START 9613458.0847

0044996

PAGE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 633320

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	T. A. Hu, Data Assessment and Interpretation, R2-12, 373-4098	[] Yes [X] No	08/06/96
	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
	Tank 241-U-102	241-U-102	Q
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.)	10. Related ECN No(s).	11. Related PO No.
	WHC-SD-WM-DP-189, Rev. 0	N/A	N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change

13b. Design Baseline Document? [] Yes [X] No

This ECN is being generated in order to include the safety screening primary analyses results (DSC, TGA, and total alpha) of core 144, segment 6A, and to include the flammability gas data of the tank dome space. Also, the calculations of the one-sided 95% confidence interval for DSC, TGA, and total alpha, plus the evaluation of the safety screening DQO requirements by comparing the 95% upper limit with the criteria of the Safety Screening DQO, have been included.

AUG 1996 RECEIVED EDMC

14a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

This ECN will assist in the completion of the documentation process for this document.

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

See attached distribution.

RELEASE STAMP

DATE: AUG 14 1996

STA: 4

HANFORD RELEASE

ID: 2

A-7900-013-2 (05/96) GEF095

A-7900-013-1

9613458.0848

ENGINEERING CHANGE NOTICE	Page 2 of 2	1. ECN (use no. from pg. 1) ECN-633320

16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

19. 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 13. Enter the affected document number in Block 20.

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	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. 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		

21. Approvals

	Signature	Date		Signature	Date
Design Authority			Design Agent		
Cog. Eng. T.A. Hu	Albert Hu	8-8-96	PE		
Cog. Mgr. J.G. Kristofzski	[illegible]	8-14-96	QA		
QA T. L. Tung	Tyu Lin Tung	8-9-96	Safety		
Safety			Design		
Environ.			Environ.		
Other A.D. Rice	[illegible]	8-8-96	Other		
L.M. Sasaki	L.M. Sasaki	8/13/96			
F. Steen	[illegible]	8/14/96			
			DEPARTMENT OF ENERGY		
			Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

A-7900-013-3 (05/96) GEF096

9613458.0849

WHC-SD-WM-DP-189, Rev. 0-A

45-Day Safety Screening Report for Tank 241-U-102, Push Mode Cores 143 and 144

T. A. Hu and F. H. Steen
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: ECN-633320 UC: 2070
Org Code: 79400 Charge Code: N4G4C
B&R Code: EW 3120074 Total Pages: 271

Key Words: 45-Day, Safety Screening Report, Safety Screening, Tank 241-U-102, Tank U-102, U-102, U Farm, Push Mode, Push, Core 143, Core 144

Abstract: N/A

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: WHC/BCS Document Control Services, P.O. Box 1970, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

DATE: HANFORD RELEASE
STA: 4 ID: 2.
AUG 14 1996

Release Approval 8/14/96 Date

Release Stamp

Approved for Public Release

A-6400-073 (10/95) GEF321

9613458.0850

RECORD OF REVISION	(1) Document Number WHC-SD-WM-DP-189	Page 1

(2) Title
45-Day Safety Screening Results for Tank 241-U-102, Push Mode Cores 143 and 144

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	(7) Initially released 06/28/96 on EDT-614797.	F. H. Steen	C. T. Narquis
0-A RS	Incorporate per ECN-633320	T.A. Hu	J.G. Kristofzski
		[illegible]	[illegible] 8-14-95

A-7320-005 (08/91) WEF168

9613458.0851

NARRATIVE

9613458.0852

This page intentionally left blank

45-Day SAFETY SCREENING REPORT FOR TANK 241-U-102, PUSH MODE CORES 143 AND 144

SUMMARY

Tank 241-U-102 Push Mode Core Sampling was performed between April 16 and May 8, 1996. The obtained cores 143 and 144 with a total of fifteen segments, a field blank and a lithium bromide solution blank were analyzed at 222-S Laboratory. The analytical results of Bulk density, Thermogravometric Analysis (TGA), Differential Scanning Calorimetry (DSC) and Total Alpha for all 26 waste subsamples plus the flammable gas test results of tank headspace presented in this document are the primary analysis of Safety Screening Data Quality Objective (DQO) as required in Sample Analysis Plan (Hu 1996a).

The analytical results were compared to the criteria of the safety screening DQO at a one-sided 95% confidence level. The DSC results (dry weight basis) of two samples from Core 143, segment 2 upper and lower half exceeded the safety screening limit of 480 joules/gram and ranged from 481 joules/gram to 624 joules/gram. The moisture content for these two samples were 50.85 wt% and 49.7 wt% water. In addition, the observed total alpha was several factors below the safety screening limit; the flammability test results showed 0% flammable gas. The tank can be claimed as "Conditionally Safe" with respect to the criteria in the Safety Screening DQO.

