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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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RPP Corrosion Probe	EC Norman Resp.	N/A
8. Originator Remarks:		9. Equip./Component No.:
This Process Test Plan bounds the operation/testing of upgraded corrosion probe systems on tanks 241-AN-102 and 241-AN-107.		N/A
		10. System/Bldg./Facility:
		N/A
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15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	RPP-6400		0	Process Test Plan for	N/A	1	1	1
				Fourth Generation Hanford				
				Corrosion Monitoring Syst.				

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D OR N/A (See WHC-CM-3-5, Sec. 12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority RS Nicholson	Robert Nicholson	6/13/00		1	1	EA Fredenburg	E Fredenburg	6/2/00	R1-04
		Design Agent									
1	1	Resp. Cog. Eng. EC Norman	E C Norman	6/2/00							
1	1	Resp. Cog. Mgr. AH Friberg	AH Friberg	6/19/00							
		QA									
		Safety									
		Env.									

18. E C Norman — Signature of EDT Originator — 6/2/00 Date

19. E Fredenburg — E A. Fredenburg — Authorized Representative for Receiving Organization — 6/2/00 Date

20. AH Friberg — Design Authority/ Cognizant Manager — Resp — 6/19/00 Date

21. DOE APPROVAL (if required)
Ctrl No. _____
○ Approved
○ Approved w/comments
○ Disapproved w/comments

Process Test Plan for Fourth Generation Hanford Corrosion Monitoring System

E. C. Norman
CH2M HILL Hanford Group, Inc.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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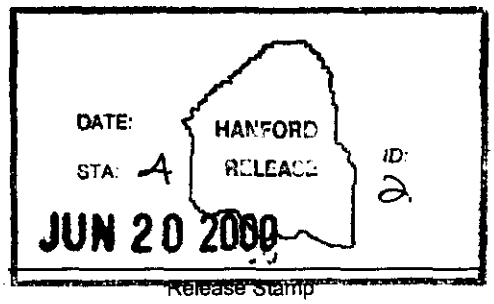
Key Words: *corrosion monitoring, corrosion probe, electrochemical noise*

Abstract: This Process Test Plan (PTP) bounds the operation/testing of upgraded corrosion monitoring systems on tanks 241-AN-102 and 241-AN-107.



Release Approval Date Release Stamp

Approved For Public Release

PROCESS TEST PLAN FOR FOURTH GENERATION HANFORD CORROSION MONITORING SYSTEM

G. L. Edgemon
Hiline Engineering & Fabrication, Inc.
2105 Aviator Drive
Richland, Washington 99352

PROCESS TEST PLAN FOR FOURTH GENERATION HANFORD CORROSION MONITORING SYSTEM

1.0 INTRODUCTION

Instrumentation and cabinets for the 241-AN-107 and 241-AN-102 corrosion monitoring systems will be upgraded in FY 2000. The bulk of the field work involved in this task will involve placement of the corrosion monitoring data collection hardware closer to the risers that house the existing corrosion probes. This will be accomplished by placing a new climate controlled cabinet by the risers containing corrosion probes on these two tanks (one cabinet per tank). Once installed the systems will feed data back to a centralized corrosion monitoring station in the 241-AN-271 instrument building. The upgraded systems will be operated under the bounds of this Process Test Plan (PTP) for six principle reasons. These reasons were established prior to installing the original systems in 1997 (241-AN-107) and 1998 (241-AN-102). They are as follows:

1. Acquire corrosion data on the waste in 241-AN-107 and 241-AN-102.
2. Provide supporting data to the site's Integrity Assessment program.
3. Demonstrate that corrosion monitoring by evaluation of electrochemical noise data is possible in waste tank systems, particularly with regard to the detection of general corrosion and (if present) pitting and stress corrosion cracking.
4. Demonstrate the durability of the design of the corrosion monitoring equipment.
5. Extend tank life and reduce annual operations cost.
6. Provide basis to control corrosion in double shell tanks through the use of direct corrosion monitoring rather than waste sampling and analysis.

The designs of the existing corrosion probes in 241-AN-107 and 241-AN-102 were reviewed and documented prior to the original installation activities in 1997 and 1998 [1-3]. Initial programmatic documentation for Hanford's corrosion monitoring program was also established prior to the original installation activities [4-7].

2.0 OPERATING CONDITIONS

Corrosion monitoring should be continuous during the operation of the probes. The data are evaluated and archived by engineering personnel using data analysis techniques developed for the evaluation of electrochemical noise (EN) data. Continuous monitoring allows for rapid detection of changes in waste chemistry that would promote stress corrosion cracking and pitting of waste tank steels should such changes take place.

The equipment for both the 241-AN-107 and 241-AN-102 systems will be controlled by computers located in the 241-AN-271 instrument building. The computers operate continuously, are connected to the Hanford Local Area Network (HLAN) and can be remotely monitored. Equipment will not be regularly checked by operations. In the event that the equipment on a system fails to operate properly, a member of the engineering organization responsible for the systems will be sent to reset the system or arrange for its

repair. It is not expected that the site's operations personnel will have any responsibility for the operation, maintenance, or surveillance of the system at this time except when requested by engineering.

Probe operation will be terminated and the ex-tank monitoring equipment removed in either of the following two cases:

1. Supernate level in the monitored tank permanently drops below the lowest of the corrosion monitoring electrode channels on the probe.
2. Corrosion monitoring probe or system failure.

