Long Island Power Authority

Shoreham Nuclear Power Station
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JUN 26 1992

LSNRC-1969

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

ATTN: Dr. Robert Bernero, Director
Office of Nuclear
Material Safety and Safeguards

Additional Information Pertaining To
Decommissioning Plan Changes:
Component Cutting/Removal Techniques
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

REF:

1) LIPA (S. Klimberg) letter SNRC-1832 to NRC (Document Control Desk) dated August 26, 1991.
2) LIPA (S. Klimberg) letter LSNRC-1859 to NRC (Document Control Desk) dated November 27, 1991.
3) LIPA (L.M. Hill) letter LSNRC-1967 to NRC (Document Control Desk) dated June 12, 1992.

Gentlemen:

This letter provides additional technical details regarding changes to activities identified in the Shoreham Decommissioning Plan (DP) and supplements (Refs. 1 and 2). The DP changes addressed herein were previously identified to the NRC Staff in Ref. 3. Verbal authorization to proceed with implementation of the changes addressed herein was received by LIPA (see Ref. 3). The following additional technical details are provided at the request of the NRC Staff in order to adequately document the bases for these changes, and to secure approval for further implementation per Condition (4) of the Shoreham Decommissioning Order.

<u>In Core Instrument Tubes (Dry Tubes)</u>

In the reference 1 letter, LIPA informed the NRC Staff that it would remove the instrument tubes using a hydraulic shear cutting method. In the reference 2 letter, LIPA updated that information and informed the NRC that it would use a hydraulic abrasive saw cutting method to remove the instrument tubes from the RPV. Upon further consideration, however, LIPA determined that the hydraulic shears were in fact the preferable technique from a schedule and ALARA viewpoint. The hydraulic shears offer more rapid cutting of the dry tubes with the attendant ALARA benefits (i.e., less personnel time spent in the work area). Moreover,

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the use of hydraulic shears will provide for debris-free severance of the dry tubes without the filings and cutting debris inherent to the abrasive saw technique. This feature of the hydraulic shears offers a clear benefit in the contamination control area, because less radioactive material is released from the cut piece into the RPV water. Consequently, there is a lower source term contribution to the RPV water and less radioactive material to build up on the associated water filter media. This, in turn, provides for lower "shine" doses to workers inside the RPV and reduces the required frequency of filter change-out and attendant personnel exposure.

In terms of worker proximity to the radiation source, i.e. to the piece being cut, there is no difference between the use of the hydraulic shearing tool and use of a hydraulic abrasive saw. Both techniques involve remote operation with the same amount of water shielding and distance provided.

Beyond the ALARA benefits described above, there are no features of the hydraulic shears, relative to hydraulic abrasive saws, which would adversely affect considerations addressed in the DP accident analysis, airborne or liquid release estimates, radioactive waste forms or quantities, or other environmental impacts. There are no catastrophic failure modes associated with hydraulic shears.

Thus, upon receipt of verbal approval from the NRC as noted earlier, LIPA proceeded to sever the dry tubes using hydraulic shears. The personnel radiation exposure incurred during performance of the dry tube removal was approximately 10 millirem.

Dryer/Separator Guide Rods

In the reference 1 and 2 letter, LIPA informed the NRC Staff that it would make the lower cut of the guide rods using the underwater metal disintegration machining (MDM) method. The cutting technique for this cut, if necessary, has been changed to underwater plasma arc because it offers schedule and cost benefits with no real additional radiological impacts. (The dryer/separator guide rod removal was accomplished with virtually no measurable personnel radiation exposure). Also, using PAC, there will be less potential for water clarity problems because the cutting residue will settle out, whereas with MDM, the finer cutting debris will more likely remain suspended.

The following is a description of the subject cutting techniques:

MDM is a machining process which uses the electromotive disintegrating machining technology. MDM uses a constant current power supply and vibrating electrode to remove metal from a work piece. MDM produces a fine talc-like particulate removable from

The PAC process is based on the establishment of a direct current arc between a tungsten electrode and any conducting metal. The arc is established in a gas, such as nitrogen, that flows through a constricting orifice in the torch nozzle to the work piece. The constricting orifice results in very high current densities and high temperatures in the stream (10,000 - 24,000°K). The stream or plasma consists of positively charged ions and free electrons. The plasma is ejected from the torch nozzle at a very high velocity and, in combination with the arc, melts the contacted work piece metal and literally blows the molten metal away. This process generates smoke, fumes and particulates. When used in air, these products are readily removed by HEPA filtration. When used underwater, the particulates are retained in the water and can be removed by vacuuming and filtration.

In References 1 and 2, plasma arc was determined to be the most acceptable technology for cutting many of the RPV Internal components. The core spray headers and the separator/dryer guide rods were the only RPV internals components identified for segmentation/removal with MDM. Based on the relatively small extent of application of the MDM technique, LIPA determined that it was not cost-effective to utilize this technique. In addition, because the MDM technique requires control of conductivity when applied underwater, deletion of the MDM cutting technique eliminated the need for a demineralizer in the RPV water filtration design. (Changes to the RPV and WCS water filtration design will be addressed in separate correspondence).

In Vessel Core Spray Headers and Elbows

Reference 1 indicated that the core spray lower elbows were to be cut from the shroud within the RPV using underwater Metal Disintegration Machining (MDM). The cutting technique has been changed to underwater plasma arc cutting (PAC). The reason for this change is the same as that described for the same type of change in the discussion of the guide rods. Descriptions of these cutting techniques are also provided therein.

