START

0033418

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 163255

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.		4. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	E. J. Walter, SSIA, H5-52, 6-1558 W23460		09/10/92
	5. Project Title/No./Work Order No. N131A Visual Examination of Tank Annuli of the 241-AW Tank Farm	6. Bldg./Sys./Fac. No. 241-AW	7. Impact Level 4
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-RPT-034, Rev. 0	9. Related ECN No(s). N/A	10. Related PO No. N/A

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. ECN only)
[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

No change was made to text, document number was changed from "WHC-SD-WP-RPT-034" to "WHC-SD-WM-RPT-034", on all pages.

JAN 1994
RECEIVED
EPIC

13a. Justification (mark one)							
As-Found	[X]	Criteria Change	[]	Design Improvement	[]	Environmental	[]
		Facilitate Const.	[]	Const. Error/Omission	[]	Design Error/Omission	[]

13b. Justification Details

The document number needs to be correct on each page of the document.

14. Distribution (include name, MSIN, and no. of copies)

See attached Distribution Sheet.

RELEASE STAMP

OFFICIAL RELEASE BY WHC
DATE SEP 29 1992
Sta. 21

A-7900-013-2 (06/92) GEF095
Engineering Change Notice

A-7900-013-1 (11/

9413446.0902

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) 163255

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

RECEIVED JAN 1994 EDMC

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer E. J. Walter	E.J. Walter Sept. 11, 1992	PE	
Cog. Mgr. K. V. Scott	K.V. Scott 9/11/92	QA	
QA		Safety	
Safety		Design	
Security		Environ.	
Environ.		Other	
Projects/Programs			
Tank Waste Remediation System			
Facilities Operations		DEPARTMENT OF ENERGY	
Restoration & Remediation		Signature or Letter No.	
Operations & Support Services			
IRM		ADDITIONAL	
Other			

DISTRIBUTION SHEET

WHC-SD-WM-RPT-034
REV. 1

To: Fluid Systems Engineering

From: System Structural Integrity Assessments

Date: 08/21/92

Project Title/Work Order:

Visual Examination of Tank Annuli of the 241-AW Tank Farm

EDT No.:

ECN No.: 163255

Name	MSIN	With Attachment	EDT/ECN & Comment	EDT/ECN Only
E. Biebesheimer	R1-51	X		
L. D. Blackburn	H5-67	X		
W. C. Carlos	H5-52	X		
D. J. Green	H5-53	X		
J. P. Hauptmann	S2-03	X		
R. Malhan	S1-57	X		
V. D. Maupin	R1-51	X		
M. A. Mclaughlin	H5-34	X		
T. L. Moore	H5-09	X		
D. C. Pfluger	H5-52	X		
R. S. Popielarcyk	R1-30	X		
J. D. Robinson	H5-09	X		
L. Ruffin	R2-95	X		
E. B. Schwenk	H5-52	X		
K. V. Scott	H5-52	X		
D. B. Smet	X5-52	X		
J. D. Thomson	R1-30	X		
E. J. Walter (5)	H5-52	X		
Central Files (Orig. + 3 copies)	L8-04	X		
IRA Clearance	H4-17	X		

B

THIS PAGE INTENTIONALLY
LEFT BLANK

SUPPORTING DOCUMENT

1. Total Pages 58

2. Title	3. Number	4. Rev No.
Visual Examination of Tank Annuli at the 241-AW Tank Farm	WHC-SD-WM-RPT-034	1

5. Key Words

Double-Shell Tank Examination, CCTV, WAC, Video Inspection System, Annulus Examination, Tank Integrity Assessment

APPROVED FOR PUBLIC RELEASE
9/15/92 N. Solis

6. Author

Name: E. J. Walter

E. J. Walter
Signature

Organization/Charge Code W23460/N131A

7. Abstract

This document records the results of the examination of the annuli of the double-shell tanks at the 241-AW Tank Farm. This examination supports the "not unfit for use" assessment of the tanks in accordance with the Washington Administrative Code 173-303-640(2).

9. Impact Level 4

10. RELEASE STAMP

THIS PAGE INTENTIONALLY
LEFT BLANK

RECORD OF REVISION	(1) Document Number WHC-SD-WM-RPT-034	Page 1

(2) Title
Visual Examination of Tank Annuli of the 241-AW Tank Farm

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	EDT 155664, dtd. 6/5/92		
1 RS	(7) Document number is changed on all page numbers from "WHC-SD-WP-RPT-034" to "WHC-SD-WM-RPT-034" ~~(EDT 155664)~~ jg 9/28 (ECN 163255)	E.J. Walter E J Walter 9/11/92	K.V. Scott K V Scott 9/11/92

9138105.0906

THIS PAGE INTENTIONALLY
LEFT BLANK

VISUAL EXAMINATION OF TANK ANNULI AT THE 241-AW TANK FARM

SEPTEMBER 1992

Prepared By: E J Walter 9/11/92
E. J. Walter, Principal Engineer Date
System Structural Integrity Assessments

Reviewed By: E B. Schwenk 9/14/92
E. B. Schwenk, Principal Engineer Date
System Structural Integrity Assessments

Approved By: K V Scott 9/11/92
K. V. Scott; Manager Date
System Structural Integrity Assessments

WESTINGHOUSE HANFORD COMPANY
For The
U.S. Department of Energy
Richland Field Office (RL)

THIS PAGE INTENTIONALLY
LEFT BLANK

CONTENTS

THIS PAGE INTENTIONALLY
LEFT BLANK

VISUAL EXAMINATION OF TANK ANNULI AT THE 241-AW TANK FARM

1.0 INTRODUCTION

The Integrity Assessment Plan for 241-AW Tank Farm and Designated Ancillary Equipment, WHC-SD-WM-WP-057, Rev. 0, identifies the tasks to be performed during the assessment of the existing tank system which stores or treats dangerous waste. This assessment is in response to the requirements defined by the Washington State Department of Ecology's Dangerous Waste Regulations, Washington Administrative Code (WAC) 173-303-640(2). Closed circuit television (CCTV) examination of the annulus of the tanks was performed and the results of the examination have been reviewed as required by the integrity assessment plan.

2.0 OBJECTIVE

The objective of this document is to report the results of the examination and review in support of the integrity assessment of the overall 241-AW tank system. The video tapes will be examined for evidence of corrosion, cracks, leaks and other evidence of physical impairment to the inner and outer shell surfaces.

3.0 SCOPE

The scope of the examinations included the surface of the insulating concrete and surface area of the primary and secondary containment vessel walls. These areas were viewed by lowering the camera through two 4 inch (10.1cm) diameter risers approximately 180° apart, thereby providing access to the tank annulus. The risers used and tanks examined are as follows:

241-AW-101, risers 17A and 17G
241-AW-102, risers 17G and 17B
241-AW-103, risers 17F and 17L
241-AW-104, risers 17J and 17D
241-AW-105, risers 17G and 17D
241-AW-106, risers 17B and 17G.

4.0 EXAMINATION DESCRIPTION

The video examination began in July 1991 and was completed in September 1991. The Acceptance Test Report for Double Shell Tank Inspections, WHC-SD-WM-ATR-018, was used to demonstrate the acceptability of the CCTV examination system. Following is a brief description of the equipment and activities found in the acceptance test procedure. The examination system consisted of a remotely operated video camera suspended on aluminum rods. The tilt capability of the camera was 65° up and 90° down from the horizontal plane. The horizontal pan range was approximately 340°. The camera was equipped with lights of variable intensity. The camera was qualified to examine from a distance of 20 feet (6.09m) at which resolution is equivalent to that attainable by direct visual examination. Direct visual examination is equivalent to resolving a 1/32 inch (0.079cm) line on an 18 percent neutral gray card at a distance of 24 inches (60.9cm). This standard is taken from the *Rules for In-Service Inspection of Nuclear Power Plant Components*, Section XI, ASME Boiler and Pressure Vessel Code.

Electronic position encoders were used to provide real time digital position reference of the closed circuit television images in the annulus. The view of the examination camera was monitored locally during the examination. The focus, zoom, lighting, and speed of the camera were adjusted to provide the optimum examination with the equipment available. If a suspected discrepancy appeared, every effort was made to obtain a clear image for review and record. Additional detail regarding the equipment used and inspection procedure is available in CCTV Examination Operating Procedure for the Double Shell Tanks, WHC-SD-WM-TCP-003, Rev. 0.

