

REPORTABLE DEFICIENCY 50.55(e)
ARIZONA PUBLIC SERVICE COMPANY (APS)
PALO VERDE NUCLEAR GENERATING STATION (PVNGS)
UNIT #1
INTERIM REPORT - MARCH 18, 1980

I. Purpose

The purpose of this report is to provide interim information required by 10CFR50.55(e) concerning apparent deficiencies relating to 600V copper power cable, delivered and partially installed in Unit #1 of the PVNGS.

II. Background

On November 16, 1979, a non-Class IE, 600V, 350 MCM, I/C cable, manufactured by the Rockbestos Company, was rejected by the installation crew because of nonsequential footage markings. Further destructive examination, although there was no outward appearance of any jacketing material disturbance, of the mismarked area revealed a factory repair of the conductor, insulation and jacket. This is commonly referred to as a "staggered braze", but is officially identified as a factory repair.

Although this deficiency was discovered in a non-Class IE cable, it was considered a significant issue because:

- (1) All of the 600V power cable is purchased as Class IE cable regardless of its application, except that the cable needed for Class IE applications is color coded.
- (2) In response to Bechtel's inquiry to Rockbestos of November 13, 1979 regarding factory repairs, Rockbestos' initial verbal response was that factory repairs are not shipped to PVNGS.

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However, subsequent to the discovery of the repair, Rockbestos advised, in writing, that these factory repairs were routinely done on 600V power cable.

- (3) The insulating material used on the factory repair was different than the cable insulation that was not part of the repair and did not appear to meet the specification requirements.
- (4) There was no test information in Rockbestos Qualification Report (IEEE-323) for the material found in the factory repair found at the PVNGS site or that factory repairs, in general, were qualified.

These discoveries initially were not considered as being a condition of 50.55(e) because Rockbestos:

- (1) Explained that their previous denial was based on their belief that although factory repairs were routinely performed on industry and utility cable, they had not repaired any cable supplied to PVNGS;
- (2) Assured APS that their factory repairs met the specification requirements;
- (3) Assured APS that the conductor brazing and the insulation and jacketing repair were done per industry standards and in accordance with their factory procedures; and
- (4) Committed to immediately begin qualification testing to verify their claims that factory repairs were suitable for Class IE service.

Consequently, it was determined that if the material used for the factory repair did, in fact, meet the environmental and flame retardant qualifications, the cable which might include factory repairs would be acceptable for use in Class IE systems as well as the balance of the plant.

III. Description of Deficiency

Although Rockbestos had developed substantial and nearly satisfactory environmental and flame retardant qualification data on their repairs between the time of the initial discovery and March 3, 1980, it was determined by testing conducted by APS Engineering that the repair material used in the qualification tests was not the same material that was used on the factory repair found in the cable delivered to PVNGS.

Furthermore, the insulating material used to make the repair found at PVNGS was not the same material as that used for the regular cable insulation and did not meet our specifications. Specifically: (1) the repair material was not the same compound as that used on the unrepaired cable insulation; (2) the material was not a cross-linked polymer as claimed by Rockbestos and required by our specifications; and (3) it was found not to be flame retardant.

On March 5, 1980, Rockbestos confirmed that there probably were between six and eight repairs in the Class IE, 600V, cable shipped to PVNGS, but they could not identify or locate any of these repairs. Rockbestos also indicated that they had determined that, contrary to previous statements, their repair process was not in control and the loss of the vulcanizing steam pressure, temperature and/or time during this process probably was the reason that the insulating material used on the repair received at PVNGS was, in fact, not a cross-linked polymer.

These discrepancies invalidated the previous qualification work applicable to the factory repair materials which may be in the cable received and installed at PVNGS and questioned the ability of the repaired cable to perform its safety function.

IV. Analysis of Safety Implications

The Class IE, 600V, cables supplied by Rockbestos are part of the Class IE, AC 480V and DC 125V power systems and, therefore, supply power to safety-related electrical equipment. The loss of cable due to the failure of one of these repairs before or during a design basis event could result in the degradation of the function of that system. Since it cannot be determined where any of these repairs are located, it cannot be determined whether the potential for a common mode failure may exist on redundant systems because of the presence of factory repairs.

V. Preliminary Corrective Action

A Hold-On-Shipment of Class IE cable from Rockbestos has been imposed until; (1) Rockbestos can demonstrate that its manufacturing process is in control; (2) adequate quality assurance has been established to assure conformance, and (3) that factory repaired cables are fully qualified to the Class IE requirements.

A "Stop Work Order" was initiated by APS and issued on March 5, 1980 by Bechtel to stop the current installation of Rockbestos Class IE cables. Class IE cables already delivered to PVNGS have been quarantined and will not be installed until the "out-of-process" factory repairs are fully qualified. Some 6,000 feet of this cable is already pulled and it will be removed if the qualification of the "out-of-process" factory repair cannot be qualified.

Rockbestos has been requested to submit to Bechtel for our review and approval; (1) repair procedures for all future factory repairs

and their methods of controlling this process, and (2) their revised quality assurance/quality control procedure which assures that no repaired cable is shipped to PVNGS until all of their materials are fully qualified, should we elect to accept shipments of cable that has not been repaired.

Arizona Public Service and/or Bechtel will assure that the procedures for the control of repair process are adequate and will verify that adequate quality assurance is in effect to assure compliance.

- VI. The corrective action described above will provide assurance that all future Rockbestos supplied Class IE cable will meet the specification requirements and all previously supplied cable will be either requalified or removed to assure that the Rockbestos Class IE cable will perform its safety function.

