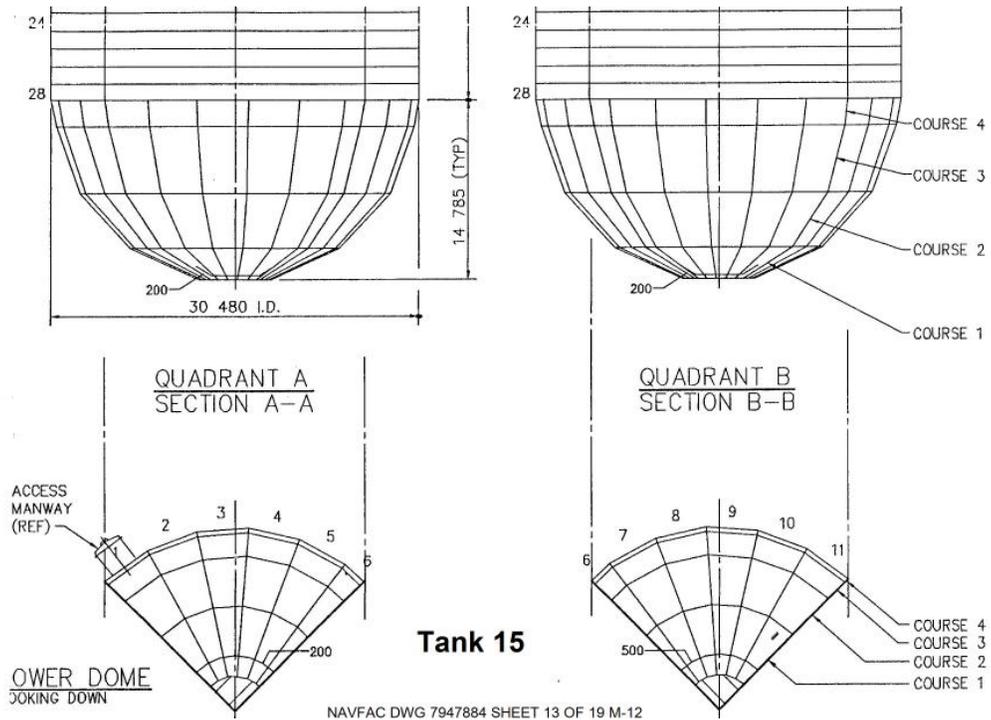


# Report On Tank 15 Phase 2 As Built Repairs



March, 2006

**CONTRACT NUMBER N62742-03-C-1402  
CLEAN AND REPAIR TANKS 1, 6, 15, AND 16, AT RED HILL  
FLEET AND INDUSTRIAL SUPPLY CENTER, PEARL HARBOR, HAWAII**

## **Summary**

This report is the second report by Dunkin and Bush, Inc. to document weld repairs completed in Tank 15. The first report documented 73 weld repairs completed in June 2005 (D&B repair numbers 15001 – 15073). Those repairs were specified in a government provided spreadsheet based on the TESTEX inspection report dated 2/28/2005.

This second report documents an additional 89 weld repairs and other repairs / modifications completed through March 2006. The additional repairs are based on the API 653 Inspection Report by Weston Solutions dated September 2005, and by directions received from the government.

The report by Weston Solutions included recommendations for repairs which were completed by Dunkin & Bush consisting of the following:

### **Repairs based on API Report Recommendations**

1. 53 patch plates to correct 73 flaws.
2. 31 weld repairs to existing weld seams.
3. Removal of unused anchors, clips, and angles at the tank bottom.
4. Replacement of existing supports on the 18" line at the tank bottom.
5. Weld repair of interior circumferential joints on the 32" line beneath the tank.
6. Investigation of grout nozzles not tested (resulting in removal and patch plate repair over 5 nozzles).
7. Performance of coating repairs on 112 each 3" grout nozzles.
8. Performance of coating repairs to patch plates, weld repairs, grout nozzles, expansion joint, and 82 square meters scattered around the lower dome and barrel.

