The background of the slide features a large, faint watermark of the official seal of the Defense Nuclear Facilities Safety Board. The seal is circular and contains the text "UNITED STATES OF AMERICA" at the top and "DEFENSE NUCLEAR FACILITIES SAFETY BOARD" around the bottom. In the center of the seal is a shield with a caduceus (a staff with two snakes) and a globe.

Big Things From Small Beginnings

**Peter S. Winokur, Ph.D., Chairman
Defense Nuclear Facilities Safety Board**

Thanks to D. Bullen, D. Owen, J. MacSleyne, and D. Minnema

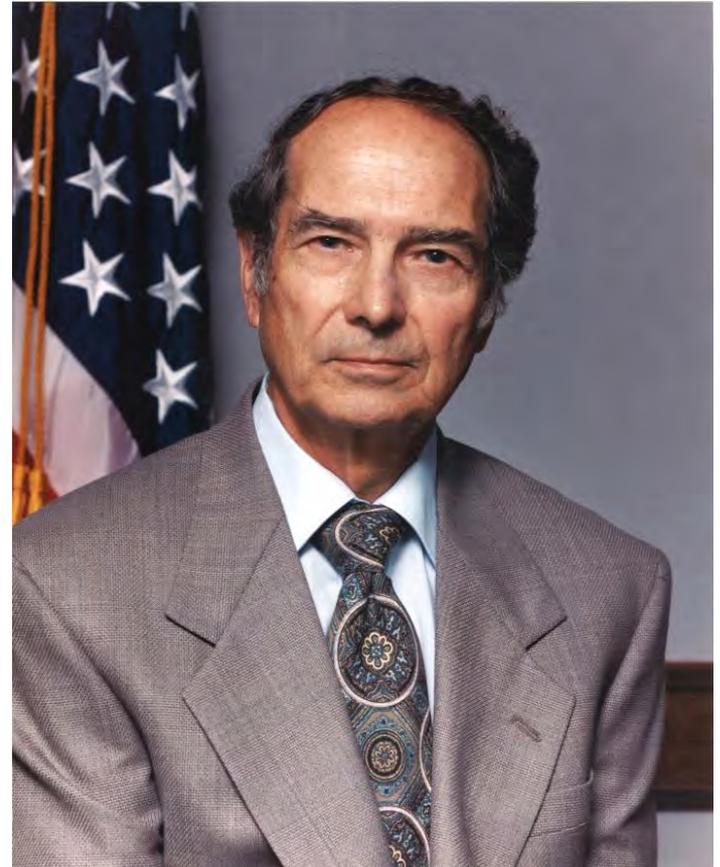
**DOE ISM Workshop
May 15, 2013**

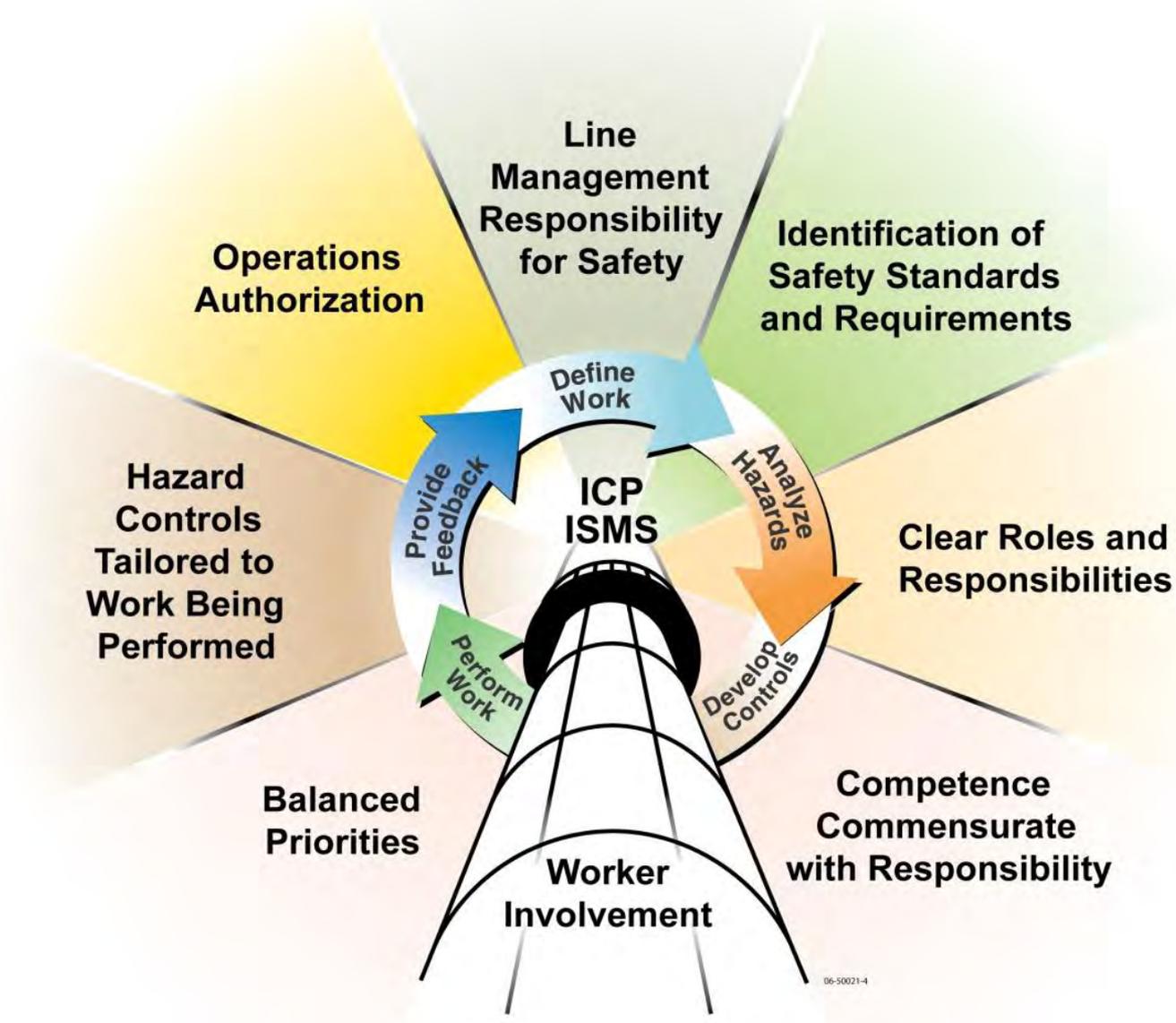
In Memoriam

Joseph J. DiNunno (1921-2012)



