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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 15, 1980

Docket No. 50-10

Ms. Bobbie Fern
606 W. Nevada
Urbana, Illinois 61801

Dear Ms. Fern:

This is in response to your recent letter to Chairman John Ahearne, which expressed your concern related to the chemical decontamination of Dresden Nuclear Power Station, Unit No. 1.

We have been reviewing this project since Commonwealth Edison's initial decontamination proposal on December 12, 1974. On December 9, 1975, we issued a conditional authorization which allowed Commonwealth Edison to initiate the chemical decontamination subject to the completion of three items which would be resolved as follows:

1. The testing program will be completed and the results submitted for the review and approval of the NRC staff prior to performing the proposed chemical cleaning.

2. A pre-service inspection program for the primary coolant boundary will be formulated and submitted for NRC review and approval prior to returning the reactor to service.

3. A post-cleaning surveillance program which includes additional surveillance specimens and a specimen withdrawal and examination schedule will be submitted for NRC review and approval prior to returning the reactor to service.

A copy of our Safety Evaluation in support of these actions is enclosed for your information.

Since our 1975 authorization Commonwealth Edison has completed its materials test program and construction of the necessary support facilities to carry out the project in a safe and environmentally acceptable manner. Our review of the testing program and the facility construction is continuing and will be completed prior to the chemical cleaning that is currently scheduled for early 1980.

The decontamination process involves the circulation of a Dow Chemical Company cleaning solvent through the reactor primary cooling system. The solvent, identified as NS-1, has been developed to remove the thin, tightly adherent, layer of highly radioactive oxide that has formed on the inside surfaces of the Dresden 1 primary cooling system.

The solvent will preferentially dissolve the oxide without significantly attacking the underlying base metal of the primary cooling system piping.

After removal of the uranium fuel, the solvent will be circulated through the primary coolant system for approximately 100 hours at about 250°F. After circulation the solvent and the dissolved oxides will be drained from the reactor to a waste treatment facility located adjacent to the reactor. Any remaining solvent will be cleaned from the reactor by rinsing with demineralized water. The rinse water and solvent will be stored in the waste treatment facility storage tanks until processed to concentrate and solidify the solvent and dissolved radioactive corrosion products.

The decontamination will be carried out entirely within a closed system and all waste processing will be accomplished within a specially designed, earthquake proof, leak tight, building. All transporation of radioactive wastes will be done in accordance with all applicable NRC and Department of Transporation regulations. Because of these precautions, there will be no increased hazard to the health and safety of the citizens of Illinois or any degradation of the environment in Illinois.

After processing the concentrated waste solution will be solidified in 55 gallon drums using a process developed by the Dow Chemical Company for the solidification of low level radioactive wastes. This solidification process has been tested on the NS-1 solvent and produced a solid waste form that contained no free liquids. The waste solidification procedures include a quality control process test on each barrel of waste to provide additional assurance that the liquid waste has been properly solidified.

After solidification the waste drums will be transported by a commercial radioactive waste carrier to a licensed solid waste burial ground such as Beatty, Nevada or Hanford, Washington. These arid, desert sites have been specifically selected for the disposal of the Dresden waste to further assure that there is no interaction of the waste with ground water. Because the waste is in a solid form, the ground water level is approximately 300 feet below the surface, and the burial sites are located in remote, uninhabited locations, there is adequate assurance that the waste will remain isolated from potential pathways for exposure of the population.

The cost of the Dresden 1 decontamination has been estimated at 36 million dollars. Much of this cost represents one time development costs which would not be incurred in subsequent reactor decontamination at Dresden 1 or other nuclear facilities. At this time there are no plans to decontaminate the primary cooling system of other U. S. nuclear facilities,

however, preliminary estimates of the cost for decontamination currently operating U. S. reactors range from 1 million to 5 million dollars per reactor and would vary depending on the extent of modification required at a specific facility to perform the decontamination.

The decontamination of reactor primary cooling systems will reduce the radiation exposure levels in the areas of these systems, thereby permitting greater access to the system for inspection, modifications, and repairs. These activities provide greater assurance of the continued safe operation of the reactor and are therefore in the best interest of the health and safety of the public. Furthermore, the decontamination will reduce the occupational exposure of the individuals employed at Dresden.

With respect to requests for the preparation of an Environmental Impact Statement for the Dresden Unit 1 decontamination, the Nuclear Regulatory Commission is fully committed to satisfying all requirements of the National Environmental Policy Act (NEPA). Our regulations which implement the NEPA requirements are contained in Title 10, Part 51.5, of the United States Code of Federal Regulations. These regulations are in conformance with guidelines issued by the President's Council on Environmental Quality which were in effect prior to July 30, 1979. They identify the following types of actions for which NRC must prepare an environmental impact statement:

> "(1) Issuance of a permit to construct a nuclear power reactor, testing facility, or fuel reprocessing plant pursuant to Part 50 of this chapter;
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> (2) Issuance of a full power or design capacity license to operate a nuclear power reactor, testing facility, or fuel reprocessing plant pursuant to Part 50 of this chapter;
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> (3) Issuance of a permit to construct or a design capacity license to operate an isotopic enrichment plant pursuant to §50.22 of this chapter;
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> (4) Issuance of a license to possess and use special nuclear material for processing and fuel fabrication, scrap recovery, or conversion of uranium hexafluoride pursuant to Part 70 of this chapter;
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> (5) Issuance of a license to possess and use source material for uranium milling or production of uranium hexafluoride pursuant to Part 40 of this chapter;
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> (6) Issuance of a license authorizing commerical radioactive waste disposal by land burial pursuant to Parts 30, 40, and/or 70 of this chapter;

(7) Conversion of a provisional operating license for a nuclear power reactor, testing facility or fuel reprocessing plant to a full power or design capacity license pursuant to Part 50 of this chapter where no final environmental impact statement has been previously prepared;

(8) Issuance of a license to manufacture pursuant to Appendix M of Part 50 of this Chapter;

(9) Amendments of Parts 30 and 40 of this chapter concerning the exemption from licensing and regulatory requirements of any equipment, device, commodity or other product containing byproduct material or source material; and

(10) Any other action which the Commission determines is a major Commission action significantly affecting the quality of the human environment."

The Commission is presently in the process of modifying our Environmental Protection regulations to take into account, voluntarily, the regulations promulgated by CEQ which became effective July 30, 1979. We have concluded that this action is not one of these actions requiring an environmental impact statement under current Commission regulations.

While our regulations do not require the preparation of an environmental impact statement, we are evaluating the environmental impact of the proposed action to determine whether an environmental impact statement should be prepared because of specific circumstances related to this particular action. If it is determined that an environmental impact statement need not be prepared, a negative declaration and environmental impact appraisal will be prepared in accordance with Sections 51.7 and 51.50(d) of our procedures for environmental protection. We will complete our review and issue the appropriate statement or appraisal prior to the Dresden decontamination.

The chemical decontamination of nuclear reactors is not an experimental process. Over the past twenty years, extensive experience has been obtained in the decontamination of reactor components such as pumps, valves, heat exchangers, and pipes. This experience has demonstrated that radioactive contamination can be removed from reactor components and significantly reduce the occupational radiation exposure to personnel who require access to these components for purposes of repair, inspection or modification. Such components have been cleaned, inspected, and returned to service without any evidence of damage caused by decontamination.

In addition to the decontamination of reactor components, at least eighteen reactor primary cooling systems or parts of those systems have been decontaminated in the United States since the early 1960's. Table 1 identifies these and other major decontaminations that have taken place to date throughout the world:

TABLE 1

Plutonium Recycle Test Reactor		1962
Shippingport PWR		1964
Plutonium Recycle Test Reactor		1965
Hanford, N Reactor	15 major decontam.	1964 to present
SENA Power Plant	Chooz, France	1967
Rheinsberg PWR	Rheinsberg, Germany	1968
Douglas Point	Canada	1970
NPD	Canada	1973
Gentilly	Canada	1973
Douglas Point	Canada	1975
Dresden Unit 1	Test Loop using Dow NS-1 Solvent	1976
Peach Bottom	Regenerative Heat Exchanger using DOW NS-1	1977

In summary, the Dresden decontamination has been carefully planned to improve the safety of the reactor and reduce the exposure of plant personnel to radiation. The waste produced by the process is similar in type and quantity to the waste routinely produced at Dresden and its processing, transportation, and disposal will not cause any new hazards not previously evaluated and deemed acceptable.

