

Docket No.: 50-298

FEB 28 1977

Nebraska Public Power District
ATTN: Mr. J. M. Pilant, Director
Licensing and Quality Assurance
P. O. Box 499
Columbus, Nebraska 68601

Gentlemen:

In response to your request dated April 16, 1976, the Commission has issued the enclosed Amendment No. 35 to Facility Operating License No. DPR-46 for the Cooper Nuclear Station.

The amendment consists of Technical Specification changes which govern the operation and surveillance of your modified crane handling system as described in Cooper Nuclear Station Final Safety Analysis Report Amendments 19 and 33 (transmitted by letters dated March 23, 1973 and May 3, 1974) and your letter dated April 6, 1976. Acceptance of your crane handling system is based on your commitment to install a mechanically operated power limit switch in the main hoist motor power circuit. Prior to handling a fuel cask, the NRC must be informed, in writing, that the power limit switch has been installed. Modifications to the proposed Technical Specifications were necessary to meet our requirements. These were discussed with your staff and have been made.

This amendment concludes our review of the refueling cask drop accident for Cooper Nuclear Station for fuel shipping casks weighing up to 70 tons.

Copies of the related Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely,

Original signed by
Dennis L. Ziemann

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Enclosures and cc: See next page

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

February 28, 1977

Docket No.: 50-298

Nebraska Public Power District
ATTN: Mr. J. M. Pilant, Director
Licensing and Quality Assurance
P. O. Box 499
Columbus, Nebraska 68601

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In response to your request dated April 6, 1976, the Commission has issued the enclosed Amendment No. 35 to Facility Operating License No. DPR-46 for the Cooper Nuclear Station.

The amendment consists of Technical Specification changes which govern the operation and surveillance of your modified crane handling system as described in Cooper Nuclear Station Final Safety Analysis Report Amendments 19 and 33 (transmitted by letters dated March 23, 1973 and May 3, 1974) and your letter dated April 6, 1976. Acceptance of your crane handling system is based on your commitment to install a mechanically operated power limit switch in the main hoist motor power circuit. Prior to handling a fuel cask, the NRC must be informed, in writing, that the power limit switch has been installed. Modifications to the proposed Technical Specifications were necessary to meet our requirements. These were discussed with your staff and have been made.

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Sincerely,

Dennis L. Ziemann
Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Enclosures and cc: See next page

February 28, 1977

Enclosures:

1. Amendment No. 35 to
License DPR-46
2. Safety Evaluation
3. Notice

cc w/enclosures:

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Mr. William Siebert, Commissioner
Nemaha County Board of Commissioners
Nebraska County Courtroom
Auburn, Nebraska 68305

Chief, Energy Systems
Analyses Branch (AW-459)
Office of Radiation Programs
U. S. Environmental Protection Agency
Room 645, East Tower
401 M Street, S. W.
Washington, D. C. 20460

U. S. Environmental Protection Agency
Region VII
ATTN: EIS COORDINATOR
1735 Baltimore Avenue
Kansas City, Missouri 64108

cc w/enclosures and copy of NPPD's
filings dated 3/23/73, 5/3/74,
and 4/6/76:

Mr. D. Drain, Director
Department of Environmental Control
Executive Building, Second Floor
Lincoln, Nebraska 68509



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

NEBRASKA PUBLIC POWER DISTRICT

DOCKET NO. 50-298

COOPER NUCLEAR STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 35
License No. DPR-46

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Nebraska Public Power District (the licensee) dated April 6, 1976, and related filings dated March 23, 1973 and May 3, 1974, comply 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.

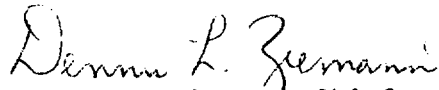
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C(2) of Facility License No. DPR-46 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 35, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION



Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 28, 1977

ATTACHMENT TO LICENSE AMENDMENT NO. 35

FACILITY OPERATING LICENSE NO. DPR-46

DOCKET NO. 50-298

Replace existing pages ii of Table of Contents, 206, and 209 of the Appendix A Technical Specifications with the attached revised pages bearing the same numbers and insert new page 209a. Changed areas on the new and revised pages are identified by a marginal line.