### **Other Repairs**

Other repairs were completed as directed by the government based on results of contract specified testing / inspection, and user requests. These other repairs include:

1. Removal, repair, and retesting of the existing slop line; supply and installation of a new 6" valve.
2. Relocation of the existing ladder in the central tower from quadrant A to the quadrant B side of the tower.
3. Structural repairs to the central tower (weld repairs and replacement of fasteners).
4. Replacement of sample line valves in the lower tunnel.
5. Removal of counterweight tube, float, tape, guy wires, and attachments.
6. Removal of the central tower elevator cage and steps & landing at the tower base.

These repairs are summarized and described in this report.

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## Section 1

### Summary of weld and patch plate repairs 15074 – 15162

The following table summarizes the patch plate and weld repairs recommended by Weston Solutions in table 2.1 of their September 2005 API-653 Inspection Report.

89 repairs covering 104 flaws are described in the table. Each phase 2 repair has been assigned a Dunkin & Bush repair number from 15074 to 15162. Dunkin & Bush also assigned a unique number to each of the flaws identified for repair by Weston to keep them in sequence. The Dunkin & Bush assigned flaw numbers can be seen in repair photographs.

5 repairs were added as the result of further examination of grout nozzles for flaws (15158 – 15162). Five flawed nozzles were removed and patched over with an 8" diameter plate.



Typical patch plate repairs (note the Dunkin & Bush assigned flaw numbers)

Section 1 Tank 15 Phase 2 Weld Repair As Built Summary								
Phase 2				D&B	Weston			
D&B Repair No.	Quadrant	V Drop	Row	Flaw Number	Flaw Number	As Built Repair	PT Accepted	Vac Box Accepted
15074	A Barrel	13	28	201	3	8" x 8" x 1/4" patch plate	24-Jan-06	31-Jan-06
15075	A Barrel	12	8 to 9	202	53	Weld repair	24-Jan-06	31-Jan-06
15076	A Barrel	12	14	203	54	Weld repair	24-Jan-06	31-Jan-06
15077	A Barrel	12	14	204	55	Weld repair	24-Jan-06	31-Jan-06
15078	A Extension	13	4	205	66	12"x14-3/8"x1/4" patch plate	23-Jan-06	31-Jan-06
15079	A Barrel	15	4	206	68	Weld repair	30-Jan-06	31-Jan-06
15080	A Barrel	15	5	207	69	Weld repair	24-Jan-06	31-Jan-06
15081	A Barrel	16	14	208	71	Weld repair	24-Jan-06	31-Jan-06
15082	A Barrel	18	13	209	90A	Weld repair	24-Jan-06	31-Jan-06
15083	A Barrel	18	13	210	90	Weld repair	24-Jan-06	31-Jan-06
15084	A Extension	18	4	211	91	9"x10"x1/4" patch plate	23-Jan-06	31-Jan-06
15085	A Extension	14	3	212	153	One 28"x48"x1/4" patch plate covers flaws 153, 150,	23-Jan-06	31-Jan-06
	A Extension	14	3	213	150	152, 149, and 151		
	A Extension	14	3	214	152			
	A Extension	14	3	215	149			
	A Extension	14	3	216	151			
15086	A Extension	13	3	217	134	One 16"x30"x1/4" patch plate covers flaws 134, 135,	30-Jan-06	31-Jan-06
	A Extension	13	3	218	135	136, 137, and 138		
	A Extension	13	3	219	136			
	A Extension	13	3	220	137			
	A Extension	13	3	221	138			
15087	A Extension	15	2	222	156	10"x16" patch plate	23-Jan-06	31-Jan-06
15088	A Extension	16	1	223	157	8"x1/4" round patch plate	23-Jan-06	31-Jan-06
15089	A Barrel	19	3	224	93	Weld repair	30-Jan-06	31-Jan-06
15090	A Upper Dome	A	18	225	133	8"x1/4" round patch plate	23-Jan-06	31-Jan-06
15091	A Upper Dome	A	12	226	154	10"x16" patch plate	30-Jan-06	31-Jan-06
15092	A Upper Dome	A	12	227	155	8"x1/4" round patch plate	23-Jan-06	31-Jan-06
15093	A Upper Dome	A	15	228	158	10"x8"x1/4" patch plate	23-Jan-06	31-Jan-06
15094	B Barrel	4	28	229	1	8"x8"x1/4" patch plate	24-Jan-06	31-Jan-06
15095	B Barrel	5	28	230	2	6"x1/4" round patch plate	24-Jan-06	31-Jan-06

