APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-498/88-25
50-499/88-25

Operating License: NPF-76
Construction Permit: CPPR-129

Dockets: 50-498
50-499

Licensee: Houston Lighting & Power Company (HL&P)
P.O. Box 1700
Houston, Texas 77001

Facility Name: South Texas Project (STP), Units 1 and 2

Inspection At: STP, Matagorda County, Texas

Inspection Conducted: April 11-15, 1988

Inspectors: A. R. Johnson 5/13/88
A. R. Johnson, Reactor Inspector, Plant Systems Section, Division of Reactor Safety — Date

for R. E. Ireland 5/18/88
E. P. Hildebrand, Reactor Inspector, Plant Systems Section, Division of Reactor Safety — Date

Approved: R. E. Ireland 5/18/88
R. E. Ireland, Acting Chief, Plant Systems Section, Division of Reactor Safety — Date

Inspection Summary

Inspection Conducted April 11-15, 1988 (Report 50-498/88-25)

Areas Inspected: Routine, announced inspection of Unit 1 control room activities.

Results: Within the areas inspected, no violations or deviations were identified.

Inspection Conducted April 11-15, 1988 (Report 50-499/88-25)

Areas Inspected: Routine, announced inspection of Unit 2 standby diesel generator maintenance, electrical systems, component startup testing records, and HL&P's response to NRC Bulletin 88-01 regarding defects in Westinghouse DS 416 and DS 206 series circuit breakers.

Results: Within these areas, no violations or deviations were identified.

DETAILS

1. Persons Contacted

HL&P

*J. T. Westermeier, Project Manager
*G. L. Parkey, Plant Superintendent, Unit 2
*J. S. Phelps, Supervising Engineer, Project Compliance
K. O'Gara, Project Compliance
*S. D. Phillips, Project Compliance
*G. Ondriska, Startup Engineering
J. A. Slabinski, Unit 2, Operations Quality Control (QC) Supervisor
H. Murray, Unit 2 Operations QC
P. Bufkin, Unit 2 Operations QC
J. Curran, Unit 2 Operations
D. Nester, Unit 2 Operations
R. A. Hernandez, Project Quality Assurance (QA)
J. J. Johnson, Project QA
*M. Duke, Engineering
*W. Trujillo, Supervisor, Nuclear Assurance
*M. E. Powell, Supervising Engineer, Licensing
B. Evans, Licensing Engineer

Bechtel

*R. W. Miller, Project QA Manager
*R. H. Medina, QA Supervisor
A. Carpenter, Startup Engineering

NRC

D. R. Carpenter, Senior Resident Inspector
*G. L. Constable, Chief, Division of Reactor Projects, Project Section D
*A. R. Johnson, Division of Reactor Safety (DRS), Region IV (RIV)
*E. P. Hildebrand, DRS, RIV

*Denotes those present at the exit interview.

2. Electrical Systems and Components, Unit 2

The NRC inspector selectively sampled and evaluated safety-related quality records pertaining to electrical systems and components regarding: medium voltage air circuit breakers (4.16KV and 480V), protective and auxiliary relays, current/potential transformers, meters and transducers, insulation resistance (megger) testing, and scheme and plant wiring verification. The inspection included record review to determine whether: the licensee was preparing, reviewing, and maintaining records properly; records reflected work accomplishment consistent with NRC requirements and FSAR

commitments; and records indicated any potentially generic problems, management control inadequacies, or other weaknesses.

a. Startup Testing Records

(1) The NRC inspector used the following generic prerequisite test procedures to evaluate the above electrical systems and components:

Procedure	Title
SG-E-06, Revision 4	Medium Voltage Air Circuit Breakers
SG-E-16, Revision 3	Current/Potential Transformers
SG-E-23, Revision 3	Meters and Transducers
SG-E-29, Revision 4	Protective and Auxiliary Relays
SG-E-03, Revision 8	Scheme Verification
SG-E-13, Revision 7	Insulation Resistance (Megger) Testing

Also, the NRC inspector reviewed the following vendor installation, operation, and maintenance instruction manuals for: guideline adjustments, settings, tolerances, and startup testing requirements recommended by the manufacturer.

