# Office of Enterprise Assessments
# Follow-up Assessment of Safety Culture
# at the Hanford Site
# Waste Treatment and Immobilization Plant


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**Office of Worker Safety and Health Assessments**
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**Office of Enterprise Assessments Follow-up Assessment of**
**Safety Culture at the Hanford Site Waste Treatment and Immobilization Plant**

**Table of Contents**

## Acronyms

| | |
|---|---|
| AHJ | Authority Having Jurisdiction |
| AJHA | Automated Job Hazards Analysis |
| BARS | Behavioral Anchored Rating Scales |
| BNI | Bechtel National, Incorporated |
| CAMP | Corrective Action Management Program |
| DNFSB | Defense Nuclear Facilities Safety Board |
| DOE | U.S. Department of Energy |
| EA | Office of Enterprise Assessments |
| ECP | Employee Concerns Program |
| EM | Office of Environmental Management |
| FPD | Federal Project Director |
| GAO | Government Accountability Office |
| HQ | Headquarters |
| IAEA | International Atomic Energy Agency |
| INPO | Institute of Nuclear Power Operations |
| ISMS | Integrated Safety Management System |
| LAW | Low Activity Waste Facility |
| MIP | Management Improvement Plan |
| NASA | National Aeronautics and Space Administration |
| NRC | U.S. Nuclear Regulatory Commission |
| NSQC | Nuclear Safety and Quality Culture |
| OCI | Organizational Culture Inventory |
| ORP | Office of River Protection |
| PIER | Project Issues Evaluation Report |
| POD | Plan of the Day Meeting |
| R2A2 | Roles, Responsibilities, Authorities, and Accountabilities |
| SCWE | Safety Conscious Work Environment |
| SETO | Safety Education Through Observation |
| STARRT | Safety Task Analysis and Risk Reduction Talk |
| URS | URS Corporation |
| WTP | Waste Treatment and Immobilization Plant |

# Executive Summary

The U.S. Department of Energy (DOE) independent Office of Enterprise Assessments (EA) conducted this follow-up assessment of nuclear safety culture at the Hanford Site's Waste Treatment and Immobilization Plant (WTP) project. The primary objective of the assessment was to provide information on the status of the safety culture at WTP and determine the progress in improvement since the previous EA assessment in 2014. Assessment activities occurred during December 2014 to February 2015, with the primary onsite data collection effort from January 26 to February 5, 2015. This is the third assessment of the WTP safety culture; the first was conducted in 2011.

The three safety culture assessments used the same methodology in order to compare change over time. The EA team used five primary methods to collect information on the organizational behaviors associated with the safety culture traits: functional analysis (used to identify organizations, key positions, functions, and interfaces), structured interviews and focus groups, Behavioral Anchored Rating Scales (a tool that quantitatively summarizes qualitative data associated with interviewees' perceptions of the organization), behavioral observations (qualitative assessment of work activities, meetings, and responses to events), and an Organizational and Safety Culture Survey. The goal of using multiple assessment measures was to seek convergence of themes and trends within the safety culture traits.

Within DOE, the Office of Environmental Management (EM) has line management responsibility for WTP. At the site level, line management responsibility for the WTP falls under the Office of River Protection (ORP). Under contract to DOE, Bechtel National, Incorporated (BNI) is designing and coordinating the construction of the WTP.

## Office of River Protection

In contrast to 2014, this assessment indicated improvement in how ORP personnel perceive the behaviors important for a healthy safety culture. Many managers and staff regard some activities since the 2011 assessment as positive. For example, both management and staff see the Organizational and Safety Culture Improvement Council as a constructive step toward improved culture and management-staff collaboration. Many also perceive the transition to the One System concept (an approach to integrate the tank farm contractor with the WTP project) as highly desirable. They also say that the issues management system is functioning better and that the distinction among technical issues, relationship issues, and personnel issues is clearer. Employees expressed hope that when complete, the ORP Strategic Plan will bring more clarity and more stable working conditions. Employees generally expressed optimism about the "no bashing - no surprises" philosophy of communication.

Survey results identified positive changes in the values of all 12 behavioral norms the survey used to assess organizational culture. Although none of these changes are statistically significant (i.e., they are within a standard five percent margin of error), the overall pattern suggests that ORP's culture has started heading in a more positive direction since the 2014 assessment. (Between the 2011 and 2014 assessments, the strength of the 12 behavioral norms was almost always changing in a more negative direction.)

In 2014, the perceived shift toward a more "collaborative" ORP/BNI relationship seemed to be creating some confusion, and many in ORP perceived that ORP was losing independence in its role. In 2015, staff expressed much less concern about loss of independence. Interviewees expressed considerable satisfaction and accomplishment in the fact that ORP oversight findings led to a more robust contractor self-assessment, and many see the resulting Management Improvement Plan as charting a course toward a management system and culture aligned with nuclear principles and practices.

The 2014 report observed that ORP senior management's stated philosophy of wanting more transparency with the contractor was not perceived to exist within ORP. The 2015 assessment found that the organization is definitely less opaque, though not yet as transparent as many desire. Some staff and managers attribute much of the continued opaqueness to EM Headquarters influences that are seen as inhibiting transparency. Trust issues between staff and management need ongoing attention, but staff members appear more optimistic than in the earlier assessments.

In 2011, the assessment team found that although employees did not fear retaliation, they were unwilling or uncertain about their ability to openly challenge management decisions. Employees perceived that management was not willing to listen to concerns and did not encourage constructive criticism. In 2014, these perceptions became slightly more negative, but they improved in 2015, sometimes significantly.

Despite these positive trends, a number of concerns remain. The pronounced perception in 2014 that ORP had not clearly established roles, responsibilities, authorities, and accountabilities remains prominent in 2015, with similar concerns amplified by the rapid expansion of the staff additions over the past year. Staff also expressed concerns about work processes, adequacy of work control, work quality, and lack of attention to workforce development. Another remaining concern is the continued downward trend in satisfaction with problem resolution.

Finally, the survey of organizational culture showed that ORP has a relatively strong Avoidance behavioral norm. An organization with a strong Avoidance norm tends not to reward success and punishes mistakes, leading staff members to shift responsibilities and avoid making decisions, taking action, or accepting risks because they feel threatened and vulnerable. Also, the survey responses regarding open communication and cooperation were the weakest of the 12 behavioral norms measured. These survey results converge with employee statements about residual trust issues. For example, many staff feel that previous ORP management treated them poorly, and they expressed doubt that the commitment to enduring improvements would last. Similar concerns extend to EM Headquarters; staff often mentioned that EM Headquarters issued directions and required reports solely for political reasons. Furthermore, some interviewees expressed frustration about the relationships and communication with various EM Headquarters offices. Many interviewees expressed (sometimes in explicit terms) that they often perceive that some EM Headquarters managers and senior staff do not respect ORP management and staff.

## Bechtel National, Incorporated

In contrast to 2014, this assessment indicated a marked improvement in how BNI personnel perceive the behaviors important for a healthy safety culture; comments from interviewees at all levels of the organization were more positive than in 2014 or 2011. The interview results were reinforced by quantitative data from the survey, which showed positive improvements in rankings across the 12 behavioral norms measured by the survey, and for 10 of the 12, the changes were statistically significant. Several specific areas of improvement since 2014 are described below.

The 2014 report noted that the volume of new initiatives had resulted in confusion about priorities and that the tendency to work in "silos" had inhibited effective work coordination. In 2015, the level of confusion seems to be lessening, enabled by organizational realignment (particularly in engineering and nuclear safety), clarification of roles and responsibilities, and the emergence of the Organizational Effectiveness concept as a nascent integrating influence. BNI's Management Improvement Plan and Nuclear Safety and Quality Culture Sustainment Plan are major elements of the framework for going forward, and many interviewees expressed optimism about these efforts. Interviewees at all levels of the

organization often referred to the high visibility of new senior leaders, their constructive leadership styles, and their continuing reinforcement of priorities. It is important to note that leadership communication and innovations appear to be developing a consistent project narrative that supports creating shared sense making, i.e., shared mental models that characterize high performing organizations.

The 2014 report also observed that the BNI organization generally lacked understanding of the organizational processes that impact the WTP project and that Bechtel Corporate's role as an underlying driver for behaviors appeared to be out of alignment with safety culture. The 2014 report also identified the need to more effectively evaluate the actions driven by corporate values and goals and understand them in terms of the goals and mission of the WTP project. In 2015, signs of change are appearing in these fundamental elements that shape an organization's culture. For example, some interviewees noted that the new Bechtel Nuclear, Security & Environmental business unit for the company's government and commercial nuclear businesses illustrates recognition at the highest levels of the unique needs and demands of the nuclear enterprise. Additionally, at the senior levels of BNI and its main subcontractor, a shared vision appears to be emerging on a management system model and corresponding culture aligned with the special expectations for nuclear operations. A number of management interviewees commented about this new model and the increasing collective understanding.

While the trends are definitely positive, the more detailed analysis identified a number of areas that need attention. For example, the concern about personnel turnover continues, particularly the frequent turnover in field engineers. Many construction personnel expressed perceptions that "DOE and BNI can't make up their minds," resulting in considerable rework and waste, and that BNI tends to overreact to what workers see as minor or localized occurrences. Also, some personnel continue to perceive that if they report a minor injury or illness for which they seek medical assistance, they are met with intrusive invasion of medical privacy and a presumption of blame. As in earlier assessments, some construction employees perceived that expressing concerns about safety or quality somehow factors into decisions about layoffs or promotions. Other continuing concerns include longstanding unresolved technical issues, communication in general, and lack of a comprehensive project history. Finally, there remains a veiled sense of umbrage that employees who try to maintain their professional integrity and personal pride in the face of continuing adversity are belittled by people and organizations that have little knowledge of the project and focus more on finding fault than contributing to solutions.

## Conclusions

This report provides recommendations that are intended to help the ORP and BNI organizational culture competencies expand and mature, allowing these organizations to better utilize culture insights and culture improvement strategies, both to complete the design and construction of facilities and to design the organizations needed to accomplish the mission safely. To reach these goals, the organizations need to expand their vision from short-term design and construction to the full, multi-decade life cycle of the project.

Overall, ORP and BNI have made improvements since the 2014 assessment. Both organizations have developed and started to implement strategies and practices that, if pursued conscientiously over the next several years, offer the promise of a safety culture commensurate with nuclear expectations and the unique character of WTP. However, these improvements are in the early stages, and progress could easily stall if attention lapses, resources are diverted, or management priorities shift. As encouraged in the 2012 assessment report, both organizations must instill in all their managers an awareness that developing and sustaining a positive organizational culture is not a sideline; it is a central tenet of management responsibility and accountability. Safety and quality are outcomes of culture. Over 30 years

of research on complex, high hazard organizations converge on one key principle: success or failure is determined by leaders' ability to understand, influence, and manage culture.

# 1. Introduction

The U.S. Department of Energy (DOE) independent Office of Enterprise Assessments (EA) conducted this follow-up assessment of nuclear safety culture[1] at the Hanford Site's Waste Treatment and Immobilization Plant (WTP) project. The primary objective of the assessment was to provide information regarding the status of the safety culture at WTP. Assessment activities occurred during December 2014 to February 2015, with the primary onsite data collection effort from January 26 to February 5, 2015.

WTP is DOE's largest ongoing design and construction project. Currently, WTP is reevaluating some aspects of the design of its pretreatment facility and has deferred some associated design and construction activities while options are being evaluated. Although WTP is not yet processing radioactive materials, WTP personnel are procuring, installing, and constructing systems, structures, and components that will be relied on for safe operation of an extraordinarily complex set of nuclear facilities. If these functions are not performed correctly and with high standards of quality, latent failures in design or safety analysis or in the installed systems, structures, and components could compromise the safety of the WTP during future operations. Therefore, a healthy safety culture, one in which employees feel empowered to raise safety questions without fear of retaliation, is essential at WTP during the current design and construction phase, as well as in the future operational phase.

Within DOE, the Office of Environmental Management (EM) has line management responsibility for WTP. At the site level, line management responsibility for the WTP falls under the Office of River Protection (ORP). Under contract to DOE, Bechtel National, Incorporated (BNI) is designing and coordinating the construction of the WTP. URS Corporation (URS) is a major subcontractor to BNI, along with several other subcontractors and consultants at the WTP.

In June 2011, the Defense Nuclear Facilities Safety Board (DNFSB) forwarded Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant*, to the Secretary of Energy. In late 2011, the Department's former Office of Health, Safety and Security, EA's predecessor organization, performed an assessment of the safety culture at WTP and in January 2012 issued an assessment report, titled *Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment Immobilization Plant*, which met one of the action items in the DOE Implementation Plan for DNFSB Recommendation 2011-1. The 2011 assessment team found that most personnel at WTP believed that safety was a high priority but that for various reasons, a significant number of staff within ORP and BNI were reluctant to raise safety or quality concerns. Therefore, the assessment team concluded that significant management attention was needed to improve the safety culture at WTP.

EA's predecessor organization completed a safety culture progress assessment at WTP in early 2014. For ORP, the progress assessment concluded that although the efforts towards improving safety culture were positive, they had not yet yielded measurable gains toward the establishment of a healthy safety culture within the ORP organization. Additionally, the assessment identified that although employees expressed no fear of retaliation in the ORP work environment, there was a definite unwillingness and uncertainty about their ability to openly challenge management decisions. For BNI, the 2014 assessment results indicated that BNI had implemented many new initiatives, actions, and program revisions since the 2011

[1] While there are various safety culture models, the definition used in the Energy Facility Contractors Group report, which was accepted by the Deputy Secretary and referenced in the DOE Integrated Safety Management Guide, is: An organization's values and behaviors modeled by its leaders and internalized by its members, which serve to make safe performance of work the overriding priority to protect workers, the public, and the environment.

assessment, but although these improvements were needed, the volume of the initiatives had resulted in a general sense of confusion about priorities. The 2014 assessment also found that employees' perceptions within many BNI organizations had not significantly changed since the 2011 assessment, and some specific groups required additional senior management attention and oversight. Finally, the 2014 assessment found that the role of Bechtel Corporate appeared to be out of alignment with safety culture attributes in the area of project decision-making, and Bechtel Corporate and the BNI organization at WTP did not fully understand each other's roles.

Based on the results of the 2014 assessment, the Secretary of Energy directed EA to conduct this additional follow-up assessment. This report documents the results of this review.

Before beginning this series of assessments in 2011, EA enhanced its capability to assess safety culture processes through consultation with the U.S. Nuclear Regulatory Commission (NRC), several nuclear power generating utilities, and associated support organizations to benchmark their processes. Recognizing that it has significant expertise in nuclear safety and issues management but limited on-staff expertise in systematic application of behavioral science-based methodologies for performing safety culture assessments, EA contracted with an external company that specializes in human performance analysis to support data collection and analysis for the 2011 and 2014 reviews. After lessons learned from the 2011 and 2014 reviews, EA added behavioral science expertise to its resources and performed this assessment with only limited outside assistance to administer and assist in analysis of the electronic survey.

# 2. Scope and Methodology

This EA follow-up assessment covered Federal and contractor employees working at the WTP. This report provides results for the Federal and contractor organizations at WTP as follows[2]:

- ORP: The results for ORP include Federal employees and general support services contractors that directly support ORP.

- BNI: The results for BNI include its subcontractors, including its primary subcontractor, URS.

EA personnel conducted the onsite data collection and most of the data analysis for this assessment. Appendix A provides additional information about the composition of the EA assessment team. EA also used an external independent survey company to administer an electronic culture survey and, in conjunction with EA behavioral specialists, provided the basic quantitative data analysis of the survey results. The population sampled in the survey included Federal and contractor project employees.

To ensure a valid and effective assessment and provide for some comparisons of progress, the EA team used the same assessment methodology as the prior two assessments. This methodology has been shown to provide an objective and systematic measurement of the organizational behaviors that impact safety performance, using multiple data collection tools to assess organizational behaviors. The evaluation methodology aligns with the NRC procedures for independent safety culture assessment, which identify nine traits that are viewed as necessary to promote a positive safety culture. For consistency, 9 of the 10 current EA team members had participated in the prior two assessments, and the other, a social scientist, was added for a fresh perspective and insights. The two prior assessments provided detailed explanations of the data collection methods; the following provides a brief overview of those methods.

The EA team used five methods to collect information on the organizational behaviors associated with the safety culture traits:

- Functional analysis
- Structured interviews and focus groups
- Behavioral Anchored Rating Scales (BARS)
- Behavioral observations
- Organizational and Safety Culture Survey.

The purposes of the functional analysis are to: (1) clearly identify the organizational units of ORP and BNI, (2) gain an understanding of each organizational unit's functions and interfaces, (3) examine how information flows within and between units, and (4) identify the key supervisory and managerial positions of each organizational unit. The EA team obtained information to support this activity primarily through review of documentation, some semi-structured interviews, and some observations of organizational activities.

[2] Prior reports categorized culture insights in three categories; ORP, BNI, and WTP. The "WTP" category was intended to examine relationships and interactions between ORP and BNI as they mutually influenced the course of the project. Because some senior managers commented that they sometimes found use of three categorizations confusing, in this report the results are categorized as ORP or BNI. Interviewees were encouraged to clarify whether their comments were directed to ORP issues, BNI issues, or relationships between the two.

