



## **NRC Activities Leading Up to the Safety Culture Policy Statement**

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Jose G. Ibarra  
Sr. Program Manager  
Office of Enforcement

Molly Keefe  
Human Factors Analyst  
Office of New Reactors

U.S. Nuclear Regulatory Commission

## Presentation

- Safety Culture Before Three Mile Island (TMI) Accident
- TMI Lessons Learned, NRC Actions, and Chernobyl Accident
- 1989 Policy Statement: Conduct of Operations
- International Nuclear Safety Group (INSAG)
- 1996 Policy Statement: Freedom to Raise Concerns
- Events of the New Millennium
- Davis-Besse Reactor Vessel Head Event
- Shuttle Accident, General Accounting Office, Congressional Committee
- Safety Culture Working Group and Palo Verde Independent Safety Culture Assessment

## **Safety Culture Before Three Mile Island (TMI) Accident**

- Nuclear Industry would not have used such words as Safety Culture
- There were no human factors staff at nuclear power plants
  - Most professionals were engineers at nuclear site
- Nuclear Industry did pay attention to safety
- Operators trained and licensed and mentality existed that accidents would not occur due operator training and design safety features
- Radiation and Industrial Safety Training

## TMI Lessons Learned

- TMI occurred in March 1979
- Human Factors introduced the Man Machine Interface (MMI)
- Main Control Rooms need to be assessed for Human Factors
  - Detailed Control Room Design Reviews/Functional Analysis
  - Safety Parameter Display System
- Identified Importance of Operator's role in operations and accident mitigation
  - Re-doing Emergency Operating Procedures
  - Senior Technical Advisor
- Operators/Engineers accepted the human factors discipline especially after control room reviews and the Functional Analysis

## **NRC Actions Due to TMI Assessments**

- TMI Action Plan (NUREG-0600) provided more work for social scientists
- Human Factors Staff hired with various expertise in Man Machine Interface and organization effectiveness
- NRC created Office for Analysis and Evaluation of Operational Data (AEOD)
- NRC created Human Factors Division in Office of Nuclear Reactor Regulation
- NRC created Human Factors Branch in the Office of Nuclear Regulatory Research

## AEOD Independent Work

- Established independent assessment of operational events
- Assessed events at nuclear sites documented as Human Performance Reports
- Conducted Diagnostic Evaluations that included training, operations, management & organization
- Managed Technical Training including reactor simulators
- Developed Emergency Response Procedures and built a top facility to monitor events
- Trained staff for highest level of NRC inspection called the Incident Investigation Teams

## Lessons Learned From Chernobyl Accident

- Accident occurred in April 1986
- There was non adherence to procedures
- There was non conservative decision making
- There was lack of clear authority
- There was poor training and understanding of the experiment
- Production was put over safety
- There existed a complacency culture

## **1989 Policy Statement: Conduct of Operations**

- Safety Culture requires:
  - Necessary full attention to safety matters
  - Personal dedication and accountability of all individuals engaged in any activity which has a bearing on the safety of nuclear power plants
  - Management has the duty and obligation to foster the development of a ‘safety culture’ at each facility and to provide a professional working environment, in the control room, and throughout the facility, that assures safe operations



## International Nuclear Safety Group (INSAG)

- 1991: INSAG-4, “Safety Culture,” was developed to emphasize safety culture concept in nuclear industry
  - Result of Chernobyl accident
  - International Atomic Energy Agency (IAEA) and INSAG work led to development of guidance in safety culture

## INSAG-4 Definition

“That assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant issues receive the attention warranted by their significance.”

## **May 14, 1996: Policy Statement**

### **Freedom of Employees in the Nuclear Industry to Raise Safety Concerns without Fear of Retaliation.**

- Issued following retaliation for whistle-blowing issue at Millstone
- Establish and maintain safety conscious work environment (SCWE)
- Applied to all NRC-regulated activities of licensees, contractors, and applicants

## Events of the new Millennium

- Reactor Oversight Process (ROP) Implemented in 2000
  - 3 cross-cutting areas have safety culture ties:
    - **Safety Conscious Work Environment (SCWE)**
    - **Problem identification and resolution (PI&R)**
    - **Human Performance**

## Events of the new Millennium

- September 11, 2001 attacks
  - Heightened importance of security at nuclear power plants
  - NRC issues orders enhancing security at NRC licensed facilities
  - Resulted in Commission adding “nuclear security” to proposed safety culture definition

## **Davis-Besse Reactor Vessel Head Event in 2002**

- Discovery of boric acid corrosion degradation on the reactor pressure vessel
- Licensee's root cause identified inadequate safety culture and an emphasis on production over safety

## **NRC Davis-Besse Lessons Learned Task Force**

- NRC Davis-Besse Lessons Learned Task Force analysis:
  - **The owner failed to assure that plant safety issues would receive appropriate attention**
  - The NRC, the reactor owner, and the nuclear industry failed to adequately review, assess, and follow-up on relevant operating experience
  - The NRC failed to integrate known or available information into its assessments of licensees' safety performance

## **NRC DBLL Task Force Recommendations**

- The Task Force Report recommended that the staff review NRC inspections and plant assessment processes
- Review would determine if there was a need to change current NRC assessment and inspection processes



## Task Force Follow-up Events

- The Commission provided the following direction:
  - Enhance the ROP treatment of cross-cutting issues to include safety culture
  - Ensure inspectors are properly trained
  - Develop a process to conduct safety culture evaluations for plants in the Degraded Cornerstone Column of the ROP Action Matrix

## Other Influences

- General Accounting Office (GAO) recommendations
- U.S. Senate Committee on Environment and Public Works concerns over Davis-Besse vessel head event
- Columbia Shuttle accident in 2003

## Safety Culture Working Group

- Formed working group in 2004 with members from RES, NRR, and OE:
  - Revised the cross-cutting issues to enhance safety culture
  - Recommended adoption of the INSAG-4 definition
  - Developed 13 components and corresponding aspects of safety culture
  - Revised baseline and supplemental inspection procedures
  - Developed training for NRC inspectors

## **2007 NRC Palo Verde Independent Safety Culture Assessment**

- First use of updated supplemental inspection procedure
- Allowed the NRC to assess into safety culture at Palo Verde

## Where are we today?

- February 2009 SRM, “A Commission Policy Statement on Safety Culture”
  - Directed Staff to reach out to all stakeholders and all types of licensees and certificate holders
  - Solicit feedback into development of policy statement

## Continued

- October 2009 Commission SRM to update Policy Statement:
  - “Seek opportunities to comport NRC terminology, where possible, with that of existing standards and references maintained by those that NRC regulates.”



**Here We Are!**

## References

- SECY-04-0111, “Recommended Staff Actions Regarding Agency Guidance in the Areas of Safety Conscious Work Environment and Safety Culture,” July 2004
- [SRM/SECY-05-0187](#) (December 2005), “Status of Safety Culture Initiatives and Schedule for Near-Term Deliverables,”
- Millstone Time Magazine article:  
<http://www.time.com/time/magazine/article/0,9171,984206,00.html>
- February 2009 SRM-COMGBJ-08-001