

## Insurance:

In accordance with 10 CFR 140 - Financial Protection Requirements and Indemnity Agreements, each 10 CFR 50 licensee is required to maintain public liability coverage in the form of primary and secondary financial protection. This coverage is required to be in place from the time unirradiated fuel is brought onto the facility site until all the radioactive material has been removed from the site, unless the Commission terminates the Part 50 license or otherwise modifies the financial protection requirements. The industry has asked the NRC to consider whether the likelihood of large scale radiological releases from decommissioning plants is low enough to justify modification of the financial protection requirements once the plant is permanently shutdown and prior to complete removal of all radioactive material from the site.

In the past, licensees have been granted exemptions from financial protection requirements on the basis of deterministic analyses showing that a zirconium fire could no longer occur. The analysis in this report supports continuation of this practice in the interim, and would support a revised regulatory framework for decommissioning plants that eliminates the need for insurance protection when a plant-specific thermal-hydraulic analysis demonstrates that a zirconium fire can no longer occur.

The NRC staff has considered whether the risk analysis in this report justifies relief from this requirement for decommissioning plants during the period when they are vulnerable to zirconium fires. As part of this effort, the staff determined that an analogy can be drawn between a SFP at a decommissioning plant and a wet (as opposed to dry) Independent Spent Fuel Storage Installation (ISFSI) licensed under 10 CFR 72 for which no indemnification requirement currently exists. Spent reactor fuel aged for one year can be stored in an ISFSI (wet or dry). The risk analysis in this report predicts high consequences for a zirconium fire, and identifies a generic window of vulnerability out to 5 years. The Commission has suggested in the SRM for SECY-93-127 dated July 13, 1993, that insurance coverage is required unless a large scale radiological release is deemed incredible. Further, they instructed the staff to determine more precisely the appropriate spent fuel cooling period after plant shut down, and to determine the need for primary financial protection for ISFSIs.

Since the consequences are high, frequency of a zirconium fire occurring in a wet ISFSI or a decommissioning reactor SFP would have to be acceptably low to justify no regulatory requirement for indemnification protection. A dry ISFSI is not under consideration since the fuel is already air cooled and no threat of zirconium fire exists. The zirconium fire frequencies presented in Chapter 3 for a decommissioning reactor SFP do not fit the category of incredible. They are comparable to the frequencies of large releases from some operating reactors. The staff is not aware of any basis for concluding that the frequency of a zirconium fire occurring in a wet ISFSI would be significantly different than those presented in Chapter 3, and thus would conclude that indemnification should be required for operation of a wet ISFSI to be consistent with a decommissioning reactor SFP and provide for coherency in the regulations.

The staff knows of no frequency criterion which could be cited to justify reduction or elimination of the insurance requirement while a vulnerability to zirconium fire exists. Defining or applying such a criterion would be inconsistent with Commission direction provided in SECY-93-127.

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Insurance does not lend itself to a "small change in risk" analysis because insurance affects neither the probability nor the consequences of an event. As noted above, the long-term consequences of an SFP draindown can be comparable to the consequences in operating reactor accident as long as an SFP zirconium fire is possible. If water is lost from the spent fuel pool but air flow is impeded, as might happen in a cask drop event or a major earthquake, the possibility of a fire lasts for many years. The likelihood of a zirconium fire would decrease with time as the probability of successfully implementing ad hoc accident management measures increases. The staff believes that accomplishment of mitigating actions in a time period on the order of 24-36 hours after fuel uncover would be achievable if mobilization of local and national resources is considered. However, it is unlikely that such measures would result in a reduction in SFP fire frequency greater than about one order of magnitude. The staff's generic analysis indicates that after 5 years decay, at least 24 hours would be available before the zirconium fire temperature is reached after fuel uncover. Relaxation of insurance requirements could therefore be considered as a function of time available for accident management measures, but are not recommended prior to 5 years<sup>1</sup>.

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<sup>1</sup> As approved in Staff Requirements Memorandum SECY-93-127 - FINANCIAL PROTECTION REQUIRED OF LICENSES OF LARGE NUCLEAR POWER PLANTS DURING DECOMMISSIONING, the staff has allowed reductions in financial protection requirements at decommissioning nuclear power plants based on the elapse of a requisite minimum spent fuel cooling period necessary to preclude a zirconium fire. SECY-93-127 described a zirconium fire as an accident that was beyond the design basis of a permanently defueled and shutdown reactor, however, it was considered "reasonably conceivable" and could warrant requiring substantial financial protection.