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March 28, 1983

OCA038331

Director of Nuclear Reactor Regulation  
ATTN: Mr. J. F. Stolz, Chief  
Operating Reactors Branch #4  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Director of Nuclear Reactor Regulation  
ATTN: Mr. Robert A. Clark, Chief  
Operating Reactors Branch #3  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

SUBJECT: Arkansas Nuclear One - Units 1 & 2  
Docket Nos. 50-313 and 50-368  
License Nos. DPR-51 and NPF-6  
Additional Information Concerning  
Spent Fuel Storage Expansion

Gentlemen:

Your letter dated March 7, 1983, (OCA038309) requested additional information regarding the proposed spent fuel storage expansion. Attached is our response to your request.

Very truly yours,

John R. Marshall  
Manager, Licensing

JRM:DB:br

Attachments

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Question 1

For each of the following operations - spent fuel pool decontamination and clean-up, decontamination of removed racks, disposition of old racks and new racks installation - provide a table for Units 1 and 2 giving the following estimates:

- a) the number of workers required for each phase of the operation including divers;
- b) the dose rates they will be working in;
- c) the occupancy times for each dose rate; and
- d) the total person-rem's to complete the operation.

Response:

		<u>Estimated Exposures</u>		<u>Avg. Rad Level (Millirem/hr.)</u>	<u>Man-rem</u>
	<u>Activity</u>	<u>No. People</u>	<u>Man-hours</u>		
Unit-1	Rack Removal	4	600	1	0.60
	Decon & Packaging	4	550	5	2.75
	Underwater Divers	4	550	10	5.50
	Fuel Shuffle	1	20	4	0.08
Unit-1 SUBTOTAL					8.43
	<u>Activity</u>	<u>No. People</u>	<u>Man-hours</u>	<u>Avg. Rad Level (Millirem/hr.)</u>	<u>Man-rem</u>
Unit-2	Rack Removal	4	600	1	0.60
	Decon & Packaging	4	240	5	1.20
	Underwater Divers	4	550	10	5.50
	Fuel Shuffle	1	10	4	0.04
Unit-2 SUBTOTAL					7.34
JOB TOTAL					<u>15.77</u>

## Question 2

For each of the operations - spent fuel pool decontamination and clean-up, decontamination of removed racks, disposition of old and new rack installation - describe what measures (e.g. health surveillance) will be taken to ensure that personnel exposure will be kept as low as reasonably achievable (ALARA). Since there will be a large number of spent fuel assemblies in the pool during these operations, describe what measures you have taken to minimize the dose from these fuel assemblies to divers working in the spent fuel pools.

## Response:

All work to be performed will be reviewed by the ALARA committee, since plant procedures dictate a review by this committee when work is performed in a radiologically controlled area and the estimated collective dose for the job exceeds 1 person-rem. The committee will review the radiological survey data, job scope, steps to be taken to avoid unnecessary exposure, temporary shielding, and changes which may occur during the work that may require additional radiological safety practices.

Health Physics personnel will continuously monitor each phase of the rerack operation. Monitoring of radiation to minimize personnel exposure will be performed using existing Health Physics procedures and by maintaining good radiological work practices. Radiation Work Permits will govern work, establish radiological controls, determine proper surveys needed prior to working in radiation areas, establish step-off pads, and drip off areas which will be physically separated from non-radiological areas with appropriate barricades.

The spent fuel decontamination and cleanup will be provided by operating the spent fuel pool filter and demineralizer system as required to establish and maintain water clarity, chemistry, and purity within acceptable limits. During the rerack project, the pool water will be sampled weekly to determine the concentrations of radionuclides in the spent fuel pool. A portable filtered water vacuum system will be used as necessary to remove loosely deposited contamination from the fuel rack surfaces, pool floor, and walls near diver working areas to reduce the radiation exposures to the divers. Surveys will be obtained around the refueling floor and at the top of the pool as well as extensively underwater in the areas where the divers will be working for that day.

The decontamination of the old racks will begin with divers vacuuming these racks to pick up loose crud prior to lifting them to the pool surface. The vacuum system includes high efficiency filters which will be monitored and changed as required.

