Distribution List

MD Aichele	T4-04
AL Bonner	H4-70
GF Boothe	G6-46
SR Briggs	G6-47
HM Bucci	B1-33
FG Cain	H4-70
DS Dutt	L5-62
DR Ellingson	H5-37
TL Erickson	H5-71
JP Estrellado	H4-70
JE Filip	G6-47
RJ Giroir	T4-05
WO Greenhalgh	L5-71
WH Hamilton	N3-10
PL Hapke	T4-05
DJ Hart	R3-54
L Jensen	T6-07
JR Keene	S2-42
DL Kelly	G2-02
RJ Koll	T3-03
RL Louie	G3-15
RS McBeath	H5-71
DE McKenney	N3-13
PV Meeuwsen	L6-13
WW Olson	H4-70
DB Powell	T4-03
DL Vance	T4-09
OSTI (2)	L8-07
SWDPC	T3-01
Central File (2)	L8-04

2. To: (Receiving Organization) Distribution		3. From: (Originating Organization) Restoration Projects		4. Related EDT No.: N/A	
5. Proj./Prog./Dept./Div.: Solid Waste Disposal		6. Cog. Engr.: R. S. McBeath		7. Purchase Order No.: N/A	
8. Originator Remarks: Approval by February 6, 1995.				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: 305 Building	
11. Receiver Remarks:				12. Major Assm. Dwg. No.: N/A	
				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: February 6, 1995	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-TRP-231		0	Drum Drop Test Report	S,Q	1		

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	4. Review	1. Approved	4. Reviewed no/comment
		2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment
		3. Information	6. Dist. (Receipt Acknow. Required)	3. Disapproved w/comment	6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)									
(G)	(H)	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN
Reason	Disp.								
1	1	Cog. Eng. RS McBeath	<i>RS McBeath</i>	2/1/95	H5-71	OSTI (2)		2/8/95	
1	1	Cog. Mgr. TL Erickson	<i>TL Erickson</i>	2/1/95	H5-71				
1	1	QA DL Vance	<i>DL Vance</i>	2/21/95	T4-06				
1	1	Safety DJ Hart	<i>DJ Hart</i>	2-21-95	S2-42				
		Env.							
1	1	DB Powell	<i>DB Powell</i>	2/23/95	T4-03				
1	1	MD Aichele	<i>MD Aichele</i>	2/23/95	T4-04				

18. Signature of EDT Originator <i>RS McBeath</i> Date 2/3/95		19. Authorized Representative for Receiving Organization T. L. Erickson Date 2/14/95		20. Cognizant Manager T. L. Erickson Date 2/14/95		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-TRP-231, Rev. 0

Document Title: Drum Drop Test Report

Release Date: 2/27/95

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

V. L. Birkland
V.L. Birkland

2/27/95

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DRUM DROP TEST REPORT

1.0 Background

Current safety documentation for the Central Waste Complex limits drum stacking of drums to 3 high. Significant additional storage space for future waste can be obtained if drums can be stacked higher while maintaining adequate safety margins. This method of expanded storage space will reduce costly construction. Two types of Department of Transportation (DOT) certifications exist; Type A which includes a 4' drop test, and Type B which requires a 30' drop. Documentation for drums falling greater than 4 feet is minimal. Sandia National Laboratory has conducted drum drop tests but does not duplicate the Hanford storage configurations (Huerta, et al, 1983). Additional tests were conducted in accordance with this plan to determine actual drum damage resulting from a drop accident.

2.0 Test Method

Tests were conducted in two geometries; single drum and a pallet of four drums to duplicate actual storage conditions. Westinghouse Hanford Company possesses the expertise and facilities to conduct this testing. The performing organization, Equipment Testing Laboratory, is the Department of Energy Center of Excellence for this scope of work.

Each of the drums tested were inspected for damage and/or flaws prior to loading. All drums were new and undamaged. There was no corrosion or other visible deterioration of the drums. Testing was conducted at ambient temperature. The simulated payload was placed directly into each drum without a bag or liner. No vent clips or filters were installed. The locking ring bolts were torqued to 40 ft-lbs in accordance with the procedures used at the Central Waste Complex.

The drums tested are designed and used for solid material handling and storage. No attempt is made to predict the behavior of liquids or gases.

Testing was conducted in accordance with the formal test plan (McBeath & Meeuwsen, 1994).

