3.11 Fuel Handling in the Auxiliary Building

Applicability

Applies to limitations while moving irradiated fuel in the operating floor area of the auxiliary building.

Objective

To limit doses in the event an irradiated fuel assembly is damaged significantly.

Specification

3.11.1 During handling of all irradiated fuel assemblies, a negative pressure relative to the outside atmosphere shall exist in the auxiliary building.

3.11.2 Radiation levels in the spent fuel storage area shall be monitored continuously.

3.11.3 The trolley of the auxiliary building crane shall never be stationed or permitted to pass over storage racks containing spent fuel.

3.11.4 The spent fuel pool temperature shall be limited to 150°F.

3.11.5 The spent fuel shipping cask shall not be carried by the auxiliary building crane, pending the evaluation of the spent fuel cask drop accident and the crane design by RG&E and NRC review and approval.

Basis

The desired air flow path, when handling irradiated fuel, is from the outside of the building into the operating floor area, into the area exhaust ducts and out through the ventilation system

exhaust to the facility vent. Operation of a main auxiliary building exhaust fan assures that air discharged into the main ventilation system exhaust duct will go through a HEPA and be discharged to the facility vent. Proper operation of the fans and setting of dampers would result in a negative pressure on the operating floor which will allow any air leakage to be into the building. Thus, the overall air flow is from the location of low activity (outside the building) to the area of highest activity (inside the building). This exhaust air flow path would, in the case of a fuel handling accident involving total clad failure of one fuel assembly, result in an unfiltered monitored dose at the exclusion area boundary which would satisfy the requirements of 10CFR 100.[1]

The spent fuel pool temperature is limited to 150°F because if the spent fuel pool cooling system is lost at that temperature, sufficient time (approximately 7 hours) is available to provide back-up cooling, assuming the maximum anticipated heat load (full core discharge & previously stored fuel), until a temperature of 180°F is reached, the temperature at which the structural integrity of the pool was analyzed and found acceptable.

References

(1) UFSAR - Section 15.7

4.11 Refueling

Applicability

Applies to refueling and to fuel handling in the auxiliary building.

Specification

4.11.1 Residual Heat Removal and Coolant Circulation

4.11.1.1 When the reactor is in the refueling mode and fuel is in the reactor, at least one residual heat removal loop shall be verified to be in operation and circulating reactor coolant at least once per 4 hours.

4.11.1.2 When the water level above the top of reactor vessel flange is less than 23 feet, both RHR pumps shall be verified to be operable by performing the surveillance specified in the Inservice Pump and Valve Test Program prepared pursuant to 10 CFR 50.55a.

4.11.2 Water Level - Reactor Vessel

4.11.2.1 The water level in the reactor cavity shall be determined to be at least its minimum required depth within 2 hours prior to the start of and at least once per 24 hours thereafter during movement of fuel assemblies or control rods in containment.

4.11.3 Auxiliary Building Ventilation System

During handling of irradiated fuel assemblies in the spent fuel pool area, a negative pressure in the auxiliary building relative to the outside atmosphere shall be verified to exist at least once per shift.

Basis

The operability requirements for residual heat removal loops will ensure adequate heat removal while in the refueling mode. The requirement for 23 feet of water above the reactor vessel flange while handling fuel and fuel components in containment is consistent with the assumptions of the fuel handling accident analysis.

Attachment B

The proposed change to the Technical Specification deletes the requirement for operation of charcoal filter when moving irradiated fuel in the spent fuel pool area.

In the evaluation of SEP Topic XV-20, the limiting dose at the exclusion area boundary (EAB) was calculated for a fuel handling accident inside containment.[1] This evaluation concluded that the calculated dose for a release of unfiltered activity would be 96 Rem at the EAB. The assumptions used in this analysis are equally applicable to an evaluation of the consequences of a fuel handling accident inside the auxiliary building with no credit taken for operation of the charcoal filters. The resulting dose is well within the guidelines of 10CFR 100. Therefore, operation of the charcoal filters are not required.

The addition of the requirement for a negative pressure to exist in the auxiliary building while moving irradiated fuel will insure air flow into the building and out through the plant vent. Therefore, any release of activity due to a fuel handling accident could be monitored.

The sole function of the charcoal filter system is to mitigate the potential consequences of a postulated fuel handling accident inside the auxiliary building. The consequences, as expressed by calculated dose at the Exclusion Area Boundary, are determined in accordance with the guidance of the Standard Review Plan and Regulatory Guide 1.25. These guidelines detail a number of conservative assumption to be used in the analysis.

1) It is assumed that the accident occurs 100 hours after shutdown which has been shown to be conservative because of required activities which take place between reactor shutdown and fuel handling.

2) The discharged assembly is assumed to have operated at peak power (1.66) for the previous cycle. This is conservative because fuel is usually discharged because of low reactivity which would restrict maximum power levels to approximately core average power (1.00).

3) The guidelines require an assumption that 100 per cent of the volatile fission product inventory be released. Given the load height limitation imposed by the fuel handling hoist, it is probable that the kinetic energy generated by a dropped fuel assembly would be insufficient to damage any fuel rods.

4) The decontamination factor assumed for iodine removal in water is conservative and differs markedly from experimental results.[2]

Acording to reference 1, the effect of the charcoal filters is to reduce the calculated dose at the EAB from 96 to 34 rem. This reduction in calculated dose could be duplicated by an adjustment in the conservative assumptions outlined above. The charcoal filters do not provide any significant real benefit in reduction of exposure to plant personnel and the general public.

Attachment C

In accordance with 10CFR 50.91 this change to the Technical Specifications has been evaluated against three criteria to determine if the operation of the facility in accordance with the proposed amendment would:

1. involve a significant increase in the probability or consequences of an accident previously evaluated; or

2. create the possibility of a new or different kind of accident from any accident previously evaluated; or

3. involve a significant reduction in a margin of safety.

Reference 1 provides an evaluation by the NRC of the limiting thyroid dose that would result from a fuel handling accident inside containment. As discussed in Attachment B, the assumption of this analysis are applicable to an evaluation of the consequences of a fuel handling accident inside the auxiliary building with no credit for iodine removal due to operation of the charcoal filters. The resulting thyroid dose of 96 Rem is well within the guidelines of 10CFR 100 and was previously considered to be acceptable by the NRC.

Therefore, a no significant hazards finding is warranted because:

1. the probability of a fuel handling accident is unchanged and the consequences are equal to those previously evaluated,

2. the possibility of a new or different kind of accident is not created, and

3. the margin of safety is not reduced due to the resulting dose being equal to that previously considered acceptable.

References

(1) Letter, Mr. D.M. Crutchfield, NRC, to Mr. J.E. Maier, RG&E, October 7, 1981.

(2) WCAP-7828, Radiological Consequences of a Fuel Handling Accident, Westinghouse Electric Corporation, 1971.