Section 1 Tank 15 Phase 2 Weld Repair As Built Summary								
Phase 2				D&B	Weston			
D&B Repair No.	Quadrant	V Drop	Row	Flaw Number	Flaw Number	As Built Repair	PT Accepted	Vac Box Accepted
15096	B Extension	3	4	231	6	One 14"x16"x1/4" patch plate covers flaws 6 and 6A	24-Jan-06	31-Jan-06
	B Extension	3	4	232	6A			
15097	B Barrel	4	1	233	11	One 30"x40"x1/4" insert plate covers flaws 11, 12, and 13	23-Jan-06	31-Jan-06
	B Barrel	4	1	234	12			
	B Barrel	4	1	235	13			
15098	B Barrel	2	1	236	10	Weld repair	24-Jan-06	31-Jan-06
15099	B Barrel	4	2	237	19	One 10"x16" patch plate covers flaws 19 and 20	23-Jan-06	31-Jan-06
	B Barrel	4	2	238	20			
15100	B Barrel	4	2	239	22	One 24"x17"x1/4" patch plate covers flaws 22 and 23	23-Jan-06	31-Jan-06
	B Barrel	4	2	240	23			
15101	B Barrel	4	2	241	16	6"x1/4" round patch plate	23-Jan-06	31-Jan-06
15102	B Barrel	6	1	242	28	6"x1/4" round patch plate	29-Dec-05	31-Jan-06
15103	B Barrel	6	3	243	29	Weld repair	23-Jan-06	31-Jan-06
15104	B Barrel	6	4	244	32	Weld repair	23-Jan-06	31-Jan-06
15105	B Barrel	6	7	245	31	Weld repair	23-Jan-06	31-Jan-06
15106	B Extension	10	4	246	51	Weld repair	23-Jan-06	31-Jan-06
15107	B Extension	10	4	247	52	Weld repair	23-Jan-06	31-Jan-06
15108	B Extension	1	3	248	97	One 12"x16"x1/4" patch plate covers flaws 97 and 98	24-Jan-06	31-Jan-06
	B Extension	1	3	249	98			
15109	B Extension	1	3	250	102	6"x1/4" round patch plate	24-Jan-06	31-Jan-06
15110	B Extension	1	3	251	104	One 6"x12"x1/4" patch plate covers flaws 104 and 105	29-Dec-05	31-Jan-06
	B Extension	1	3	252	105			
15111	B Extension	1	3	253	106	6"x1/4" round patch plate	24-Jan-06	31-Jan-06
15112	B Extension	1	3	254	108	6"x10" patch plate	30-Jan-06	31-Jan-06
15113	B Extension	1	3	255	107	8"x1/4" round patch plate	9-Jan-06	31-Jan-06
15114	B Extension	1	3	256	109	8"x8"x1/4" patch plate	9-Jan-06	31-Jan-06
15115	B Extension	1	3	257	99	One 10"x18"x1/4" patch plate covers flaws 99 and 100	24-Jan-06	31-Jan-06
	B Extension	1	3	258	100			
15116	B Extension	1	3	259	103	6"x1/4" round patch plate	24-Jan-06	31-Jan-06
15117	B Extension	2	3	260	121	One 8"x14"x1/4" patch plate covers flaws 121 and 122	24-Jan-06	31-Jan-06

