Long
Island
Power
Authority

Shoreham Nuclear Power Station
P.O. Box 628
North Country Road
Wading River, N.Y. 11792

SEP 9 1992 LSNRC-1995

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

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

Request For Approval of
Decommissioning Plan Change:
Residual Heat Removal Heat Exchangers
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Ref:
1) Long Island Power Authority (S. Klimberg) letter LSNRC-1859 dated November 27, 1991 to NRC (Document Control Desk); Additional Information In Support of the Decommissioning Plan for Shoreham
2) Long Island Power Authority (S. Klimberg) letter SNRC-1832 dated August 26, 1991 to NRC (Document Control Desk); Response to Request for Additional Information for Shoreham Decommissioning Plan
3) Long Island Power Authority, (R.M. Kessel) letter dated December 29, 1990 to NRC; Shoreham Nuclear Power Station, Supplement to Environmental Report (Decommissioning)

110050

Gentlemen:

In accordance with Condition 4 of the Shoreham Decommissioning Order, Long Island Power Authority (LIPA) hereby requests NRC approval of a proposed change to the Shoreham Decommissioning Plan. The request is for a change in the methodology for removal of the two contaminated heat exchangers of the Residual Heat Removal (RHR) system.

A001
1/1

In response number 2 of Reference 1), LIPA indicated that the RHR heat exchangers were to be removed via mechanical means. Although not specified, it was contemplated that this would involve removal of the heat exchanger shells in one piece and cutting of tubes with band saws. Due to space and weight constraints, however, it is possible that the heat exchanger shells may need to be cut into several sections in order to remove them. LIPA is therefore reviewing the feasibility of decontaminating the shells and leaving them in place. Also, due to the configuration of the heat exchanger tube bundle, it is considerably more difficult and time consuming than expected to cut the tubes utilizing the bandsaw cutting technique. The tube compactness and circular bundle pattern make it difficult to properly position the cutting tool to cut one tube and impractical to cut more than one at a time. Therefore, LIPA requests approval to allow RHR heat exchanger shells to be decontaminated in place or removed in sections as described below (should it be necessary), and approval of an alternate tube cutting technique that is not encompassed by the existing Decommissioning Plan (DP) or LIPA supplements that have been approved by the NRC.

Shell Decontamination or Removal in Sections

The feasibility of decontaminating the shells in place is dependent on accessibility considerations within the shells. Should adequate working clearance exist, localized manual decontamination techniques will be employed in the same manner as was previously described by LIPA for local decontamination of plant structural areas (see LIPA response no. 2 of Ref. 1) and response no. II.(5)D of Ref. 2); (copies attached). These methods were approved by the NRC for local area decontamination.

Should sectioning of the RHR heat exchanger shells be necessary because of inadequate accessibility for complete decontamination, the heat exchanger shells will be cut into sections using oxyacetylene torches. The cutting would occur in or near the area where the heat exchangers are presently installed; i.e., near elevation 8' of the Reactor Building. Each heat exchanger would be cut into a maximum of three sections. In accordance with the station fire protection program, appropriate protective and preventive measures will be specified in a fire permit to address any fire hazards that are associated with the torch cutting.

Alternate Tube Cutting Technique

Using a band saw to cut the heat exchanger tubes has proved to be very inefficient. As there are over 1,000 tubes in each heat exchanger with several cuts to be made on each tube, approval is requested to utilize a grinder and/or a circular saw to cut the tubes more efficiently . These methods will speed the cutting process significantly. In addition to reducing the time-dependent costs associated with RHR heat exchanger tube removal, these more efficient cutting methods will minimize the potential impact on LIPA's overall project schedule by making workers available earlier to perform other decommissioning tasks.

Appropriate protective measures will be taken to protect the workers and the environment from the airborne dust and grinding debris generated by these cutting methods. Health Physics controls to be applied will include, but will not be limited to, the following:

* A local ventilation system with HEPA filtered exhaust to the Reactor Building atmosphere will be used.

* Workers in the area will wear respirators when the heat exchanger shells are first breached by cutting torches and when the first cuts are made on the tubes using the grinder or circular saw.

* Initial sampling for airborne radioactivity will be performed to establish if there is a need for continued use of respirators by workers.

Accident Analysis Considerations

The use of oxyacetylene torches was analyzed for accident considerations in Section 3.4.1.5 of the Shoreham Decommissioning Plan for potential application to the severance of recirculation system piping from the reactor pressure vessel. This analysis has been reviewed with respect to the potential application of oxyacetylene cutting to the RHR heat exchangers. Based on this review, it has been determined that the existing accident analysis would bound the consequences of a postulated oxyacetylene explosion during the cutting of the RHR heat exchangers. The existing accident analysis estimated that 7.04 μCi of radioactive material would be released to the Reactor Building atmosphere. A total of 0.217 μCi is the estimated maximum amount of radioactive material that could be released to the building atmosphere in the event of an oxyacetylene explosion at the RHR heat exchangers.

The location for cutting of the RHR heat exchangers is remote from the Spent Fuel Storage Pool and from areas with ongoing reactor internals segmentation activities. It is separated from these areas by substantial physical barriers, such that no credible interactions would result from an oxyacetylene explosion at the heat exchangers.