## Question 2 (Cont'd)

The rack sections will be rinsed with a low pressure spray of demineralized water or spent fuel pool water as they are removed from the pool. If further decontamination is necessary, as determined by radiation surveys, the racks will be cleaned using a high pressure water spray (hydrolasing equipment). Once the entire rack is cleaned appropriately as determined by Health Physics, it will be placed in a designated area so that it can be wiped down. Health Physics will continue to monitor the rack during the wipe-down and once complete will provide approval to move the rack out of the spent fuel area.

The rack will then be moved to a temporary decontamination facility where the racks will be disassembled, decontaminated and prepared for further disposition as determined by Health Physics. The portable facility that will be used for the electro-polishing process consists of sheet metal wall panels covered on the interior with a strippable latex coating. The floor area is covered in plastic sheeting and herculite. The cutting room will have sheets of sheet metal placed over the herculite for protection. An absolute air filtration system will be operable during all working hours.

Personnel performing rack decontamination on the racks will wear appropriate protective clothing and respiratory protection equipment as required. Health Physics will provide continuous coverage of the decontamination project performed in the portable building. A detailed procedure will be used for disassembling and electropolishing the spent fuel racks which includes specific instructions for cutting the racks, numbering the pieces, and electropolishing as well as special precautions to be followed while performing the work.

Prior to diving operations, the spent fuel assemblies stored in the pool will be rearranged in such an array as to provide the lowest practicable dose rates to divers by reducing the effects of direct radiation from the fuel. The spent fuel pool filter and demineralizer will be run for a sufficient period following fuel shuffle to remove a majority of the contaminated particles in the water which may be stirred up by fuel movement.

Underwater radiation surveys will be performed in all areas where divers must work or have the need for access to the work area. An underwater radiation monitoring instrument will be used to perform dose rate measurements in the pool. Underwater work and access areas will be established for divers to ensure that exposures received are maintained ALARA. Health Physics Technicians will provide continuous coverage when divers are in the water. Their duties will be to provide health physics support, minimize personnel exposure, and enforce good radiological work practices and compliance with RWP requirements. The Health Physics Technicians and the diving supervisor will be in direct communication with the divers and will continually observe the divers while they are in the pool and warn them if they approach high radiation/exclusion zones.

## Question 2 (Cont'd)

Divers will wear protective clothing inside their rubber diving suits to protect them from contamination when they remove the diving suits and exit the controlled area. TLD's will be worn inside the diving suits on the head, chest, back, legs, and extremities. Self reading dosimeters (SRD) will be sealed in plastic bags and worn inside the diving suits. Portable radiation monitoring equipment will be attached to their bodies where they can monitor themselves and they will also be monitored by Health Physics Technicians on the refueling floor.

In summary, Health Physics personnel have taken extensive measures to ensure that exposures to personnel will remain ALARA. All work performed in Radiation Controlled Areas will require a Radiation Work Permit. The scope of the rerack work falls into an ALARA Category 2 since the expected dose to personnel is greater than 1 person-rem. All Category 2 work requires an ALARA review by committee which performs a detailed examination of each part of the entire job scope and provides changes which will reduce personnel exposure.

The existing health physics procedures specifically covers contamination, radiation and exposure control. Health Physics will also provide continuous supervisory control in conjunction with technical support during the entire rerack project. Lessons learned from previous rerack experiences, namely Indian Point, will be implemented in our program and Health Physics Supervisors and Technicians will be aware of problems previously encountered at other facilities. Daily pre-job briefings will be held to notify all rerack personnel of their work area and specific hazards existing in surrounding areas. TLD's will be read daily and a personnel exposure tracking will be followed for the duration of the rerack effort. Multiple badging will be incorporated and portable radiation monitoring equipment will be attached to each diver. This instrumentation will be continuously monitored by a Health Physics Technician on the refueling floor. These Technicians will maintain audible communications with the divers and warn them should they venture out of their particular work area. The Technicians will also monitor the stay times in radiation fields and will assure that exposures and stay times are maintained as planned. Calibration checks of the instrumentation will be performed daily including a source response check. As shown above, these measures will be more than adequate to minimize personnel exposure during the rerack effort at ANO.