The average radioactive dose rates encountered by the equipment in the six tanks during the annulus examinations are as follows:

241-AW-101 - 37.4 rem/hr
241-AW-102 - 2.8 rem/hr
241-AW-103 - 5.1 rem/hr
241-AW-104 - 3.5 rem/hr
241-AW-105 - 2.3 rem/hr
241-AW-106 - 3.5 rem/hr

For each tank examined, the camera was sequentially lowered through two risers that entered the annulus at opposed positions, approximately 180° apart. The examination began with the camera lowered approximately 25 feet (7.6m) below the entry level and continued in 4-foot (1.2m) increments to a depth of 55 feet (16.7m). A vertical strip of the surface of the inner and the outer shell were examined continuously from the 25 foot (7.6m) elevation to and including the bottom of the annulus. Approximately 18 percent of the inner shell surface and 30 percent of the outer shell surface were examined. The percent of the inner shell surface examined is limited by the curvature of

the vessel and the location of the camera. The percent of the outer shell surface examined is limited by the range of the camera which is 20 feet (6.09m). Figure A, Typical Arrangement for Annulus Examination of the 241-AW Double Shell Tanks, is intended to depict viewing position of the camera in the annulus.

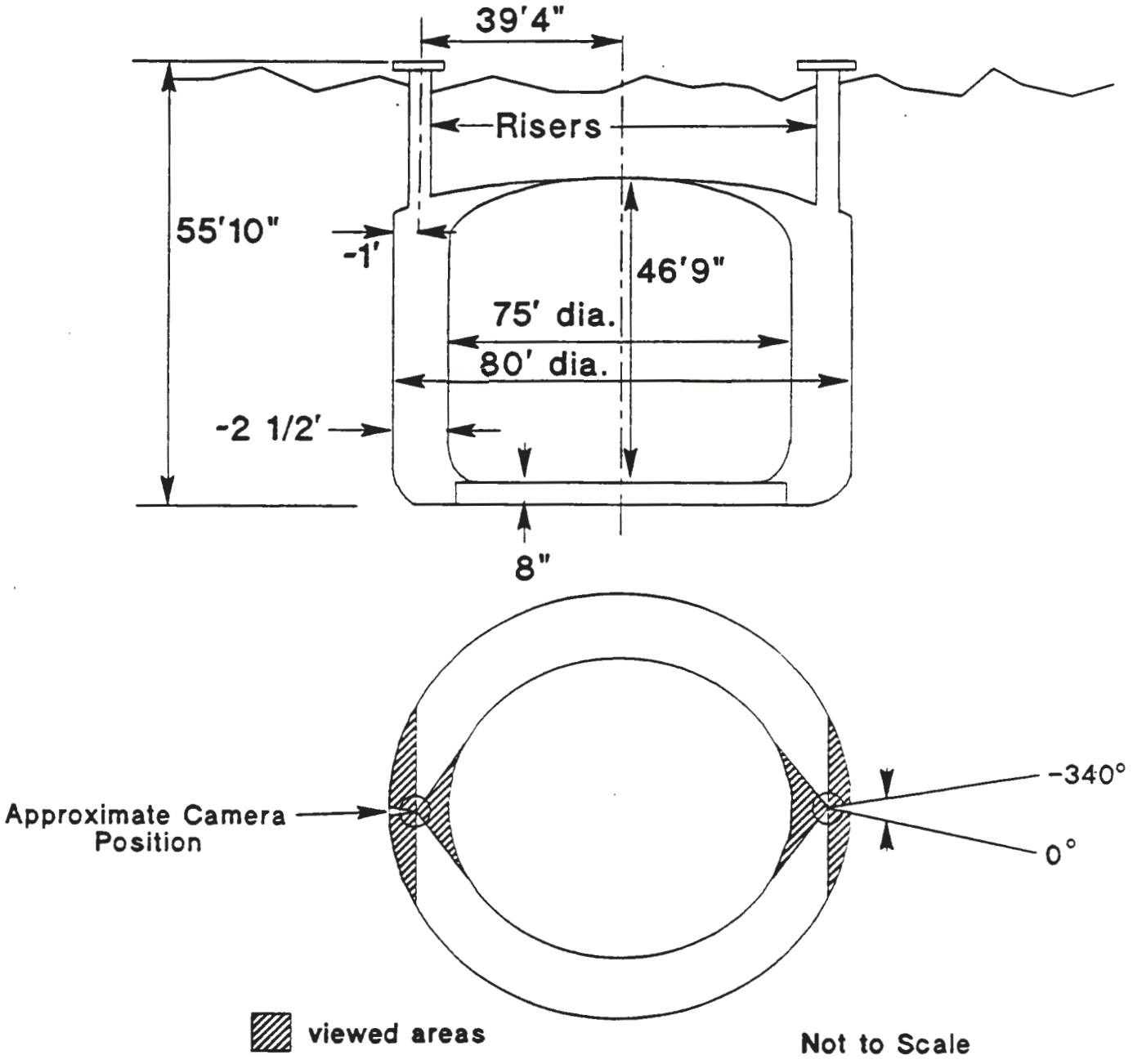
5.0 GENERAL OBSERVATIONS

As previously noted, the video examination of the inner and outer shell and the insulating concrete surfaces was viewed on a monitor at the site. Areas with indications of significant material degradation were revisited until the examination was considered adequate. In these observations all forms of corrosion or oxidation of the inner or outer shell surfaces will be described as rust.

On two occasions suspect indications viewed in 104-AW Riser 17D and 106-AW Riser 17B prompted follow-up examinations. In each of these two cases smears were taken at the suspect area using the viewing camera system with an added mechanical device that took the smear. In each of the two cases no radioactive contamination above background was found on the smears. The record of these two smear inspections is on a video cassette and the results of the smear examination may be found in Internal Memo, DCP-91-007, dated October 16, 1991. Photographs of these areas were also taken. Attachment 1 contains photographs of the areas where the smears were taken. The video tape and the photographs of the suspect areas were reviewed and no significant degradation was found.

Photograph #093974-28CN, Attachment 2 provides a near typical view of the condition of the surface of the primary shells examined. This photograph of 241-AW-101, was taken in 1980 before the tank was placed in-service.

Following completion of the examination, the video tapes, listed in Table 1, were viewed by an accredited second party to provide an independent review of the condition of the tanks. As the viewing progressed, observations were made and recorded. Attachment 3 contains the details of these observations. The degradation of the tanks to date is considered minimal, but rust does exist over many areas. The accumulation of rust was always greater at the welds and the adjacent heat affected area. The degree of rust varies from tank to tank, but more markedly between the inner and outer shell. Without exception, the progress of rust on the outer shell exceeds the progress of rust on the inner shell. One explanation may be a lower outer shell temperature enabling condensation which may accelerate the rusting process.



TYPICAL ARRANGEMENT FOR ANNULUS EXAMINATION OF THE 241-AW DOUBLE SHELL TANKS

FIGURE A

9413145.0913

TABLE 1

LIST OF 241-AW TANK ANNULUS EXAMINATION TAPES

Tape No.	Tank Annulus Examination	Examination Date	Examination Depth	Examination Tape	Date Reviewed	Tape Reviewer
1	241-AW-102-17G	07/31/91	285"	1 of 4	10/22/91	EJ Walter
3	241-AW-102-17G	08/01/91	309"-333"	2 of 4	10/22/91	" "
2	241-AW-102-17G	08/02/91	373"-568"	3 of 4	10/23/91	" "
4	241-AW-102-17G	08/02/91	616"-bottom	4 of 4	08/12/91	EB Schwenk
5	241-AW-102-17B	08/05/91	299"-588"	1 of 2	11/26/91	EJ Walter
6	241-AW-102-17B 241-AW-104-17J	08/05/91	614"-bottom 300"-337"	2 of 2 1 of 3	10/24/91 10/24/91	" " " "
7	241-AW-104-17J 241-AW-104-17J	08/05/91 08/06/91	348"-397" 384"-540"	2 of 3	10/24/91	" "
8	241-AW-104-17J	08/06/91	540"-670" bottom	3 of 3	10/25/91	" "
9	241-AW-104-17D	08/07/91	300"-396"	1 of 2	10/25/91	" "
10	241-AW-104-17D	08/07/91	492"-654"	2 of 2	10/28/91	" "
11	241-AW-106-17B	08/08/91	300"-444"	1 of 2	10/28/91	" "
12	241-AW-106-17B	08/08/91	444"-666"	2 of 2	10/29/91	" "
13	241-AW-106-17G	08/09/91	300"-444"	1 of 3	10/29/91	" "
14A	241-AW-106-17G	08/12/91	444"-540"	2 of 2	10/31/91	" "
14	241-AW-106-17G	08/13/91	540"-666"	" "	10/31/91	" "
17	241-AW-106-17G	08/12/91	540"-588"	3 of 3	11/05/91	" "
18	241-AW-105-17G	08/21/91	300"-540"	1 of 2	11/05/91	" "
19	241-AW-105-17G	08/21/91	588" Sweep 636"-666"	2 of 2	11/18/91	" "
20	241-AW-105-17D	08/23/91	300"-588"	1 of 2	11/19/91	" "
21	241-AW-105-17D	08/23/91	636"-666"	2 of 2	11/19/91	" "

Note: Tapes 15 & 16 contain data not applicable to this review data.