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3.10.D**D. Time Limitation**

Irradiated fuel shall not be handled in or above the reactor prior to 24 hours after reactor shutdown.

E. Spent Fuel Cask Handling

1. Fuel cask handling above the 931' level of the Reactor Building will be done in the RESTRICTED MODE only except as specified in 3.10.E.2.
2. Fuel cask handling in other than the RESTRICTED MODE will be permitted in emergency or equipment failure situations only to the extent necessary to get the cask to the closest acceptable stable location.
3. Operation with a failed controlled area limit switch is permissible for 48 hours providing an operator is on the refueling floor to assure the crane is operated within the restricted zone painted on the floor.
4. Spent fuel casks weighing in excess of 140,000 lbs. shall not be handled.

4.10.E Spent Fuel Cask Handling

1. Prior to fuel cask handling operations, the redundant crane including the rope, hooks, slings, shackles and other operating mechanisms will be inspected.

The rope will be replaced if any of the following conditions exist:

- a. Twelve (12) randomly distributed broken wires in one lay or four (4) broken wires in one strand of one rope lay.
- b. Wear of one-third the original diameter of outside individual wire.
- c. Kinking, crushing, or any other damage resulting in distortion of the rope.
- d. Evidence of any type of heat damage.
- e. Reductions from nominal diameter of more than 1/16 inch for a rope diameter from 7/8" to 1 1/4" inclusive.

2. Prior to operations in the RESTRICTED MODE

- a. the controlled area limit switches will be tested;
- b. the "two-block" limit switches will be tested;
- c. the "inching hoist" controls will be tested.

3. The empty spent fuel cask will be lifted free of all support by a maximum of 1 foot and left hanging for 5 minutes prior to any series of fuel cask handling operations.

3.10 BASES (cont'd.)

in a lower reactivity potential of the core. The requirements for SRM operability during these core alterations assure sufficient core monitoring.

B. Core Monitoring

The SRM's are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRM's in or adjacent to any core quadrant where fuel or control rods are being moved assures adequate monitoring of that quadrant during such alterations. The requirement of 3 counts per second provides assurance that neutron flux is being monitored and insures that startup is conducted only if the source range flux level is above the minimum assumed in the control rod drop accident.

C. Spent Fuel Pool Water Level

To assure that there is adequate water to shield and cool the irradiated fuel assemblies stored in the pool, a minimum pool water level is established. The minimum water level of 8 ½' above the top of the fuel is established because it provides adequate shielding and is well above the level to assure adequate cooling.

D. Time Limitation

The radiological consequences of a fuel handling accident are based upon the accident occurring at least 24 hours after reactor shutdown.

E. Spent Fuel Cask Handling

The operation of the redundant crane in the Restricted Mode during fuel cask handling operations assures that the cask remains within the controlled area once it has been removed from its transport vehicle (i.e., once it is above the 931' elevation). Handling of the cask on the Refueling Floor in the Unrestricted Mode is allowed only in the case of equipment failures or emergency conditions when the cask is already suspended. The Unrestricted Mode of operation is allowed only to the extent necessary to get the cask to a suitable stationary position so the required repairs can be made. Operation with a failed controlled area microswitch will be allowed for a 48-hour period providing an Operator is on the floor in addition to the crane operator to assure that the cask handling is limited to the controlled area as marked on the floor. This will allow adequate time to make repairs but still will not restrict cask handling operations unduly.

4.10 BASES

A. Refueling Interlocks

Complete functional testing of all refueling interlocks before any refueling outage will provide positive indication that the interlocks operate in the situations for which they were designed. By loading each hoist with a weight equal to the fuel assembly, positioning the refueling platform and withdrawing control rods, the interlocks can be subjected to valid operational tests. Where redundancy is provided in the logic circuitry, tests can be performed to assure that each redundant logic element can independently perform its functions.

R. Core Monitoring

Requiring the SRM's to be functionally tested prior to any core alteration assures that the SRM's will be operable at the start of that alteration. The daily response check of the SRM's ensures their continued operability.