Section 1 Tank 15 Phase 2 Weld Repair As Built Summary								
Phase 2				D&B	Weston			
D&B Repair No.	Quadrant	V Drop	Row	Flaw Number	Flaw Number	As Built Repair	PT Accepted	Vac Box Accepted
	B Extension	2	3	261	122			
15118	B Extension	2	3	262	123	8"x8"x1/4" patch plate	24-Jan-06	31-Jan-06
15119	B Extension	2	3	263	124	8"x1/4" round patch plate	24-Jan-06	31-Jan-06
15120	B Extension	2	3	264	125	One 6"x12"x1/4" patch plate covers flaws 125 and 126	29-Dec-05	31-Jan-06
	B Extension	2	3	265	126			
15121	B Extension	7	2	266	129	10"x10"x1/4" patch plate	30-Jan-06	31-Jan-06
15122	B Extension	8	2	267	131	8"x1/4" round patch plate	23-Jan-06	31-Jan-06
15123	B Extension	8	1	268	132	Weld repair	23-Jan-06	31-Jan-06
15124	B Upper Dome	C	28	269	162	10"x10"x1/4" patch plate	30-Jan-06	31-Jan-06
15125	C Extension	1	4	270	7	Weld repair	25-Jan-06	31-Jan-06
15126	C Extension	1	4	271	7A	Weld repair	9-Jan-06	31-Jan-06
15127	C Barrel	4	6	272	18	Weld repair	9-Jan-06	31-Jan-06
15128	C Barrel	6	5	273	33	Weld repair	25-Jan-06	31-Jan-06
15129	C Barrel	6	5	274	34	Weld repair	25-Jan-06	31-Jan-06
15130	C Barrel	6	15	275	38	Weld repair	25-Jan-06	31-Jan-06
15131	C Barrel	6	16	276	39	Weld repair	9-Jan-06	31-Jan-06
15132	C Barrel	6	16	277	40	Weld repair	25-Jan-06	31-Jan-06
15133	C Barrel	6	16	278	41	Weld repair	9-Jan-06	31-Jan-06
15134	C Barrel	9	24	279	43	Weld repair	9-Jan-06	31-Jan-06
15135	C Barrel	9	10	280	46	Weld repair	25-Jan-06	31-Jan-06
15136	C Barrel	11	13	281	48	Weld repair	9-Jan-06	31-Jan-06
15137	C Upper Dome	A	46	282	95	6"x1/4" round patch plate	29-Dec-05	31-Jan-06
15138	C Upper Dome	A	48	283	94	6"x1/4" round patch plate	29-Dec-05	31-Jan-06
15139	C Upper Dome	B	52	284	142	6"x1/4" round patch plate	29-Dec-05	31-Jan-06
15140	D Barrel	13	18	285	59	8"x1/4" round patch plate	30-Jan-06	31-Jan-06
15141	D Barrel	15	14	286	61	One 8"x1/4" round patch plate covers flaws 61 and 62	9-Jan-06	1-Feb-06
	D Barrel	15	14	287	62			
15142	D Barrel	15	11	288	63	8"x1/4" round patch plate	9-Jan-06	1-Feb-06
15143	D Barrel	16	14	289	65	8"x1/4" round patch plate	24-Jan-06	1-Feb-06
15144	D Barrel	17	12	290	77	Weld repair	9-Jan-06	1-Feb-06

<b>Section 1 Tank 15 Phase 2 Weld Repair As Built Summary</b>								
<b>Phase 2</b>				<b>D&amp;B</b>	<b>Weston</b>			
<b>D&amp;B Repair No.</b>	<b>Quadrant</b>	<b>V Drop</b>	<b>Row</b>	<b>Flaw Number</b>	<b>Flaw Number</b>	<b>As Built Repair</b>	<b>PT Accepted</b>	<b>Vac Box Accepted</b>
15145	D Barrel	17	14	291	80	8"x1/4" round patch plate	24-Jan-06	1-Feb-06
15146	D Barrel	18	14	292	84	Weld repair	25-Jan-06	1-Feb-06
15147	D Barrel	22	16	293	88	8"x1/4" round patch plate	9-Jan-06	1-Feb-06
15148	D Extension	13	1	294	111	One 8"x1/4" round patch plate covers flaws 111	29-Dec-05	1-Feb-06
	D Extension	13	1	295	112	and 112		
15149	D Extension	13	2	296	113	Weld repair	9-Jan-06	1-Feb-06
15150	D Extension	13	3	297	114	Nozzel removed, hole covered with 8"x1/4" round plate	24-Jan-06	1-Feb-06
15151	D Extension	14	1	298	116	6"x1/4" round patch plate	9-Jan-06	1-Feb-06
15152	D Extension	15	2	299	117	8"x1/4" round patch plate	30-Jan-06	1-Feb-06
15153	D Extension	16	1	300	118	6"x10" patch plate	24-Jan-06	1-Feb-06
15154	D Extension	18	1	301	119	8"x1/4" round patch plate	30-Jan-06	1-Feb-06
15155	D Barrel	23	22	302	8	8"x1/4" round patch plate	30-Jan-06	1-Feb-06
15156	D Barrel	23	23	303	9	8"x1/4" round patch plate	30-Jan-06	1-Feb-06
15157	D Barrel	13	58	304	145	6"x1/4" round patch plate	9-Jan-06	1-Feb-06
15158	C Lower Dome	4	1	501	188	Nozzel removed, hole covered with 8"x1/4" round plate	3-Feb-06	1-Feb-06
15159	C Barrel	5	28	502	187	Nozzel removed, hole covered with 8"x1/4" round plate	9-Jan-06	1-Feb-06
15160	A Lower Dome	15	4	503	182	Nozzel removed, hole covered with 8"x1/4" round plate	24-Jan-06	1-Feb-06
15161	B Barrel	9	2	504	180	Nozzel removed, hole covered with 8"x1/4" round plate	24-Jan-06	1-Feb-06
15162	B Barrel	5	2	505	176	Nozzel removed, hole covered with 8"x1/4" round plate	30-Jan-06	1-Feb-06