Tape No.	Tank Annulus Examination	Examination Date	Examination Depth	Examination Tape	Date Reviewed	Tape Reviewer
22	241-103-17F	08/28/91	300"-444"	1 of 2	11/19/91	EJ Walter
23	241-AW-103-17F	08/29/91	494"-666"	2 of 2	11/25/91	" "
24	241-AW-101-17A	08/30/91	300"-494"	1 of 2	11/25/91	" "
25	241-AW-103-17L 241-AW-103-17L	08/29/91 08/30/91	300"-448" 494"-540"	1 of 2	11/25/91	" "
26	241-AW-103-17L	08/30/91	588"-666"	2 of 2	11/26/91	" "
27	241-AW-101-17G	09/03/91	300"-588"	1 of 2	11/26/91	" "
28	241-AW-101-17A	09/03/91	494"-637"	2 of 2	11/26/91	" "
29	241-AW-101-17G	09/03/91	636"-666"	2 of 2	11/26/91	" "

In several areas, on the inner and outer shell surfaces, it appeared that condensation existed, but this has not been verified. Water did appear as a small puddle on the floor of the annulus in the area of the leak detector sensor. Whether the source of this puddle was condensation or leakage has not been determined.

Swirling particles in front of the camera indicated presence of the ventilation system. The buildup of mill scale on the annulus floor appeared greater along the outer shell than the inner shell in most tanks.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

The review identified no degradation or defect that would cause any of the tanks or the insulating concrete to be unfit for service. It is the opinion of the reviewer that an adequate portion of the surface area was examined to determine that the tanks are fit for service from an annulus surface viewpoint. Other reviews and evaluations are planned to complete the integrity assessment of the tanks.

6.2 RECOMMENDATIONS

1. The range and focus of the camera could be expanded. The surface being inspected would often become blurred as the camera zoomed in for a closer view. A Kodak[1] color bar inside the annulus may be useful for establishing a more accurate color comparison.

2. The ventilation system should be instrumented to indicate whether condensation occurs in the annulus. If condensation occurs, it is recommended that the ventilation system be modified to preclude the occurrence of condensation in the annulus. Maintaining the humidity in the annulus to 70 percent or less would reduce the rate of corrosion or rust to a conservative level. The "Metals Handbook," Ninth Edition, Volume 13, Corrosion, page 511, and "Corrosion," Volume 1, L. L. Shreir, page 2.11 may be referred to for the effect of atmospheric factors in atmospheric corrosion.

3. Leakage of water into the annulus, if it occurs, should be stopped.

---

[1]Kodak is a registered trademark of the Eastman Kodak Company.

4. It is recommended that a comparison examination of these same tank areas be included in the subsequent periodic integrity assessments of these tanks.

5. Long term plans should evaluate the need to perform examinations through other risers.

7.0 REFERENCES

1. Shreir, L. L., Corrosion, Volume 1, 1963.

2. Metals Handbook, Ninth Edition, Volume 13, Corrosion, 1987.

3. Pfluger, D. C., 1991, *Follow-Up Examination of 104-AW and 106-AW Tank Annuli*, Internal Memo, DCP-91-007, Westinghouse Hanford Company, Central Engineering Department, Richland, Washington.