For the structured interviews and focus groups, the EA team used a similar set of interview questions as previous independent safety culture assessments. A particular subset of those questions with a predefined focus was selected for each interview and focus group session to ensure the team gathered needed information related to the selected safety culture components and attributes.

The BARS are a tool that provides the opportunity to quantitatively summarize qualitative data associated with interviewees' perceptions of the organization. The EA team administered BARS to almost all of the 349 individuals who participated in the structured interviews and/or focus groups (logistics and time constraints sometimes prevented the administration of BARS to all participants). Each interviewee was administered BARS associated with 4 of 10 different organizational behaviors in a structured manner so that all 10 behaviors were representatively sampled. Appendix B summarizes changes in responses to BARS, survey questions about the safety conscious work environment (SCWE), and behavioral norms in the 2011, 2014, and 2015 safety culture assessments.

Behavioral observations provide an unobtrusive assessment of particular organizational behaviors and critical processes, including work planning, management meetings, department meetings, and responses to planned or unplanned events. The selected organizational behaviors are specifically identified in the evaluation of the activities observed.

The Organizational and Safety Culture Survey was administered electronically by an independent survey company, Human Synergistics. This survey consisted primarily of an Organizational Culture Inventory (OCI) supplemented with additional tailored, safety-specific questions. The OCI has been in constant use and periodic re-validation for some 40 years and is reputed to be the most widely used organizational culture diagnostic instrument in the U.S. and internationally. The OCI questionnaire focuses on the behavioral norms[3] and expectations associated with the values shared by members within an organization. EA identified a 35% random stratified sample of BNI personnel and 100% of ORP personnel (because ORP is a relatively small organization) to take the survey to assess the current organizational culture. The overall survey response rate was 64% (77% ORP, 51% BNI, 12% Prefer Not to Respond, and 3% Unsure), which was an adequate response rate for the assessment.

For this assessment, EA compared the results of the OCI survey to an ideal cultural profile developed and maintained by Human Synergistics. The Historical Ideal database is based on the average responses of managers within 56 different organizations who had previously completed the Human Synergistics OCI-Ideal survey, which asks respondents to consider the extent to which members ideally should be expected to exhibit 12 behavioral styles to maximize individual motivation and performance and enhance the long-term effectiveness of their organizations. The Historical Ideal Culture data can be used as a benchmark against which to compare an organization's current operating culture results, and for the most part, the ideal values for the four constructive norms have been consistent across all types of organizations. What tends to differ from industry to industry, however, is the strength of the Defensive norms on the Ideal profile. For example, Cooke and Szumal (2000) report that, "For nuclear power plants, a moderate

[3] Norms indicate how members of an organization think and behave or how they should think and behave. Some of these norms correlate with high performing organizations; other norms correlate with poor performance. In the results, some of the norms receive a higher statistical ranking by organizational members than others. These norms are referred to as "strong" norms, in that there is widely shared agreement by organizational members that these norms "strongly" drive organizational behaviors. Similarly the term "weak" is used to describe norms that organizational members deem to have minimal influence on organizational behavior. The terms "strong" and "weak" do not imply that those norms are good or not good, rather that some norms drive organizational performance more than others.

amount of Oppositional behavior is desirable."[4] Where pertinent, these differences are pointed out in Section 3.

Before the assessment, ORP and WTP management expressed a desire for the EA team to help them understand whether the interventions they had implemented or were in the process of implementing seemed to be having positive impact, even if the statistical survey data might not indicate significant overall attitudinal change. The EA team, ORP, and WTP management were aware that culture change research suggests that attitudinal transitions in large organizations may take years before manifesting major statistical shifts. In essence, management wanted to know whether their efforts were heading in a positive direction – i.e., "Is there reason to believe that our efforts are making a difference and are advancing progress toward where we want to be?"

To support management's desire to judge the effectiveness of actions to date, EA conducted additional literature review to determine whether recent research on safety culture or industry practice might add value to EA's safety culture assessment methodology. That research led EA to add two new aspects to the assessment: seeking input from interested parties not directly involved in the ORP/WTP organizations; and comparing ORP and WTP improvement initiatives to recently published studies on success in safety culture improvement in nuclear and other high hazard industries, as well as published material on cultural considerations in projects of size and scope similar to WTP ("megaprojects"). Appendix C provides additional detail on this methodology. References are listed in Appendix D.

[4] Robert A. Cooke, Ph.D. Janet L. Szumal, Ph.D. [2000], "Using the Organizational Culture Inventory to Understand the Operating Cultures of Organizations". Reprinted with permission from Handbook of Organizational Culture & Climate. Neal M. Ashkanasy, Celeste P.M. Wilderom, Mark F. Peterson (eds.) Chapter 9, pp. 147-162.

# 3. Results

The results presented below summarize the insights gained from the assessment team's analyses of the structured interviews and focus groups, BARS, observations, and survey data. The results are presented in terms of nine traits descriptive of a healthy safety culture and their associated performance attributes for each organization, ORP and BNI. The Positive Observations and Areas in Need of Attention for each trait provide the observations, insights, and data needed to understand their impact on the overall health of safety culture**.** Since the same methodology was used during the 2011 and 2014 assessments of WTP, comparisons are provided where the EA team identified notable changes.

Not all Areas in Need of Attention will necessarily result in a corrective action. The insights are intended to stimulate the organizations to reflect on their culture in order to understand the values and assumptions that may be driving behaviors and thus help to shape interventions supportive of a healthy safety culture. Developing a massive number of corrective actions may perpetuate a compliance mentality that is not conducive to creating and promoting a healthy safety culture, so creating a traditional corrective action for each insight may be counterproductive. To the extent that corrective actions are identified for the specific recommendations presented later in the report, it is recommended that they be managed in accordance with established causal analysis and issues management processes as appropriate.

## 3.1 ORP Traits – Positive Observations and Areas in Need of Attention

### Trait 1. Leadership Safety Values and Actions

*Leaders demonstrate a commitment to safety in their decisions and behaviors.*

**Positive Observations**

- Most interviewees agreed that if something is an immediate safety hazard, there is no question that safety takes priority over other activities and that there are always resources available to take care of safety issues.

- Management's realignment of work priorities because of Tank Farm vapor concerns was cited as an example of safety concerns taking priority over schedules.

- Many interviewees expressed that there is a high degree of awareness about the activities of the ORP Organizational and Safety Culture Improvement Council.

- Management interviewees in particular expressed sensitivity to the need to help focus staff activities so they can see tangible accomplishments and feel that their jobs are worthwhile, thus helping to foster individual and collective accountability.

- Generally, ORP interviewees indicated that they do not perceive that cost or schedule pressures conflict with safety in their individual work. Example comments included:
  - "In the past they held our feet to the fire on deadlines. It's more relaxed now."
  - "There are still some tasks that we must complete on time, e.g., readiness reviews."
  - "There is self-imposed internal pressure to accomplish the job in the time assigned or to personal satisfaction."
  - "Day to day management is pretty good about helping with priorities and schedules."

- Results from the BARS on Time Urgency indicate that a majority of ORP management interviewees (71%) do not perceive schedule pressures to be the determining factor while completing various tasks.

**Areas in Need of Attention**

- Several interviewees observed that the Tank Farms pose more safety concerns than WTP at present. In general, they expressed confidence that WTP safety issues were receiving appropriate levels of attention, but less confidence that this was the case for the Tank Farms.

- Several interviewees emphasized the need for basic funding for the mission and for funding to support research on better technologies and science to do the cleanup mission faster and with commensurate quality and safety improvements.

- A number of interviewees reflected on the need to focus the ORP mission on what ORP will be over the next 10 years; many interviewees, both management and staff, identified this as a central issue for leadership. Some interviewees noted a positive shift in philosophy – from ORP as the "policing" force responsible primarily for finding contractor error, to ORP as an integrally engaged steward with co-responsibility for project success. Noting the multiple demands on the organization at present, several interviewees observed that resources and management attention have to accord priority to this alignment.

- Many interviewees expressed concern about achieving some degree of stable and predictable workloads and schedules. Several interviewees used the term "ambiguity" to characterize the current standard state of affairs for ORP and the project overall. Management interviewees in particular expressed awareness that the current circumstances sometimes impose undesirable work/life balance issues. Some stated that "work demands can be finicky" and that a few people might thrive on high-tempo activity, but that such a high tempo is not sustainable for the long term. Several interviewees (management and staff) mentioned efforts to address this issue and expressed the view that establishing more stability for ORP staff work is essential to creating a more supportive and healthy work environment.

- Some interviewees expressed concern about the perceived disproportionate influence and interference from outside entities. For example:
  - External reviews are often perceived to take priority over other ORP tasks; a recent Government Accountability Office (GAO) report was referenced multiple times as an example of external groups having an influence that overrides other priorities.
  - There were statements that schedule changes due to external influences occurred frequently.
  - Many interviewees expressed that they perceive a lot of pressure from consent decree issues and milestones, and that the pressure comes from external sources.
  - ORP staff and management interviewees expressed a shared perception that time urgencies for their work loads are a function of "political" influences rather than technical ones. (Note that "political influences" were expressed as an inclusive term to describe EM Headquarters (HQ), the DNFSB, Washington State, and oversight groups from DOE and GAO.)

**Trait 2. Problem Identification and Resolution**

*Issues potentially impacting safety are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance.*

**Positive Observations**

- Interviewees commented that current safety issues are being addressed, and no one expressed concern about significant safety issues being suppressed.

- Interviewees identified multiple means to raise issues and concerns, including the issues management system, Safety Council, audits and surveillances, management assessments, the safety tracking program, weekly interface meetings with contractors, supervisors, professional personal ethics, the employee concerns program (ECP), the union, the HQ Ombudsman, the Differing Professional Opinion process, and the Inspector General.

- Interviewees mentioned several ways that the management team encouraged reporting, including open door policies, routinely emphasizing openness to issues as part of meetings, efforts to improve formal reporting mechanisms such as the local ECP, and casual hallway conversations in which managers ask about concerns or issues.

- Many interviewees identified that one of ORP's most significant positive influences on contractor performance improvement was the Performance Evaluation and Measurement Plan for identifying problems: a 50% fee incentive for contractor self-identification of issues.

- A number of interviewees mentioned consolidation of personnel into a single office building as a positive improvement. Some noted that the consolidation was an important step toward developing ORP into an organization that can effectively support the One System vision (an approach to integrate the tank farm contractor with the WTP project). Some interviewees identified this consolidation as a constructive response to previously identified issues.

- Some interviewees mentioned that the strategic plan and framework document under development will serve as important guidance to identify and resolve future issues.

- Several interviewees mentioned the ORP oversight efforts that led to level 1 findings (the most significant level of ORP findings against BNI), which in turn influenced a major contractor internal review and the improvement strategy captured in the Management Improvement Plan (MIP). Some interviewees indicated that the ORP oversight staff viewed this accomplishment as a validation of their professionalism. Other ORP interviewees expressed similar positive views about this validation of the oversight process. Several interviewees noted that the issuance of the findings, and the contractor's response to those findings, marked a shift in relationships that initiated increased collaboration between ORP and BNI, an improved contractor corrective action strategic approach, and improved contractor/ORP working relationships

- Quantitative data relating to problem identification and resolution in general indicates positive movement in comparison to the prior assessment in 2014:
  - Responses to SCWE questions provide some support for Problem Identification and Resolution. The mean value of ORP responses to "I am responsible for identifying problems" was relatively high (4.11 on a 5-point scale). (See Appendix B, Table B.)
  - The mean value of ORP responses to "I can openly challenge management decisions" is significantly higher ($p < 0.05$) than the corresponding value from the prior year (3.23 vs. 2.81). (See Appendix B, Table B.)
  - The mean value of ORP responses to "Management wants concerns reported & willingly listens to problems" is relatively high (3.59), and slightly higher than the mean responses to this question in 2014 and 2011. (See Appendix B, Table B.)

**Areas in Need of Attention**

- Interviewees expressed that issues that don't have safety or quality implications are sometimes confused with personnel or office operation issues. Several interviewees raised the office move and union involvement as examples of issues that can be contentious, consume much energy and time, serve as a distraction, and contribute to complacency because people "just get tired of non-important issues being raised."

- Interviewees cited some factors as disincentives for reporting; examples include:
  - Problems are too big or far-reaching, or are viewed with a sense of futility (the "boulder is too big").
  - Feedback on concerns reported in the past has been lacking or inconsistent, or resolutions were seen as non-responsive.
  - Some interviewees perceived that the level of management attention to issues was a function of relationships rather than the validity of issues and that preferential attention was sometimes accorded to long-tenured personnel but not to new employees.

- Some interviewees commented that some issues are raised repeatedly because:
  - The project does not have a well-documented institutional history or record of the basis for decisions. Some interviewees noted that now there is a much clearer record of how issues were dispositioned than five years ago, when record keeping was not centralized and was organizationally idiosyncratic; however, no formal, comprehensive historical record exists, according to interviewees.
  - Since much of the project history is a function of "tribal knowledge," it is difficult for new people to learn.
  - ORP staff and management have expanded, new positions have been added, and leadership responsibilities have rotated.

- A number of interviewees expressed generalized anxiety that EM HQ, DNSFB, HQ oversight, or other external parties may overreact or react inappropriately to identified issues. These interviewees expressed concern that such reactions might have unanticipated consequences, such as disenfranchising locally proposed solutions, damaging the credibility of ORP as an organization, or calling into question the professional credibility or integrity of management and/or staff. Other interviewees expressed similar concerns that external groups may have erroneous perceptions of project circumstances because they sometimes operate according to far different mental models of project realities and quite different priorities than the people who actually work at the project.

- Some interviewees expressed that on several occasions, past reticence to report issues or trepidation about potential adverse consequences resulted from the actions or reactions of previous managers. Some interviewees expressed residual lack of trust from experiences in which they felt ill-treated by prior management.

- The mean value of ORP responses to the SCWE question, "Concerns raised are addressed" is somewhat lower than the corresponding values from both the 2014 and 2011 surveys.

- Although the mean value of ORP responses to Problem Identification and Resolution was relatively high compared to the other BARS, it is still well below the 2011 value. (See Appendix B, Table A.)

**Trait 3. Personal Accountability**

*All individuals take personal responsibility for safety.*

**Positive Observations**

- Interviewees expressed broad agreement that ORP staff and management feel personally responsible and accountable for safety.

- Interviewees expressed that the level of professionalism, expertise, and performance of the ORP team is much higher than is sometimes perceived by external groups.
  - A number of interviewees within ORP and the contractor organizations noted that roles and relationships are maturing from adversarial to a shared commitment for successful project completion, while maintaining appropriate distinctions of DOE as customer and oversight with contractor as performance provider. One notable example cited was how ORP and the Tank Farms contractor jointly examined possible implications of the Waste Isolation Pilot Plant fire and radioactive release events for Tank Farm vapor issues to ensure that they have the right sampling protocol. The interviewees noted this as a positive change from some earlier ORP behavioral norms, when behaviors might have tended toward either benign neglect or adversarial criticism of contractor decisions or actions.
  - Multiple interviewees expressed that the quality of ORP oversight has been of a high level citing that the Level 1 findings and the quality of the staff work that led to those findings was highly contributory to the new strategic approach by the contractor expressed in the MIP.

- Some management interviewees expressed an aspiration for ORP to become a high performing organization and that a primary focus of managers should be to help people feel that their jobs are worthwhile and to foster individual and collective accountability

- A number of interviewees maintained that, under the circumstances, ORP is a higher performing organization than it may appear and that most employees are committed to their roles, engaged and striving to do their jobs as well as possible in a difficult situation.

- Some interviewees stated that changing the name of the former ORP Safety Culture Integrated Project Team to the ORP "Organizational and Safety Culture Improvement Council" was a symbolic decision to emphasize their maturing awareness of organizational and ecological factors that have influenced behaviors, and that the next step in their improvement journey is to strive to develop an organizational culture in which safety and quality have primacy.

**Areas in Need of Attention**

- Multiple measures indicated that fundamental organizational issues need to be acknowledged and addressed. Examples include:
  - Many interviewees commented that the ORP/WTP safety culture focus was historically limited to problem reporting and fear of retaliation. Several interviewees expressed that continuing a narrow definition might distract from the organizational improvement work that needs to be done, and commented that ORP needs to work on organizational culture as a more comprehensive concept.
  - Many interviewees shared their perspectives that some two decades of history shaped a situation that has historically not been supportive of them doing meaningful work.

