Docket No. 50-528/529/530

50.55(e) Report

Arizona Public Service Company
P.O. BOX 21666 • PHOENIX, ARIZONA 85036

March 24, 1983
ANPP-23348-BSK/RQT

U. S. Nuclear Regulatory Commission
Region V
Creekside Oaks Office Park
1450 Maria Lane - Suite 210
Walnut Creek, CA 94596-5368

Attention: Mr. D. M. Sternberg, Chief
Reactor Projects Branch 1

Subject: Interim Report - DER 83-11
A 50.55(e) Potentially Reportable Deficiency Relating to Exide Batteries May Leak or Corrode at Terminals Due to Cracking of Plastic Seals/Covers
File: 83-019-026; D.4.33.2

Reference: Telephone Conversation between A. D'Angelo and G. Duckworth on February 28, 1983

Dear Sir:

The NRC was notified of a potentially reportable deficiency in the referenced telephone conversation. At that time, it was estimated that a determination of reportability would be made within thirty (30) days.

Due to the extensive investigation and evaluation required, an Interim Report is attached. It is now expected that this information will be finalized by June 14, 1983, at which time a complete report will be submitted.

Very truly yours,

E. E. Van Brunt, Jr.
APS Vice President,
Nuclear Projects
ANPP Project Director

EEVB/RQT:wp
Attachment

cc: See Attached Page 2

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cc: Richard DeYoung, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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INTERIM REPORT - DER 83-11
POTENTIAL REPORTABLE DEFICIENCY
ARIZONA PUBLIC SERVICE COMPANY (APS)
PVNGS UNIT

I. Potential Problem

G-cell Batteries supplied by Exide have been determined by the supplier to be potentially deficient (see attached notice). Existing stresses could cause certain plastic components, which combine to form the seal around the terminal posts, to crack, allowing leakage of battery acid. Additional stresses resulting from nodular corrosion could lead to radial cracks in the cell cover.

These batteries are located in the Class IE 125V DC Power System, which distributes power to plant protection and engineered safety features equipment.

II. Approach To and Status of Proposed Resolution

Bechtel Engineering is currently corresponding with Exide to disposition the condition.

III. Projected Completion of Corrective Action and Submittal of the Final Report

Evaluation of this condition and submittal of the Final Report is forecast to be completed by June 14, 1983.

EXIDE

NOTICE TO OPERATORS OF EXIDE GN CLASS 1E BATTERIES

1. MINOR FAULTS DISCOVERED

Two minor faults have been discovered by EXIDE in G-cells produced before August 1982. These faults may be present on some or all GN batteries qualified for Class 1E service, even though, in most cases, there may be no visible evidence of the faults. While the faults will not affect the safety or the performance of the battery, at least in its early years of life, EXIDE believes it is prudent to effect an on-site correction as soon as reasonably possible, to pre-empt any hazard from developing.

2. THE FIRST FAULT

The fault centers around the terminal post seals and the components and materials which combine to make the seals.

The design of the seal (see Fig. 1) involves the compression of a rubber sleeve, or gland, against the lead terminal post. The gland is held in compression by the cover and the seal nut.

Unfortunately, the stress on these plastic components, over a period of years, can cause them to crack. The plastic boss at the base of the seal can crack as shown in Fig. 2, or the seal nut can crack as shown in Fig. 3.

The effect of either type of cracking is the same in that it relieves the pressure on the gland, thereby allowing the seal to "leak", that is, to allow acid to migrate slowly up the posts. Given that the intercell connectors are tight, as they should be, this leakage should cause no problems.

A procedure has been developed for permanent repair, which is now being refined, and submitted for qualification, for reducing the rate of the leakage. This can be carried out on site by EXIDE personnel, and should be implemented during your next planned shutdown.

It is based on the principle of eliminating all stresses on the plastic parts, and creating a new seal, of stress-free design, above the old seal location.

