

# Industry Nuclear Safety Culture Process

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# Industry Nuclear Safety Culture Process

## I. Description of Industry Approach

The industry approach to assessing and addressing nuclear safety culture issues places primary responsibility on line management, and in particular, on the site leadership team. The objective is to provide an objective, transparent and safety-focused process, which uses all of the resources available (e.g., performance trends, NRC inspections, industry evaluations, nuclear safety culture assessments, self assessments, audits, operating experience, employee concerns program, etc.) to provide an early indication of potential problems, develop effective corrective actions and monitor the effectiveness of the actions.

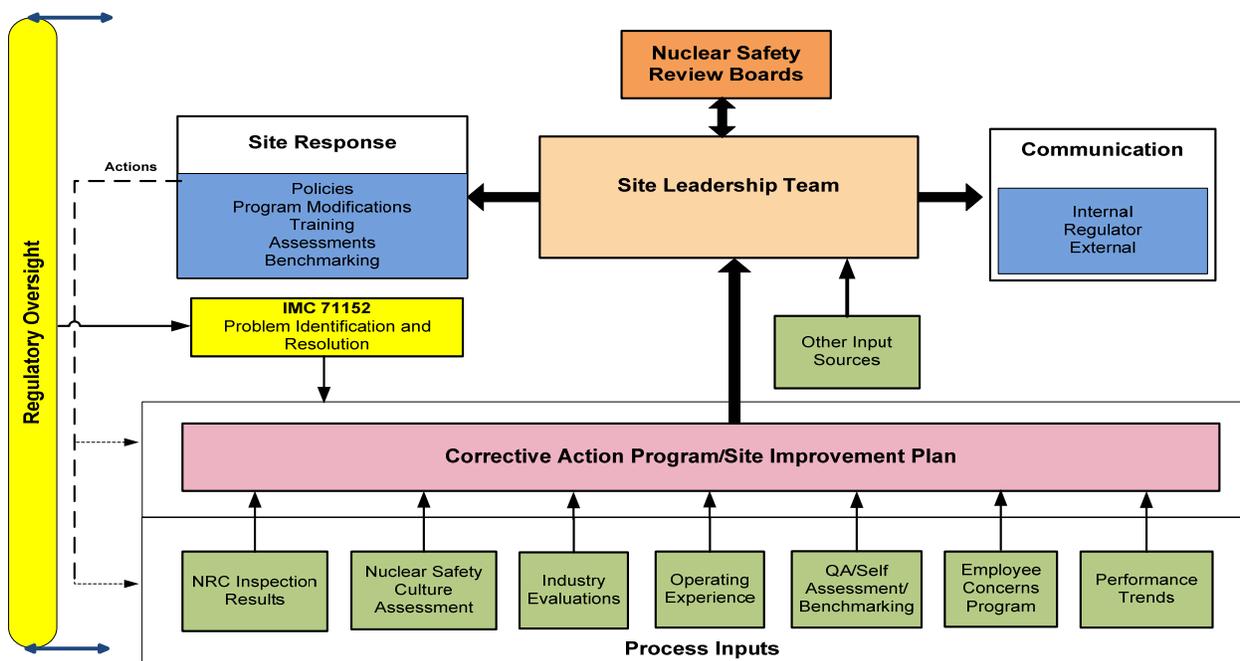
While it is not possible to directly measure culture, and thus there must be some subjectivity, there are aspects of plant conditions which can be trended to provide a warning to site leadership to determine if cultural issues contributed to the condition. Process weaknesses, discovered through audits, self assessments, inspections, etc., also can provide symptoms of cultural problems. Similarly, the attitudes and behaviors of site personnel can be assessed through surveys, interviews and behavioral observations. It is the responsibility of the site leadership team to employ all of these tools and take effective action.

## Overview of Proposed Industry Process

The proposed process is shown below and is comprised of eight distinct elements.