- Several interviewees commented that prior surveys and questionnaires have seemed limited in scope, like SCWE, and have not helped the organization to acknowledge the bigger issues.
- The OCI electronic survey indicates that ORP has a relatively strong Avoidance behavioral norm. (An Avoidance culture characterizes organizations that fail to reward success but nevertheless punish mistakes. This negative reward system leads members to shift responsibilities to others and to avoid any possibility of being blamed for a mistake. Members are unwilling to make decisions, take action, or accept risks. It indicates that people feel threatened and vulnerable in their work environment.) Avoidance was one of ORP's two strongest norms. (Although the Avoidance norm carries negative connotations, the other strong norm for ORP was a constructive norm, further described in Trait 9, Questioning Attitude). The mean responses to eight of the survey items used to assess the Avoidance norm are listed first, along with the Historical Ideal values of multiple organizations (as described in Section 2).

| **Survey Item** | **ORP 2015** | **Historical Ideal** |
|---|---|---|
| Never be the one blamed for problems | 2.23 | 1.57 |
| Make "popular" rather than necessary decisions | 2.19 | 1.35 |
| "Lay low" when things get tough | 2.10 | 1.36 |
| Be non-committal | 1.99 | 1.48 |
| Put things off | 2.04 | 1.28 |
| Take few chances | 2.64 | 1.82 |
| Not get involved | 1.97 | 1.34 |
| Wait for others to act first | 2.09 | 1.38 |

Note: The response scale ranged from 1 (not at all) to 5 (to a very great extent). Because Avoidance is considered an undesirable self-defensive behavior, lower numbers indicate a more positive culture. The average ORP rating for each of these items was higher than the Historical Ideal database. The ORP ratings suggest that employees may fear what might happen to them if they try to make a decision or stick their necks out.

- Many interviewees expressed concerns about the "churning" in ORP management. Although interviewees made a number of positive comments about changes initiated by current management or willingness to see whether management's intentions will lead to change, several interviewees commented on the common knowledge that the average tenure of ORP managers is only about two years, and that there is considerable skepticism about whether commitment to a positive organizational culture would survive future management changes.

- Although several interviewees expressed cautious optimism that things are getting better at the local level, many interviewees indicated skepticism that DOE/EM HQ will maintain consistent direction or funding, or that EM HQ will refrain from imposing on or impeding locally developed cultural improvement initiatives.

- Survey and BARS data indicate concerns affecting quality:
  - Data on the BARS for Performance Quality indicates that only about 30% of the ORP interviewees who completed this scale perceive that project personnel take personal responsibility for their actions and the consequences of their actions. The average response to the Performance Quality BARS was significantly lower this year than last year (3.06 vs. 4.00). This decline in scores on this BARS suggests less commitment and pride in the organization.

- The mean value of ORP responses to the OCI survey item, "To what extent do members emphasize quality over quantity?" is lower than the Historical Ideal value for this survey item (3.29 vs. 4.01)

- Multiple methods identified roles and responsibilities as a significant issue:
  - Interviewees expressed the opinion that normal position descriptions and roles, responsibilities, authorities, and accountabilities (R2A2) descriptions provide minimal value to the dynamic and evolving work of ORP management and staff. Management expressed that the senior level of many technical staff merits broad professional discretion, and that management would like to see strong expression of technical input. Management interviewees communicated the view that many technical positions mandate a level of professionalism and maturity for skills, knowledge, and self-direction based on mission, goals, and broad management guidance. A number of staff interviewees expressed perceptions of being constrained by formal position descriptions and performance plans, and some expressed that performance assessment is not valid because they perceive that their professional opinions are not welcomed due to political factors.
  - A particular instance of R2A2 vagueness was noted in Federal Project Director (FPD) positions. Perspectives on such positions varied among managers – e.g., that the primary focus of FPDs was tracking project status, or that the FPD serves as the "conscience of safety culture" for the project. FPD incumbents evidenced a wide variety of perspectives on their roles, with some noting that the certification requirements and descriptions from DOE HQ had little to do with their actual work, and some staff members commented that FPDs did not attend to safety or quality issues but focused instead on reporting project status only in the most favorable light to EM HQ because of political pressure to look good.
  - Data on the BARS for Roles and Responsibilities indicates that only 10% of all respondents (manager and non-manager) to this scale have a positive perception of the extent to which office personnel positions and departmental work activities are clearly defined and carried out. Among the ORP non-managers, none of the respondents had positive perceptions about this behavior in 2014 or in 2015. The mean value on this scale (2.25) is the lowest of all 10 BARS scales. It is 0.54 points lower than the value observed in 2014.
  - The results of the OCI survey also suggest that role clarity is low. The mean response to the question, "To what extent do you clearly know what is expected of you as a member of this organization?" is only 3.61. This is below the Historical Ideal average value for this survey item (3.92).

**Trait 4. Work Processes**

*The process of planning and controlling work activities is implemented so that safety is maintained.*

**Positive Observations**

- Some interviewees noted that the ORP/WTP Roles and Responsibility document was developed with a series of workshops that involved staff and management; this developmental approach seemed to improve mutual understanding and work relationships.

- Some interviewees noted that progress on One System and the weekly One System meetings are a source of optimism for bringing more coherent focus to the mission and thus promise more clarity in work focus. Similarly, a number of interviewees commented that the increased attention on the Low Activity Waste Facility (LAW) as a project technical priority is a potential positive game changer for clarifying work priorities and work processes.

- Several interviewees perceive that working relationships with the contractors have improved; particular examples noted were the One System integrated project team and the weekly contractor interface meeting.

- Responses to a BARS scale indicate a statistically significant improvement in employees' perceptions of coordination of work since 2014. (See Appendix B, Table A.)

**Areas in Need of Attention**

- In some instances, management and staff interviewees express different perspectives about expectations for work control, formalization of work processes, and guidance for the performance of work.
  - Many staff expressed ambiguity, or inconsistency of understanding, about how work should be performed. For example:
    - Interviewees noted that some people struggle with what is an acceptable level of work process formalization. For example, some commented that personnel with shipyard or other nuclear backgrounds are accustomed to highly formalized work processes, and the absence of such formalization at ORP causes them consternation.
    - Many interviewees maintain that the work is so variable for ORP that detailed formalization is not practical or not worth the investment of time to achieve.
    - Some interviewees observed that newer employees seem to prefer greater formalization, while employees with longer ORP tenure may prefer less formality and greater professional discretion.
    - In some instances, interviewees noted that management's treatment of staff in the past may have caused a desire for more explicit job rules to help protect employees, thus inhibiting the expression of technical judgment and advice that current managers may say they desire.
  - Some management interviewees expressed different views from staff about expectations for work coordination and performance, and perspectives varied among managers. For example:
    - Some management interviewees indicated that they expect ORP technical staff to apply their expertise and exercise judgment within broad general guidelines.
    - Some managers stated that expectations for work were well established and that verbatim compliance with procedures was the expectation.
    - Some management interviewees commented that because most demands on ORP are "A" priority it is hard to prioritize work and that although managers attempt to "buffer" employees from much of the confusion, it is hard to stabilize work for staff.

- Several interviewees reported that coordination of work is an ongoing challenge. They commented that many work activities require multiple people "to be on the same page" about the nature of issues and decisions. Interviewees observed that because there is so much to know, and so many opinions on many issues, it is difficult to get people to come to agreement, and sometimes it is not clear who can make decisions. Some interviewees did note that efforts to clarify decision making are ongoing, but the bottom line is that successful coordination often depends on persistence, flexibility, and lots of patience.

- Some interviewees expressed enthusiasm that ORP should aspire to become a high performing organization, yet they noted that developing collective mindsets and collaborative team processes is hindered by a lack of attention to training on teamwork skills and lack of the facilitation needed to support collaborative work.

- Perceptions about work process documentation are negative within some parts of the organization. For example:
  - Some staff stated that as many as 50% of their procedures are in various states of revision and that it takes about a year to get through the process to update them. Interviewees noted that tracking revision status through the Electronic Suspense Tracking and Routing System began about a year ago. Some expressed the view that all revisions "go through the front office," thus delaying the process and making the revision process opaque to the staff.
  - Some noted that the Engineering division formerly used desk instructions, but they became outdated or were canceled, and the division now uses the Implementing Procedure (higher level document) instead. Some interviewees considered that the desk instructions provided better guidance and expressed dissatisfaction that the organization had failed to keep the desk instructions up to date.

- Interviewees indicate that the level of staff involvement in procedure development and validation was inadequate in some parts of the organization. Some reported they had no involvement in developing their work procedures. Still others perceived that desk instructions or other performance guidance was too general or too out of date to be particularly helpful, so they had to use considerable discretion in formulating how to perform their work. The general sense expressed by several interviewees is that ORP work process support documents are as a whole ambiguous and lack unifying principles that might promote shared understanding or commonly shared approaches when appropriate.

- According to some interviewees, shifting authorities and lines of communication at EM HQ sometimes hinder coordination of work. As an example, some management interviewees noted that mission-focused EM HQ managers have reporting relationships that are not aligned well with the responsibilities of some ORP managers. The result, according to the interviewees, is that how often ORP managers interact with their designated mission support is subject to the personal preferences and styles of the HQ managers – interaction is as frequent as the EM HQ managers want to make it, with no structure to support it. Some commented that the EM structure almost excludes collaborative interaction and that some areas lack a formal process to support resolution of conflicts. Several interviewees (management and staff) perceive interactions with EM HQ to be a function primarily of the individual relationships that might exist at a given time, subject to frequent changes. Interviewees' impression is that the prevailing model of interaction with EM HQ does not promote stability in work and decision making.

- Data from the BARS for Formalization indicated that only about 30% of ORP interviewees who completed this scale believe that rules and procedures governing work activities are readily available and that personnel are aware of the importance of procedural adherence. The mean value of members' responses on the Formalization BARS was 0.76 points lower than the corresponding value in 2014.

- The norm for ORP's Affiliative behaviors was the weakest of all 12 behavioral norms measured by the OCI. It should also be noted that the mean value of ORP's responses to the OCI question, "Think ahead and plan?" is below the Historical Ideal value for this survey item (3.66 vs. 4.56). (Note: These factors may contribute to poor coordination and communications regarding work activities. A strong Affiliative behavioral norm can enhance organizational performance by promoting open communication, cooperation, and the effective coordination of activities.)

**Trait 5. Continuous Learning**

*Opportunities to learn about ways to ensure safety are sought out and implemented.*

**Positive Observations**

- Some interviewees stated that there is a new issues management system (instituted October 2012) with an organizational policy of "zero threshold" input – i.e., any issue may be submitted without restriction. They noted that there is a formal process to keep track of issues to closure and that formal annual assessments and corrective actions are subjected to thorough causal analysis and tracked via the new system.

- Several interviewees remarked that close attention is being devoted to analyzing, understanding, and using insights from the Federal Viewpoint Surveys (FVS) and prior DOE safety culture assessments. A number of management and staff interviewees stated that there is broad awareness and discussion of the FVS results, and efforts are under way to develop progress metrics to keep attention focused on monitoring progress in improvement.

- Some interviewees noted that there has been a conscious effort to begin learning from successes locally and from other organizations. For example:
  - The Salt Waste Processing Facility at the Savannah River Site recently had an interim project review. ORP sent a representative to participate, and lessons shared were integrated into ORP contract negotiation strategies and commissioning.
  - ORP obtained lessons learned from Integrated Waste Treatment Unit commissioning activities at the Idaho National Laboratory but found them not applicable to WTP.
  - ORP has been examining software documentation challenges and pursuing lessons learned on this topic from other sites.
  - The ORP response to the DNFSB regarding the approach to addressing the consequences of ashfall from a postulated volcano was a recent example of collaborative teamwork between Nuclear Safety and Engineering, co-led by good engineers from the WTP Engineering Division, the Technical and Regulatory Support Office, and HQ. Interviewees stated that approaches recommended by the joint team, if adopted, could save $1B. Some ORP interviewees pointed to this teamwork as an example of successful new working relationships that could serve as a model for resolving future complex, sensitive problems.

- Some interviewees commented on the recent appointment of a senior level training program manager and expressed that this appointment is consistent with a long term objective to establish a comprehensive ORP leadership and technical development center. Also, some interviewees noted that ORP retained a consultant safety culture advisor to support ORP's internal culture improvement efforts.

**Areas in Need of Attention**

- Multiple measures identified workforce development as a significant concern. For example:
  - A number of ORP interviewees commented that training and succession planning are becoming increasing issues of concern and that historically there has been insufficient attention to workforce development. Interviewees noted that with a 30% increase in staff over the past 12 months, the challenges of developing collaborative work teams became magnified. They further commented that while new hires have good technical knowledge, they do not have institutional knowledge of the project, and because they have diverse experiences before joining ORP they have differing mental models of what constitutes acceptable standards and practices.
  - Results from the OCI also suggest that more attention should be given to workforce development. ORP responses to questions regarding the Humanistic-Encouraging behavioral norm suggest that

this norm needs to be strengthened. Specific survey items showed relatively low mean values compared to the Historical Ideal values.

| Survey Item | ORP 2015 | Historical Ideal |
|---|---|---|
| Help others think for themselves | 2.85 | 4.16 |
| Take time with people | 3.28 | 4.24 |
| Encourage others | 3.53 | 4.56 |
| Help others to grow and develop | 3.57 | 4.48 |

- Many interviewees commented that both veteran employees and new hires are frustrated by lack of stability. Management and staff interviewees expressed broad consensus about the transitory nature of project work, and while most express commitment to the mission, they express definite concern about workload, frustration, and creeping cynicism attributed to prolonged ambiguity and uncertainty. Staff and management express feelings that they are continually second-guessed by EM HQ, the DNFSB, and state regulators; that their long hours of labor seem to be disregarded; and that on occasion their integrity is besmirched. In general, interviewees expressed feelings of struggling to accomplish a very hard job with little control, few champions, and only cursory recourse for resolving grievances.

- Some interviewees expressed concern that some project documents were not sufficiently detailed to give a good understanding of technical or decision bases. For example, interviewees stated that it is sometimes difficult to know whether procurements meet specified requirements based on the procurement documentation, so detailed assessments are needed to determine compliance. Interviewees commented that better project documentation was needed to satisfy compliance, maintain configuration, and establish project history.

- Some interviewees commented that ORP staff and managers have little knowledge about safety culture apart from the required SCWE training. Some expressed that their experiences in the Navy or commercial nuclear programs provided a broader view of safety culture than the view promoted by DOE.

- Data on the BARS for Organizational Learning indicated that only approximately 20% of ORP interviewee respondents held positive views about this behavior; 80% provided ratings of 3 or less on a 5-point scale. The mean value of members' responses on the Organizational Learning BARS was 0.80 points lower than the corresponding value in 2014.

**Trait 6. Environment for Raising Concerns**

*A safety conscious work environment is maintained where personnel feel free to raise safety concerns without the fear of retaliation, intimidation, harassment, or discrimination.*

**Positive Observations**

- Many interviewees indicated that they had no apprehensions about reporting safety concerns.

- Many interviewees expressed that managers are more approachable and more open to receiving helpful criticism than in the past.

- Many interviewees indicated that they felt they could question or offer alternative perspectives on management decisions.

- The mean responses to most of the SCWE survey items are somewhat more positive this year compared to prior years. (See Appendix B, Table B.) The mean of responses to the question "I can openly challenge management decisions" is significantly more positive this year than last year ($p<0.05$). Mean responses to four of the other items are also higher in 2015 than in 2014, but these four differences are not statistically significant.

**Areas in Need of Attention**

- Some interviewees observed that although employee concerns efforts seem to be improving at the ORP local level, "the HQ ECP is awful," and there is a lack of trust in EM HQ's attention to employee concerns. In addition at the time of the assessment, one HQ ECP concern had not been resolved in over two years.

- In comparison to the 2014 assessment, fewer interviewees indicated reservations about expressing concerns. However, some interviewees suggested that at the staff level, candid expression of differing opinions remains a concern. For example:
  - A number of interviewees observed that previous managers' behaviors toward staff, as well as historical project technical missteps, provoked an attitude of risk avoidance within the workforce that dissuades the staff from staking out firm technical positions at odds with official pronouncements, primarily emanating from EM HQ.
  - A few interviewees commented that job security could be endangered by conflicting or inconsistent positions, primarily from EM HQ or external sources.

- The average value of the responses to one SCWE item, "Concerns raised are addressed," is lower this year than last year. (See Appendix B, Table B.)

**Trait 7. Effective Safety Communication**

*Communications maintain a focus on safety.*

**Positive Observations**

- Several interviewees commented that ORP and project contractors have committed to a "no surprises" approach to communication, representing a cultural trend towards openness (with agreements of confidentiality as appropriate and necessary), inclusion of all affected parties, and full vetting of issues by exchanging position drafts back and forth during the issue discussion process, with a joint focus on issue resolution for mission success rather than allocating blame (referred to by several interviewees as "no bashing").

- Interviewees identified many avenues for communication, including morning meetings Tuesday and Wednesday, full group meetings on Thursday, ORP meetings once a week, periodic status and staff meetings within WTP ORP staff, email announcements, direct interface, all hands meetings, *Bill's Perspectives* newsletter, and Deputy Manager weekly notes on key activities. Several interviewees commented that some managers seemed to be making a special effort to increase the frequency of informal communication via hallway chats and office drop-ins.

- Several interviewees commented that co-location of all ORP personnel into a single office location has improved internal communication. While there are some dissenting opinions on the office consolidation, most interviewees expressed support.

**Areas in Need of Attention**

- Some interviewees commented on the number and frequency of meetings and stated that some meetings appear to have little value, while some duplicate other meetings. Some interviewees commented that they would like to see an evaluation of what meetings are really necessary and what they are intended to accomplish. Some interviewees offered suggestions for improving meetings. First, they commented that BNI had performed an evaluation of meetings and that the results seemed to have helped improve BNI's workload and better prioritize time utilization. Second, interviewees commented that in some cases, the type of preparation and structure adopted for the manager's weekly meeting and the weekly contractor interface meeting exemplifies constructive and productive communication behaviors that could improve the effectiveness of other meetings.