Instruction Manual/Bulletin	Description
IB-18.1.7-2, Issue H	ITE Brown Boveri Ground Protection Fault Relays
IB-7.2.1.7-1, Issue A	ITE Brown Boveri Overcurrent Relays
IB-8.2.7-2, Issue H	ITE Gould-Brown Boveri 5KV Type 5HK Power Circuit Breakers
I.L.41-759.4A, March 1979	Westinghouse Type AR High Speed Auxiliary Relays
198 4555K10-U01E, Revision 8-74	General Electric Type AB Ammeters and Voltmeters
GEH-230AE, Revision 1-77	General Electric 600V thru 15KV Instrument Transformers

(2) The NRC inspector reviewed and evaluated the HL&P startup testing data and records associated with the electrical systems and components identified in Table 1 (attached).

The NRC inspector also reviewed and evaluated the startup testing data and records associated with the scheme verification and insulation resistance (megger) testing of the following systems:

System (Description)	System ID (Test No.)
4.16KV SG E1C Cub 12 Fdr to 480V ESF LC E1C (Scheme Verification)	C2PK02C3SC (2PL01-141297 & P01)
4.16KV SG E1C Cub 13 Fdr to 480V ESF LC E1C (Scheme Verification)	C2PK03C3SC (2PL01-141299 & P01)
4.16KV SG E1C Cub 12 Fdr to 480V ESF LC E1C (Megger Testing)	C2PLACC1GA (2PL01-162637)
4.16KV SG E1C Cub 12 Fdr to 480V ESF LC E1C (Megger Testing)	C2PLACC1GA (2PL01-162638)

No violations, deviations, or unresolved items were identified.

3. Defects in Westinghouse DS416 and DS206 Series Circuit Breakers

NRC Bulletin No. 88-01 provided information on Westinghouse series DS circuit breakers (CBs) and safety concerns associated with their use. The Bulletin required licensees using these breakers in Class 1E service to perform and document: inspection of the welds on pole shafts, and inspection of the alignment in the breaker closing mechanisms. HL&P evaluated the Bulletin and submitted a response to the NRC dated March 29, 1988. South Texas Project (STP), Units 1 and 2 use DS series CBs in Class 1E 480V load center applications, supply CBs, feeder CBs, motor generator set output CBs, reactor trip CBs, and reactor trip bypass CBs. STP, Units 1 and 2 have a total of 104 series DS CBs (52 in Unit 1 and 52 in Unit 2) in Class 1E applications. Six are in the reactor trip switchgear for each unit, and 46 are in 480 Vac load center applications for each unit.

HL&P performed inspections in accordance with Westinghouse Technical Bulletin No. NSID-TB-87-11 on reactor trip, trip bypass, and motor generator set output CBs of Unit 1, including replacements from Unit 2. The results of these inspections indicated that: all CB mechanism alignment inspections were satisfactory; all "short-term" inspections of pole shaft welds were satisfactory (based on reduced inspection criteria, but with imposition of subsequent inspections at 200-cycle intervals up to 4000 cycles, per Section 6.1.2 of the Bulletin); and "Long-term" inspections of a number of Unit 1 pole shaft welds were unsatisfactory (based on welds that were less than 120° of 1/8-inch fillet, lack of fusion on welds for the auxiliary switch drive link, and porosity of welds of the anti-pumping and right stop levers). These pole shafts were replaced from those in Unit 2 CBs. All inspection results of the Unit 1 pole shaft replacements from Unit 2 were satisfactory.

HL&P is in the process of performing inspections of the remainder of the DS series CBs utilized in Units 1 and 2. HL&P is inspecting these 480 Vac Class 1E CBs to the following guidelines:

Unit 1

Station Procedure OPMP05-NA-0008, Revision 3, has been revised to incorporate the short-term and long-term inspection criteria of Westinghouse Technical Bulletin NISD-TB-87-11. This procedure is being used by HL&P on a CB-by-CB basis for each of the remaining Westinghouse DS series CBs. These inspections are being performed by the HL&P operations group in conjunction with the HL&P CB preventive maintenance schedule, pursuant to Bulletin 88-01.

