ORGANIZATION: CORPORATE CONSULTING & DEVELOPMENT COMPANY, LTD
RESEARCH TRIANGLE PARK, NORTH CAROLINA

REPORT NO.: 99900511/85-01	INSPECTION DATE(S): 5/6-10/85	INSPECTION ON-SITE HOURS: 67

CORRESPONDENCE ADDRESS: Corporate Consulting
& Development Company, Ltd.
ATTN: Dr. J. R. Yow
President
P.O. Box 12728
Research Triangle Park, N.C. 27709
ORGANIZATIONAL CONTACT: Mr. Carson Blanton, Jr., QA Manager
TELEPHONE NUMBER: (919) 362-8800

PRINCIPAL PRODUCT: Engineering, consulting, and testing services.

NUCLEAR INDUSTRY ACTIVITY: Corporate Consulting and Development Company, Ltd. (CCL) provides engineering consulting and testing services to the nuclear industry for seismic analysis, testing, and nuclear environmental qualifications of equipment.

ASSIGNED INSPECTOR: Randolph N Moist — 4 JUNE 1985
R. N. Moist, Equipment Qualification Inspection Section (EQIS) — Date

OTHER INSPECTOR(S): G. T. Hubbard, EQIS

APPROVED BY: Uedi Potapovs — 6-13-85
U. Potapovs, Chief, EQIS, VPB — Date

INSPECTION BASES AND SCOPE:

A. BASES: Appendix B to 10 CFR Part 50 and 10 CFR Part 21.

B. SCOPE: This inspection consisted of : (1) a technical evaluation of equipment qualification (EQ) test activities for safety-related equipment, (2) witnessing of inprocess EQ testing; and (3) verification of implementation of the quality assurance (QA) program.

PLANT SITE APPLICABILITY: Brunswick 1 & 2 (50-324 and 50-325)

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A. VIOLATIONS:

None

B. NONCONFORMANCE:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and section 5 of the Quality Assurance Manual (QAM), no documented procedure existed for the control of mixing the chemical spray solution used during design basis event testing and monitoring the solution's PH.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Background

Carolina Power and Light Company (CP&L) contracted with CCL to conduct EQ test (vibration aging, thermal aging, radiation, seismic and High Energy Line Break (HELB)) of limit, control and pushbutton switches, terminal blocks, and solenoid valves. Test requirements were defined in three Patel Engineers Qualification Test Plans (QTPs), (PE1-TR-83-4-25 REVC-QTP for switches, PE1-TR-83-4-26 REV C-QTP for terminal blocks, PE1-TR-83-4-27 REV E - QTP for solenoid valves as required by CP&L purchase order (PO) to CCL. CCL wrote detailed test procedures for Qualification Testing based on the three Patel Engineers QTPs. These Qualification Tests were performed under CCL Job Number (JN) 1857.

2. Post HELB Inspection and Functional Tests for JN 1857:

The NRC inspectors observed and visually inspected switches and terminal blocks after the test chamber cover was removed and again after the removal of the specimens from the chamber. Visual inspection of a DC terminal block GE CR151D showed a build-up of foreign material between two terminal lugs. Following functional testing (FT) the CP&L representative sent the terminal block to a lab for analysis of the foreign material. CCL personnel took photos of the terminal blocks to document their conditions. The inspectors witnessed post HELB FT (insulation resistance and continuity measurements) for the switches and terminal blocks. The NRC inspectors reviewed detailed Test Procedure (TP) 1857-1-1/REV 1/FT for switches, TP 1857-1-2/REV 1/FT knob and key switches, TP 1857-1-3/REV 1/FT pushbutton switches, TP 1857-1-4/Rev 1 FT indicating lights and

TP 1857-1-7/REV 3/FT terminal blocks. It was determined that the tests and inspection activities were being performed in accordance with the detailed test procedures and CCLs QAM Revision 1 dated 12-10-84. The NRC inspectors also evaluated the calibration status and accuracy of the instrumentation used to perform the Post HELB FT by review of instrumentation calibration records.