1. Process Inputs
2. Corrective Actions
3. Other Input Sources
4. Site Leadership Team
5. Site Response
6. Communication
7. External Input
8. Regulatory Oversight

## Site Nuclear Safety Culture Process



# Industry Nuclear Safety Culture Process

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## 1. Process Inputs

The following are the inputs to the nuclear safety culture process. For each input, there are data (e.g., deficiencies, violations, or weaknesses) which can be reviewed in combination with data from other inputs to determine whether there is a nuclear safety culture issue. The INPO *Principles for a Strong Nuclear Safety Culture* describes the essential attributes of a healthy nuclear safety culture. They provide a useful framework for assessing and categorizing the data, and in combination, are used to identify potential cultural issues for action. Using a consistent model and terminology throughout the entire process will allow clear communication of cultural issues which the entire site can understand and respond to. Each input has an owner whose responsibilities include assessing the data against the INPO principles and attributes and reporting their results to the site leadership team on a periodic basis.

- **NRC inspection results.** These include the baseline inspections of plant and processes (especially the problem identification and resolution inspection which also looks at safety conscious work environment and any past safety culture assessments), supplemental inspections, event follow-up, etc. These are extremely valuable inputs for the site.
- **Nuclear Safety Culture Assessment.** Using a common industry guideline, sites conduct a self assessment of nuclear safety culture on a biennial basis. This is already an INPO SOER 02-4 requirement. What has been added is a common industry approach. The proposed approach is discussed in Section III.
- **Industry Evaluations.** For example, INPO evaluations are conducted on an approximately biennial basis, in the alternate year from the culture assessment. Included in the INPO evaluation is an assessment of nuclear safety culture. Thus the site would receive a nuclear safety culture assessment almost every year. These industry evaluations are available to NRC on site.
- **Operating Experience.** Data on previous deficiencies (such as operations, design, and equipment) are used to improve procedures and processes and to avoid future problems. Information from OE can also be used to look for nuclear safety culture issues.
- **QA/Self Assessment/Benchmarking.** Each site requires a variety of self reviews. These include audits required in the quality assurance programs, department self assessments, and benchmarking of other sites in the industry (or other industries).
- **Employee Concerns Program.** This required program looks at the site's safety conscious work environment. It may not be appropriate to enter some of the ECP issues in the corrective action program, but the issues will be considered by the site leadership team.
- **Site Performance Trends.** Each site has a broad suite of indicators which it uses to assess performance. They do not include ROP performance indicators which generally measure plant-wide outcomes, but rather they provide intermediate outcomes, which, if not corrected, could lead to safety system failures, scrams or events. Trends can be developed in these indicators and the cause of the trend – be it process or design deficiencies, training, resources, or nuclear safety culture issues – can be examined and corrective action taken.

# Industry Nuclear Safety Culture Process

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Examples include operator workarounds, control room deficiencies, preventive maintenance deferred, open positions, etc. These trends would not be reported to NRC, because they are not performance outcomes. They would be available to NRC on site.

- Note that a site may have additional process inputs that it finds effective in helping to assess nuclear safety culture.

## 2. Corrective Actions

Problems in all of these areas are fed into the site's **corrective action program** where they are assessed for significance, including whether apparent cause or root cause analyses will be conducted. Both apparent and root cause analyses will include an assessment against the INPO principles and attributes. In some cases, the corrective action program is not the appropriate location for the problem; for example, some ECP issues, allegations, perhaps some nuclear safety culture assessment issues, and some organizational or personal issues. Cultural and organizational issues may more appropriately be placed in the **Site Improvement Plan**, or whatever term the site uses.

## 3. Other Inputs

There may be additional inputs that come directly to the attention of the site vice president, such as allegations or other sensitive information, which are not appropriate to be handled through the corrective action program.

## 4. Site Leadership Team

The **Site Leadership Team** is responsible for reviewing plant performance and taking a holistic view of all of the potential indications of nuclear safety culture. The team should be guided by the INPO principles and attributes. In addition to having very subtle issues which the team discerns from several inputs, the team will also, of course, have situations which are more direct, such as ECP and nuclear safety culture surveys and assessments. While maintaining an ongoing sensitivity to nuclear safety culture issues, the team will also meet quarterly to discuss and assess cultural issues. Reports from the managers responsible for each of the process inputs will provide information for the team.