- Some interviewees stated that communication often takes a "giving directions" approach and that listening and reciprocity are often weak. In particular, some interviewees stated that "EM HQ doesn't listen well." Interviewees also noted that weakness in listening was also an issue for some ORP managers, but less now than in the past.

- Several interviewees commented on the complexity of communication challenges. One interviewee commented that a key barrier to improving communication was "bureaucratic obliviousness." Other interviewees addressed the same phenomenon using different terms, such as "politics over substance." Many interviewees expressed perceptions that internal and external communication behaviors and barriers prevent or harm trust. For example:
  - The consent decree is viewed as definite barrier to open communication with the staff. Interviewees noted that there are limits on what management is allowed to communicate to the staff because of restrictions imposed by EM HQ or legal counsel.
  - Some interviewees expressed that attempts to control communication were sometimes unrealistic or counterproductive. One interviewee described attempts to control communications as "an exercise in naïve irony." Other interviewees commented that some EM HQ and DOE Office of General Counsel personnel try to restrain communications, although the broad WTP local community perceives that the size and complexity of the project almost guarantee that information will get out. For example, multiple comments were made about how often information is reported by the media before management is allowed to share it. Some interviewees mentioned that on some occasions, EM HQ "cautioned" ORP managers not to share certain information, only to find that the same information was soon thereafter reported in the Weapons Complex Monitor.
  - Some interviewees noted that sometimes communication is minimized or oversimplified because of the seriousness of issues or because there are simply no straightforward solutions to the most difficult project problems.

- The BARS for Interdepartmental Communications refers to the exchange of information, both formal and informal, between the different departments or units in the facility. It includes both the top-down and bottom-up communication networks. About 40% of the responses to BARS regarding Interdepartmental Communications were in the negative range. These respondents selected one of the following two statements to characterize how departments in their organization currently communicate:

- "Departments only communicate with each other when reacting to problems. Most departments are uncommunicative with one or more other departments."
- "Many departments think it is unnecessary and intrusive to communicate with other departments unless absolutely necessary."

A greater proportion of non-managers than managers provided negative ratings on Interdepartmental Communications.

**Trait 8. Respectful Work Environment**

*Trust and respect permeate the organization.*

**Positive Observations**

- Several ORP interviewees, both management and staff, indicated that internal mutual trust has improved over the past couple of years. (Note that this reflects trust within ORP but does not address trust factors regarding EM HQ, contractors, or other external parties.)

- Several interviewees stated that relationships within ORP are improving.

- Several interviewees indicated that they aspire for ORP to be a highly performing organization.

- Some management interviewees shared their candid awareness that the ORP and WTP environment is often challenging for even seasoned managers. Some interviewees shared that they have private discussions with some of their peers about personnel management or communication styles developed over many years in other organizations. A few interviewees acknowledged that their communication behaviors might sometimes be perceived as a bit off-putting and that they might not always be as skillful as they might need to be when confronted with contentious or emotionally laden situations. (Note: Reflective peer discussions and questioning self-awareness are indicative of constructive behaviors.)

- A number of interviewees, both management and staff, indicated that the shift from focusing solely on safety culture to focusing more broadly on organizational culture has enabled ORP to begin to talk more openly about issues that affect trust and respect.

- ORP employees were given the opportunity to respond to the OCI in 2011, early in 2014, and again one year later in 2015. The changes in their responses to the 12 behavioral norms are shown in Appendix B, Table C. From 2014 to 2015, the mean values of all 12 behavioral norms used to assess organizational culture moved in a positive direction. Although none of these changes are statistically significant, the overall pattern suggests that the ORP culture has started heading in a more positive direction. In contrast, the comparison between 2011 and 2014 showed the strength of the 12 behavioral norms almost always changing in a more negative direction.

**Areas in Need of Attention**

- Interview responses from ORP members expressed concerns about respect. Overall survey results indicate that in terms of the general types of culture measured by the OCI, members view the current culture of ORP as being (from strongest to weakest):

- Passive/Defensive: Involving expectations for members to interact with other people in cautious and tentative ways to protect their own security (includes norms and expectations for Approval, Conventional, Dependent, and Avoidance behaviors).
- Aggressive/Defensive: Involving expectations for members to approach tasks in forceful ways to promote their status and security (includes norms and expectations for Oppositional, Power, Competitive, and Perfectionistic behaviors).
- Constructive: Involving expectations for members to interact with people and approach tasks in ways that will help them to meet their higher-order needs for satisfaction and growth (includes norms and expectations for Achievement, Self-Actualizing, Humanistic-Encouraging, and Affiliative behaviors).

In highly performing organizations, the Constructive behaviors are the strongest norm, not the weakest. ORP responses to questions regarding its Constructive behavioral norms (Affiliative, Humanistic-Encouraging, Achievement, and Self-Actualization) suggest that this norm needs to be strengthened.

- A number of interviewees, both management and staff, identified trust as a historical weakness. Interviewees commented about trust issues between management and staff, trust between work groups, and trust between ORP and EM HQ. A few stated their perceptions that EM HQ does not respect ORP staff or ORP managers. Although none of the OCI survey items attempt to directly measure "trust," several of them can be interpreted as supporting expressions of the level of distrust among organizational members:
  - Results from the electronic OCI survey show that ORP's weakest behavioral norm is **Affiliative**. An Affiliative culture characterizes organizations that place a high priority on positive interpersonal relationships. Members are expected to be friendly, open, and sensitive to the satisfaction of their work group. An Affiliative culture can enhance organizational performance by promoting open communication, good cooperation, and the effective coordination of activities. Members are loyal to their work groups and feel they "fit in" comfortably. As task interdependence, teamwork, and self-management become essential because of the complexity and knowledge intensiveness of the mission and technology, coordination and open communication become increasingly important to organizational effectiveness. Affiliative cultures encourage honesty and commitment in communications and actions. Relative to the Historical Ideal values for these survey items, ORP survey responders gave low ratings to the following individual survey items:

| **Survey Item** | **ORP 2015** | **Historical Ideal** |
|---|---|---|
| "Treat people as more important than things" | 3.59 | 4.59 |
| "Show concern for people" | 3.48 | 4.45 |
| "Use good human relations skills" | 3.67 | 4.62 |
| "Cooperate with others" | 3.73 | 4.50 |
| "Share feelings and thoughts" | 2.91 | 3.84 |
| "Be open, warm" | 3.15 | 4.17 |
| "Motivate others with friendliness" | 3.06 | 3.89 |
| "Be tactful" | 3.56 | 4.24 |
| "Deal with others in a friendly, pleasant way | 3.85 | 4.54 |

  - Results from the electronic OCI survey also show ORP survey responders to be relatively weak on the behavioral norm called **Humanistic-Encouraging**. Relative to the Historical Ideal value

for these survey items, ORP survey responders gave low ratings to the following individual survey items:

| Survey Item | ORP 2015 | Historical Ideal |
|---|---|---|
| "Take time with people" | 3.28 | 4.24 |
| "Encourage others" | 3.53 | 4.56 |
| "Help others to grow and develop" | 3.57 | 4.48 |
| "Be a good listener" | 3.76 | 4.57 |
| "Resolve conflicts constructively" | 3.75 | 4.54 |
| "Involve others in decisions affecting them" | 3.48 | 4.36 |
| "Show concern for the needs of others" | 3.67 | 4.24 |
| "Be supportive of others" | 3.70 | 4.41 |

– ORP responses also indicate a relatively strong **Avoidance** behavioral norm. Avoidance was one of ORP's two strongest current norms (slightly less strong than Oppositional). The specific survey items that assess the Avoidance norm, and the ORP survey scores on those, items are:

| Survey Item | ORP 2015 | Historical Ideal |
|---|---|---|
| Never be the one blamed for problems | 2.23 | 1.57 |
| Make "popular" rather than necessary decisions | 2.19 | 1.35 |
| "Lay low" when things get tough | 2.10 | 1.36 |
| Be non-committal | 1.99 | 1.48 |
| Put things off | 2.04 | 1.28 |
| Take few chances | 2.64 | 1.82 |
| Not get involved | 1.97 | 1.34 |
| Wait for others to act first | 2.09 | 1.38 |
| Push decisions upward | 2.97 | 2.21 |

Note: The response scale was from 1 to 5. Because this is one of the defensive behaviors, lower numbers indicate a more positive culture. Although these numbers may not appear high, they are definitely higher than the Historical Ideal values for these survey items. Such scores indicate that some ORP employees are afraid of what might happen to them if they try to make decisions or stick their necks out. This indication is consistent with what some interviewees stated about risk aversion.

**Trait 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.*

**Positive Observations**

- Several interviewees indicated that management is open to employees expressing concerns and differing opinions.

- Results from the OCI quantitative survey support that questioning attitude is an established and accepted behavior within ORP. Results from the electronic OCI survey show that ORP's strongest

behavioral norm is Oppositional. On a scale from 1 to 5, the mean response to some of the individual survey items making up this norm are:

| Survey Item | ORP 2015 | Historical Ideal |
|---|---|---|
| "Look for mistakes" | 3.33 | 2.52 |
| "Point out flaws" | 3.20 | 3.04 |

These mean responses are somewhat higher than the Historical Ideal values for these survey items.

- Results from two of the SCWE questions about whether a questioning attitude currently exists are higher than in previous years:
  - On a scale from 1 to 5, the mean response to "I can openly challenge management decisions" was 3.23, which is significantly higher than the corresponding value from last year's assessment.
  - On a scale from 1 to 5, the mean response to "Helpful criticism is encouraged" was 3.30. This value is somewhat higher than the corresponding values from the two prior assessments, though the difference is not statistically significant. (See Appendix B, Table B.)

**Areas in Need of Attention**

- This trait includes the potential for complacency as well as willingness to question. Interview responses and survey data indicated that alertness to signs of complacency is warranted. For example:
  - Some interviewees (managers and staff) commented about the risk of questioning sensitive issues, based on the reactions of prior ORP managers or strong positions taken by EM HQ.
  - Responses to the SCWE survey question "Concerns Raised are Addressed" were in the mid-range of the response scale and slightly more negative than in 2014. (See Appendix B, Table B.)

## 3.2 BNI Traits – Positive Observations and Areas in Need of Attention

### Trait 1. Leadership Safety Values and Actions

*Leaders demonstrate a commitment to safety in their decisions and behaviors.*

**Positive Observations**

- Most interviewees agree that worker safety is a high priority, and people express confidence that they can report unsafe conditions or express safety concerns without fear of intimidation.

- Interviewees identified numerous avenues available to report safety concerns; in particular, construction personnel commented on routine communication with supervisors, labor safety representatives, daily pre-job briefs, safety log books, Corrective Action Management Program (CAMP), and ECP.

- Some interviewees commented that it takes a considerable time and reinforcement for new construction workers to understand how serious the project is about safety. Several interviewees noted that for many new employees, the emphasis on safety and quality is higher at WTP than other places they have held jobs, so extra time and care are needed to train and acclimate them. In particular, craft personnel contrasted their WTP experience with how things are "in the real world," expressing that many safety and quality practices at WTP are not applied in other construction efforts.

- Many interviewees expressed that the project has focused considerable attention over the past year on identifying precursor conditions to prevent accidents or near misses.

- Management interviewees, as well as a number of technical staff, noted that the Performance Evaluation and Measurement Plan modifications involving issues identification and targeted budgets for corrective actions were key stimuli for moving the project forward.

- Interviewees at all levels of the organization observed that safety and quality culture has been more visible in the past year. Dialogs from Peggy (email communications from the BNI WTP Project Director), posters, the people based quality program, Safety Education Through Observation (SETO), the Safely Speaking program, and peer challenging on unsafe conditions in the workplace have become more accepted as respectful professional behavior.

- Many interviewees noted that organizational alignments have improved working relationships and quality of work. Frequently cited examples included restructuring of nuclear safety into engineering; fire protection groups restructured into one group and more fire protection engineers hired; and improved collaboration with the fire sprinkler subcontractor.

- A number of interviewees noted that the integrated safety management system (ISMS) is the overarching framework for safety, and line managers expressed a high degree of personal responsibility for safety. Some interviewees noted that merging quality and culture concepts with ISMS is gradually evolving a holistic, integrated management framework to support readiness approval of the project. Interviewees emphasized that these efforts are in the early formative stages, but they feel confident that it is being strategically aligned within the One System approach to establish an overarching management framework for WTP operations. Of the ten BARS, Attention to Safety had the highest average rating. (See Appendix B, Table D.) The ratings were relatively high in the previous two assessments and rose even higher in 2015, to an average of 4.193 on a 5-point scale.

- Results from the BARS on Time Urgency indicate that most BNI interviewees (64%) do not perceive schedule pressures to be the determining factor while completing various tasks.

**Areas in Need of Attention**

- The needs for a stable work environment and a stable budget were the most consistently expressed areas for improvement from interviewees across all levels of the organization. Interviewees discussed these in a variety of ways, such as “freezing the code of record,” finalizing the design, or committing to the LAW approach.

- Some interviewees expressed that reporting of minor injuries automatically initiates superficial incident investigations, which they say generally blame the injured party for inattention, failure to recognize the hazard, or similar person-focused causes. Further, some express that minor injuries may result in automatic drug testing, which some considered being a violation of medical privacy in the absence of further probable cause.

- As previously mentioned, several interviewees noted that for many new employees the emphasis on safety and quality is higher at WTP than at their prior jobs. However, some craft personnel expressed that safety and quality practices are applied at WTP to the extent that sometimes they seem like “overkill here.”

- Interviewees do not perceive time pressure as a safety concern, but they do perceive it as a frequent occurrence detrimental to quality. Specifically, some attributed it to project uncertainty, lack of good planning, or non-value "fire fights" imposed by external groups with excessive audits and assessments, or demands for information from "bureaucrats" and inconsistent or conflicting direction from EM HQ.

- Interviewees at various levels of the organization expressed varying perspectives about the reasons for changes in planned work. Craft interviewees expressed that they often do not understand the basis for decisions and view "knee-jerk reactions," frequent changes, and "re-work" as indications of management ineffectiveness, waste, or collusion between DOE and the contractor to prolong the project. Some engineering and design interviewees attributed the frequency and magnitude of changes in design direction and scope as ineffective project management or DOE's inability to "make up its mind." Management attributes changes to technical, budgetary, and/or political factors.

- The average value for craft employees' responses to the Attention to Safety BARS is significantly lower than the average for non-craft employees (3.48 vs. 4.48).

- The average value for craft employees' responses to the Time Urgency BARS is significantly lower than the average for non-craft employees (3.07 vs. 4.04).

- Of the ten BARS, Resource Allocation has the lowest average rating (2.59 on a 5-point scale). The average value for craft employees' responses is significantly lower than the average for non-craft employees (2.09 vs. 3.40).

**Trait 2. Problem Identification and Resolution**

*Issues potentially impacting safety are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance.*

**Positive Observations**

- Interviewees in management and technical positions offered numerous positive observations about the new approaches to identification and resolution of issues. Key factors noted included the DOE incentive to stimulate contractor self-identification of issues and specific contractor set-aside funding for corrective actions.

- Several management and technical staff interviewees expressed that issue resolution with management engagement was the single most positive improvement in problem resolution, noting that accountability was changed from the functions being responsible for corrective actions to area managers who own the resources. Interviewees often noted the tiered approach to corrective action, with a top level Performance Improvement Review Board, three Integrated Project Team Performance Improvement Review Boards, and the Organizational Effectiveness group's involvement as strong components of the new approach to problem identification and resolution.

- Interviewees identified many examples of ways to identify issues or concerns: safety log book; condition reports, Craft Safety Alliance, craft safety representatives, people based quality, automated job hazards analysis (AJHA) safety walkdowns, Safely Speaking, SETO, questioning attitude, design reviews, the Trend program and Integrated Trend team, non-conformance reports, supplier deviations and construction deficiency reports, Engineering Progress and Performance reporting, and field based

observation (senior supervisor making field observations using standardized check sheets for core processes, such as lifting).

- The average of the BNI ratings for Problem Identification and Resolution on the BARS is second highest among the 10 behaviors sampled (3.99 on a 5-point scale).

- Responses to several SCWE questions also indicate strong support for Problem Identification and Resolution. (See Appendix B, Table E.) The mean value of BNI responses to "I am responsible for identifying problems" is 4.30, higher than the corresponding mean from the 2014 assessment by a statistically significant amount. Likewise, the mean values of BNI responses to two other SCWE survey questions ("Management wants concerns reported & willingly listens to problems" and "Concerns raised are addressed") are significantly higher than the 2014 value.

