

Power Reactor

Event # 43527

<b>Site:</b> NORTH ANNA <b>Unit:</b> 1 2 <b>Region:</b> 2 <b>State :</b> VA <b>Reactor Type:</b> [1] W-3-LP,[2] W-3-LP <b>Containment Type:</b> DRY SUB DRY SUB		<b>Notification Date / Time:</b> 07/27/2007 09:05 (EDT) <b>Event Date / Time:</b> 07/26/2007 (EDT) <b>Last Modification:</b> 07/27/2007				
<b>NRC Notified by:</b> TOM SHAUB <b>HQ Ops Officer:</b> MARK ABRAMOVITZ <b>Emergency Class:</b> NON EMERGENCY <b>10 CFR Section:</b> 21.21                      UNSPECIFIED PARAGRAPH		<b>Notifications:</b> JOEL MUNDAY                      R2 PART 21 (E-MAIL)                      NRR				
Unit	Scram Code	RX Crit	Init Power	Initial RX Mode	Curr Power	Current RX Mode
1	N	Yes	100	Power Operation	100	Power Operation
2	N	Yes	100	Power Operation	100	Power Operation

**PART 21 NOTIFICATION - FAILURE OF ENERSYS (EXIDE) BATTERY**

In March 2005, battery cell internal resistance for an EDG battery bank revealed five cells with abnormal resistance. "There was one cell for which no reading could be obtained and was replaced immediately. A second cell had a reading that was nearly four times the average of the associated string and was subsequently replaced as a proactive measure during the EDG maintenance outage. Three (3) other cells were noted with higher than average readings that are not considered to be operability concerns. In total, five (5) cells out of a total of 240 were found with higher than expected internal resistance values."

The failed battery was destructively tested revealing significant corrosion within the battery. The unit-2 batteries have been replaced. The unit-1 batteries will be replaced in the fall 2007 outage.

Manufacturer: Enersys (Exide)  
 Model: 3CA-5  
 Serial Number: beginning with 05

The licensee notified the NRC Resident Inspector.

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JE19

NRC FORM 381 (12-2000)		<b>REACTOR PLANT EVENT NOTIFICATION WORKSHEET</b>				U.S. NUCLEAR REGULATORY COMMISSION OPERATIONS CENTER EN# <b>43527</b>	
NRC OPERATION TELEPHONE NUMBER: PRIMARY -- 301-816-5100 or 800-532-3469*, BACKUPS -- [1st] 301-951-0550 or 800-449-3694*, [2nd] 301-415-0550 and [3rd] 301-415-0553 *Licensees who maintain their own ETG are provided these telephone numbers.							
NOTIFICATION TIME <b>0905</b>	FACILITY OR ORGANIZATION Dominion - North Anna Power Station	UNIT 1 and 2	NAME OF CALLER <i>Licensing Engineer</i> Tom Shaub		CALL BACK # (804) 273-2763		
EVENT TIME & ZONE N/A	EVENT DATE 07/26/07	POWER/MODE BEFORE 100%/Mode 1		POWER/MODE AFTER 100%/Mode 1			
<b>EVENT CLASSIFICATIONS</b>		<b>1-Hr. Non-Emergency 10 CFR 50.72(b)(1)</b>			(v)(A) Safe S/D Capability AINA		
GENERAL EMERGENCY	GEN/AEAC	TS Deviation		(v)(B) RHR Capability AINB			
SITE AREA EMERGENCY	SIT/AEAC	<b>4-Hr. Non-Emergency 10 CFR 50.72(b)(2)</b>			(v)(C) Control of Rad Release AINC		
ALERT	ALE/AEAC	(i) TS Required S/D ASHU		(v)(D) Accident Mitigation AIND			
UNUSUAL EVENT	UNU/AEAC	(iv)(A) ECCS Discharge to RCS ACCS		(xii) Offsite Medical AMED			
50.72 NON-EMERGENCY (see next columns)		(iv)(B) RPS Actuation (scram) ARPS		(xiii) Loss of Conv/Asmt/Resp ACCM			
PHYSICAL SECURITY (73.71)	DDDD	(xi) Offsite Notification APRE		<b>60-day Optional 10 CFR 50.73(a)(1)</b>			
MATERIAL EXPOSURE	B???	<b>8-Hr. Non-Emergency 10 CFR 50.72(b)(3)</b>			Invalid Specified System Actuation		
FITNESS FOR DUTY	HFIT	(ii)(A) Degraded Condition ADEG		<b>Other Unspecified Requirement (Identify)</b>			
<input checked="" type="checkbox"/> OTHER UNSPECIFIED REQMT (see last column)		(ii)(B) Unanalyzed Condition AUNA		<input checked="" type="checkbox"/> <b>10 CFR Part 21 Notification</b> NONR			
INFORMATION ONLY	NINF	(iv)(A) Specified System Actuation AESF		NONR			

**DESCRIPTION**

Include: System affected, actuations and their initiating signals, causes, effect of event on plant, actions taken or planned, etc. (Continued on back)

10 CFR 21 Notification

**Abstract:**

Internal cell resistance measurements obtained on one of the safety-related emergency diesel generator (EDG) batteries identified a possibly degraded cell. The affected cell was replaced and subsequent destructive testing revealed significant corrosion within the battery.

Component Information (as applicable):

Manufacturer: **Enersys (Exide)**

NSSS/A-Model Number:

Part Number:

**3CA-5**

**Description:**

In 2005, Internal Operating Experience from Dominion Substation Engineering communicated a potential long-term degradation issue associated with Exide model 3CC-7 batteries. The degradation is the result of an improperly made connection during the manufacturing process at Exide's (Enersys) facility in Sumter, SC, during the mid to late 1990's. There are no batteries of this specific model at North Anna, however, the commercially dedicated batteries (Exide model 3CA-5) for the EDGs are of a similar design and were manufactured at the same facility using the same process.