SCOPE

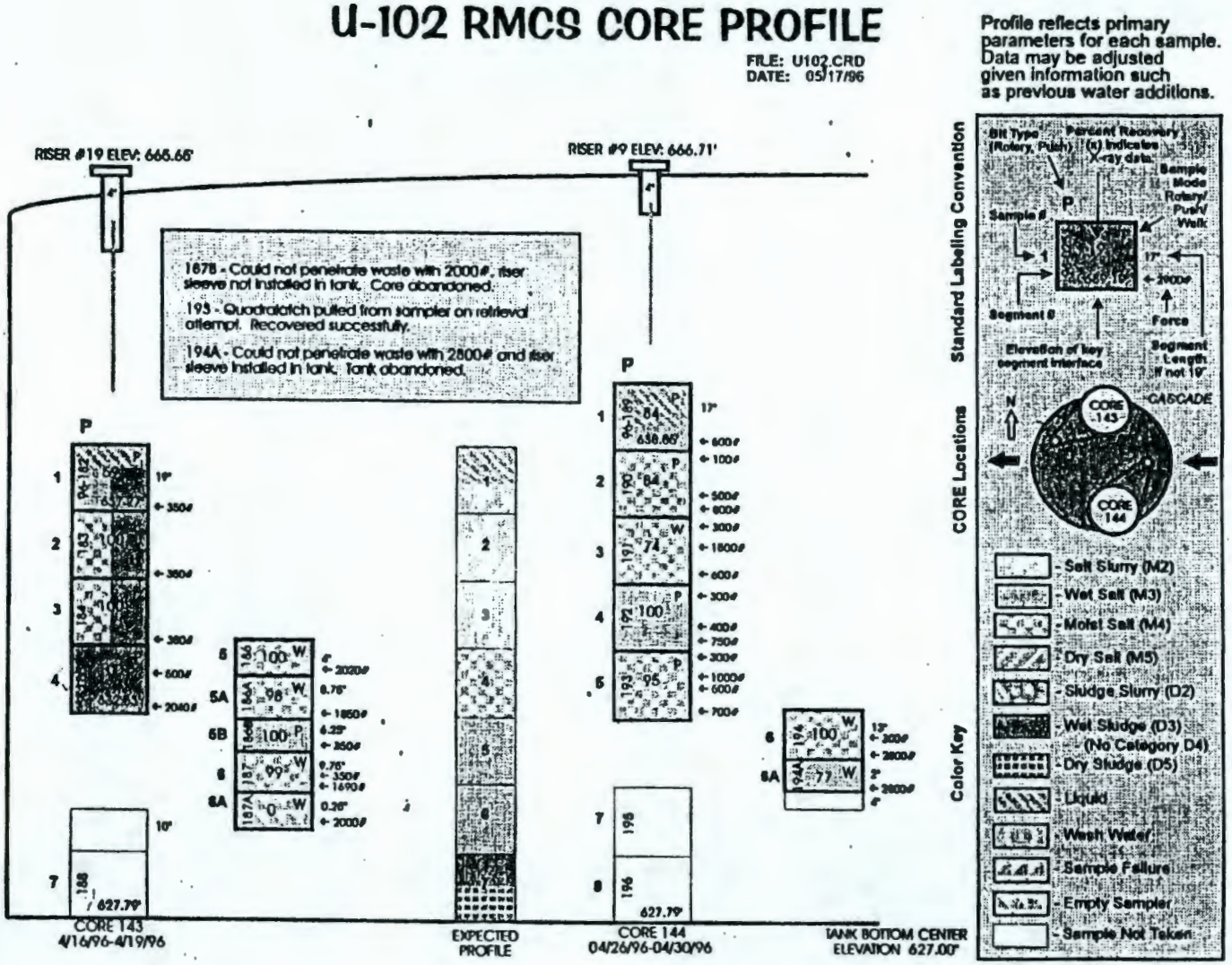
The Data Quality Objectives applicable to this tank characterization sampling event were the Safety Screening DQO (Dukelow et al. 1995), the Historical Model DQO (Simpson and McCain 1995) and the Waste Compatibility DQO (Fowler 1995). This document serves as the 45-Day Safety Screening Report of sample characterization; it contains the results of the primary analysis of safety screening and the evaluation of the safety screening DQO requirements.

