

MOX Fuel Qualification and Reactor Regulatory Support



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AOP Task Description

- ORNL will provide regulatory issue support for the mission reactors, including the fuel qualification program, review selected DCS deliverables (emphasis added), perform independent technical reviews and calculations of various fuel cycle issues, and provide technical advice related to the use of MOX fuel at U.S. reactors, including security, fuel qualification, systems engineering, and fuel cycle economics [AOP Subtask 4.2.1 - Mission Implementation Technical Support].





Importance of AOP Task to Program

- Over 20 years has passed since the last U.S. reactor licensing action permitting the use of MOX fuel assemblies.
- NRC licensing of domestic pressurized water reactor (PWR) operation with significant MOX core fractions is unprecedented.
- The use of MOX fuel fabricated from weapons-grade plutonium in domestic reactors is unprecedented.
- The DCS Fuel Qualification Plan (FQP) is a unique document.
- DOE/MD has limited experience with the NRC licensing process.
- As such, DOE/MD benefits from having ORNL personnel experienced with NRC licensing requirements and protocols involved in the review of MOX fuel qualification and irradiation issues.





Task Activities (Oct. 1998 - Dec. 1999)

- **DOE FQP Review Team participation**
- **DOE Irradiation Services Plan Review Team participation**
- **Review of related DCS deliverables (PMP and Licensing Plan outline)**
- **Participation in DOE/DCS/NRC meetings**
- **Review NRC regulatory activities for issues relevant to MOX fuel qualification/licensing**
- **Respond to information requests on fuel qualification and reactor licensing issues of potential relevance to MOX fuel mission**





Future Task Activities (FY 2000/FY 2001)

- **Complete FQP Review Team participation**
- **Complete Irradiation Services Plan Review Team participation**
- **Review DCS Mission Reactors Licensing Plan and Licensing Amendment Plan (August 2000 submittal date)**
- **Participate in DOE/DCS/NRC meetings related to fuel qualification and reactor licensing**
- **Maintain cognizance of NRC regulatory activities relevant to MOX fuel qualification/licensing**
- **Respond, as needed, to information requests on fuel qualification and reactor licensing issues of potential relevance to MOX fuel mission**



Task Challenges

- MD management direction - no leadership role by DOE Laboratory personnel on NRC interactions
- Maintaining awareness of (1) changes in NRC regulatory positions, (2) evolutions in MOX mission fuel design, and (3) technical issues in other MOX Project areas (MFFF, transportation, etc.) that represent an increased risk to licensing of MOX fuel use in the mission reactors



Summary

- **Licensing of domestic PWR operation with a significant percentage of the core using MOX fuel fabricated from weapons-grade plutonium is a “first-of-a-kind” activity.**
- **DOE/MD has limited experience with the NRC licensing process.**
- **ORNL’s contributions to the task have been viewed as adding value to DOE/MD’s understanding of NRC licensing requirements and protocols.**
- **As such, DOE/MD should continue to fund ORNL involvement in the MOX fuel qualification and mission reactor regulatory support activity.**

