

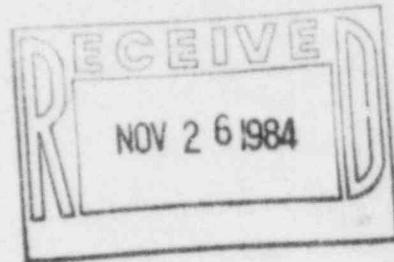
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November 21, 1984

W3P84-3235
Q-3-A35.07.90
3.A1.01.04
A4.05

Mr. John T. Collins
Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011



Dear Mr. Collins:

Subject: Waterford 3 SES
Docket No. 50-382
SIGNIFICANT CONSTRUCTION DEFICIENCY NO. 90
"Electrical Conduit Overstressed"
Final Report (revision R-2)

Reference: LP&L letter W3P84-2964 dated October 31, 1984

The referenced letter submitted the final report of SCD-90 (revision R-1) with a Justification for Interim Operation (JIO). Subsequently, NRC Region IV Inspector, J.I. Tapia, revisited the Waterford 3 site during the period of November 5-15, 1984 for final reinspection toward closure of SCD-90. Additionally, all corrective action for SCD-90 was completed.

In accordance with the requirements of 10CFR50.55(e)(3) enclosed are two copies of the LP&L revised Final Report of SCD-90 (R-2) which is submitted for NRC final disposition. This revision supersedes revision R-1 and it reflects the completion of corrective action. SCD-90 (R-2) final report is expected to satisfy Mr. Tapia's concerns and it also deletes the JIO which was included in the revision R-1 report previously issued.

Very truly yours,

K.W. Cook
Nuclear Support & Licensing Manager

KWC:GEW:sms

Enclosure

cc: NRC, Director, Office of I&E (15 copies)
NRC, Director, Office of Management
G.W. Knighton, NRC-NRR
D.M. Crutchfield
J.I. Tapia, NRC Region IV
E.L. Blake
W.M. Stevenson
INPO Records Center (D.L. Gillispie)

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FINAL REPORT OF
SIGNIFICANT CONSTRUCTION DEFICIENCY NO. 90 R2
"ELECTRICAL CONDUIT OVERSTRESSED"

INTRODUCTION

This report is submitted pursuant to 10CFR50.55(e). It describes a deficiency arising from the lack of complete installation records regarding verification of conduit and conduit supports installation in accordance with established installation criteria from span and support loading.

This report supercedes Revision 1. It deletes the "Justification for Interim Operation" and identifies that Corrective Actions are complete.

To the best of our knowledge, this deficiency has not been reported to the USNRC pursuant to 10CFR21.

SCOPE

SCD 90 covers conduits installed by Fischbach & Moore (F&M) at Waterford #3.

DESCRIPTION OF PROBLEM

Electrical conduit installation at Waterford #3 was performed by Fischbach & Moore (F&M). F&M field fabricated and installed conduit supports in accordance with approved designs and their approved procedure, and inspected them under their quality program. However, records documenting load checks did not record the actual loads. As a result of this, Ebasco Q.A. performed surveillance to verify conduit loading and span lengths per drawing 1564-B-288 series (B-288).

NCR-W3-6727 was generated based on the discrepancies identified on surveillance reports W3-NY-12 TK1 and TK3.

To clarify the sequence of events associated with SCD #90 Phase I through Phase II, a graphic "time line" has been added to this revision of the Final Report (See Exhibit C).

PHASE I

SCD 90 was initiated as a result of the potential impact of the discrepancies reported on NCR-W3-6727. A program was developed to walk down and evaluate conduits installed by F&M for compliance with design requirements (B-288) and to document any required Corrective Actions.

A listing for Waterford #3 was developed based on cable and conduit takeoffs from the Master Equipment List submitted to the NRC as part of the LP&L response to NUREG-0588. It encompasses cable/conduit required to mitigate and/or monitor a Loss of Coolant Accident, Main Steam Line Break, or High Energy Line Break Accident.

A total of 1826 conduits were included on this list.

(This figure was reported in error in Rev. 1 as 838.)

Of the 1826 conduits (items) listed, 1626 were included in the Phase I walkdown. The 1626 items encompassed 10,805 conduit spans (3252 end spans and 7553 interior spans) and 5239 supports. Items which did not meet the design requirements incorporated in the walkdown criteria were identified on daily walkdown documentation. The discrepancies identified on daily walkdown documentation were evaluated by ESSE. Discrepancies requiring repair were assigned a sequential "info" number and identified as to location and type of rework required to correct the condition. This information was then submitted to Ebasco Construction for performance of work.

Of the 1626 items walked down:

1. 141 supports (2.7% of 5239) were overloaded or otherwise defective. 31 safety related supports (0.8% of 3678), ($5239 \times 0.702 = 3678$) were included in the above.
2. 355 spans (3.3% of 10,805) were over length. (This figure represents 5.0% of the 3252 end spans and 2.0% of the 7553 interior spans.) (Also see Exhibit A).

