



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

July 15, 1986

Docket No. 50-219

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: RECIRCULATION PUMP INTERLOCK SCOPE CHANGE (TAC 61133)

Re: Oyster Creek Nuclear Generating Station

The Commission has issued the enclosed Amendment No. 106 to Provisional Operating License No. DPR-16 for the Oyster Creek Nuclear Generating Station. This amendment is in response to your application dated September 19, 1985.

This amendment revises the requirement in the Order dated March 14, 1983, to install interlocks on the recirculation pump loops at Oyster Creek to prevent isolating four recirculation loops. You proposed to install an alarm to indicate that a fourth recirculation loop has been isolated instead of the original design of electrical interlocks to prevent isolation of more than three recirculation loops. This includes an alarm reflash if the fifth loop was isolated.

In our letter to you dated April 16, 1986, the staff concluded that your proposed modification scope change for the Recirculation Loop Interlock was acceptable. We also concluded that the scope change did not meet the requirement in the Order dated March 14, 1983. Therefore, we stated that we would revise this requirement in the Order to agree with the acceptable scope change. This letter is the staff's action to revise this requirement in the Order.

This revision will not change the schedule for implementing the Order. Therefore, all plant activities, e.g., installation, operability, procedures, training, associated with putting the alarm in service shall be completed before the restart from the Cycle 11 Refueling outage to meet the schedule in the Order. Also, as requested in our letter dated April 16, 1986, we request you to propose appropriate technical specifications on this alarm before the restart from this outage.

On May 19, 1986, the State of New Jersey was consulted in accordance with 10 CFR 50.91(b)(4). The state expressed its concern that the staff was not imposing the requirements in the Order. This is addressed in the

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Mr. P. B. Fiedler

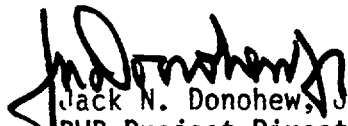
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July 15, 1986

enclosed Safety Evaluation. We have concluded that the alarm only modification and trained operators will have the same effect as the interlock without the complexity introduced by the interlock.

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notices.

Sincerely,

  
Jack N. Donohew, Jr., Project Manager  
BWR Project Directorate #1  
Division of BWR Licensing

Enclosures:

1. Amendment No.106 to License No. DPR-16
2. Safety Evaluation

cc w/enclosures:  
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\*See Previous Concurrence

Mr. P. B. Fiedler  
Oyster Creek Nuclear Generating Station

Oyster Creek Nuclear  
Generating Station

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 CRÉEK NUCLEAR GENERATING STATION

AMENDMENT TO PROVISIONAL OPERATING LICENSE

Amendment No. 106  
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 September 19, 1985, 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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P PDR

Mr. P. B. Fiedler


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July 15, 1986

enclosed Safety Evaluation. We have concluded that the alarm only modification and trained operators will have the same effect as the interlock without the complexity introduced by the interlock.

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notices.

Sincerely,

  
Jack N. Donohew, Jr., Project Manager  
BWR Project Directorate #1  
Division of BWR Licensing

Enclosures:

- 1. Amendment No. 106 to License No. DPR-16
- 2. Safety Evaluation


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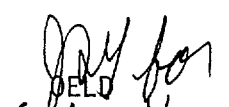
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Jack N. Donohew, Jr., Project Manager  
BWR Project Directorate #1  
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO.106 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 September 19, 1985, GPU Nuclear (the licensee) requested an amendment to Provisional Operating License No. DPR-16 for Oyster Creek Nuclear Generating Station (Oyster Creek). This amendment would revise the requirement in the Commission's Order dated March 14, 1983, to install interlocks on the recirculation pump loops at Oyster Creek to prevent isolating four recirculation loops. The licensee has proposed to install an alarm to indicate that a fourth recirculation loop has been isolated. This is instead of its original design of electrical interlocks to prevent isolation of more than three recirculation loops.

In its letter to the licensee dated April 16, 1986, the staff concluded that the licensee's proposed modification scope change for the recirculation loop interlock was acceptable. The staff also concluded that the scope change did not meet the requirement in the Order dated March 14, 1983, for NUREG-0737 Item II.K.3.19, Interlock on Recirculation Pump; therefore, the staff stated that it would revise the requirement in the Order to agree with the acceptable scope change. This evaluation is to support the staff's action to revise the requirements in the Order.

2.0 DISCUSSION AND EVALUATION

By Order dated March 14, 1983, the licensee is required to implement NUREG-0737, TMI Action Plan Item II.K.3.19, Interlock on Recirculation Pump Loops, before the restart from the Cycle 11R outage. The licensee requested a scope change for the modification originally proposed for TMI Action Item II.K.3.19.