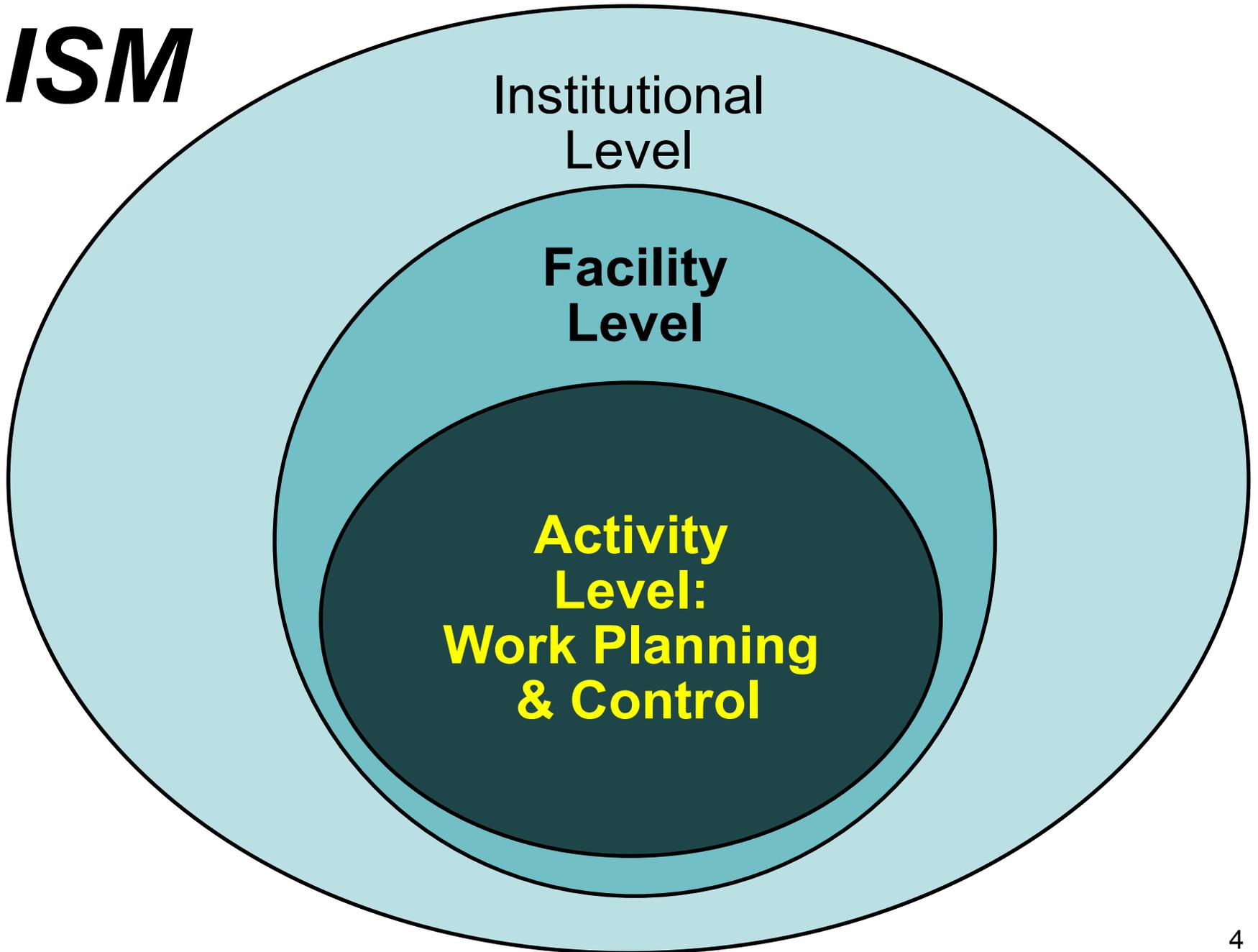
- DNFSB Member from 1992 to 2002
- Joe was a key driver behind Board Recommendation 95-2, *Safety Management*
- At the Board and throughout the nuclear weapons complex, Joe will always be remembered as the “Father of Integrated Safety Management.”