The jars susceptible to this process have a serial number beginning with "05", indicating they were manufactured in the Sumter facility. There are no visual inspections that can definitively determine if any of these batteries are exhibiting premature degradation. However, susceptible cells may be detected by measuring the cell internal impedance, resistance, or conductance.

On March 24, 2005, cell internal resistance readings were obtained on one of the EDG battery banks using an Alber cell-corder. Out of sixty (60) cells, three (3) exceeded the overall average for the battery string and on a fourth cell no reading could be obtained, indicating a degraded cell. The affected cell was replaced and subsequent destructive testing revealed significant corrosion at the positive post.

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NOTIFICATIONS	YES	NO	WILL BE	ANYTHING UNUSUAL OR NOT UNDERSTOOD?	YES (Explain above)	X NO
NRC RESIDENT	X			DID ALL SYSTEMS FUNCTION AS REQUIRED?	X YES	NO (Explain above)
STATE(s)		X		MODE OF OPERATION UNTIL CORRECTED:	ESTIMATED RESTART DATE:	ADDITIONAL INFO ON BACK
LOCAL		X		Mode 1	N/A	X YES NO
OTHER GOV AGENCIES		X				
MEDIA/PRESS RELEASE		X				

ADDITIONAL INFORMATION

RADIOLOGICAL RELEASES: CHECK OR FILL IN APPLICABLE ITEMS ( <i>specific details/explanations should be covered in event description</i> )							
LIQUID RELEASE	GASEOUS RELEASE	UNPLANNED RELEASE	PLANNED RELEASE	ONGOING	TERMINATED		
MONITORED	UNMONITORED	OFFSITE RELEASE	T. S. EXCEEDED	RM ALARMS	AREAS EVACUATED		
PERSONNEL EXPOSED OR CONTAMINATED		OFFSITE PROTECTIVE ACTIONS RECOMMENDED			*State release path in description		
Total Activity (Ci) %	Release Rate (Ci/sec)	% T. S. LIMIT	HOO GUIDE	Total Activity (Ci)	% T. S. LIMIT	HOO GUIDE	
Noble Gas			0.1 Ci/sec			1000 Ci	
Iodine			10 uCi/sec			0.01 Ci	
Particulate			1 uCi/sec			1 mCi	
Liquid ( <i>excluding tritium and dissolved noble gases</i> )			10 uCi/min			0.1 Ci	
Liquid (tritium)			0.2 Ci/min			5 Ci	
Total Activity							
	PLANT STACK	CONDENSER/AIR EJECTOR	MAIN STEAM LINE	SG BLOWDOWN	OTHER		
RAD MONITOR READINGS							
ALARM SETPOINTS							
% T. S. LIMIT ( <i>if applicable</i> )							
RCS OR SG TUBE LEAKS: CHECK OR FILL IN APPLICABLE ITEMS: ( <i>specific details/explanations should be covered in event description</i> )							
LOCATION OF THE LEAK ( <i>e.g., SG #, valve, pipe, etc.</i> )							
LEAK RATE:	UNITS gpm/gpd	T. S. LIMITS	SUDDEN OR LONG-TERM DEVELOPMENT				
LEAK START DATE	TIME	COOLANT ACTIVITY AND UNITS:	PRIMARY	SECONDARY			
LIST OF SAFETY RELATED EQUIPMENT NOT OPERATIONAL							
EVENT DESCRIPTION ( <i>Continued from front</i> )							
<p><u>Description (continued)</u>                      A Part 21 evaluation was performed (2005) and it was concluded that this was not a substantial safety hazard because the defect would be identified through normal battery testing before a battery was rendered incapable of performing its function. A more recent review of this issue along with discussions with NRC personnel has resulted in re-evaluation of this earlier conclusion. Without the new quarterly internal cell resistance tests that were created, the Technical Specification required battery surveillances (weekly, quarterly and 18-month) would not be able to detect this internal degradation. The 5-year EDG battery capacity test would be able to detect when internal resistance advanced to the point where capacity was &lt;80% of manufacturers rating, but the degradation could progress between tests resulting in inoperability without detection.</p> <p><u>Causes:</u>                      Equipment Specification, Manufacture, and Construction- Fabrication Deficiency                      The internal lead post and connector / terminal within the battery jar were bonded together by hand using a high temperature heating process referred to as a "burn". If the temperature used during the "burn" is too low, cracks and voids are left between the post and connector. Acid seeps into the voids, causing the post to corrode and resulting in an open circuit over an extended period of time.</p> <p><u>Corrective Actions:</u>                      Cell internal resistance readings were obtained on all four (4) battery banks for the EDGs. There was one cell for which no reading could be obtained and was replaced immediately. A second cell had a reading that was nearly four times the average of the associated string and was subsequently replaced as a proactive measure during the EDG maintenance outage. Three (3) other cells were noted with higher than average readings that are not considered to be operability concerns. In total, five (5) cells out of a total of 240 were found with higher than expected internal resistance values.</p> <p>Periodic testing of all North Anna EDG batteries was put in place to monitor for this defect (increases in internal cell resistance readings) to confirm continued operability of all EDG batteries. In parallel, plans were launched to replace all EDG batteries with models that are not susceptible to this defect. Unit 2 batteries have been replaced and Unit 1 batteries will be replaced during the fall 2007 outage.</p>							