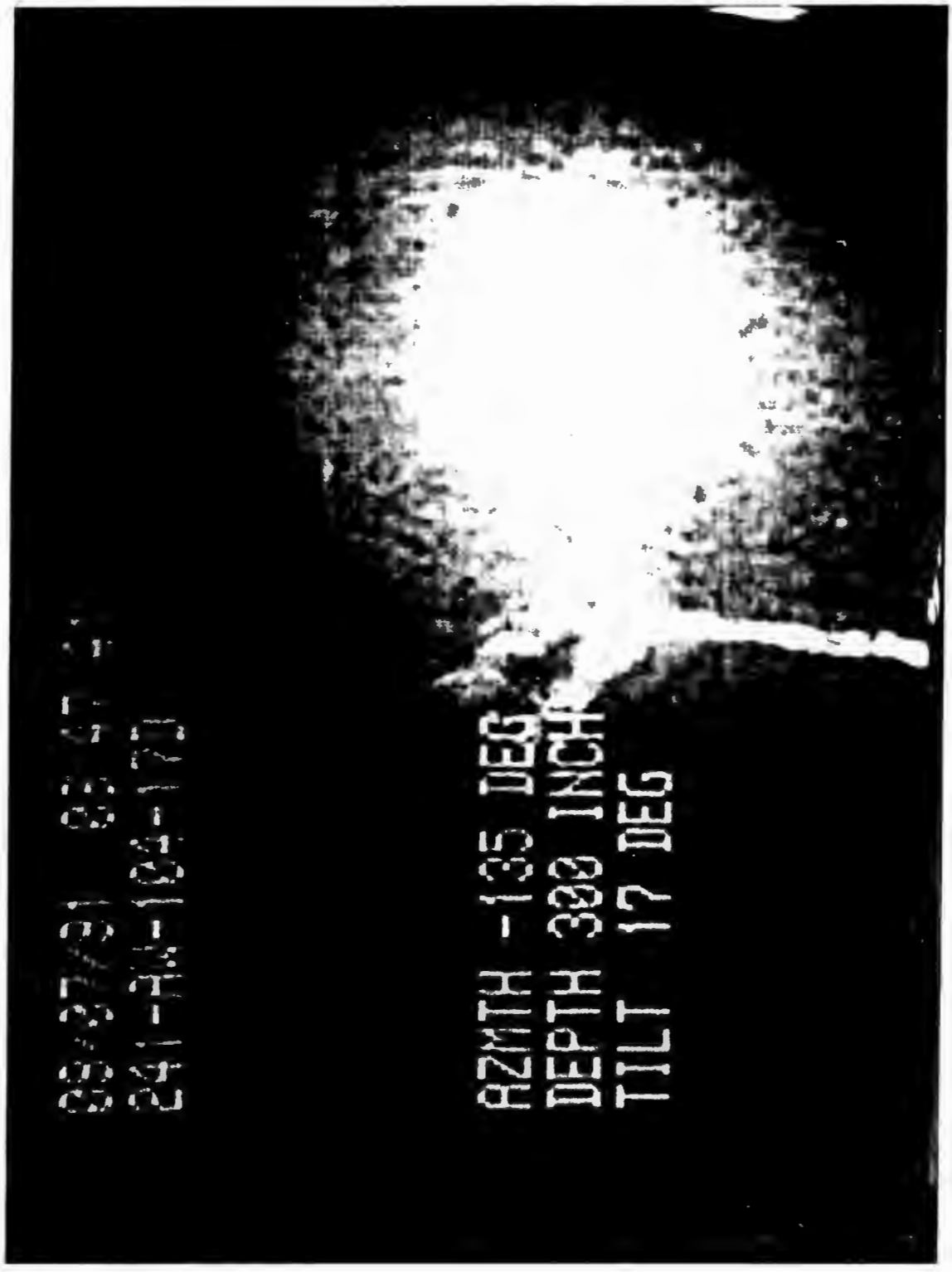
ATTACHMENT 1

Examination Photographs

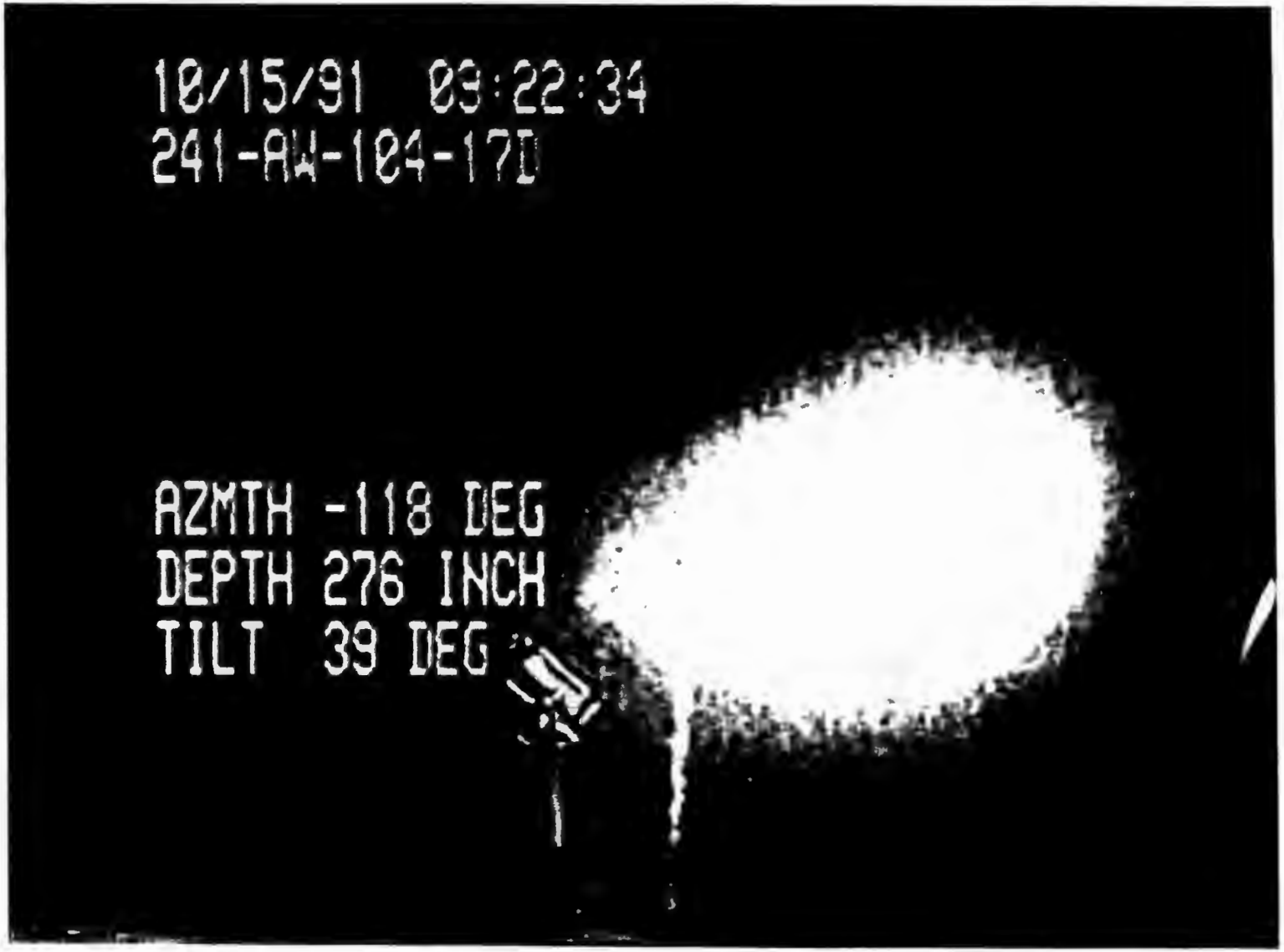
THIS PAGE INTENTIONALLY
LEFT BLANK

THIS PAGE INTENTIONALLY
LEFT BLANK

THIS PAGE INTENTIONALLY
LEFT BLANK



THIS PAGE INTENTIONALLY
LEFT BLANK

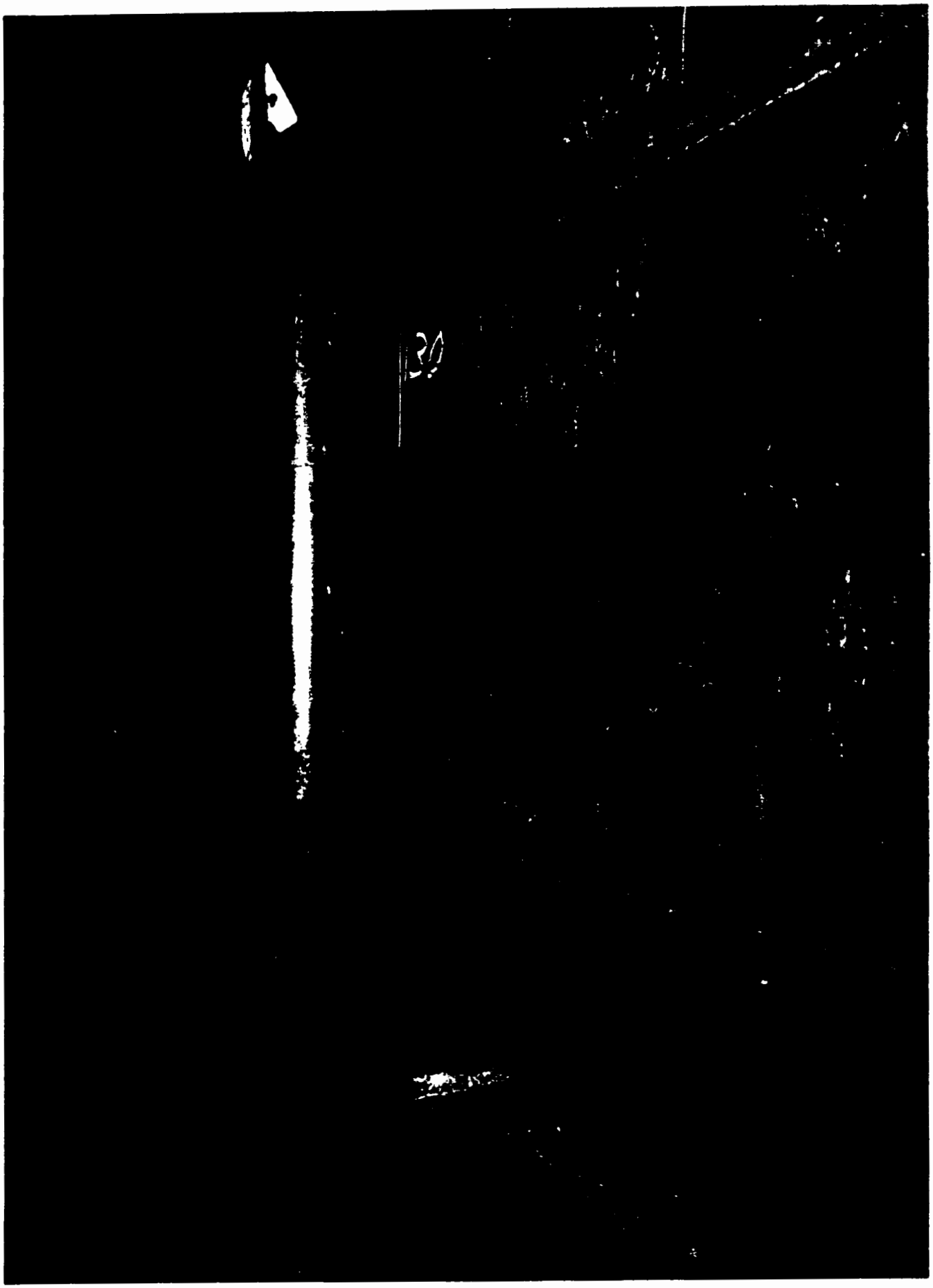

10/15/91 03:22:34
241-AW-104-17D
AZMTH -118 DEG
DEPTH 276 INCH
TILT 39 DEG

THIS PAGE INTENTIONALLY
LEFT BLANK

ATTACHMENT 2

Photograph, Annulus Tank 241-AW-101

THIS PAGE INTENTIONALLY
LEFT BLANK



THIS PAGE INTENTIONALLY
LEFT BLANK

ATTACHMENT 3

Video Inspection Record - Double-Shell Tank Annulus 241-AW Tanks

THIS PAGE INTENTIONALLY
LEFT BLANK

Video Examination Record - Double-Shell Tank Annulus

Date: 10/22/91

Tank Number: 241-AW-102-17G Examination Date: 07/31/91 Tape Number: 1 Time Range (Min.): 14:28 to 15:15

Depth Viewed: 285" Reviewer: E. J. Walter/ EJWalter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	28	91	-4	285"	-86	1st in annulus observation-weld seam nothing notable, light rust - mill scale
14	32	147	+0	285"	65	View of a pipe penetrating the secondary vessel wall and view of the primary and secondary wall convergence area.
14	35	200	+0	285"	65	Hillside penetration containing conduit is shown. Some discoloration in weld seam in the area above the riser in outer shell.
14	36	226	-3	284"	-62	A bracket appears to be attached to the outer shell. Cables or pipe with no noticeable support at this level. Bracket has collected some falling debris.
14	37	242	-3	284	-1	Horizontal weld seam in outer shell
14	39	275	-5	284	-88	Cables appear to be tied to support brackets at lower elevation.
14	40	300	-29	284	-18	A cable and pipe in addition to previous cables came into view.
14	41	315	-30	284	42	View of two pass-thrus, one small & one larger, PVC serves as grommet for cable.
14	42	334	-30	284	64	Appears to be a lump along side of weld seam between the cable penetration and the inner outer convergence.
15	08	675	-178	284	-83	Brackets attached to the outer shell are shown.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/22/91

Tank Number: 241-AW-102-17G Examination Date: 07/31/91 Tape Number: 1 Time Range (Min.): 14:28 to 15:15

Depth Viewed: 285" Reviewer: E. J. Walter/ EJ Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
15	09	686	-178	284	60	Two riser penetrations thru the outer shell have adjacent discoloration which is more than usual.
15	15	752	-249	284	64	Most of the past several minutes were not clear. Most of what was shown was the secondary shell surface. Chalk markings were noted.
						General - Intensity of lighting seemed to be changing frequently.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/22/91

Tank Number: 241-AW-102-17G Examination Date: 08/01/91 08/02/91 Tape Number: 2 Time Range (Min.): 13:32 to 13:48 10:30 11:20