2.1 Description of Single Drum Test Procedure

The actual drop test procedure is the same as performed for DOT Type 7A tests. The following table lists the test parameters for the single drum tests.

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Table 1
Drop Test Parameters
Single Drum Tests

Test Parameters	DOT Type 7A Conditions	WHC Solid Waste Conditions
Drop Height	4'	11'
# Test Repetitions	3	3
Ballast (Simulated Payload)	Sand and Lead Bricks	Sand and Lead Bricks
Drop Configuration	Tilted 45° dropped onto locking ring bolt.	Tilted 45° dropped onto locking ring bolt.
Void Space	Dependent on Weight	Noted on Data Sheets

DOT 17-C and 17-H (See Table 2 for drum dimensions) drums were tested. Approximately 80% of the existing drummed waste is stored in 17-C drums, the remaining 20% in 17-H containers. The containers are interspersed and not visually distinguishable.

The Department of Transportation adopted United Nations labelling and package identification in 1992. Existing stocks of DOT 17-C and 17-H drums could be sold until November, 1994. Type C & H drums were specifically ordered for this testing because of the existing waste inventory. Some of the drums tested were dually certified and labelled DOT and UN.

Drums heavier than 1000 lbs are administratively limited to the bottom tier (Willis, 1993). Less than 1% of the waste drum inventory exceeds 1000 lbs. The 1000 lb. drums were selected because it is the maximum weight that can be stacked above the base tier.

A drop height of 132" (11') was selected. A drum and pallet is nominally 40" tall. A fourth tier would have 3 drum/pallet combinations (120") supporting it. A drop height of 11' will provide data to the Burial Grounds, Central Waste Complex and other Solid Waste facilities.

2.2 Single Drum Test Equipment/Facilities

The drop pad is secured to the floor of the 305 Building. Loads are distributed through a steel plate to the floor foundation. The pad is unyielding and meets the requirements of 49CFR173.465. Department of Transportation (DOT) tests are conducted at this facility for national certification. The drop pad is approximately 4' x 7'. A 3' high fence surrounds the pad perimeter to constrain smaller packages or missiles generated during the drop testing process. Personnel and equipment are protected from flying objects.

The test drums were new but each one was inspected for damage before being loaded with ballast. Each drum was placed on a platform scale for loading of sand and/or lead bricks. Ballast material was reused from the previous test specimen if the preceding weight was the same. Makeup material was utilized where required due to spills or drum variations. Gross drum weight was entered on the data sheets and verified by test personnel. The drum lid and locking ring were placed on top of the drum. The locking ring was tapped with a hammer while the bolt was tightened. The final torque value (40 ft-lbs.) was attained by using a calibrated torque wrench.

The drum was tipped on it's side after loading by lifting it with a fabric sling, formed into a choker, and set onto a piece of wood cribbing. The choker was moved to the bottom of the drum so that the locking ring bolt was the lowest position and the drum tilted approximately 45° to horizontal. A

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length of string, and small weight, was taped to the lowest position on the drum. This device gave an accurate measurement of the drop height without subjecting test personnel to hazardous conditions.

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TABLE 2

Drum Dimensions

<u>Drum Designation</u>	<u>Capacity</u>	<u>Height Nominal</u>	<u>Diameter Nominal</u>	<u>Wall Thickness (Gauge)</u>	<u>Thickness (Inches)</u>
17C	55 gal	34"	24"	16	.059
17H	55 gal	34"	24"	18	.039

Lid Dimensions

<u>Designation</u>	<u>Diameter</u>	<u>Thickness Gauge/Inches</u>
17C	24"	16 / .0598
17H	24"	16 / .0598

The test drums were lifted with the permanently mounted facility crane. The crane controls are operated by pendant so that the operator is in close proximity, and communication, to test personnel. The specifically designed release mechanism was attached to the 5 ton crane hook by a rigging shackle. Extra precautions were taken to assure that the drum sling would clear the mechanism and not snag on the release when it was opened. The cord to actuate the release mechanism was separated from the rigging and terminated adjacent to the release station.

The test drum was maneuvered into position over the drop pad and slowly lowered to the proper elevation, ie. until the weight at the end of the string just touched the surface. The drum was fine positioned by moving the crane bridge and/or trolley.