3. Test Results of Post HELB FT for JN 1857

FT was started May 7, 1985, and was completed on May 9, 1985. During the testing, four test anomalies were identified and were documented by Record of Anomaly (ROA) per CCL's QAM.

The four ROAs are summarized as follows:

(1) The knob on a Honeywell oil tight manual control switch would not turn clockwise or counterclockwise.

(2) The pushbutton on a GE oil tight pushbutton switch could not be depressed.

(3) A Honeywell limit position switch OP-AR did not meet the acceptance criteria of the QTP for IR measurements.

(4) A Honeywell limit position switch OPD-AR did not meet the acceptance criteria of the QTP for continuity measurement. CCL and CP&L are currently reviewing and evaluating the four ROAs. The results of the evaluation will be reviewed in a future inspection.

4. Technical Evaluation

The NRC inspectors performed an in-depth technical evaluation and review of previous testing conducted on three test programs for qualification of safety-related electrical equipment. The following table summarizes the test programs examined including equipment type and types of documents examined.

Test Program	Equipment Type	Documents Examined
1857	Solenoid valves; terminal blocks; switches; and indicating lights.	QTP, TPs, PO's, receiving slips, test data, test monitor log sheets.

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Test Program	Equipment Type	Documents Examined
1859	Electro switches, indicating lights, fuseblock, fuse, terminal block & enclosure.	TR, calculation file for thermal aging, POs, specification test plan.
1914	Electro switches, indicating lights	TR

The NRC inspectors reviewed the EQ process prescribed in each test plan and reviewed test results, including the bases for accelerated thermal aging and radiation, and verified calculations.

Each of the three EQ test plans and related engineering documents were examined for the following:

a. Adequate test instrumentation and their accuracies were described and used to meet the requirements of NUREG-0588/IEEE-STD-323/1974.

b. Equipment interfaces were addressed.

c. Test acceptance criteria were established as described in the test specification or in the design engineering documents, such as calculations and engineering letters to meet the requirements of NUREG-0588/IEEE-STD-323/1974.

d. Same equipment was used for all phases of testing and represented a standard production item.

e. Environmental conditions were established and described (e.g., pressure and temperature profiles, and thermal aging factors were consistent with those outlined in the test specification or test plan).

f. Test results were adequately reduced and evaluated against established acceptance criteria described in customer test specifications or purchase orders and these requirements had been met.

g. All prerequisites for the given tests as outlined in the test specification had been met.

h. Test equipment included a description of all material, parts, and subcomponents.

i. ROAs were properly documented.

No nonconformances were noted during this review.

5. Other Testing

The NRC inspectors observed a test set up for Loss of Coolant Accident (LOCA) testing of conduit seals and anti-wicking splices for cables. During the observance of the test setup the NRC inspector determined, after interviews with CCL personnel, that CCL did not have a documented procedure for the control of mixing the chemical spray solution and monitoring the solution's PH. (see nonconformance B.1) The QA Manager provided the NRC inspectors prior to leaving CCL a copy of a new data sheet called "Chemical Spray Data Sheet Form TF-114" which showed calculations of the mixing ratios, initial PH and Daily PH readings, a revised test monitor log which now verifies that Form TF-114 has been prepared, and a revised Accident Simulation testing checklist which now contains a check for preparing Form TF-114.

PERSONS CONTACTED

Company CORPORATE CONSULTING & Development Co Ltd Dates 6 MAY 85

Docket/Report No. 99900511/85-01 Inspector MOIST

✓ Pre-Inspection Conference ____ Post-Inspection Conference

NAME(Please Print)	TITLE(Please Print)	ORGANIZATION(Please Print)
GEORGE HUBBARD	EQ QUALIFICATION ENG.	NRC
DR. J. ROLAND YOW	PRESIDENT	CCL
C. GARY HUGHES	VICE PRESIDENT, OPERATIONS	CCL
CARSON BLANTON	QUALITY ASSURANCE MANAGER	CCL

