



Spent Fuel Pool Accident Risk at Decommissioning Plants

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Background

- **Decommissioning nuclear power plants seek early regulatory relief in three areas:**
 - **Insurance**
 - **Security**
 - **Emergency Preparedness (EP)**
- **Relief provided by exemption process**
- **Zirconium fire important consideration**
- **Several rulemaking attempts initiated**
 - **Stopped; technical bases inadequate**

Background (cont.)

- **Industry challenged zirconium fire criteria**
- **Commission meeting March 17, 1999**
 - **SRM sanctioned risk-informed approach**
- **Staff committed to perform detailed technical study on decommissioning plant spent fuel pool accident risk**
- **Risk study now complete**

Study Charter

- **Provide generic, risk-informed technical study for spent fuel pool accidents that could be used as basis for rulemaking**
- **Provide guidance that could be used while rulemaking process was ongoing**

Stakeholder Interactions

- **2 draft reports issued for public comment**
- **15 different organizations or individuals provided comments**
- **14 open meetings held with stakeholders**
- **5 open agency meetings
(Commission and ACRS)**

Analysis Approach

- **Used “generic” decommissioning plant and spent fuel pool**
- **Estimated likelihood of fuel uncover**
- **Performed numerous sensitivity studies**
 - **Consequence analyses** *—plume characteristics*
 - **Thermal-Hydraulic analyses** *—decay heat*

Analysis Approach (cont.)

- **Compared results to agency quantitative health objectives**
- **Assessed Emergency Preparedness relaxation consistent with RG 1.174**

Examples of Stakeholder Comment Response

- **Need to consider criticality**
 - **Included a criticality assessment**
- **Too conservative in our seismic assessments**
 - **Included EPRI and LLNL hazard curves**
- **Need to consider recent events**
 - **Included Browns Ferry and Duane Arnold SFP temperature increase**

Technical Findings & Conclusions

- **Spent fuel pool accident risk is low**
- **Agency quantitative health objectives are met**
- **Consistent with RG 1.174**
 - **EP relaxation after 60 days is consistent with a “small change” in risk**

Technical Findings & Conclusions (cont.)

- **Cannot define a generic decay heat time beyond which a zirconium fire is not physically possible**
 - **Fuel geometry following very low frequency events indeterminate**
- **Research on source term generation in air environment would be useful in reducing uncertainties**

Regulatory Implications

- **No immediate safety concerns**
 - **Immediate regulatory action not needed**
 - **Low likelihood of fuel uncover event resulting in significant off-site radiological release**
- **Staff granted exemptions based on sufficient cooling for reasonably conceivable situations**

Insurance

- **SRM for SECY-93-127 directed staff to approve a reduction in insurance requirements after requisite minimum spent fuel cooling period elapsed**
- **Exemptions based on assessment that air cooling of fuel would not result in zirconium fire**
- **Exemptions granted relief in primary and secondary insurance protection**

Security

- **Exemptions to certain security requirements based on considerations such as:**
 - **No significant threat to public health and safety**
 - **No significant offsite consequences**
 - **Potential release of large radioactive source term no longer exists**

Emergency Preparedness

- **Exemptions were granted to onsite and offsite plans based on:**
 - **Doses from any reasonably conceivable accident do not exceed EPA Protective Action Guidelines, or**
 - **Sufficient time for mitigative actions and offsite protective measures**
- **Emergency Action Levels (EALs) limited to the ALERT level**

Next Steps

Develop policy options that will:

- **Provide a risk-informed, performance-based approach to exemptions for decommissioned sites**
- **Establish a similar approach for rulemaking**

Summary

- **SFP accident risk is low**
- **No immediate safety concerns**
- **Future Milestones**
 - **Policy options paper: 5/31/01**
 - **Action plan on existing exemptions, rulemaking plan schedule 60 days after SRM on policy options paper**