The drum was dropped by pulling the release mechanism cord. The drum dropped with the nylon choker attached, which simplified recovery. Each drum was videotaped during and after the drop. Still photographs were taken while the drum was situated on the pad just as it had dropped. Additional photographs and video were taken after the drums were recovered. Drum retrieval was accomplished by raising the drum bottom and setting it on a piece of wood cribbing. The choker was then moved to the top of the drum so that it could be lifted upright. Any spilled ballast was recovered and placed back into the drum and lifted to floor level. The drop pad was swept clean so that any spill from subsequent tests would be visible. The ballast material was transferred to another new drum for test continuation. The lead bricks used as ballast were part of the existing 305 Building inventory and handled in accordance with the facility procedures.

Note: One of the drums was photographed utilizing high speed equipment by BCSR Photography. See Photo 8.

2.3 Description of Palletized Drum Drop Tests

The Central Waste Complex stores drums in a 4 drum array banded to a pallet. The pallet configuration increases material handling efficiency and reduces the probability of a single drum handling accident. The pallets are heavier and more stable than a single drum.

A special drop mechanism was fabricated to drop pallets of four drums. The mechanism allowed the dropping of one edge of the pallet to duplicate a situation where the pallet was either pushed off the top of a stack or where the edge was tilted causing motion. A preliminary drop test was conducted to check out the drop mechanism and to verify how the drums landed. The drums on the pallet rotated 90° and landed on the side during the preliminary test. The formal test plan specified that drums of average weight (175#) be situated so that 500# drums (97 percentile of stored waste drums weigh 500# or less) fall onto the lighter drums. This configuration represents realistic storage

conditions. The 175# drums were aligned on the pallet so that they would hit on the locking ring bolt.

2.4 Palletized Drum Test Equipment/Facilities

The palletized drums were dropped onto the same pad as the single drums. Clearances to the metal fence were reduced as the loaded pallets are larger than a single drum. Additional care was exercised to position the pallets precisely over the pad to assure that the metal fence was not damaged.

The test drums were new but each one was inspected for damage before being loaded with ballast. Each drum was placed on a platform scale for loading of sand and/or lead bricks. Ballast material was reused from the previous test specimen if the preceding weight was the same. Makeup material was utilized where required due to spills or drum variations. Gross drum weight was entered on the data sheets and verified by test personnel. The loaded drums were removed from the scale and placed on the pallet. The drum lid and locking ring were attached to the drum. The locking ring was tapped with a hammer while the bolt was tightened. The final torque value (40 ft-lbs.) was attained by using a calibrated torque wrench. The pallet is loaded so that the equal weight drums are side-by-side. The locking ring bolts of the 175# drums are turned to the outside so that the bolt will strike the surface first.

Metal banding is used to secure the drums to the pallet. The procedure used during testing was the same as utilized in the Central Waste Complex. The banding is routed over the lids of two drums and to the pallet. A second parallel band is attached to the adjacent two drums. A third metal band is placed around the four drums just below the top. (See Photo 6.) A length of string, and small weight, was taped to the lowest position on the pallet. This device gave an accurate measurement of the drop height without subjecting test personnel to hazardous conditions.

The loaded pallet is set on a special pallet that is part of the drop mechanism. The special pallet is secured to a metal frame that protrudes beyond each of the four corners. Nylon slings are attached to each of these corners with a lifting shackle. The two slings that are nearest the 500# drums are attached to the crane hook with several shackles. The shackles are used as spacers to level the pallet when it is suspended. This side of the pallet remained fixed. The remaining two slings are attached to the release mechanism which is suspended from the crane hook. When the release occurs the pallet pivots and falls, with the 175 lb. drums closest to impact, rather than dropping straight down.

The pallet was dropped by pulling the release mechanism cord. Each test was videotaped during and after the drop. Still photographs were taken while the pallet and drums were situated on the pad just as it had dropped. Additional photographs and video were taken after the drums were recovered. Drum retrieval was accomplished by removing the bands and raising each drum with a fabric sling. Only one drum in this series spilled a small amount of ballast. The ballast material was transferred to another new drum for test continuation. The lead bricks used as ballast were part of the existing 305 Building inventory and handled in accordance with the facility procedures.

3.0 Test Results

Test results are given on the following test results matrix.

4.0 Test Anomalies and Unexpected Conditions

Preliminary tests were conducted to determine if the procedures were workable. In no case did a breach occur in either a single drum or in a pallet drop. Breached drums during testing were not expected.

The preliminary pallet drop rotated 90° and landed on it's side. This was not the case with every test. Drum pallets also rotated 180°, landing on the lid, and 135°, landing on the edge. These geometries were not predicted from the preliminary test.