FIELD SAMPLING ACTIVITY

Between April 16 and 30, 1996, a total of fifteen core segments were push-mode sampled from risers 9 and 19 in Tank 241-U-102. Based on historical data and surveillance data, seven segments were expected in both cores. As shown in Figure 1(Mousel 1996), full 19-inch samples were pushed and collected in segments 1 through 4 for Core 143 and in segments 1 through 5 for core 144, while segments 5, 5A, 5B and 6A of Core 143 and segments 6 and 6A of core 144 were 13-inches or less due to the hardness of the waste. The average push forces used in each segment are given in Figure 1.

9613458.0854

Figure 1. The Core Profile of Tank U-102



One gallon of LiBr solution was added in collecting segment 5A of core 143 and segment 6A of core 144. Since LiBr solution was used in sampling these partial segments, lithium bromide solution contamination was possible; the analytical results for lithium and bromide from IC and ICP will determine the level of LiBr contamination and will be reported in a revision of this report.

On May 6, 1996, an effort was made to perform push mode sampling to collect segment 6A of core 143 without success; the sampling operation was abandoned after this effort. It was impossible to collect sample from the bottom part of the tank, an estimate of 29 inches in riser 19 and 44 inches in riser 9. Depending on the complete analytical results of this tank and the knowledge from other similar tanks, another sampling event may be scheduled to obtain the remaining segments when the rotary mode sampling is available.

LABORATORY SAMPLING ANALYSIS

Cores 143 and 144, with a total of fifteen segments plus the field blank and LiBr blank, were received by the 222-S laboratory between April 17 and May 8, 1996. The sample was extruded and analyzed by half segments. The sample extrusion results along with the bulk density measurement and the drill string dose measurements during the sampling event are listed in Table 1. The recovery from the segment 6A of core 143 was 31.3 grams. There is a concern that the samples may not be enough for the ICP, IC analysis and select composite samples, so the density measurement was not performed for this segment. Note that drainable liquid only appeared on the top segment of each core. The sludge density ranged from 1.61 to 1.88 g/mL with an average of 1.67 g/mL; the average density of drainable liquid was 1.38 g/mL. Also included in the Table 1 are the data from the waste sample field blank of core 144. The moisture content of the waste was determined by the TGA, and the measured results along with relative percentage differences (RPD), standard deviations of average value and lower limits of one-sided 95% confidence level are listed in Table 2.

The fuel propagation information was determined by DSC analysis. The observed exotherm data in wet basis and calculated dry weight basis value along with the RPDs, standard deviation and 95% confidence upper limit in dry weight basis are given in Table 3. The dry weight basis values were derived by using the average moisture contents value from TGA measurement. The total alpha concentration was measured for every lower half segment and the results are given in Table 4.

Detailed analytical results and quality control except core 144, segment 6A can be found in the narrative of Revision 0 of this document (Steen 1996), which is part II of this document. The experimental raw data, sample breakdown, lab work list and sample chain of custody can be found in the Attachment 1 of Rev. 0 of this document. The analytical raw data for sample from core 144, segment 6A can be found in the attached data summary.

Table 1. Sample Description and Extrusion Results of Tank U-102

Core-Segment[1]	Extrusion ID Number[2]	Analysis ID Number[2]	Weight (g)	Density (g/mL)	Dose (mR/hr)	Sample Description
143-1U	96-2186	96-2325	171.5	1.61	1200	6 inches, 326.2 grams, dark gray, wet mixture of sludge and saltcake
143-1L		96-2328	49	1.81		
143-1D		96-2323	105.7	1.399		Yellow and clear liquid
143-2U	96-2187	96-2331	228.9	1.69	1200	19 inch, 401.1 grams medium gray, wet mixture of sludge and saltcake
143-2L		96-2334	172.2	1.64		
143-3U	96-2188	96-2337	202.3	1.65	1500	19 inch, 400.9 grams medium gray, wet mixture of sludge and saltcake
143-3L		96-2340	198.6	1.64		
143-4U	96-2189	96-2343	210.2	1.62	1500	19 inch, 416.4 grams, medium gray, damp sludge
143-4L		96-2346	206.2	1.61		
143-5W	96-2190	96-2498	80.6	1.88	300	5 inch, 190 grams, medium gray,
143-5AW	96-2191	96-2499	186.9	1.71	1000	8 inch, 186.9 grams, medium
143-5BU	96-2509	96-2663	108.4	1.65	1700	12 inch, 278.8 grams, medium gray, wet crystalline saltcake
143-5BL		96-2664	170.4	1.55		
143-6W	96-2626	96-2754	245.9	1.61	1200	9 inches, 245.9 grams, medium
144-1W	96-2492	96-2551	63.5	1.67	1500	3 inch, 366.8 grams, grayish
144-1D		96-2549	303.3	1.352		Grayish brown and opaque
144-2U	96-2493	96-2554	169.7	1.67	1000	16 inch, 374.8 grams, medium gray, damp crystalline saltcake
144-2L		96-2552	205.1	1.81		
144-3U	96-2494	96-2555	167.3	1.71	1000	14 inches, 316.8 grams, medium gray, damp crystalline saltcake
144-3L		96-2553	149.5	1.7		
144-4U	96-2628	96-2781	234.6	1.7	1000	19 inch, 459.0 grams, medium gray, wet salt
144-4L		96-2782	224.4	1.61		
144-5U	96-2629	96-2783	182.8	1.63	1600	18 inches, 420.1 grams, medium gray, moist saltcake
144-5L		96-2784	237.3	1.77		
144-6U	96-2630	96-2785	134.6	1.61	1700	13 inches, 295.8 grams, medium gray, moist saltcake
144-6L		96-2786	161.2	1.67		
144-6AW	96-2510	n/a[3]	31.2	n/a[3]	400	1 inch, 31.2 grams, medium
144-FBD	96-2631	96-2762	212.6	0.978	0.5	212.6 grams. Clear, colorless

Note: [1]In the column of core-segment, the abbreviation was used as follow:

U upper half segment L lower half segment FB field blank

D drainable liquid W whole segment

[2]The extrusion and analysis ID number 96-#### is a simplified form of S96T-00####.

[3]See text section of Laboratory Sampling Analysis.

Table 2. Thermogravimetric Analysis (TGA) of Tank U-102

Sample Core-Segment	Extrusion Sample ID	Analysis Sample ID	Sample wt% H_2O	Duplicate wt% H_2O	Average wt% H_2O	RPD (%)	SD[1] of Average	95% lower limit
143-1U	96-2186	96-2326	41.5	40.3	40.9	2.93	0.6	37.1
143-1L		96-2329	51.79	51.35	51.57	0.85	0.2	50.2
143-1D		96-2323	50.93	50.28	50.61	1.28	0.3	48.6
143-2U	96-2187	96-2332	50.3	51.41	50.85	2.18	0.6	47.3
143-2L		96-2335	50.52	48.92	49.72	3.22	0.8	44.7
143-3U	96-2188	96-2338	42.94	43.6	43.27	1.53	0.3	41.2
143-3L		96-2341	31.61	33.17	32.39	4.82	0.8	27.5
143-4U	96-2189	96-2344	22.44	14.78	18.61	41.2	3.8	-5.6
143-4L		96-2347	46.82	43.2	45.01	8.04	1.8	33.6
143-5W	96-2190	96-2500	15.72	16.48	16.1	4.72	0.4	13.7
143-5AW	96-2191	96-2501	17.19	17.11	17.15	0.41	0.0	16.9
143-5BU	96-2509	96-2665	40.24	32.66	36.45	20.8	3.8	12.5
143-5BL		96-2666	46.26	42.96	44.61	7.4	1.7	34.2
143-6W	96-2626	96-2755	41.68	40.7	41.19	2.38	0.5	38.1
144-1W	96-2492	96-2632	40.77	38.2	39.49	6.51	1.3	31.4
144-1D		96-2549	52.29	40.23	46.26	26.1	6.0	8.2
144-2U	96-2493	96-2646	38.93	12.51	25.72	102.7	13.2	-57.7
144-2L		96-2633	33.61	33.85	33.73	0.71	0.1	33.0
144-3U	96-2494	96-2647	7.68	10.46	9.07	30.7	1.4	0.3
144-3L		96-2636	11.72	37.05	24.39	103.9	12.7	-55.6
144-4U	96-2628	96-2775	24.47	20.1	22.29	19.6	2.2	8.5
144-4L		96-2776	30.1	29.9	30.00	0.67	0.1	29.4
144-5U	96-2629	96-2777	35.9	33.7	34.80	6.32	1.1	27.9
144-5L		96-2778	40.04	37.04	38.54	7.78	1.5	29.1
144-6U	96-2630	96-2779	50.1	55.46	52.78	10.2	2.7	35.9
144-6L		96-2780	44.9	44.08	44.49	1.84	0.4	41.9
144-6AW	96-2510	96-3609	28.09	20.5	24.30	31.24	3.8	0.3

Notes: [1]SD Standard Deviation

9613598.0858

Table 3. Differential Scanning Calorimetry (DSC) Analyses of Tank U-102.

