Safety Culture
And
Training and Competency

Joseph F. Bader
Board Member
Defense Nuclear Facilities Safety Board

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Objectives

- Discuss the Board's approach to staff training
- Review the Board's concerns about safety culture at the Waste Treatment and Immobilization Plant (WTP)
- Understand what group culture is and why it is an important part of nuclear operations
- Explore the linkage between safety culture and training and competency

The Board's Technical Staff

- Currently about 85 Technical Staff members.
- Essentially all of the Technical Staff members have at least one technical master's degree, ~20% have a PhD.
- Extensive experience in nuclear, mechanical, electrical, chemical, structural, and metallurgical engineering and physics.
- Extensive practical experience in the nuclear weapons complex, the U.S. Navy's nuclear propulsion program, and the civilian nuclear industry.

Example Short Course Matrix

COURSE TITLE	VENDOR	LENGTH	DESCRIPTION	AUDIENCE	REVIEW	RECENT ATTENDEES
Fundamentals of Actinide Chemistry	Radiochemistry Society	3 days	Fundamental knowledge of radiochemistry for engineers, scientists, technicians, managers.	Limited chemistry experience	Advanced course would be more useful	Lewis, Sharpless
Nuclear Plant Safety	MIT	5 days	New developments in reactor safety and regulatory issues. Plant outages, risk- informed operations, power uprates, etc.	Degree-holding engineers and scientists with some knowledge of nuclear technology.	Good course	Duncan, Burnfield, Anderson
Nuclear Criticality Safety Training	LLNL	4 days	Designed to meet formal criticality safety engineer quals in STD-1173 and STD-1135.	Non-nuclear engineers	Hand stacking experiments and hand calcs useful.	Rauch, Anderson
Process Hazards Analysis	ABS Consulting	5 days	Intro to basic hazards analysis techniques. Perform PHAs that meet federal regulatory requirements.	Geared toward chemical, not nuclear, industry.	Good for those without PHA experience.	Shuffler

Professional Development Program

- A 3-year program with 3-year service commitment
- Year 1- interns are oriented to the work of the Board, including involvement in a variety of technical projects; mentored by senior staff member
- Year 2- Interns attend graduate school with fully-paid tuition and salary. School selection and course of study are mutually agreed upon by Board and intern
- Year 3- Interns work a challenging technical assignment at private company, national lab, or other government agency
- Year 4 & Beyond - intern becomes a full, contributing member of the technical staff.

Safety Culture at WTP

On June 9, 2011, the Board issued Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant;* it was based on two key findings from an extensive investigation:

- "A chilled atmosphere adverse to safety exists" in the project's contractor and Federal staff; based on reviews of allegations of suppression and retaliation, and supported by worker interviews
- "DOE and contractor management suppress technical dissent," based on evidence of withheld information, pressuring experts to change opinions, and failing to act on identified safety concerns

DOE's Response

Since the Recommendation was issued, DOE has conducted multiple assessments at the project; the most authoritative assessment was the Office of Health, Safety and Security's review, issued in January 2012

What did the HSS team conclude?

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What did the HSS team conclude?

Why did they reach those conclusions?

Why Study Safety Culture?

•Safety Culture is an important part of establishing and maintaining a safe nuclear operation; however, it is not easy to recognize cultural problems

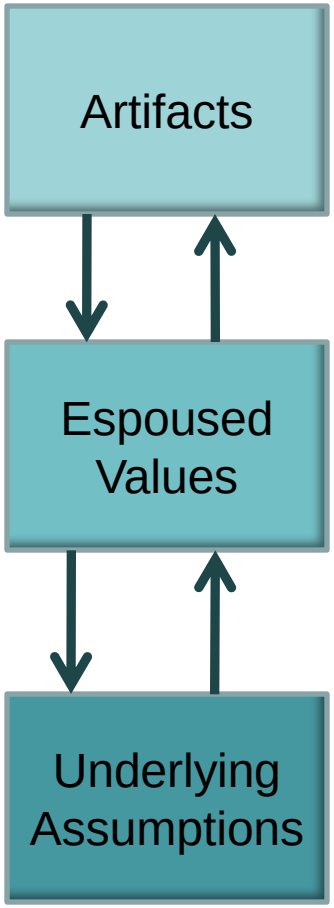
What is Culture?

