a.k.a., 2013 Safety Culture Focus Areas). The Leadership team has reviewed the work of these Focus Groups to leverage the actions underway in the improvement action plan.

4.0 IMPROVEMENT ACTIONS

This SCIP is intended to show how the issues in the 2013 ISCA are being addressed as required by Confirmatory Order EA-10-076 and provide an easily understood plan for the NFS workforce. The leadership team reviewed the 2013 ISCA results and six recommendations. With recognition of the previous processes/programs put in place through the previous SCIP and the 2013 Safety Culture Focus Areas, the team developed improvement actions believed to have the greatest impact to strengthen and sustain the NFS safety culture. This plan is not a checklist of action items to be completed and forgotten, but rather a means to engender behaviors and practices embedded in the culture. Additionally, we recognize that although actions are listed under specific trait focus areas, most of them could be listed under multiple trait areas. This was done for simplicity of communication, but should not be confused with a lack of recognition of the complexity of safety culture improvement. Furthermore, NFS recognizes that the 2013 ISCA report provided observations for each trait in the form of "Comments for Potential Exploration and Possible Opportunities for Improvement" and these have been useful in informing our improvement action plan; however they are not specifically addressed. The "Recommendations" (below) made by the 2013 ISCA are cross walked to the actions listed in the table below.

2013 ISCA Recommendations:

1) Continue with the safety culture improvement efforts that are part of the 2011 Safety Culture Improvement Plan, as well as the initiatives that have been implemented since 2012. These efforts, as reported to the assessment team by NFS, are listed in the section above entitled,

"NFS Initiatives that Have Been Designed and Implemented in the Past Two Years to Improve Safety." However, some efforts are likely to be more helpful than others. To ensure that the company is putting its resources into the programs with the greatest beneficial effect, it may want to evaluate the effectiveness of each of the programs and eliminate or improve those that are less effective than others.

2) Consider conducting a self-assessment of the PIRC system. Possibly include industry peers or INPO staff on the self-assessment team. Review the individual survey item means that resulted in the low mean on the PIR Trait. Explore the causes for respondents' unfavorable responses.
3) Review the individual survey item means that resulted in the low mean on the Respectful Work Environment Trait. Explore the causes for employees' negative beliefs. Avoid assuming that management knows what needs to be done to create a work environment that employees will feel is more respectful.
4) Capitalize on the fact that people are influenced to do what they see others do, more than they are influenced by positive reinforcement, punishment, facts, threats, warnings, etc. Work groups, particularly those which do not do well at displaying behaviors and attitudes consistent with a healthy safety culture need to observe other work groups that do display these behaviors and attitudes. There are a variety of ways to do this. Some of them are: (a) send employees on benchmarking trips, (b) send employees to training where they can observe current standards, (c) send employees to industry meetings where they meet peers with higher standards, and (d) publicize the number of employees who demonstrate the desired norm rather than highlighting the outliers who do not demonstrate the desired norm.
5) Consider recruiting employees to teach others about behaviors and attitudes characteristic of a healthy safety culture. Those they teach may not benefit a great deal, but the teacher is likely to benefit. It is difficult to teach something and not come to understand and believe it. NFS may rely too much on those responsible for programs (e.g., the ECP or Industrial Safety) to teach about their programs.
6) Measure progress periodically, particularly with groups or behaviors that have been a particular focus of efforts. Consider conducting group interviews every three to six months to assess progress and remove obstacles.

To better support understanding and communication of the issues and actions and alignment with employees around the improvement initiatives, the improvement actions have been grouped into the four Focus Areas listed in the Table below. The four 2013

Focus Areas will remain our focus under this SCIP. To better describe issues within the Respectful Work Environment Trait, the Respect Focus Area has been rebranded Work Environment in the SCIP. Furthermore, each Focus Area's descriptive goal statement may be refined based on further analysis of the issues by the associated employee focus groups.

Within the Work Environment Area the actions identified are focused on providing a work environment that is seen as one where respect is evident, opinions are valued, and trust is fostered among individuals and workgroups throughout the organization. For example, the Work Environment focus group provides an avenue for the leadership team to receive input and feedback on what needs to be done to create a work environment that employees will feel is more respectful. This group can reach out for input/feedback from other employees, and assist and advise the leadership team on opportunities for improvement. Spurred by the recognition that employees observations of degraded facility conditions in some key common-use areas provides a perception that the organization has a lack of consideration for its employees, the improvement plan includes obtaining funding and scheduling of improvements, focused on common use areas.

The actions in the Leadership Area are targeted to improve in the free and open exchange of ideas, questions, requests, and overall transparency, including communication of strategic direction and focus areas for the year. For example, the roundtables provide an important format for communication up and down the chain. With another action in the Leadership Area, NFS plans to extend the observation program to include third-tier managers. The observation program was established to increase senior manager presence in the field by scheduling observations for first and second tier managers. These observations are spread over all shifts and a report is filed by each manager after the observation. Reports are trended and included in the Metrics program. Adding the third tier managers to this program is designed to increase engagement of the managers with employees by being out in the work areas, talking with employees, and reinforcing desired behaviors.