Depth Viewed: 333"-568" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
13	32	001	-23	333"	1	Start
13	43	65	-20	358"	-7	Shows 4 conduit - vertical run.
13	43	72	-21	358"	+49	Shows 4 conduit - less clear.
13	44	90	-62	358"	-51	Shows cable? (believe a spot on the lens) inner wall looks relatively clean with mill scale light rust and chalk markings.
13	47	171	-199	358	+49	Bracket shown on outer wall weld seam.
13	48	179	-222	358	-59	Thick weld seam on outer wall appears to be a repair type weld.
13	48	189	-229	358	-31	Appears to be blister like corrosion above weld seam on parent material, but it doesn't seem to be adequate to spall off the mill scale. (New depth & clock)
10	30	223	0	373	-89	Start
10	31	242	0	373	-88	Conduit run on outer wall & free fall cable (I think)
10	36	328	-116	373	-63	Girth weld on the primary tank is shown with superficial rust.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/22/91

Tank Number: 241-AW-102-17G Examination Date: 08/01/91 08/02/91 Tape Number: 2 Time Range (Min.): 13:32 to 10:30 / 13:48 to 11:20

Depth Viewed: 333"-568" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	36	336	-139	373	63	An unused pass thru in secondary vessel - vertical secondary wall appears to have had condensation induced rust - but not significant. Wall brackets, possibly for scaffold or stair support remain on secondary vessel wall.
10	37	351	-161	373	-74	Thick outer weld & possibly a backing plate to account for fit-up problems.
10	38	370	-4	385	-85	Conduit and free hanging cable shown going to bottom of secondary vessel. Conduits fan out in different direction beneath primary vessel.
10	40	394	-1	418	-50	Depth has changed. Weld seam shown on primary vessel. Vertical chalk mark may have been made and left by NDE. Material condition looks good.
10	46	480	-31	421	-14	It appears that some corrosion occurred beneath the mill scale - does not appear significant.
10	53	571	-4	472	-80	The depth has just changed.
10	54	590	-5	472	-32	The free hanging cable & pipe is shown.
11	01	672	-180	472	-48	Weld seam appears to be of poor quality but is probably adequate.
11	04	699	-135	500	-89	Depth changed.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/22/91

Tank Number: 241-AW-102-17G Examination Date: 08/01/91 08/02/91 Tape Number: 2 Time Range (Min.): 13:32 to 13:48 10:30 11:20

Depth Viewed: 333"-568" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
11	07	731	-96	520	-83	Depth changed. - "zero Quad - 1"
11	08	747	-40	520	-43	At horizontal & vertical weld seam intersection there appears to be more than normal rust.
11	14	805	-4	568	-71	Depth changed - view of scaffold brackets & conduit on outer vessel.
11	20	865	-180	568	-6	Excessive crown on girth weld on outer shell.
						General - Using the tilt mechanism the camera was sweeping too rapid to observe and focus on detail.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/23/91

Tank Number: 241-AW-102-17G Examination Date: 08/01/91 Tape Number: 3 Time Range (Min.): 10:15 to 11:31

Depth Viewed: 309"-333" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	15	003	0	0	17	Start
10	40	33	-1	309"	-22	Appears to be a discontinuity - similar to a gouge but evidence is inconclusive. Believe this is a result of focus and camera angle viewing outer shell wall.
10	44	116	-24	309"	2	Viewing conduit along outer shell wall.
10	44	127	-78	309"	2	Viewing inner shell - surface looks ok.
10	45	146	-266	309	1	Worm like contours on base material - apparently caused by rust beneath mill scale, outer shell.
10	47	179	-186	309	-51	Inner shell surface appears to have less rust than outer shell.
10	50	237	-17	309	-58	For reasons unknown, the conduit support bracket and the conduit are not connected.
11	01	424	-142	309	-72	Horizontal weld seam on the inner tank - looks normal.
11	08	513	-241	309	63	Girth weld at the upper knuckle of the outer shell has an excessive crown. Material below weld appears to small crater features which developed during surface corrosion. Corrosion above the weld is markedly less.
11	09	533	-257	309	39	Corrosion is causing mill scale to loosen in large flakes.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/23/91

Tank Number: 241-AW-102-17G Examination Date: 08/01/91 Tape Number: 3 Time Range (Min.): 10:15 to 11:31

Depth Viewed: 309"-333" Reviewer: E. J. Walter/ EJ Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
11	13	578	-323	309	47	Camera appears pointed toward outer shell, however, the lighting is somehow blocked, thereby preventing a suitable view.
11	17	625	-319	332	10	Depth changed.
11	21	679	-228	333	62	Large riser penetration in the upper outer shell knuckle.
11	25	722	-195	333	-7	Girth weld in inner shell - corrosion looks typically normal.
11	28	748	-170	333	-7	Girth weld in inner shell - weld looks extremely wide.
11	29	756	-149	333	-7	Girth weld in inner shell - weld appears divergent as if repaired , not clear.
11	30	767	-136	333	-11	Girth weld - see above.
11	31	778	-91	333	-3	Girth weld - the width of the weld appears to be returning to the normal width.

Video Examination Record - Double-Shell Tank Annulus

Date: 08/12/91

Tank Number: 241-AW-102-17G Examination Date: 08/02/91 Tape Number: 4 Time Range (Min.): 13:03 to 13:21

Depth Viewed: 615"-660" Reviewer: E. B. Schwenk/ EB Schwenk (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
13	5	---	---	615	53	Bracket on secondary wall
13	5	---	---	615	-16	Close-up of brackets on secondary
13	6	---	---	615	58	Horizontal scrapes or gouges in secondary
13	6	---	---	613	-81	Fly in field of view
13	10	---	---	662	-49	Returned to "attached"? thin wall conduit at bottom radius (water mark?) however, no "water marks" on secondary wall.
13	12	---	---	661	61	Another bracket? on secondary wall near conduits.
13	14	---	---	660	27	Finally a view of knuckle
13	16	---	---	660	-15	Another view of paint or oxidized grinding in knuckle
13	18	---	---	660	-42	Color variations on insulating concrete; what does this mean?
13	21	---	---	660	-70	Rectangular strip (unknown item) on floor
						NOTE: TV monitor spends too much time on bottom of secondary (6'-12") Definition of Azimuth & tilt needed, suggest graphic leader to each tape. Put Kodak color bar in tank - say bottom?

Video Examination Record - Double-Shell Tank Annulus

Date: 11/26/91

Tank Number: 241-AW-102-17B Examination Date: 08/05/91 Tape Number: 5 Time Range (Min.): 10:07 to 11:21

Depth Viewed: 299"-588" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	07	030	-80	299	-89	Start
11	21	880	1	588	45	The outer shell mill scale is flaking off alot, more so than the inner shell. The welds & weld areas on the outer shell had accumulated surface corrosion, more in some areas than others. Welds were poorly done in some areas.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/24/91

Tank Number: 241-AW-102-17B
241-AW-104-17J

Examination Date: 08/05/91

Tape Number: 6
(Tape 2 of 2 for 17B)
(Tape 1 of 3 for 17J)

Time Range (Min.): 13:04 to 13:29
14:06 14:49

Depth Viewed: 614"-637"
299"-337"

Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
13	04	001	-178	614	-89	Start
13	06	035	-170	656	-27	Lower knuckle of secondary shell - surface crud & corrosion at lower girth weld suggests that most corrosion occurred after completion of weld. Some seems to be debris that was floated in place.
13	07	058	0	670	-19	The steel form for the concrete beneath the primary tank & concrete to lower knuckle of primary tank are shown. Tank looks good with some evidence of condensate stains. Horizontal section of secondary shell indicates sediment.
13	13	142	-2	670	-13	Steel band which serves as a band for the concrete has patches of significant oxidation, however, the remaining function & need for this band is uncertain.
13	28	334	-180	637	-34	Depth changed sometime back. View shows mill scale on outer shell along with superficial corrosion or rust.
13	29	345	-180	637	-88	Bottom of the secondary shell does not show indication of existing or recent water.
14	06	350	0	0	6	242-AW-104-17J

Video Examination Record - Double-Shell Tank Annulus

Date: 10/24/91

Tank Number: 241-AW-102-17B
241-AW-104-17J

Examination Date: 08/05/91

Tape Number: 6
(Tape 2 of 2 for 17B)
(Tape 1 of 3 for 17J)

Time Range (Min.): 13:04 to 13:29
14:06 14:49

Depth Viewed: 614"-637"
299"-337"

Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	28	365	0	299	63	Girth weld at lower end of upper outer shell knuckle shows lots of surface rust at and below the weld, but not much above the weld. Weld does not appear to be of high quality.
14	30	393	-265	299	64	Same weld as discussed above at different location has discoloration which could be associated with leakage. Weld has excessive crown and of questionable quality.
14	33	419	0	300	58	Same weld. Again the rust pattern suggests leakage at the seam or condensation causing surface rust.
14	35	446	-81	300	35	Primary shell & welds look normal.
14	40	493	-200	300	46	Vent pipe, apparently carbon steel, has superficial rust in isolated areas where it appears to have been scraped during fabrication.
14	40	499	-220	300	-28	The conduit appears to be galvanized or cadmium plated with negligible corrosion.
14	44	534	-162	337	-89	Depth changed. Particles appear to be falling past the camera. Cause & identification are unknown.
14	49	**588				End

*Film said "242," believe it should be "241"; **Counter backed to 704 on rewind.-?

