

September 11, 1989

Docket No. 50-320

Mr. Michael B. Roche
Vice President/Director
Three Mile Island Unit 2
GPU Nuclear Corporation
P. O. Box 480
Middletown, Pennsylvania 17057

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Dear Mr. Roche:

SUBJECT: ISSUANCE OF AMENDMENT (TAC NO. 62068) AND APPROVAL OF THE
TER ON PROCESSED WATER DISPOSAL SYSTEM (TAC NO. 71119)

The Commission has issued the enclosed Amendment No. 35 to Facility Operating License No. DPR-73 for the Three Mile Island Nuclear Station, Unit No. 2, in response to your letter dated February 25, 1987 and revised April 13, 1987. (Technical Specification Change Request No. 56).

Additionally the Commission has approved, subject to the restrictions contained in the enclosed Safety Evaluation your Technical Evaluation Report (TER) on the Processed Water Disposal System submitted by letter dated October 7, 1988.

The amendment modifies the Appendix A Technical Specifications by deleting the prohibition, imposed by Technical Specification 3.9.13 and on disposal of the Accident Generated Water (AGW). The amendment does retain the requirement for prior NRC approval of procedures associated with the disposal of the AGW. The approval of the TER on the Processed Water Disposal System approves disposal of the AGW by evaporation subject to the restrictions provided in the enclosed Safety Evaluation.

Also enclosed is a Notice of Issuance which has been sent to the Office of the Federal Register for publication.

Sincerely,

/s/

Michael T. Masnik, Senior Project Manager
Project Directorate 1-4
Division of Reactor Projects - 1/11
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 35 to DPR-73
2. Safety Evaluation
3. Notice of Issuance

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cc w/enclosures:

See next page

[TMI AMEND 71119]

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PD:PD1
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CPW
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 11, 1989

Docket No. 50-320

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Vice President/Director
Three Mile Island Unit 2
GPU Nuclear Corporation
P. O. Box 480
Middletown, Pennsylvania 17057

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Sincerely,

A handwritten signature in cursive script, appearing to read "Michael T. Masnik".

Michael T. Masnik, Senior Project Manager
Project Directorate I-4
Division of Reactor Projects - I/11
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 35 to DPR-73
2. Safety Evaluation
3. Notice of Issuance

cc w/enclosures:
See next page

Mr. M. B. Roche
GPU Nuclear Corporation

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Unit No. 2

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

GPU NUCLEAR CORPORATION

DOCKET NO. 50-320

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 35
License No. DPR-73

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by GPU Nuclear Corporation, (the licensee) dated February 25, 1987 and revised April 13, 1987 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.c.(2) of Facility Operating License No. DPR-73 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 35, are hereby incorporated in the license. GPU Nuclear Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



John F. Stoiz, Director
Project Directorate I-4
Division of Reactor Projects - 1/11
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 11, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 35

FACILITY OPERATING LICENSE NO. DPR-73

DOCKET NO. 50-320

Replace the following page of the Appendix A Technical Specifications with the attached page. The revised page is identified by amendment number 35 and contains vertical lines indicating the area of change.

Remove

Page 3.9-3

Insert

Page 3.9-3

LIMITING CONDITIONS FOR OPERATION

3.9.12.2 The Auxiliary Building Air Cleanup Exhaust System shall be OPERABLE with one of the four system air cleanup exhaust fans OPERABLE.

APPLICABILITY: MODES 1, 2, 3

ACTION:

With the Auxiliary Building Air Cleanup Exhaust System inoperable, restore the system to OPERABLE status within 4 hours or, suspend all operations involving movement of liquid and solid radioactive wastes in the Auxiliary Building (other than sampling evolutions required by the Technical Specifications or RECOVERY OPERATIONS PLAN), the release of which could exceed 50% of the Appendix B Technical Specification instantaneous release rate for gaseous effluents, until the system is restored to OPERABLE status.

ACCIDENT GENERATED WATER

3.9.13 ACCIDENT GENERATED WATER shall be disposed of in accordance with NRC-approved procedures.

APPLICABILITY: MODES 1, 2 and 3

ACTION:

None except as provided in Specification 3.0.3.

UNITED STATES NUCLEAR REGULATORY COMMISSIONGPU NUCLEAR CORPORATIONDOCKET NO. 50-320NOTICE OF ISSUANCE OF AMENDMENT TOFACILITY OPERATING LICENSE

The U.S. Nuclear Regulatory Commission (Commission) has issued Amendment No. 35 to Facility Operating License No. DPR-73 issued to GPU Nuclear Corporation (the licensee), which revised the Technical Specifications for operation of the Three Mile Island Nuclear Station Unit 2 located in Dauphin County, Pennsylvania. The amendment is effective as of the date of issuance.

