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Richard DeYoung, Assistant Director for Pressurized Water Reactors, L

RAB INPUT FOR SECTIONS 11.6, 12.1, 12.2 & 12.3, MILLSTONE UNIT 2 SER

Plant name: Millstone Nuclear Power Station Unit 2
Licensing stage: OL
Docket number: 50-336
Responsible branch: PWR-3
Project Manager: O. Parr
Date request received by RA-L: Per Blue Book
Requested completion date: 8/29/73
Description of response: SER Sections 11.6, 12.1, 12.2 & 12.3
Review status: Complete

RAB has reviewed those sections of the Millstone 2 FSAR related to the information requested in the subject sections of the Standard Format. As a result of this review, the attached proposed input to the Safety Evaluation Report has been generated. As described in the enclosed sections, RAB considers additional modifications are necessary to the environmental monitoring program and the program for in plant sampling of airborne radioactivity prior to complete acceptance of these programs.

This review was performed by F. Wenslawski, RAB.

/s/
Harold R. Denton, Assistant Director
for Site Safety
Directorate of Licensing

Enclosure:
As stated

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RADIOLOGICAL ASSESSMENT BRANCH
INPUT TO
MILLSTONE NUCLEAR POWER STATION, UNIT 2 SER

11.6 Offsite Radiological Monitoring Program

The applicant proposes in the FSAR to utilize the same radiological environmental monitoring program for unit 2 as is presently in existence and defined in the Millstone Unit 1 technical specifications. The existing program includes monitoring of the aquatic environment (flora, sediment, mussels, clams, oysters, lobsters, fish and seawater), direct radiation, and radioactivity in air particulates, precipitation, soil, vegetation, well water and milk.

It is the staff's position that development in the ALAP policy and refinements in environmental monitoring guides have outdated the existing environmental monitoring program. The applicant has received the staff's position on his environmental monitoring program and is presently developing a revised program for the Unit 2 technical specifications. The existing program deficiencies primarily concern the types of analysis performed on samples and the frequency of collection and sensitivity of analysis on milk samples.

As part of the review and licensing process for Millstone Unit 3, the applicant has submitted changes to the environmental monitoring program for the Millstone site. After review of these proposed changes, the staff considers the following elements are still necessary to have a satisfactory program for unit 2.

(a) additional principal edible fish types shall be included.
(b) samples of shoreline sedimentation shall be taken at onsite recreational areas.
(c) vegetation samples shall include food types when available and sampling will occur at harvest time.
(d) air sampling stations located at prevalent downwind directions shall include collection and analysis for radioiodine.
(e) milk sampling shall include the goat milk pathway, sensitivity of analysis shall be 0.5 pCi/l.

The above elements will be included in the applicant's technical specifications. The proposed changes to the existing environmental monitoring program, as indicated in the Millstone unit 3 PSAR, plus inclusion of these elements will result in a satisfactory environmental monitoring program for Millstone Unit 2. This program will be consistent with the guidance of the ICRP,[1] Environmental Protection Agency[2] and USAEC Regulatory Guide 4.1, "Measuring and Reporting of Radioactivity in the Environs of Nuclear Power Plants".

[1]ICRP Publication 7, "Principles of Environmental Monitoring Related to the Handling of Radioactive Materials," International Commission on Radiological Protection, Pergamon Press, New York, September 1965.
[2]U.S. Environmental Protection Agency, "Environmental Radioactivity Surveillance Guide," ORP/SID 72-2, June 1972.

12.0 Radiation Protection

12.1 Shielding

The radiation shielding has been designed to achieve specific radiation levels in particular areas according to the need to occupy those areas and to keep exposures to personnel in both restricted and unrestricted areas below the limits specified in 10 CFR 20. Allowable design dose rates for all controlled access areas of the plant correspond to a maximum whole body exposure of 1.25 rem per calendar quarter.

To ensure adequate radiation protection to the general public and to operating personnel as well, the shielding design is based on operating at design power level of 2700 MWt with reactor coolant system activity levels corresponding to one percent failed fuel. The reactor vessel and the primary loop components are shielded both by internal structures and the containment shell. Secondary shielding within the containment will allow limited access to the containment during operation. Areas of the auxiliary building which contain radioactivity are shielded. Different systems are isolated from each other by individually shielded compartments. As far as practicable tanks, pumps, filters, demineralizers and piping containing contaminated materials are shielded by concrete for the protection of adjacent areas. Access for maintenance purposes is thus provided without unnecessary exposure to adjacent equipment. All areas which are frequently occupied by plant personnel receive an exposure rate of less than 1.0 mrem/hr during operation.

The effectiveness of the shielding provided will be evaluated by means of radiation surveys of the plant during initial low power reactor operation and during power ascension operations. These surveys will ensure that the radiation levels are below the maximum designated limits.

We conclude that adequate consideration has been given to shielding design to provide reasonable assurance that exposures will be maintained within applicable limits of 10 CFR 20.

12.1.4 Area Monitoring

The area radiation monitoring system is designed to provide operating personnel with a continuous indication of radiation levels in selected locations within the plant. Alarm set points for each monitor are variable and are set at a level sufficiently above the normal ambient radiation level to avoid spurious alarming, yet at the same time warn personnel of abnormally high radiation levels. Readout and alarm units are located in or adjacent to the monitored area as well as the control room. Detection capability ranges from background levels to high level dose rates resulting from accident situations. Calibration of the instruments is periodically performed by station personnel.

Based on the location chosen for area radiation monitors, the types of detectors, sensitivities and alarm level settings, the staff concludes that the area radiation monitoring system described by the applicant is satisfactory.

In addition to area radiation monitoring system, the applicant has proposed a system of monitoring airborne particulate and gaseous radioactivity. The proposed functions of the system as stated in the FSAR are to sample ventilation air to assure personnel safety within the limits of 10 CFR 20 and to monitor releases from the plant to assure compliance with proposed appendix I to 10 CFR 50. The applicant has stated in the FSAR that alarm setpoints for the inplant monitors are chosen to give audible warning before the airborne radioactivity exceeds that specified in 10 CFR 20, Appendix B, Table I. The locations monitored by the airborne monitoring systems include the containment atmosphere, control room supply air and various exhausts from ventilation and process units.

It is the staff's position that the fixed monitoring stations function primarily to monitor effluent releases and plant processes. They are not effective for assuring inplant control of personnel exposures by identifying harzards, evaluating individual exposures and permitting proper selection of respiratory protective equipment. Specifically the applicant has not demonstrated that (1), the containment monitors are capable of detecting airborne hazards in normal working zones, especially during refueling, (2) the spent fuel pool exhaust monitor is capable of detecting airborne harzards in normal working zones of the local area exhausted, (3) the radwaste area vent monitor is capable of detecting airborne hazards in normal working zones in the numerous areas served by the radwaste ventilation system, (4) that any sort of portable equipment or program exists for taking special air samples for evaluating airborne radioactivity hazards. In order to meet these criteria, we require the applicant to: (1) clearly demonstrate that the containment and spent fuel pool exhaust monitors are capable of evaluating hazards in the respective work areas which they service or install fixed monitoring instruments that have this capability, (2) install fixed monitoring instruments in frequently occupied areas of the radwaste portions of the auxiliary building (such as waste drumming fill area, sampling room and other similar areas) (3) present a program of special air sampling with portable instruments to complement fix instrumentation and evaluate hazards in areas not serviced by fixed instrumentation.

The staff considers that inclusion of these elements will result in an air sampling program consistent with USAEC Regulatory Guide 8.8,[1] the recommendations of the ICRP[2] and will provide reasonable assurance that the limits of 10 CFR 20 will not be exceeded.

12.2 Ventilation

The ventilation systems are designed to provide a habitable environment for operations personnel. Design criteria include provisions for access and maintenance. Clean and potential radioactively contaminated areas are served by separate systems with potentially contaminated areas being maintained at a negative pressure with respect to adjacent clean areas. To avoid an inadvertent positive pressure in contaminated areas, an interlock exists which will only allow starting of the supply fans when exhaust fans are operating. The design criteria of the systems, the physical descriptions provided in the FSAR and the description of planned operations provide reasonable assurance that adequate consideration has been given to ventilation design for the protection of personnel from airborne radioactivity hazards.

12.3 Health Physics Program

Personnel protection will be accomplished through administrative controls and procedures, through the use of protective equipment and verified by personnel monitoring. The applicant has stated in the FSAR that it is his policy to keep radiation exposures as low as practicable and it will be the responsibility of each individual to observe rules and keep his exposure as low as possible consistent with discharging his duties.

Areas of the plant which contain radioactive materials and where radiation is present will be designated as radiation control areas. Access to these areas will be limited to those persons authorized entry by plant supervisors and health physics and entry/exist will be through designated access control points only. Appropriate security measures will be employed to prevent unauthorized entry to high radiation areas and entrance will require issuance of a radiation work permit. When appropriate, protective clothing will be required for entry to controlled areas. Health physics personnel will evaluate the radiological conditions and specify the required items of protective clothing to be worn.

Personnel monitoring will be accomplished by beta-gamma film badges. Neutron sensitive film packets will be issued whenever a significant neutron exposure is possible. Self-reading dosimeters will be issued to film badged individuals whose work conditions make a day-to-day indication of exposure desirable. Dosimeter records will furnish the exposure data for the administrative control of radiation exposure.

The applicant's description of his health physics program includes portable survey instruments and a general discussion of survey practices. However, as previously stated under area monitoring, it is the staff's position that the applicant has not presented an adequate program of surveying for inplant airborne radioactivity. It is the staff's conclusion that the applicant's health physics program is adequate with the exception of his air sampling program. Inclusion in the FSAR of the provisions mentioned under area monitoring will result in a health physics program which incorporates guidance of Regulatory Guide 8.[1] and which will provide reasonable assurance of compliance with the requirements of 10 CFR 20.

[1]U.S. Atomic Energy Commission, "Regulatory Guide 8.8, Information Relevant to Maintaining Occupational Radiation Exposures as Low as Practicable, (Nuclear Reactors), Section C.3-k", July 1973.

[2]ICRP Publication 12, "General Principles of Monitoring for Radiation Protection of Workers", International Commission on Radiological Protection, Pergamon Press, New York, May 1968.