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Docket Number 50-346

License Number NPF-3

Serial Number 1953

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United States Nuclear Regulatory Commission  
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Washington, DC 20555

Subject: Request for Exemption from 10CFR20 Appendix A to Allow Credit  
for Use of a Radioiodine Protection Factor for Mine Safety  
Appliance Company GMR-I Filter Canisters (TAC No. 75234)

Gentlemen:

By letter dated December 5, 1989, (Serial Number 1728) Toledo Edison (TE) requested the subject exemption from 10CFR Part 20 to allow credit for a radioiodine protection factor for air purifying respirators to be used at the Davis-Besse Nuclear Power Station (DBNPS). As a result of a telephone call with the NRC staff, the following additional information is submitted to support review and approval of the request.

10CFR20.103 provides standards relating to the exposure of individuals to concentrations of radioactive materials in air in restricted areas. 10CFR20.103(b) requires licensees to use process or other engineering controls to the extent practicable to limit concentration of airborne radioactivity to levels below those which delimit an airborne radioactivity area. Where it is impracticable for process or other controls to limit airborne concentrations below the level which delimits an airborne radioactivity area, 10CFR20.103(b) provides for the use of respiratory protection to maintain exposure of individuals as low as reasonably achievable (ALARA).

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Respiratory protective equipment used to limit exposure to airborne radioactivity shall be certified or have had certification extended by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA). Additionally, protection factors credited to the use of respiratory protection shall not exceed those specified in 10CFR20 Appendix A. Currently, Appendix A states that no allowance is to be made for the use of sorbents against radioactive gases or vapors. However, 10CFR20.103(d) permits the NRC to authorize higher protection factors than those specified where the need for higher protection factors exists and where it is demonstrated that the respiratory protective equipment will provide the higher protection factors under the proposed conditions of use. 10CFR20.103(e) permits the NRC to authorize the use of respiratory protective equipment which has not been certified or had certification extended by NIOSH/MSHA provided that testing or reliable test information demonstrates that the material and performance characteristics of the equipment are capable of providing the proposed degree of protection under the anticipated conditions of use.

Toledo Edison has requested an exemption from 10CFR20 Appendix A, and authorization to credit a radioiodine protection factor for the use of Mine Safety Appliance Company (MSA) GMR-I canister (Number 466270). A NIOSH/MSHA testing and certification schedule for sorbents for use for protection against radioiodine gases and vapors has not been developed.

In support of this request Toledo Edison referenced test data and canister qualification information provided by MSA and submitted to the NRC in conjunction with similar exemption requests for Farley 1 and 2 by Alabama Power Company dated January 13, 1984, by Southern California Edison Company for San Onofre Units 1, 2, and 3 dated March 20, 1985 and by Union Electric Company for the Callaway Plant dated October 22, 1985.

The MSA data constitutes reliable test information which demonstrates that the material and performance characteristics of the MSR GMR-I canister are capable of providing the proposed degree of protection under the anticipated conditions of use. The test data verifies that the MSR GMR-I canister will provide a protection factor of 50 over a continuous period of eight hours of use. Testing was conducted under conditions of cyclic flow and under worst case environmental conditions affecting service life of temperature, relative humidity, challenge concentration of methyl iodide, which is the most penetrating of the challenge forms. Testing was conducted at 110°F. A challenge concentration of 5 to 10 ppm of methyl iodide was used. Sample lots of canisters were tested to break through (1% of the challenge concentration) at 60% and 90% relative humidity. Cyclic flow of 64 liters per minute was used for the tests which is at least twice the average breathing rate that could be sustained over an eight hour period. Statistical analysis of the test results indicate that under the above test conditions and 100% relative humidity that over 99% of GMR-I canisters have a service life of well over eight hours (15.8 hours).