PERSONS CONTACTED

Company CORPORATE CONSULTING & DEVELOPMENT CO. LTD. Dates 6-10 MAY 1985

Docket/Report No. 99900511/85-01 Inspector MOIST

Page ___ of ___

NAME(Please Print)	TITLE(Please Print)	ORGANIZATION(Please Print)
CARSON BLANTON	QA MANAGER	CCL
PETE RUTTEN	TEST TECHNICIAN	CCL
JOHN DIETRICH	BRUNSWICK LICENSING	CP&L
MARK TURKAL	BRUNSWICK LICENSING	CP&L
DAVE RHYNE	ENGINEER	UNITED ENG. (CP&L)
DON HATMAKER	MANAGER TEST OPERATIONS	CCL
BOB MINADEO	PROJECT ENGINEER	PATEL
JOHNNY JENKINS	GRP / DIVISION DIRECTOR	PATEL
KEN BOONE	SENIOR TEST TECHNICIAN	CCL
ALAN MINER	SENIOR ENGINEER	CCL
HARDY DUERSON, JR	MANAGER, BUSINESS DEVELOPMENT	CCL

PERSONS CONTACTED

Company Corporate Consultant & Development Co. Ltd

Dates May 10, 1985

Docket/Report No. 99900511/85-01

Inspector

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___ Pre-Inspection Conference ✓ Post-Inspection Conference

NAME(Please Print)	TITLE(Please Print)	ORGANIZATION(Please Print)
RANDY MOIST	EQUIPMENT QUALIFICATION TEST ENG	NRC
GEORGE HUBBARD	EQUIPMENT QUALIFICATION TEST ENG	NRC
ALAN MINER	SENIOR ENGINEER	CCL
MARK HATMAKER	SR. TEST SUPERVISOR	CCL
C Blanton Jr.	QA Manager	CCL
Gary Hughes	VP Operations	CCL
J. ROLAND YOW	PRESIDENT	CCL

PERSONS CONTACTED

Company Corporate Consultant & Development Co. Ltd.

Dates May 6-10, 1985

Docket/Report No. 99900511/85-01

Inspector G. T. Hubbard

NAME(Please Print)	TITLE(Please Print)	ORGANIZATION(Please Print)
Carson Blanton, Jr	Manager, QA	CCL
John Dietrich	Brunswick Licensing	Carolina Power & Light (CP&L)
Mark Turkal	Brunswick Licensing	CP&L
David Rhyne	Engineer	United Engineers (CP&L)
Hardy Duerson, Jr	Manager, Business Development	CCL
Alan Miner	Sr. Engineer	CCL
Gary Hughes	Vice President, Operations	CCL
Robert Minades	Project Engineer	Patel Engineers
Johnny Jenkins	Grp/Division Director	Patel Engineers
Don Hatmaker	Mgr Test Operations	CCL
Pete Rutten	Test Technican	CCL

INSPECTOR G. T. Hubbard

SCOPE

DOCUMENTS EXAMINED

DOCKET NO. 99900511/~~F~~

REPORT NO. 85 - 01

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ITEM NO.	TYPE OF DOCUMENT	DOCUMENT NO.	REV.	DATE	TITLE / SUBJECT
1	QAM	A-608-83-01	1	12/10/84	Quality Assurance Manual
2	RPT	A-672-85		3/22/85	Volume I & II of Nuclear Environmental Qualification Report, Project Number 84-1859
3	RPT	A-675-85-01	1	4/5/85	Nuclear EQ Report for Switches & Indicator Lights for Project Number 85-1914
4.	File	—		—	Project 1859 Calculation File for Thermal Aging
5.	P.O.	0001766		8/15/84	CCL Purchase Order for Seismic Testing Services
6.	P.O.	0001743		7/6/84	CCL PO for Radiation Services
7.	P.O.	307101		5/84 → 11/84	Customer P.O. To CCL for Project ~~#~~ 84-1859 & Change of Scope 1 thru 5
8.	Form	QA-034			Notice of Test Monitor Appointment ~~& Test Monitor Log~~ Job # 1927.02
9.	Form	QA-035	2		Test Monitor Log for Job 1927.02
10.	—	T.59		4/24/79	Computer Software User Information (Arrhenius Equation)
11.		CCL-CA-19		3/5/84	Calculation Cover Sheet & Work Sheets, Verification of T.59 Activation Energy Calculation

