Integrated Safety Management System as the Basis for Work Planning and Control for Research and Development

RICH DAVIES*, KAMI LOWRY*, MIKE SCHLENDER*, AND TED PIETROK**

* Pacific Northwest National Laboratory (PNNL)
**Pacific Northwest Site Office (PNSO)

ISM Champions Workshop
May 16, 2013
Outline

- Introduction to PNNL – scope of work
- Integrate Safety Management System Overview
- R&D Activity-level Work Planning and Control
- Discussion - Continuous Improvement
- Summary
Introduction

- Work Planning and Control (WP&C) is essential to assuring the safety of workers and the public regardless of the scope of work.
  - Research and Development (R&D) activities are no exception.
- Integrated Safety Management System (ISMS) implements WP&C.
  - Approach is developed to match the work and needs site-by-site.
- PNNL has developed and refined attributes of WP&C for application to R&D activities as part of our ISMS.
  - Treating hazards while simultaneously enabling R&D mission delivery.
  - Increasing WP&C rigor at Hazard Category 2 Nuclear Facility.
PNNL has a diverse portfolio of R&D

FY 2012 Cost: $859M

FY 2008 — FY 2012

- 4,689 peer-reviewed papers
- 14 R&D 100 & 11 FLC awards
- 537 U.S. and foreign patents
PNNL R&D Mission divided into 2000 projects spanning Basic Research to Scientific Systems

Our ‘universe of projects’ can be divided into four general categories:

- Level of Effort Projects (Basic Research)
- Milestone Driven RD&D Projects (Applied R&D)
- Facilities and Infrastructure Projects
- Large Scientific Systems Projects (e.g. SNS, NSLS II)

Generally Increasing Project Management Rigor
PNNL has three focus areas where we apply the five core functions of ISM.
R&D projects make us productive, and safety is integrated into the productivity process.
PNNL has (900) project managers responsible for risk management across (2000) projects.

<table>
<thead>
<tr>
<th>Elements of Project Management Process</th>
<th>Initiating</th>
<th>Planning</th>
<th>Implementing</th>
<th>Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References:
1. ISO 21500, Guidance on Project Management
2. ISO 31000, Risk Management – Principles and Guidelines
We have defined roles and responsibilities to manage project risk and hazards.

**R&D Line Responsibility for ES&H**

R&D Line Organizations Are Responsible for Providing for the Safety of R&D Space and Staff

R&D Project Management Offices are Responsible For Providing for the Safety of R&D Projects

- Laboratory Director
  - R&D Associate Laboratory Directors
    - Division Directors (Level 2)
      - Technical Group Managers
        - Cognizant Space Managers
          - R&D Organization Staff Working on R&D Projects

- Project Management Office Directors
  - Project Managers
    - For Procuring Project Services
    - For new IOPS Permits
    - For Procuring Project Staff
We enable all R&D projects by deploying a systematic approach to WP&C

- **System for every project:** Electronic Prep and Risk System (EPR)
  - Risk identification
  - Risk analysis
  - Risk evaluation
  - Risk treatment - Identifies and delivers Work Controls

- **System for every lab space:** Integrated Operations System (IOPS)
  - R&D project can rely on IOPS for laboratory work under an establish and approved routine operating envelope
R&D Projects use a Risk Catalog to Systematically Analyze Risks/Hazards

Electronic Prep and Risk (EPR) System

Risk Category

Risk Source

Technical Risks

Experimental / Field Work
Project involves experimental/laboratory and/or field work activities.

Experimental/laboratory activities are associated with scientific experiments, methods/processes that generate data/evidence, and may involve use of animals, chemicals, drugs, or other known and unknown materials to confirm or prove theories. Laboratory is a space/location where experimental activity is conducted at a facility, room, are outside area/laydown yard with the equipment and materials to conduct the experimental work. Types of laboratories at PNNL are dry, wet and unique.

Field work is an activity conducted indoors or outdoors, at either an onsite [institutionally controlled PNNL laboratory(s)] and/or offsite [non-institutionally controlled PNNL laboratory(s)] work location(s) where experimental activity is conducted. Types of field work locations include natural areas, undeveloped areas, outside industrial or construction sites, Hanford Site locations outside of operating areas, hazardous waste sites, or areas covered with transitioning between locations.

Comment Box
Project Managers depend on IOPs for WP&C in onsite laboratory spaces

Line Managers and Delegates define a Routine Operating Envelope

Workspace Hazard Identification
Worker Hazard Interaction
Access Control/Authorization

Hazard Communication and Tailored Hazard Control
Verification of Worker Qualification to perform work

Apply Work Controls
Standard Work Controls
Tailored Work Controls

Process for Tailored Self-Assessment and Corrective Action Management

Feedback & Improvement
Define the Scope of Work
Perform Work
Develop and Implement Hazard Controls
Analyze the Hazards

May 31, 2013
Discussion – More Recent Observations and Continuous Improvement

- We are further enhancing project risk management
  - Launched a new Electronic Prep and Risk (EPR) System
  - Subject Matter Experts more directly engaged with project risk mgmt

- We are focusing more on people (highly variable population)
  - Historically overemphasized process – need people, process, & systems
  - Working to better understand the contribution of people networks

- We are actively engaged in WP&C working groups
  - Advocating ISMS for WP&C in R&D Environment

- Continuous Feedback and Improvement (5th Core Function)
  - Research Productivity Sentiment Survey, Federal Burden Survey
  - Suite of performance measures – Integrated Management System
  - Contractor Assurance is foundational
Work Planning and Control (WP&C) is essential to assuring the safety of workers and the public across the entire Department of Energy (DOE) regardless of the scope of work or nature of facility.

- Research and Development (R&D) activities are no exception.

Integrated Safety Management System implements WP&C

- Approach is developed to match the work and needs site-by-site

Each DOE organization has developed a way to implement WP&C through their tailored Integrated Safety Management System

PNNL has developed and refined attributes of WP&C for application to R&D activities as part of our ISMS

- Built WP&C into our business – mission delivery through R&D projects
Questions?
PNNL is managed and operated according to the **Integrated Management System**

PNNL Integrated Management System

- **Inputs**
  - DOE Mission Needs & Strategic Plan
  - S&T Customer Needs
  - External Environment/Conditions
  - Operational Requirements

- **Outputs**
  - Program Deliver and Mission Accomplishment
  - Laboratory Stewardship
  - Operational & Financial Mgmt

- **Processes**
  - Develop Strategy
  - Assess Performance
  - Develop Business
  - Execute Project Lifecycle
  - Execute Project
  - Manage Staff
  - Manage Facilities and Infrastructure
  - Manage Equipment
  - Manage Materials and Specimens
  - Manage Requirements