Video Examination Record - Double-Shell Tank Annulus

Date: 10/24&25/91

Tank Number: 241-AW-104-17J Examination Date: 08/05&6/91 Tape Number: 7 Time Range (Min.): 14:53 to 13:58
(Tape 2 of 3 for 17J)
(Tape 3 of 3 for 17J)

Depth Viewed: 348"-540" Reviewer: E. J. Walter/ EJWalter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	53	999	-101	348	-71	Film says "242-AW-104-17J"
14	54	017	-112	348	62	White stains in a square geometric configuration are somewhat puzzling - perhaps some wrapping with condensation was involved.
--	--	056	---	---	---	Header not shown during Zoom-In. A bluish mark and a dark "crack like" feature with no supporting rationale were seen.
15	20	---	---	---	---	(close of inspection for the day?) (08/06/91 begins)
10	42	382	0	388	-60	Film header corrected to show "241-AW-104-17J"
13	06	399	-2	395	-72	Time & elev. change. 10/25/91
13	14	502	-140	396	43	Primary tank surface looks normal with a majority of the surface finish remaining the mill scale.
13	17	511	2	444	-89	Change of depth
13	33	656	2	497	-62	Change of depth - welds, surfaces, conduit & piping looked normal. There was one patch of discoloration on the conduit which may have been a rust break through.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/24&25/91

Tank Number: 241-AW-104-17J Examination Date: 08/05&6/91 Tape Number: 7 (Tape 2 of 3 for 17J) (Tape 3 of 3 for 17J) Time Range (Min.): 14:53 to 13:58

Depth Viewed: 348"-540" Reviewer: E. J. Walter/ EJWalter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
13	34	670	-41	497	-29	Long streaks of white several inches apart vertically on the surface of the primary shell. Apparently past condensation, possibly seasonal, but no noticeable moisture now. These streaks are independent of the rust or corrosion patterns.
13	43	765	-206	495	-90	Viewing the bottom of the annulus with conduit and vent piping in both vertical and horizontal plane there appears to be sediment from standing water, possibly a foot deep.
13	46	772	0	540	-9	Depth changed - Horizontal increments are ~20° between viewing sweeps.
13	50	805	-60	540	15	Primary shell has relatively thick paste-like substance stuck on - no significant evidence of related corrosion - some of this substance has fallen off. Could have occurred at same time as other chalk like markings.
13	58	885	-201	540	-64	End.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/25/91

Tank Number: 241-AW-104-17J Examination Date: 08/06/91 Tape Number: 8 3 of 3 Time Range (Min.): 14:00 to 14:49

Depth Viewed: 540"-669" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	00	004	-205	540	-90	Start
14	13	060	-2	588	-78	Depth change
14	23	255	-191	610	-90	Depth change - floor of outer shell has some debris and rust - but it doesn't appear significant.
14	26	265	0	637	-87	Depth change - two joining seams are viewed through the floor dust. No degradation observed.
14	32	364	-81	637	-81	Vent pipe - 4" dia., is embedded in the concrete beneath the primary vessel. Nippon Steel Mfgr.
14	35	417	-140	637	-57	The ventilation/cooling return appears to be a square passage in the concrete from beneath the primary vessel. The return spills into the annulus area.
14	37	443	-178	637	-75	Dark flakes on the outer shell floor could be mill scale which fell off the wall.
14	43	526	-74	671	-88	Depth change.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/25/91

Tank Number: 241-AW-104-17J Examination Date: 08/06/91 Tape Number: 8 3 of 3 Time Range (Min.): 14:00 to 14:49

Depth Viewed: 540"-669" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	49	605	-185	669	-5	An article which disappears between the concrete & inner vessel is sticking out a foot or so. Material for 3/4" thick by 3" wide is unknown. End

Page 1 of 1

Video Examination Record - Double-Shell Tank Annulus

Date: 10/25/91

Tank Number: 241-AW-104-17J Examination Date: 08/06/91 Tape Number: 9 1 of 2 Time Range (Min.): ____ to ____

Depth Viewed: 540"-669" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
9	11	32	0	300	-82	Start
9	48	239	-136	300	14	Discoloration or marking of unknown substance and source. If this were a leak it appears to have stopped. There doesn't appear to be much or enough, residual corrosion to penetrate the wall unless it approached from inside or there was a gross material defect.
9	52	311	-169	300	11	A pair of wires ending at left going out of picture to right-attached?
9	54	342	-22	300	10	Wire ending at right.
9	57	373	-4	347	-77	Depth change.
10	00	410	-40	348	-10	A rusty spot on the galvanized conduit may be an indication of a significantly corrosive environment inside the annulus at one time or perhaps periodically.
10	08	530	-260	348	-67	Primitive art displayed.
10	24	660	-240	396	59	The girth weld in the outer shell appears to be discontinuous or possibly corroded since performed

Video Examination Record - Double-Shell Tank Annulus

Date: 10/28/91

Tank Number: 241-AW-104-17D Examination Date: 08/07/91 Tape Number: 10 2 of 2 Time Range (Min.): 10:59 to 13:44

Depth Viewed: 492"-653" Reviewer: E. J. Walter/ EJ Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	59	000	-201	492	59	Start
10	59	07	-201	492	16	Apparently a vertical weld of the primary tank but the focus is not adequate to evaluate the weld condition.
11	02	82	-262	492	61	As observed before there are streaks on the outer shell which are thought to be caused by condensation. There are broad areas of superficial rust.
11	15	88	-1	543	-55	Depth change
11	25	290	-240	543	37	The scaffold bracket which is welded to the outer wall has essentially the same degree of rust as the outer wall.
11	26	295	-240	543	-67	A string like item (1 to 2" in length) attached at the outer shell girth weld was flapping indicating significant air movement direction thought to be generally from right to left as viewed.
13	00	300	0	588	-89	
13	02	346	-60?	588	-82	The sediment like substance on the conduit across the bottom of the annulus suggest that water several inches deep may have collected at one time. The area appears dry.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/28/91

Tank Number: 241-AW-104-17D Examination Date: 08/07/91 Tape Number: 10 2 of 2 Time Range (Min.): 10:59 to 13:44

Depth Viewed: 492"-653" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
13	04	368	-84	586	-66	The free hanging cable which terminates just above the annulus floor is swinging as a pendulum several inches to and fro. Apparently the air is causing this movement. Was told this is the leak detector, spark plug type.
13	18	487	1	634	39	Depth change
13	21	526	-41	634	-85	Camera is looking closely at the annulus floor, but detail is poor. Corrosion appears no greater than on walls.
13	22	539	-60	634	-38	Another better view of the leak detector.
13	31	647	-240	636	-17	Just above the lower knuckle girth weld of the outer vessel there appears to have been a run of some kind. If looks as if a spill ran down toward the annulus floor. It is not thought to be a leak, past or present, but the view is not clear.
13	41	731	-160	654	-12	A flake or fabric in the ventilation return passage was pulsating indicating a brisk air flow.
13	44	766	-55	653	17	While discoloration of unknown origin. Consequences do not seem significant.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/28/91

Tank Number: 241-AW-106-17B Examination Date: 08/08/91 Tape Number: 11 1 of 2 Time Range (Min.): 09:27 to 10:45

Depth Viewed: 300"-444" Reviewer: E. J. Walter/ EJ Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
9	27	-823	-2	300	-24	Past several feet show heavy discoloration of outer shell in some areas and rivulets of collected condensation are suspected.
9	28	-836	-20	300	61	One could suspect leakage through the upper outer shell girth weld because of the heavy discoloration of rust & rivulets from the weld downward.
9	37	000	-180	299	-5	A splotch of white material ran down the primary vessel a couple feet. There is no weld or evidence of corrosion in the area. Therefore a failure would be gross material or corrosion from inside. No evidence of continuing leakage or liquid.
9	41	068	-232	299	6	A wire or cable appears to be spot welded to the inner vessel wall, then extends a foot or so into the annulus.
9	42	080	-2	299	33	The girth weld on the outer vessel has a heavy rust discoloration,bleeding downward. Above the weld the rust is contrastingly light.
9	56	241	-60	348	-7	A rusty splotch on the conduit suggests a corrosive environment since it is Cd on Zn coated.
9	59	282	-140	348	-45	Two parallel horizontal marks, almost like indentations across the inner shell - unexplained.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/28/91

Tank Number: 241-AW-106-17B Examination Date: 08/08/91 Tape Number: 11 1 of 2 Time Range (Min.): 09:27 to 10:45

Depth Viewed: 300"-444" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	19	351	-1	397	+4	Rust & rivulets on outer vessel are reflecting light. Could possibly be accumulated moisture. Believe this really is water because of the darker shade of the rivulets.
10	28	450	-174	396	62	The past few feet of video suggest that there may be condensation on the inner vessel. Symptoms are dark rivulets and reflections from what could be drops of water, but it is uncertain.
10	30	478	-240	297	-57	Again it appears that an instrument cable, possibly a thermocouple, a couple feet in length, is attached, probably brazed or welded to the inner vessel.
10	37	521	-1	444	62	The past footage again supports the presence of condensation on the outer shell.
10	45	600	-160	444	-57	End - Some moisture on inner vessel is suspected.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/29/91