Thanks to CH2M•WG, Idaho, LLC

ISM



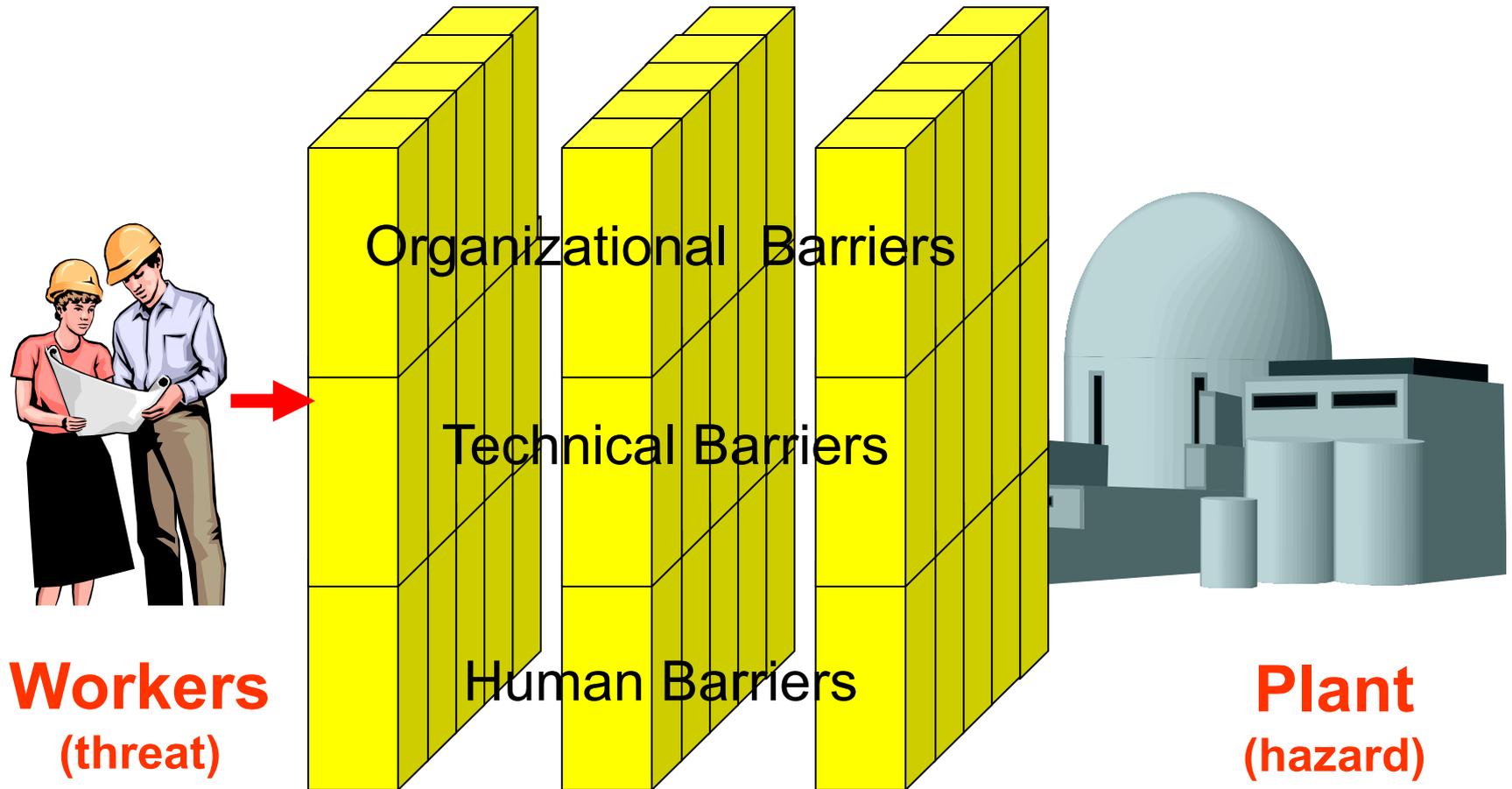
**Is this what
“Big Things
from Small
Beginnings” is
referring to?**



NO! It refers to how small work planning and control failures can cause big problems!