**Areas in Need of Attention**

- Some interviewees commented negatively on the BNI goal of 50% reduction in the number of outstanding corrective actions (about 800 currently) of legacy reports. Interviewees identified several factors associated with resolving or closing legacy reports and completing the transition from project issues evaluation reports (PIERs) to the new CAMP system, including:
  - The scope is not clear, (Scope examples included "Does the reduction goal include only legacy reports or does it include recently generated issues?" and "does the reduction effort include all issues or just those categorized as a high level of significance?")
  - Working through the backlog of PIER items is a complicated process. Many of the condition reports were poor resolution of previous PIERs, because there was a push to close things and the original PIER items weren't resolved correctly.
  - DOE's contract incentive emphasizes identifying new issues, and to some interviewees the reduction of legacy issues while generating new ones seems to send conflicting signals.
  - The legacy PIER system is said to contain issues that are no longer relevant because "It's a different plant than we originally planned to build." Thus, many historical items may reflect work that no longer needs to go into completing the project.
  - Although many interviewees expressed that the project is in a period of transition to an improved situation, they commented that a simplistic emphasis on reducing the number of outstanding old items as a metric is not necessarily helpful. Some also expressed perceptions that much of the backlog reduction was a kneejerk reaction to political and oversight mischaracterization of the issues, and that it does not contribute toward developing a more "rational, risk-informed" system for problem identification and resolution.
  - A few managers noted that the big backlog of unresolved issues has a negative psychological effect on the staff.

- Some interviewees commented that resolution of certain issues require research that is not funded or not on the schedule, and that these type items cannot be treated for closure the same way as in a more conventional project management system. They expressed concern that oversight bodies, such as the DNFSB and EM HQ, need to take this difference into account, instead of using a standardized checklist approach to project assessment.

- Some technical staff interviewees identified the risk registry and risk list as not sufficiently mature or tailored for managing the type of uncertainties and erratic technical and budget decisions associated with the project. Trend data for seismic issues and bubblers for tank level indicators were cited as examples of risk related data and budgeting decisions that need to be tracked but cannot be well managed with the current risk registry/list approaches.

- A number of interviewees noted that some sectors of the organization retain a strong sense of the "fix it now" design and construction mentality, in contrast to the "document, analyze, and resolve" nuclear mentality currently adopted for the project. Some staff expressed a preference for the "fix it now" mindset and characterized formal CAMP entry and resolution as a waste of time and resources.

- Timeliness and quality of feedback to issue originators remain an issue with some interviewees; similar comments were made in previous assessments. Interviewees expressed general agreement that problem identification and resolution has improved, but some interviewees indicated that they did not receive or could not obtain feedback on the status of their issues or concerns, or that they did not think their concern was adequately addressed.

- Interviewees expressed concern that the length of time for some repairs can prompt workarounds and result in safety vulnerabilities. Interviewees mentioned a material access rollup door that had been inoperable for a an extended period, an equipment transport elevator that has frequent service problems, and a broken access ramp as problems that seem to take a long time to evaluate and repair. Interviewees stated that as a result, workers have to transport material by hand that would otherwise be transported by forklift or elevator.

**Trait 3. Personal Accountability**

*All individuals take personal responsibility for safety.*

**Positive Observations**

- Many interviewees agree that individuals actively look out for each other's safety and that the organizations support them in doing so.

- Most interviewees have no fear of reporting personal errors and perceive that there is clear distinction between normal human error and willful harmful actions.

- Interviewees express a high awareness of the people based quality effort and view it as a needed link between safety and quality.

- Many interviewees perceive the Reliability Validation process as helpful in gaining more clarity on their work processes and procedures.

- Some interviewees commented that people are beginning to see working at WTP as a positive career experience. Example comments included: "BNI employees used to feel disgruntled—that they were stuck here. You couldn't leave unless you went to a different company. But now it's easier to transition to other parts of Bechtel." "Recently, some former BNI employees have been returning here to work." "We are getting a more positive reputation." "You develop a specialized skill set here."

**Areas in Need of Attention**

- Many interviewees indicate that considerable effort has been applied to clarifying and aligning roles and responsibilities at the higher levels of the organization, but that clarity about roles and relationships, particularly at the work execution levels for technical roles, requires ongoing attention. Several interviewees noted that it was not clear who they should coordinate with in various aspects of

engineering and design. They acknowledged that the recent reorganization contributed somewhat to the need for continuing clarification and that they were working on this issue through intensive personal networking, but that coordination was confusing and time consuming.

- Several interviewees expressed that individual roles and responsibilities, as well as position descriptions, are broadly defined (e.g., they might specify the position of nuclear engineer versus a chemical or maintenance engineer). Actual tasks, relationships, and responsibilities are often not well defined and must be learned on the job. Some interviewees noted that such specificity may not be desirable or feasible for a formal project orientation and that instead they have to spend time on forming working relationships and defining who needs to be involved in what products. A number of interviewees commented that understanding the necessary roles and relationships is more complicated than on their previous work projects.

- Several interviewees indicated that frequent personnel turnover resulted in problems. For example:
  - New employees often do not understand nuclear culture expectations.
  - New employees take time to develop an understanding of the organizational relationships and networking required on the project.
  - Personnel who leave the project often possess valuable project knowledge that is not formally captured, is difficult to locate, or may not exist in project records, so safety, quality, or rework issues may arise.

- The average response to the BARS on Roles and Responsibilities was 3.25, somewhat lower than in the prior two assessments.

**Trait 4. Work Processes**

*The process of planning and controlling work activities is implemented so that safety is maintained.*

**Positive Observations**

- Management and technical staff interviewees indicated that employees' perceptions about work control have become more favorable during the past year. They emphasized that work process improvement has been a major focus of attention and investment. Interviewees provided numerous examples, including clarification of organizational R2A2s (not to be confused with individual R2A2s), Integrated Project Teams and integrated project schedules, a logic-driven work scheduling system that shows organizational interfaces, document control, a complete revision of the approximately 600 project procedures to a nuclear standard system and streamlined performance-based procedure format, Requirements Area Managers, and a new Work Control System scheduled to go online in 2016.

- Examples of perceptions of improved coordination of work include:
  - Many interviewees perceive that the clarity of reciprocal responsibilities between URS and BNI is much improved.
  - Integration of engineering, quality engineering, and radiological engineering has improved, with good alignment in document preparation and review.
  - BNI determined that procurement procedures were too oriented toward the procurement organization's concerns, so BNI provided joint training between Engineering and Procurement. BNI also combined metrics with procurement to find problems and improve the processes.
  - The relationships changed from a "blame game" to focusing on solutions.

- Engineering was closely aligned with the construction site and participated in site integration meetings. The Engineering Design Review process for integration was revised to be formal and prescriptive, and it is perceived to work well.
- In previous reviews, interviewees viewed the Electrical Authority Having Jurisdiction (AHJ) as acting as a policeman and impeding work. BNI clarified the roles, and interviewees now see the AHJ as part of the team and process and as more integrated into the work process.
- Subcontractor integration has improved; BNI initiated a subcontractor surveillance plan that includes safety, fire protection, and radiological surveillance.
- Several craft foremen reported good communication and relationships in coordinating work. Morning and afternoon coordination meetings – plan of the day meetings (PODs) – were cited as promoting good work coordination.
- People based quality is helping to integrate quality into daily work during planning and daily execution.

- The average of BNI employees' responses to the BARS for Coordination of Work is relatively high. It is higher than the corresponding value from the prior assessment by a statistically significant amount, indicating positive change in perception since the prior assessment.

- The average of responses to the BARS concerning Formalization continues to be relatively high (3.82). It was also high in both the 2011 and 2014 assessments.

**Areas in Need of Attention**

- Many site interviewees commented that work packages are often problematic because they are received not complete or not approved. For example:
  - Work packages repeat themselves, contain generic answers, include the same hazards from package to package, are vague, may not pertain to task at hand, and/or are written at a reading level inappropriate for the work teams (written more for an engineer than for a construction worker).
  - Work package writers may not understand the work and may not include all needed tasks, or packages may include information from the past that is no longer needed.
  - The logistics in trying to get everyone together and getting key players to sign off on paperwork is difficult. Superintendents and group leads who have signature authority are very busy; scheduling them to facilitate meetings (e.g., AJHA meetings) is difficult and often delays the start of work.

- A number of interviewees expressed frustration about frequent turnover in field engineers. Interviewees commented that they expect field engineers to play a central coordination role between design and construction execution and that new field engineers often do not understand WTP, resulting in considerable delay and confusion.

- Several technical staff interviewees commented that dispositioning legacy issues is encumbered because:
  - Modifications require digging through old information.
  - There is difficulty in getting to the right people, some of whom may no longer be with the project.
  - Some calculations incorrectly assume the availability of some information, and incomplete information affects the scope of the effort, requiring extra time to determine what information may be needed and to confirm assumptions.

- Some interviewees noted that work control was undergoing major changes, commenting on the close coordination, communication, relationships, and legacy knowledge during the transition. In a few cases, they mentioned that the new procedures may not be well suited to deal with legacy issues, such as unresolved technical decisions and the unavailability of technical knowledge or decision bases.

**Trait 5. Continuous Learning**

*Opportunities to learn about ways to ensure safety are sought out and implemented.*

**Positive Observations**

- Interviewees noted several methods of lessons sharing:
  - Lessons learned coordinator, operating database, and lessons learned for each organization
  - Performance Improvement Review Board; three lower Integrated Project Team boards, including two for production; focus on production and quality; DOE and Hanford lessons learned programs; operating experience
  - Lessons learned being used in work planning and in work packages
  - Rapid input from notes in the STARRT (Safety Task Analysis Risk Reduction Talk) cards used at the construction site
  - BNI internal lessons learned program; flash report if Bechtel has an event anywhere in the world
  - Variety of meetings where experience is shared: Integrated Project Team meetings, internal staff meetings, construction management safety teams, Safely Speaking, POD, Peggy's Project Health meetings
  - Participation in various discussion groups with other contractors
  - More reliance on channels that appeal to younger employees, such as Twitter and Facebook
  - Implementation of a new mechanism ("the scorecard") in the coming year to provide status indicators in 28 areas via red, yellow, and green color codes.

- Interviewees commented that a quality engineering organization was recently put in place to review a sampling of engineering products and hold quarterly feedback meetings. BNI awarded four quality plaques to employees this year.

- Some interviewees stated that the self-assessment program is working better, but more improvement is needed.

- Interviewees mentioned several ways to recognize people for identifying and resolving concerns, including quality coin and recognition awards or putting their picture on the wall (some who received this award spent a year resolving corrective actions). The Performance Improvement Review Board also highlights contributions, and management recently mentioned five PIERs as commendable.

- Some interviewees noted that after the Waste Isolation Pilot Plant event, a special review team was formed to share information and discuss implications for the WTP project.

- Several interviewees spoke about various efforts that are under way to develop an overarching management system that should help to unify WTP culture. In particular, some noted that the ongoing orientation for senior leadership on ISMS in preparation for readiness review of the facility is a key factor in establishing a shared common language and operating framework. Similarly the "readiness strategy" document and the ISMS steering committee were noted as important related efforts.

- A few interviewees mentioned culture-building efforts that are underway, such as Women at Bechtel and NextGen. Mention was also made of a program implemented for 2014 summer interns that involved mentoring sessions covering a variety of topics including adult learning models, personal mastery, attitudes toward a vision, Maslow's hierarchy of needs, motivation theory, exemplary leadership, verbal and nonverbal communication, ladder of accountability, time management, types of courage, and related safety and quality topics.

- Some interviewees noted that in the past, senior managers had inconsistent understandings of the meaning and purpose of safety culture, often because they lacked nuclear management experience. The interviewees noted a considerable improvement over the past three years in creating a shared understanding of what a strong nuclear safety culture looks like. (However, see bullet #6 under Areas in Need of Attention, below).

**Areas in Need of Attention**

- Several interviewees commented that the project does not typically learn from successes, noting for example: "We don't celebrate our successes as much as we should"; "rare to see lessons learned from what went right"; "Never hear good job"; "never heard how x group did good job and here's how they were successful."

- Several interviewees expressed a perception that management addresses minor events with "kneejerk reactions." Examples cited included: "drug paraphernalia was found and 100% drug testing was required"; "a person received a cut when using a knife and site wide restrictions were placed on types of knives that could be used"; "one event with a golf cart resulted in all golf cart windshields being removed." The last two examples happened years ago but continue to be cited.

- Some interviewees commented that the large number of new hires (some said as many as 500 in past 18 months) complicates developing a shared culture.

- Some interviewees commented that senior managers seem to rotate every two to three years, disrupting organizational cohesion. Interviewees also noted that they were not aware of efforts to capture important project knowledge before employees depart.

- A few interviewees mentioned the desirability of learning from non-consequential errors. Some said that the DOE/Institute of Nuclear Power Operations (INPO) Human Performance Improvement philosophy was beneficial and consistent with safety and quality effort but had not yet been applied to many of the site operations.

- As discussed above, some interviewees noted considerable improvement within senior management in creating a shared understanding of what a strong nuclear safety culture looks like. However, interviewees also expressed a concern that a similar shared understanding has not permeated throughout the organization, characterizing the situation as "Understanding and awareness at lower levels is all over the map."

- Interviewees commented that a wide array of non-technical skills training is needed and that the Supervisory Development Academy and the new Onboarding training are examples of new training and orientation essential to shaping a strong nuclear safety and quality culture. Interviewees further noted that personnel selection and qualification need to evolve to an individualized selection and development approach, citing as an example: "when superintendents are selected who have been in the craft, they understand the relationship and what motivates the craft; however if field engineers are

appointed as superintendents they do not possess the same knowledge, skill sets, relationships or trust, thus they need different development training."

- The survey contains three questions relating to helping others grow and develop. This function is important in organizations such as BNI that have recently hired many new employees. The questions fall under the Constructive behavioral norm called Humanistic-Encouraging. Responses to the questions show a negative gap between what BNI employees view as the current culture and the Historical Ideal values for these items.

| Survey Item | BNI 2015 | Historical Ideal |
|---|---|---|
| Help others to grow and develop | 3.77 | 4.48 |
| Take time with people | 3.56 | 4.24 |
| Help others think for themselves | 3.22 | 4.16 |

**Trait 6. Environment for Raising Concerns**

*A safety conscious work environment is maintained where personnel feel free to raise safety concerns without the fear of retaliation, intimidation, harassment, or discrimination.*

**Positive Observations**

- Several interviewees at all levels of the organization, including craft, technical staff, and management, expressed that reporting safety concerns is encouraged and expected. Numerous comments were made about attitudes toward reporting concerns. For example: "We've seemed to have overcome fear of retaliation, moved beyond that. In fact people are so sensitized to this issue (retaliation), that they bend over backwards to ensure that you are not seriously concerned about something"; "If you initiate a safety concern you are allowed to follow it through"; "They encourage you to report. If you see something say something"; "You don't get in trouble for raising the concern." Some interviewees gave examples such as "Peggy's flyer indicated a concern that went into a safety log book on lighting at the [High Level Waste Facility]; electricians indicated that the documents didn't match; it was presented anonymously; got up to Peggy's level and she thanked the folks for bringing up the concern."

- Some interviewees spoke about improvements in attitudes toward and use of employee concerns. For example:
  - Training for supervisors and managers has emphasized their responsibilities for more than just getting work completed. More supervisors now understand that they need to be responsive to worker needs and concerns, and that the managers and the ECP can support them.
  - There is a better understanding of the purpose and use of the corrective action program and the ECP; more people now understand and use the corrective action program to report quality and safety concerns.

- The responses to the SCWE survey questions strongly suggest improvements during the past year in creating an environment where personnel feel free to raise concerns. For six of the seven questions, the mean responses are significantly more positive this year than last year. (See Appendix B, Table E.) The mean of the responses to "Retaliation not tolerated by management" is relatively high.

**Areas in Need of Attention**

- Some interviewees commented about inconsistency between subcontractor and contractor safety, expressing that some of the smaller subcontractors to BNI appear to operate with lower safety standards than BNI, and that subcontractor employee safety practices sometimes appear less robust than the practices BNI employees feel are acceptable and for which they are held accountable.

- Several interviewees, when asked about safety concerns, instead expressed concerns about schedules, perceived rework, or related production issues. Some expressed concerns about budgets and personnel processes for employee retention in case of budget layoffs. (This observation suggests further support for perceptions by other interviewees that there may still be lack of clarity about the new corrective action system, or perhaps it illustrates a need for continuous education and reinforcement. Neither interviews nor quantitative data gave indications that the residual lack of clarity was unique to any particular population segment, except that several comments suggested that WTP technical staff residing in the BNI Corporate office in Reston, Virginia who have little direct exposure to the site may not be familiar with reporting mechanisms or may not yet be as acculturated to reporting as the personnel on site.)

- Some construction interviewees expressed that if people have a minor injury they may be hesitant to report to medical because of the fear of being blamed as careless; they expressed concerns about privacy invasion because of mandatory drug testing for minor injuries, or fear that an injury report would make them more vulnerable to layoffs if budget cuts occur. Interviewees in prior safety culture assessments expressed similar perceptions. These recurring perceptions could suppress or deter reporting of minor accidents or injuries and were among the concerns most frequently voiced during this assessment.

**Trait 7. Effective Safety Communication**

*Communications maintain a focus on safety.*

**Positive Observations**

- Interviewees identified many ways of communicating: Peggy's posts, safety topics, newsletter, PODs, feedback on STARRT card, safety log book, frequent interactions with foremen and general superintendents, "state of the union" meetings, Monday morning senior manager plan-of-the-week meeting, biweekly meetings with Washington River Protection Solutions and ORP, biweekly meetings with staff, Integrated Performance Review Board, and Tuesday Safely Speaking.

- Several interviewees commented about the study on the number of meetings and identified the subsequent reduction and streamlining of meetings as a very positive improvement in communication and time use.