## Section 2

### Removal of unused anchors, clips, and angles at tank bottom

Unused anchors, clips, and angles were removed from the tank bottom as recommended by Weston Solutions. Areas where these attachments were removed were ground smooth and vacuum box tested (if removed from the bottom plates).



Tank 15 bottom after anchors and clips were removed. Also note where the elevator landing platform and steps were removed from the facing side of the tower structure.

## Section 3

### Replacement of 18" line supports at tank bottom

The 18" line supports were removed and replaced as recommended by Weston Solutions. Two existing supports were removed, areas where they were attached to the tank bottom were ground smooth and vacuum box tested.

One new support was installed shown in the photograph below. Reinforcing plates attached to the tank bottom were PT'd and vacuum box tested.



New 18" line support with re-pads

## Section 4

### Repair of 32" line internal circumferential joints

Five internal circumferential weld joints of the 32" line beneath the tank bottom were weld repaired and PT'd as recommended by Weston Solutions. Locations are shown on the Weston Solutions sketch dated 12/29/5.



View looking down the 32" line from inside tank 15. Note the circumferential weld before the bend. This is weld repair "A" identified in the Weston Solutions sketch.

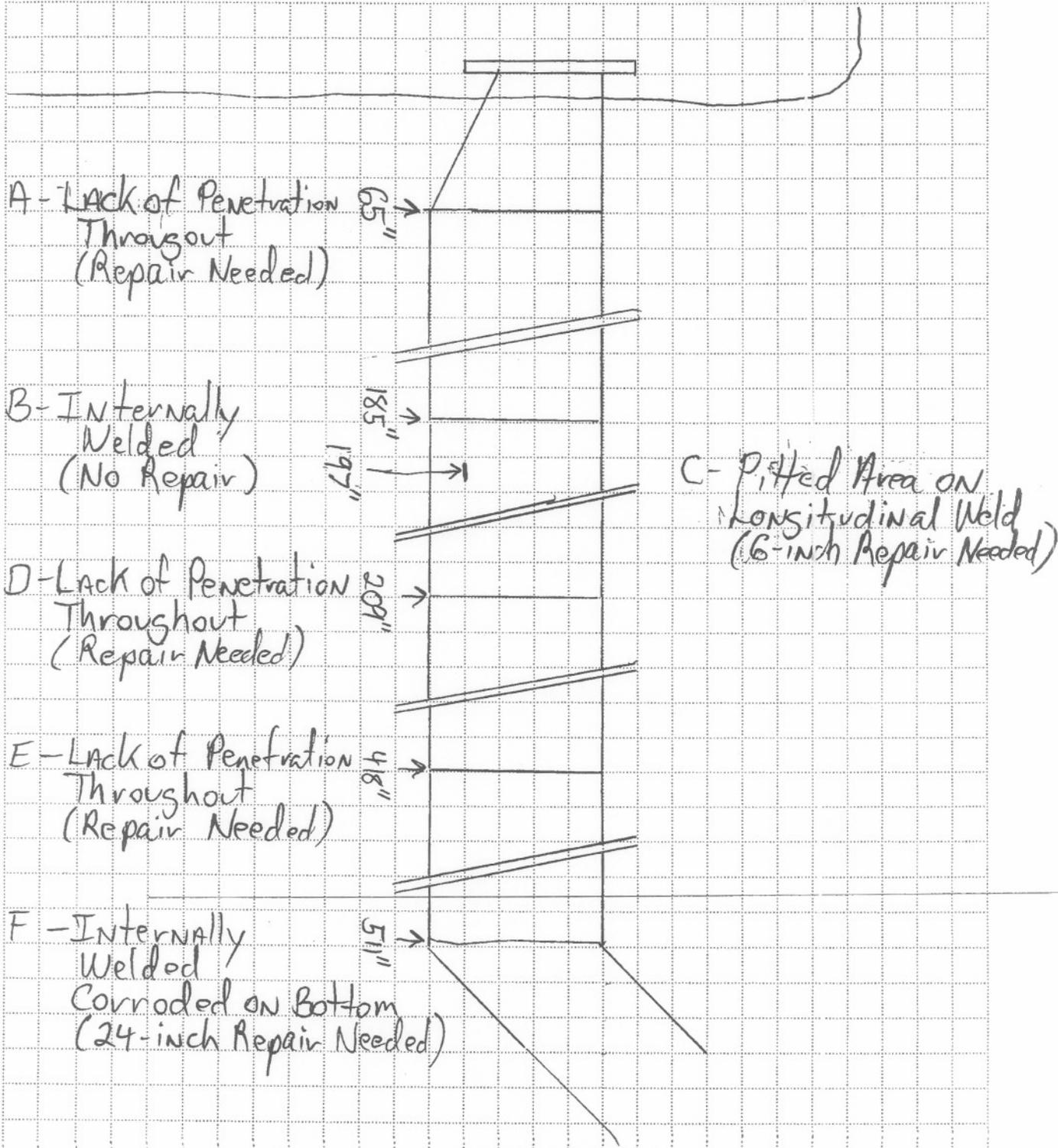
CLIENT/SUBJECT AFCEE W.O. NO. \_\_\_\_\_