Tank Number: 241-AW-106-17B Examination Date: 08/08/91 Tape Number: 12 2 of 2 Time Range (Min.): 10:46 to 15:04

Depth Viewed: 444"-666" Reviewer: E. J. Walter/ EJWalter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	46	-807	-160	444	-44	Start
13	48	-949	-0	499	35	The rivulets look very wet but as shown later, a collection of liquid at the bottom is not readily apparent.
13	51	999	-81	495	51	Start
13	52	017	-113	495	-64	Girth weld on the inner tank. Weld looks as if it has been reworked.
13	53	030	-120	495	-3	A spot of rust with a particularly bright and active appearance.
14	02	146	0	540	-70	Depth change
14	10	265	-181	540	46	At the girth weld on the inner tank there is a darker strip below and above the weld suggesting moisture, but it is not certain.
14	23	328	0	588	-23	Depth change
14	45	486	-3	636	-26	Depth change
15	00	605	-39	666	4	Depth change
15	04	628	-156	666	-4	At upper elevations there were indications of moisture running down the vessel, however, at this lower elevation there doesn't seem to be any substantiation of moisture collecting. At this point it is possible that there is dampness between the inner tank and concrete pad interface.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/29/91

Tank Number: 241-AW-106-17G Examination Date: 08/12/91 Tape Number: 13 1 of 2 Time Range (Min.): 10:24 to 13:45 (break between)

Depth Viewed: 300"-444" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	24	25	---	---	---	Start
10	27	107	-9	300	63	A view of the girth weld in the outer vessel shows rivulet stains, seemingly originating at the weld. This could be interpreted as a leak, but with uncertainty.
10	34	255	-161	300	-22	A surface discontinuity mark on vessel is not clear enough to draw conclusions. No attendant discoloration.
10	39	332	-2	300	-66	Lighting has diminished.
10	44					Lighting returned.
10	48	472	-101	348	6	The rivulets of apparent past condensation have taken a bluish color on the inner shell.
10	49	485	-121	348	48	It appears that a weld repair was made in a girth weld in the inner shell.
13	44	770	-121	444	8	The rivulets previously referred to as condensation and recently described as having a bluish hue, now have a splattered pattern as if flung on the wall with a wet paint brush.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/31/91

Tank Number: 241-AW-106-17G Examination Date: 08/12/91 Tape Number: 14 & 14A 2 of 2 Time Range (Min.): 09:27 to 10:45

Depth Viewed: 444"-666" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	06	004	-141	444	58	Start
14	39	331	-1	540	61	Lower depth
14	42	389	-122	540	30	Rivulets are of lighter & darker colors. It isn't known whether or not this is an indication of moisture.
13	34	443	-1	636	-73	It appears that there may be moisture on the annulus floor. Dark patches are considered the symptoms.
13	37	481	-9	636	-50	It appears that the conductivity leak detection hanging, & inconstant circular movement is dragging on the annulus floor.
13	41	541	-101	636	-81	The concrete insulation pad appears to be moist or wet in places.
13	46	600	-179	636	-82	On the annulus floor toward the outer shell appear to have fallen many mill scale flakes. Not as many toward inner wall.
13	52	665	-4	636	-45	A measuring tape is clamped to the leak detector cable with an Aeroquip or hose clamp. It also appears to have been brazed to the detector at the lowest point.
13	55	701	-59	636	-7	The rivulets along the inner vessel shell are numerous and of different shades. Whether they carry water is not known.

Video Examination Record - Double-Shell Tank Annulus

Date: 10/31/91

Tank Number: 241-AW-106-17G Examination Date: 08/12/91 Tape Number: 14 & 14A 2 of 2 Time Range (Min.): 09:27 to 10:45

Depth Viewed: 444"-666" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	01	768	-24	666	-1	A fiber of some sort attached to the inner vessel is flapping indicating significant air movement.

Video Examination Record - Double-Shell Tank Annulus

Date: 11/05/91

Tank Number: 241-AW-106-17G Examination Date: 08/12/91 Tape Number: 17 3 of 3 Time Range (Min.): 14:48 to 15:02

Depth Viewed: 540"-588" Reviewer: E. J. Walter/ EJWalter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	48	008	-220	540	64	Start - outer shell moderately rusty surface.
14	54	066	-19	588	63	Past footage shows contrasting darkness along rivulets which may be moisture.
14	55	85	-43	588	-67	An accumulation of condensation appears to be on the annulus floor. It is noted that the rivulets seem to fade away as they approach the floor level. One may speculate that significant quantities of condensate wash them away or ?
15	02	228	-252	588	56	A very prominent rivulet is in view - cannot determine whether it is active. Past footage has shown others, similar.

Video Examination Record - Double-Shell Tank Annulus

Date: 11/05/91

Tank Number: 241-AW-105-17G Examination Date: 08/21/91 Tape Number: 18 1 of 2 Time Range (Min.): 10:49 to 14:50

Depth Viewed: 300"-540" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	49	028	-2	300	63	Start - outer shell appears in very good condition.
10	56	191	-100	300	-9	Appears that rivulets of (water) condensation are on inner shell.
11	00	261	-180	300	48	There appears to be a welded patch in the haunch of the outer shell.
13	52	319	-20	348	-9	In this tank at various points numerous particulates are moving thru the atmosphere.
13	56	368	-100	348	10	Rivulets of condensate appear to be running down the inner shell.
14	06	450	-20	396	23	Possibly moisture on outer shell, but it is uncertain. Different shades of rust are the indication.
14	10	506	-0	396	-104	There appear to be blisters of corrosion on the inner tank, small ones. The prominence of condensate is less, but there appears to be some. The inner shell retains a majority of the mill scale finish with a small percent of the surface having a heavy coat of rust.
14	21	628	-100	444	15	There appears, again, to be rivulets of moisture going down the tank, but not as prominent as higher.
14	24	660	-180	444	53	Believe the pipe is ASTM A53 ERW BB.04 Xsch 40 x 21 ft. - This pipe has a localized heavy scale of rust in a longitudinal direction. Cause is somewhat puzzling, and unknown.

Video Examination Record - Double-Shell Tank Annulus

Date: 11/05/91

Tank Number: 241-AW-105-17G Examination Date: 08/21/91 Tape Number: 18 1 of 2 Time Range (Min.): 10:49 to 14:50

Depth Viewed: 300"-540" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	37	726	-100	493	16	Appears to be evidence of condensate in this area and also to the left, quantifying, if so, is difficult.
14	42	780	-200	493	10	Around and especially below the unistrut (conduit support) which is welded to the outer shell, is heavy.
14	50		-100	540	-32	There appeared to rivulets of moisture on the tank in recent footage.

Video Examination Record - Double-Shell Tank Annulus

Date: 11/18/91

Tank Number: 241-AW-105-17G Examination Date: 08/21/91 (8/21) Tape Number: 19 Time Range (Min.): 14:58 to 15:03 (8/21)
08/22/91 (8/22) 2 of 2 14:39 to 15:00 (8/22)

Depth Viewed: 588"-666" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	58	010	-89	588	5	Start (August 21)
14	39	200	0	636	-90	August 22, 1991
14	44	286	-61	636	62	Particulates were noticed falling past the camera.
14	57	437	0	666	6	While there appeared to be some moisture along the tank walls, no accumulation of moisture is noticed on the floor. There is a layer of mill scale on the floor.
15	00	479	-172	666	2	A fragment attached to the inner shell is flapping back & forth indicating air movement.

Video Examination Record - Double-Shell Tank Annulus

Date: 11/19/91

Tank Number: 241-AW-105-17D Examination Date: 08/23/91 Tape Number: 20 1 of 2 Time Range (Min.): 09:44 to 10:54

Depth Viewed: 300"-588" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
9	44	000	-140	300	-26	Start
9	46	037	-201	300	61	A rust discoloration streak on the outer shell from the outer & inner shell juncture was noticed.
10	32	460	-118	493	62	~2' instrumentation lead is welded to the inner shell, nothing notable.
10	54	661	-220	588	-27	End.

Page 1 of 1

Video Examination Record - Double-Shell Tank Annulus

Date: 11/19/91

Tank Number: 241-AW-105-17D Examination Date: 08/23/91 Tape Number: 21 2 of 2 Time Range (Min.): 11:01 to 11:22

Depth Viewed: 636"-666" Reviewer: E. J. Walter/ EJ Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
11	01	001	0	636	-86	Start
11	02	035	-20	636	-69	Where the conduit along the outer shell fan out at floor level it appears that moisture from the conduit made a wash pattern through the mill scale collected on the floor. It looks wet.
11	04	089	-52	636	-40	A wet spot on the floor exists where the leak detector swings. It appears that a ~5' tape, from a yo-yo, is strapped to leak detection cable at the bottom end. The source of the moisture is uncertain. The leak detector constantly swings in a pendulum motion.
11	22	384	-22	666	-21	End.