The amendment modifies Appendix A Technical Specifications by deleting the prohibition on disposal of the accident generated water (AGW) at the plant. In 1986 the licensee submitted a plan to dispose of the AGW by forced evaporation and atmospheric release of the 2.3 million gallons of AGW resulting from the March 28, 1979 accident at TMI-2. The NRC staff updated the 1981 Programmatic Environmental Impact Statement (PEIS) in June 1987 with the publication of the final Supplement 3 to the PEIS dealing with disposal of the AGW.

On February 25, 1987 the licensee requested a change to the Technical Specifications deleting the prohibition for disposal of the AGW. This request to amend the license was revised on April 13, 1987.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment.

Notice of Consideration of Issuance of Amendment and Opportunity for Hearing in connection with this action was published in the FEDERAL REGISTER on July 31, 1987 (52 FR 28626). A hearing before an Atomic Safety and Licensing Board Panel (ASLBP) was held in November 1988. On February 2, 1989 the ASLBP issued a final initial decision finding in favor of the licensee in all relevant matters and recommending that the requested amendment to the license be authorized. On April 13, 1989 the Commission affirmed the Licensing Board's February 3, 1989 decision and determined that the licensee's application for an operating license amendment, when issued by the staff, should become effective immediately. The Commission found no reason to stay the effectiveness of the Licensing Board's decision pending completion of the appeals process.

Based upon the findings of Supplement 2 to the PEIS, the ASLBP final initial decision and the staff's safety evaluation, the Commission has concluded that the issuance of this amendment will not have a significant effect on the quality of the human environment.

For further details with respect to the action see (1) the application for amendment dated February 25, 1987, revised April 13, 1987, (4) Amendment No. 35 to License No. DPR-73, which includes the NRC staff's Safety Evaluation

(2) the Commission's related evaluation of this amendment is contained in Supplement 2 to the Programmatic Environmental Impact Statement dated June 1987 and a Safety Evaluation dated September 11, 1989, and (3) the Commission's Environmental Assessment dated August 31, 1989 published in the FEDERAL REGISTER on September 11, 1989 (54 FR 37517). All of these items are available for public inspection at the Commission's Public Document Room, the Gelman Building, 2120 L Street N.W., Washington, D.C. and at the Government Publications Section, State Library of Pennsylvania, Walnut Street and Commonwealth Avenue, Box 1601, Harrisburg, Pennsylvania 17105. A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Reactor Projects - 1/11.

Dated at Rockville, Maryland this 11th day of September 1989.

FOR THE NUCLEAR REGULATORY COMMISSION



Michael T. Masnik, Project Manager
Project Directorate 1-4
Division of Reactor Projects - 1/11
Office of Nuclear Reactor Regulation



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 35 TO FACILITY OPERATING LICENSE NO. DPR-73

GPU NUCLEAR CORPORATION

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 2

DOCKET NO. 50-320

1.0 INTRODUCTION

GPU Nuclear Corporation (GPUN, the licensee) submitted a proposal to dispose of 2.3 million gallons of accident generated water (AGW) stored at Three Mile Island, Unit 2 (TMI-2) using an evaporation process. Accident generated water is defined as:

- a. Water that existed in the TMI-2 Auxiliary, Fuel Handling, and Containment Buildings including the primary system as of October 16, 1979, with the exception of water which as a result of decontamination operations becomes commingled with non-accident generated water such that the commingled water has a tritium content of 0.025 uCi/ml of tritium or less before processing;
- b. Water that has a total activity of greater than one uCi/ml prior to processing except where such water is originally non-accident water and becomes contaminated by use in cleanup;
- c. Water that contains greater than 0.025 uCi/ml of tritium before processing.

The NRC staff, in response to the licensee's February 25, 1987 (revised April 13, 1987) application for a change in the TMI-2 technical specifications to allow the disposal of the AGW, prepared Final Supplement 2 to the Programmatic Environmental Impact Statement (PEIS) related to decontamination and disposal of radioactive wastes resulting from the March 28, 1979 accident. Final Supplement 2 to the PEIS, issued in June 1987, evaluated the licensee's proposal to evaporate the AGW as well as a number of alternatives. A Notice of Consideration of Issuance of Amendment and Opportunity for Hearing in connection with this action was published in the FEDERAL REGISTER on July 31, 1987 (52 FR 28626). A hearing before an Atomic Safety and Licensing Board Panel (ASLBP) was held in November 1988. On February 2, 1989 the ASLBP issued a final initial decision finding in favor of the licensee in all relevant matters and recommending that the requested amendment to the license be authorized. On April 13, 1989 the Commission affirmed the Licensing Board's February 2, 1989 decision and determined that the license amendment would be effective immediately upon issuance by the NRC staff. The Commission found no reason to stay the effectiveness of the Licensing Board's decision pending completion of the appeals process.