There are no such accident analysis considerations with the use of grinders or circular saws because these are mechanical cutting techniques with no catastrophic failure modes.

<u>Environmental Impact Considerations</u>

There are low contamination levels in the Shoreham systems. No airborne contamination has been observed in test cuts or in decommissioning production work on Shoreham piping. This includes the bandsaw cutting performed to date on the heat exchanger tubes. Based on these low contamination levels and on the controls described above, the use of alternate techniques in limited applications as described above will result in negligible, if any, additional worker exposure to airborne contamination. Further, due to the low radiation levels at and around the affected heat exchangers, there will be negligible differences, if any, in radiation exposure to workers using the proposed mechanical cutting or decontamination techniques. Any such differences would likely be offset by the longer time that would be spent attempting to remove the heat exchanger shells in one piece and cutting the tubes with a band saw. Thus, there would be no net increase in the project occupational radiation exposure estimate.

With respect to any non-accident environmental impacts that may be associated with the proposed change, the postulated addition of up to 0.217 μCi of airborne radioactive material (an unrealistic and highly conservative assumption) would have a negligible impact (less than 0.03 percent) on the estimated total of 814 μCi presented in Reference 3) for the airborne radioactive releases associated with the entire Shoreham decommissioning project. This additional material, in turn, would have a negligible effect on the already-minimal doses to the offsite public which are estimated to result from Shoreham decommissioning.

There would be no additional radioactive waste beyond that estimated for Shoreham decommissioning because the RHR heat exchangers were included in the estimate provided in the Decommissioning Plan. Similarly, the cost of removing the RHR heat exchangers with oxyacetylene torches would be comparable to the cost associated with mechanical removal as originally contemplated. Any cost differential that may be associated with this change will be negligible relative to the overall $186 million project cost estimate. Such a cost differential, if any, would also be justified by the avoided cost of prolonged cutting of heat exchanger tubes with band saws.

Finally, non-radiological environmental impacts such as air quality, land and water use, noise, and dust will not be increased beyond that described in Reference 3) because of confinement of work within the Reactor Building.

Conclusion

Based on the above, LIPA has concluded that there are no unreviewed safety questions associated with the proposed change, and that there would be no environmental impacts different from or exceeding those set forth in Reference 3). LIPA respectfully requests that the NRC review and approve the proposed change as expeditiously as possible.

Should you have any questions or require any additional information, please do not hesitate to contact my office.

Very truly yours,

FOR

L. M. Hill
Resident Manager
SMS/sw
(enclosures)

cc:
L. Bell (NMSS)
J. Austin (NMSS)
E. Brach (NMSS)
R. Bangart (NMSS)
G. Arlotto (NMSS)
S. Brown (NRR)
R. Dudley (NRR)
S. Weiss (NRR)
B. Norris (NRC-Region I)
E. Wenzinger (NRC-Region I,
R. Nimitz (NRC-Region I)
J. Joyner (NRC-Region I)

LIPA RESPONSE NUMBER 2
OF REFERENCE 1)

~~Airborne and liquid radioactive waste will be generated when using the high pressure and ultra high pressure techniques or tanks and vessels. Airborne will be controlled by covering the tank and vessel openings with temporary contamination control containments (tents, glove boxes and glove bags) with HEPA filters on the exhaust. The HEPA filtered ventilation will exhaust to the building atmosphere.~~

~~Liquid radioactive waste will be collected in existing sumps and routed to the Radwaste Building in existing piping for processing. LIPA's response to Question [illegible] of November 7 and 8, 1[illegible] addresses the processing of liquid radwaste.~~

~~The piping and components left in place after decontamination will be surveyed in accordance with the Final Termination Survey. Any piping and components that do not meet the release criteria will be further remediated or removed.~~

[illegible]

~~[illegible] decontamination technology to be used on structures will be as f[illegible]~~

~~Pr[illegible] Containment [illegible] Suppression [illegible]~~	~~-~~	~~Mechanical decontamination using high pressure water ([illegible] 20,000 psi)~~
~~Building Sumps, Dryer Separator Storage Pool, Reactor He[illegible],~~	~~-~~	~~Mechanical decontamination using ultra high pressure water ([illegible] 20,000 psi)~~
~~Spent Fuel Storage Pool~~		
~~Spent Fuel Storage Racks~~	~~-~~	~~Mechanical decontamination using a high pressure water ([illegible] cells) and ultra high pressure water (rack structure)~~
~~Radwaste Laydown Area~~	~~-~~	~~Mechanical decontamination using a scarification process~~

~~The high pressure and ultra high pressure water mechanical decontamination techniques described above will employ demineralized water without chemicals or oils.~~ Local decontamination of some areas may also require manual application of aggressive chemical reagents such as gels and sols. These are reagents that are typically used at nuclear facilities for decontamination. Several popular chemicals include nitric acid and phosphoric acid. Manual application of gels and sols is performed with rollers, paint brushes, airless spray guns, and rags. Gels (colloid in a more solid form than a sol) and sols (a fluid colloidal system in which the continuous phase is a liquid) are preferred physical forms of solution because they are easy to control, and they remain in contact with the surface, allowing time for the chemical reactions to be completed. The effectiveness of these solvents will be verified prior to their use.