The banding on one pallet slipped, scattering the drums at impact. The drums remained within the enclosure. In this case the drums slid out of the banding during the fall. The banding remained intact. It did not separate nor was it cut or sheared.

5.0 Conclusions

- o 1000 lb. drums dropped 11' are likely to spill some of their contents. 13.7% of the gross weight of the single drum drops was spilled when dropped.
- o Four drums banded to a pallet that drop 11' are likely not to open or spill their contents. 0.06% of the gross weight of the palletized drum drops was spilled. Spilled material occurred in only 1 test of 6, or 1 drum in 24 that were dropped in this configuration.
- o The total amount (for all tests) of material spilled/amount of material dropped is 5.8%.
- o Spilled contents remained near the point of drop. The maximum distance the material spread was 4' from the drum.
- o The bottom drums in a multiple (pallet) drum drop cushion the upper drums.

DRUM DROP TEST RESULTS - SUMMARY

<u>Drum Ident</u>	<u>Configuration</u>	<u>Drum Type</u>	<u>Weight</u>	<u>Drop Height</u>	<u>Void Volume</u>	<u>Damage Summary</u>	<u>Amount Material Lost</u>	<u>Dispersion Distance</u>	<u>Remarks</u>
I-001	Single	17-C	1000 lbs.	132" (11')	5%	Lid separated 16"	250 lbs. (estimate)	4'	Lid Stayed Attached
I-002	Single	17-C	1000 lbs.	132" (11')	10%	Lid separated 1"	30 lbs.	6"	Lid Stayed Attached
I-003	Single	17-C	1000 lbs.	132" (11')	10%	Lid separated 1.5"	30 lbs.	1'	Lid Stayed Attached
II-001	Single	17-H	1000 lbs.	132" (11')	10%	Lid opened 90 degrees	1/2 (500# estimate)	3'	Lid Stayed Attached
II-002	Single	17-H	1000 lbs.	132" (11')	10%	6.5" deformation	<5 lbs.	1'	Lid Stayed Attached
II-003	Single	17-H	1000 lbs.	132" (11')	10%	1.5" cut in drum from bolt	<5 lbs.	1'	Lid Stayed Attached
III-001	4/Pallet	17-C	175 lbs.	132" (11')	70%	<3" deformation	<5 lbs.	3"	Landed on Edge
III-002	4/Pallet	17-C	175 lbs.	132" (11')	70%	<3" deformation	0	N/A	Landed on Edge
III-003	4/Pallet	17-C	500 lbs.	132" (11')	30%	<3" deformation	0	N/A	None
III-004	4/Pallet	17-C	500 lbs.	132" (11')	30%	<3" deformation	0	N/A	None
III-005	4/Pallet	17-C	175 lbs.	132" (11')	85%	1.5" dent	0	N/A	Banding Slipped
III-006	4/Pallet	17-C	175 lbs.	132" (11')	85%	1.5" dent	0	N/A	Banding Slipped
III-007	4/Pallet	17-C	500 lbs.	132" (11')	35%	1.5" dent	0	N/A	Banding Slipped
III-008	4/Pallet	17-C	500 lbs.	132" (11')	35%	1.5" dent	0	N/A	Banding Slipped
III-009	4/Pallet	17-C	175 lbs.	132" (11')	80%	0.5-1" dent	0	N/A	Landed on Lids
III-010	4/Pallet	17-C	175 lbs.	132" (11')	80%	0.5-1" dent	0	N/A	Landed on Lids
III-011	4/Pallet	17-C	500 lbs.	132" (11')	40%	0.5-1" dent	0	N/A	Landed on Lids
III-012	4/Pallet	17-C	500 lbs.	132" (11')	60%	0.5-1" dent	0	N/A	Landed on Lids
IV-001	4/Pallet	17-H	175 lbs.	132" (11')	60%	13.5" dent	0	N/A	Landed on Side
IV-002	4/Pallet	17-H	175 lbs.	132" (11')	60%	13.5" dent	0	N/A	Landed on Side
IV-003	4/Pallet	17-H	500 lbs.	132" (11')	30%	Slight dent at top	0	N/A	Landed on Side
IV-004	4/Pallet	17-H	500 lbs.	132" (11')	30%	Slight dent at top	0	N/A	Landed on Side
IV-005	4/Pallet	17-H	175 lbs.	132" (11')	70%	12" dent	0	N/A	Landed on Side
IV-006	4/Pallet	17-H	175 lbs.	132" (11')	70%	12" dent	0	N/A	Landed on Side
IV-007	4/Pallet	17-H	500 lbs.	132" (11')	60%	Small dent in side	0	N/A	Landed on Side
IV-008	4/Pallet	17-H	500 lbs.	132" (11')	50%	Small dent in side	0	N/A	Landed on Side
IV-009	4/Pallet	17-H	175 lbs.	132" (11')	70%	2.5" dent	0	N/A	Landed on Lids
IV-010	4/Pallet	17-H	175 lbs.	132" (11')	75%	2.5" dent	0	N/A	Landed on Lids
IV-011	4/Pallet	17-H	500 lbs.	132" (11')	30%	2.5" dent	0	N/A	Landed on Lids
IV-012	4/Pallet	17-H	500 lbs.	132" (11')	50%	2.5" dent	0	N/A	Landed on Lids