SPUN submitted a system description (reference b), a technical evaluation report (reference c) and additional supporting documentation (ref d and e) in response to NRC staff requests for further information (reference f and g) as a result of the staff's detailed review of the processed water disposal system.

2.0 DESCRIPTION OF THE EVAPORATOR SYSTEM

The processed water disposal system has two subsystems the evaporator subsystem and the packaging subsystem.

The evaporator subsystem actually contains four separate components which change water from the aqueous to a vapor form. Two of these components are designated as evaporators, one as a dryer, and the final one is designated as a vaporizer. Water to be evaporated is routed to a source or feed tank where it is sampled and analyzed to verify proper influent specifications. This influent water will have an average influent concentration of approximately 4000 ppm of solids, principally boron and sodium. The influent water then passes through a vapor-recompression vaporizer. The distillate from this process will normally have achieved a decontamination factor (DF) of 1000 or greater.

During initial operations the distillate will be routed to a distillate tank for sampling and analysis to verify that the required DF has been achieved. The water will then be pumped through a vaporizer where it will be heated under pressure then flashed to steam. After verifying that boron concentration in the distillate can be used to monitor DF, the licensee may use a coupled mode in which the distillate will go directly to the vaporizer. The concentrated solution, (bottoms) containing about 5-10 times the dissolved solids content of the influent is continuously recirculated through the concentrate tank. A portion of the recirculating concentrate is continuously drawn off to feed an auxiliary evaporator and auxiliary concentrate tank for further concentration. The distillate from the auxiliary evaporator will be returned to the main evaporator system. The bottoms from the auxiliary concentrate tank which will be in the 20-40% solids concentration range will be sent to a dryer and pelletizer. The dryer uses electrical strip heaters to dry the incoming liquid or slurry. The vapor from the dryer is condensed and the distillate returned to the main concentrates tank.

The dry solid waste from the blender/dryer is transferred to the second major subsystem of the processed water disposal system the packaging subsystem. The solids are discharged to a pellet mill and extruded into solid pellets. The pelletizer and drum filling station are in an enclosure which is maintained under negative pressure by a high efficiency particulate absolute (HEPA) filter system. The dried pelletized bottoms will be packed into 55 gallon drums and shipped by truck to the low level waste disposal grounds near Richland, Washington.

Final Supplement 2 to the PEIS assumed certain criteria for operation of processed water disposal system. Operating the system within the criteria provided by Supplement 2 would result in an acceptable level of impact. These criteria pertained to the characterization of the influent AGW, the decontamination factor of the disposal system, the system inventory of AGW at any given time (for estimating the potential impacts associated with accidents) and the characteristics of the evaporator bottoms and the associated shipping campaign (for estimating impacts associated with processing, packaging, and shipment of the evaporator bottoms).

3.0 EVALUATION

The technical issues concerning the evaporator system are:

1. Preprocessing of water to achieve the base case radionuclide concentrations described in PEIS Supplement 2 (reference a).
2. The ability of the evaporator system to achieve a decontamination factor (DF) of 1000 while processing base case water.
3. The ability of the licensee to monitor effluents from the process stack and the building ventilation during routine and off normal conditions.
4. Potential accidents associated with the use of the evaporator.
5. Potential for any safety problems in the transporting of evaporator bottom to the LLW disposal site.

The licensee has several systems which could be used alone or in combination as a preprocessor to achieve the base case assumed in PEIS Supplement 2. These include the EPICOR system, the Submerged Demineralizer System (SDS, which would have to be reactivated prior to use), the defueling water cleanup system (DWCS), and the evaporator system itself in a closed cycle mode. Verification that preprocessing has achieved base case or lower concentrations is easily confirmed by the licensee's sampling program. Samples will be taken and analyzed after preprocessing prior to using the water as a feed source to the evaporator system. The staff is satisfied that the licensee has adequate resources available to achieve and verify base case (or better) feedwater to the evaporator system.