E. Spent Fuel Cask Handling

The Surveillance Requirements specified assure that the redundant crane is adequately inspected in accordance with the accepted ANSI Standard (B.30.2.0) and manufacturer's recommendations to determine that the equipment is in satisfactory condition. The testing of the controlled area limit switches assures that the crane operation will be limited to the designated area in the Restricted Mode of operation. The test of the "two-block" limit switch assures the power to the hoisting motor will be interrupted before an actual "two-blocking" incident can occur. The test of the inching hoist assures that this mode of load control is available when required.

Requiring the lifting and holding of the cask for 5 minutes during the initial lift of each series of cask handling operations puts a load test on the entire crane lifting mechanism as well as the braking system.

Performing this test when the cask is being lifted initially from the cask car assures that the system is operable prior to lifting the load to an excessive height.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING APPROVAL OF FACILITY MODIFICATIONS TO REDUCE THE PROBABILITY
OF A FUEL CASK DROP ACCIDENT TO AN ACCEPTABLY LOW LEVEL
AND
AMENDMENT NO. 35 TO LICENSE NO. DPR-46
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
DOCKET NO. 50-298

Introduction

During the Cooper Nuclear Station (CNS) operating license review Nebraska Public Power District (NPPD) committed to modify the reactor building crane and associated systems to reduce the probability of dropping the fuel cask into the spent fuel pool to an acceptably low level (Reference: Section 9.2 of the Safety Evaluation Report for CNS issued February 14, 1973 and Supplement 1 to the SER dated July 16, 1973). NPPD submitted information on the proposed modifications in Amendments 19 and 26 to the CNS Final Safety Analysis Report (FSAR). Technical discussions with NPPD led to the submittal, on May 3, 1974, of FSAR Amendment 33 which supplements the information of Amendment 19 and supersedes that of Amendment 26. Our review of Amendment 33 resulted in a request for additional information concerning the reactor building crane which NPPD supplied by letter dated April 6, 1976. This Safety Evaluation is concerned with the acceptability of the overhead crane handling system described in Amendments 19 and 33 as supplemented by NPPD's April 6, 1976 letter.

BACKGROUND

Overhead handling systems are used for moving heavy items at nuclear power plants. The handling of heavy loads such as a spent fuel cask raises the possibility of damage to the load and to safety-related equipment or structures under and adjacent to the path of travel should the handling system malfunction. Overhead handling systems intended to provide

single failure-proof handling of loads should be designed so that a single failure or malfunction will not result in dropping or losing control of the heaviest load to be handled. Since the crane industry has not yet developed codes or standards that adequately cover the design, operation, and testing for a single failure-proof crane, the NRC staff has developed a position statement to provide a consistent basis for reviewing overhead handling systems. This statement is Auxiliary and Power Conversion Systems Branch Technical Position 9-1. (BTP APCS 9-1) Review of the CNS overhead crane handling system was based on BTP APCS 9-1 a copy of which was sent to NPPD as enclosure (B) of our request for additional information dated October 16, 1975.

SYSTEM DESCRIPTION

The overhead crane handling system for CNS consists of an overhead, bridge type crane, spent fuel cask lifting devices, and controls. The overhead crane handling system is used during plant operation for lifting and transporting the spent fuel shipping cask between the spent fuel pool and the cask decontamination/shipping area. The overhead crane is located indoors in a controlled environment in excess of 50°F, and has a main hoist rated at 100 tons. The crane hoist system consists of a dual load path through the hoist gear train, the reeving system, and the hoist load block along with restraints at critical points to provide load retention and minimization of uncontrolled motions of the load in the event of failure of any single hoist component. Redundancy has also been designed into the hoist and trolley brakes, the spent fuel cask lifting devices, and the crane control components. Within the dual load path, the design criteria are such that all dual elements comply with the Crane Manufacturers Association of America Specification #70 for allowable stresses except for the hoisting rope which is governed by more stringent job specification criteria. All single element components within the load path have been designed to a minimum safety factor of 8.2 based on the ultimate strength of the material.

All analyses performed relative to the overhead crane handling system loads have been based on the General Electric IF 300 spent fuel shipping cask which weighs 140,000 lbs. If larger casks are used, additional analyses will be required to assure safety margins are maintained.

