REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8105050572 DOC.DATE: 81/05/01 NOTARIZED: NO DOCKET #
FACIL:50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
AUTH.NAME AUTHOR AFFILIATION
CHIANGI,N.J. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
O'REILLY,J.P. Region 2, Atlanta, Office of the Director

SUBJECT: Final deficiency rept re weld symbol errors & misapplication of weld on Bergen-Patterson pipe hangers, initially reported on 800908. QA welding inspectors assigned to reinspect all previously accepted HVAC & electrical hangers.

DISTRIBUTION CODE: B019S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 42
TITLE: Construction Deficiency Report (10CFR50.55E)

NOTES:

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
ACTION:	A/D LICENSNG	04	1	1	LIC BR #3 BC	05	1	1
	LIC BR #3 LA	06	1	1	LICITRA,M.	07	1	1
INTERNAL:	ASLBP/J.HARD		1	1	D/DIR HUM FAC	15	1	1
	EDO & STAFF	19	1	1	EQUIP QUAL BR	11	1	1
	HYD/GEO BR	22	1	1	I&E	09	1	1
	IE/EES		1	1	LIC QUAL BR	12	1	1
	MPA	20	1	1	NRC PDR	02	1	1
	OELD	21	1	1	PROC/TST REV	13	1	1
	QA BR	14	1	1	REG FILE	01	1	1
	RUTHERFORD,W.IE		1	1	STANDRDS DEV	21	1	1
EXTERNAL:	ACRS	16	16	16	LPDR	03	1	1
	NSIC	08	1	1				

MAY 0 6 1981

TOTAL NUMBER OF COPIES REQUIRED: LTTR 38 ENCL 38

JF

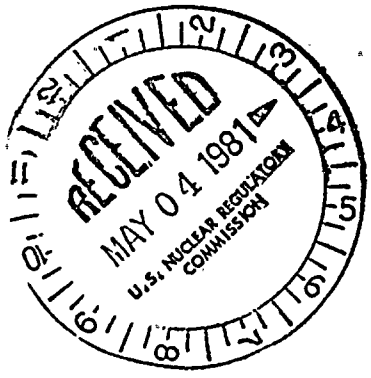
FORM 2S

CP&L
Carolina Power & Light Company

COPY

File: SH N-2/18
Item 48

May 1, 1981



Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest
Atlanta, Georgia 30303

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT 1
DOCKET NO. 50-400
WELD SYMBOL ERRORS AND MISAPPLICATION
OF WELD ON BERGEN-PATTERSON
PIPE HANGERS
(NRC INFRACTION 400/80-22-01)

Dear Mr. O'Reilly:

In accordance with 10CFR50.55(e), the Region II office (Mr. R. McFarland) was officially notified by Mr. N. J. Chiangi (CP&L) of the subject deficiency as being "potentially reportable" on September 8, 1980. On October 7, 1980, the Region II office (Mr. J. K. Rausch) was officially notified by Mr. N. J. Chiangi (CP&L) that the subject deficiency was considered reportable under the provisions of 10CFR50.55(e). An interim report on the subject matter was submitted to the Region II office on November 3, 1980, wherein it was stated that all corrective action would be completed by May 1, 1981, at which time the final 10CFR50.55(e) report would be submitted.

Attached is the final 10CFR50.55(e) report on the subject deficiency which describes the problem and the corrective action taken to accomplish resolution. With this report, Carolina Power & Light Company considers this matter closed.

B019
S
1/1

8105050578
S

If you have any questions regarding the above, please do not hesitate to contact me.

Yours very truly,

Original Signed By
N. J. Chiangi

N. J. Chiangi - Manager
Engineering & Construction
Quality Assurance/Quality Control

NJC/mt (7267)
Attachment

cc: Mr. G. Maxwell W/A
Mr. V. Stello (2) W/A✓

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NO. 1

WELD SYMBOL ERRORS AND MISAPPLICATION OF WELD ON BERGEN-PATERSON PIPE HANGERS

FINAL REPORT

PREPARED BY:
CAROLINA POWER & LIGHT COMPANY

INTRODUCTION

Seismic Class I Bergen-Paterson pipe hangers are detailed on design drawings which specify location, geometry, material and joint welding requirements. Welding processes, filler metal, etc. are described in Procedure MP-08 - "General Welding Procedure for Structural Steel (Seismic and Non-Seismic) and Hangers". Weld inspection requirements are specified in Site Specification No. 034, "Nondestructive Examination, Visual Inspection and Testing Requirements for Code Class 1, 2, 3, Balance-of-Plant Piping Systems, Seismic and Non-Seismic Structures for Permanent Plant Construction".

Work Procedure WP-110 - "Installation of Safety Related (Seismic Class I) Pipe Hangers and Thermally Analyzed Pipe Hangers" provides instruction to the craft regarding the installation of the pipe hangers.

Weld types most often used in the installation of pipe hangers are the fillet weld and the flare-bevel weld. Occasionally, a groove weld is used.

DESCRIPTION

On September 3, 1980, the Resident NRC Inspector identified a problem with unclear and incorrect weld symbols on Bergen-Paterson Seismic Class I pipe hanger drawings. Also, field inspection by the Resident NRC Inspector identified situations where the weld actually applied on the pipe hangers differed from that required by the design drawing; i.e., over-welding (more weld length than required) and over-sized fillets.

The problem identified above prompted an immediate investigation of other pipe hanger drawings and reinspection of selected completed and inspected pipe hangers.

1. Approximately 1,200 pipe hanger drawings (representing hangers whose installation was either in progress or complete) were reviewed for errors and clarity. The results were many incorrect and unclear weld symbols.

2. Approximately 100 installed pipe hangers were reinspected by QA inspectors. The results were: 1) Welds larger and smaller than specified by the drawings; 2) fillet welds applied where full penetration groove welds were specified; 3) no evidence of complete penetration on some full penetration groove welds rendering them questionable; and, 4) welds being applied on more sides or fewer sides than specified.

SAFETY IMPLICATIONS

Those hangers welded with smaller fillets, fewer sides than specified (under-welding) and improper welds, pose a potential safety concern in that these hangers, as installed, may not be capable of supporting their design loads or meeting their design margins.

Those hangers welded on more sides than specified (over-welding) pose a potential safety concern in that some hangers require flexibility at specific joints in order to not transmit large moment loads to the embedded steel support plates. Flexibility is obtained by no welding or minimal welding on certain sides of the joint.

Those hanger drawings with incorrect and unclear weld symbols pose a potential safety concern in that, if left uncorrected, would result in incorrect or questionable translation of design requirements in the installation and inspection process.

This item is considered reportable due to design drawing errors by Bergen-Paterson, failure to fabricate in accordance with design drawings by the craft personnel and failure of QA to translate design requirements to insure proper construction.

CORRECTIVE ACTION

The cause of the problem is three-fold: 1) Design drawing with incorrect or unclear weld details were provided by the vendor and, passing through all checking stages, were issued to the field uncorrected. 2) Field personnel failed to weld the pipe hangers in accordance with the design drawings and/or made welds when details were missing or unclear. 3) QA failed to insure that welds were applied in accordance with design drawings and/or that welds applied were clearly indicated on design drawings.

To prevent future occurrences, the following actions were taken:

1. The Site Mechanical and Welding Units are now reviewing pipe hanger design drawings for missing, unclear, and incorrect weld symbols prior to issuance to the field. Drawings with problems are reported to Ebasco/Bergen-Paterson for correction via pipe hanger problem memos (PHPs) written by the Site Mechanical Unit. Ebasco discussed the design drawing problems with Bergen-Paterson who identified the problem to their design personnel. Bergen-Paterson agreed to revise their review procedures to insure that design drawings show proper weld symbols. All drawings being issued from Bergen's three design offices are now routed through the Hempstead Office to provide more consistent review by Bergen engineering personnel. A review of 37 hanger design drawings issued by Bergen-Paterson since January 1, 1981 revealed only 3 design drawings with weld symbol problems.

2. Weld symbol identification training classes were conducted by Site Welding and Mechanical Engineers. Superintendents, general foremen, foremen, and welders of pipe and pipe hangers attended along with construction inspectors, QA inspectors, and mechanical unit personnel involved with pipe hangers. In addition to instruction on weld symbol identification, emphasis was given on the importance of welding the pipe hanger exactly as the design drawing requires. In those instances where this is not possible, due to physical limitations or drawing errors, the hanger drawing is to be returned to the Site Mechanical Unit. Analysis of QA inspection reports on welding performed since the training classes indicate that corrective action has been effective. For example, a test case of hangers welded and inspected since the training yielded the results shown in Exhibit 1.

3. In addition to attending the weld symbol identification classes referenced in 2. above, QA personnel attended similar classes given within the QA organization in order to strengthen weld symbol recognition skills and to emphasize the necessity for inspections to be in strict accordance with drawing details. QA personnel were instructed to report incorrect design drawings to the Site Mechanical Engineering Unit.

Due to the safety implications detailed earlier in this report, a program of corrective action was required for the hangers previously installed or partially installed. This corrective action was a 100% QA reinspection of all seismic pipe hangers that had ever been issued to the craft for work that were still active. Some pipe hangers were deleted by Ebasco or Bergen-Paterson and were omitted from the reinspection scope. This corrective action also included 100% in-house review of these hangers' design drawings. The results of the reinspection and in-house review of these hanger drawings and the resolutions of the problems identified are detailed on Exhibit No. 2. The hangers involved are shown on Exhibit No. 3.

As a result of our investigations of the welding problems of pipe hangers, we began to investigate other areas of welding activity for similar problems. The following report details our investigation and corrective and preventive actions on the welding of HVAC duct hangers and electrical cable tray and conduit hangers.

HVAC, CABLE TRAY AND CONDUIT SEISMIC SUPPORT HANGERS

DESCRIPTION

To begin the investigation of potential welding problems, several HVAC and electrical hanger drawings were reviewed. It was noted that numerous inconsistencies and unclear welding symbols and details existed on the design drawings. The discovery of clarity problems on the design drawings prompted a field spot check on several HVAC and electrical hangers to reveal any potential weld problems similar to the pipe hangers. The results of the spot check revealed: a) welds larger and smaller than design; b) welds being applied on more sides than required; c) welds improperly located; d) welds over holes or gaps between embedded plates; e) missing welds; f) missing welder's symbol.

Welds for HVAC, cable tray and conduit hangers were detailed on Ebasco Services design drawings as well as erection drawings furnished by the hanger vendor, Peden Steel. Welding processes are described in Procedure MP-08 - "General Welding Procedure for Structural Steel (Seismic and Non-Seismic) and Hangers" and weld inspection requirements are specified in Site Specification No. 034.

Work Procedure WP-400 - "Installation of HVAC Seismic Category I Support" and WP-203 - "Installation of Seismic Class I Electrical Cable Tray, Tray Support, Conduit, Conduit Support, Boxes and Box Support", provides instructions to the craft regarding hanger installation.

The weld type most frequently found in the design of electrical and HVAC hangers is a fillet weld. Flare-bevel welds are used on the attachment of unistrut supports and combination supports (supports that carry both HVAC duct and cable tray).

SAFETY IMPLICATIONS

Those hangers welded with smaller fillets, fewer sides and missing welds pose a potential safety concern in that if the condition was left uncorrected, the hangers may not be capable of supporting their design loads.

Consideration for flexibility was not a concern as HVAC anchor type hangers are rigidly braced to prevent movement and HVAC guide type hangers are rigidly braced and designed to allow for thermal movement of the duct in one plane only. Flexibility was also of no concern for electrical hangers since they are of rigid design.

CORRECTIVE ACTION

The occurrence of HVAC and electrical hanger problems were attributed to 1) failure of the A/E or the vendor to supply correct and clear design drawings; 2) failure of craft personnel to properly read and interpret the design drawings, and to bring to the attention of on-site engineering unclear information or questions, and, 3) failure of QA personnel to interpret and to inspect welds to the design drawing.

To prevent future occurrences, the following actions were taken:

1. The A/E was notified and requested to make the design drawing corrections and to review additional design drawings to evaluate their present method of indicating design welds to welded connections.

2. Additional sessions of the weld symbol identification training classes were conducted by site welding and mechanical engineers. Craft supervisors, craft personnel, QA inspectors and construction inspectors involved with HVAC and electrical hangers attended. The subjects discussed were the same as those addressed in the classes conducted for pipe hanger personnel.

3. WP-400 - "Installation of HVAC Seismic Category I Supports", and WP-203 - "Electrical Cable Tray, Cable Tray Support, Conduit, Conduit Support, Boxes and Box Support", have been revised to include hold points during the erection and welding processes. The procedures also prohibit the craft from proceeding with work when problems arise during the erection process without resolution from the discipline engineer.

4. As a result of the problems identified during the field spot check of HVAC and electrical hangers, QA welding inspectors were assigned to reinspect all of the HVAC and electrical hangers that had been previously accepted. Approximately 100 HVAC and 350 cable tray and conduit hangers were reinspected for field errors and discrepancies. The results revealed that approximately 95% of the hangers reinspected had nonconforming conditions or deviations from the design drawings.

The results of the 100% reinspection are shown on Exhibits 4 and 5. A list of the affected HVAC and electrical hangers are shown on Exhibits 6 and 7 respectively. Welds were rejected based on the same criteria as applied to pipe hangers.

The rejected hangers were resolved by the following means:

1. Hangers with missing and undersized welds were rewelded in accordance with design documents with work controlled through the use of a rework package in which QA inspection and acceptance of the rework was documented.

2. Hangers that were missing welders' stencils were corrected in like manner as the pipe hangers.

3. Hangers with arc strikes, spatter, cold lap, undercut, slag and porosity were reworked with controls similar to item 1. and reinspected by QA.

4. Hangers with discrepancies such as oversized welds, welds over holes and gaps, improper weld locations, improper weld lengths, improper hanger fit-up and design drawing problems were dispositioned by engineering evaluations with permanent waivers (PWs) or field change requests (FCRs). See Exhibit 8 for listing of applicable FCRs and PWs.

EXHIBIT NO. 1

- Analysis of QA Inspection Reports -
Test Case of 63 Pipe Hangers
Welded After Welder Training Class

63 hangers in test case

55 hangers acceptable; 87.3%

8 hangers rejectable; 12.7%

Rejected Hangers:

1.	A-3-236-1-PD-H-1266 Rejected 3/20/81	Overlap, lack of fusion
2..	A-2-236-1-PD-H-1519 Rejected 1/9/81	Convexity; Accepted 1/20/81
3.	A-2-236-1-PD-H-1526 Rejected 3/24/81	Oversized; Accepted 1/20/81
4.	A-2-236-1-PD-H-1550 Rejected 3/24/81	Overlap, weld splatter, arc strikes
5.	T-2-261-1-FW-H-30 Rejected 3/25/81	Arc Strikes, missing welds, lack of fusion
6.	T-2-261-1-FW-H-31 Rejected 3/25/81	Arc Strikes, undercut, overlap, undersize, missing welds
7.	F-1-236-1-SF-H-463 Rejected 3/28/81	Undercut; Accepted 4/3/81
8.	W-6-236-1-WG-H-1706 Rejected 3/28/81 Rejected 4/4/81	Slag, overlap, weld splatters

EXHIBIT NO. 2

Results of 100% In-House Review of
Pipe Hanger Design Drawings and
Reinspection of Pipe Hanger Welding

1. Drawing Review

1786 hanger design drawings were reviewed

613 PHPs (pipe hanger problems) were written to report to Ebasco/ Bergen -Paterson the problems identified. Problems were of three groups:

a) Unclear symbols
b) Missing symbols
c) Incorrect symbols

Most PHPs reported problems with one hanger drawing only. A few reported problems with more than one hanger drawing. The PHP resulted in the issuance of a new drawing revision with corrections to the problems.

2. Reinspection

1786 pipe hangers issued for QA reinspection
701 determined to be not installed
487 pipe hangers found acceptable
598 pipe hangers rejected

Pipe hangers were rejected when the following conditions were found:

a. missing welder's symbols
b. oversized welds (greater than 1/8")
c. undersized welds
d. weld type applied not the same as drawing
e. overweld
f. missing welds
g. incomplete penetration of groove welds
h. welder's stencil in heat affected zones
i. welding over holes/gaps in embeds
j. slag
k. porosity
l. undercut
m. overlap
n. arc strikes
o. weld splatter

The rejected pipe hangers were resolved by the following means:

1. Hangers with missing and undersized welds and those with cosmetic deficiencies (conditions j through o) were reissued to the craft for corrective rework and each was subsequently reinspected and accepted by QA. There were only a few hangers with missing or undersized welds. Some hangers rejected for missing welds were not reworked because the hanger's installation was only partially complete. The missing welds will be made when the hanger installation resumes. A few hangers that required rework were removed completely and the QA record of previous work was voided. This was done when the rework was extensive. These hangers will be reinstalled with new material and new QA inspections at a later date.
2. The overwelding condition found on hangers was resolved by FCR-H-286 if the overwelded hanger joint was not a flexible joint (pinned connection). If the overwelded joint was flexible, the joint was reworked by the craft. Seven hangers that were overwelded were determined by Ebasco/Bergen-Paterson and the Harris Plant Engineering Section to have flexible joints. These seven were reworked.
3. Hangers with oversized welds on non-flexible joints were resolved by FCR-H-286. Oversized welds were evaluated and determined to be of no consequence or detriment to the hanger's ability to perform its support function. However, if any case of local deformations or evidence of excessive heat being applied in the vicinity of oversized welds is noted during inspections this will be evaluated. Our inspection of oversized welds revealed no evidence of these two effects. Hangers with oversize welds (greater than 1/8" oversize) on flexible joints were resolved by rework.
4. Welds applied that did not agree with the hanger design drawing were of two types and were resolved as follows:
   a) The weld differed because the weld symbol on the hanger design drawing was incorrect. The drawing error was reported to Ebasco/Bergen-Paterson via a PHP and a new drawing revision was issued showing the correct weld symbol.

b) The weld differed because the craft did not apply the proper weld. Example: The craft may have applied a fillet weld when the proper weld would have required groove joint preparation and welding. In this case, resolution was either rework of the joint or a permanent waiver approved by Ebasco/Bergen-Paterson to accept the fillet weld "as-is". A new drawing revision was issued showing the new weld symbol.

5. Hangers reported to be missing a welder's stencil were resolved by several means:
   a) Initially, some of these hangers were wire brushed, the stencils identified and accepted by QA.
   b) Later, some hangers whose initial inspection reports recorded the welder's stencil were accepted without brush-up work.
   c) Finally, those hangers without initial inspection reports and/or any recording of the welder's symbols were accepted based on the fact that our code requirements do not commit us to impression stamp the hanger welds. See RCI-H-110 for details. Also, we are confident of our welder qualification program's ability to provide us with qualified pipe hanger welders and this small number does not significantly alter trend analysis data.
6. Groove welds which showed no evidence of complete penetration or complete penetration could not be verified from inspection records were resolved by two methods:
   a) In most cases, these hangers were resolved by a Permanent Waiver to accept fillet welding of the joint.
   b) In a few cases, the weld joint was reworked by removing the old weld material, repreparation of the hanger member and rewelding of the joint.
7. Some welds joining hanger members to the embed plates were to be located over the 1/4" diameter holes which secure the embed to the concrete forms and across gaps between adjoining embed plates. These welds, if made, were rejected as "questionable", and, if not made, were rejected as "missing". RCI-W-49 clarified the conditions for which acceptable welds could be made over holes and across gaps. Rework in accordance with RCI-W-49 was accomplished where conditions allowed. When rework was not allowed, 1" thick splicer plates were used to join the embeds and the hanger members was welded to the splicer plate. This was done in accordance with approved Ebasco design details.

8. Welders' stencils located in the heat affected zones were repaired by removing the stencils and relocating them outside the heat affected zones. The removing of the stencils was accomplished by grinding.
9. A total of 254 hangers were reworked in the instances described above.

EXHIBIT NO. 3

Sheets 1 thru 16

Listing of installed Bergen-Paterson Hangers that received a QA field reinspection. Hangers with "Void" listed were deleted by Bergen-Paterson after the QA reinspection.

1.	A-1-190-1-CC-H-	600	4/E
2.		602	5/D
3.		612	3/C
4.		635	4/D
5.		636	2/B
6.		641	3/D
7.		644	5/E
8.		1148	4/E
9.		1153	8/I
10.		1156	4/E
11.		1157	5/F
12.		1158	2/C
13.		1159	5/F
14.		1269	2/B
15.		1271	2/B
16.		1272	2/B
17.		1277	2/B
18.		1283	3/C
19.	A-1-190-1-CH-H-	70	4/E
20.		71	1/B
21.		72	2/C
22.		91	1/B
23.		92	1/B
24.	A-1-190-1-CT-H-	224	6/C
25.		227	5/C
26.		247	5/D
27.		269	6/C
28.		270	5/C
29.		277	8/E
30.		278	6/D
31.		279	5/C
32.		280	6/D
33.		282	7/D
34.		283.	6/D
35.		298	8/F
36.	A-1-190-1-CT-H-	299	5/D
37.		300	4/C
38.		304	2/B
39.		309	7/D
40.		312	8/E
41.		331	7/D
42.		337	4/B
43.		338	8/E
44.		358	6/D
45.		359	5/C
46.		360	8/F
47.		423	4/C
48.		424	6/E
49.		427	4/C
50.		430	3/B
51.		432	3/B
52.		433	4/C
53.		434	6/E
54.		438	3/B
55.		440	4/C
56.		442	3/B
57.		446	3/B
58.		447	3/B
59.		449	3/B
60.		451	3/B
61.		459	10/H
62.		460	8/F
63.		462	6/D
64.		464	7/E
65.		466	5/C
66.		468	5/C
67.		469	5/C
68.		470	6/D
69.		471	6/D
70.		472	8/F

71.	A-1-190-1-CT-H-	474	6/D
72.		476	5/C
73.		477	6/D
74.		479	5/C
75.		480	6/D
76.		481	5/C
77.		482	6/D
78.		483	5/C
79.		486	6/D
80.		797	0/A
81.	A-1-190-1-CX-H-	96	2/C
82.	A-1-190-1-FP-H-	256	1/B
83.	A-1-190-1-PD-H-	5	2/C
84.		6	2/C
85.		7	1/B
86.		8	1/B
87.		9	1/B
88.		10	2/C
89.		13	4/E
90.		14	1/B
91.		29	1/B
92.		35	2/C
93.		37	2/C
94.		40	0/A
95.		42	2/C
96.		43	2/C
97.		44	4/F
98.		45	2/C
99.		46	2/C
100.		47	2/C
101.		48	2/C
102.		49	0/A
103.		50	2/C
104.		51	1/B
105.		52	1/B
106.	A-1-190-1-PD-H-	53	1/B
107.		54	1/B
108.		55	1/B
109.		56	1/B
110.		59	2/C
111.		63	1/B
112.		65	1/B
113.		67	1/B
114.		69	2/C
115.		71	3/D
116.		72	1/B
117.		73	3/D
118.		74	3/D
119.		75	1/B
120.		76	2/C
121.		77	1/B
122.		78	2/C
123.		81	1/B
124.		82	2/C
125.		83	1/B
126.		84	3/D
127.		86	4/E
128.		87	1/B
129.		88	2/C
130.		89	1/B
131.		91	0/A
132.		92	1/B
133.		97	1/B
134.		98	1/B
135.		102	2/C
136.		103	2/C
137.		104	2/C
138.		105	1/B
139.		107	4/E
140.		109	0/A

141.	A-1-190-1-PD-H-	111	2/C
142.		112	2/C
143.		113	1/B
144.		115	1/B
145.	A-1-190-1-RH-H-	15	7/D
146.		16	4/D
147.		17	3/B
148.		25	7/E
149.		26	5/D
150.		33	5/C
151.		35	6/D
152.		45	7/E
153.		53	0/A
154.		55	6/D
155.		57	6/B
156.		60	7/D
157.		62	7/C
158.		63	13/J
159.		64	7/D
160.	A-3-216-1-CT-H-	208	3/C
161.		209	0/A
162.		211	0/A
163.		213	0/A
164.		214	0/A
165.		216	0/A
166.		249	3/D
167.		250	1/B
168.		252	3/C
169.		253	2/B
170.		254	2/B
171.		257	3/C
172.		274	5/E
173.	A-3-216-1-FP-H-	246	1/B
174.		270	1/B
175.	A-3-216-1-PD-H-	339	3/D
176.	A-3-216-1-PD-H-	341	4/E
177.		345	1/B
178.		352	1/B
179.		367	1/B
180.		368	0/A
181.		369	1/B
182.		370	0/A
183.		371	2/C
184.		489	1/B
185.		490	1/B
186.		491	0/A
187.		492	1/B
188.		493	1/B
189.		494	2/C
190.		495	1/B
191.		496	3/D
192.		565	1/B
193.		567	2/C
194.		569	0/A
195.		570	0/A
196.		571	2/C
197.		572	1/B
198.		576	2/C
199.		577	0/A
200.		578	1/B
201.		615	0/A
202.		616	1/B
203.		617	0/A
204.		619	4/E
205.		620	5/F
206.		621	0/A
207.		622	0/A
208.		623	1/B
209.		627	0/A
210.		628	0/A

211.	A-3-216-1-PD-H-	629	1/B	246.	A-3-216-1-SW-H-	362	4/C
212.		630	1/B	247.		364	2/B
213.		631	4/E	248.		366	1/B
214.		633	3/D	249.		368	2/B
215.		634	3/D	250.		370	5
216.		635	1/B	251.		372	3/C
217.		636	1/B	252.		374	4/B
218.		637	4/E	253.		378	4/B
219.		639	1/B	254.		379	3/C
220.		640	1/B	255.		380	3/C
221.		641	1/B	256.		381	3/C
222.		642	0/A	257.		382	3/C
223.		643	4/E	258.		384	3/C
224.		645	4/E	259.		385	3/C
225.		647	2/C	260.		386	3/C
226.		648	2/C	261.		387	3/C
227.		649	1/B	262.		388	3/C
228.		650	2/C	263.		391	3/C
229.		652	4/E	264.		392	3/C
230.		689	0/A	265.		393	3/C
231.		690	1/B	266.		394	3/C
232.		691	0/A	267.		398	0/A
233.		692	1/B	268.		400	0/A
234.		693	0/A	269.		404	0/A
235.		694	1/B	270.		406	1/B
236.		695	1/B	271.		410	1/B
237.		696	0/A	272		412	2/B
238.		697	4/E	273.		448	3/C
239.		1132	3/D	274.		452	3/C
240.		1134	2/C	275.		454	2/B
241.		1135	3/D	276.		455	2/B
242.		2086	1/B	277.		456	3/C
243.		2092	0/A	278.		458	2/B
244.	A-3-216-1-SW-H-	359	2/B	279.		459	2/B
245.		360	2/B	280.		460	3/C

281.	A-3-216-1-SW-H- 462	2/B	
282.	463	2/B	
283.	464	3/C	
284.	466	2/B	
285.	467	2/B	
286.	468	2/B	
287.	471	3/C	
288.	475	3/C	
289.	517	3/C	
290.	519	4/D	
291.	521	3/C	
292.	528	6/F	
293.	529	4/D	
294.	530	3/C	
295.	531	4/C	
296.	532	4/C	
297.	533	4/C	
298.	534	4/C	
299.	535	4/C	
300.	536	4/C	
301.	537	4/C	
302.	538	4/C	
303.	539	5/D	
304.	540	2/B	
305.	545	4/D	
306.	608	3/C	
307.	893	1/B	
308.	895	2/C	
309.	897	1/B	
310.	899	1/B	
311.	901	1/B	
312.	902	2/C	
313.	903	1/B	
314.	904	1/B	
315.	905	1/B	
316.	A-3-216-1-SW-H- 906	1/B	
317.	907	1/B	
318.	908	1/B	
319.	927	1/B	
320.	928	1/B	
321.	929	1/B	
322.	930	1/B	
323.	932	1/B	
324.	934	1/B	
325.	935	1/B	
326.	936	1/B	
327.	943	2/C	
328.	947	1/B	
329.	952	2/C	
330.	953	2/C	
331.	959	1/B	
332.	960	1/B	
333.	978	2/C	
334.	979	4/E	
335.	982	4/E	
336.	991	2/C	
337.	1176	3/D	
338.	1177	1/B	
339.	1181	1/B	
340.	1183	1/B	
341.	1184	1/B	
342.	1186	1/B	
343.	1201	3/D	
344.	1203	2/C	
345.	A-4-216-1-CT-H- 259	5/E	
346.	260	4/D	
347.	261	4/D	
348.	262	4/D	
349.	263	2/B	
350.	A-4-216-1-PD-H- 307	2/C	

351.	A-4-216-1-PD-H- 317	0/A	
352.	319	4/E	
353.	320	1/B	
354.	321	4/E	
355.	735	2/C	
356.	736	1/B	
357.	A-4-216-1-SW-H- 419	6/E	
358.	420	2/B	
359.	422	4/C	
360.	424	2/B	
361.	477	4/C	
362.	479	3/B	
363.	484	3/B	
364.	487	4/E	
365.	489	5/C	
366.	547	5/D	
367.	568	6/B	
368.	570	7/E	
369.	572	4/C	
370.	581	3/B	
371.	583	3/B	
372.	585	3/B	
373.	A-4-216-2-CT-H- 641	2/B	
374.	643	1/A	
375.	A-4-216-2-PD-H- 228	1/B	
376.	A-4-216-2-SW-H- 425	4/C	
377.	552	4/C	
378.	554	4/C	
379.	556	4/C	
380.	563	3/B	
381.	565	2/B	
382.	576	3/B	
383.	578	4/C	
384.	589	3/B	
385.	595	4/C	
386.	A-4-216-2-SW-H- 596	3/B	
387.	598	4/B	
388.	602	3/B	
389.	603	3/B	
390.	604	4/C	
391.	605	4/C	
392.	1876	1/B	
393.	1878	0/A	
394.	F-1-216-1-FP-H-1075	1/B	
395.	1077	2/C	
396.	1079	1/B	
397.	1080	1/B	
398.	1081	1/B	
399.	1082	1/B	
400.	1084	2/C	
401.	1085	1/B	
402.	1086	1/B	
403.	1088	2/C	
404.	1090	1/B	
405.	F-2-216-1-FP-H-1114	2/C	
406.	1125	2/C	
407.	1127	2/C	
408.	1129	2/C	
409.	1131	2/C	
410.	A-2-236-1-AF-H- 83	4/E	
411.	85	2/C	
412.	109	1/B	
413.	114	3/D	
414.	118	3/D	
415.	119	2/C	
416.	120	1/B	
417.	129	2/C	
418.	133	2/C	
419.	134	2/C	
420.	135	1/B	

421.	A-2-236-1-AF-H- 138	2/C	
422.	144	3/D	
423.	A-2-236-1-BD-H- 131	1/B	
424.	132	1/B	
425.	139	2/C	
426.	142	1/B	
427.	A-2-236-1-BR-H- 467	0/A	
428.	468	0/A	
429.	1553	0/A	
430.	1554	0/A	
431.	1555	0/A	
432.	1556	0/A	
433.	1557	0/A	
434.	1558	0/A	
435.	1559	0/A	
436.	1560	0/A	
437.	A-2-236-1-CC-H- 89	2/C	
438.	90	1/B	
439.	91	2/C	
440.	92	3/D	
441.	93	5/F	
442.	94	2/C	
443.	95	2/C	
444.	97	2/C	
445.	98	2/C	
446.	99	3/D	
447.	100	6/G	
448.	101	4/E	
449.	102	5/F	
450.	105	3/D	
451.	107	2/C	
452.	110	2/C	
453.	111	1/B	
454.	112	2/C	
455.	113	1/B	
456.	A-2-236-1-CC-H- 374	2/C	
457.	473	5/F	
458.	483	3/D	
459.	662	3/D	
460.	663	2/C	
461.	665	2/C	
462	667	2/C	
463.	668	2/C	
464.	669	3/D	
465.	670	1/B	
466.	671	4/E	
467.	672	4/E	
468.	673	4/E	
469.	677	1/B	
470.	678	2/C	
471.	877	2/C	
472.	878	1/B	
473.	880	2/C	
474.	882	3/D	
475.	887	1/B	
476.	888	4/E	
477.	889	2/C	
478.	891	2/C	
479.	892	2/C	
480.	893	2/C	
481.	894	1/B	
482.	896	2/C	
483.	900	3/D	
484.	902	2/C	
485.	903	1/B	
486.	905	1/B	
487.	906	4/E	
488.	908	4/E	
489.	909	2/C	
490.	910	1/B	

491.	A-2-236-1-CC-H- 911	4/E		
492.	913	2/C		
493.	914	2/C		
494.	916	3/D		
495.	918	4/E		
496.	919	5/F		
497.	920	2/C		
498.	922	1/B		
499.	942	4/E		
500.	943	2/C		
501.	944	3/D		
502.	945	4/E		
503.	947.	5/F		
504.	948	3/D		
505.	949	1/B		
506.	952	4/E		
507.	958	2/C		
508.	965	4/E		
509.	967	5/F		
510.	968	3/D		
511.	969	4/E		
512.	976	2/C		
513.	1211	1/B		
514.	1213	0/A	VOID	
515.	1216	0/A		
516.	1218	0/A		
517.	1220	2/C		
518.	1222	0/A		
519.	1224	1/B		
520.	1247	0/A		
521.	1310	0/A		
522.	1312	0/A		
523.	1326	0/A		
524.	1557	0/A		
525.	1560	0/A		
526.	A-2-236-1-CC-H-1562	0/A		
527.	1564	0/A		
528.	1566	0/A		
529.	1576	0/A		
530.	1583	0/A		
531.	1584	1/B		
532.	1587	0/A		
533.	1598	1/B		
534.	1599	0/A		
535.	1601	0/A		
536.	1603	2/C		
537.	1604	0/A		
538.	A-2-236-1-CE-H- 11	0/A		
539.	14	2/C		
540.	15	5/F		
541.	18	3/D		
542.	21	1/B		
543.	22	1/B		
544.	25	1/B		
545.	A-2-236-1-CH-H- 166	0/A		
546.	168	0/A		
547.	169	1/B	VOID	
548.	170	2/C		
549.	171	1/B		
550.	176	0/A		
551.	177	1/B		
552.	181	4/E		
553.	194	0/A	VOID	
554.	195	1/B		
555.	201	1/B		
556.	203	1/B		
557.	204	1/B		
558.	205	1/B		
559.	206	1/B		
560.	207	1/B		

561.	A-2-236-1-CH-H-	208	1/B		596.	A-2-236-1-FP-H-	735	1/B
562		249	5/B		597.		736	1/B
563.	A-2-236-1-CS-H-	8	5/D		598.		737	1/B
564.	A-2-236-1-CX-H-	228	0/A		599.		738	1/B
565.		229	1/B		600.		739	0/A
566.		248	3/D		601.		749	2/C
567.		249	3/D		602.		757	1/B
568.		391	3/D		603.		761	1/B
569.		397	3/C		604.		790	1/B
570.		400	0/A		605.		791	1/B
571.		423	1/B	VOID	606.		792	2/C
572.		424	1/B	VOID	607.		793	3/D
573.		425	1/B		608.		794	2/C
574.		426	1/B	VOID	609.		795	1/B
575.		427	1/B	VOID	610.		799	2/C
576.		432	1/B		611.		800	3/D
577.		433	1/B		612.		801	3/D
578.		437	1/B		613.		803	3/D
579.		438	2/C		614.		804	3/D
580.		442	1/B		615.		805	1/B
581.		446	1/B		616.		806	2/C
582.	A-2-236-1-DW-H-	79	0/A		617.		882	2/C
583.		81	1/B		618.		884	0/A
584.	A-2-236-1-FP-H-	525	1/B	VOID	619.		886	0/A
585.		526	1/B		620.		888	1/B
586.		527	0/A		621.		890	0/A
587.		533	1/B		622.		894	0/A
588.		626	0/A		623.		896	1/B
589.		629	0/A		624.		899	0/A
590.		729	1/B		625.		900	0/A
591.		730	1/B		626.		901	0/A
592.		731	0/A		627.		908	0/A
593.		732	1/B		628		911	0/A
594.		733	2/C		629.		912	0/A
595.		734	1/B		630.		913	0/A

631.	A-2-236-1-FP-H-	921	0/A	666.	A-2-236-1-PM-H-	228	0/A
632.		924	0/A	667.		229	0/A
633.	A-2-236-1-PD-H-	1502	0/A	668.	A-2-236-1-RH-H-	166	2/C
634.		1503	0/A	669.		174	4/E
635.		1504	1/B	670.		183	3/D
636.		1505	1/B	671.		199	1/B
637.		1506	0/A	672.	A-2-236-1-SW-H-	345	0/A
638.		1507	0/A	673.		346	0/A
639.		1508	0/A	674.		354	0/A
640.		1509	0/A	675.		355	2/C
641.		1516	0/A	676.		433	0/A
642.		1518	0/A	677.		441	0/A
643.		1520	1/B	678.		442	0/A
644.		1522	1/B	679.		443	0/A
645.	A-2-236-1-PM-H-	185	0/A	680.		444	0/A
646.		187	0/A	681.		445	0/A
647.		189	0/A	682.		446	1/B
648.		191	1/B	683.		507	2/C
649.		196	0/A	684.		509	2/C
650.		197	1/B	685.		510	2/C
651.		198	0/A	686.		511	2/C
652.		200	0/A	687.		512	2/C
653.		201	0/A	688.		513	2/C
654.		209	0/A	689.		515	3/D
655.		213	1/B	690.		961	1/B
656.		216	0/A	691.		1207	1/B
657.		217	0/A	692.		1231	3/D
658.		218	0/A	693.		1235	2/C
659.		220	0/A	694.		1237	1/B
660.		221	0/A	695.		1239	1/B
661.		222	0/A	696.		1241	4/E
662.		223	0/A	697.		1242	3/D
663.		224	0/A	698.		1244	1/B
664.		225	0/A	699.		1245	1/B
665.		227	0/A	700.		1254	2/C