TASK DESCRIPTION JK 15 32" Nozzle Inspection TASK NO. 176

PREPARED BY DFD DEPT \_\_\_\_\_ DATE 12-29-05 APPROVED BY \_\_\_\_\_

MATH CHECK BY \_\_\_\_\_ DEPT \_\_\_\_\_ DATE \_\_\_\_\_

METHOD REV. BY \_\_\_\_\_ DEPT \_\_\_\_\_ DATE \_\_\_\_\_ DEPT \_\_\_\_\_ DATE \_\_\_\_\_



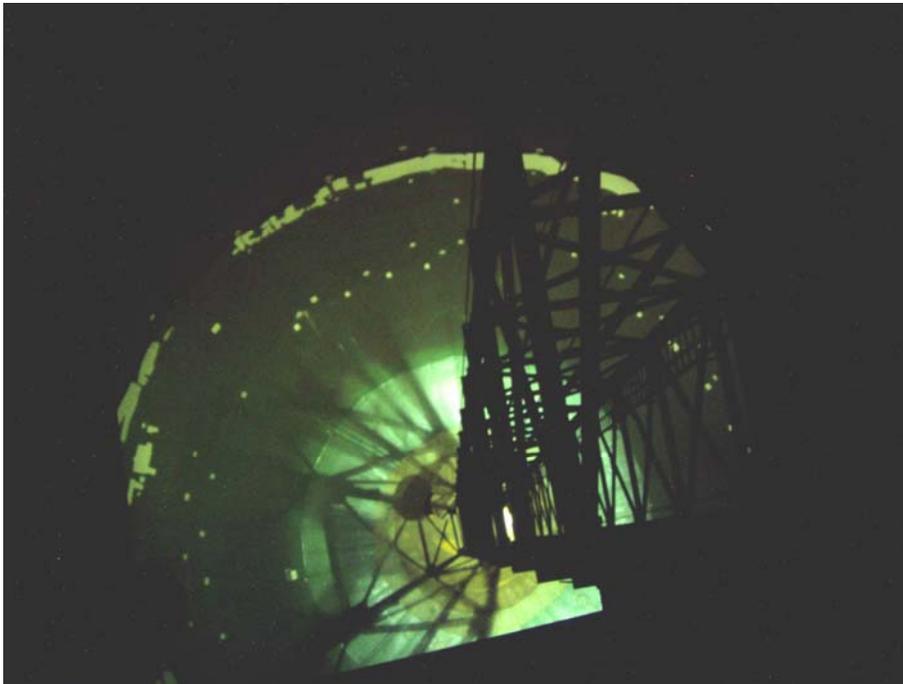
## Section 5

### Coating repairs

Coating repairs were completed using the approved single coat paint system with surface preparation done in accordance with manufacturers recommendations.

