



UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION II - SUITE 818
230 PEACHTREE STREET, NORTHWEST
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Docket file

SEP 16 1969

J. P. O'Reilly, Chief, Reactor Inspection and Enforcement Branch
Division of Compliance, Headquarters

INQUIRY MEMORANDUM - DUKE POWER COMPANY (OCONEE 1 AND 2), LICENSE NOS.
CPR-33 AND 34, DOCKET NOS. 50-269 AND 270

During a routine announced inspection of the subject facilities on September 9-12, 1969, C. E. Murphy, Reactor Inspector, Region II, was advised by J. R. Wells, Principal Field Engineer, Duke, that in late July 1969 No. 14 rebar test splices had failed, by pullout of the rebar, well below the specified minimum limit of 75,000 psi. Subsequent checks revealed that the filler material in the sleeve was porous and brittle indicating that certain lots of the Cadweld powder were defective. The details relating to the defective powder problem are as follows.

The first in a series of defective splices noted failed at 44,000 psi. A canister of powder from the work area was used to make a second splice; it failed at 33,000 psi. Another canister of powder from the work area was used to make a third test splice; it failed at 86,600 psi which is above the 75,000 psi minimum, but below Duke's control limit of 90,000 psi. All powder used in the above-mentioned tests were from Cadweld Lot No. FF-CS-2. Inasmuch as the powder taken from the work area could have been subjected to moisture, a canister of powder from the same lot was taken from the powder house and used for the fourth test; it failed by rebar pullout at 85,700 psi. As a result of these several tests, samples of powder were taken at random from the powder house and tested. These tests produced results ranging from 90,200 psi to 100,800 psi. In light of the results of the several tests made, Duke decided that all powder from Lot No. FF-CS-2 be placed in quarantine.

It is not known how many Cadweld splices had been made in the field with powder from Lot No. FF-CS-2. However, all accessible splices were rechecked in the Unit 1 area with a hammer and chisel for any indication of brittleness at the taphole and the top of the sleeve. All sleeves checked were completely filled. Those that did not have shiny metal completely around the top of the sleeve were rejected. Those that indicated brittleness when struck with the chisel were also rejected. Eleven splices around the Unit 1 refueling canal were rejected as a result of this recheck. All No. 14 vertical splices made around the

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emergency sump in the Unit 2 secondary shielding walls were rechecked in a similar fashion; no brittleness was detected in the filler material in these splices.

The powder from Lot No. FF-CS-2 had been certified by ERICO Products Company in their report dated July 8, 1969. The latest No. 14 Cadweld splices made prior to the splices which were rechecked were in a Unit 1 secondary shielding wall placement that was made on May 26, 1969. Therefore, there is no possibility of a splice, made from the powder lot in question, being embedded in concrete.

ERICO Products Company was notified of the low breaks, and on August 7, Messrs. Pfeiffer and Crockett of ERICO Products Company visited the site to qualify a crew in the Cadweld process and to test various lots of powder. These tests were made from powder lots which exhibited "hang fires" in the field; i.e., where the powder burned and remained in the crucible and did not flow to the pouring basin and sleeve. Based on these tests, six lots of powder were placed in quarantine pending the results of tests made by ERICO in their laboratory on samples taken from these lots. ERICO's testing resulted in their replacing 16 boxes of Lot No. EM-BW-3, as well as 21 boxes of FF-CS-2. The additional lots of powder were deemed acceptable and were removed from quarantine on August 21, 1969. Since the replacement of this defective powder, no other splices have failed from this cause.

In response to the inspector's questions, Wells stated that he did not know the number of boxes of powder that they received in each lot, but that the information could be obtained. He also stated that he did not have the certification report by ERICO on Lot No. EM-BW-3, but that he would obtain a copy of this report and send it to the inspector. (Region II was subsequently advised by Duke that the certification report could not be found.)

In that ERICO Products Company supplies Cadweld products to many nuclear plant contractors, it would appear advisable to alert the other regions to this filler metal problem experienced at Duke. I also recommend that Compliance visit the ERICO shop in Cleveland, Ohio, for the purpose of reviewing their QA/QC program associated with the production and packaging of the filler metal powder.

We are satisfied that Duke has taken appropriate action on this problem. We do intend to continue our effort in obtaining the ERICO certification report for Lot No. EM-BW-3 so that we can determine by the date of the

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certification whether or not Cadwelds made from this lot are embedded in concrete.

Original Signed
by W. C. Seidle

W. C. Seidle
Senior Reactor Inspector

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REG Files ←