Jet Pump Components

In references 1 and 2 LIPA informed the NRC Staff that it would remove the Jet Pump Risers and Diffusers using plasma arc cutting in air. The current plan is to use the underwater plasma arc cutting method.

The Jet Pump components are activated and, therefore, the underwater plasma air cutting method will offer increased ALARA benefits. Replacing the Jet Pump Ram's Head mechanical removal with under water plasma minimizes the number of tools to be used, and simplifies qualification of equipment and personnel.

Also, Ref. 1 indicated that the jet pump instrument lines would be cut using a hydraulic shear. The current plan for these lines is also to use underwater PAC. Consequently, in order to accommodate the underwater cutting, certain cut locations were revised.

Feedwater Spargers

The feedwater spargers were originally planned to be mechanically disconnected (unpinned) inside the vessel, then jacked out of the nozzles as identified in reference 1. In order to facilitate removal, it was subsequently determined that the feedwater nozzles should be cut from outside the vessel and the thermal sleeves freed from the nozzles. The nozzle cuts were originally to have been performed during vessel segmentation activities. An additional change was that an OD milling machine was used to make the cut instead of diamond wire rope. The filings produced using an O.D. milling machine are readily collected in catch basins as opposed to the diamond wire cutting technique which utilizes significant amounts of water for removing heat and produces cutting fines and debris in a slurry form that will require extensive contamination control measures (see the section on large and small bore pipe cutting for a description of the OD milling cutting technique).

Following nozzle cuts, the sparger was mechanically disconnected from inside the vessel. The revised approach eliminated the need for developing the high jacking forces inside the vessel originally necessary for removal and therefore eliminated a potentially dangerous condition for workers.

The radiological work environment for both approaches is identical. However, the improved feedwater sparger removal plan resulted in reduced man-hours spent in the work area, which resulted in reduced radiation expopsure. Also, note that the feedwater piping dose rate is comparable to other system piping outside the vessel and will be disposed of similarly by sending it to a volume reduction vendor.

The feedwater sparger removal was accomplished with virtually no measurable personnel radiation exposure.

Large and Small Bore Piping

The SNPS DP stated that LIPA would use band saws for cutting small bore (less than or equal to three inch diameter) pipe. LIPA has determined that the band or reciprocating saw, under certain limited access conditions, is better suited to sever pipe in excess of three inches in diameter. Similarly, under certain access conditions, the OD milling machine is better suited to cutting small bore pipe. (It is noted that LIPA reported in the DP that large bore pipe would be severed with the OD milling machine, with no specific mention that this technique would be used in small bore applications.) Based on the foregoing, LIPA intends to use band or reciprocating saws and OD milling machines on both small bore and large bore pipe, in cases where limited access conditions warrant a deviation from the DP descriptions.

The split OD milling machine is a hydraulic-powered, self-feeding, externally mounted cutting machine. This machine uses a milling head cutter which cuts as it moves around the outer circumference of a pipe on a split OD mounted track.

The band saw is a hand held power saw which is positioned manually against the work piece. The blade is an endless loop which travels between a drive wheel and an idler wheel.

A reciprocating saw utilizes a single-edged blade which is driven with a rectilinear stroking motion of approximately 1 1/4 inches. It can be electrically or pneumatically driven and is hand held against the work piece.

All of these techniques are mechanical in nature. Although there is a slight theoretical advantage offered by the split OD milling technique in terms of the likelihood of airborne particulate generation, because of the low contamination levels in the Shoreham system, no airborne contamination has been observed in mock-up testing or in initial production work on Shoreham piping. From a cutting debris and contamination control standpoint, the same control measures will be applied regardless of which technique is used.

Based on the above, use of alternate techniques in limited applications as described above will not result in additional worker exposure to airborne contamination nor in any increase in airborne radioactive releases from those previously identified. Further, due to the low radiation levels at and around the affected piping, there will be negligible differences, if any, in radiation exposure to workers using the manual techniques where split OD milling was previously indicated. Further, any such differences would likely be offset by increased time spent attempting to set up milling machines in difficult locations.

Sequencing

LIPA's decommissioning activities are described in a certain sequence in the DP and related supplements. It is LIPA's understanding that the NRC views any departures from the described sequence of activities as changes to the DP and, therefore, subject to the requirements of Condition (4) of the Decommissioning Order.

LIPA does anticipate, however, that some changes in the sequence of performing decommissioning activities will be identified which can offer benefits in such areas as contamination control and/or personnel radiation exposure. It is also anticipated that sequence changes might be identified which can offer project cost and schedule benefits without incurring radiological penalties or adversely affecting worker or public safety. It is likely that in some cases these types of changes would not be identifiable sufficiently in advance to meet the prior NRC notice and approval requirements of Condition (4) without incurring project schedule and cost penalties. Thus, cases may arise where the requirements of Condition (4) may actually inhibit the realization of benefits which are in both LIPA's and the NRC's best interests. This in fact may also be true for potential changes, (of a minor or detailed nature) in design or decommissioning techniques.

With the above in mind, LIPA hereby proposes that we meet with you and members of the NMSS and NRR staffs to discuss this matter as soon as possible. Please advise me when it would be possible to arrange such a meeting. I can be reached at my Shoreham office at (516)-929-8429. Your prompt consideration of these matters would be greatly appreciated.

Very truly yours,

L. M. Hill, Resident Manager
Shoreham Nuclear Power Station

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