- Some interviewees commented that the re-organization and alignment of responsibilities have removed former barriers to work coordination and communication, and although there are still improvements to be made, the new working relationships are promoting improved communication. Some interviewees remarked particularly that new alignments of Engineering and Nuclear Safety, along with clarification of decision-making roles, have promoted more open, collaborative communication and reduced prior adversarial relationships.

**Areas in Need of Attention**

- Some interviewees expressed concern about lack of communication with the Tank Farms. Comments included concerns for safety, such as:
  - "If there is a take cover we never get informed, don't know what is happening, until we see it on the news."
  - "We don't even participate in drills or respond when they take cover even though we are directly downwind."
  - "Workers at the site report that some have detected odors from the tank farms and experienced physical effects, but there is no monitoring; and that their management tell them that they are too far away for odors to be from the tank farms." Interviewees still maintain that they do detect a strong onion smell sometimes, but have been told that it comes from a distant onion farm.

- Some interviewees stated that the way the senior management team functions was restructured to improve operation and communication, but that information is sometimes still slow to filter down. They noted that timeliness of information exchange affects employee engagement and trust, and that several barriers to communication need attention. For example:
  - Communication issues are of three general kinds: daily operations (getting the work done), routine business operations (payroll, personnel, project milestones and progress), and unique issues about the WTP project (such as reports from outside groups, budgets, political decisions, and unresolved technical issues that get a lot of attention). Some interviewees commented that in the construction industry and at BNI there is a respect for the hierarchical flow of information, so while "authentic" face-to-face communication can be difficult, it is very important.
  - Many technical specialists expressed that technical documents in design and engineering are considered to be a primary means of communicating to achieve consensus and conformance to standards. Interviewees perceive technical documentation to be lacking or weak in some areas and mentioned the absence of some historical calculations and technical prints as examples. Interviewees noted that although procedure improvements are under way, document control still needs more attention, and some documents need reconstruction of their technical basis information and detailed document history.
  - Supervisory interviewees expressed difficulties in educating craft that WTP is not a typical construction job where the work is predictable and where they can see daily progress. Explaining to crafts the difference in field changes resulting from mandated design changes versus re-work due to poor planning is an ongoing challenge, and crafts in general view such changes as a source of ongoing frustration.
  - Interviewees perceive the consent decree as a barrier to effective communication due to legal and political issues. Some management interviewees expressed that timely and open communication with all employees is key to building a trusting culture. However, some interviewees commented that timely communication with employees is inhibited because EM HQ requires that all written communications from senior management to employees be cleared and approved by EM HQ and DOE General Counsel. Various employees at all levels of the organization observed that they often hear about important project information from the local media or the Weapons Complex Monitor before they hear it from their own management. The restrictions on communication imposed by EM HQ were cited as a significant impediment to improving communication.

- The average of BNI responses to the BARS on Interdepartmental Communications is low (2.88) relative to the averages for other BARS and has not changed since the 2014 assessment. The average of craft workers' responses to this BARS scale is significantly lower than the average for non-craft workers (2.1 vs. 3.5).

**Trait 8. Respectful Work Environment**

*Trust and respect permeate the organization.*

**Positive Observations**

- Many comments from interviewees during the earlier assessments referred to widely known management team conflicts. During the 2015 assessment, few references were made to those conflicts, and comments about prior circumstances were often expressed in terms of perceived improvements in organizational relationships. Staff expressed very few negative comments about any supervisory or management personnel.

- Several interviewees at all levels of the organization made statements that illustrated their awareness of the importance of respectful and supportive relationships. For example: "Most powerful tool is to look someone in the eye and tell them that they did a good job, to thank and recognize them"; "Try to break down differences and always be respectful"; from a recent college graduate, "There is more importance to the work than I expected, people relying on our work more than I thought"; "Before there was some hostility, some changes were made, now we all have a job to get done, now we go talk with people"; "We are not casting blame, management is accountable"; "If our supervisors were in this room we would say the same things."

- The responses to some of the SCWE survey questions suggest improvement over the past year in creating an environment where personnel feel that management shows respect and listens to employee concerns.

- The mean responses to three items are significantly higher (more positive) this year than last year: (See Appendix B, Table E.)
  - "I can approach management with concerns."
  - "Management wants concerns reported & willingly listens to problems."
  - "Concerns raised are addressed."

- Another positive indicator concerning respect is that the mean of the responses to "Retaliation not tolerated by management" continues to be at a relatively high level.

- Results indicate positive changes in all 12 behavioral norms used to measure organizational culture since the last assessment. For 10 of the 12 norms, the changes are statistically significant: (See Appendix B, Table F.)
  - The OCI survey measures "what is expected of members of the organization," or, technically speaking, behavioral norms and expectations, which may reflect the more abstract aspects of culture such as shared values and beliefs. The inventory assesses the strength of 12 different behavioral norms associated with three general types of cultures: Constructive, Passive/ Defensive, and Aggressive/Defensive. In general, within most organizations, it is desirable for members to perceive strong Constructive norms and weak Passive/Defensive and Aggressive/Defensive norms.
  - The responses from BNI members show that the Constructive norms are stronger than either the Passive/Defensive or Aggressive/Defensive norms. In organizations with strong Constructive norms, employees are expected to interact with people and approach tasks in ways that will help them meet their higher-order needs for satisfaction and growth.

**Areas in Need of Attention**

- The survey includes measures of Affiliative cultural norms that place a high priority on positive interpersonal relationships. An Affiliative culture can enhance organizational performance by promoting open communication, good cooperation, and the effective coordination of activities. As task interdependence and teamwork become more important, coordination and open communication become increasingly important to organizational effectiveness. Affiliative cultures encourage honesty and commitment in communications and actions. Results from the organizational culture survey show that, of the four constructive behavioral norms, BNI scored weakest on the Affiliative norm. Relative to the Historical Ideal values for each of these survey items, BNI survey responders gave low ratings to the following individual survey items:

| Survey Item | BNI 2015 | Historical Ideal |
|---|---|---|
| "Treat people as more important than things" | 3.74 | 4.59 |
| "Show concern for people" | 3.66 | 4.45 |
| "Use good human relations skills" | 3.83 | 4.62 |
| "Cooperate with others" | 3.91 | 4.50 |
| "Share feelings and thoughts" | 3.04 | 3.84 |
| "Be open, warm" | 3.31 | 4.17 |
| "Motivate others with friendliness" | 3.23 | 3.89 |

- Although the survey does not attempt to directly measure "trust," several survey items can provide insights about the level of distrust among organizational members:
  - BNI responses suggest that personnel exhibit relatively strong Avoidance behaviors, implying a lack of trust. Of the eight defensive behavioral norms assessed by the survey, Avoidance had the biggest gap between what BNI employees view as their current culture and the Historical Ideal value. Average values for both the current and the Historical Ideal are provided below for the specific survey items used to assess the Avoidance norm:

| Survey Item | BNI 2015 | Historical Ideal |
|---|---|---|
| Make "popular" rather than necessary decisions | 1.81 | 1.35 |
| Not get involved | 1.78 | 1.34 |
| "Lay low" when things get tough | 1.73 | 1.36 |
| Put things off | 1.78 | 1.28 |
| Take few chances | 2.36 | 1.82 |
| Wait for others to act first | 1.81 | 1.38 |
| Push decisions upward | 2.96 | 2.21 |

  - The response scale was from 1 to 5. Because this is one of the Defensive behaviors, lower numbers indicate a more positive culture. The values for the ideal culture are always lower than the values for the current culture. Although these numbers may not appear high, they are definitely higher than the Historical Ideal values for each of these survey items. Such responses might suggest that some BNI employees are afraid of what might happen to them if they try to make decisions or stick their necks out.

**Trait 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.*

**Positive Observations**

- Responses to three SCWE questions provide support for the existence of a questioning attitude. (See Appendix B, Table E.) The mean values of BNI responses to the following survey questions are significantly higher than the corresponding values from the prior assessment:
  - "I can openly challenge management decisions."
  - "Helpful criticism is encouraged."
  - "I am responsible for identifying problems."

  The average of BNI responses to this last question was quite high (4.3), indicating that personnel have a clear understanding that they should be vigilant in identifying discrepancies and other indicators of problems.

- According to research done by INPO on the applicability of the OCI instrument to nuclear power, a moderately strong Oppositional behavioral norm is desirable at nuclear facilities, reflecting the fact that the Oppositional norm includes the existence of a strong questioning attitude. This norm was relatively strong among BNI personnel. Compared to the Historical Ideal values, the average of BNI responses to the following two specific OCI survey questions support the existence of a relatively strong questioning attitude among most BNI personnel:

| Survey Item | BNI 2015 | Historical Ideal |
|---|---|---|
| Point out flaws | 3.61 | 3.04 |
| Look for mistakes | 3.48 | 2.52 |

**Areas in Need of Attention**

- BNI member responses to two questions pertaining to the Defensive behavioral norm called Dependent are high relative to the Historical Ideal values for these questions:

| Survey Item | BNI 2015 | Historical Ideal |
|---|---|---|
| Never challenge superiors | 2.28 | 1.88 |
| Accept goals without questioning them | 2.50 | 1.94 |

  Dependent cultural norms have been found in organizations where goals are set exclusively by superiors, where power and influence are based primarily on position, and where decision-making is centralized.

# 4. Conclusions

During the assessment, ORP and BNI staff and management expressed numerous times, in various ways, that "Things are better and going in a good direction, many new things are underway that offer optimism, considerable uncertainty remains from unresolved technical issues and approaches, the project is by no means where people want it to be, and there is still a long way to go." The EA team concurs in this overall assessment of the current status and concludes that there has been observable progress since the earlier assessment. Key observations about the status and progress for ORP and BNI are described in the following sections.

## Office of River Protection

In contrast to 2014, the results of this assessment, both quantitative and qualitative, show an improvement in the perceptions of ORP personnel about behaviors important for a healthy safety culture. ORP employees were given the opportunity to respond to an independent culture survey in 2011, early in 2014, and again one year later in 2015. Comparing survey results from 2014 to those from 2015 identified positive changes in the values of all 12 behavioral norms used in the survey to assess organizational culture. Although none of these changes are statistically significant, the overall pattern suggests that ORP's culture has started heading in a more positive direction. (Note that between the 2011 and 2014 assessments, the strength of the 12 behavioral norms was almost always changing in a more negative direction.)

Many managers and staff have a positive view of several activities initiated by ORP since the 2011 assessment. For example, both management and staff perceive the Organizational and Safety Culture Improvement Council as a constructive step toward culture improvement and improved collaboration of management and staff, and they see it as beginning to earn more prominence as an adjunct to management in organizational change. Staff and management have recently been co-located into the same office building; many view this as an important step in improving communications and developing a more cohesive shared culture, as well as improving working relationships and preparing to transition to the One System concept, which many interviewees see as a highly desired transition. The issues management system is perceived to be functioning better, and a clearer distinction among technical issues, relationship issues, and personnel issues is said to be emerging. ORP employees expressed hopes that the ORP Strategic Plan that was in development during the assessment will bring greater clarity about the future of ORP and more stable working conditions. Employees generally expressed optimism about the "no bashing - no surprises" philosophy of communication.

In 2014, the perceived shift toward a more "collaborative" ORP/BNI relationship seemed to be creating some confusion, and many in ORP perceived that ORP was losing independence in its role. In 2015, ORP staff expressed much less concern about loss of independence. Interviewees expressed considerable satisfaction and accomplishment in the fact that the ORP oversight level 1 findings were a constructive catalyst for a more robust contractor self-assessment, and many see the resulting MIP as charting a course toward a management system and culture aligned with nuclear principles and practices. This positive change in perceptions of ORP's role was further illustrated by the interviewees rating the Problem Identification and Resolution behavior as the second highest rated of the 10 organizational behaviors assessed via BARS. Similarly, the ORP responses agreeing to the statement "I am responsible for identifying problems" were relatively high (4.11 on a 5 point scale). The one concern in this area is the somewhat lower level of satisfaction with problem resolution than in 2014 and 2011, as evidenced qualitatively by comments from some interviewees and quantitatively from the slightly lower mean value of ORP responses to "Concerns raised are addressed."

The 2014 report observed that "The stated philosophy of ORP senior management – wanting more transparency with the contractor – is not perceived to exist within ORP's own organization." The 2015 assessment found that although the organization has not achieved the level of transparency many desire, it is definitely less opaque that in the past, and several staff and management attributed much of the continued opaqueness to EM HQ influences that are seen as preventing ORP managers from being as transparent with ORP staff as they might otherwise like to be. Trust issues between staff and management clearly remain at levels that require ongoing attention, but staff appear more optimistic than in the prior assessments.

In 2011, the assessment team identified that although employees did not fear retaliation in the ORP work environment, they had a definite unwillingness and uncertainty about their ability to openly challenge management decisions. Employees perceived that the environment was not conducive to raising concerns and that management did not want to or willingly listen to concerns. Most employees also believed that management did not encourage constructive criticism. This 2015 assessment presented a noticeable difference in perceptions on these issues. For example, from the SCWE questions in the survey, the mean value of ORP responses to "I am responsible for identifying problems" was relatively high. The mean value of ORP responses to "I can openly challenge management decisions" is significantly higher than in 2014. The mean value of ORP responses to "Management wants concerns reported & willingly listens to problems" is also relatively high. These results show that ORP's environment for raising concerns has become more positive.

The results of the 2015 assessment indicate clearly positive trends, but they also indicate that a number of concerns still require attention. In 2014, there was a pronounced perception that R2A2s were not clearly established within ORP. This perspective remains prominent in the similar concerns expressed in 2015, amplified by the rapid expansion of new staff additions during the past year. ORP staff expressed related concerns about work processes, adequacy of work control, work quality, and lack of attention to workforce development.

The OCI survey of organizational culture indicates that ORP has a relatively strong Avoidance behavioral norm, which characterizes organizations that fail to reward success but nevertheless punish mistakes and thus lead members to shift responsibilities and to avoid making decisions, taking action, or accepting risks. Also, the survey responses to the behavior style relating to open communication, cooperation, and the effective coordination of activities (the Affiliative behavioral norm) was the weakest of all 12 behavioral norms measured. These survey results converge with statements about residual trust issues. For example, many staff perceive that previous ORP management treated them poorly and express doubt that EM HQ and current ORP management's promises of enduring improvements will last after the focus on the DNFSB recommendation has abated. Concerns about Avoidance and Affiliative behaviors extend to EM HQ, as interviewees often referred to EM HQ issuing directions and requiring reports that are perceived to be designed for political expediency and tending to ignore or obfuscate actual organizational culture issues. Interviewees used terms such as "arrogance" to describe EM HQ behaviors, and they strongly expressed feelings that EM HQ does not respect the ORP staff and that EM HQ often treats ORP management dismissively.

## Bechtel National, Incorporated

BNI has implemented many new initiatives, actions, and program revisions since the 2011 assessment. A few examples of those that interviewees commented on frequently in the 2015 assessment included: the new CAMP (along with specific funding for corrective actions), the BNI Forthright Conversations training for managers, and the Nuclear Safety and Quality Culture (NSQC) Leadership Forum. The Organizational Effectiveness group was often mentioned as the primary organizational impetus for organizational maturity, with a goal of bringing together CAMP, requirements management, project

procedures, project training, employee concerns and ethics, lessons learned, metrics, trending, assessment, and the NSQC program. Some management interviewees commented that the purpose of Organizational Effectiveness is to serve as the cultural and learning organizational conscience for BNI. Mention was made of leadership and professional development efforts, including Women at Bechtel and NextGen; an intern mentoring program that included a variety of social science and professional development topics; a Leadership Academy that is in the beginning stages; and a new Onboarding program designed to begin positive culture inculcation as soon as one joins BNI.

The 2014 report noted that "the volume of these initiatives has resulted in a general sense of confusion of priorities" and that the tendency of much of the organization to work in "silos" inhibited effective work coordination. In 2015, the formerly perceived general state of confusion seems to be lessening, enabled by organizational realignment (particularly in Engineering and Nuclear Safety), the clarification of roles and responsibilities, and the emergence of the Organizational Effectiveness concept from a startup effort to a functioning (though early-stage) integrating influence. The MIP and the NSQC Sustainment Plan collectively represent major elements of the BNI framework for going forward. Many interviewees expressed optimism about this framework, but some acknowledged that the program enhancements and commitments making up this framework are in early stages and that configuration and change control of these efforts will have to be of the highest priority as the work proceeds. Interviewees at all levels of the organization frequently referred to the high visibility of new senior leaders, their constructive leadership styles, and their continuing reinforcement of priorities. It is important to note that leadership communication and innovations appear to be developing a consistent project narrative that supports creating shared mental models that characterize high performing organizations.

The 2014 report noted "a lack of understanding in the BNI organization on the organizational processes that impact the WTP Project." Related observations were that Bechtel Corporate's role as an underlying driver for behaviors appeared to be out of alignment with safety culture attributes and that its role in project decision-making was not well understood by the BNI organization at WTP. The 2014 report stated that actions driven by corporate values and goals needed to be more effectively evaluated and understood in terms of the goals and mission of the WTP project. These observations were not intended to be evaluative but to focus attention on the fact that the culture of the Bechtel organization was quite strong and, like any strong culture, shaped assumptions about "what good looks like"; these assumptions warranted close examination to determine whether they might be inconsistent with the unique character of WTP. Signs of change are appearing related to these subtle yet fundamental elements that shape culture. For example, some interviewees noted that the new Bechtel Nuclear, Security and Environmental business unit for the company's government and commercial nuclear businesses illustrates recognition at the highest levels of the unique needs and demands of the nuclear enterprise.