The operation of the corrosion monitoring systems will be evaluated through the measurement of corrosion current and corrosion potential of the probe electrodes. Since this process test serves the purpose of evaluating equipment as well as acquiring actual tank corrosion information, the data obtained will be used in two distinctly different manners. The first use will be to compare the data from the field probes with the data obtained in the laboratory. Similar responses will demonstrate that the probe system is functioning as expected and returning reliable information. The second use of the data will be to provide information on the corrosivity of the waste contained in tanks 241-AN-107 and 241-AN-102. EN data returned from the probe will be evaluated by engineering to determine whether there are any unexpected corrosion processes underway in the tank. Expected corrosion processes for waste tanks are well documented [8-9]. Unexpected corrosion processes will be evaluated as necessary and recommendations for a response will be provided to the appropriate tank farm management personnel.

3.0 DESCRIPTION OF TEST

3.1 Required Changes to Authorization Basis

For this process test there are no impacts on the site's authorization basis for the waste tanks or any procedures or equipment described in the authorization basis. This conclusion is supported by Unreviewed Safety Question (USQ) Screenings TF-97-0537, TF-97-0570, TF-97-0617, TF-97-0627, TF-98-0669, TF-98-0690, TF-98- TF-98-0760, TF-99-0307, and TF-99-0308. Applicable active OSDs were also reviewed for impact associated with corrosion probe installation into the 241-AN farm. In particular, OSD-T-151-00007 H-19, "Unclassified Operating Specifications for the 241-AN, AP, AW, AY, AZ and SY Tank Farms" was reviewed for applicability. The corrosion monitoring systems have no impact on tank composition, waste chemistry, liquid level, hydrostatic head, vapor space pressure, solution temperature, concrete temperature, ventilation system, airlift circulator operation, or total fuel concentration. Therefore, there are no impacts to the existing active site OSDs.

3.2 Permissible Ranges

Corrosion monitoring is continuous during the operation of the systems. Since this is a passive monitoring of waste tank conditions, there are no anticipated tank conditions which would require shutdown of this equipment. Similarly, a failure of the corrosion monitoring equipment will have no impact on tank operations. This conclusion is supported by the USQ Screenings listed in section 3.1 of this PTP and by FGEAB review [3].

3.3 Duration

Monitoring will be terminated and the ex-tank equipment removed in either of the following two cases: 1) when the supernate level in a monitored tank permanently drops below the lowest of the corrosion monitoring electrode arrays on the probe installed in that tank; or 2) probe or system failure that cannot be repaired. It is intended that the duration of the operation be open-ended, with the probe operated until failure.

4.0 TEST REQUIREMENTS

4.1 Required Materials

All required equipment for this test will be provided by the engineering organization responsible for corrosion monitoring system operation.

4.2 Support Services

Physical support services required by this test and equipment are limited to the weather protection and climate control to be provided by the installation of the two new cabinets for the corrosion monitoring equipment and the centralized corrosion monitoring station in 241-AN-271. These systems demand phone service (for HLAN access) and a source of 110V power. No supplemental air, water, or compressed gas is required.

4.3 Data Acquired

The type of data acquired by the Hanford corrosion monitoring systems has been well documented [6-7]. The data acquired from these systems do not meet the definitions of "Quality-Assurance Data" as defined by RPP-PRO-222, Rev. 0 and will not be tracked under the Records Inventory and Disposition Schedule (RIDS). However, corrosion probe data will be stored on a standard desktop personal computer located in 200E/2750E/D-111 throughout the duration of this test and backed-up on a monthly basis on the HLAN.

4.4 Personnel Required

Approximately 8 – 16 hours per week per probe will be required to download and evaluate corrosion monitoring data. This time will be provided by the

engineering organization responsible for corrosion monitoring. In the event that the equipment on a system fails to operate properly, a member of the engineering organization responsible for the systems will be sent to reset the system or arrange for its repair. It is not expected that the site's operations personnel will have any responsibility for the operation, maintenance, or surveillance of the system at this time except when requested by engineering.

5.0 SAFETY

5.1 Objective Hazards

Objective hazards for this process test (tank pressurization, tank level, dome load, and flammable gas controls) have been addressed in Unreviewed Safety Question (USQ) Screenings TF-97-0537, TF-97-0570, TF-97-0617, TF-97-0627, TF-98-0669, TF-98-0690, TF-98- TF-98-0760, TF-99-0307, and TF-99-0308. Applicable active OSDs were also reviewed for impact associated with corrosion probe installation into the 241-AN farm. In particular, OSD-T-151-00007 H-19, "Unclassified Operating Specifications for the 241-AN, AP, AW, AY, AZ and SY Tank Farms" was reviewed for applicability. The corrosion monitoring systems have no impact on tank composition, waste chemistry, liquid level, hydrostatic head, vapor space pressure, solution temperature, concrete temperature, ventilation system, airlift circulator operation, or total fuel concentration. Therefore, there are no impacts to the existing active site OSDs.

6.0 REFERENCES

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[6] G.L. Edgemon and G.E.C. Bell, Technical Basis for Electrochemical Noise Based Corrosion Monitoring of Underground Nuclear Waste Storage Tanks, Westinghouse Hanford Company Report, WHC-SD-WM-TI-772, November, 1996.

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DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Equipment Engineering	Date June 2, 2000
Project Title/Work Order		EDT No. 629677
RPP-6400, Process Test Plan for Fourth Generation Hanford Corrosion Monitoring System		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
EA Fredenburg	R1-04	X			
EC Norman	R1-04	X			
RS Nicholson	S5-05	X			
JL Castleberry	R1-56	X			
GL Edgemon	R3-83	X			

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