## 5. Site Response

The Site Leadership Team is responsible for determining what actions are necessary to address any nuclear safety culture issues. In addition, the team is responsible for assessing the effectiveness of prior actions and redirecting these actions where appropriate. **Site Response** suggests some actions that might be taken: changes in policies, program modifications, training, additional assessments, benchmarking, etc. The site responses, of course, provide feedback into the process inputs and into the corrective action program and/or site improvement plan.

## 6. Communication

The Site Leadership Team is also responsible for ensuring there is appropriate **Communication** of its conclusions and actions. This communication is internal to the site workforce and if appropriate, corporate, and external, if appropriate, to the public. Raw data and reports, such as the INPO evaluation and the nuclear safety culture assessment would be available on site for NRC review.

# Industry Nuclear Safety Culture Process

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## 7. External Input

The **Nuclear Safety Review Board** (or equivalent) provides an additional perspective to the site leadership team. The experience and outside eyes of the board can assist the site leadership team in many ways, including bringing a fresh look at cultural problems which may be invisible to those living in the culture day to day. Corporate organizations or fleets may also be used to provide external input.

## 8. NRC Oversight

The NRC retains a **Regulatory Oversight** footprint in the process through its residents and baseline and supplemental inspections. While inspectors will not assign crosscutting aspects to inspection findings, their observations can provide valuable insight to the licensee. In particular, the Identification and Resolution of Problems (IP 71152) inspection procedure objectives are:

- “01.01 To provide for early warning of potential performance issues that could result in crossing thresholds in the action matrix.
- 01.02 To help the NRC gage supplemental response should future action matrix thresholds be crossed.
- 01.03 To provide insights into whether licensees have established a safety conscious work environment.
- 01.04 To allow for follow-up of previously identified compliance issues (e.g., NCVs).
- 01.05 To provide additional information related to the crosscutting areas that can be used in the assessment process.
- 01.06 To determine whether licensees are complying with NRC regulations regarding corrective action programs.
- 01.07 To verify that the licensee is identifying operator workarounds at an appropriate threshold and entering them in the corrective action program.”

This inspection procedure includes specific questions related to raising safety questions. (Upon adoption, this procedure and other NRC internal guidance would need to be revised to remove the references to crosscutting themes and aspects.) Additionally, the inspectors review any safety culture assessments which have been performed. The NRC footprint would also include observation on site of various aspects of the industry safety culture approach. NRC communicates results to the public through inspection reports, assessment letters and public meetings.