"The only thing of real importance that leaders do is to create and manage culture…"

– Edgar Schein

- Group culture is the shared basic assumptions developed by a group as it learns and copes with problems
- Assumptions that are considered valid are taught to new members as the way to perceive, think, act, and feel
- Culture is the sum total of the group's learning; as such it defines how a group will respond to any situation
- "Culture is for the group what character and personality are for the individual" (INPO)

The Three Levels of Culture



(E. Schein)

Typical Artifacts:
- Turnover rates in safety-related positions.
- Types of accomplishments being recognized and rewarded.
- Division of resources between functional areas.
- Response to a 'stop work' order or differing opinion.

Typical Espoused Values:
- "We value and reward team work."
- "Safety and security are our highest priorities."
- "Everybody at the plant has 'stop work' authority."
- "Our workers are always trained to the highest standards."

Typical Underlying Assumptions:
- "We know the job better than anybody."
- "I'd never do anything that would hurt me or my buddies."
- "We need to get the job done so that we'll get paid."
- "My bosses will keep me out of trouble."

Pattern of Declining Safety

1. ***Over-confidence.*** A result of good past performance and unjustified self-satisfaction
2. ***Complacency***. Minor events begin to occur but are not adequately assessed; oversight begins to be weakened due to self-satisfaction
3. ***Denial***. More significant events begin to occur; negative oversight findings tend to be rejected as invalid; corrective actions not systematically carried out, improvement programs not completed
4. ***Danger***. A few potentially severe events occur; organization consistently rejects criticisms; oversight afraid to confront management
5. ***Collapse***. Problems become clear for all to see; management is overwhelmed and usually needs to be replaced

Source: IAEA, INSAG-13

Pattern of Declining Safety (con't)

Plants with significant problems:

- Failed to recognize declining performance
- Did not effectively monitor and trend performance
- Experienced increasing human error rates
- Lacked awareness among top managers about principal deficiencies and corrective actions
- Did not use operational experience feedback effectively
- Did not conduct adequate or sufficient self-assessments
- Failed to effectively supervise and monitor subcontractors

Source: IAEA, INSAG-13

Culture and Training

- Group culture is a learned behavior
- It is usually taught to new members by role modeling, informal story-telling, and peer pressure
- Addition of cultural elements into formal training and competency programs is encouraged
  - Cultural elements incorporated into training needs to support local cultural values
  - Cultural elements incorporated into training must be consistent with both group policies and practices

Do not give trainees the message
"Do as I say, not as I do!"

Training Warning Flags

1. Lack of ownership by line and training managers
   - Line managers infrequently observe training, seldom provide meaningful comments
   - Training staff assumes little responsibility for plant performance
   - Line staff assumes training organization has sole responsibility for training performance
2. Self-Assessments are not conducted effectively
   - Self-assessments not self-critical, weaknesses seldom identified
   - Line managers only review self-assessment results, do not actively participate in self-assessment activities
   - Effectiveness of corrective actions not evaluated
   - Self-assessment activities seldom include actual observations of training

Training Warning Flags (con't)

3. Student dissatisfaction with training provided
   - Student attendance frequently low, makeup training not completed or at a lower standard
   - Students complain about attending training, believe training does not apply to their jobs
   - Students do not actively participate in class activities
   - Student feedback is generally negative, not given, or contains little substantive information
4. Isolationism
   - Interaction between training staff and other training groups is minimal
   - Training staff rarely interacts with or applies lessons learned from other plants

Training Warning Flags (con't)

5. Training not being used to improve performance
   - Training is not a strategy for improving plant performance
   - Positions are formed or existing positions are modified without consideration of training needs
   - Impacts on training not considered when significant procedure or equipment changes are made
   - Training staff not proactively seeking solutions to plant problems by analyzing plant events for training needs
6. Insufficient training expertise in management team
   - Training manager assigned without experience and not provided sufficient training or staff
   - Line managers do not have sufficient understanding of systematic training

Training Warning Flags (con't)

7. Distractions draw attention away from training
   - Continuing training is suspended during extended outage periods
   - Distractions such as major regulatory challenges or significant plant performance issues interfere with managing training
   - Training staff is assigned to responsibilities outside of training for extended periods
   - Training budget cut disproportionately with that of other groups when resources are limited

Conclusions

- Group culture has a very large impact on safe operations
- Simply put, a culture that reflects safety as the group's highest priority is referred to as a "safety culture"
- The training and competency programs are an important parts of establishing a good safety culture
- There are characteristic warning flags that anyone can watch for to gain insight into the quality of a training program and its impact on safety culture

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– Edgar Schein