Additionally, at the senior levels of BNI and its main subcontractor, a shared vision appears to be emerging on a management system model and a corresponding culture aligned with the special expectations for nuclear operations. A number of management interviewees commented about this new model and the increasing collective understanding. The 14-month ISMS orientation for senior leadership, the ISMS steering committee, and the "readiness strategy" document were noted as major factors in creating a common language and common understanding among the senior management team.

The 2014 report noted that "the perceptions of employees in many of the BNI organization have not significantly changed since the 2011 assessment." The results of the 2015 assessment differ significantly. As noted above, comments from interviewees at all levels of the organization were more positive than in 2014. Sentiments expressed by interviewees were reinforced by quantitative data from the anonymous computerized survey; there were observable positive improvements in rankings across all 12 behavioral norms measured by the survey, and for 10 of the 12, the changes were statistically significant.

While the trends are definitely positive, the more detailed description of BNI traits identifies a number of areas that need attention. For example, the concern about personnel turnover continues; in particular, frustration continues about the frequent turnover in field engineers. Many construction personnel expressed perceptions that because "DOE and BNI can't make up their minds," considerable rework and waste are needed, and also that BNI tends to have "knee jerk" overreactions to what workers perceive as minor or localized occurrences that would receive little attention in other environments. Additionally, some personnel continue to perceive that if they report a minor injury or illness for which they seek medical assistance, they are met with intrusive invasion of medical privacy and a presumption of blame for individual error. As in earlier assessments, some construction employees perceive that expressing concerns about safety or quality somehow factors into decisions about layoffs or promotions. Other continuing concerns include longstanding unresolved technical issues, communication in general, and lack of a comprehensive project history, with absent or incomplete records of configuration control for design and technical bases and inadequate explanation of records of decision. Finally, there remains a veiled sense of umbrage that employees seeking to exhibit and sustain their professional integrity and personal pride in the face of continuing adversity find those qualities besmirched by people and organizations that have little knowledge of project complexities and realties and that focus more on finding fault than contributing to solutions.

# 5. Recommendations

A healthy safety culture is most often found within an aligned organization that has effective processes and motivated people. ORP and BNI have directed considerable attention and resources to improve safety culture by adapting concepts and principles from external organizations. These efforts have shown progress. At the same time, management must be mindful that safety culture is unique in that improvement cannot be imposed by making discrete changes in procedure or policy, as is typical for traditional technical issues. A healthy safety culture is enacted by advocating and inculcating a set of shared core values and beliefs, facilitated through continuous communication and trust building, and supported by organizational systems, with the goal of promoting collaborative human relationships that will sustain safe organizational and individual behaviors. The recommendations from this independent assessment of safety culture for ORP, BNI, and DOE HQ are presented below.

DOE HQ, EM HQ, ORP, and BNI managers should evaluate the full results of this EA safety culture report and should initiate organizational enhancements and cultural improvement initiatives as appropriate. Further, the results of this report should be examined in relation to the recommendations from prior reports to maintain a holistic context for culture change over the long term. The overarching recommendation from the 2012 assessment report provides a strategic vision for such a long-term context:

- **WTP needs to establish a safety culture competence commensurate in priority to science, engineering, and project management competencies.** Safety culture competence requires that organizations:

    - Have a defined set of values and principles, and demonstrate behaviors, attitudes, policies, and structures that enable them to sustainably accomplish mission goals.

    - Have the capacity to (1) value diversity, (2) conduct self-assessment, (3) manage the dynamics of difference, (4) acquire and institutionalize cultural knowledge, and (5) adapt to diversity and the cultural contexts of complex and dynamic environments.

    - Incorporate the above in all aspects of policy-making, administration, practice, and operations, systematically involving employees, suppliers, stakeholders, and communities.

    - Recognize that development of cultural competence is a process that evolves over an extended period of time. Individuals and organizations are at various levels of awareness, knowledge, and skills all along the cultural competence continuum. Consequently, a specific set of actions cannot be prescribed; a collaborative effort is required to understand and enact core principles that ensure that a healthy safety culture is developed and internalized.

Assessment methods include inviting interviewees to identify the things they would change if they had the power to do so (referred to as the Queen/King question). The most frequently wished for change was for stability. Consistency in strategy for culture improvement can help create a sense of stability for continued progress, and it is in that context that the following recommendations should be considered.

## Office of River Protection

- ORP should consider taking the next step toward cultural maturity by expanding the focus of the Organizational and Safety Culture Improvement Council to support organizational learning. According to research, traditional learning concepts of training and lessons learned, while important, represent only a small percentage of how organizations actually learn.[5] Culture change and leadership research emphasize that learning and change are primarily influenced by reflective approaches: "Thoughtful reflection on natural experience, in the light of conceptual ideas, is the most powerful tool we have for management learning."[6] Implementing a strategy of reflective learning, beginning with the Council focusing on expanding knowledge of organizational and safety culture, would be the next important step in the Council's becoming a learning and improvement forum to help management co-create an ORP organization designed for the long term. ORP should consider inviting BNI to participate in appropriate phases of shared research, review, and discussions on culture and organizational development.

- ORP should consider undertaking an effort to define principles of professionalism as the bases for clarifying performance expectations and professional development strategies for both management and staff. The INPO Principles for Enhancing Professionalism of Nuclear Personnel, initiated in 1989 and continuing today, can provide insights for collaborative processes to establish professionalism as the aspirational standard for personal and organizational performance. A key feature of such principles should be resilience and the ability to adapt to change; these resilient principles should be a guide for developing individual and organizational learning approaches that promote adaptive individual and organizational behaviors. An important near term focus is to investigate programs to help ORP managers and staff cope with stress and change associated with the uncertainties and complexities of the WTP effort. (Other Federal agencies, such as the Department of Homeland Security and the U.S. Army, have initiated similar efforts.[7,8])

- ORP should consider developing a strategy for monitoring culture development within BNI, not so much as a project management or compliance effort but more as an organizational inquiry, using the International Atomic Energy Agency (IAEA) guidance on safety culture and approaches described by the VTT Technical Research Centre of Finland[9] for life cycle approaches for nuclear safety culture. ORP should consider adopting a similar strategic approach for monitoring internal ORP cultural maturity.

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[5] The ideas of social learning are sometimes expressed as the 10-20-70 approach: 10% of learning occurs from formal training, 20% from other people (mentors, supervisors, peers), and 70% by doing work. Learning occurs in the process of doing work by solving real problems and reflecting on results.

[6] Mintzberg, H. (2005), *Managers not MBAs: A hard look at the soft practice of managing and management development*, San Francisco, CA: Berrett-Koehler Pub.

[7] *A Ready and Resilient Workforce for the Department of Homeland Security: Protecting America's Front Line*, Committee on the Department of Homeland Security Workforce Resilience, Board on Health Sciences Policy, Institute of Medicine, Washington (DC): National Academies Press (US); 2013 Nov 26.

[8] Army Regulation 350–53, "Training Comprehensive Soldier and Family," Fitness Headquarters, Department of the Army, Washington, DC 19 June 2014

[9] VTT Technical Research Centre of Finland is the biggest multitechnological applied research organization in Northern Europe. VTT is a not-for-profit organization, a part of the Finnish innovation system under the domain of the Ministry of Employment and the Economy.

## Bechtel National, Incorporated

- BNI should consider developing an integrated knowledge management framework to guide project completion and support long-term operation. The IAEA defines knowledge management as an integrated, systematic approach to identifying, acquiring, transforming, developing, disseminating, using, sharing, and preserving the knowledge relevant to achieving specified objectives. Experience in commercial nuclear power, as in other complex technical organizations such as the National Aeronautics and Space Administration (NASA), has demonstrated that quality and safety issues often emanate to a significant degree from problems with managing explicit knowledge that can be captured via documents, databases, procedures, and formal training.

  Related research and experience address the vital role of tacit knowledge to nuclear operations that is created, shared, and modified by social interaction.[10,11] Because tacit knowledge is closely associated with expertise, it is particularly relevant to WTP, whose complexity requires high levels of expertise to design, construct, and operate. The tacit knowledge of experts is not reducible to simple procedures and, in complex endeavors, is often collective knowledge (instead of individual knowledge) residing in communities of practice, communicated via mentoring or experiential learning, validated through formal or informal certification, and maintained by continuing membership and participation in professional, technical, and craft communities. Comprehensive knowledge management programs include sophisticated use of narrative science and learning histories to capture, share, and maintain expertise and to shape and maintain organizational culture. IAEA and NASA in particular have valuable guidance on integrated knowledge management programs that should serve as a basis for BNI's initial research and development of an integrated approach to knowledge management for WTP.

- BNI should consider institutionalizing the NSQC concept and activities as an inherent component of the ongoing significant transition in management philosophy and corresponding organizational design as exemplified in the MIP. As the new operational excellence efforts evolve, BNI should consider expanding the scope of the culture focus to address organizational culture as a broader set of organizational behaviors that affect safety, quality, and production. This transition is implicitly under way via several of the proposed improvement actions but should be expressed as a matter of policy and practice to give management and staff a common language about what organizational culture means and to provide management with enhanced diagnostic tools to monitor how the organization is progressing toward its stated goals to support a decades-long mission. An example of an expanded safety culture focus is illustrated in a 2014 Bechtel Power Corporation publication, *Traits of a Healthy Nuclear Safety Culture*, based on an INPO document of similar name. The document states, "The team customized the Traits to reflect Bechtel's work, culture, and terminology. The Traits parallel Bechtel's Covenants and Quality Absolutes." Like the developmental approach used to craft this document, a similar effort to customize an expanded culture framework for the uniqueness of WTP would be appropriate and would further develop the respectful, collaborative culture that ORP and BNI personnel desire.

- BNI should consider institutionalizing the application of social science in the organizational competencies and systems being designed for long term WTP operation. Guidance from IAEA on the

[10] *Tacit Knowledge Involvement in the Production of Nuclear Weapons: A Critical Component of a Credible US Nuclear Deterrent in the 21st Century*, Stephanie J. Buffett, Lt Col, USAF, US Air University, 2013
[11] *Knowledge Management for Nuclear Industry Operating Organizations*, IAEA-TECDOC-1510, International Atomic Energy Agency, October 2006

Individuals, Technology and Organization systems approach offers insights.[12] At present, BNI staff members with relevant social science education and experience are providing constructive influence primarily on the strength of respected relationships with senior management. As advocated by IAEA and practiced in the nuclear industry, social science expertise also needs to be used to support internal organizational training, assessments, event investigations and causal analyses, employee concerns, coaching, and confidential counseling for management and/or staff. Social science specialists can provide unique insights about organizational factors and performance that technical staff or management cannot. To provide full value, added guidance and executive intelligence, organizational and safety culture must be based on specialized social science knowledge. Successful organizations access specialized expertise via formal staff positions, affiliation with educators/researchers in academic institutions, or relationships with external advisors or consultants. Some large utilities and organizations, such as INPO, IAEA, and NRC, have chosen to have social scientists on staff or have specialized experts on retainer or contract. BNI has noted that the WTP NSQC Leadership Forum is intended to have a role similar to that of Nuclear Safety Review Boards consistent with the Nuclear Energy Institute NEI 09-07 guidance for Fostering a Healthy Nuclear Safety Culture approach; social science and safety culture experts with relevant academic qualifications and certifications play important roles on such review and advisory boards.

- BNI should consider reviewing communication practices and training concerning response to and management of workplace injury cases. There is a pronounced perception, particularly at the craft level, that investigations of occupational injuries often result in conclusions that personnel error was the primary cause of the injury, hence workers feel they are being blamed for the injury. Consequently, workers expressed reluctance to report minor injuries. It is important that all employees understand BNI policies and practices associated with injury treatment. It is also important that BNI communicate with all employees about the facts related to workplace injuries – promptly, and to the greatest extent possible, while respecting patient privacy and company policies. Workers want to know about the safety of their colleagues when one is injured or ill, and how injury cases are perceived to be handled directly influences workers' willingness to report. In the absence of clear communication about injuries, rumors spread across the workforce, often inaccurate and detrimental to workforce morale, the organization's integrity, and mutual trust.

## EM Headquarters

- EM HQ should seek to understand the relationship issues expressed by ORP. An examination of the bases of these perceptions was beyond the scope of this assessment. However, the frequency and intensity of comments by interviewees about communications and interactions between EM HQ and ORP suggest that some of the relationships may be less than collegial. As a first step toward such an examination, EM HQ should consider reviewing its practices relating to EM HQ and General Counsel approval of communications from ORP and BNI management to ORP and BNI employees. Timely and transparent communication is a crucial factor in restoring trust and respectful work relationships. When HQ elements are perceived to "forbid" ORP or BNI management to communicate information that the ORP or BNI managers believe their employees need to know, and then that information is communicated by the media or other sources, trust is damaged and the pronounced cynicism that currently exists about management's and EM HQ's honesty and integrity is reinforced. Improvement in communication among all parties is essential to support ORP's and BNI's progress in creating a robust safety culture.

[12] *The Management System For Facilities And Activities*, IAEA Safety Standards Series No. Gs-R-3, International Atomic Energy Agency, Vienna, 2006

- EM HQ should consider initiating a learning history[13] of the WTP project to capture lessons that might improve the completion of WTP and inform the planning and execution of future DOE megaprojects. Learning history approaches were developed from work at the MIT Sloan School to demonstrate linkages between organizational learning and key performance results. *NASA's Journey to Project Management Excellence*[14] would be a good model for such a study. EM HQ should empanel a working group to scope such an inquiry, engaging ORP, BNI, the DOE Chief Learning Officer, and engaging involvement of members of the DOE and contractor community who possess relevant social science academic backgrounds. There are qualified social scientists at the Brookhaven, Idaho, Pacific Northwest, Oak Ridge, and Sandia National Laboratories; learning technology support is available through the National Training Center; and external experts could be obtained if the working group deemed it necessary. To capture the maximum learning history from the WTP project, it should be scoped as a longitudinal study tracking the project over several years. Therefore the initial efforts of the working group should focus on scoping the study along with considerations of funding and staffing.

[13] Learning histories provide methods to assess learning efforts and to judge the value of past experience. They help answer questions such as how to replicate successes, and avoid repeating mistakes. They help develop new ways of thinking and new forms of behavior; they present the experiences and understandings of participants who initiated, implemented, and participated in organizational efforts, as well as non-participants who were affected by these efforts. Learning histories' perspectives of a variety of people, understanding that no individual view can encompass more than a fraction of what actually happens in a real organization, reflect this reality. When participants discover that their own points of views are treated fairly in the learning history, they become better able to understand the many other people's perspectives that make up the learning effort. From another perspective, learning histories apply social science inquiry and collective narrative construction to illuminate how cultures may be shaped from the discovery and sharing of individual perceptions to create a new collective understanding of how things happened the way they did and how to use these understandings to create better futures. See for example **Developing Organizational Memory Through Learning Histories** by George Roth, Art Kleiner *Organizational Dynamics*, Vol. 27, No. 2. (1998), pp. 43-60.

[14] *NASA's Journey to Project Management Excellence*, Dr. Ed Hoffman, Matt Kohut, NASA Academy of Program/Project & Engineering Leadership, Vol. 5, Issue 11, November 29, 2012. http://appel.nasa.gov/2012/11/29/5-11_pm_excellence-html

## Appendix A
## Supplemental Information

**Dates of Review**

| | |
|---|---|
| Scoping Visit | December 8-10, 2014 |
| Safety Culture Survey Administration | January 12-23, 2015 |
| Observations/Interviews/BARS | January 26 – February 5, 2015 |
| Debriefing | May 4-7, 2015 |

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**Appendix B**
**Quantitative Results**

**Table A. Changes in ORP Behavioral Anchored Rating Scale (BARS) Average Values By Year**

| BARS Behavior | 2011 | 2014 | 2015 | Difference 2015 - 2014 |
|---|---|---|---|---|
| **Attention to Safety** | 4.075 | 2.905 | 3.222 | 0.32 |
| **Coordination of Work** | 3.737 | 2.393 | 3.625 | 1.23** |
| **Formalization** | 3.567 | 3.313 | 2.556 | -0.76 |
| **Interdepartmental Communication** | 3.556 | 3.231 | 2.960 | -0.27 |
| **Organizational Learning** | 3.367 | 3.300 | 2.500 | -0.80 |
| **Performance Quality** | 3.692 | 4.000 | 3.063 | -0.94* |
| **Problem Identification & Resolution** | 4.115 | 3.000 | 3.281 | 0.28 |
| **Resource Allocation** | 2.818 | 2.563 | 2.925 | 0.36 |
| **Roles & Responsibilities** | 4.179 | 2.792 | 2.250 | -0.54 |
| **Time Urgency** | 4.043 | 3.430 | 3.216 | -0.21 |

*$p < 0.05$ (indicating statistically significant); ** $p < 0.01$ (indicating highly statistically significant)
A highly statistically significant improvement in perceptions of Coordination of Work has occurred since 2014.
A statistically significant decrease in perceptions of Performance Quality has occurred since 2014.

