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LSNRC-1971

U.S. Nuclear Regulatory Commission
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ATTN: Dr. Robert Bernero, Director
Office of Nuclear Material
Safety and Safeguards

Additional Information Pertaining To
Decommissioning Plan Changes:
Wet Cutting Station Design
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

References:
1) LIPA (L.M. Hill) letter LSNRC-1967 to NRC (Document Control Desk) dated June 12, 1992
2) LIPA (L.M. Hill) letter LSNRC-1968 to NRC (Document Control Desk) dated June 19, 1992
3) LIPA (L.M. Hill) letter LSNRC-1969 to NRC (Document Control Desk) dated June 26, 1992

Pursuant to Condition 4 of the NRC's June 11, 1992 Decommissioning Order, LIPA hereby submits for NRC review and approval, additional information in support of proposed changes to the Wet Cutting Station (WCS) design as described in LIPA's Decommissioning Plan. Notification and other supporting information were previously provided to the NRC in References 1) and 2), respectively.

The WCS purpose and fundamental design bases and features described in the Decommissioning Plan remain unaffected by the proposed changes described herein. The changes to WCS design details described in the Decommissioning Plan include:

(1) Number and location of Water Processing System (WPS) filtration units;

(2) Removal of the WPS demineralizers;

(3) Reconfiguration of the WCS ventilation system hardware;

(4) Reconfiguration of the WCS platform assembly; and

(5) Deletion of the use of protective coatings (i.e., strippable paint) on steam dryer/moisture separator pool surfaces.

The proposed changes to the WCS are described and evaluated herein.

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Number and Location of WPS Filtration Units

LIPA has evaluated and approved the use of three filtration units in lieu of the single WPS filtration unit described in the Decommissioning Plan. The proposed WPS configuration is described in the enclosed Technical Report. One filtration unit will be located (submerged) in the WCS and will have the capability of filtering the water in both the WCS and the RPV as described in the Decommissioning Plan. Normally, however, the filtration unit in the WCS will process WCS water only.

In addition to the WCS filtration unit, LIPA intends to use two filtration units that will process the water in the RPV. The primary unit is of a submersible design and is similar to that used in the WCS. The secondary unit is located under the reactor vessel and will take suction from/discharge to valved connections located on the reactor CRD housings. As indicated in the attached report, the purpose of this secondary RPV unit is to provide for a RPV drain and sample point. In addition, this filtration unit would be called upon to augment the RPV filtration capabilities of the two submersible units described above should RPV water conditions warrant its use.

The benefits offered by using this combination of filtration units in lieu of the single WCS unit described in the Decommissioning Plan are as follows:

(1) The combined flow rate for all three filtrations is almost 1000 gallons per minute (GPM). This is considerably more than the single 600 GPM WCS unit described in the Decommissioning Plan and will provide for enhanced contaminant removal from the WCS/RPV water inventory.

(2) Filtration of the WCS and RPV will normally be performed independently thus providing for operations and maintenance flexibility. The single WPS described in the Decommissioning Plan served both the WCS and RPV.

(3) With filtration capability provided in both locations, LIPA has obviated the need to transfer water on an almost continuous basis between the WCS and RPV. This will allow for enhanced control of the water inventory and level in both work locations.

(4) The RPV submersible filtration unit is readily transportable and could be deployed in the WCS should either the work sequence or WCS water conditions warrant its use in the WCS.

It should be noted that as in the case of the design described in the Decommissioning Plan, all of these filtration units will be operated on a "closed-loop" cycle (i.e., all take suction from the contaminated WCS or RPV and the filtered effluent is returned directly back to these locations). The ultimate WCS and RPV drain

paths to the existing Shoreham liquid radioactive waste treatment systems remain unchanged from that described in the Decommissioning Plan.

The improved filtration scheme will not affect the conclusions presented in the NRC's Safety Evaluation or Environmental Assessment. The cumulative occupational radiation exposure and radioactive waste will remain unchanged because, while LIPA will be using more filtration units, the filter elements will require change out on a less frequent basis (i.e., LIPA will use a larger number of filtration units to process the same WCS and RPV water inventory described in the Decommissioning Plan). The occupational exposure and radioactive waste stream related to WPS operation remain unchanged from that described in the Decommissioning Plan.