The licensee has developed administrative controls and installed limit switches to restrict the path of travel of the crane and spent fuel cask to a specific controlled area. The controls

are intended to assure that a controlled path is followed in moving a cask between the shipping area and the spent fuel pool. Requirements for portions of these controls will be incorporated into the CNS Technical Specifications. The revised specifications would assure that the electrical interlocks are operable and in operation prior to cask handling, would provide limitations on crane operation with a failed controlled area limit switch, and would permit operation without controlled area interlocks in an emergency to move the cask to the closest acceptable stable location.

EVALUATION

Based on our review of data provided by the licensee, we have concluded that the integrated design of crane, controls, and cask lifting devices meets the intent of BTP APCSB 9-1 as regards single failure criteria except in the specific areas of the crane reeving system, and protection against "two blocking". "Two blocking" is an inadvertently continued lift which brings the load and block assembly into physical contact, thereby preventing further movement and creating shock load on the rope and reeving assembly.

The crane reeving system, which was designed and constructed prior to the development of the NRC Branch Technical Position, does not meet the recommended criteria for wire rope safety factors and fleet angles. The purpose of these criteria is to assure a design which minimizes wire rope stress and thereby provides maximum assurance of crane safety under all operating and maintenance conditions. Because the crane reeving system does not meet these recommended criteria, there is a possibility of an accelerated rate of wire rope wear occurring. To compensate in these design areas, the licensee, by letter dated April 6, 1976, has committed to incorporate into the CNS Technical Specifications, a specific program of wire rope inspection and replacement, the purpose of which would be to ensure the wire rope will be maintained as close as practicable to original design safety factors at all times. This inspection and replacement program provides an equivalent level of protection to the methods suggested in our wire rope safety and crane fleet angle criteria and will assure that accelerated wire rope wear will be detected before crane use and satisfies our concerns; and, on this basis, we conclude that the crane reeving system is acceptable.

The crane control system does not provide adequate protection against "two blocking" in the event of a fused contactor in the main hoist control circuitry. However, the licensee has agreed to provide and install a mechanically operated power limit switch in the main

hoist motor power circuit on the load side of all hoist motor power circuit controls. This power limit switch will interrupt power to the main hoist motor and cause the holding brakes to set prior to "two blocking" in the event of a fused contractor. We have concluded that this proposed addition will provide adequate protection against "two blocking", and the control system is acceptable.

We have reviewed the administrative procedures, proposed Technical Specifications, and electrical interlocks for limiting the crane and cask travel path as detailed in NPPD's submittals. Some modification of the proposed Technical Specification was required to meet our requirements. These changes were discussed with NPPD representatives. We conclude that adequate provisions have been provided to assure that the crane and cask could not travel outside the controlled area and that the control system for this purpose is acceptable. We also find the Technical Specification provisions for cask handling in emergency situations and for operating with a failed controlled area limit switch are acceptable.

Based on our evaluation of the data provided and the commitments made by NPPD in the areas of wire rope surveillance and prevention of "two blocking", we conclude that the overhead crane handling system and proposed spent fuel cask handling Technical Specifications meet our requirements and are acceptable for handling spent fuel casks weighing up to 70 tons.

ENVIRONMENTAL CONSIDERATION

We have 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, we have 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.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendment 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 amendment 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: February 28, 1977

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-298

NEBRASKA PUBLIC POWER DISTRICT

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY
OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 35 to Operating License No. DPR-46, issued to the Nebraska Public Power District (the licensee), which revised Technical Specifications for operation of the Cooper Nuclear Station (the facility) located in Nemaha County, Nebraska. The amendment becomes effective 30 days after its date of issuance.

This amendment incorporated spent fuel cask handling Technical Specifications and approved the overhead crane handling system for Cooper Nuclear Station.


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. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated April 6, 1976, and related filings by the licensee dated March 23, 1973 and May 3, 1974, (2) Amendment No. 35 to License No. DPR-46, and (3) the Commission's concurrently issued Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Auburn Public Library, 118 15th Street, Auburn, Nebraska 68305. A single copy of items (2) and (3) may be obtained upon request addressed to the United States Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 28th day of February, 1977.

FOR THE NUCLEAR REGULATORY COMMISSION


Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors