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Project Title/Work Order WHC-SD-WM-TP-265, Test Plan for Enraf Series 854 Level Gauge Testing in Tank 241-S-106		Date August 23, 1994
		EDT No. 604965
		ECN No.

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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)
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18. G. A. Barnes Signature of EDT Originator	Date	19. <i>J. R. Biggs</i> Authorized Representative for Receiving Organization	Date	20. <i>T. L. Moore</i> Cognizant Manager	Date	21. DOE APPROVAL (if required) Ctrl. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-TP-265 REV. 0

Document Title: TEST PLAN FOR ENRAF SERIES 854 LEVEL GAUGE TESTING
IN TANK 241-S-106

Release Date: 8/24/94

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**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

APPROVED FOR PUBLIC RELEASE

* * * * *

WHC Information Release Administration Specialist:



N. L. Solis
(Signature)

8/24/94
(Date)

SUPPORTING DOCUMENT		1. Total Pages 5 ¹⁰ <i>2008/25</i>
2. Title Test Plan for Enraf Series 854 Level Gauge Testing in Tank 241-S-106	3. Number WHC-SD-WM-TP-265	4. Rev No. 0
5. Key Words Enraf, level gauge, LIT <div style="text-align: center;"> APPROVED FOR PUBLIC RELEASE <i>8/24/94 D. White</i> </div>	6. Author Name: G. A. Barnes Signature: <i>[Signature]</i> Organization/Charge Code 7EA30/N3064	
7. Abstract This document details a plan to test an Enraf level gauge in tank 241-S-106.		
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**WHC-SD-WM-TP-265
Revision 0**

**Test Plan for
Enraf Series 854
Level Gauge Testing
In Tank 241-S-106**

**G.A. Barnes
Mechanical Equipment**

August 23, 1994

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
2.0 OBJECTIVE	1
3.0 SCOPE	1
4.0 TEST PROCEDURE	1
5.0 SAFETY	2
6.0 ORGANIZATION AND FUNCTIONAL RESPONSIBILITIES	2
7.0 REFERENCES	2
APPENDIX A	3

1.0 INTRODUCTION

An Enraf¹ Series 854 level gauge was installed on tank 241-S-106 (S-106) during the first week of June 1994. On August 11, 1994, the gauge's measuring wire broke. An investigation has been started to determine how the wire broke. This test plan identifies a qualification test that is part of this investigation.

2.0 OBJECTIVE

This is a qualification test to verify the design adequacy of the Enraf 854's stainless steel measuring wire in tank S-106. This test will also provide evidence as to the location and extent of potential corrosion on the measuring wire due to tank environment. The results from this testing will provide data for better material selections.

Even though the unit will be tested in an operational system, this test is not a Process Test as defined in WHC-IP-0842, Sect. 8.10 and EP 4.2 because changes are not being made to process operating parameters. The Enraf gauge will be operated by previously approved procedures. Also, no design changes are being made to the Enraf gauge or facility.

3.0 SCOPE

This test will involve placing the existing Enraf Series 854 level gauge back into service with the same type of measuring wire (316 stainless steel) that originally broke on August 11, 1994. The gauge will be operated for 14 days. At the end of the 14-day test, the wire shall be sent to Pacific Northwest Laboratory (PNL) for analysis.

4.0 TEST PROCEDURE

This test plan shall be inserted into the appropriate Job Control System work package for test execution.

All work performed on the Enraf Series 854 level gauge during this testing shall be performed in accordance with Tank Farm Maintenance Procedure 6-TF-125.

- 4.1 Remove the wire drum and displacer from the Enraf Series 854 level gauge installed on tank S-106. Thoroughly clean approximately the first 20 feet of measuring wire and the displacer with alcohol.
- 4.2 Reinstall the wire drum and displacer.
- 4.3 Start the Enraf level gauge.

¹Enraf, Inc.

- 4.4 Tank Farm Operations shall monitor and record the tank liquid level per TF-OR-WST-01-D on a daily basis.
- 4.5 At the end of 14 days of operation, remove the wire drum from the level gauge and send it to PNL for analysis (PNL contact-S. G. Pitman).

5.0 SAFETY

There is no anticipated safety impact with this testing (see Appendix A for Unreviewed Safety Question Screening).

6.0 QUALITY ASSURANCE

Quality Assurance will not be required to witness any part of the testing.

7.0 ORGANIZATION AND FUNCTIONAL RESPONSIBILITIES

Tank Farm Operations is responsible for providing a Person In Charge (PIC). The PIC will also be the Test Director.