- o Highly visible damage to a drum is not necessarily an indicator of drum integrity. Large areas of damage to the drum sides may not breach the container while a small amount of damage to the lid and upper sealing surface may cause separation and loss of container integrity.
- o Larger material size would not have been ejected from the drum. The ballast was selected because of its density and ease of handling, not because it is representative of actual solid waste materials.
- o The landing configuration of palletized drums is unpredictable.
- o Container breach occurred at the drum/lid sealing surface (see photo 7) in all the cases tested.
- o The lid remained attached to the drums in all cases tested.

6.0 Recommendations

- 1) Perform additional testing with 500 lb. containers.

Basis: 1000 lb. containers were selected as the maximum weight that could be elevated (Willis, 1993). However, less than 1% of all stored drums equal or exceed 1000 lb. Drums weighing less than 500 lb. account for approximately 97% of the stored waste packages. Data for 500 lb. drums provides a more realistic storage configuration. Implementation of future test results may be administratively controlled.

- 2) Perform additional testing with poly bags around the waste material.

Basis: Poly bags inside the drums may reduce waste dispersion if the container breaches during a handling accident. Breaches occurred at the sealing surface; it is unknown whether bagged material would have been contained. Material spread is of prime concern in analyzing fire propagation.

7.0 References

M. Huerta, et al, 1983, "Analysis, Scale Modeling, and Full Scale Tests of Low-Level Nuclear Waste Drum Response to Accident Environments", SAND-80-2517, Sandia National Laboratory, Albuquerque, New Mexico.

RS McBeath and PV Meeuwsen, 1994, "Elevated Drum Testing-Phase 1 Test Plan", WHC-SD-WM-TP-263, Westinghouse Hanford Company, Richland, Washington.

NP Willis, 1993, "Solid Waste Acceptance Criteria", WHC-EP-0063-4, Westinghouse Hanford Company, Richland, Washington.