701.	A-2-236-1-SW-H-1258	4/E		736.	A-3-236-1-BD-H-	338	2/C	
702.	1454	1/B		737.		339	2/C	
703.	1458	3/D		738.	A-3-236-1-CC-H-	340	5/F	
704.	1481	1/B		739.		341	5/F	
705.	1483	1/B		740.		342	6/G	
706.	1485	0/A		741.		344	6/G	
707.	1535	2/C		742.		346	4/E	
708.	1537	2/C		743.		348	3/D	
709.	1540	3/D		744.		349	4/E	VOID
710.	A-3-236-1-AF-H- 149	1/B		745.		368	2/C	
711.	151	2/C		746.		375	1/B	
712.	153	2/C		747.		378	2/C	
713.	160	1/B		748.		379	1/B	
714.	161	2/C		749.		380	1/B	
715.	A-3-236-1-BD-H- 144	0/A		750.		381	2/C	
716.	146	3/D		751.		384	1/B	
717.	147	1/B		752.		385	2/C	
718.	148	2/C		753.		386	1/B	
719.	149	1/B		754.		387	2/C	
720.	150	1/B		755.		388	2/C	
721.	151	2/C		756.		391	5/F	
722.	155	1/B		757.		393	4/E	
723.	157	3/D		758.		397	3/D	
724.	160	3/D		759.		401	2/C	
725.	162	3/D		760.		402	5/F	
726.	192	2/B		761.		404	1/B	
727.	193	2/B		762.		464	4/E	
728.	199	2/B		763.		469	4/E	
729.	203	2/B		764.		471	3/D	
730.	204	2/B		765.		474	2/C	
731.	205	3/C		766.		475	1/B	
732.	231	2/B		767.		476	2/C	
733.	232	2/B		768.		479	3/D	
734.	233	4/D		769.		484	3/D	
735.	242	2/B		770.		485	2/C	

771.	A-3-236-1-CC-H- 488	3/D		806.	A-3-236-1-CC-H-1189	4/E	
772.	490	4/E		807.	1190	2/C	
773.	492	5/F		808.	1192	2/C	
774.	494	2/C		809.	1193	4/E	
775.	497	3/D		810.	1194	3/D	
776.	499	3/D		811.	1232	0/A	
777.	501	2/C		812.	1321	0/A	
778.	502	3/D		813.	1572	2/C	
779.	508	2/C		814.	1580	1/B	
780.	509	2/C		815.	1581	2/C	
781.	510	2/C		816.	1583	0/A	
782.	511	4/C		817.	1600	0/A	
783.	512	3/D		818.	A-3-236-1-CE-H- 4	1/B	
784.	926	2/C		819.	6	2/C	
785.	927	3/D		820.	7	4/E	
786.	929	3/D		821.	8	2/C	
787.	931	1/B		822.	302	1/B	
788.	932	4/E		823.	A-3-236-1-CH-H- 144	0/A	
789.	936	0/A		824.	145	0/A	
790.	938	2/C		825.	147	0/A	
791.	978	1/B		826.	151	1/B	
792.	980	1/B		827.	273	0	
793.	982	1/B		828.	279	3/D	
794.	983	1/B		829.	281	1/B	
795.	984	1/B		830.	284	2/C	
796.	985	2/C		831.	307	1/B	
797.	986	3/D		832.	311	0/A	
798.	989	1/B		833.	364	0/A	
799.	1011	1/B		834.	365	1/B	
800.	1016	2/C		835.	366	0/A	
801.	1017	1/B		836.	367	2/C	
802.	1058	1/A		837.	368	0/A	
803.	1062	1/A		838.	369	1/B	VOID
804.	1064	2/B		839.	370	1/B	VOID
805.	1188	2/C		840.	390	1/B	

841.	A-3-236-1-CH-H- 392	0/A	VOID	
842.	415	0/A		
843.	420	0/A	VOID	
844.	422	1/B		
845.	425	1/B		
846.	426	0/A		
847.	429	2/C		
848.	A-3-236-1-CX-H- 290	2/C		
849.	362	2/B		
850.	364	4/E		
851.	370	3/D		
852.	374	4/E		
853.	378	4/E		
854.	380	2/C		
855.	A-3-236-1-DW-H- 83	0/A		
856.	84	0/A		
857.	A-3-236-1-FP-H- 508	1/B		
858.	509	0/A		
859.	511	1/B		
860.	512	1/B		
861.	513	3/D		
862.	514	0/A		
863.	515	1/B		
864.	516	1/B		
865.	518	2/C		
866.	519	1/B		
867.	538	0/A		
868.	542	2/C		
869.	545	1/B		
870.	546	0/A		
871.	604	2/C		
872.	639	2/C		
873.	640	3/D		
874.	641	2/C		
875.	648	2/C		
876.	A-3-236-1-FP-H- 649	2/C		
877.	650	2/C		
878.	651	2/C		
879.	652	2/C		
880.	653	2/C		
881.	A-3-236-1-MS-H- 408	2/C		
882.	409	1/B		
883.	444	1/B		
884.	A-3-236-1-SW-H-1195	1/B		
885.	1199	1/B	VOID	
886.	1262	4/E		
887.	1263	2/C		
888.	1264	2/C		
889.	1265	2/C		
890.	1266	1/B		
891.	1269	1/B		
892.	1270	1/B		
893.	1291	0/A		
894.	1292	0/A		
895.	1293	2/C		
896.	1294	1/B		
897.	1295	3/D		
898.	1296	1/B		
899.	1574	1/B		
900.	1607	3/C		
901.	W-5-236-1-WG-H- 386	2/C		
902.	387	2/C		
903.	392	2/C		
904.	393	2/C		
905.	406	1/B		
906.	407	0/A		
907.	408	2/C		
908.	409	2/C		
909.	411	2/C		
910.	414	1/B		

911.	W-5-236-1-WG-H- 415	0/A	
912.	416	2/C	
913.	417	2/C	
914.	422	1/B	
915.	423	2/C	
916.	424	2/C	
917.	438	2/C	
918.	444	0/A	
919.	445	0/A	
920.	446	1/B	
921.	447	1/B	
922.	450	4/E	
923.	451	2/C	
924.	455	0/A	
925.	457	1/B	
926.	462	2/C	
927.	463	2/C	
928.	467	2/C	
929.	470	2/C	
930.	471	2/C	
931.	474	3/D	
932.	475	0/A	
933.	476.	2/C	
934.	477	3/D	
935.	482	3/D	
936.	485	1/B	
937.	490	1/B	
938.	491	1/B	
939.	510	1/B	
940.	511	1/B	
941.	512	1/B	
942.	513	1/B	
943.	515	1/B	
944.	518	2/C	
945.	519	2/C	
946.	W-5-236-1-WG-H- 520	2/C	
947.	521	3/D	
948.	523	1/B	
949.	525	1/B	
950.	527	2/C	
951.	529	3/D	
952.	533	0/A	
953.	536	0/A	
954.	538	2/C	
955.	541	3/D	
956.	542	2/C	
957.	557	1/B	
958.	565	1/B	
959.	566	2/C	
960.	567	2/C	
961.	570	2/C	
962.	571	2/C	
963.	580	1/B	
964.	581	1/B	
965.	582	1/B	
966.	583	1/B	
967.	585	1/B	
968.	598	4/E	
969.	599	2/C	
970.	600	2/C	
971.	601	3/D	
972.	610	2/C	
973.	620	3/D	
974.	621	2/C	
975.	627	2/C	
976.	1065	2/C	
977.	1066	2/C	
978.	1067	2/C	
979.	W-5-236-1-WL-H-2192	1/B	
980.	2196	1/B	

981.	W-6-236-1-WG-H- 628	1/B	
982.	630	2/C	
983.	633	0/A	
984.	639	1/B	
985.	669	3/D	
986.	670	4/E	
987.	672	4/E	
988.	680	1/B	
989.	681	1/B	
990.	682	1/B	
991.	683	1/B	
992.	691	1/B	
993.	692	1/B	
994.	693	2/C	
995.	705	2/C	
996.	710	2/C	
997.	711	1/B	
998.	712	3/D	
999.	717	2/C	
1000.	723	2/C	
1001.	729	3/D	
1002.	731	3/D	
1003.	732	3/D	
1004.	733	2/C	
1005.	734	3/D	
1006.	735	3/D	
1007.	739	2/C	
1008.	750	0/A	
1009.	752	0/A	
1010.	759	2/C	
1011.	762	3/D	
1012.	763	2/C	
1013.	767	2/C	
1014.	771	3/D	
1015.	A-5-236-1-CC-H- 352	4/E	
1016.	A-5-236-1-CC-H- 463	2/C	
1017.	A-5-236-1-SW-H- 495	2/C	
1018.	496	0/A	
1019.	503	0/A	
1020.	505	0/A	
1021.	1346	0/A	
1022.	1653	0/A	
1023.	A-5-236-2-SW-H- 786	0/A	
1024.	787	0/A	
1025.	F-1-236-1-SF-H- 879	2/C	
1026.	890	1/B	
1027.	902	4/E	
1028.	910	1/B	
1029.	916	1/B	
1030.	T-2-240-1-SW-H- 265	6/G	
1031.	266	5/F	
1032.	267	5/F	
1033.	268	5/C	
1034.	269	5/F	
1035.	270	5/F	
1036.	271	5/F	
1037.	272	5/F	
1038.	274	6/G	
1039.	275	5/F	
1040.	276	5/F	
1041.	277	5/F	
1042.	278	5/F	
1043.	279	5/F	
1044.	280	5/F	
1045.	281	5/F	
1046.	283	6/G	
1047.	284	5/F	
1048.	285	4/E	
1049.	286	5/F	
1050.	287	5/F	