Removal of the WPS Demineralizers

The WPS described in the Decommissioning Plan included demineralization equipment in addition to filtration capability. The primary purpose of the demineralizer was to maintain the conductivity of the WCS and RPV inventory sufficiently low so as to allow the use of the metal disintegration machining (MDM) process. LIPA had initially intended to use MDM for the segmentation of certain reactor internals. The use of underwater MDM requires stringent conductivity control that can only be provided by a demineralizer. An anciallary benefit offered by the demineralizer includes the removal of radioactive contaminants from the process flow stream.

LIPA has determined (and described in Reference 3) that the MDM process will not be used at Shoreham. Having made this determination, it will not be necessary to equip the WPS with demineralization capability. The proposed WPS configuration is described in the enclosed Technical Report. The reasons why this is both acceptable and beneficial are as follows:

(1) As originally designed, the WPS had a total throughput of 600 GPM. However, it was contemplated that only 50 GPM of this total would be processed through the WPS demineralizer. The balance, 550 GPM, would be processed through a filtration unit which is virtually identical to the two submersible units that LIPA intends to deploy as part of its enhanced WPS design. In summary, the original WPS design relied extensively on filtration to remove radioactive contaminants from the WCS and RPV. Removing the demineralizer from the WPS, which was initially intended to process only 10% of the total throughput, will have a negligible affect on the overall performance of the WPS. The original design described in the Decommissioning Plan, like the enhanced WPS design described herein, both rely on filtration as the mainstay for removing the particulate debris resulting from underwater plasma arc cutting. It should be noted that this negligible impact will be more than offset through the 65% increase in total WPS throughput.

(2) LIPA estimated that the level of contaminants in the WCS and RPV would peak at 4.44 E-5μcu/ml. Because the contaminants resulting from plasma arc cutting are primarily in particulate form, LIPA expects that this peak value will remain unchanged even with the removal of the demineralizer equipment from the WPS. Again, because of the increased throughput of the WPS, it is expected that the peak contaminant concentration will actually be reduced. In addition, through water inventory monitoring and administrative control, LIPA has adopted measures that will ensure that the 4.44 E-5μci/ml concentration will not be exceeded in the WCS and RPV. Based on the foregoing, the general area WCS radiation dose rates will remain unchanged as will the total occupational radiation exposure for WCS work activities.

(3) The Decommissioning Plan provided an estimate of the offsite radiation dose(s) associated with the release of processed liquid radioactive waste; the estimate included the dose contributions of the WCS and RPV water inventories. The underlying assumption in the offsite dose calculation was that untreated WCS and RPV water, with assumed radionuclide concentrations of 4.44 E-2μci/ml, was routed to the existing Shoreham radwaste facility for processing prior to discharge. The 4.44 E-2 value was derived taking absolutely no credit for the removal of contaminants using the WPS. Based on the foregoing, the removal of the demineralizers from the WPS will have absolutely no affect on the offsite dose estimates provided in the Decommissioning Plan; the estimated offsite doses presented in the Decommissioning Plan assumed worst case (i.e., raw, untreated) WCS and RPV water as the source term entering the plant's Liquid Radwaste System.

(4) Removing the demineralizers from the WPS will offer the benefit of simplifying the handling and disposal of wastes resulting from the processing of the WCS and RPV water inventories. This action will obviate the need to handle and dispose of contaminated resin. Resin transfer would have been complicated due to the remote (i.e., submerged) location of the WPS demineralizers. Moreover, removing the demineralizers from the WPS will consolidate the waste from water processing activities into a single media type thus further simplifying waste handling operations.

In summary, removing the demineralization equipment from the WPS will have no affect on either the offsite dose(s) associated with liquid releases or the occupational radiation exposure associated with WCS activities for the reasons provided herein. Moreover, the WPS that LIPA intends to use represents a substantial improvement compared to that described in the Decommissioning Plan.

WCS Ventilation System

The Decommissioning Plan describes an enclosure arrangement located above the WCS that would provide for fume collection and

contamination control. Key to this contamination control system is the use of a self contained, portable HEPA filtration unit.

