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REPORT OF CONFERENCE

RM:RSD03 #97, 404334

Subject: SRS Radiation Monitoring System (June 15) (U)

Date and Place: December 5, 1950, Navy Department, Washington, D. C.

Present: Naval Reactors Branch, R.D.D.

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 O. Schneider Nuclear Engineering Section
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DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
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NAME:	5. DECLASSIFICATION CANCELLED
DATE:	6. CLASSIFIED INFO BRACKETED
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REVIEWER NAME: C. Little	1. CLASSIFICATION RETAINED
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entered by NE-60 memo 11/14/94

1. Purpose: To review and approve the preliminary specifications for the SRS radiation monitoring system.
2. Summary: A fixed radiation monitoring system consisting of 15 monitoring channels plus two spares is required. This system is essentially that presented in Westinghouse Specification No. B2355, with the number of channels reduced.

3. Decisions:

The system presented in Westinghouse Specification No. B2355 is granted Step A approval, subject to the following changes:

- (a) Channels number 1, 3, 4, 10, 15, 16, 18, 19, and 20 are deleted.
- (b) Two spare channels are added, type to be specified later.
- (c) Channel eleven will be designed to give the best performance regarding discharge of radioactive fluid. The exact method of doing this will be studied further by WAPD.
- (d) Channels 18 & 15 will contain particle detectors whose exact location will be determined later, after considering air cooling system, etc.

(e) Channel 17 will contain a detector located outside of the shield within the steam generating compartment, the exact location to be recommended later by WAPD.

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(f) The desirability of monitoring the primary coolant was emphasized, and if channel 11 or 22 does not accomplish this, an additional channel will be considered.

(g) The power supply will be 400 cycle, rather than 800.

(h) The location of the main display console, detectors, and the number and location of remote indicator and alarm units may not be exactly as shown in B2375 and WAPD-EM-27. WAPD will make recommendations on these items after study with Electric Boat Company as a part of step B approval.

(i) It was especially noted that miniaturization and unitized construction were stressed in the design. It was further agreed that ruggedness, reliability, and ease of maintenance would be emphasized as detail design progresses.

4. Discussion:

(a) It is noted that the chief function of the radiation monitoring system has evolved from personnel hazard detection at the watch stations to equipment failure warning. This is felt to improve the personnel safety, since monitoring now occurs nearer the source. Additional personnel protection and monitoring will be provided by adequate shielding (checked at Arco as well as on Mark II), and portable radiation detection equipment.

(b) The main display console of the approved 13 channel system will occupy about $4 \frac{1}{2}$ cubic feet. This is to be contrasted with the 16 channel 20-40 cubic foot system originally proposed for Arco, and with the 8 channel 80 cubic foot system developed for surface vessels.

(c) A description of each of the 22 proposed channels follows:

Channel 1, high level gamma detector in shielded portion of steam generating compartment. ~~Deleted~~, because indications of trouble in this space will be provided by the bilge, airborne particle, and active water discharge detectors.

Channel 2, GM gamma detector in the unshielded portion of the steam generating compartment. Approved, for detection of gamma shield failures above the reactor where trouble is most likely to occur, due to presence of manhole through shield.

Channels 3 & 4, G.M. gamma detectors in control room and machinery space respectively. ~~Deleted~~, because adequate monitoring is provided by neutron and gamma detectors nearer source.

Channels 5 & 6, G.M. gamma detectors on the steam separators. Approved, to detect a leak between primary and secondary water systems, which would result in contaminating steam system.

Channels 7 & 8, G.M. gamma detectors on the sea water inlet. Approved, although only one, or more than two, may be required for proper supervision of sea water intake. These detectors will indicate intake of radioactivity caused by active discharge from some ship, by wake of another ship or by radiological or atomic warfare.

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Channels 9 & 10, G.M. gamma detectors in the bilge below the reactor. One approved, for monitoring the bilge water activity.

Channel 11, G.M. gamma detector on the active water discharge. Approved, in principle. The method of monitoring this effluent, however, requires further study.

Channels 12 & 13, Airborne particle detectors, Approved, although their exact location is to be studied further. Such a detector provides the only means of monitoring the serious potential hazard of particle inhalation, since no portable particle detector will be available.

Channel 14, Airborne particle detector in the shielded portion of the steam generating compartment. Approved, the location will permit early detection of radioactive particles.

Channels 15 & 16, slow neutron detectors in control room and machinery space. Deleted, since one channel is adequate.

Channel 17, slow neutron detectors in the unshielded portion of the steam generating compartment. Approved, because this location offers the best opportunity of detecting leakage of water from the neutron shield which constitutes the only source of neutron exposure.

Channels 18, 19, & 20, fast neutron detectors. Rejected, because the usefulness of fixed detectors is greatly decreased by the collimated nature of fast neutron leaks. Periodic survey with portable equipment will be required to locate such faults.

Channels 21 & 22, fast neutron fuel plate flaw detectors. Approved, as the best means of detecting the presence of uranium and fission products in the primary coolant.

(d) The location of the main display console, detectors and remote indicator units is not at present specified. Agreement on this should be reached between Electric Boat Company and WAPD before submission for Step B approval.

(e) It was emphasized that; reliability, ruggedness, miniaturization, and ease of maintenance of all electronic circuitry is of primary importance. Wherever practicable, unitized construction and potting of circuits should be followed.

5. A draft of the conference was reviewed and approved by the principal conferees.

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