LA-UR- 11-03289

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Title:	Quality-System Management of Nuclear-Material Storage Containers
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Intended for:	Institute of Nuclear Material Management 52nd Annual Meeting Slide Presentation Palm Desert, CA

Los Alamos
NATIONAL LABORATORY
EST. 1943

Form 836 (7/06)

Title: *Quality-System Management of Nuclear-Material Storage Containers*

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Abstract:

Quality-system management of nuclear-material (NM) storage containers remains the foundation for successfully designing, testing, and procuring NM storage containers for use at United States Department of Energy (DOE) national laboratories. The DOE, Los Alamos National Laboratory (LANL), and the American Society of Mechanical Engineers (ASME) specifically define quality-system requirements for NM storage containers. Quality-system management addresses the inherent risks and hazards associated with project activities. Implementation of project quality assurance (QA) minimizes environmental, safety, health, and security risks and any additional impacts associated with work processes, while maximizing reliability and performance of the NM storage container. To optimize worker safety, the management of quality-system requirements ensures the control of hazards and associated risks imposed by the work and by the functions required of the NM storage containers. Project QA also provides senior management a level of confidence that both business management and technical processes remain effective and efficient. My presentation will address the importance of quality-system management when designing, testing, and procuring NM storage containers to ensure worker safety and the minimization of environmental, health, and security risks.

Quality-System Management of Nuclear-Material Storage Containers

E. Jeanne Hamilton

52nd Annual INMM Meeting

July 2011

The Foundation

- **Quality-System Management**
  - Controls Hazards & Risks Associated with Project Activities
  - Optimizes Worker Safety
  - Minimizes Environmental, Health, & Security Risks
  - Ensures Successful Procurement
  - Ensures Successful Design
  - Ensures Successful Testing
  - Ensures Successful Manufacturing
  - Ensures Business Management & Technical Processes Effective & Efficient

Quality-System Requirements

- **DOE Manual 441.1-1, *Nuclear Material Packaging Manual***
  - Provides Detailed Packaging Requirements
  - Ensures Worker Protection
    - From internal exposure
    - To nuclear material stored outside of an approved engineered contamination barrier
    - Prevent airborne contamination hazard resulting in an internal radiation dose in excess of 5 rem Committed Effective Dose Equivalent (CEDE).

Quality-System Requirements

- **Title 10, Code of Federal Regulation (CFR), Part 830, *Nuclear Safety Management,* Section 830.122, *Quality Assurance Requirements***
  - Governs Conduct Affecting DOE, Nuclear-facilities Safety
  - LANL "facility" definition
    - Land, buildings, and other structures
    - Related functional systems and equipment
    - Other fixed systems and equipment installed within
      - Including site development features outside the plant, such as landscaping, roads, walks, parking areas
      - Outside lighting and communication systems
      - Central utility plants
      - Utilities supply and distribution systems
      - Other physical plant features

Quality-System Requirements

- **DOE Order 414.1C, *Quality Assurance***
  - Achieve QA through Principles:
    - Quality assured and maintained through a single, integrated, effective QA program (i.e., management system)
    - Management support for planning, organization, resources, direction, and control remains essential to QA
    - Performance and quality improvement require thorough, rigorous assessment, and corrective action
    - Workers remain responsible for achieving and maintaining quality
    - Environmental, safety, and health risks and impacts associated with work processes are minimized while maximizing reliability and performance of work products

Quality-System Requirements

- **ASME, American National Standard, NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications***
  - Reflects Industry Experience and Understanding of QA Requirements
  - Achieve Safe, Reliable, and Efficient Utilization of Nuclear Energy
  - Achieve Safe, Reliable, and Efficient Management and Processing of Radioactive Materials
  - Focuses on the achievement of results
  - Emphasizes the Individual and Line-management Roles in Achieving Quality
  - Fosters Consistent Requirements' Application

SAVY-4000 Nuclear Material Storage Container

- **Design Features**
  - Sizes: 1-, 3-, 5-, 8-, 12-qt. and 5-and 10-gal.
  - Bayonet style lock—no tools required
  - Corrosion resistant 316L stainless steel
  - Ceramic-filtered lid that allows container to "breath"
  - Soft durometer, Viton O-ring seal

Developed for Use

- **Safe & Effective Nuclear Material Storage**
- **Outside of Engineered Barriers**
  - Glovebox Line
  - Hoods
  - Tanks
  - Liquid-Transfer Lines