The staff's position on TMI Action Item II.K.3.19 in NUREG-0737 was that interlocks should be installed on nonjet pump plants (other than Humboldt Bay) to assure that at least two recirculation loops are open for recirculation flow for modes other than cold shutdown. This was to assure that the level

measurements in the downcomer region are representative of the level in the core region. Isolation of all five recirculation loops results in inadequate communication of coolant between the downcomer and core regions in the reactor vessel.

The licensee presented that the Recirculation Loop Interlock requirement resulted from the evaluation of feedwater transients and small break loss-of-coolant accidents in General Electric boiling water reactors presented in NUREG-0626, "Generic Evaluation of Feedwater Transients and Small Break LOCA in GE-Design Operating Plants." For nonjet pump plants like Oyster Creek, isolation of all its five recirculation loops results in inadequate communication of coolant between the downcomer and core regions in the reactor vessel. Interlocks were recommended to assure that at least two recirculation loops are open for recirculation flow for modes other than cold shutdown so that level measurements in the downcomer region are representative of the level in the core region.

The licensee presented that the interlock, as originally proposed, consisted of an electrical interlock which would prevent closure of valves which would isolate more than three of the five recirculation loops. The modification also included an alarm to warn the operator that the interlock has been activated and a bypass switch and circuit to allow isolation of loops when conditions permit.

During the review of the interlock design, the licensee determined that by simplifying the modification to an alarm only the interlock functional requirements could be adequately met. The licensee stated that the alarm provides positive active indication to the operator that a fourth loop has been isolated. Since isolation of a fourth loop does not cause any short-term problems with core inventory, the operator has adequate time to recognize and correct the problem indicated by the alarm, therefore, a preventive electrical interlock is not necessary.

The licensee presented that the reduced scope modification has the advantage (1) of not requiring an additional control switch for electrical interlock bypass and additional indications on the control board of a bypass condition, (2) of greatly reducing the complexity of the valve control circuitry thereby minimizing the effect on circuit reliability and (3) of simplifying training requirements and procedural changes for operators.

The licensee presented that the NRC staff evaluation, presented in NUREG-0626, did not take into consideration a fuel zone level monitoring system for Oyster Creek vintage plants. During the 1979-80 Cycle 9 refueling outage, a wide range fuel zone level indication and recorder were installed. With recirculation pumps tripped this instrumentation provides the reactor operator with level indication in the core region. Also, the 10-10-10 water level trip for automatic depressurization system initiation, concurrent with drywell pressure, is sensed within the core region.



Oyster Creek Technical Specifications (TS) Safety Limits require that at least two recirculation loop suction valves and their associated discharge valves be in the full open position during all modes of operation except when the reactor head is off and the reactor is flooded to a level above the main steam nozzles. This requirement is addressed in plant operating procedures and licensed operator training.

The licensee also presented that the Human Factors review of this modification determined that the functional requirements of preventing core region isolation from the downcomer can be met by the reduced scope modification which adds alarm capabilities and that the electrical interlock provides additional complexity not justified by the benefit gained. The licensee stated that the reduced scope modification would be installed during the upcoming Cycle 11 Refueling outage in accordance with the schedule in the Order dated March 14, 1983.

The alarm would alert the operator that the Safety Limit has been exceeded and that procedures have been violated. In addition, an alarm reflash capability has been incorporated into the annunciator design to indicate closure of the isolation valves for the fifth recirculation loop.

In the control room, there is the following indication of the status of the recirculation pump loops to the operators: (1) recirculation inlet/outlet valve indication being opened or closed, (2) flow indicating ammeter for each pump, (3) frequency meter for each motor generator set for each pump and (4) a tag on the board above the valve position indicators that states that the operators must have at least two recirculation loops open (Ref. 4).

The alarm-only modification would provide an active warning of a potentially unsafe condition, thus preventing accidental isolation of four recirculation loops. Even with the addition of an electrical interlock, operators would still have the ability to isolate more than three of five recirculation loops. This could be done using the interlock bypass feature. The bypass would be necessary to allow isolation of more than three loops when conditions permit. With the alarm-only modification, an operator would have to disregard his training, violate procedures, ignore the posted warning, and be unaware of the significance of the control switch covers in order to exceed the Safety Limit indefinitely.

Therefore, based on the above, the staff concludes, as it did in its Safety Evaluation dated April 16, 1986, that operation of Oyster Creek with this recirculation loop interlock scope change is acceptable. One open recirculation loop is sufficient to assure adequate communication between the core and downcomer regions. The alarms plus adequate training should suffice to maintain at least one open loop.