This information is pertinent to DP change requested in LSNRC-1995.

The site Chemical Control Program is focused on the prevention of mixed waste. The Chemical Control Program Station Procedure (SP) 12X023.0[illegible] establishes an active program to evaluate and control any chemical identified for use onsite to ensure that its use will not result in the generation of mixed waste.

LIPA RESPONSE NUMBER II.(5)D OF REFERENCE 2)

LIPA RESPONSE II.(5)D

~~Decontamination technologies are grouped under mechanical or chemical headings. Summarized below are descriptions of the Decontamination Technologies planned for application at Shoreham.~~

~~Chemical Technologies~~

~~The chemical decontamination technologies are: soft (passive) and harsh (aggressive) chemicals, continuous regeneration, batch additions, and manual applications.~~

~~<u>Soft decontamination</u> uses chemicals that dissolve the oxide layer but do not attack the base metal. The contaminants that are contained in the oxide layer are removed with the oxide layer and go into solution. There are many soft chemical processes available on the market, and many are fully described in the EPRI NP 6169 and the Decommissioning Handbook (DH). Three of the more popular soft decontamination processes are Citrox, CAN-DEREM, and LOMI. These solvents are capable of achieving decontamination factors between 5 and 20 and have been used at nuclear facilities to decontaminate operational equipment.~~

~~Harsh decontamination uses chemicals that dissolve the oxide layer and attack the base metal. The contaminants are removed with the oxide layer and base metal. Harsh chemicals are also described in EPRI NP 6169 and the DH. Several popular chemicals, which include nitric acid and phosphoric acid, have been used in the nuclear industry to decontaminate tools and equipment that did not have to be reused. While the chemicals are effective, they do attack the metal surface and may cause pitting and may potentially damage the functionality of the components being decontaminated.~~

~~Harsh chemicals are used for components that are to be scrapped and they can reduce contamination levels below release criteria. Many proprietary decontamination reagents have good track records at nuclear facilities and are readily available. Examples are NUTEK 316 and TURCO DECON 4521.~~

This information is pertinent to DP change requested in LSNRC-1995

Manual application or gels and sols is performed with rollers, paint brushes, airless spray guns, and rags. Gels (colloid in a more solid form than a sol) and sols (a fluid colloidal system in which the continuous phase is a liquid) are preferred physical forms of solution because they are easy to control and they remain in contact with the surface, allowing time for the chemical reactions to be completed. Both soft and harsh chemicals can be used as gels or sols.

~~Mechanical Technologies: The mechanical decontamination technologies and equipment evaluated for Shoreham included: ultra-high pressure water, high pressure water, liquid abrasive, wet sanding, scabbling, dry vacuuming, and strip coating.~~

~~Ultra-high pressure water systems elevate fluid pressures to greater than 20,000 psi and then emit the fluid at high velocity. Special nozzles create the high velocities and direct the fluid towards the contaminated surfaces. The kinetic energy loosens tightly adhered contaminants and flushes them away from the surface. Oxide layers can be removed with ultra-high pressure water, but oxide layers formed at high temperature may require pressures as high as 40,000 psi or the use of grit. Available equipment has flow rates of 2 to 5 gpm and pressures ranging from 20,000 to 60,000 psi. Protective clothing is needed for operators who handle the nozzles, and special training is required for pump operators and mechanics. The water can be recycled through filters and ion exchangers to minimize radwaste generation.~~

~~High pressure water systems elevate fluid pressures up to 20,000 psi and emit fluid through nozzles. These pressures are effective at removing loosely adhered contaminants and debris from pipes. One example, a mole nozzle, emits fluid through jets aimed perpendicular to the line of travel (i.e., the mole nozzle crawls a pipe, the jet stream is directed towards the pipe wall). Equipment is available with flow rates of 2 to 40 gpm. The water can be recycled through filters and ion exchangers to minimize the generation of radwaste.~~

~~Scabbling is a construction industry technique for removing layers of concrete by repetitious hammering of the surface. A scabbler has several hammer-headed pistons arranged on a common manifold. The hammer heads have needle-faced surfaces that impact the concrete surface. The repetitious pounding breaks the upper layer of concrete into rubble. The depth of penetration depends upon the speed at which the scabblers move across the surface. Scabblers can be equipped with vacuum devices to collect dust and rubble. It should be noted that the extent of contaminated concrete is limited to a small area in the Radwaste Building.~~

~~Dry vacuuming uses commercial grade vacuum cleaners equipped with HEPA filters.~~

~~Strippable coating is the application of paint that is capable of attaching to loose surface contamination. After drying, the paint is peeled off in strips and the loose contamination remains attached to the paint strips.~~

This information is pertinent to DP change requested in LSNRC-1995

Wet sanding is manual rubbing of the metal surface with emery cloth soaked in water. Fixed contamination is removed with the metallic fines.