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Appendix A - Photographs

Photo 1
Release Mechanism
FOR INFORMATION ONLY

Photo 2
Pallet Drop Mechanism
FOR INFORMATION ONLY

Photo 3

Single Drum Ready to Drop

FOR INFORMATION ONLY

Photo 4

Single Drum with Spilled Contents

FOR INFORMATION ONLY

Photo 5

Major Damaged but non-leaking drum from pallet drop

FOR INFORMATION ONLY

Photo 6

Banded drums on Pallet

FOR INFORMATION ONLY

FOR INFORMATION ONLY

Dispersion

Photo 7

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Photo 8

High Speed Photo at Impact

FOR INFORMATION ONLY

Appendix B - Ultrasonic Thickness Measurements

Westinghouse Hanford Company		ULTRASONIC THICKNESS MEASUREMENT PROCEDURE AND TEST REPORT <small>NONDESTRUCTIVE EXAMINATION 306 BLDG., 300 AREA - TEL. 376-5401</small>			Job No. 94-214	Request/Inst. No. N/A
Requester (client) D. R. Duncan R. S. McBeath	Company WHC WHC	MSIN H5-33 H5-71	Bldg. ETC-1 ETC-2	Area RCHN RCHN	PART INFORMATION	
Copy To ☒ NA		MSIN	Bldg.	Area	Material <u>Carbon Steel</u>	
Project/System/Work Package/Traveler No. <u>UT Wall Thickness</u>		Wall Thickness <u>As Found</u> ☐ NA		Diameter <u>23" Nominal</u> ☐ NA		
Measurements on drop tested new 55-gallon waste drums		Schedule <u>DOT Drums</u> ☐ NA		Size <u>55 Gallon</u> ☐ NA		
Acceptance Std.	Section	Para.	Date ☐ NA	Dwg. No. ☒ NA	NCR	☒ NA
Accept By Client - Information Only						
WHC PROCEDURE NO. for reference only <u>3</u> NDT-UT-9000, Revision No. <u>2</u> Appendix A, Revision No. <u>2</u> Special Technique No. ☒ NA				RESULTS SITE: <u>305 Building Drop Location</u> TRENCH: <u>N/A</u> MODULE: <u>N/A</u> TIER: <u>N/A</u> ALPHABETIC ROW POSITION: <u>N/A</u> NUMERIC ROW POSITION: <u>N/A</u> HANFORD DRUM NUMBER: <u>See Data Sheets for I.D.'s</u>		
COVERAGE ☒ Spot ☒ 100% of area requested
INSTRUMENTATION S/N 92049402 Mfg. <u>Panametrics</u> Model <u>26DL+</u> Standards Lab No. <u>584-31-30-027</u> Expiration Date <u>5/11/95</u>						
CALIBRATION STANDARD(S) Standards Lab No. <u>584-99-30-128[17C]</u> Expiration Date <u>7/16/95</u> Standards Lab No. <u>584-99-30-132[17H]</u> Expiration Date <u>8/5/95</u>						
TRANSDUCER Diameter <u>.250"</u> Frequency <u>10</u> MHZ Mfg. <u>Panametrics</u> Type <u>D-792</u> Serial No. <u>99106</u> Stand Off <u>-NONE-</u>						
Couplant <u>ECHO "Ultragel II"</u> Batch No. <u>8336</u>						
ULTRASONIC DRUM READINGS ON CONTINUING PAGE						
Technician <u>B. J. Stewart</u>	UT Level <u>II</u>	Interpreted by <u>B. J. Stewart</u>	UT Level <u>II</u>	UT Level II Review <u>John V. Kane</u>	Date <u>10-13-94</u>	
Date of examination <u>10/12/94</u>		Date of examination <u>10/12/94</u>		Date <u>10-13-94</u>		

Hanford Drum # I-003

SD-WM-TRP-231

Rev. 0

Location # N/ATier # N/ADOT Drum Type: 17 CPAGE 2 OF 7NDE Job # 94-214

	AREA 1	AREA 2	AREA 3	AREA 4
0°	N/A	.053	.052	.051
90°	.052	.050	.052	.050
180°	.053	.053	.053	.054
270°	.051	.053	.052	.052

AREAS 1, 2, 3, AND 4 TAKEN APPROXIMATELY 90 DEGREES APART.

Thickness Readings Taken Thru Paint Unless Otherwise Specified

(NOTE: ALL MEASUREMENTS ARE IN INCHES)

INFORMATION ONLY

TOP AND BOTTOM MEASUREMENT LOCATIONS.

	TOP	BOTTOM
0°	N/A	.055
120°	N/A	.057
240°	N/A	.056
CENTER	N/A	.055

THIS MAY BE USED WHEN ADDITIONAL CHARACTERIZATION IS NEEDED

☐ All Thickness Readings ($\geq .042$ inch)

☐ Thickness Reading(s) ($< .042$ inch)

☐ NDE Unable to Measure an Area(s) Because:

NDE UT Level II

Date

Bj Sewant

10/12/94

Hanford Drum # II-002

SD-WM-TRP-231

Rev. 0

Location # N/ATier # N/ADOT Drum Type: 17HPAGE 3 OF 7NDE Job # 94-214

BOLT RING (0° MARK)
JOINING POINT
(READINGS TAKEN IN CLOCKWISE DIRECTION)

	AREA 1	AREA 2	AREA 3	AREA 4
0°	N/A	.032	.033	.032
90°	.033	.035	.034	.034
180°	.035	.034	.034	.033
270°	.034	.034	.035	.034

AREAS 1, 2, 3, AND 4 TAKEN APPROXIMATELY 90 DEGREES APART.

Thickness Readings Taken Thru Paint Unless Otherwise Specified

(NOTE: ALL MEASUREMENTS ARE IN INCHES)

INFORMATION ONLY

TOP AND BOTTOM MEASUREMENT LOCATIONS.