We also conclude that the reduced scope change does not change the schedule for implementing the Order dated March 14, 1983. Therefore, the alarm must be installed and be operational, the procedures written to use the alarm, and the operators trained before the restart from the Cycle 11 Refueling outage. Also, as requested in our letter dated April 16, 1986, the licensee is to propose appropriate TS on this alarm before the restart from this outage.

### 3.0 CONSULTATION WITH THE STATE

On May 19, 1986, the staff's Project Manager consulted with Ms. R. Green of the State of New Jersey, Department of Radiation Protection. This consultation per 10 CFR 50.91(b)(4) concerned the staff's intent to issue this license condition to revise the requirements in the Order dated March 14, 1983. The State expressed its concern that the staff was, for Oyster Creek, not imposing the requirements in the Order to install interlocks on the recirculation pump loops. The State pointed out that the event leading to this TMI requirement was the May 2, 1979, loss-of-feedwater transient at Oyster Creek.

During this transient, an operator closed four of the five recirculation loop discharge valves. The fifth valve was already closed because one loop was out-of-service and isolated. Therefore, all five loops were closed. The bypass lines around the discharge valves were open; however, these lines did not allow sufficient communication between the annulus outside the core region (the downcomer region) and the core region. As a result, the water was boiling away in the core region faster than it was being returned through the bypass lines and the water level above the core decreased below the low-low-low level alarm. When one of the recirculation loop pump discharge valves was reopened the water flow from the annulus to the core region was large enough to compensate for the water boiling off in the core region so the water level increased above the low-low-low level alarm.

In the staff's two Safety Evaluations (SE) dated May 30, 1979, the staff concluded that (1) the Technical Specification (TS) change to Section 2.1 to add the Safety Limit requirement that two recirculation loops remain open during all modes of operation except with the reactor vessel head removed and the reactor flooded and (2) administrative controls and operation training were sufficient for the safe operation of Oyster Creek. The two SE were for the restart of Oyster Creek from the transient and for Amendment No. 36 which added the above Safety Limit requirement.

The alarm modification discussed in Section 2.0 above is an additional requirement above that required by the staff in its SE dated May 30, 1979. Although this is not the interlock of NUREG-0737 Item II.K.3.19, it is the staff's judgement that the alarm with trained operators will have the same effect as the interlock without introducing the complexity associated with the interlocks. The alarm would alert the operator that a Safety Limit has been violated. The operator would then have to disregard his training to have this condition continue indefinitely. In addition, an

alarm reflash capability would indicate closure of the fifth recirculation loop and only one open loop is needed for adequate communication between the core and the downcomer.

#### 4.0 CONSULTATION WITH THE NRC RESIDENT INSPECTOR

In Inspection Report 50-219/86-06 dated May 12, 1986, the Oyster Creek resident inspector questioned the licensee's alarm logic for isolating recirculation loops in that it seemed more appropriate to have the alarm when the third loop is isolated. This, the inspector stated, could prevent the isolation of a fourth loop. The NRC inspector stated in the report that this was discussed with the staff and the staff concluded, as discussed in Section 2.0 above, that the licensee's proposal was acceptable in that the alarm would first sound when the fourth loop was isolated. The inspector also stated in the report that there was concern about the time delay in implementing the corrective action to the May 2, 1979 event. This event was discussed in Section 3.0 above.

The staff found it acceptable that the alarm would first sound when the fourth loop is isolated because this is when the Safety Limit has been exceeded. The Safety Limit is not three loops being isolated. Also, one open loop, the fifth, is sufficient to assure adequate communication between the core and the downcomer region. Thus, an alarm at isolation of the fourth loop provides a margin of safety. The licensee has not proposed to change the schedule for implementing this item which is in the Commission's Order.

#### 5.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

#### 6.0 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 nor to the health and safety of the public.

7.0 REFERENCES

1. Letter from R. F. Wilson of GPU Nuclear to J. A. Zwolinski of NRC, "Recirculation Loop Interlock," September 19, 1985.
2. Letter from J. A. Zwolinski of NRC, to P. B. Fiedler of GPU Nuclear, "Recirculation Loop Interlock Scope Change", April 16, 1986.
3. NUREG-0737, Clarification of TMI Action Plan Requirements, dated November 1980.
4. Telephone call between J. Donohew, USNRC, and J. Rogers, GPU Nuclear, on March 31, 1986.
5. NRC Inspection Report No. 50-219/86-06 dated May 12, 1986.

Principal Contributor: W. Hodges and J. Donohew.

Dated: July 15, 1986