After further evaluation, LIPA has determined that the WCS fume collection system described in the Decommissioning Plan offers limited capability to develop horizontal air velocities necessary for complete collection of the underwater plasma arc cutting gases. Furthermore, restricted access for cutting and the need for multiple relocation of the movable covers would have resulted in increased duration(s) for WCS activities. These inefficiencies and increased durations represent additional occupational radiation exposure.

The proposed alternative consists of a floating hood connected by a flexible duct directly to a HEPA filtration unit. The attached figure describes this fume collection arrangement.

The proposed ventilation system is acceptable for the following reasons:

(1) The floating fume hood will be manually positioned in close proximity to the plasma arc cut location and will provide for positive, localized collection of the cutting gases. The hood was specifically designed to collect the limited dispersion of escaping gases observed during the mockup testing and qualification of the Shoreham underwater plasma arc equipment.

(2) The proposed ventilation scheme has been successfully used in at least one previous application at an operating nuclear plant. In this application, the floating hood was used to collect cutting gases resulting from underwater plasma arc segmentation of highly radioactive (several orders of magnitude greater than in the Shoreham application) reactor core components. The equipment operators, working in close proximity to the actual cutting operations (i.e., staged in comparable locations to the Shoreham WCS), were able to perform their duties without the use of respiratory protection.

(3) In the Shoreham application, the use of respirators will be required until the results of air sampling demonstrate the effectiveness of the WCS ventilation system.

In summary, the proposed ventilation system provides for superior cutting gas collection and is "user friendly" from an operations standpoint. The floating hood arrangement is conceptually identical to the system described in the Decommissioning Plan in that both rely on the local collection and HEPA filtration of cutting gases. Based on the foregoing, the proposed alternative WCS ventilation system will not affect the findings and conclusion in the NRC's Safety Evaluation Report and Environmental Assessment.

WCS Platform Assembly

The WCS platform assembly is described in considerable detail in the Decommissioning Plan. Based on further evaluation, LIPA has determined that modifications to this platform layout offer considerable radiological (ALARA) and cost benefits. The proposed WCS platform layout is illustrated in the attached figure.

The WCS work platform now encompasses the entire moisture separator/steam dryer (MS/DS) pool rather than just the north end; access to the work platform is by ladder rather than stairs, and the filtration equipment is relocated to the MS/SD storage pool floor rather than the elevated platform as detailed in the Decommissioning Plan.

The increased work area provides added flexibility for cutting operations and enables the handling of components inside the WCS totally underwater. Prior to these changes, movement of radioactive pieces from the WCS work area to the south end of the MS/SD pool, for storage and or packaging, required they be lifted over the work platform. The lowering of the filtration equipment provides greater radiation shielding. These changes provide enhanced ALARA and operational flexibility.

The structural design requirements for the proposed WCS work platform remain unchanged from those described in the Decommissioning Plan. In summary, the conceptual framework for the WCS platform remains unchanged; the proposed alternative represents changes to platform layout details offering both ALARA and cost benefit. Based on the foregoing, the proposed WCS work platform configuration does not affect the findings and conclusions provided in the NRC's Safety Evaluation Report and Environmental Assessment.

MS/DS Pool Protective Coatings

The Decommissioning Plan broadly describes the application of a protective coating on the surfaces of the MS/DS pool. Based on further evaluation, LIPA has determined that the application of the protective coating on the walls of the MS/DS pool will complicate the operations and maintenance of the WCS.

While flooding the MS/DS pool following the application of the protective coating, the coating began separating from the pool walls. It was determined that the risks and consequences associated with the clogging of filtration system and MS/SD pool drains and the attendant clean up efforts far outweigh the potential benefits afforded by the coating system. The pool walls are stainless steel and easily decontaminated. Final decontamination shall be performed until the steel is below the Free Release Criteria.

Conclusion

The foregoing and enclosed information demonstrates that the proposed WCS design changes represent improvements in the overall effectiveness and operational efficiency of the WCS. The fundamental purpose and concept of the WCS have not been altered by these changes in design detail. Therefore, LIPA hereby respectfully requests that the NRC review and approve these changes on an expedited basis, in order that utilization of the enhanced WCS may proceed immediately.

Very truly yours,

L. M. Hill, Resident Manager
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