Video Examination Record - Double-Shell Tank Annulus

Date: 11/19/91

Tank Number: 241-AW-103-17F Examination Date: 08/28/91 Tape Number: 22 1 of 2 Time Range (Min.): 10:58 to 14:32

Depth Viewed: 300"-444" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	58	000	0	0	0	Start
13	29	077	-89	300	-62	A white discoloration "run" on both the inner and outer shell, fairly narrow, and appears to originate at the outer shell to inner shell upper juncture.
13	35	209	-20	300	-59	Girth weld on outer shell shows surface corrosion. As in many other instances the rust is heavy at the weld and area below weld.
14	04	541	-280	348	52	The discoloration on the outer shell suggests presence of condensation but it is uncertain.
14	32	777	-140	444	27	The inner shell retains the majority of its mill scale.

Video Examination Record - Double-Shell Tank Annulus

Date: 11/25/91

Tank Number: 241-AW-103-17F Examination Date: 08/29/91 Tape Number: 23 2 of 2 Time Range (Min.): 09:55 to 10:43

Depth Viewed: 495"-666" Reviewer: E. J. Walter/ EJWalter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
9	55		0	495	90	Start
10	26	483	3	636	87	There is a shadow like area beneath the conduit where there is less mill scale and rust or other particulates on the floor. Generally, the rust on either the inner or outer shell does not appear significant.
10	43	693	-59	666	4	End

Page 1 of 1

Video Examination Record - Double-Shell Tank Annulus

Date: 11/25/91

Tank Number: 241-AW-101-17A Examination Date: 08/30/91 Tape Number: 24 1 of 2 Time Range (Min.): 13:37 to 14:57

Depth Viewed: 300"-494" Reviewer: E. J. Walter/ E.J. Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
13	37	031	0	300	90	Start
13	54	143	-23	300	-62	At a girth and vertical weld seam there is corrosion or rust which could be taken as a seam leak. This is not thought to be the case. Believe it is another case of moisture from an unknown source and the heat effected zone. Elsewhere the walls exhibit significantly less rust than observed on other tanks.
14	51	801	-260	494	40	End

Video Examination Record - Double-Shell Tank Annulus

Date: 11/25/91

Tank Number: 241-AW-103-17L Examination Date: 08/29-30/91 Tape Number: 25 1 of 2 Time Range (Min.): 14:09 to 10:10

Depth Viewed: 300"-540" Reviewer: E. J. Walter/ EJWalter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
14	09	049	-74	300	-62	Start. Camera acts like it is in a thunderstorm. Camera 0° reference appears to be more counter-clockwise than normal.
14	28	363	-100	348	57	Milky white runs originating in area of the upper outer shell & inner shell intersection show prominently along the surface of both shells. There are also runs or rivulet markings of two less prominent shades.
14	54	645	-260	448	2	End of day 08/29/91
9	47	655	0	494	-8	Start 08/30/91
10	10	873	-262	540	62	End

Video Examination Record - Double-Shell Tank Annulus

Date: 11/26/91

Tank Number: 241-AW-103-17L Examination Date: 08/29/91 Tape Number: 26 2 of 2 Time Range (Min.): 10:17 to ____

Depth Viewed: 588"-636" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	17	011	-26	588	67	Start
10	24	184	-120	588	-23	An insect, probably a fly, is flying in front of the camera.
10	34	312	-81	636	25	An instrument boss, just above the lower girth weld on the inner tank, appears to be an active pressure sensing tap into the inner tank. Could also be a thermo-well.
10	39	397	-240	636	89	Mill scale on the annulus floor is thicker toward the outer wall. The insect is still flying in front of the camera.
--	--	531	----	----	----	End

Video Examination Record - Double-Shell Tank Annulus

Date: 11/26/91

Tank Number: 241-AW-101-17G Examination Date: 09/03/91 Tape Number: 27 1 of 2 Time Range (Min.): 13:58 to 15:01

Depth Viewed: 300"-588" Reviewer: E. J. Walter/ E J Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
13	58	035	-1	300	70	Start
15	01	788	-214	588	13	The inner shell had markings, looked like an imprint of chicken wire on the surfaces, in two cases a different geometric imprint. Could have been the result of the heat treat.

Page 1 of 1

Video Examination Record - Double-Shell Tank Annulus

Date: 11/26/91

Tank Number: 241-AW-101-17A Examination Date: 09/03/91 Tape Number: 28 2 of 2 Time Range (Min.): 11:00 to 11:02

Depth Viewed: 494"-637" Reviewer: E. J. Walter/ EJWalter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
10	07	044	3	494	64	Normal view.
10	24	344	-100	540	-47	Heavy marking on inner shell, apparently from construction.
10	43	560	-235	588	-60	Heavy surface corrosion and flaking of remaining mill scale on outer shell.
11	00	690	-133	637	5	Insulating concrete to inner shell interface looks normal.
11	02	713	-19	637	11	End - Heavy dusting on annulus floor along concrete and at vent pipe.

Page 1 of 1

Video Examination Record - Double-Shell Tank Annulus

Date: 11/26/91

Tank Number: 241-AW-101-17G Examination Date: 09/03/91 Tape Number: 29 2 of 2 Time Range (Min.): 15:03 to 15:22

Depth Viewed: 636"-666" Reviewer: E. J. Walter/ EJ Walter (Print/Signature)

Tape Time		VCR	Complementary Information			Reviewer Comments
Hr	Min	Footage	Azim. (Deg.)	Depth (in.)	Tilt (Deg.)	
15	03	006	0	636	63	Start
15	06	050	-20	636	43	Watermarks on the annulus floor in the vicinity of the leak detector indicate the presence of water at some previous time. The floor appears dry.
15	22	338	-1	666	9	An insect is flying about End - nothing significant observed.

Date Received: 9/14/92

INFORMATION RELEASE REQUEST

Reference: WHC-CM-3-4

Complete for all Types of Release

Purpose

- [] Speech or Presentation
  - [] Full Paper
  - [] Summary
  - [] Abstract
  - [] Visual Aid
  (Check only one suffix)
- [] Speakers Bureau
- [] Poster Session
- [] Videotape
- [] Reference
- [X] Technical Report
- [] Thesis or Dissertation
- [] Manual
- [] Brochure/Flier
- [] Software/Database
- [] Controlled Document
- [] Other

ID Number (include revision, volume, etc.): WHC-SD-WM-RPT-034, Rev. 1

List attachments: N/A

Date Release Required: 09/18/92

Title: Visual Examination of Tank Annuli of the 241-AW Tank Farm

Unclassified Category: UC-

Impact Level: 4

New or novel (patentable) subject matter? [X] No [] Yes
If "Yes", has disclosure been submitted by WHC or other company?
[] No [] Yes Disclosure No(s).

Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions?
[X] No [] Yes (Identify)

Copyrights? [X] No [] Yes
If "Yes", has written permission been granted?
[] No [] Yes (Attach Permission)

Trademarks?
[] No [X] Yes (Identify) Kodak (pg.7)

Complete for Speech or Presentation

Title of Conference or Meeting: N/A

Group or Society Sponsoring:

Date(s) of Conference or Meeting:

City/State:

Will proceedings be published? [] Yes [] No
Will material be handed out? [] Yes [] No

Title of Journal:

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature Indicates Approval: Name (printed) / Signature / Date
Classification/Unclassified Controlled Nuclear Information	[]	[X]	
Patent - General Counsel	[X]	[*]	Per telecon with SW Berglin EMW no review required 08/19/92
Legal - General Counsel	[X]	[*]	Per telecon with SW Berglin EMW 08/19/92
Applied Technology/Export Controlled Information or International Program	[]	[X]	
WHC Program/Project	[]	[X]	
Communications	[]	[X]	
RL Program/Project	[]	[X]	Per telecon with JE Trevino EMW no review required 09/03/92
Publication Services	[X]	[X]	Per telecon with MK Oldfield EMW 08/19/92
Other Program/Project	[]	[X]	

Information conforms to all applicable requirements. The above information is certified to be correct.

	Yes	No
References Available to Intended Audience	[X]	EMW 9/17/92 [*]
Transmit to DOE-HQ/Office of Scientific and Technical Information	[]	[X]

Author/Requestor (Printed/Signature) Date: E. J. Walter Eugene J. Walter 9/11/92

Intended Audience: [] Internal [] Sponsor [X] External

Responsible Manager (Printed/Signature) Date: K. V. Scott K V Scott 9/11/92

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.

APPROVED FOR RELEASE OFFICIAL DOCUMENT NS 9/15/92

Date Cancelled | Date Disapproved

BD-7600-062 (08/91) WEF074

Part 1

9413116.0963

THIS PAGE INTENTIONALLY
LEFT BLANK