Unit 2

As required by Bulletin 88-01, the remaining Class 1E Westinghouse DS series CBs are being inspected in accordance with Station Procedure No. OPMP05-NA-0008, and the results will be documented prior to fuel loading. It should be noted that HL&P is using the reduced inspection guidelines of Bulletin 88-01 on inspection of the three primary welds (short-term inspections). As short-term inspections are passed, repeated inspections at 200 cycle intervals up to a maximum of 4000 cycles are required. A letter confirming completion of the required short-term and long-term inspections by HL&P, with documented inspection results, will be submitted to NRC in accordance with the reporting requirements of Bulletin 88-01.

HL&P is preparing Station Procedure No. OPMP05-RS-0003 (draft) which is dedicated specifically to the instructions and guidelines for maintaining Westinghouse type DS 416 reactor trip switchgear CBs. This procedure considers the inspection and maintenance attributes of the Westinghouse Owners Group Maintenance Manual (WOG) entitled "Maintenance Program Manual MPM-WOGRTSDS416-01 for Westinghouse Type DS 416 Reactor Trip Circuit Breakers and Associated Switchgear, Revision 0, dated November 30, 1986." Section 6, entitled "Inspection and Test Checklist," is designed to identify the required mechanical and electrical inspection and maintenance attributes to maintain Westinghouse type DS 416 reactor trip CBs and their associated switchgear in a continuous state of operational readiness. The checklist provides the maintenance techniques to ensure that CBs protective trip, opening, and interlocks function properly. It includes electrical performance checks, tests, tolerance measurements, and the record requirements, including undervoltage trip attachment (UVTA) and shunt trip attachment (STA) operation, needed to detect and correct a degraded condition.

Station Procedure OPMP05-RS-0003 will replace OPMP05-NA-0008, Revision 3 (now in place), for type DS 416 reactor trip switchgear CBs only.

Station Procedure No. OPMP05-NA-0008 now provides instructions and guidelines for maintaining Westinghouse type DS and DSL low-voltage power circuit breakers (480 volt breaker tests). This procedure has considered

the requirements of the Westinghouse vendor manuals, with recommendations for maintaining these CBs. However, all attributes of the WOG are not necessarily included in Procedure OPMP05-NA-0008, Revision 3.

No violations or deviations were identified.

4. Unit 2 Standby Diesel Generator (SDG) Engine Maintenance

During this inspection period, work was in progress on the "A" train diesel engine to replace the cylinder liner expansion seals. The expansion seals had been subjected to microbiologically induced corrosion (MIC) which caused some failures to occur. The expansion seal failures are discussed in NRC Inspection Report 50-498/88-21 and 50-499/88-21.

The mechanics performing the work observed by the NRC inspector were from Cooper-Bessemer Corporation. Some assistance was provided by EBASCO construction personnel. The work was being performed under a startup work request (SWR) using Cooper-Bessemer procedures. QC for the work was provided by a contract QC engineer. HL&P QC was also monitoring the work. Torque wrenches used on the job were calibrated by the STP onsite metrology lab for use with various adaptors and tool configurations. Work practices observed included use of lockboxes for tools and parts storage, bagging and tagging engine parts during disassembly, and housekeeping.

It was noted that the SDG "A" air motor jacking gear sump was low on oil, and gear wear was evident on the pinion gear. The Cooper-Bessemer lead mechanic was informed, and he stated that he would notify the startup engineering organization. This gear is used only for jacking the engine during maintenance and does not affect engine operation.

In summary, the work effort on SDG "A" appeared to be well organized and professionally conducted in accordance with the applicable site procedures.

No violations or deviations were identified.

5. Unit 1 Operation - Control Room Observations

During this inspection period, Unit 1 operations activities were observed. The reactor was at approximately 20 percent power and preparations were being made to place a main feed pump in operation. The main feed pumps were out of service because of alignment and vibration problems.

The conduct of operations personnel was formal and professional. Control Room logs were well maintained and thorough.

