

Team Based Program Design

Management and Research Operations Involvement in Nanoscale Materials ES&H



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Personal Bio

Kevin Sheffield, a member of the ASTM Committee E56 on Nanotechnology, served on the National Laboratory Directors' Council task group that worked with DOE to develop DOE Notice 456.1. He currently serves as the subject matter expert for the Nanoscale Materials Safety Program at the Pacific Northwest National Laboratory in Richland, Washington. Kevin has more than 22 years experience in occupational health and safety, is a Certified Industrial Hygienist and Certified Safety Professional, and received his doctorate from the University of Texas Health Science Center at Houston.



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Background

In 2008, the National Laboratory Directors' Council worked with DOE during the development of DOE Notice 456.1, *The Safe Handling of Unbound Engineered Nanoparticles*.

- ▶ Cited as a first in having those who must comply with a notice involved in its development
- ▶ PNNL team comprised of research and ES&H staff participated on NLDC task group. Team members:
 - Developed a greater understanding of the issues related to each other's areas of expertise, i.e., industrial hygiene, environmental compliance, and research
 - Developed working relationships outside of their respective organizations that continued after DOE N 456.1 was issued
 - Formed the core of a new Nanoscale Materials Safety Committee



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Nanoscale Materials Safety Committee

- ▶ PNNL executive management convened the Nanoscale Materials Safety committee comprised of:
 - 2 NLDC task group members (Lab Fellow & Industrial Hygienist)
 - 4 Additional nanomaterials research staff
 - Manager of Integrated Operations System (IOPS)
- ▶ Committee charter - make recommendations regarding the implementation of DOE Notice 456.1 at PNNL
- ▶ Immediate needs and objectives:
 - Identify activities to which the Notice applies
 - Determine how to inventory nanotechnology activities & materials
 - Perform a gap analysis of current nanomaterials safety policy relative to DOE N 456.1
 - Provide recommendations to the Laboratory on how to close gaps



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Nanoscale Materials Safety Committee Recommendations

- ▶ Revise Nanoscale Materials Safety Program
- ▶ Supplement existing IOPS capabilities
- ▶ Establish a Nanomaterials Safety Advisory committee to review policy & practices involving nanomaterials safety
- ▶ Identify a Nanomaterials Expert Mentors pool to assist and guide new nanomaterials workers
- ▶ Establish Nanoscale Materials Level III laboratory spaces where new nanomaterials or processes can be tested to determine the appropriate risk level



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Revise Nanoscale Materials Safety Program

- ▶ Revised Nanoscale Materials Safety program to incorporate “Control Banding” and “Precautionary Principle” for:
 - R&D work
 - Invasive & Dust Disturbing Maintenance Work
 - Non- Invasive & Non-Dust Disturbing Maintenance Work
 - Diagnostic, testing, maintenance, and repair of potentially contaminated equipment and building systems
- ▶ Developed workplace exposure assessment templates to standardize controls for work involving equipment or building systems potentially contaminated with unbound engineered nanoparticles
- ▶ Developed a chapter for PNNL’s Contractor Environmental Safety & Health Manual that addresses subcontractor work involving unbound engineered nanoparticle contaminated equipment and building systems



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Revise Nanoscale Materials Safety Program

Worked with Site Occupational Medical Director to establish new protocol and enrollment criteria for Nanomaterial Worker Surveillance Program:

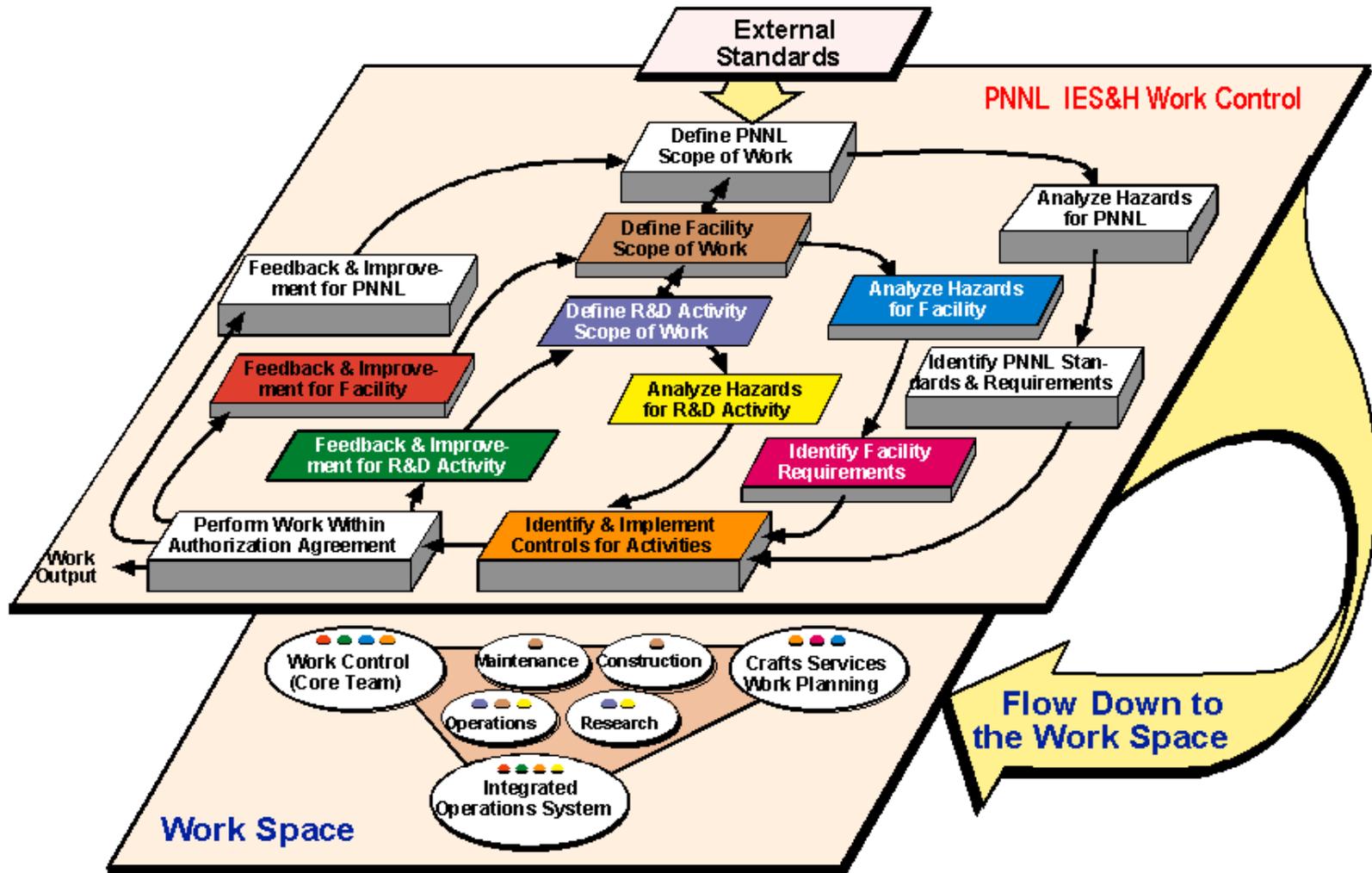
- ▶ Developed acceptance/declination form for Nanomaterial Worker Medical Examination
- ▶ Implemented Nanomaterial Worker Medical Surveillance program
 - Revised electronic Employee Job Task Analysis for Nanomaterial Workers
 - Offered voluntary medical exam and email acceptance/declination form
 - Scheduled medical exams and return signed forms to Site Occupational Medical Contractor



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Integrated Operations System (IOPS)



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Supplement Existing IOPS Capabilities

Existing nanoscale material capabilities

- ▶ Chemical Process Permits already addressed precursors, intermediates, nanoscale materials:
 - Description of Chemical Process
 - Chemical Identification
 - Description of Hazards
 - Amount and Frequency of Use
 - Risk Assessment
 - Hazard Mitigation



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Supplement Existing IOPS Capabilities

New nanoscale material capabilities:

- ▶ Chemical Process Permits now collect information about physico-chemical characteristics of nanoparticles in a manner that allows the data to be retrieved in an electronic format, which enables:
 - Reporting purposes
 - Reevaluate control measures as additional toxicological data becomes available
- ▶ Hazard Evaluation Module to assist R&D staff determine appropriate level of precautions for nanoparticle work and classify laboratories according to level of risk
- ▶ Expanded Nanoscale Material Hazard Statements
- ▶ Prompts to include additional detail in Hazard Awareness Summaries
- ▶ New IOPS Self Assessment Questions



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Conclusion

Team-based approach for program design resulted in:

- ▶ Comprehensive nanoscale materials safety program that encompasses research, maintenance, operations, and subcontractor/vendor work
- ▶ A more conservative approach to nanoscale materials safety:
 - Control banding is easy to understand and implement
 - Precautionary principle simplifies control banding process
 - Expanded medical surveillance program
 - Ability to address unique issues
- ▶ Early feedback from researchers has been positive
 - Control banding allows researchers to plan for control measures in proposal stage and should reduce unanticipated costs
- ▶ Significantly increased the credibility of the Nanoscale Materials Safety Program among Research staff

Questions?



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