Barriers Between Workers and Plant*



Defense-in-Depth

**High Reliability Operations, Hartley, Tolk, and Swaim, B&W Pantex, 2008.*

ISM and DOE Accident Experiences



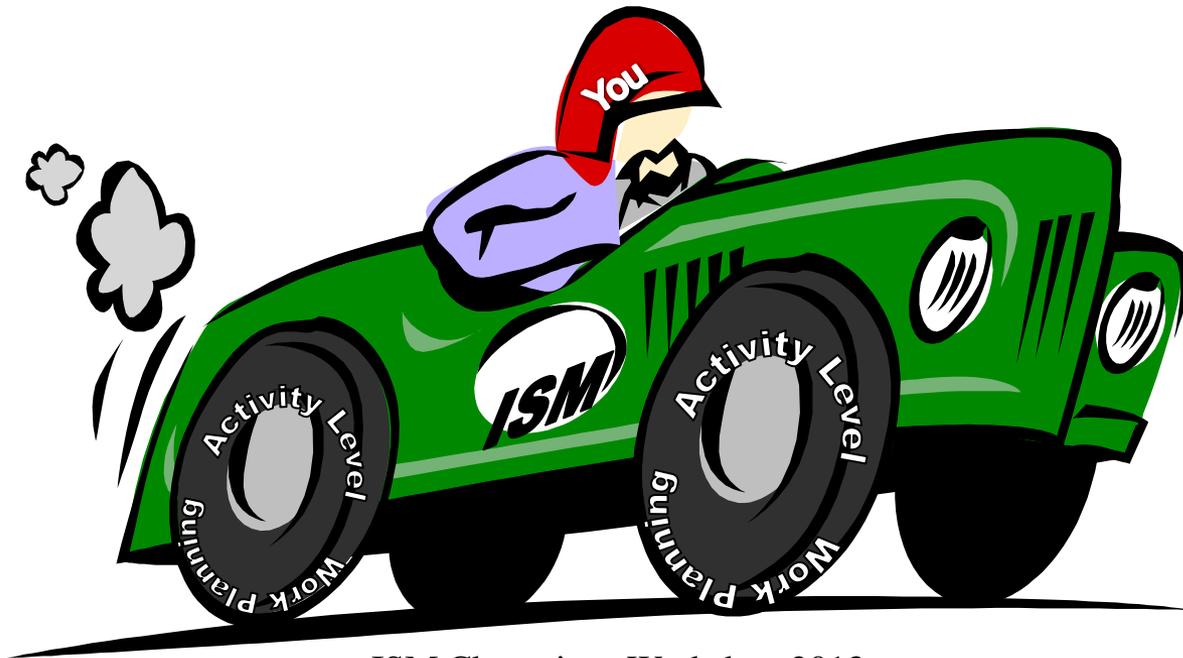
Accident	Hazard Analysis & Control	Procedures & Adherence	Reliance on "Skill of the Craft"	Lessons Learned & Corrective Actions	Mgmt. Oversight
K-25 Welder Fatality; 1997	Yellow	Red	Yellow	Yellow	Yellow
Hanford Red Oil Explosion, 1997	Red	Red	Light Blue	Yellow	Red
INEEL CO ₂ Release; 1998	Red	Red	Yellow	Yellow	Red
Y-12 NaK Explosion; 1999	Red	Red	Yellow	Yellow	Yellow
LANL TA-55 Pu Uptake; 2000	Red	Red	Red	Yellow	Yellow
FERMI Drill Rig Accident; 2001	Red	Yellow	Yellow	Red	Red
LANL TA-55 Pu-238 Uptakes; 2003	Red	Yellow	Yellow	Red	Red
LANL Sigma Contamination; 2005	Red	Red	Yellow	Yellow	Yellow
LANL Acid Vapor Inhalation; 2005	Red	Red	Red	Red	Yellow
LANL GB puncture wounds; 2007	Red	Red	Yellow	Light Blue	Yellow
SNL Sled Track Accident; 2008	Red	Red	Yellow	Light Blue	Yellow
Hanford Employee Fall Injury; 2009	Red	Red	Yellow	Light Blue	Red
SPRU contamination Spread; 2010	Yellow	Yellow	Yellow	Light Blue	Red
SRS GB Puncture Wound; 2010	Red	Yellow	Yellow	Yellow	Yellow
INL ZPPR Pu Contamination; 2011	Yellow	Yellow	Yellow	Light Blue	Yellow

– Process not followed;
 – process inadequate/ineffective;
 – not causal factor

Activity-Level Work Planning and Control



- Where the ISM rubber meets the road
- Applicable to all types of work activities including operations, maintenance, research, decommissioning, construction, etc.
- Protects both the worker from the plant and the plant from the worker

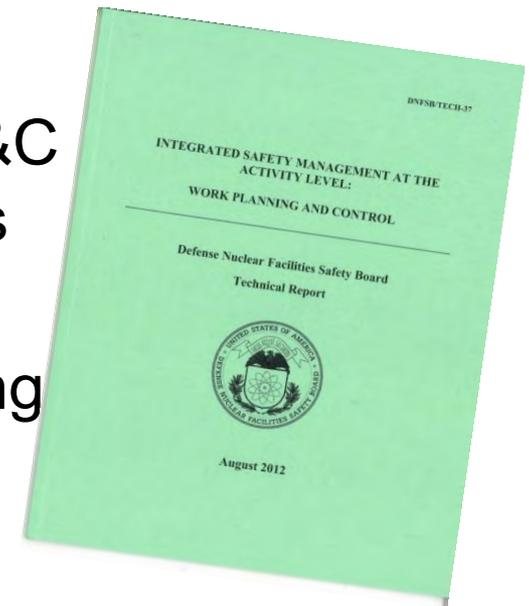


DNFSB/TECH-37



“ISM at the Activity Level: Work Planning and Control”

- Evaluated DOE actions to improve work planning in 2005-2006 responding to Recommendation 2004-1
- Based on a four-year effort reviewing WP&C at DOE sites with defense nuclear facilities from 2008-2012
- Considered Board Letters to DOE regarding issues identified during individual site reviews
- Identified consistent sets of WP&C weaknesses shared by most contractors



DNFSB/TECH-37 (cont.)