Coating application was completed in the following areas:

1. 89 weld and patch plate repairs.
2. 112 grout nozzles.
3. Scattered areas of the lower dome and barrel totaling approximately 82 square meters. Coating repair areas in the lower dome were described in the Dunkin & Bush Report on Coating Failure Observations dated September 30, 2005.



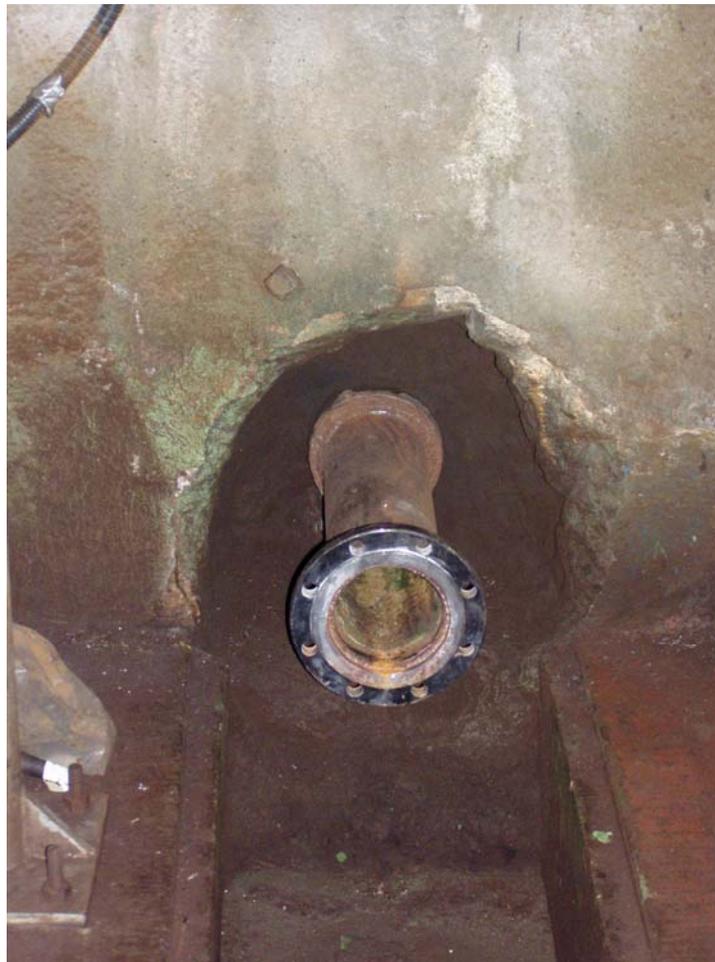
Tank 15 Lower Dome Coating Repairs

## Section 6

### Other repairs including slop line, tower, etc.

Other repairs were completed in tank 15 as directed by the government and based on results of contract specified testing, inspection, differing site conditions, and user requests. These repairs include:

1. **Removal, repair, reinstallation and testing of the 6" slop line.** The existing slop was removed as directed by the government. The flexible stainless steel portion of the line was found to be leaking at weld joints and was replaced with a 24 foot section of new 5" diameter flexible stainless steel tubing. The existing carbon steel slop line pipe was re used, with a new flange installed at the lower tunnel.



View of new slop line from lower tunnel before installation of 6" valve.

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2. **Relocation of the ladder** in the central tower from the quadrant “A” side (facing) to the quadrant “D” side (right side of photograph). This required cutting and re welding clips connecting the ladder over the full height of the tower.



Tank 15 relocated ladder – note the clips attaching the ladder to the tower.