Tank Farm Maintenance is responsible for operating the level gauge during the testing.

PNL is responsible for analyzing the measuring wire and writing an analysis report. Formal PNL guidance on analysis scope, criteria and controls will be forthcoming in a Letter of Instruction (LOI)

8.0 REFERENCES

- Enraf Series 854 ATG Level Gauge, Instruction Manual, Part No. 4416.220, Version 2.1.
- H-2-817634, INSTM ENRAF NONIUS ASSY INSTALLATION & RISER SCHED, SHEETS 1 and 2.
- 6-TF-125, Enraf Nonius Model 854 Level Gauge Preventive Maintenance and Calibration.

WHC-SD-WM-TP-265
Rev. 0

APPENDIX A

USQ Tracking Number: TF-94-0299, Rev. 0

Page 2¹ of 4

WHC-SD-WM-TP-265
REV. 0
PAGE 4

Does the PROPOSED CHANGE:

- A. Represent a change to the facility as described in the AUTHORIZATION BASIS documentation?
- | | | |
|----|---|-----------|
| NO | X | YES/MAYBE |
|----|---|-----------|

BASIS: The authorization basis for tank farms is the *Hanford Site Tank Farm Facilities Interim Safety Basis*, WHC-SD-WM-ISB-001, Rev. 0-C. The U.S. Department of Energy has authorized the use of the material in Chapter 6 for Safety Screenings and Safety Evaluations. Chapter 6 of WHC-SD-WM-ISB-001 refers the reader to the *Single-Shell Tank Interim Operational Safety Requirements*, WHC-SD-WM-OSR-005, Rev. 0. The availability of a functioning level monitoring system is required by LCO 3.1.1. If the primary waste level monitoring system in a non-interim isolated tank is inoperable, then tank farm operations has 14 days from discovery of the failure to restore the system to operable status.

The new Enraf level displacement gauge in tank 241-S-106 has been found to be non-functional. The plummet and a portion of the 316 stainless steel wire is missing (see Figure 1). The cause of the failure has not been determined conclusively. However, it is thought that the polyvinyl chloride riser liner is degrading and forming hydrochloric acid that runs down the 316 stainless steel wire and this caused the failure. The question at hand is does the loss of the plummet and the potential for another loss in the future cause hazards that are not addressed in the existing safety basis.

Two hazards can be postulated from this incident. The first deals with whether the plummet can come into contact with the tank liner and cause corrosion due to the dissimilar metals (the liner is carbon steel and the plummet has some stainless steel). Figure 1 shows that the majority of the plummet is made of polyethylene. There is only a very small portion of stainless steel exposed. The hazard from this piece of equipment would be no greater than the other equipment known to be in the tank waste. In earlier times, it was a common practice to dispose of non-functioning equipment (like Food Instrument Corporation wires and plummets, thermocouple trees, etc.) in the tank. This is no longer an accepted practice. The second hazard deals with miscellaneous debris interfering with future retrieval equipment. Since the debris is known to exist in the tanks, the safety documentation dealing with retrieval will need to cover aspects such as missiles (mixer pumps picking up small objects and propelling them around the tank) and pump failures (equipment enters the pump intakes and causes pump failure).

Therefore, the failure of this equipment does not affect the tank in its current life cycle stage.

B. Represent a change to procedures as described in the AUTHORIZATION BASIS?

NO	X	YES/MAYBE
----	---	-----------

BASIS: The tank farm authorization basis does not specifically mention procedures. However, the intent of this question is to determine if procedural changes will be made that do affect the safety envelope.

Two changes to procedures may happen due to this incident. The first is that the Enraf may be examined periodically for corrosion. This may lead to increased worker exposure to radiation. However, worker protection is covered by the *Tank Farm Health and Safety Plan*, WHC-SD-WM-HSP-002, Rev. 0-C. Another procedural change could be the use of a different riser liner material.

Neither of these changes would affect the safety envelope of the facility.

C. Represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

NO	X	YES/MAYBE
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BASIS: The tank farm authorization basis does not specifically mention tests or procedures. However the intent of this question is to determine if a test or experiment would affect the safety envelope.

This activity is not considered a test or experiment. The ability to measure the waste level in the tank is a necessary monitoring requirement. Therefore, the safety envelope is not affected.

WAC-SD-WM-TP-265 Rev.
Page 6

D. Does the change impact:

- Implemented OSRs or IOSRs? NA NO X YES/MAYBE
- Approved IOSR Compliance Implementation Plans? NA X NO YES/MAYBE

BASIS: There already exists a requirement to measure the waste level in single-shell tanks. No new OSRs or IOSRs are required. Additionally, there is not an approved IOSR Compliance Implementation Plan for single-shell tanks at this time.