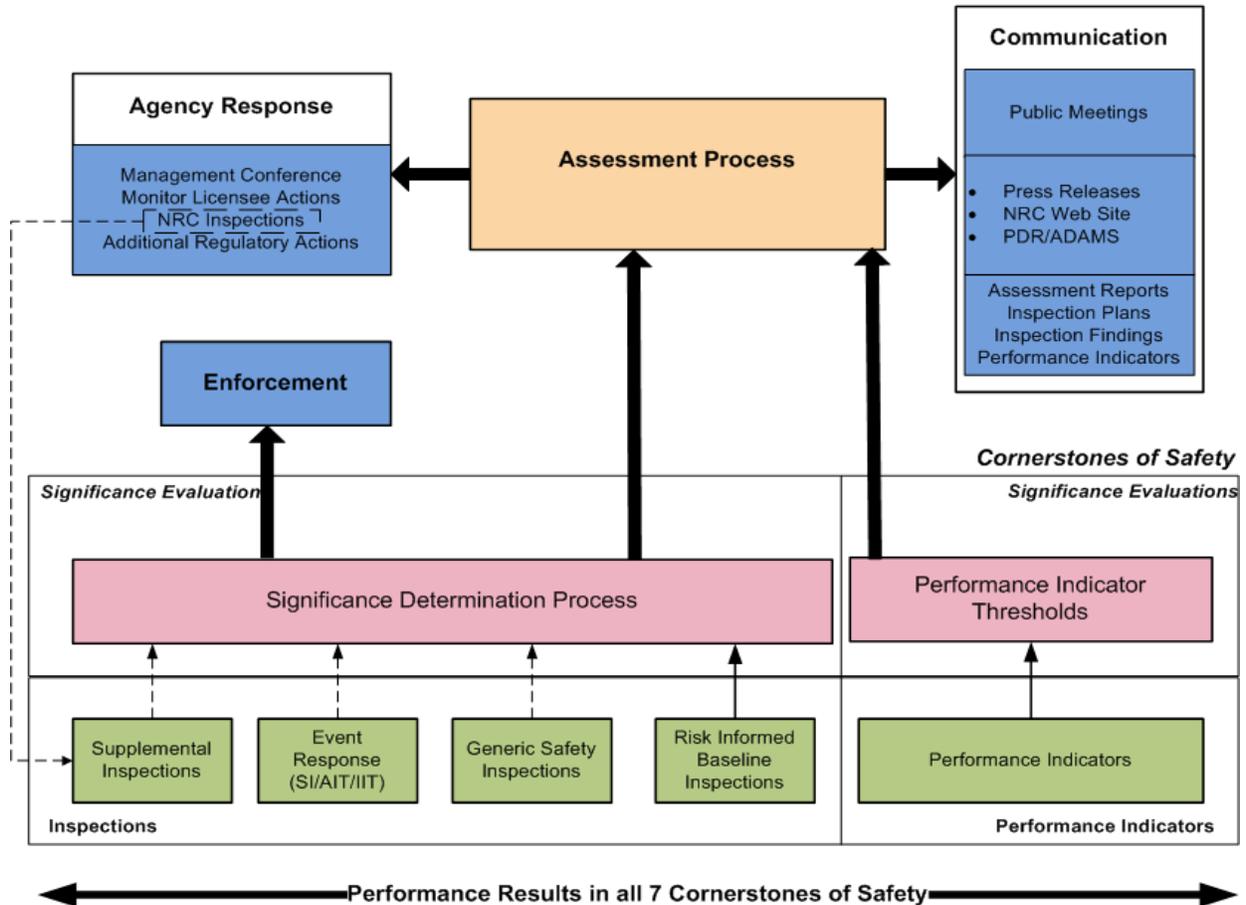
## Comparison with Reactor Oversight Process

The industry nuclear safety culture process, in many respects, mirrors the Reactor Oversight Process, which is shown below. In both processes a range of inputs (in the case of the ROP, performance indicators and inspection findings) are individually reviewed for significance. In the site process, deficiencies and weaknesses are entered into the corrective action process. They are assessed for significance, extent of condition and cause. Actions are developed to preclude recurrence and implemented. In both the ROP and the industry process, all of the information is assessed in combination to determine what actions should be taken by the responsible management. In the ROP case, senior NRC management determines the additional inspection and communication that are appropriate. For the site nuclear safety culture process, the site leadership team is responsible for determining the appropriate action. (Of course, in a broader sense, the

# Industry Nuclear Safety Culture Process

nuclear safety culture model reflects how site leadership oversees all of the site activities, not just safety culture.)

## Reactor Oversight Process



### Advantages of Industry Process

The advantages of this process are many. The process is built around the INPO principles and attributes which emphasize that EVERYONE is responsible for nuclear safety. The principles provide a common language across the site and across the industry so that communication and actions are understood. The process uses a broad spectrum of input available from plant condition, process and people issues. In addition, the majority of the data were already in use at the site, albeit for other purposes. Finally, the process places clear responsibility on line management, with the site leadership team at the top.

The NRC approach uses a different set of attributes, and a different language, than the industry. Many of NRC attributes may not be nuclear safety cultural issues at all. They may be training or procedures, or process weaknesses as opposed to cultural issues. Unfortunately, the NRC sampling approach relies on categorizing violations, of which there are on average only 15 or so a year per site, whereas the industry approach has literally thousands of inputs. The NRC counting scheme for assessing a "crosscutting theme" is only four data points in a year. When NRC is not convinced that

## Industry Nuclear Safety Culture Process

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the site has taken sufficient action for these four (usually) safety-insignificant violations, it issues a “substantive crosscutting issue” which can divert precious resources and management time away from safety significant issues and ensuring that processes and procedures are being effectively implemented. It also presents a distorted and negative image of the site which is misleading to the public. NRC resources are also diverted from their attention on inspecting plant and processes toward subjective judgments on minor inspection findings and attempting to assess the culture based on limited data. Then more senior NRC management is diverted by having to make subjective judgments on whether cultural issues have been resolved.

