

January 26, 1984

Docket No. 50-219
LS05-84-01-043

(see meeting letter)
DATED 5-15-86

Mr. P. B. Fiedler
Vice President and Director
Oyster Creek Nuclear Generating Station
Post Office Box 388
Forked River, New Jersey 08731

Dear Mr. Fiedler:

SUBJECT: CORE SPRAY SPARGERS

Re: Oyster Creek Nuclear Generating Station

The Commission has issued the enclosed Amendment No. 70 to Provisional Operating License No. DPR-16 for the Oyster Creek Nuclear Generating Station. This amendment consists of changes to the license in response to your application dated May 21, 1982, as supplemented by letters dated November 5, 1982, May 13, 1983 and October 11, 1983.

The amendment modifies Paragraph 2.C.(7) of the license to require inspections by a method acceptable to the NRC of both core spray spargers and repair assemblies at each refueling outage.

A Notice of Consideration of Issuance of Amendment to License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on October 26, 1983 (48 FR 49587). No request for hearing was received. By letter dated January 3, 1984, the staff received comments from Mr. David M. Scott, New Jersey Department of Environmental Protection relating to the requested action. These comments are addressed in the enclosed Safety Evaluation, which Mr. Scott is receiving by carbon copy of this letter.

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This action will appear in the Commission's Monthly Notice publication in the Federal Register.

Sincerely,

Original signed by

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosures:

- 1. Amendment No. 70 to License No. DPR-16
- 2. Safety Evaluation

cc w/enclosures:

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Docket No. 50-219

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Oyster Creek Nuclear Generating Station
Post Office Box 388
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A Notice of Consideration of Issuance of Amendment to License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on October 26, 1983 (48 FR 49587). No request for hearing and no comments were received.

A copy of our related Safety Evaluation is also enclosed. This action will appear in the Commission's Monthly Notice publication in the Federal Register.

Sincerely,

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosures:

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- 2. Safety Evaluation

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DCrutchfield
/ /83

DL: AD/SA
FMiraglia
/ /83

Mr. P. B. Fiedler

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January 26, 1984

cc

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

GPU NUCLEAR CORPORATION

AND

JERSEY CENTRAL POWER & LIGHT COMPANY

DOCKET NO. 50-219

OYSTER CREEK NUCLEAR GENERATING STATION

AMENDMENT TO PROVISIONAL OPERATING LICENSE

Amendment No. 70
License No. DPR-16

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by GPU Nuclear Corporation and Jersey Central Power and Light Company (the licensees) dated May 21, 1982 as supplemented by letters dated November 5, 1982, May 13, 1983, and October 11, 1983, 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, Provisional Operating License No. DPR-16 is hereby amended by changing Paragraph 2.C.(7) to read as follows:

(7) Inspections by a method acceptable to the NRC of all accessible surfaces and welds of both core spray spargers and repair assemblies at each refueling outage will be performed so that meaningful comparisons of any indications with previous inspections can be made. Results of the inspections along with an evaluation of the safety significance of any new or progressing indications will be provided to the Commission's staff for review. Authorization will be obtained from the Commission's staff before the plant is restarted from the refueling outage. Should the staff determine that new cracks or further progression of existing cracks has occurred resulting in unacceptable degradation of safety margins, the sparger will be replaced prior to restart.

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

FOR THE NUCLEAR REGULATORY COMMISSION


Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Date of Issuance: January 26, 1984



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 70 TO PROVISIONAL OPERATING LICENSE NO. DPR-16
GPU NUCLEAR CORPORATION AND
JERSEY CENTRAL POWER & LIGHT COMPANY
OYSTER CREEK NUCLEAR GENERATING STATION
DOCKET NO. 50-219

1.0 INTRODUCTION

By letter dated May 21, 1982 as supplemented by letters dated November 5, 1982, May 13, 1983, and October 11, 1983 GPU Nuclear Corporation (GPU) and Jersey Central Power & Light Company (the licensees) requested an amendment to Provisional Operating License No. DPR-16 for the Oyster Creek Nuclear Generating Station. This amendment would authorize changes to Paragraph 2.C.(7) of the license to require inspections by a method acceptable to the NRC of both core spray spargers and repair assemblies at each refueling outage.