During Phase I walkdown a parallel effort was initiated to test and analyze examples of the typical worst case items identified by the walkdown. Examples of typical worst case items (i.e., considerably over-spanned compared to original criteria) were selected to determine whether failure resulting in circuit interruption or missile generation could occur. The "Shaker Table" tests by Southwest Research indicated that no such failures would occur under overload conditions if left uncorrected.

Of the 1826 items listed, 200 were not included in the walkdown for the following reasons:

1. There were 13 lines being rerouted by Ebasco, of which 6 were non-safety, 7 were safety related and the end conditions were accepted by FCR-E-3420.
2. There were 7 embedded conduits, 5 of which were safety related; 4 are fully embedded and 1 is partial embedded, 2 are non-safety related and are partially embedded. (Not subject to over-span conditions).
3. There are 6 conduits which are inaccessible, 5 of which are non-safety and 1 safety.
4. The other 169 conduits are fire wrapped, of which 144 are safety related, 25 are non-safety.
5. 5 lines are duplicated.

(Also See Exhibit "B")

Note: Based upon the low percentage of problems identified during the walkdowns and the results of the Shaker Table Tests and analyses, it was concluded that no further walkdown/evaluation of the remaining safety conduits in items 3 and 4 above was required.

(In Rev. 1, these 200 were reported in error as 206).

NCR-W3-6727 was closed and a Final Report for SCD 90 was issued to the NRC.

Shortly after submittal of the Final Report a Civil ESSE Review identified conduits originally reported as deficient during the walkdown which were inadvertently not identified to Ebasco Construction for performance of rework. (The cause of this oversight is attributed to clerical errors which occurred while consolidating the daily walkdown information into a single document). NRC-W3-6727 was reopened to identify this condition and to track completion of Corrective Action.

PHASE II

While NCR-W3-6727 was reopened, CIWA 8830 was issued to identify an additional 30 safe shutdown conduits. Based upon this occurrence, NY Engineering conducted a review and identified an additional 950 safe shutdown conduits. These additional conduits were walked down for span lengths utilizing new span criteria developed as a result of the Phase I walkdown and the Shaker Table Test and analyses. The supports were not evaluated in the Phase II walkdown based on the small rejection rate found in Phase I. NCR-W3-6727 was utilized to document and track Corrective Action.

Exhibit "A" summarizes Phase I and Phase II walkdown results.

SAFETY ANALYSIS

The potential impact of this deficiency was that in the event of an SSE, safety related conduit not installed to established installation criteria could have failed in a manner adverse to plant safety. The results of the original walkdown on span length and support adequacy on a large sample of conduits, and the analyses/test results provided a high degree of confidence that even if the situation had remained undetected, there was still reasonable assurance that plant safety would not have been affected. The results of the subsequent inspection for span length of the remaining conduits required for the design basis accidents now provides assurance that the safety-related functions of the Waterford 3 conduit installations would not be adversely affected by an SSE.

CORRECTIVE ACTION

All safety related conduits installed by Fischbach & Moore have been evaluated.

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The installing contractor, F. schbach & Moore, has ceased performing field installations; therefore, no Corrective Action on future installations under their jurisdiction is required.

NCR-W3-6727 was issued to track and document Corrective Action for the conduit installations identified as deficient in the Phase I and II Walkdown Programs.

FCR-E-3618 has been incorporated into the B-288 series drawings to specify the revised design criteria based on the analyses performed.

All Corrective Actions are complete.

This report is submitted as the revised Final Report.

SCD 90 FINAL REPORT REV. 2

EXHIBIT "A"

SUMMARY TOTAL

<u>NO. OF CONDUITS</u>	<u>SPANS</u>	<u>SUPPORTS</u>	<u>REJECTED SPANS</u>	<u>REJECTED SUPPORTS</u>	<u>END SPAN</u>	<u>END SPAN REJC. RATE</u>	<u>INTERIOR SPAN</u>	<u>INTERIOR SPAN REJC RATE</u>
PHASE I 1626 (1)	10805	5239	355 (3.3%)	141 (2.7%)	3252	5.0%	7553	2.0%
PHASE II 980 (2)	6057	95	140 (2.3%)	0	1960	5.2%	4097	0.9%
<hr/>								
2606	16862	5334	495 (2.9%)	141 (2.7%)	5212			

(1) OF 1626 conduits 485 (29.8%) were non-safety related
1141 (70.2%) were safety related

(2) 30 conduits were walked and evaluated for spans and supports

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SCD 90 FINAL REPORT REV. 2

EXHIBIT "B"

TOTAL NO. OF CONDUITS NOT WALKED SAFETY AND NON-SAFETY	TOTAL SAFETY	TOTAL NON- SAFETY	REROUTED REWORKED		EMBEDDED IN CONCRETE		INACCESSIBLE		FIRE WRAPPED	
			SAFETY	NON- SAFETY	SAFETY	NON- SAFETY	SAFETY	NON- SAFETY	SAFETY	NON- SAFETY
200	157	38	7	6	5	2	1	5	144	25

* 5 lines were duplicated

SCD No. 90 REV. 2

EXIBIT "C"

TIME FRAME TABLE