**Table B. Changes in ORP Responses to Safety Conscious Work Environment (SCWE) Questions by Year**

| QUESTION: To what extent… | 2011 (N=139) | 2014 (N=95) | 2015 (N=148) | Difference 2015-2014 |
|---|---|---|---|---|
| **I am responsible for identifying problems** | 3.94 | 4.04 | 4.11 | 0.07 |
| **I can openly challenge management decisions** | 3.01 | 2.81a | 3.23a | 0.42 |
| **I can approach management with concerns** | 3.55 | 3.56 | 3.77 | 0.21 |
| **Management wants concerns reported & willingly listens to problems** | 3.44 | 3.55 | 3.59 | 0.04 |
| **Concerns raised are addressed** | $3.96_{ab}$ | $3.45_{a}$ | $3.22_{b}$ | -0.23 |
| **Helpful criticism is encouraged** | 3.15 | 3.05 | 3.30 | 0.25 |
| **Does management tolerate retaliation of any kind for raising concerns (2011 & 2014 versions)** | 4.31 | 4.27 | | No data for 2015 |
| **Retaliation for raising concerns is not tolerated by management (2015 version)** | | | 3.63 | No data for 2014 |

Important points about this table:

- Subscripts a and b show statistical significance ($p < 0.05$ level). Within the same row, differences in mean numbers sharing the same subscript (i.e., a and a, or b and b) are statistically significant. Differences in mean numbers with no subscript or different subscripts (i.e., a and b) are not statistically significant. For example, in the "Concerns raised are addressed" row, the difference between 2011 and both 2014 and 2015 are statistically significant (2011 and 2014 share a; 2011 and 2015 share b), but the difference between 2014 and 2015 is not statistically different (no shared subscript).
- Response scale options ranged from 1 (not at all) to 5 (to a great extent).
- Significant improvement has occurred in ORP responses to "I can openly challenge management decisions" since the 2014 assessment.
- The mean for "Concerns raised are addressed" is a little lower than the corresponding mean in 2014. The mean for the last question, about retaliation for raising concerns, appears to be lower this year compared to last year. However, because the wording for this item was changed in the 2015 version of the survey, we must be very cautious in interpreting any changes in responses. Employees may have interpreted the item somewhat differently this year compared to prior years. The 2011 and 2014 surveys worded this item: "...does management tolerate retaliation of any kind for raising concerns?" The 2015 survey rephrased this item as follows: "Retaliation for raising concerns is not tolerated by management." This change involved a difference in desirable response scale (i.e., in the 2011 and 2014 responses, a higher number was less desirable). The scoring needed to be reversed because the statement was changed to convey the opposite meaning. Instead of asking about the extent to which management tolerates retaliation, the survey question asked the extent to which management does NOT tolerate retaliation. So the response values were changed such that 1s are changed to 5s, 2s are changed to 4s, 3s did not need to be changed, 4s were changed to 2s, and 5s were changed to 1s. To ensure consistency, the scores for the 2011 and 2014 responses were reversed. The reversed scores are used in these analyses.

**Table C. Changes in ORP Ratings of 12 Behavioral Norms between 2014 and 2015**

| Behavioral Norm | 2011 (N=139) | 2014 (N=95) | 2015 (N=148) | Difference 2015 - 2014 |
|---|---|---|---|---|
| **Humanistic-Encouraging** | 33.06 | 32.53 | 34.40 | 1.87 |
| **Affiliative** | 32.84 | 32.86 | 33.86 | 1.00 |
| **Approval** | 24.74 | 25.76 | 24.68 | -1.08 |
| **Conventional** | 26.71 | 27.83 | 27.12 | -0.71 |
| **Dependent** | 28.35 | 29.17 | 28.71 | -0.46 |
| **Avoidance** | 21.89 | 23.24 | 22.02 | -1.22 |
| **Oppositional** | 23.91 | 24.70 | 23.47 | -1.23 |
| **Power** | 23.98 | 23.89 | 22.71 | -1.18 |
| **Competitive** | 21.79 | 22.07 | 20.63 | -1.44 |
| **Perfectionistic** | 26.79 | 27.05 | 26.12 | -0.93 |
| **Achievement** | 33.84 | 31.93 | 33.78 | 1.85 |
| **Self-Actualizing** | 30.59 | 29.71 | 31.10 | 1.39 |

Important points about this table:

- Response scale options ranged from 1 (not at all) to 5 (to a great extent).
- The four behavioral norms in green text are "Constructive" because they lead to desirable outcomes for organizations. Therefore, the higher the numbers, the better. The behavioral norms in black text are called "Defensive." They are associated with undesirable employee behaviors and organizational outcomes. Therefore, the lower the numbers, the better.
- It is encouraging to see that, during this time interval, positive changes occurred in the mean values of all 12 behavioral norms used to assess organizational culture. Although none of these changes are statistically significant, the overall pattern in the direction of changes suggests that the ORP's culture has started heading in a more positive direction. Between the assessments in 2011 and 2014, the direction of change in the strength of the 12 behavioral norms was almost always going in a more negative direction.

**Table D. Changes in BNI Behavioral Anchored Rating Scale (BARS) Average Values By Year**

| BARS Behavior | 2011 | 2014 | 2015 | Difference 2015 - 2014 |
|---|---|---|---|---|
| **Attention to Safety** | 3.802 | 4.165 | 4.193 | +0.03 |
| **Coordination of Work** | 3.882 | 3.368 | 3.820 | +0.45** |
| **Formalization** | 4.161 | 3.845 | 3.815 | -0.03 |
| **Interdepartmental Communication** | 3.117 | 2.967 | 2.884 | -0.08 |
| **Organizational Learning** | 3.279 | 3.401 | 3.602 | +0.20 |
| **Performance Quality** | 3.295 | 3.370 | 3.583 | +0.21 |
| **Problem Identification & Resolution** | 3.850 | 3.878 | 3.985 | +0.11 |
| **Resource Allocation** | 3.103 | 2.816 | 2.587 | -0.23 |
| **Roles & Responsibilities** | 3.336 | 3.442 | 3.250 | -0.19 |
| **Time Urgency** | 3.836 | 3.522 | 3.652 | +0.13 |

**$p < 0.01$ (indicating highly statistically significant)

Important points about this table:

- Attention to Safety is viewed very positively. It was rated relatively high in the 2011 and 2014 assessments, and rose slightly higher in 2015 to an average of 4.19 on a scale from 1 to 5. Independent samples t tests (statistical tests used to determine whether the difference in the average values of the two groups is large enough to be considered statistically significant) of the difference between the mean values for 2014 and 2015 were performed. None of the differences were statistically significant except the BARS for Coordination of Work. This mean rose from 3.37 to 3.82, which was a highly significant change ($p < 0.01$). Coordination of Work refers to the planning, integration, and implementation of the work activities of individuals and groups.
- Two behaviors have means below 3.0, suggesting that management may want to pay attention to what may be causing those perceptions. Those behaviors are Interdepartmental Communication and Resource Allocation. Interdepartmental Communication refers to the exchange of information, both formal and informal, between the different departments or units at the site. It includes both the top-down and bottom-up communication networks. Resource Allocation refers to the manner in which the facility distributes its resources, including personnel, equipment, time, and budget.

**Table E. Changes in BNI Responses to Safety Conscious Work Environment (SCWE) Questions from 2014 to 2015**

| QUESTION: To what extent … | 2014 (N=572) | 2015 (N=530) | Difference 2015 - 2014 |
|---|---|---|---|
| **I am responsible for identifying problems** | 3.98 | 4.30 | 0.32* |
| **I can openly challenge management decisions** | 3.08 | 3.53 | 0.45* |
| **I can approach management with concerns** | 3.40 | 4.02 | 0.62* |
| **Management wants concerns reported & willingly listens to problems** | 3.41 | 3.87 | 0.46* |
| **Concerns raised are addressed** | 3.32 | 3.63 | 0.31* |
| **Helpful criticism is encouraged** | 3.16 | 3.63 | 0.47* |
| **Does management tolerate retaliation of any kind for raising concerns (2014 version)** | 4.07 | | No data for 2015 |
| **Retaliation not tolerated by management (2015 version)** | | 4.02 | No data for 2014 |

*$p < 0.05$ (indicating statistically significant)

Important points about this table:

- Response scale options ranged from 1 (not at all) to 5 (to a great extent).
- Significant improvements have occurred in BNI responses to most SCWE items since the prior assessment.
- Except for the last item, all means in the same row were significantly different at $p < 0.05$.
- The mean for the last question, about retaliation for raising concerns, appears to be about the same this year compared to last year. However, because the wording for this item was changed in the 2015 version of the survey, we must be very cautious in interpreting any changes in responses. Employees may have interpreted the item somewhat differently this year compared to prior years. The 2014 survey worded this item: "...does management tolerate retaliation of any kind for raising concerns?" The 2015 survey rephrased this item as follows: "Retaliation for raising concerns is not tolerated by management." This change involved a difference in desirable response scale (i.e., in the 2014 responses, a higher number was less desirable). To ensure consistency, the scores for the 2014 responses were reversed. The scoring needed to be reversed because the statement was changed to convey the opposite meaning. Instead of asking about the extent to which management tolerates retaliation, the survey question asked the extent to which management does NOT tolerate retaliation. So the response values were changed such that 1s are changed to 5s, 2s are changed to 4s, 3s did not need to be changed, 4s were changed to 2s, and 5s were changed to 1s. The reversed scores are used in these analyses.

**Table F. Changes in BNI Ratings of 12 Behavioral Norms between 2014 and 2015**

| Behavioral Norm | 2014 (N=572) | 2015 (N=530) | Difference 2015 - 2014 |
|---|---|---|---|
| **Humanistic-Encouraging** | 34.05 | 37.10 | 3.05* |
| **Affiliative** | 33.74 | 35.65 | 1.91* |
| **Approval** | 25.40 | 23.69 | -1.71* |
| **Conventional** | 28.32 | 26.50 | -1.82* |
| **Dependent** | 29.61 | 28.14 | -1.47* |
| **Avoidance** | 21.84 | 19.93 | -1.91* |
| **Oppositional** | 24.54 | 24.18 | -0.36 |
| **Power** | 22.64 | 21.13 | -1.51* |
| **Competitive** | 21.94 | 20.83 | -1.11* |
| **Perfectionistic** | 28.14 | 27.72 | -0.42 |
| **Achievement** | 33.39 | 35.38 | 1.99* |
| **Self-Actualizing** | 31.15 | 33.12 | 1.97* |

* The difference between row means was statistically significant at $p < 0.05$.

Important points about this table:

- Response scale options ranged from 1 (not at all) to 5 (to a great extent).
- The four behavioral norms in green text are "Constructive" because they lead to desirable outcomes for organizations. Therefore, higher numbers are more desirable. The behavioral norms in black text are called "Defensive." They are associated with undesirable employee behaviors and organizational outcomes. Therefore, lower numbers are more desirable. Looking at the direction of the change in mean values from 2014 to 2015, one sees that the changes are always going in the desired direction of what leads to a stronger, more positive organizational culture. For 10 of the 12 behavioral norms, the differences between means were statistically significant at the $p < .05$ level. It should be noted that the rather large sample sizes increased the chances of obtaining differences that are statistically significant.

## Appendix C
## Overview of Safety Culture Assessment Methodology and Implications for Nuclear Operations


As expressed by the International Atomic Energy Agency (IAEA), the basis for safe operation of a nuclear facility is technical competence supported by a well implemented and established management system and a good organizational culture in which all cultural aspects, such as safety, maintenance, and security culture, are also integrated.

### Overview of Methodology

The safety culture evaluation methodology selected for use by the U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) was developed by research initiated in 1987 by the U.S. Nuclear Regulatory Commission (NRC) in support of the NRC's efforts to understand the impact of organizational performance on safety. The NRC "concluded that the inadequate management direction, control, and oversight of plant activities such as operations, maintenance, engineering, and safety assessment (may) have a negative effect on both equipment and human reliability, thereby increasing the likelihood and potential severity of plant events." [15]

Thus NRC identified a need for "Accurate assessments of corporate and plant management capabilities"[16] and commissioned Brookhaven National Laboratory to develop scientifically valid and acceptable techniques to examine and assess the broad influence of organizational factors on facility safety. That model, the Nuclear Organization and Management Analysis Concept (NOMAC), was subsequently refined and further validated through additional research performed with DOE, the Canadian Nuclear Safety Commission, the IAEA, the Alaska Transportation Department, and the National Institute of Occupational Safety and Health. Related d research on high reliability organizations, carried out by the University of California, Berkeley, examined U.S. Navy Carrier Group Three, with the two nuclear carriers USS Carl Vinson and the USS Enterprise (including their air groups); the Federal Aviation Air Traffic Control System; and the Pacific Gas and Electric transmission and power plant operations groups. In 2002 the assessment methods developed from this collective body of research were applied for an independent safety culture assessment for the Davis Besse nuclear plant in Ohio. The NRC ordered that the plant be shut down for safety reasons due to discovery of a major corrosion problem (referred to as the Davis Besse nuclear plant reactor head event). Subsequent to that investigation this methodology, the same as used by EA, was aligned with the NRC procedures for independent safety culture assessment.

The model includes 17 organizational behaviors correlated with safe nuclear performance. In contrast to technical or regulatory compliance assessments, the EA organizational assessment focuses on human and organizational issues, emphasizing human perceptions and the influence of those perceptions on safety performance. Because seeking to understand organizational and human behavior is a complex

[15] Stello, Victor Jr., Memorandum to Chairman Zech, "Assessing Plant Performance as it Relates to Plant Management" (August 17, 1988).
[16] BNL-NUREG-60966. R.N. 940653. Safety Culture Management: The Importance Of Organizational Factors Haber, S.B., Shurberg, D.A., Jacobs, R., & Hofmann, D.A. (1994).

undertaking, multiple measurement methods are employed, including Functional Analysis, Semi-Structured Interviews and Focus Groups, Behavioral Observations, an Organizational and Safety Culture Survey, and Behavioral Anchored Rating Scales (BARS), an appraisal method that combine narratives, critical incidents, and quantified ratings using specific narrative examples of good, moderate, and poor performance. The goal of obtaining quality data for management decision making is supported by comparing data from these multiple assessment measures and seeking convergence of themes and trends among these multiple methods – i.e., convergence of data.

**Data Acquisition Frameworks**

EA's interviews, focus groups, behavioral observations, and BARS are structured using the 17 identified organizational behaviors: Attention to Safety, Communication, Coordination of Work, Decision-Making, Formalization, Goal Setting/Prioritization, Organizational Culture, Organizational Knowledge, Organizational Learning, Performance Evaluation, Performance Quality, Personnel Selection, Problem Identification and Resolution, Resource Allocation, Roles and Responsibilities, Time Urgency, and Training. Since the behaviors interrelate to shape performance and culture, an assessment typically employs a subset of 10 to facilitate data management. Questions to elicit information on the behaviors being sampled were developed and validated as part of the methodology designed by Brookhaven National Laboratory for the NRC.

The survey consists primarily of the Organizational Culture Inventory (OCI), supplemented with additional tailored, safety-specific questions. The OCI has been in constant use and periodic re-validation for some 40 years and is reputed to be the most widely used organizational culture diagnostic instrument in the U.S. and internationally. The OCI questionnaire focuses on the behavioral norms and expectations associated with the values shared by members within an organization. The results describe the behaviors that members believe are required to "fit in and meet expectations." Such expectations guide the way they approach their work and interact with each other. In turn, these behavioral norms have a significant impact on the organization's ability to solve problems, adapt to change, and perform effectively. The OCI results from a given organization can be compared to the results from over 900 operating units in a wide range of business lines. With particular relevance to DOE application, the Institute of Nuclear Power Operations conducted a study of good, medium, and low performing nuclear power plants using the OCI, and it is this comparative data that EA uses to examine the convergence of survey data with data obtained from the other evaluation tools.

**Making Sense of Assessment Results and Implications for Improvement**

At a 2014 IAEA safety culture working meeting, Dr. Edgar Schien, Professor Emeritus at MIT and former organizational culture advisor to the Institute of Nuclear Power Operations, provided the following observations about understanding culture and actions that can be taken to improve culture: "The risks and dangers that make us want 'safety' do not derive from cultural factors. They derive from the work itself, the actual tasks that have to be performed that bring various kinds of risks and dangers with them. Culture may have influenced the design of those tasks and cultural factors may influence the kinds and degrees of risk we want to take, but if we want to increase safety itself in a given work situation it is the designers, operators, and executives aligning their interests and working together to minimize those risks that worry them most that will produce an effective safety program. Such a program will gradually change behavior that will make things safer for both operators and public, and, as those behaviors become habits and standards, they will become embedded in the cultures of those organizations. And what will often be discovered is that the behavior changes invented by the working group to make things safer turn out to also make the organization more effective. The actual behavior changes, standards, rules and regulations that will derive from such local problem solving will, of course, vary immensely in terms of

the kind of industry, the maturity of the technology and the economic conditions… In the end it is the task and the people doing it that create their own standards, rules, and behavior patterns."[17]

[17] Schein, E.H., IAEA meeting, April 9, 2014, "National and Occupational Culture Factors in Safety Culture."

**Appendix D**
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