The Responsiveness Focus Area actions are meant to improve on having the workforce engaged in the problem resolution process, such that follow-up input is received, actions are explained, and status/priority is communicated. The 2013 ISCA report noted that a very low threshold for writing PIRCS may be overloading CAP and in response the plan provides for taking actions, including education, to better focus the Corrective Actions Program on the safe, reliable operation of the plant.

Efforts within the Communication Focus Area are intended to foster Communications focus on Safety, and ensure the flow of information up and across the organization is seen as important as the flow of information down the organization. Just as some actions in the other Focus Areas touch on addressing difficulties in effective communication, the actions the Communication Area work in concert with the other Focus Area actions to improve the work environment and workforce engagement. To ensure strategic alignment of overall safety culture improvement efforts, the plan includes having roundtables with members from the four 2013 Focus Areas and the leadership team. Although the 2013 ISCA did not list the Effective Safety Communication Trait as an area with Opportunity for Improvement, but did list the Environment for Raising Concerns Trait as one, we noted that the survey mean results of the two were extremely close. Review of the issues in the Environment for Raising Concerns pointed to the need for improving how the processes for open reporting, including the Employee Concerns Program, are publicized and communicated. Therefore, the leadership team addressed this issue within the *Communication* Safety Culture Focus Area.

We understand that the need to drive continual improvement must be an integral part of what the leadership team does every day to reinforce the desired behaviors. The foundational concepts and programs/processes successfully implemented under the previous improvement plan must continue to be reinforced and supported. The leadership team is committed to the successful and effective implementation of this SCIP. NFS will list and track actions with the responsible individual and Senior Manager in the Plan of the Day schedule to ensure accountability for execution and completion of actions. The actions will be tracked in the NFS Corrective Action Program. Closure

Standards will be established to provide a review and concurrence that the objective evidence supports the action is ready for closure. NFS' planned actions and their planned completion dates are provided below.

Action	Planned Completion Dates	Crosswalk to 2013 ISCA recommendations
Leadership *Improve in the free and open exchange of ideas, questions, requests, and overall transparency, including communication of strategic direction and focus areas for the year.*		
Complete a series of "roundtables" to facilitate improved communication on perspectives and issues important to the workforce.	December 31, 2013	1, 3
Provide learning content focused on safety culture using a computer application called SCORE (**S**afety **C**ulture is **O**ur **RE**sponsibility).	October 31, 2013*	1, 5
Extend the observation program to include third-tier managers, in an effort to increase engagement of the workforce and management team.	December 31, 2013*	1, 5
Enhance supervisor training on behaviors of a healthy safety culture as referenced in INPO 12-012 Addendum 1	March 31, 2014	1
Engage the workforce in further examination of the 2013 safety culture assessment results at the department and sub-department level.	December 31, 2013	5, 3
Regularly examine/measure key safety culture health attributes in improvement focus areas to determine effectiveness of improvement efforts.	February 28, 2014*	1, 6

Action	Planned Completion Dates	Crosswalk to 2013 ISCA recommendations
Work Environment *Respect is evident, opinions are valued, and trust is fostered among individuals and workgroups throughout the organization.*		
Continue the use of a Work Environment focus group of employees to assist and advise on workforce communications and provide feedback to the leadership team on opportunities for improvement.	March 31, 2014*	1, 3, 5
Complete physical workplace environment improvements, focused on common use areas. Included for example, are walkways, lunchrooms, change rooms, key restrooms, and vending equipment.	March 31, 2014*	1
Pilot a class on dealing with differing opinions, challenging others and having open dialogue when the stakes are high. Use feedback from the pilot class participants to evaluate methodology and potential for further use.	November 30, 2013	1, 4
Responsiveness *Workforce is engaged in the problem resolution process, such that follow-up input is received, actions are explained, and status/priority is communicated.*		
Continue the use of a Responsiveness focus group of employees to assist and advise on workforce communications and provide feedback to the leadership team on opportunities for improvement.	March 31, 2014*	1, 2
Take actions, including education, designed to better focus the Corrective Actions Program on the safe, reliable operation of the plant.	March 31, 2014	1, 2

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Action	Planned Completion Dates	Crosswalk to 2013 ISCA recommendations
Communication *Communications focus on Safety, the flow of information up and across the organization is seen as important as the flow of information down the organization.*		
Continue the use of a Communications focus group of employees to assist and advise on workforce communications and provide feedback to the leadership team on opportunities for improvement.	March 31, 2014*	1, 4, 5
Continue to ensure workforce involvement and input into All Hands Meetings.	April 1, 2014*	1, 5
Conduct a communication campaign to increase workforce awareness of open forms of communication within the environment for raising concerns, to include the use and purpose of the Employee Concerns Program.	March 31, 2014	1, 5
Members from the four 2013 Focus Areas will have periodic roundtables with the leadership team to ensure strategic alignment of overall safety culture improvement efforts.	April 1, 2014 *	1, 3, 6

*Completion date indicates the action is in place with established documented evidence. These actions are intended to continue beyond the indicated date.