	TOP	BOTTOM
0°	N/A	.032
120°	N/A	.032
240°	N/A	.033
CENTER	N/A	.033

THIS MAY BE USED WHEN ADDITIONAL CHARACTERIZATION IS NEEDED

☐ All Thickness Readings
($\geq .042$ inch)☐ Thickness Reading(s)
($< .042$ inch)☐ NDE Unable to Measure
an Area(s) Because:

NDE UT Level II

Date

BJ Swart

10/12/94

Hanford Drum # III-007SD-WM-TRP-231
Rev. 0Location # N/ATier # N/ADOT Drum Type: 17CPAGE 5 OF 7NDE Job # 94-214

	AREA 1	AREA 2	AREA 3	AREA 4
0°	.053	.054	.054	.054
90°	.054	.053	.053	.053
180°	.054	.054	.054	.054
270°	.051	.051	.053	.053

AREAS 1, 2, 3, AND 4 TAKEN APPROXIMATELY 90 DEGREES APART.

Thickness Readings Taken Thru Paint Unless Otherwise Specified

(NOTE: ALL MEASUREMENTS ARE IN INCHES)

INFORMATION ONLY

TOP AND BOTTOM MEASUREMENT LOCATIONS.

	TOP	BOTTOM
0°	N/A	.055
120°	N/A	.057
240°	N/A	.057
CENTER	N/A	(removed paint. .060 thickness = .055)

THIS MAY BE USED WHEN ADDITIONAL CHARACTERIZATION IS NEEDED

☐ All Thickness Readings
(≥.042 inch)☐ Thickness Reading(s)
(<.042 inch)☐ NDE Unable to Measure
an Area(s) Because:

NDE UT Level II

Date

B. J. Sewant

10/12/94

Hanford Drum # III-012

SD-WM-TRP-231

Rev. 0

Location # N/ATier # N/ADOT Drum Type: 17CPAGE 6 OF 7NDE Job # 94-214

BOLT RING
JOINING POINT
(READINGS TAKEN IN CLOCKWISE DIRECTION)

	AREA 1	AREA 2	AREA 3	AREA 4
0°	.048	.049	.049	.047
90°	.050	.049	.049	.050
180°	.052	.048	.050	.050
270°	.048	.049	.049	.050

AREAS 1, 2, 3, AND 4 TAKEN APPROXIMATELY 90 DEGREES APART.

Thickness Readings Taken Thru Paint Unless Otherwise Specified

(NOTE: ALL MEASUREMENTS ARE IN INCHES)

INFORMATION ONLY

TOP AND BOTTOM MEASUREMENT LOCATIONS.

BOLT RING
JOINING POINT
(0° Mark)

	TOP	BOTTOM
0°	N/A	.054
120°	N/A	.054
240°	N/A	.054
CENTER	N/A	.051

THIS MAY BE USED WHEN ADDITIONAL CHARACTERIZATION IS NEEDED

☐ All Thickness Readings
($\geq .042$ inch)

☐ Thickness Reading(s)
($< .042$ inch)

☐ NDE Unable to Measure
an Area(s) Because:

NDE UT Level II

Date

Bj Swant

10/12/94

Location # N/A

Tier # N/A

DOT Drum Type: 17H

PAGE 7 OF 7

NDE Job # 94-214

BOLT RING (0° MARK)
JOINING POINT
(READINGS TAKEN IN CLOCKWISE DIRECTION)

(Note: 350°) 0°

90°

180°

270°

AREA 1	AREA 2	AREA 3	AREA 4
.032	.033	.034	.032
.033	.034	.033	.033
.038	.034	.037	.036
.032	.032	.032	.032

AREAS 1, 2, 3, AND 4 TAKEN APPROXIMATELY 90 DEGREES APART.

Thickness Readings Taken Thru Paint Unless Otherwise Specified

(NOTE: ALL MEASUREMENTS ARE IN INCHES)

INFORMATION ONLY

TOP AND BOTTOM MEASUREMENT LOCATIONS.

	TOP	BOTTOM
0°	N/A	.030
120°	N/A	.031
240°	N/A	.032
CENTER	N/A	.031

THIS MAY BE USED WHEN ADDITIONAL CHARACTERIZATION IS NEEDED

☐ All Thickness Readings
($\geq .042$ inch)

☐ Thickness Reading(s)
($< .042$ inch)

☐ NDE Unable to Measure
an Area(s) Because:

NDE UT Level II

Date

Bj Swant 10/12/94