USQE #1

R. J. Van Vleet, Ph.D.

USQE #2

R. L. Guthrie

Print Name

R. J. Van Vleet 8/25/1994

Signature

Date

Print Name

R. L. Guthrie 8/27/94

Signature

Date

USQ Tracking Number: TF-94-0299, Rev. 0

Page 4 of 4

WHC-SD-WM-TP-265
Rev. 0 Page 7

WHC-SD-WM-ETP-016
Revision 0
Page 5

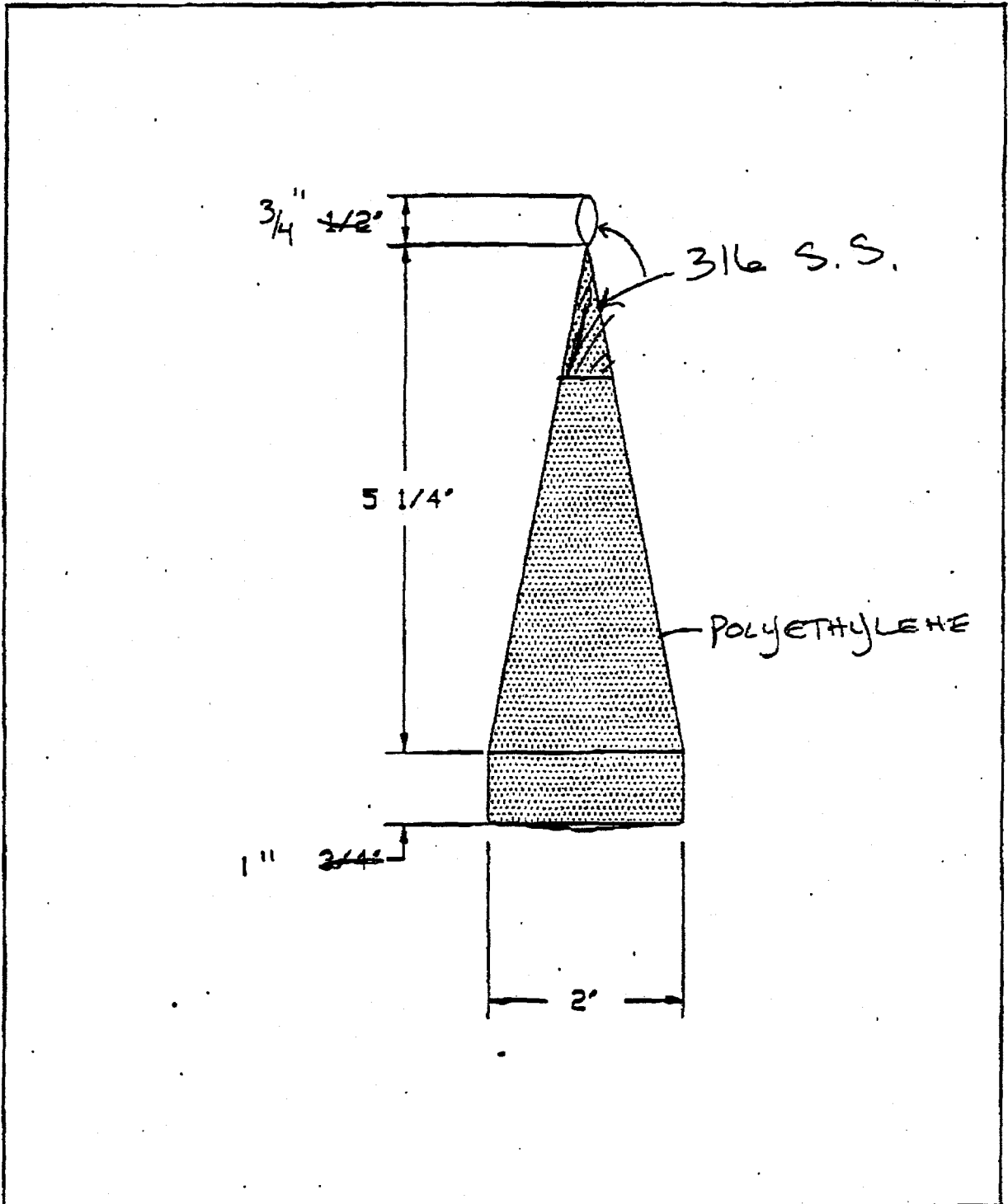


Figure 1 - LEVEL SENSOR PROBE