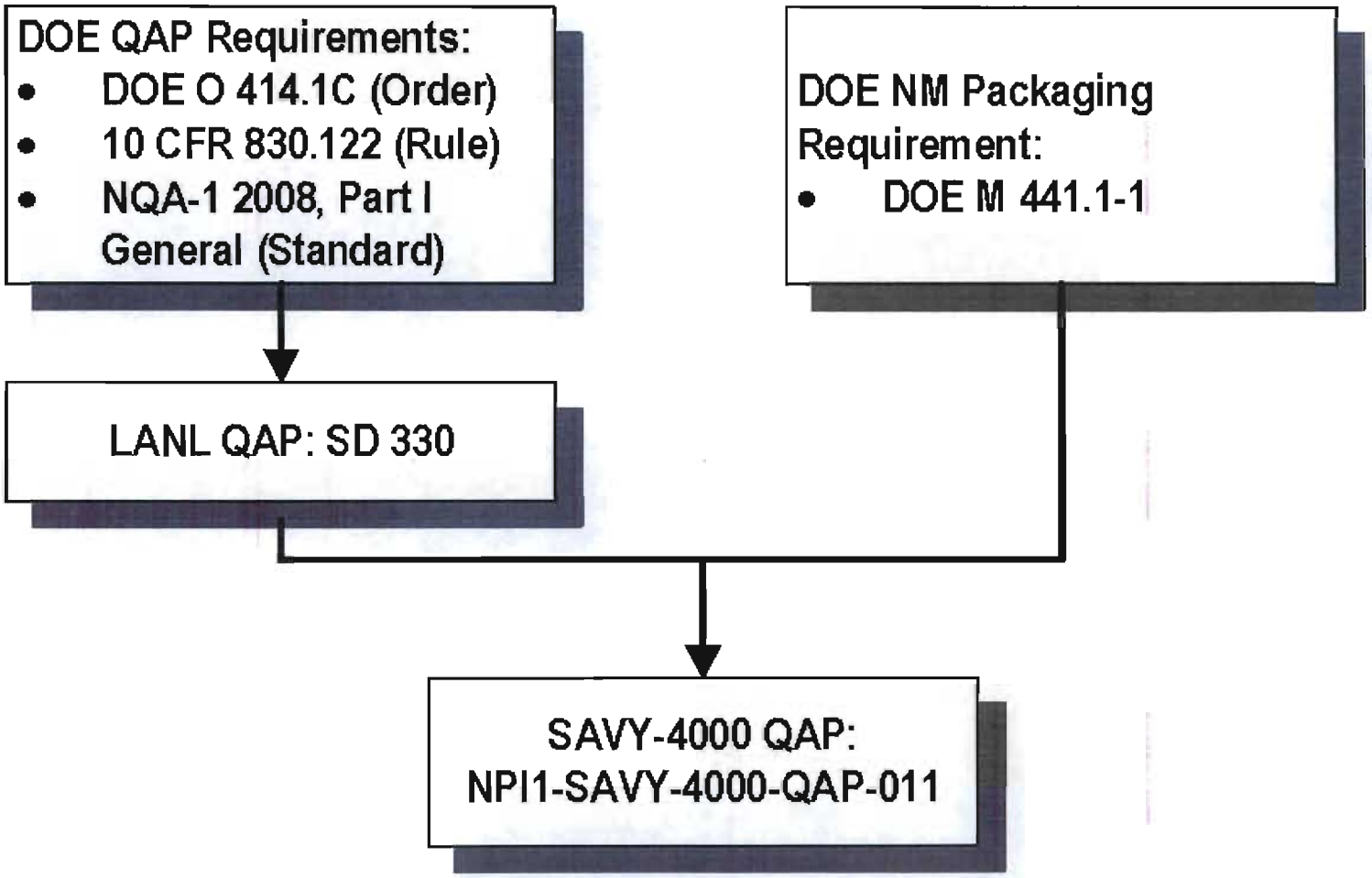
History

- Procurement: June 2007
- Contract Award: December 2008
- Phase I, R&D Closeout: November 2010
- Phase II, Final Design Approval: June 2011
- Phase III, Production: July 2011

Supplier QA Specification Requirements

- **Typical DOE QAP Requirements**
  - DOE-O-414.1C (the Order)
  - 10 CFR 830.122 (the Rule)
  - NQA-1 2004, Part I (the National Standard)
- **Project Quality Assurance**
  - Seventeen Assessments/Surveillances since 2006
  - Ensured Supplier's QAPP Aligned with DOE Requirement
  - Worked as a Team in Part I Procedural Development

SAVY-4000 Quality Assurance Plan



Areas of Quality-System Management

1. Program Development
2. Personnel Training and Qualification
3. Quality Improvement
4. Document Control and Records Management
5. Work Processes
6. Design
7. Procurement
8. Inspection and Acceptance Testing
9. Management Assessment
10. Independent Assessment

Conclusion

- **Quality-System Management the Foundation**
  - Controls Hazards & Associated Risks
  - Optimizes Worker Safety
  - Minimizes Environmental, Health, & Security Risks
  - Ensures Successful Procurement
  - Ensures Successful Design
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  - Ensures Successful Manufacturing
  - Ensures Business Management & Technical Processes Effective & Efficient