Surveillance testing and maintenance was in progress, requiring personnel to enter the control room frequently. Control room access was generally well controlled by the unit supervisor, but sometimes personnel would

enter from the side entrance behind the electrical plant control boards without obtaining permission. This resulted in the control room space becoming crowded to the extent that excess personnel had to be asked to leave by the shift operations staff. This observation was discussed with the shift supervisor.

During this observation period, the NRC inspector noted that permission was requested to troubleshoot the steam dump control system. MWR-MS-55308 was the controlling work document. The troubleshooting required jumper(s) to be installed which would render the steam dumps inoperable. Permission was granted to proceed with the work.

Subsequently, during the troubleshooting, the reference temperature (Tref) signal failed. The Tref value is a function of turbine impulse pressure and is used in the steam dump control system and rod control system. Control room personnel were not aware that Tref would be unavailable during the troubleshooting nor was the technician controlling the work. The Tref signal was immediately restored and the technician stopped work to discuss the occurrence with his foreman.

6. Exit Interview

An exit interview was conducted with HL&P personnel on April 15, 1988, at the conclusion of the inspection, during which the inspection findings were summarized. The information discussed at the exit was not identified as proprietary.

TABLE 1

Component (Description)	Component ID (Test No.)
ITE Gould Medium Voltage Circuit Breaker (4.16KV SG E1C Cub 12 Main Bkr to Xfmr E1C1)	C2PKSGOE1C-12-CB (2PL01-141290)
ITE Gould Medium Voltage Circuit Breaker (4.16KV SG E1C Cub 13 Main Bkr to Xfmr E1C2)	C2PKSGOE1C-13-CB (2PL01-141291)
GE, AB-40 Ammeter (4.16KV SG E1C Cub 12 Fdr to 480V ESF LC E1C1)	C2PKSGOE1C-12-A (2PL01-141303)
GE, AB-40 Ammeter (4.16KV SG E1C Cub 13 Fdr to 480V ESF LC E1C2)	C2PKSGOE1C-13-A (2PL01-141305)
Gould Current Transformer, 400:5, 5KV (4.16KV SG E1C Cub 13 CT ABC 50/51 to Xfmr E1C2)	C2PK5GOE1C-13-CT-ABC-50/51 (2PL01-141301)
Gould Current Transformer, 400:5, 5KV (4.16KV SG E1C Cub 12 ABC CT 50/51 Relay)	C2PKSGOE1C-12-CT-ABC-50/51 (2PL01-141300)
Gould Current Transformer, 1200:5, 5KV (4.16KV SG E1C Cub 12 CT ABC to Xfmr E1C1)	C2PKSGOE1C-12-CT-ABC-SP (2PL01-141292)
Gould Current Transformer, 1200:5, 5KV (4.16KV SG E1C Cub 13 CT ABC to Xfmr E1C2)	C2PKSGOE1C-13-CT-ABC-SP (2PL01-141294)
Gould Brown Boveri GR-5, Protective Relay (4.16KV SG E1C Cub 12 Gnd Relay 480V ESF LC E1C1)	C2PKSGOE1C-12-50G (2PL01-141296)
Gould Brown Boveri GR-5, Protective Relay (4.16KV SG E1C Cub 13 Gnd Relay 480V ESF LC E1C2)	C2PKSGOE1C-13-50G (2PL01-141298)
Westinghouse AR, Protective Relay (4.16KV SG E1C-13 Aux Relay 50GX)	C2PKSGOE1C-13-50GX (2PL01-141411)
Westinghouse AR, Protective Relay (4.16KV SG E1C-12 Aux Relay 50GX)	C2PKSGOE1C-12-50GX (2PL01-141410)
ITE Brown Boveri, 5IL, Protective Relay (4.16KV SG E1C Cub 13 50/51 to LCE1C)	C2PKSGOE1C-13-50/51 (2PL01-141304)
ITE Brown Boveri, 5IL, Protective Relay (4.16KV SG E1C Cub 12 Fdr to 480V ESF LC E1C)	C2PKSGOE1C-50/51 (2PL01-141302)