

APR 29 1968

SUMMARY STATEMENT
BY THE
DIVISION OF REACTOR LICENSING
U. S. ATOMIC ENERGY COMMISSION
IN THE MATTER OF
CONSUMERS PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
NEMAHA COUNTY, NEBRASKA
DOCKET NO. 50-298

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The Consumers Public Power District applied to the Atomic Energy Commission on July 26, 1967, for a construction permit for a 2381 Mwt boiling water reactor, designated Cooper Nuclear Station, to be located in Nemaha County, Nebraska. During the period between the July filing date and this hearing, we had a number of meetings with the applicant, its nuclear steam supply contractor, the General Electric Company, and its architect-engineer contractor, the Burns and Roe Corporation, to discuss various safety related aspects of the plant design. As a result of requests for specific information, the applicant submitted amendments to the Preliminary Safety Analysis Report. During our review, we received advice from consultants on site related subjects and plant structural design. In addition, the Commission's Advisory Committee on Reactor Safeguards reviewed this application.

The Reactor Projects group of the Division of Reactor Licensing has the responsibility for the safety review, analysis and evaluation of applications for provisional construction permits and provisional operating licenses. The Cooper Station application was assigned to Reactor Projects Branch No. 1, one of the five branches within the Reactor Projects group. In addition to the technical evaluation within the Projects group, specialized aspects of the review were undertaken by various branches in the Reactor Technology group of Division of Reactor Licensing. The site characteristics and environmental considerations, including an evaluation of consequences of postulated accident situations, were reviewed by members of the Environmental and Radiation Safety Technology Branch. Personnel from this branch worked closely with our consultants in the Environmental Meteorology Branch of the Institute for Atmospheric Sciences, the Environmental Science Services Administration; the U. S. Geological Survey (geological and hydrological considerations); the U. S. Coast & Geodetic Survey (seismology); and the Fish and Wildlife Service.

The Containment and Component Technology Branch review of the Cooper Station project included consideration of the adequacy of the containment structure and the design of Class I structures and components for seismic and accident loadings. Members of this Branch coordinated and reviewed the work of our seismic design consultant, Nathan M. Newmark Consulting Engineering Services.

The instrumentation, control, and electrical systems of the plant were reviewed by members of the Instrumentation and Power Technology Branch.

The Reactor Operations group of Division of Reactor Licensing, particularly the Operational Safety Branch, assisted in the preliminary review of proposed plant operations.

Additional assistance from Division of Reactor Standards personnel in some of the above matters was utilized.

In general, our safety evaluation encompassed an examination of the proposed plant layout, structural, system, and component design, and plant operating characteristics with special attention to those areas concerned with public health and safety relative to radiological effects. We considered in detail the thermal, hydraulic, nuclear, and mechanical design characteristics of the reactor core and found them to be appropriate under all anticipated modes of operation. We reviewed the proposed instrumentation and control systems and found them to be acceptable. We have considered the overall mechanical layout of the plant, including provisions for shielding and missile protection, and conclude that the appropriate measures have been taken in these respects. We have considered the radiological effects on the environment and conclude that the off-site dose levels resulting from normal plant operation, as well as from postulated accidents, are within established regulations or site criteria guidelines.

In our review, design features were frequently compared with similar features of other reactor facilities which have been previously reviewed and approved by the Commission, including in particular the Tennessee Valley Authority's Browns Ferry Nuclear Power Station.

As a consequence of our review, a number of design changes were made which have safety implications unique to Cooper Nuclear Station. These matters include:

1. The residual heat removal heat exchanger capacity was increased on Cooper Station so that the capability of the primary containment to handle accidents was equivalent to that of the Dresden and Browns Ferry plants.

2. The parallel-bus arrangement of the diesel generators, as originally proposed, was susceptible to failure from a single cause. Accordingly, the applicant has agreed to change the reference designs from a parallel-bus to a split-bus arrangement by connecting the diesel generators to independent buses.

3. As originally proposed, the piping system complex to supply water from the pressure suppression pool to the emergency core cooling system was susceptible to a single point failure. This failure would result in a loss of emergency core cooling capability. The applicant has proposed a new design whereby this susceptibility is eliminated.

These items are discussed in detail in the regulatory staff's Safety Evaluation. Any problem which these features may have presented has now been resolved to the satisfaction of the staff for this construction permit review.

In addition, in our review we examined some safety matters common to boiling water reactors in general, which warrant further evaluation. These matters include:

1. Adequacy of the analytical model used to predict the efficiency of the high-pressure coolant injection system when functioning as a depressurizer following a primary coolant system break.
2. Analysis of the thermal shock effects resulting from the injection of emergency core cooling water into the reactor.

Cooper Nuclear Station is being designed and will be constructed to be safe under all conditions including startup, power operation, power load changes, shutdown, and refueling. In the unlikely event of credible accidents, including a primary system pipe failure and resultant complete loss of all normal reactor cooling water, engineered safety features will provide core protection, will confine any radioactivity released to the containment vessel, and will control release from the plant stack.

The design of the major systems and components of the proposed plant, including the emergency cooling systems and containment structure, which bear significantly on the acceptability of the plant under the site criteria guidelines identified in 10 CFR Part 100, have been analyzed and evaluated by the applicant and the staff at a power level of 2500 MWt. The thermal and hydraulic characteristics of the reactor core were analyzed and evaluated at 2381. The applicant feels that 2500 MWt can be safely achieved after suitable operating experience at 2381 MWt, the operating limit established under the present licensing procedure. However, before operation at any power level above 2381 MWt will be authorized, the Commission will evaluate the proposed power operation to assure that the core can be operated safely at the higher power level.

All applications for authority to construct nuclear power plants, including the proposed Cooper Nuclear Station, are reviewed by the Commission's Advisory

Committee on Reactor Safeguards (ACRS). The ACRS conducts an independent review of the safety of the proposed facility and advises the Atomic Energy Commission on the results of its review.

The ACRS, in its letter of March 12, 1968, to the Chairman regarding the Cooper Nuclear Station application, made several comments and recommendations with respect to various technical features of the proposed reactor. We have considered each of these and will be guided by all of them in our continuing review of Cooper Nuclear Station.

The ACRS letter concludes: ". . . the proposed facility can be constructed with reasonable assurance that it can be operated without undue risk to the health and safety of the public."

This summary of the scope of the Commission's safety review of this project indicates the consideration which has been given by the regulatory staff and the Advisory Committee on Reactor Safeguards to those design features of Cooper Nuclear Station which are important to safety.

As discussed in our Safety Evaluation, we have concluded that there is reasonable assurance that Cooper Station can be built and operated as proposed without undue risk to the health and safety of the public. To reach this conclusion, we have considered both the off-site radiation doses which might occur in the unlikely events of various postulated accidents, and radiation doses which might result as a consequence of normal plant operation. These radiation doses were calculated based on the ultimate thermal power rating of 2500 megawatts.

The construction permit sought for this station is the first step in the Commission's regulatory process which will continue throughout the lifetime of the station. In order to determine that all of the Commission's safety

requirements have been satisfied, prior to issuing an operating license for this unit, the final design will be thoroughly evaluated by the regulatory staff of the Division of Reactor Licensing and the Advisory Committee on Reactor Safeguards in a manner similar to the review process at this, the construction permit stage. The plant will then be operated only in accordance with the Commission's regulations under the continued scrutiny of the Commission's regulatory staff throughout the plant lifetime.