The staff has evaluated GPUN's system description (reference b), technical evaluation report (TER), (reference c), evaporator test report, (reference h) and the supplemental information on the TER (reference f). The staff has concluded that the evaporator system is capable of achieving a DF of 1000 or greater in the feed to the vaporizer. This determination is based on a detailed review of the system, the results of surrogate AGW testing by the manufacturer, and the ability of the licensee to change the processed control system to vary the DF. GPUN has satisfactorily described a program which will use boron concentrations and effluent samples to control the process such that the required average DF is being achieved. Alternate control methods may prove more advantageous after the licensee completes an additional onsite testing program using a non-radioactive surrogate. The staff finds it acceptable to use alternate control systems provided that they are either incorporated in procedures subject to NRC review and approval or a revised description is submitted to the NRC in licensing basis documents.

The licensee's process and effluent monitoring system shall include a compositing sampler on the vaporizer feed line and a continuous air monitor (CAM) in the process area near the building ventilation exhaust. GPUN radiological controls personnel will evaluate the positioning of the CAM on a quarterly basis to assure that the results from this device conservatively represent the effluent from the building exhaust. In the event that the compositing sampler or CAM become inoperable, grab samples may be taken every 4 hours for up to 1 week. If the sampling equipment is not returned to service within 1 week, the evaporator system shall be shut down. The licensee has the capability to measure routine and non-routine effluents from the evaporation process and from non-process sources such as maintenance and system leaks.

The staff also evaluated potential accidents associated with the evaporator system. The source term in the accident generated water, which is fully described in PEIS Supplement 2 (reference a) is small and very dilute. Only a small fraction of the water and resulting solids would be in the process building at any time. Potential offsite dose consequences of liquid spills, dry spills and filter failure were evaluated by the licensee and the NRC. In all cases, the results were less than 0.1 mrem. This is a small portion of 10 CFR 50 Appendix I objectives and very small in relation to 10 CFR 20 or 10 CFR 100 limits.

Transportation of the solidified evaporator bottoms was evaluated in PEIS Supplement 2 and an additional environmental assessment dated . Radiation levels at 3 ft. from an individual 55 gallon drum are expected to be less than 0.2 mrem/hour. The pelletized waste will be shipped in accordance with Department of Transportation (DOT) regulations. Routine exposure from the shipments was conservatively estimated to be 7.1 person-rem, approximately half of which is attributed to the truck crews. The probabilistic exposure risk from transportation accidents which integrates probability and outcome was 0.16 person-rem for the entire shipping program.

4.0 ENVIRONMENTAL CONSIDERATION

The staff fully considered the environmental consequences of the proposed action in Final Supplement 2 to the PEIS published in June 1987, and an environmental assessment and finding of no significant impact was published in the Federal Register on September 11, 1989 (54 FR 37517). Furthermore a hearing was held in November 1988 to further supplement the record on environmental considerations. The staff concludes that the proposed action will not have a significant effect on the quality of the human environment.

5.0 CONCLUSIONS

The NRC staff has reviewed and evaluated the proposed use of the processed water disposal system to evaporate the accident generated water at Three Mile Island Unit 2. These activities, subject to the limitations in this safety evaluation, fall within the scope of activities previously considered in PEIS Supplement 2 and the staff's environmental assessment.

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 REFERENCES

- a. Programmatic Environmental Impact Statement related to decontamination and disposal of radioactive wastes resulting from March 28, 1979 accident at Three Mile Island Nuclear Station, Unit 2, Supplement 2 (NUREG 0683, supplement 2), June 1987
- b. GPUN letter 4410-88-L-0012/0335P dated February 16, 1988, from F. R. Standerfer to NRC with attached Accident Generated Water Disposal System Description
- c. GPUN letter 4410-88-L-0168/0428P, dated October 7, 1988 from M. B. Roche to NRC with attached Processed Water Disposal System Technical Evaluation Report (TER).
- d. GPUN letter 4410-89-L-0038/0455P dated April 17, 1989 from M. B. Roche to NRC re Processed Water Disposal System TER
- e. GPUN letter 4410-89-L-0067/0469P dated June 7, 1989 from M. B. Roche to NRC re Processed Water Disposal System TER
- f. NRC letter dated February 16, 1989 from J. F. Stolz to M. B. Roche, GPUN, re Processed Water Disposal System TER
- g. NRC letter dated May 31, 1989 from M. B. Masnik to M. B. Roche, GPUN, re Processed Water Disposal System
- h. GPUN memorandum with attachments, dated February, 16, 1989 from J. A. Thomas to O. R. Buchannan re Licon Aquavap Testing Program

Principal Contributors: Lee H. Thonus, Linda F. Munson

Dated: September 11, 1989