A Notice of Consideration of Issuance of Amendment and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on October 26, 1983 (48 FR 49587). No request for hearing was received. By letter dated January 3, 1984, the staff received comments from Mr. David M. Scott, New Jersey Department of Environmental Protection relating to the requested action. These comments are addressed in this Safety Evaluation.

2.0 DISCUSSION AND EVALUATION

The Oyster Creek reactor vessel contains two independent core spray sparger assemblies which are fed by two separate core spray systems. Each of these systems is provided with full redundant pumps, valves, power supplies, controls and instrumentation, so that either system can perform the safety function in the presence of a single failure in the other system. Only one system is needed to accomplish the safety objective. When the system is activated, core spray water is directed through the reactor vessel and shroud into the core spray sparger assemblies. Each core spray sparger contains spray nozzles that are designed to provide a spray pattern that will ensure that each fuel bundle receives adequate coolant flow.

Each sparger consists of two 180° segments, each of which is supported at the centrally located inlet pipe connection that is welded to the shroud, and by three approximately equally spaced support brackets on either side

of the central inlet pipe connection. The sparger arms, supported in the radial and vertical directions, are free to slide circumferentially as required to accommodate any differential thermal expansion between the shroud and the sparger during injection of cool core spray water.

On the basis of cracking in core spray systems discovered at Oyster Creek in October 1978 and Pilgrim in January 1980, IE Bulletin No. 80-13 was issued. IE 80-13 mandated that at the next scheduled and following refueling outages until further notice, a visual inspection was to be made of the core spray spargers and the segment of piping between the inlet nozzle and the vessel shroud.

License Amendment No. 47, dated May 15, 1980, to License No. DPR-16 for the Oyster Creek Nuclear Generating Station added a license condition which requires the replacement of the existing cracked core spray sparger during the cycle 10 refueling outage. Operation with a cracked sparger for an interim fuel cycle was permitted based on repairs to the sparger using repair bracket assemblies. The NRC staff concluded in the Safety Evaluation supporting Amendment No. 47 that this interim repair of the Oyster Creek sparger did not constitute a significant change in safety margin from that of the original design and that installation of the repair hardware would not increase the probability of an accident.

GPUN Topical Report No. 013, Rev. 0 dated May 3, 1983 summarized the video visual inspection of the Oyster Creek Spargers:

1978 - 1 through wall crack; fix involved installation of a clamp assembly over crack.

1980 - 19 indications observed, which were identified as cracks.

1982 - enhanced video reassessment of 19 indications observed in 1980 concluded 3 indications as cracks, 2 indications as possible cracks. Reassessment concurred in by 3 NDE qualified inspectors.

1983 - Reinspection disclosed no indications. (Note: Area of inspections limited by repair brackets.)

During the current refueling outage, the licensee has completed full inspection of the accessible surfaces and welds of the sparger and repair assemblies using new inspection techniques and computer photo enhancement and has compared indications of cracks to previous indications. The new inspections and analyses appear to show that: (1) many previous indications of cracks from prior inspections are, in fact, not cracks; (2) no further degradation of the sparger has occurred since the prior inspections; and (3) susceptibility to new cracking (stress corrosion cracking postulated to result from high residual stresses from forcing pipes into position during installation and sensitization from welding, cold work etc.) in new locations is reduced by stress relief from existing cracks.

The examination was performed using procedures and equipment that have been demonstrated to resolve a wire .001" in diameter. These procedure have been used extensively at other plants for similar examinations, and have adequate sensitivity to detect significant cracks. The sensitivity of this procedure may not be good enough to resolve small cracks, or minor crack extensions because of the presence of crud on the examined surfaces.

The inconsistency between the evaluation of the 3 NDE qualified inspectors, who found 3 relevant indications to constitute cracks on reassessment of the 1980 video tapes, and the 1983 reinspection, which did not reveal these indications, indicates that the examination procedure lacks a confirmed reliability. Factors which contribute to the lack of reliability include the inability to view the bare base metal surface, because of its reflectivity, and the inability to date to focus on an in situ artificial flaw, such as a vibrotooled (or engraved) component or part identification marking, part assembly match marking, or induced surface scratches at mapped locations.

Because the future decision on the replacement of the Oyster Creek Core Spray Spargers will be based on evidence that no major progression of cracking has occurred, an inspection method that has the sensitivity to allow crack dimension measurement will be necessary to evaluate crack progression. An in situ artificial flaw of known dimension, as discussed above, could be used to scale crack progression.