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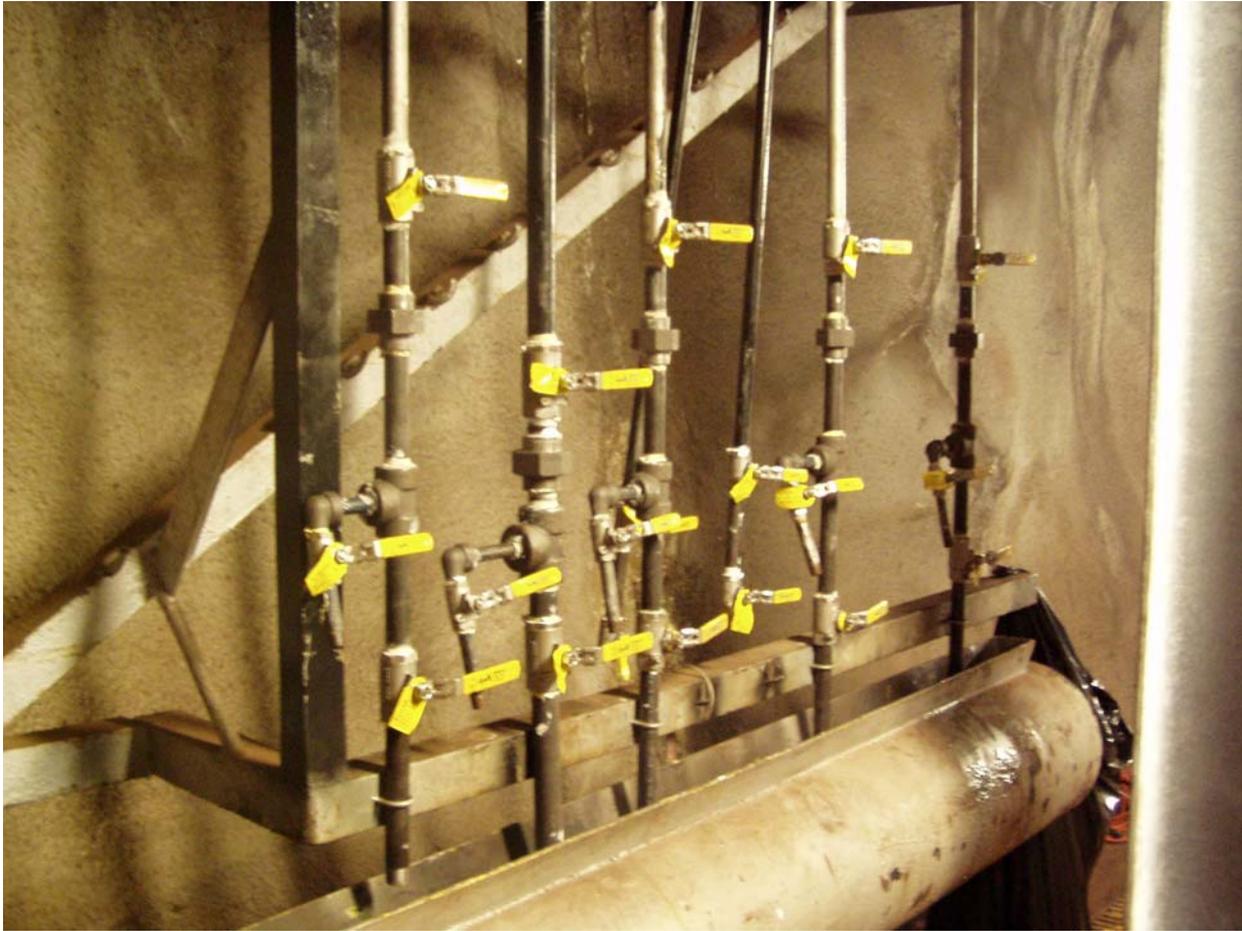
3. **Central tower structural repairs** including the installation of 48 missing fasteners, and repairs to cracked weld joints below the catwalk platform on the tower structure.



Typical area of replaced fasteners - note plug weld repair of flame cut holes.

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**4. Replacement of sample line valves in the lower tunnel.**



Tank 15 sample line valves at lower tunnel – note added branch and valve for filling sample bottles.

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- 5. Removal of the existing counterweight tube, gauge float, guy wires and attachments.**



View of tank 15 bottom area where gauging equipment and attachments were removed

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6. **Removal of the elevator cage** and lower landing & steps from the central tower structure.



Area where elevator cage was removed at the platform level – note the relocated ladder.

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View of tank 15 bottom area where the elevator platform and steps were removed.