1051.	T-2-240-1-SW-H-	288	5/E
1052.		289	5/F
1053.		290	5/F
1054.		291	5/F
1055.		292	9/K
1056.		293	8/J
1057.		294	8/J
1058.		295	8/J
1059.		296	8/J
1060.		297	8/J
1061.		298	8/J
1062.		299	8/J
1063.		300	8/J
1064.		301	5/F
1065.		317	4/E
1066.		323	5/F
1067.		325	5/F
1068.		331	8/J
1069.		332	6/G
1070.		333	7/H
1071.		334	6/G
1072.		335	6/G
1073.		336	6/G
1074.		337	6/G
1075.		338	6/G
1076.		339	6/G
1077.		815	7/H
1078.	TK-1-236-1-PM-H-	289	0/A
1079.		292	1/B
1080.		293	1/B
1081.		294	1/B
1082.		295	1/B
1083.		298	1/B
1084.		300	2/C
1085.		301	1/B
1086.		302	1/B

EXHIBIT NO. 4

HVAC HANGER INSPECTION STATUS

REINSPECTION

85 Duct Hangers Reinspected

81 Hangers rejected

2 Determined to have engineering problems

2 Hangers tacked

RESOLUTIONS

41 Hangers accepted by waivers

40 Hangers reworked

EXHIBIT 5

ELECTRICAL HANGERS REINSPECTION STATUS

343 - Total cable tray & conduit hangers reinspected

318 - Rejected hangers

13 - Accepted hangers

12 - Hangers with engineering problems

RESOLUTION OF THE 318 REJECTED HANGERS

192 - Hangers accepted by PW or FCR

22 - Hangers accepted by field rework

104 - Hangers accepted by combination of field rework and PW's or FCR's

EXHIBIT NO. 6

REINSPECTION LIST OF
HVAC DUCT SEISMIC SUPPORTS

RAB 190 ELEV.

F-1930	F-1011	F-1933
F-1931	F-1012	
F-1016	F-1013	
F-1000	F-1014	
F-1001	F-1002	
F-1008	F-1004	
F-1009	F-1934	
F-1005	F-1200	
F-1203	F-1201	

RAB 236 ELEV.

F-1098	F-1090	F-1926	F-1956
F-1291	F-1092	F-1927	
F-1292	F-1093	F-1928	
F-1101	F-1094	F-1929	
F-1100	F-1095	F-1950	
F-1099	F-1096	F-1951	
F-1123	F-1097	F-1102	
F-1086	F-1108	F-1952	
F-1087	F-1109	F-1953	
F-1088	F-1110	F-1954	
F-1089	F-1111	F-1955	

EMDRAC Drawings 1364-12756 Rev. 5, 1364-16318 Rev. 1, 1364-16319 Rev. 1, 1364-16320 Rev. 2 were used by QA to perform the reinspection on the above hangers.

(continued) HVAC DUCT SEISMIC SUPPORTS

RAB 247 ELEV.

F-1696	F-1297	F-1703
F-1103	F-1483	F-1704
F-1104	F-1486	F-1305
F-1298	F-1300	F-1494
F-1105	F-1699	F-1707
F-1904	F-1303	F-1304
F-1301	F-1905	F-1307
F-1702	F-1901	F-1495
F-1489	F-1491	F-1708
F-1490	F-1906	F-1309
F-1501	F-1711	

TOTAL HANGERS: 85

EXHIBIT 7

REINSPECTION LIST OF
CABLE TRAY & CONDUIT SUPPORT HANGER

1. 7021-EC2328
2. 7041-ED2326
3. 7021-HC2301
4. 7021-EC2327
5. 7041-HD2315
6. 7021-EC2353-1
7. 7021-EC2352
8. 7021-EC2353-2
9. 7041-ED2324 - Sect. R
10. 7041-ED2324
11. 7041-HD2312
12. 7041-ED2325
13. 7041-CD2310
14. 7041-CD2308
15. 7041-ED2323
16. 7041-ED2328
17. 7041-ED2328 - Sect.
18. 7041-ED2320 - Sect. H
19. 7041-ED2320
20. 7041-ED2302
21. 7041-ED2301-2
22. 7041-ED2301-1
23. 7042-ED2358-3
24. 7042-CD2364
25. 7042-ED2351-1
26. 7042-ED2351-2
27. 7042-ED2351-3
28. 7041-CD2311
29. 7041-ED2312
30. 7041-ED2313
31. 7041-ED2314
32. 7041-ED2315
33. 7041-ED2316
34. 7041-ED2319
35. 7041-ED2322
36. 7041-ED2333
37. 7041-ED2321
38. 7041-ED2308-1
39. 7041-ED2307-1
40. 7041-ED2307-2
41. 7041-ED2308-2
42. 7041-CD2309
43. 7041-ED2310
44. 7042-HD2365
45. 7041-ED2303-1
46. 7041-ED2303-2
47. 7041-ED2304
48. 7041-ED2306 - Sect. E
49. 7041-ED2306 - Sect. F
50. 7041-EC2339

51. 7021-EC2323
52. 7021-EC2317
53. 7021-EC2322
54. 7021-HC2307
55. 7021-HC2306
56. 7021-HC2303
57. 7021-HC2302
58. 7021-EC2326-2
59. 7021-EC2341
60. 7021-EC2326-1
61. 7042-ED2356
62. 7042-ED2357-1
63. 7042-ED2357-2
64. 7042-CD2366
65. 7042-ED2375
66. 7042-CD2365
67. 7042-ED2373
68. 7042-ED2352
69. 7042-ED2366
70. 7042-ED2379
71. 7041-ED2305-1
72. 7041-ED2305-2
73. 7041-ED2305-3
74. 7041-ED2306-1
75. 7041-ED2306-2
76. 7041-ED2309
77. 7041-ED2311
78. 7042-CD2364
79. 7042-ED2365
80. 7042-CD2369
81. 7042-ED2353
82. 7021-EC2325
83. 7042-ED2380
84. 7042-ED2358-2
85. 7042-HD2370
86. 7042-CD2363
87. 7042-ED2358-1
88. 7042-ED2358-2
89. 7041-ED2301-1
90. 7041-ED2301-2
91. 7041-ED2302
92. 7041-ED2301-1
93. 7041-ED2301-2
94. 7042-ED2353
95. 7042-CD2366
96. 7042-ED2375
97. 7042-CD2365
98. 7042-ED2373
99. 7042-ED2352
100. 7042-CD2369