Despite the staff's concern over the lack of precision in crack sizing as expressed above, the visual inspection as supplemented by the enhanced video assessment technique is adequate for the staff to conclude that a significant progression has not occurred. Further the minor cracking that may escape being detected is insignificant in terms of both structural integrity or flow distribution if cracks were 100% through wall.

Moreover, analysis of the seismic, static and thermal loadings for the repair bracket assemblies which were analyzed, designed and installed in accordance with accepted engineering practices, demonstrate the repair bracket assemblies' ability to limit crack openings to an acceptable range should existing cracks propagate around the sparger circumference. Inspection data obtained during the current refueling outage indicates that the repair bracket assemblies are capable of maintaining the integrity of the system.

The "state of the art" of the video visual examination procedure used in the inspection of the Oyster Creek Core Spray Spargers, at this time, precludes the assignment of the reliability on crack length precision measurement. An ultrasonic inspection in evaluating the Oyster Creek Core Spray Spargers is not feasible because of the limited access. The staff further concludes that a UT inspection is not practical due to the high radiation. The visual air test disclosing the presence only of through wall cracks is limited as an inspection method and is further limited by constraints of piping configuration which precluded air test of System I, as noted in GPUN Topical Report No. 013, Rev. 0.

Even though there is a lack of precision in crack sizing of the examination of the Oyster Creek Core Spray System during the current refueling outage as discussed above, the technique employed at Oyster Creek is adequate to detect whether there is a major progression of existing cracks. Therefore, the staff concludes that, (1) major progression, while currently unquantifiable, has not occurred and (2) that continued operation of the facility for an additional cycle with the existing sparger can be permitted because the extent of sparger cracking remains as evaluated in the SER supporting Amendment 47.

In addition, future inspections by a method acceptable to the NRC of all accessible surfaces and welds of both core spray spargers and repair assemblies at each refueling outage will be performed so that meaningful comparisons of any indications with previous inspection indications can be made. Results of the inspections along with an evaluation of the safety significance (e.g., in terms of the potential for a significant bypass flow that may result in an inadequate distribution of water spray to the core.), of any new or progressing indications will be provided to the Commission's staff for review. Authorization will be obtained from the Commission's staff before the plant is restarted from the refueling outage. Should the staff determine that new cracks or further progression of existing cracks has occurred resulting in unacceptable degradation of safety margins, the sparger will be replaced prior to restart. This decision will be founded on the determination of whether or not safety margins have been significantly reduced from levels currently in the sparger.

Because, the magnitude of sparger cracking is not as severe as previously indicated, there has been no additional degradation during the last fuel cycle, and the repair bracket assemblies should maintain the integrity of the existing sparger as it has been maintained during the last fuel cycle, the staff finds the proposed change to the license acceptable.

NRC staff contacted Mr. D. Scott, New Jersey Office of Environmental Protection, who had no comments on the contents of this amendment. He inquired about the effectiveness of the core spray nozzles and was advised this matter would be addressed in a separate licensing action and is not part of this amendment.

On January 11, 1984, the staff received a letter dated January 3, 1984 from Mr. David M. Scott proposing that the Commission delay issuance of this amendment until evaluation of the nozzle spray effectiveness has been completed.

However, the nozzle spray effectiveness in steam environment is being evaluated by the staff for the Oyster Creek plant, which is separate from and unrelated to the evaluation of the core spray sparger cracking. In regard to this amendment, it should be noted that the distribution of spray flow through the repaired sparger was evaluated previously in Amendment 34 dated November 24, 1978. In its evaluation, the staff concluded that the distribution in spray flow from the repaired sparger will not be significantly different from the previously accepted distribution

from the uncracked and unrepaired sparger. The effect of crack leakage on total sparger flow has been accounted for by increasing the Technical Specification requirement on flow rate from the sparger. Therefore, the staff does not believe it is necessary to delay this amendment until completion of the evaluation of the nozzle spray effectiveness.

3.0 ENVIRONMENTAL CONSIDERATION

The staff has determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, the staff has further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The staff has 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 the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ACKNOWLEDGEMENT

This Safety Evaluation was prepared by J. Halapatz and J. Lombardo.

Dated: January 26, 1984