Sincerely,

Richard H. Vollmer, Acting Assistant
Director for Systematic Evaluation
Program
Division of Operating Reactors

Enclosure:
Safety Evaluation

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AUTHORIZATION TO CHEMICALLY DECONTAMINATE THE PRIMARY COOLING SYSTEM AT DRESDEN UNIT 1

COMMONWEALTH EDISON COMPANY

DRESDEN NUCLEAR POWER STATION UNIT 1

DOCKET NO. 50-10

INTRODUCTION

By letters dated December 16, 1974, April 1, 1975 and April 14, 1975, the Commonwealth Edison Company (CECo) requested authorization to carry out a chemical decontamination of the interior surfaces of the Dresden Unit 1 primary coolant system.

The purpose of the decontamination is to remove a deposition of activated corrosion products which is tightly bonded to the primary coolant system piping and components. The presence of the corrosion products in the system results in high levels of radiation in adjacent areas and limits access to these areas for the purpose of in-service inspection, routine maintenance and plant modifications.

CECo has tentatively scheduled the chemical cleaning project to begin in January 1977 with an anticipated return to service scheduled for July 1977.

EVALUATION

The staff's review of CECo's proposed chemical decontamination of the interior surfaces of the Dresden Unit 1 primary coolant system has been completed. The results of this review are as follows:

1. Environmental Impact

   The chemical decontamination of the Dresden 1 primary coolant system will be performed entirely within a closed decontamination system. The system has been designed so that no chemical or radiological wastes will be released to the environment from the decontamination process. All wastes generated in the process will be either solidified for offsite burial at a licensed burial ground or reprocessed for reuse onsite. The solid wastes produced are similar in type and quantity to those handled routinely at the site. Therefore, no adverse environmental impacts are anticipated due to the decontamination.

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2. Materials Compatibility

The staff has reviewed the results of the material testing program that has been carried out in support of the proposed Dresden 1 decontamination program. The test program was organized to look at corrosive effects during the decontamination process and possible residual effects during subsequent reactor operation.

Based upon our review of the results of the testing program completed to date, we have concluded that the test program adequately evaluated those aspects of the materials compatibility that we consider to be important. As a result of our discussions with CECo's consultant, Dr. Craig Cheng of Argonne National Laboratory, we find that the remaining program will be conducted in a manner that will answer our presently unresolved concerns and the test results will be adequately interpreted and reported.

We conclude that upon the successful completion of the testing program described in the submittals and with an adequate surveillance and inspection program, the Dresden Nuclear Power Station Unit 1 can be subjected to the described chemical cleaning process without undue corrosion or other deleterious materials compatibility effects that would adversely effect the integrity of the primary coolant system and connected systems.

A small number of items of concern have not been resolved to the staff's full satisfaction at this time. However, we conclude that authorization to carry out the chemical decontamination should be granted in anticipation of the successful resolution of these open items in the near future. The following open items are identified at this time as requiring resolution to the staff's satisfaction:

(a) The materials test program will be completed and the test results will be analyzed and reviewed prior to the beginning of the cleaning process.

(b) Surveillance specimens in addition to those now planned will be determined by mutual agreement with the applicant and a schedule for specimen withdrawal will be stated.

(c) A pre-service inspection program for the primary coolant boundary and safety related systems will be formulated and performed prior to return to power.

3. Effluent Treatment Systems

We have determined that the effluent treatment system, if constructed as described in the CECo submittals, is capable of handling the types and quantities of effluents expected to be generated by the decontamination program. Our review was limited to the use of the system for chemical decontamination only, and use of the system for any other purpose subsequent to that program must be reviewed prior to such use.

4. Radiological Safety

We have further concluded that the radiological safety program described in the submittals is adequate to assure that the health and safety of the public and the onsite personnel will not be endangered by the Dresden 1 decontamination project.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the chemical cleaning does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the cleaning project does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: December 9, 1975