



ENTERGY

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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Reactor Vessel Water Level During CEA Latching Technical Specification
Change - Request for Additional Information TAC No. 92067

Gentlemen:

By letter dated April 4, 1995 (2CAN049503), Entergy Operations submitted a technical specification change request to allow the latching and unlatching of control element assemblies (CEAs) with less than 23 feet of water over the top of the irradiated fuel assemblies. Subsequent conversations with the Staff have been held in which additional information was requested. Please find attached responses to the requested additional information. Should you have any further questions, please contact me.

Very truly yours,

Dwight C. Mims
Director, Licensing

DCM/nbm
Attachment

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RESPONSE TO NRC QUESTIONS

1. The change request does not specify exactly what water level under 23 feet you are requesting to use during the latching and unlatching of CEAs. The licensee request must specify the minimum water level above the irradiated fuel that will be used.

Response:

Normally, the latching and unlatching of the CEAs is performed with greater than 23 feet of water over the top of the core utilizing an underwater camera to verify proper engaging slot position. However, if this equipment is not available, our evaluations show it to be acceptable and appropriate to lower the water level to approximately 20 feet above the fuel to perform this task. As discussed in the April 4, 1995, technical specification change request, lowering the water level to just below the engagement slot will allow positive visual verification of proper engaging slot position. This verification is necessary as one of several means of ensuring proper CEA latching and unlatching. As discussed in the April 4, 1995, submittal the latching and unlatching operation presents no increased risk of a fuel handling accident and therefore the requirement for 23 feet of water over the top of the fuel is not applicable.

The ANO-2 SAR currently requires 9.5 feet of water be maintained above the top of the active fuel during fuel handling and storage operations in order to limit the maximum dose rates at the water surface. Even though CEA coupling and uncoupling is not considered a fuel handling operation, the 9.5 feet of water over the top of the active fuel SAR requirement will continue to be maintained.

2. If 23 feet of water over the irradiated fuel will remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly, calculate what percentage of the assumed iodine gap activity will be removed at the minimum water level proposed during CEA unlatching.

Response:

ANO does not have the ability to calculate an exact iodine removal percentage. The 99% decontamination associated with 23 feet of water comes from Regulatory Guide 1.25. However, using a very conservative linear extrapolation, 20 feet of water over the fuel would remove approximately 86% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. Realizing this is probably an exponential function and not linear; it would probably be on the order of less than a 1% reduction in the iodine removal percentage to 98%. At ANO, it has never been necessary to calculate iodine removal rates for less than 23 feet of water covering the fuel because ANO has not changed our licensing basis for the fuel handling accident with respect to the water level covering the fuel. The 23 feet requirement is for iodine removal given the potential of a

fuel handling accident. In the case of latching and unlatching CEAs, a fuel handling accident is not a credible event since there is no potential for fuel damage and thus, no potential for iodine release. Therefore, the iodine removal capability for a fuel handling accident is not considered applicable to coupling and uncoupling CEAs.

3. State if any additional part of the core internals will be uncovered during CEA unlatching if the water level drops below 23 feet above the irradiated fuel. Discuss any increase in dose rates on the refueling deck and other areas where workers will be situated caused by the lowering of the water level. Provide a table of average dose rates in occupied areas during this operation with a water level of 23 feet above the irradiated fuel.

Response:

No additional parts of the reactor internals will be uncovered during the CEA latching and unlatching with the water level at 20 feet above the irradiated fuel except for approximately 2 to 3 feet of the upper tips of the CEA extension shafts. At power the CEAs are typically fully withdrawn and the tips would be approximately 35 feet above the core. Since the tips of the extension shafts are not exposed to high neutron irradiation, they would only become slightly activated, and thus would not be a significant source of radiation. The refueling platform, where individuals performing the latching and unlatching operation will be located, is approximately 14 feet above the tips of the CEA extension shafts. Therefore, dose rates on the refueling deck are not expected to increase significantly with the lowering of the refueling canal water level and the exposure of the CEA extension shaft tips. Should the water level need to be lowered below 23 feet, work will stop and lowering the water level will be a controlled evolution. Surveys of the tips of the CEA extension shafts and constant monitoring of the dose rates in the area will be performed when lowering the water level in order to ensure radiological safety of workers in the area. Survey data during a previous uncoupling operation indicates dose rates of 1-2 mR/hr with the water level just over the CEA extension shaft tips. Lowering the water level to 20 feet over the fuel in the core is not expected to change this dose rate appreciably. ANO does not have any previous survey data available with the water level reduced to 20 feet above the fuel; however, the dose rates are not expected to be significantly different than that experienced during previous latching and unlatching operations.

4. In the amendment request, you state that the reason for wanting to lower the water level is to increase operator visibility during CEA unlatching/latching. Provide a listing of other means to increase operator visibility during this operation without lowering the water level (e.g., use of better lighting, use of better cameras, less water turbidity).

Response:

As discussed above, normally, the latching and unlatching operation will be performed with at least 23 feet of water over the top of the fuel utilizing an underwater camera; however, should this equipment become unavailable, an alternate, reliable means of verifying proper engaging slot position should be available. The refueling canal water is calm at the surface and there is adequate underwater lighting; however, 2 to 3 feet of water causes enough distortion that makes it difficult to verify the engaging slot position through visual observation above the water surface. It is extremely important to verify proper latching/unlatching of the CFAs prior to pulling the upper guide structure or reactor vessel head replacement. From an ALARA and fuel handling accident perspective, ANO considers lowering the water level to expose the engaging slot to be an acceptable approach.