3. SECOND FAULT

The cracking of the plastic boss or nut, if complete, causes nothing more than leakage, which, as stated, can be reduced by other means. If the cracking is only partial, or the compression of the gland is marginal to begin with, then a secondary fault, called "nodular corrosion" of the lead post can occur. This corrosion takes place in the crevice of a partially tight seal and causes a growth to take place on the surface of the lead.

Nodular corrosion does not take place in the presence of acid and is, therefore, avoided if the seal "leaks" slightly.

The consequence of nodular corrosion is to create additional stress on the plastic components, this time in a radial direction. This stress can lead to radial cracks in the cell cover (Fig. 4). A small number of cells have been reported with this condition.

4. CORRECTIVE ACTIONS

A) HOLDING POSITION

Until such time as we can effect permanent repairs, which we plan to do using EXIDE personnel supervised by Headquarter's Engineering during your next planned shutdown, the following procedures should be done by EXIDE personnel. Taken together, they will ensure integrity of the battery. They should be carried out expediently.

1. Back off all red and black nuts to eliminate any remaining gasket compression of the post seals.
2. Retorque intercell connector bolts to 250 in. lbs.
3. Ensure that terminals are fully coated with No-oxide grease.
4. Repair any cracks in the covers with approved cement, after appropriate cleaning and neutralizing.
5. Conduct micro-ohmeter check on all intercell connections and arrange for this check to be repeated quarterly by EXIDE personnel or until permanent repairs have been completed. Connectors must also be retorqued quarterly to 250 in. lbs. as well as a thorough and detailed examination of the cell covers for further cracks.

NOTE: This procedure will not affect our qualification.

B) PERMANENT REPAIRS

During shutdown, effect permanent repairs as follows:

1. Disconnect and remove all intercell, intertier and terminal connectors.
2. Remove all red and black terminal seal plastic nuts.
3. Remove rubber glands from inside the seals.
4. Rebuild the seals using "O" rings with liquid sealing compound and new red and black caps.
5. Clean connectors and terminal posts and reassemble hardware in accordance with instructions including micro-ohmeter readings.
6. Return the battery to service.

This procedure will not only correct the primary fault, by reducing stress, but will also correct the secondary fault if it exists. Any nodular corrosion present will be "quenched" if allowed exposure to the acid in the cell.

NOTE: The permanent repairs cannot be undertaken until we have completed the re-qualification of the liquid seal planned for July 1983.

C)

A final corrective action, necessary only for the few units which have radial cracks in the covers, is a "flood-pour" cover repair. This relatively simple technique creates an all-enveloping secondary cover above the old one, sealing off any cracks. The flood pour technique should be used only if many cracks are present. For small, isolated cracks, individual repair is prefereable.