101. 7042-ED-2365
102. 697S01-9
103. 697S01-10
104. 697S01-11
105. 697S01-12
106. 697S01-13
107. 697S01-14
108. 697S01-15
109. 697S01-16
110. 697S01-17
111. 697S01-18
112. 7021-EC2304-2
113. 7021-EC2337
114. 7021-EC2346-3
115. 7021-EC2360-1
116. 7021-EC2360-2
117. 7021-EC2324-
118. 7021-EC2302-2
119. 7021-EC2359
120. 7021-EC2316
121. 7021-EC2306-1
122. 7021-EC2306-2
123. 7021-EC2346-1
124. 7021-EC2348-1
125. 7021-EC2348-2
126. 7021-EC2346-2
127. 7021-EC2356
128. 7021-EC2355
129. 7021-EC2305
130. 7021-EC2338
131. 7021-EC2304-4
132. 7021-EC2302-1
133. 7021-EC2345
134. 7021-EC2304-1
135. 7021-EC2304-3
136. 7021-EC2358-2
137. 7021-EC2358-1
138. 7021-EC2357
139. 7021-EC2340
140. 697S01-30
141. 697S01-31
142. 697S01-32
143. 697S01-33
144. 697S01-34
145. 697S01-35
146. 697S01-36
147. 697S01-37
148. 697S01-38
149. 697S01-39
150. 697S01-40

151. 697S01-41
152. 697S01-52
153. 697S01-53
154. 697S01-67
155. 697S01-60
156. 697S01-42
157. 697S01-43
158. 697S01-44
159. 697S01-45
160. 697S01-46
161. 697S01-47
162. 697S01-48
163. 697S01-49
164. 697S01-50
165. 697S01-51
166. 7021-HC2309
167. 7021-HC2308
168. 7021-EC2354-3
169. 7021-EC2354-2
170. 7021-EC2354-1
171. 7026-EC2638 - Sect. AE
172. 7026-EC2638 Sect. G
173. 7026-EC2638 - Sect. K
174. 7026-EC2638 - Sect. M
175. 7026-EC2641
176. 7026-EC2659-265
177. 7026-EC2659-270
178. 7026-EC2659-275
179. 7026-EC2659-279
180. 7026-EC2649
181. 7026-EC2634
182. 7026-EC2664-6
183. 7026-EC2664-8
184. 7026-EC2608-1
185. 7026-EC2608-2
186. 7026-EC2601-1
187. 7026-EC2602-3
188. 7026-EC2635
189. 7026-EC2603
190. 7026-EC2613
191. 7026-EC2605
192. 7026-EC2602-2
193. 7026-EC2602-1
194. 7026-EC2635
195. 7026-EC2613
196. 7026-EC2603
197. 7026-EC2634
198. 7026-EC2601-1
199. 7026-EC2602-3
200. 7026-EC2602-2

201. 7026-EC2602-1
202. 7026-EC2605
203. 7026-EC2608-2
204. 7026-EC2608-1
205. 7026-EC2664-8
206. 7026-EC2664-6
207. 699S02-131
208. 699S02-130
209. 699S02-100
210. 699S02-99
211. 699S02-98
212. 699S02-96
213. 699S02-95
214. 699S02-97
215. 699S02-96 & 97 Brace
216. 699S02-27
217. 699S02-28
218. 699S02-29
219. 699S02-30
220. 699S02-31
221. 699S02-35
222. 699S02-36
223. 699S02-37
224. 699S02-38
225. 699S02-39
226. 699S02-40
227. 699S02-41
228. 699S02-44
229. 699S02-69
230. 699S02-72
231. 699S02-73
232. 699S02-74
233. 699S02-139
234. 699S02-140
235. 699S02-141
236. 699S02-142
237. 699S02-145
238. 699S02-146
239. 699S02-147
240. 699S02-18
241. 699S02-19
242. 699S02-20
243. 699S02-22
244. 699S02-23
245. 699S02-24
246. 699S02-25
247. 699S02-26
248. 699S02-21
249. 699S02-117
250. 699S02-116

251. 699S02-115
252. 699S02-114
253. 699S02-113
254. 699S02-112
255. 699S02-111 & 112
256. 699S02-111
257. 699S02-110
258. 699S02-109
259. 699S02-109 & 108
260. 699S02-108
261. 699S02-107
262. 699S02-91
263. 699S02-62
264. 699S02-88
265. 699S02-119
266. 699S02-118
267. 699S02-15
268. 699S02-16
269. 699S02-17
270. 699S02-45
271. 699S02-48
272. 699S02-55
273. 699S02-54
274. 699S02-53
275. 699S02-52
276. 699S02-144
277. 699S02-43
278. 699S02-14
279. 699S02-1
280. 699S02-136
281. 699S02-137
282. 699S02-138
283. 699S02-146
284. 699S02-145
285. 699S02-143
286. 699S02-56
287. 699S02-50
288. 699S02-51
289. 699S02-49
290. 699S02-47
291. 699S02-46
292. 699S02-101 & 100
293. 699S02-101
294. 699S02-102
295. 699S02-103
296. 699S02-104
297. 699S02-105
298. 699S02-106
299. 7026-EC2634
300. 7026-EC2601-1

301. 7026-EC2603-3
302. 7026-EC2602-2
303. 7026-EC2602-1
304. 7026-EC2605
305. 7026-EC2603
306. 7026-EC2608-2
307. 7026-EC2608-1
308. 7026-EC2635
309. 7026-EC2664-8
310. 7026-EC2664-6
311. 7026-EC2613
312. 699S02-32
313. 699S02-33
314. 699S02-34
315. 699S02-57
316. 699S02-58
317. 699S02-75 & 61
318. 699S02-79
319. 699S02-81
320. 699S02-82
321. 699S02-83
322. 699S02-84
323. 699S02-85
324. 699S02-86
325. 699S02-87
326. 699S02-63
327. 699S02-64
328. 699S02-65
329. 699S02-68
330. 699S02-89
331. 699S02-90
332. 699S02-92
333. 699S02-93
334. 699S02-94
335. 699S02-95
336. 697S01-7
337. 697S01-8
338. 697S01-22
339. 697S01-26
340. 7042-ED2374
341. 7021-EC2399
342. 7021-EC2324
343. 7021-EC2340

EXHIBIT NO. 8

REINSPECTION FCR & PW RESOLUTIONS REQUIRED FOR HVAC, CABLE TRAY AND CONDUIT SUPPORT HANGERS

ELECTRICAL

PW-AS-152 Rev. 2
FCR-AS-334 Rev. 1
PW-AS-346
PW-AS-347
PW-AS-349 Rev. 1
PW-AS-354
PW-AS-356
FCR-AS-372 Rev. 1
PW-AS-380
PW-AS-391
PW-AS-392 Rev. 1
PW-AS-414
FCR-AS-394
FCR-AS-395
FCR-AS-396
FCR-AS-397
FCR-AS-398
PW-AS-399
PW-AS-400
PW-AS-401
PW-AS-402
PW-AS-403
PW-AS-404
FCR-AS-405
FCR-AS-414
FCR-AS-436
PW-AS-440
PW-AS-441
PW-AS-442
PW-AS-443

HVAC

FCR-AS-334 Rev. 1
FCR-AS-349 Rev. 1
FCR-AS-372 Rev. 1
FCR-AS-380
FCR-AS-392 Rev. 1
FCR-AS-446
FCR-AS-483
PW-AS-508
PW-AS-509
PW-AS-510
PW-AS-511

ELECTRICAL (cont'd)

PW-AS-444
PW-AS-445
PW-AS-446
PW-AS-447
PW-AS-481
FCR-AS-483
PW-AS-489
FCR-AS-496
PW-AS-497
PW-AS-499
PW-AS-500
PW-AS-519
PW-AS-520
PW-AS-521
PW-AS-522
PW-AS-523
FCR-AS-524
PW-AS-527
PW-AS-541
PW-AS-546
PW-AS-547
DCN-650-406
FCR-E-078
DCN-560-076
FCR-E-041
FCR-E-060
PW-AS-215
PW-AS-152 Rev. 1
FCR-AS-218 Rev. 2
FCR-AS-314 Rev. 1
FCR-AS-372 Rev. 1
DCN-560-026
DCN-560-031
DCN-560-033
DCN-560-043
DCN-560-051
DCN-560-055
DCN-560-061
DCN-560-071
DCN-560-083
DCN-650-366
DCN-560-086