

Non Power Reactor: “MOX Project Commercial Grade Dedication Challenges”

Rodney Whitley, Vice President of Project Assurance
Shaw AREVA MOX Services, LLC.



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Project Introduction

- The MOX project is a National Nuclear Security Administration (NNSA) facility that will convert United States surplus plutonium (Pu) from nuclear weapons into MOX Fuel for use in U.S. commercial nuclear power plants.
- The facility is being built at the Savannah River Site in South Carolina. The design, license, construction, and operation are contracted to Shaw AREVA MOX Services, LLC.
- The Mixed Oxide Fuel Fabrication Facility will be an NRC-licensed facility.

Regulatory Commitments for QA Program

- **10 CFR Part 70 – Domestic Licensing of Special Nuclear Material**
 - Application for...plutonium processing and fuel fabrication facility shall contain...a description of the quality assurance program
 - Include discussion of how the criteria of 10CFR50 Appendix B will be met [10CFR70.22(f)]
 - NUREG-1718, 15.1.4.3
 - Acceptable option is commitment to implement and maintain its QA program to comply with applicable “requirements” of ASME-NQA-1-1994...
 - Each applicant or licensee shall establish management measures to ensure compliance with the performance requirements of § 70.61.
 - The management measures shall ensure that...IROFS...are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of § 70.61 of this subpart. [10CFR70.62(d)]

Commercial Grade Dedication Documents on MOX Project

- **Process is based on EPRI Guideline NP-5652**
- **Commercial Grade Item Evaluations (CGIE)**
 - Develops technical, quality and documentation requirements for Commercial Grade Items (CGI)
 - Establishes critical characteristics for acceptance (CCAs), acceptance criteria and acceptance methods
 - Develops input that controls and documents procurement and dedication activities.

Use of Commercial Grade Dedication

- **Commercial Grade Item purchased directly by MOX Services**
 - MOX is responsible for completion of dedication actions and Part 21
 - MOX Services performs the dedication
 - CGD, CGAR and Catalogue IDs Used
- **Commercial Grade Item purchased by Approved Supplier with no Restrictions**
 - Supplier is responsible for completion of dedication actions and Part 21
 - Only required to define safety functions if the Approved Supplier is responsible for design & manufacture
 - If Approved Supplier is “fabricating” MOX Services developed design, applicable CGIEs(Safety Function and CCAs) are developed by MOX Services and provided to the Approved Supplier for use, or is a third party dedicatior
- **Commercial Grade Item purchased by Approved Supplier with CGD Restriction**
 - Supplier is responsible for completion of dedication actions and Part 21)
 - Increased communication, monitoring and controls are placed upon suppliers with CGD related restrictions depending upon the nature of the restriction.

Vendor Oversight and Approvals

- 17 suppliers that we require to submit commercial grade dedication procedures and plans for review and approval
 - Had no design functions
 - Had no established CGD processes
 - Had inadequate CGD processes
- 21 suppliers that are required to submit commercial grade dedication plans for review and approval
 - New or infrequently used processes
- 6 suppliers that have to submit commercial grade dedication plans to assure our CCAs are incorporated

Vendor Oversight and Approvals

- MOX currently has 35 vendors listed on the Approved Commercial Grade Vendors List.
- Restrictions typically focus on CCAs identified in the CGIE that the supplier cannot fully meet.
Examples:
 - Not approved for specific CCAs,
 - E.g. Thermo Gravimetric Analysis, Material Testing etc.
 - Serial number and calibration due date for M&TE used shall be identified on associated inspection and test reports.
 - Qualification is limited to a specific facility location.
 - Procurements to calibration suppliers to address requirements for A2LA /NVLAP accreditations, and Certificates of Calibration to provide As-Found and As-Left data.

MOX Commercial Grade Dedication Challenges

- **Since 2006, 5 Level IV Violations**
 - Rebar - vendor oversight related(enveloping under program or commercial grade dedication)
 - Stainless steel material verification
 - CCA not directly verified
 - Studs - vendor oversight related(3rd party action)
 - Couplers(2 examples) – vendor oversight of receipt documents(testing by non qualified source)
 - CC development and/or change without a fully documented evaluation

Lessons from Previous NOVs

- Verify correct knowledge base involved in acceptance decisions
- The results stemming from Commercial Grade Survey's have to be accounted for when developing procurement strategy for how to establish a supply chain for a CGI
- The completeness of the evaluation, survey results, test results and the final acceptance records are important for CGI as any other nuclear component

Vendor Related Lessons Learned/Recommendations

- Know your supplier's (and your supplier's supplier) fabrication and CGD processes
- Demand objective evidence that suppliers and sub-suppliers have appropriate QA programs & CGD Processes in-place to assure implementation is effective
 - Otherwise you may see or get:
 - Procedures not workable or developed but not followed
 - Implementing procedures don't consistently address requirements
 - Incapable of identifying critical characteristics
 - Lack of experience with nuclear regulations and QA requirements
 - Control of sub-suppliers by prime suppliers is poor

Vendor Related Lessons Learned/Recommendations

- **Allow vendor flexibility in sampling plans due to their knowledge of particular circumstance of their supply chain knowledge**
 - Allow vendors to propose alternatives for your acceptance
 - Experience has shown that QL-1 (IROFS) vendors vary dramatically in their knowledge of standard sampling plans and implementation of sampling plan methodology.
 - Example – Destructive/Non-destructive testing of raw materials.
- **Vendor Communication with project CGD group is very important.**
 - Placing CGD personnel in the vendor shop can be very beneficial.
 - Train Subcontract Technical Representatives to understand project CGD positions, since they are the first line of technical oversight of the vendor.
 - Understand foreign company quirks.

Vendor Related Lessons Learned/Recommendations

- **Aggressive management and oversight of NQA-1 vendor CGD programs is prudent**
 - Review all vendor Commercial Grade Dedication plans and procedures initially.
 - Reviews may be lessened when confidence is gained with vendor programs
- **CGD acceptance process needs to be closely coordinated with receipt inspection capabilities**

Vendor Related Lessons Learned/Recommendations

- **Licensee will always be held responsible by the regulator.**
 - Audited and Approved Suppliers do have Part 21 responsibility
 - Nuclear suppliers can be held accountable through contracts, legal actions, and market place.
- **MOX Services has generated Supplier Direction Lessons Learned document in order to clarify common areas of concern found in previous procurements**