TECH-37 concluded that there was a need for a different approach from the initial efforts

- Line managers need to renew their focus and emphasis in WP&C
- The DOE Directives need to comprehensively address WP&C
- DOE and its Contractors need to institutionalize meaningful oversight of WP&C via routine and thorough assessments
- Contractors need to improve integration of ISM core functions into activity-level WP&C

DOE's Response



The Deputy Secretary outlined the following major actions in his November 2012 letter:

- Develop a DOE Handbook on WP&C for contractor implementation
- Develop DOE CRADs and other guidance for oversight of WP&C
- Evaluate operating experience and conduct this workshop

DOE's Response (cont.)



The Deputy Secretary emphasized the need for rigorous implementation and enhancement of DOE and contractor oversight of WP&C

- In January 2013 brief to the Board “WP&C deficiencies are due to implementation weaknesses and lack of rigorous oversight...”
- Deputy Secretary’s January 2013 letter to the complex requested action to enhance WP&C implementation and oversight by DOE and contractors

What WP&C is not!



Integrated Safety Management



Recurring Challenges



- Define Scope Of Work:
 - Avoid using work procedures/ instructions with too broad of a scope and insufficiently defined boundaries
 - Include adequate detail in the work descriptions to support effective hazard analysis





Recurring Challenges (cont.)

- Analyze Hazards and Develop Controls:
 - Divide work into tasks and/or work steps suitable for hazard analysis
 - Use a team approach with the right subject matter experts to develop an optimal control set
 - Ensure hazard analysis addresses “what can go wrong”
 - Avoid over-reliance on “automated hazard analyses” and pay particular attention to hierarchy of controls





Recurring Challenges (cont.)

- Implement Controls and Work Within Controls:
 - Incorporate safety controls into procedures in a specific and unambiguous manner
 - Ensure procedures and instructions can be performed as written
 - Emphasize worker empowerment and responsibility to stop and report when work cannot be performed as written or upon encountering unexpected conditions



Bad Conduct of Operations can negate the best WP&C (and vice-versa)!



Recurring Challenges (cont.)

- Feedback and Improvement:
 - Ensure lessons learned in WP&C are developed and used to prevent recurring deficiencies
 - Conduct adequate oversight assessments

Effective oversight is a management tool, not a measure of non-compliance





Recurring Challenges (cont.)

- Overarching Challenges:
 - Increase worker involvement in walk-downs, team hazard analyses, procedure V&V
 - Improve managers' responsiveness to worker feedback
 - Enhance training and competence on WP&C – include good and bad examples
 - Promote a safety conscious workplace; foster questioning attitudes and conservative decision-making



Meeting the WP&C Challenges



- Develop line management leaders in WP&C at site, facility, and first-line supervisor levels (“WP&C Champions”)
- Establish competent mentors, reporting to line managers, to constructively engage “on-the-floor” with work planning teams and work crews
- Institute routine and thorough independent oversight assessments, including “on-the-floor” evolutions, to evaluate and confirm sustained performance

Getting to the Next Level



- Develop a “Gold Standard” DOE Handbook and oversight guidance on WP&C (use this workshop to assist in those efforts)
- Develop and deploy competent leaders and mentors for WP&C
- Apply rigorous oversight “on-the-floor” to confirm sustained performance of WP&C



But, Expect the Unexpected

Regardless of how good work planning and control is, accidents may still happen - be prepared:

- Ensure that detection and suppression systems (e.g., fire, gas, chemical, radiation) and emergency equipment work when called on
- Anticipate the possibility of collateral damage or “downstream” effects from unintended actions
- Expect that, sooner or later, somebody will do the totally unexpected
- Remember that hidden design faults can reveal themselves at any time
- Beware the dangers of an aging infrastructure
- Recognize that deferred component maintenance and upgrades introduces uncertainty in system performance

Big Things Can Come from Small Beginnings!