W. E. M. Jones, Jr.
Vice President
Engineering

WEMJ:jeb

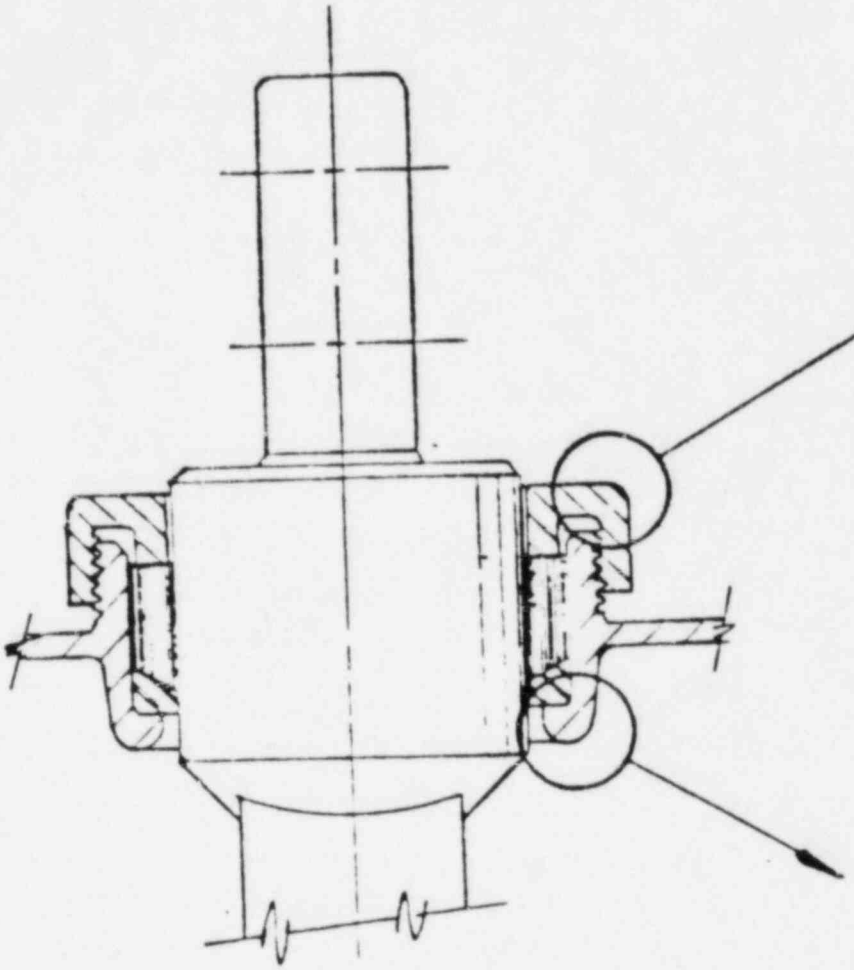

FIG. 1

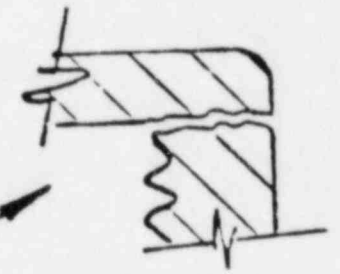

FIG. 3

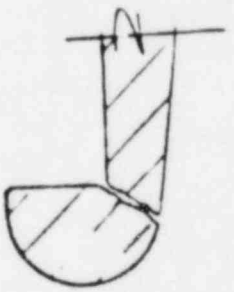

FIG. 2

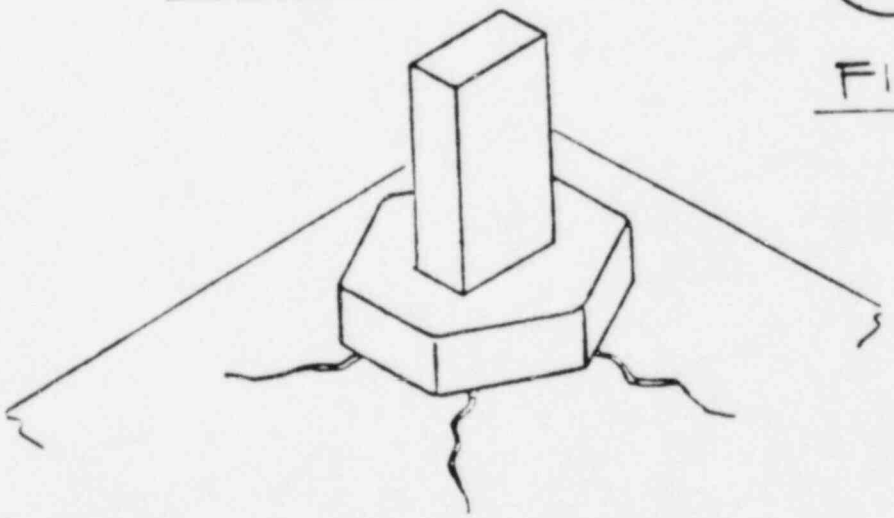

FIG. 4