A more appropriate role, or footprint, for the NRC is focus on objective, tangible evidence of plant safety, compliance with the regulations and using risk-informed tools to determine significance and regulatory response. It should use its inspections of the corrective action program to determine if plant and process deficiencies are being corrected in a timely manner and that events are being properly evaluated. The corrective action program inspection also can look at the site’s actions to correct safety culture issues which have been identified. The NRC informs the public through its inspection reports, assessment letters and public meetings.

### Conclusion

The industry nuclear safety culture process provides a structured approach of looking at multiple inputs to assess the culture using the “lens” of the INPO principles and attributes. It looks at plant conditions, processes, and people’s attitudes, opinions and behaviors. It appropriately places responsibility for assessing and improving nuclear safety culture on the line management, while emphasizing that everyone on site is responsible for nuclear safety.

# Industry Nuclear Safety Culture Process

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## II. Nuclear Safety Culture Assessment Including Third Party Assessments

### Introduction

This section discusses current requirements for nuclear safety culture assessments, and a graded nuclear safety culture assessment guideline. The objective is to:

- Create a consistent, quality guideline and approach for conducting nuclear safety culture assessments which will be used across industry and will be used for self assessment, independent assessment and third party assessment.

The approach was developed by an NEI task force, building on a very successful assessment process developed and implemented over the past five years by the Utilities Service Alliance (USA) member stations.

### Current Requirement for Nuclear Safety Culture Assessment

INPO SOER 02-4 calls for a nuclear safety culture assessment every other year. There are no specific requirements. Some utilities do an assessment entirely in house using company resources (either all on site resources, or a combination of fleet resources); some are in the USA program 17 stations) which include both internal assessors and external loaned utility assessors; some use consultants (cost varies but is in the range of \$ 100,000 to \$ 150,000); and there may be other variations.

NRC demands a third party nuclear safety culture assessment for plants in column 4 of the action matrix and has required an independent assessment in certain other instances when it is concerned about performance and "significant crosscutting issues." These assessments are ad hoc and usually do not build on the same model as the self assessments, resulting in no economies of scale and difficulty in comparing the two assessments. (This is often the case because self assessments commonly use the INPO nuclear safety culture model of principles and attributes, whereas the independent or third party assessments are organized around specific issues and the NRC's nuclear safety culture aspects.)

### Graded Nuclear Safety Culture Assessment Guideline

The industry nuclear safety culture assessment guideline is built on the successful USA approach which uses the industry standard INPO principles and attributes for surveys, interviews, and behavioral observations. The USA self assessment approach differs from some utilities' self assessments in that it uses a team made up of half site assessors, and half independent assessors. The strength of this team structure is that there are people on the team with site knowledge, and independent assessors who may be more sensitive to cultural issues on site because they are not a part of that culture. The assessors conduct interviews of senior managers and managers, first line supervisors, various departments and craft groups, security and oversight in two person teams, usually with one onsite and one offsite member. Two person teams allow greater reliability in assessing nuclear safety culture attributes, and also allow for one person to take notes while the other person conducts the interview. The team also conducts behavioral observations (e.g., morning

## Industry Nuclear Safety Culture Process

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meeting, CARB, pre-job briefs, control room). Usually there are four two-person teams. In addition there is a team host, an external team executive, an external team lead, and two site administrative support staff. More details are provided in the table below.

The self assessment approach can be readily adapted to the needs of an independent assessment (requested by a site VP who requires a deeper or more specific review), or to a 95003 assessment. The differences between the variations between self, independent and third party assessments are an increase in sample size, more independence by the assessment team and additional focus on areas of concern.

