UNITED STATES GOVERNMENT

Memorandum

PDR

TO : THE FILES
THRU: D. R. Muller, Chief
Reactor Projects Branch No. 1, DRL

DATE: March 27, 1967

FROM : B. Grimes, Reactor Projects Branch No. 3
Division of Reactor Licensing

SUBJECT: NORTHERN STATES POWER, DOCKET NO. 50-263, STAFF MEETING MARCH 22, 1967; ACRS SUBCOMMITTEE MEETING MARCH 23, 1967

A. Staff Meeting

On March 22, 1967, a meeting was held in the Bethesda offices to discuss the Northern States Power Construction Permit application. An attendance list is attached.

Areas discussed at the meeting were (1) present knowledge of fuel failure modes and planned research, (2) the present storage capacity and use rate of the Minneapolis and St. Paul water intakes and the 20 and 40 year forecasts for these muncipalities, (3) the disposition of liquid wastes during an MCA, (4) the length of time for a slug of pollutant to pass the Minneapolis water intake at a riverflow of 400 cfs and (5) the adequacy of the single diesel generator for emergency on-site power. Satisfactory presentations on the first four points were made by the applicant. These four points were transmitted to D. R. Muller by the ACRS Subcommittee and are delineated in his February 14, 1967, memo to files.

The emergency on-site power was discussed from the standpoint of (1) reliability of the Northern States Power network, (2) probability of the loss of offsite power caused by an accident and (3) reliability of the proposed diesel generator. The G. E. proposed criterion on reliability of off-site power was handed out and is attached to this memo. The staff restated its position that two on-site power sources are required.

B. Subcommittee Meeting

The subcommittee meeting covered the same points as the staff meeting with the result that the first four points were satisfactorily resolved (the analysis on the 400 cfs river flow will be submitted as an amendment to the application) and the following questions were raised on the diesel generator reliability:

(1) Is the on-site power truly independent of offsite power? That is, could a single failure take out both power sources? (The applicant's answer was that they were independent.)

(2) Would the plant be shutdown if the diesel was not operable? For example, the technical specifications might require shutdown if the diesel were out for more than a few hours. (NSP stated that there were many considerations in the decision to take a plant off the line.)

(3) When will adequate test and historical data on the proposed diesel (with modifications intended to improve reliability) be available to confirm the 0.999 reliability as opposed to the present information which indicates a 0.99 reliability?

Brief presentations by the applicant on the following topics were requested:

(1) Differences from Quad-Cities.

(2) Water supply and liquid waste disposal.

(3) New research on fuel failure at G. E., blowdown forces on core internals and the resultant mechanical effects of cold water on the hot core, and

(4) The above questions on the diesel generator should be answered.

Attachments:
Attendance List
Proposed Emergency Power Criterion

Distribution:
DRL Reading
RPB #3 Reading
R. S. Boyd
D. R. Muller
J. J. Shea
B. Grimes
D. Sullivan

ATTENDANCE LIST
MARCH 22, 1967

G. E.

J. Violette
W. Gilbert
H. Hollingshouse
A. F. Bray
L. Klein
I. Jacobs
C. Concordia (Schenectady)
S. Simolen
H. Beers

NSP

R. Rewell (Hargo Engineering)
A. Dienhart
A. Ward
G. Neils
R. Jensen
L. Schedin
D. McElroy

DRL

R. S. Boyd
D. R. Muller
J. J. Shea
B. Grimes
D. Sullivan

THE GENERAL ELECTRIC COMPANY CRITERION FOR EMERGENCY POWER

The General Electric Company has established a safety criterion which utilizes a numerical goal for the availability of power needed to operate essential engineered safeguards for nuclear plants. This goal is established on the basis that the availability of power must be commensurate with, in fact better than, the availability of the essential equipment it serves. The goal, which is considered to have adequate margin, is set at 0.99999 for the reliability of power following a major accident, such as loss-of-coolant.

The criterion can be applied uniformly across all nuclear plants for all sites and would assure that acceptable levels of power integrity are attained. The total complex of power is derived from off-site network sources, as well as on-site standby sources. Plants closely coupled to strong networks are especially well endowed with a reliable source of off-site power for use in emergencies. An evaluation of a particular nuclear plant on a particular reactor site for purposes of satisfying this emergency power safety criterion might indicate that, although a supplementary on-site power requirement is required, it might only involve a conventional diesel source because of a very dependable off-site power network. On the other hand, the evaluation may indicate that since the off-site power network is not of the highest level of dependability, the on-site power source of diesel power must be designed for a higher level of availability.

Most domestic plants are favorably sited so that the availability
ff-site power, even following a loss-of-coolant accident is in
ss of 0.999. In such a case, a conventional peaking plant diesel
rator with a starting reliability of 0.99 is adequate supplementar
te power to meet the goal. In some cases where the availability
f-site power falls below 0.999, then extra measures to assure
r starting reliability on the diesel such as augmented devices
tensified surveillance and maintenance would be employed to meet
al. In unusual cases where a plant is rather isolated from the
rid network, such that off-site power availability may be low
ere the extra measures mentioned above are not sufficient to
y the reliability goal, a redundant diesel generator would be
d.

lication of the criterion requires a detailed analysis of the
etwork associated with each plant. In addition, a thorough
anding of the cause and effect relationship existing between
ident requiring the operation of an engineered safeguard and the
power is evaluated under the hypothetical conditions that the
has occurred; no other assumption is realistic or meaningful.
General Electric Company considers that when the criterion
power availability is achieved by a combination of off-site
l one on-site diesel generator, the further addition of a
-site diesel generator is not the proper action to contribute
ntly to plant safety.

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An evaluation of the total power complex for the Monticello Nuclear Generating Plant, Unit No. 1 (Northern States Power Co.) has been made. For the proposed reactor and site, a single diesel will provide a sufficient source of alternate power to assure a capability for performing the functions required of the engineered safeguards. Performance of the NSP power network is covered in the answer to Question 4 in Amendment 6 and an analysis of the reliability of the power complex is covered in the answer to Question 7 in Amendment 6.