The conditions, limitations, and restrictions on the use of GMR-I canisters proposed by Toledo Edison in the December 5, 1989 request for exemption are conservative relative to the test results. These conditions, restrictions, and limitations on the use of GMR-I canisters will be implemented through a planned revision to Radiological Controls Procedure DB-HP-01315, Respiratory Protection Permit. Respiratory Protection Permits issued for the use of GMR-I canisters will:

- o Limit the radioiodine protection factor to a maximum of 50.
- o Require that canisters be used only with full face piece masks proven capable of providing the individual with a protection factor greater than 100 by a quantitative respirator fit test.
- o Limit the maximum permissible use time to less than eight hours after which the canister will be discarded. The use time will begin when the canister is unsealed and will include periods of non-exposure.
- o Prohibit the use of GMR-I canisters in areas where temperature exceeds 110°F. Temperatures at work locations where GMR-I canisters are in use will be measured each shift and/or coincidentally with operations which heat the work areas to assure that the 110°F limit is not exceeded.
- o Prohibit the use of GMR-I canisters in the presence of organic solvent vapors or in areas where the total challenge concentrations of organic iodines and other halogenated organic compounds (including non-radioactive compounds) greater than 1 ppm.

DBNPS administrative procedure NG-HS-00505 "Controlled Materials Program" preclude the indiscriminate use of organic solvent containing materials on site. Materials used on site are evaluated for both personnel hazards and effects on station equipment before being authorized for use on site under the controlled materials program. Operating procedures for safety related ventilation systems such as the Emergency Ventilation System and Control Room Emergency Ventilation System which employ charcoal filters include precautions and restrictions relating to use of paint and organic vapor producing processes. The existing controls on the use of organic vapor producing solvents and chemicals in conjunction with the requirements of DB-HP-01315, provide adequate restrictions to assure that GMR-I canisters will not be used in organic vapor environments.

Since radioiodine breakthrough is not directly detectable by the user, Toledo Edison recognizes its responsibility to assure the quality and performance of MSA GMR-I canisters. Prior to crediting an iodine protection factor for MSA GMR-I canisters, Toledo Edison will verify that the MSA GMR-I canisters will meet the standards for quality assurance and quality control which are recognized by NIOSH

(i.e. Mil-STD 414). Specifically this includes a 1% Acceptable Quality Limit (AQL) in a 5 to 10 ppm challenge concentration of methyl iodide, 90% relative humidity, 110°F, 64 LPM cyclic flow, for a service life of eight hours or more at a penetration equal to 1% of the challenge concentrations. Prior to NIOSH certification of MSA GMR-I canisters this verification will be made through Toledo Edison acceptance and periodic review of the MSA QA controls for the GMR-I canisters.

Prior to use, canisters purchased from MSA, will be stored in sealed humidity barrier packaging in a cool dry environment. Canisters will be maintained in Class "A" storage (as defined by ANSI N45.2.2) in accordance with DBNPS procedure EN-DP-00070 except for those maintained in the respirator issue area for ready issuance. MSA test results submitted to the NRC by Union Electric (August 29, 1986) in support of the Callaway Plant exemption request, demonstrate that the canister seals provide an effective barrier against any adverse effects of temperature/humidity in storage. These measures ensure that the canisters will perform as required during use.

Toledo Edison's December 5, 1989 exemption request included program verification measures to be used during the initial implementation of MSA GMR-I canisters. These measures included weekly whole body counts; whole body counts at 30 MPC hours in the seven consecutive days prior to next entry into a radioiodine atmosphere; health physics evaluation of individuals whose whole body count indicates a thyroid uptake of 35 nCi or greater of iodine; and, compilation of whole body count data to assess the effectiveness of the program. Toledo Edison has reassessed these verification measures in view of differences with verification measures employed in conjunction with similar exemptions at other plants. The revised following program verification measures will be used during initial canister implementation:

- a. Weekly whole body counts of individuals using the GMR-I canister for radioiodine protection will be performed;
- b. A whole body count will be given to individuals who exceed 10 MPC hours in seven consecutive days prior to their next entry into a radioiodine atmosphere;
- c. If an individual measures any iodine uptake to the thyroid during a whole body count following use of GMR-I canisters, the individual will be restricted from further entries into radioiodine atmospheres pending a health physics evaluation;
- d. A whole body count survey data base will be compiled to evaluate the results of the program.

After an adequate data base has been accumulated to support the effectiveness of the GMR-I canisters, these verification measures will be reviewed and if supported by the data, relaxed accordingly. The verification measures described above will be implemented through a planned revision to DBNPS Radiological Controls Procedure DB-HP-00002, Internal Exposure Control Program.



Toledo Edison requested the exemption to permit the use of air purifying respirators as another means of maintaining personnel exposure as low as reasonably achievable. Although Toledo Edison has not identified specific tasks it is expected that the use of air purifying respirators in lieu of air line supplied or self-contained breathing apparatus can reduce personnel exposure on the order of 25 percent. The use of air purifying respirators provides increased worker comfort and mobility. The corresponding increase in efficiency and decrease in exposure time on the job can result in overall dose savings.

During Cycle 7 operation the need for this exemption has increased. Increased levels of reactor coolant system (RCS) activity have been experienced due to a small number of leaking fuel rods in the reactor core. In addition, a small primary to secondary leak and small RCS-to-component cooling water (CCW) system leak have resulted in increased levels of activity in these systems. As a result of these increased levels of activity, respiratory protection may be required to support work on these systems during the upcoming seventh refueling outage (7RFO).

Toledo Edison plans to inspect fuel assemblies which are to be reinserted into the reactor during the 7RFO to identify leaking fuel rods. Toledo Edison has requested NRC approval of a license amendment to permit reconstitution of affected fuel assemblies to eliminate leaking fuel pins from the reactor core.

In order to ensure fuel cladding integrity, Toledo Edison audits the Babcock & Wilcox (B&W) fuel fabrication quality assurance program, and performs receipt fuel inspections at the DBNPS. DBNPS operating procedures include restrictions on rate of power changes in accordance with B&W guidelines to reduce the potential for fuel degradation.

In addition to maintaining fuel integrity, Toledo Edison employs other practices to reduce the levels of airborne radioiodine. During plant cooldown for refueling, the containment is purged as soon as permitted by Operating License Appendix A Technical Specifications to reduce airborne contamination as much as practical. Other areas such as mechanical penetration rooms are normally purged continuously during plant operation. During plant cooldown, the makeup and purification system removes contaminants from the RCS. During cooldown for the 7RFO, Toledo Edison plans to chemically induce a crud burst in the RCS to maximize the removal of contaminants from the RCS by the makeup and purification system during cooldown.

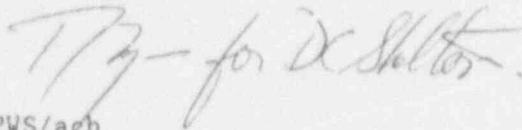
ALARA planning is an integral part of outage planning at the DBNPS. Radiological Controls procedure DB-HP-01800, ALAPA Job Review, provides for job planning to maintain exposure ALARA. The ALARA job review considers the needs for engineering controls, such as portable HEPA filters and temporary containments, to reduce airborne contamination levels as low as practical.

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Toledo Edison considers that approval of the requested exemption will further enhance the effectiveness of Toledo Edison's radiological controls program. Toledo Edison requests approval of the exemption by September 1, 1991, so that it may be utilized during the upcoming refueling outage.

If you have any questions regarding the information provided by this letter, please contact Mr. R. W. Schrauder, Manager - Licensing at (419) 249-2366.

Very truly yours,

A handwritten signature in dark ink, appearing to read "PWS for R. W. Schrauder". The signature is fluid and cursive.

PWS/aeh

cc: P. M. Byron, NRC Region III, DB-1 Senior Resident Inspector  
A. B. Davis, Regional Administrator, NRC Region III  
J. B. Hopkins, NRC/NRR DB-1 Senior Project Manager  
Utility Radiological Safety Board