### Graded Nuclear Safety Culture Assessment

	Self Assessment	Independent Assessment	Third Party Assessment
Purpose	To meet INPO SOER 02-4 (Davis Besse) biennial assessment	Requested by Site VP who wants deeper/more specific review	95003: Plant in Column 4 of action matrix
Base Assumptions	Standard Assessment (pre-survey <sup>1</sup> , document review, interviews, behavioral observation, four 2 person teams, exit, written report) One week.	Standard Assessment plus review of additional area(s) of concern to Site VP. Could require an additional team of assessors to address issues. Typically one week.	Standard Assessment plus review of additional areas of concern determined by Site VP and Team Leader. Two weeks.
Work Product	Assessment Report, including: executive summary, survey and interview results by principle and attribute, follow-up from previous assessment, positive traits observed, conclusions and recommendations for improvement.	Same as Standard Assessment, with conclusions and recommendations on additional topic requested by Site VP.	Same as Standard Assessment with conclusions and recommendations addressing 95003 issues.
Coverage	INPO principles and attributes; minimal additional topics. Typically 60-85 interviews, 15 observations, survey offered to 100%; goal of 70% response (including write in comments)	Same as self assessment with coverage of additional areas of concern and perhaps 20% more interviews and observations.	INPO principles and attributes and additional topics selected to address 95003 issues. Approximately twice the number of interviews and observations as self assessment
Team Makeup	Team Leader (outside utility) Team Executive (outside utility) 4 external assessors (fleet or outside) 4 internal assessors 1 Host peer 2 admin (host station)	Team Leader (outside utility) Team Executive (outside utility) 8-10 external assessors (at least half outside utility, remainder fleet) 1 Host peer 2 admin (host station) Optional: Behavioral scientist (MA level)	Team Leader (outside utility) Team Executive (outside utility) 10 external assessors (outside utility) 1 Host peer 2 admin (host station) Behavioral scientist (MA level)
Team Roles	<b>Team Leader:</b> Interfaces with host site and team members prior to the assessment; conducts ½ day training with team Sunday before assessment;	Same as Self Assessment. <b>Behavioral scientist</b> works at the direction of the Team Leader. Can	Same as Self Assessment. <b>Behavioral scientist</b> works at the direction of the Team Leader. Can provide insights

<sup>1</sup> Surveys performed by contractors may be substituted for the USA survey if the results are provided to the assessment team in terms of the INPO principles and attributes.

## Industry Nuclear Safety Culture Process

	<p>leads team to ensure adequate number of interviews and observations are conducted; briefs site management; conducts exit; prepares report obtaining team concurrence.</p> <p><b>Team Executive:</b> Provides senior oversight of the team; preferred attendance for entire week; required Wed-Friday. Interfaces with site VP.</p> <p><b>Assessors:</b> Conduct interviews and observations as two person teams; develop conclusions and findings</p> <p><b>Host Peer:</b> Ensures logistics including badging, interview and observation scheduling; coordinates survey administration</p> <p><b>Admin:</b> Ensure smooth execution of assessment and manage data collection.</p>	<p>provide insights into data analysis, interviewing techniques, and team findings and recommendations.</p>	<p>into data analysis, interviewing techniques, and team findings and recommendations.</p>
Training	<p><b>Team Leader:</b> Industry workshop training and previous assessor experience</p> <p><b>Assessors:</b> Interviewing skills training (or experience in conducting evaluations which involve interviewing) and ½ day team training prior to the assessment.</p> <p><b>Admin:</b> orientation by qualified Team Leader</p>	<p>Same.</p> <p><b>Behavioral scientist</b> will be familiar with assessment methodology.</p>	<p>Same.</p> <p><b>Behavioral scientist</b> will be familiar with assessment methodology.</p>
Document Review	<p>CAP, root cause evaluations past 2 years, policies on nuclear safety culture and SCWE, site process PIs, QA audits, self assessment and benchmarking reports, last nuclear safety culture assessment, NRC assessment letters, review ROP results on NRC website.</p>	<p>Same, with any additional materials provided by Site VP.</p>	<p>Same, with any additional materials provided by Site VP, and 95003 related reports.</p>

### Activities Necessary to Enhance the USA product for Nuclear Safety Culture Assessments for Industry Use (including 95003 third party nuclear safety culture assessments)

The Utilities Service Alliance has created an excellent nuclear safety culture assessment product which it has been implementing and improving over the past five years. A team of leaders of the USA effort reviewed the current product and considered what additional improvements would be necessary. These enhancements include:

1. Modify document to reflect three levels of assessment (self, independent, third party).
2. Update survey tool to distinguish between departments and respondent's organization level.
3. Develop survey criterion and content validity.
4. Upgrade to Microsoft Access 2007.