TYPE OF DOC:

DWG - DRAWING
SPEC - SPECIFICATION
PRO - PROCEDURE
QAM - QA MANUAL
QCD - QC DOCUMENT
P.O. - PURCHASE ORDER
TNM - INTERNAL MEMO

LTR - LETTER
RPT - Report
___ - ___
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INSPECTOR G. T. Hubbard

SCOPE

DOCUMENTS EXAMINED

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ITEM NO.	TYPE OF DOCUMENT	DOCUMENT NO.	REV.	DATE	TITLE / SUBJECT
12	SPEC	14679-01-C1		2/23/84	Customer Specification for Project 84-1859
13	Plan	A-647-84-01	1	11/30/84	Nuclear EQ Program of Safe Shutdown Panels, Project # 84-1859
14	PRO	10-002	3	3/1/83	Test Monitoring Program
15	Form	QA-034		3/1/85	Notice of Test Monitor Appointment, Project # 1914
16	PO	830		4/11/85	Customer ~~Specification~~ Purchase Order for Project # ~~1914~~ 1927

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LTR - LETTER

INSPECTOR MOIST

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ITEM NO.	TYPE OF DOCUMENT	DOCUMENT NO.	REV.	DATE	TITLE / SUBJECT
1	QAM	A-608-83-01	1	12-10-84	QUALITY ASSURANCE MANUAL
2	P.O.	B23564	-	5-29-84	PURCHASE ORDER FROM CPEL TO CCL to perform ENVIROMENTAL TESTING
3	QP	PEI-TR-83-4-26	C	3-21-84	QUALIFICATION PLAN FOR TERMINAL BLOCKS
4	PRO	1857-1-7	3	10-18-84	TEST PROCEDURE for FUNCTIONAL TESTING OF TERMINAL BLOCKS
5	PRO	1857-2-1	-	3-19-85	TEST PROCEDURE FOR THERMAL AGING OF ~~TERMINAL BLOCKS~~ COMPONENTS
6	P.O	0001848	-	12-5-84	PURCHASE ORDER FROM CCL to FARWELL & HENDRICKS for V-SEISMIC
7	P.O.	0001881	-	1-28-85	PURCHASE ORDER FROM CCL to GEORGIA INSTITUTE OF TECHNOLOGY (RAD SERV)
8	QP	PEI-TR-83-4-27	E	3-20-84	QUALIFICATION PLAN FOR ASCO SOLENOID VALVES
9	TPRO	1857-6	2	4-16-85	TEST PROCEDURE FOR HIGH ENERGY LINE BREAK
10	PRO	1857-3	1	8-22-84	TEST Procedure for WEAR AGING TEST
11	PRO	1857-5	1	8-22-84	TEST Procedure for RADIATION TEST
12	PRO	1857-1-1	1	8-8-84	TEST PROCEDURE FOR FUNCTIONAL testing of switches (LIMIT)
13	PRO	1857-1-2	1	8-8-84	TEST Procedure FOR FUNCTIONAL TESTING OF Switches (KNOB & KEY)
14	PRO	1857-1-3	1	8-8-84	TEST Procedure For FUNCTIONAL TESTING OF Switches (PUSH BUTTON)
15	PRO	1857-1-4	1	8-8-84	TEST Procedure FOR FUNCTIONAL TESTING INDICATING LIGHT

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___ - _____
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___ - _____

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DOCUMENTS EXAMINED

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ITEM NO.	TYPE OF DOCUMENT	DOCUMENT NO.	REV.	DATE	TITLE / SUBJECT
16	PRO	1857-1-6	0	8-6-84	TEST PROCEDURE for FUNCTIONAL TESTING OF ASCO Solenoid VALVES
17	FORM	TF-047 QA			Receiving and INSPECTION Summary

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