			DSC wet results				DSC dry results					
Sample Core-Segment	Extrusion Sample ID	Analysis Sample ID	Sample (J/g)	Duplicate (J/g)	Average (J/g)	RPD (%)	Sample (J/g)	Duplicate (J/g)	Average (J/g)	RPD (%)	SD (average)	95% upper limit
143-1U	96-2186	96-2326	69.8	66.6	68.2	4.69	118.1	112.7	115.4	4.69	2.7	132.5
143-1L		96-2329	53.1	51.7	52.4	2.67	110	107	108	2.67	1.4	117.3
143-1D		96-2323	122	124.1	123	1.79	247	251	249	1.71	2.1	262.6
143-2U	96-2187	96-2332	236	288.9	262.6	20	480	588	534	20.2	53.8	873.8
143-2L		96-2335	307	313.8	310.6	2.09	611	624	617	2.19	6.8	660.0
143-3U	96-2188	96-2338	61	64.8	62.9	6.04	108	114	111	6.04	3.3	132.0
143-3L		96-2341	65.7	86.5	76.1	27.3	97	128	113	27.33	15.4	209.7
143-4U	96-2189	96-2344	0	11.7	5.85	200	0	14	7	200	7.2	52.6
143-4L		96-2347	0	57.2	28.6	200	0	104	52	200	52.0	380.4
143-5W	96-2190	96-2500	16.6	15.5	16.05	6.85	20	18	19	6.85	0.7	23.3
143-5AW	96-2191	96-2501	19.00	15.50	17.25	20.30	23	19	21	20.3	2.1	34.2
143-5BU	96-2509	96-2665	164	141.5	152.9	14.9	258	223	240	14.7	17.7	352.1
143-5BL		96-2666	97.4	111.8	104.6	13.8	176	202	189	13.8	13.0	270.9
143-6W	96-2626	96-2755	70.2	62.2	66.2	12.1	119	106	113	12.1	6.8	155.5
144-1W	96-2492	96-2632	48.5	41.9	45.2	14.6	80.1	69.2	74.7	14.6	5.5	109.1
144-1D		96-2549	112	146.6	129.3	26.8	208.4	272.8	241	26.8	32.2	443.9
144-2U	96-2493	96-2646	39.4	1.62	20.51	184.2	53.0	2.2	28	184.2	25.4	188.2
144-2L		96-2633	69.2	68.1	68.65	1.6	104.4	102.8	104	1.6	0.8	108.8
144-3U	96-2494	96-2647	18.3	29.6	23.95	47.2	20.1	32.6	26	47.2	6.2	65.6
144-3L		96-2636	18.2	22.2	20.2	19.8	24.1	29.4	27	19.8	2.6	43.4
144-4U	96-2628	96-2775	35.1	36	35.55	2.5	45.2	46.3	46	2.5	0.6	49.4
144-4L		96-2776	29.8	41.7	35.75	33.3	42.6	59.6	51	33.3	8.5	104.7
144-5U	96-2629	96-2777	87.6	99	93.3	12.2	134.4	151.8	143	12.2	8.7	198.3
144-5L		96-2778	71.4	93.4	82.4	26.7	151.2	197.8	175	26.7	23.3	321.6
144-6U	96-2630	96-2779	63.2	76.6	69.9	19.2	133.8	162.2	148	19.2	14.2	237.6
144-6L		96-2780	14.4	19.8	17.1	31.6	25.9	35.7	31	31.6	4.9	61.5
144-6AW	96-2510	96-3609	15.8	14.8	15.3	6.5	20.9	19.5	20	6.5	0.7	24.4

Table 4 Total Alpha Concentration of U-102

Core-Segment (Sludge)	Extrusion ID Number	Analysis ID Number	Sample (μCi/g)	Duplicate (μCi/g)	Average (μCi/g)	RPD (%)	SD of Average	95% Upper limit
143-1L	96-2186	96-2328	5.56E-02	5.91E-02	5.74E-02	6.10	1.75E-03	6.84E-02
143-2L	96-2187	96-2334	1.33E-01	1.48E-01	1.41E-01	10.68	7.50E-03	1.88E-01
143-3L	96-2188	96-2340	1.47E-01	1.54E-01	1.51E-01	4.65	3.50E-03	1.73E-01
143-4L	96-2189	96-2346	2.13E-01	2.36E-01	2.25E-01	10.24	1.15E-02	2.97E-01
143-5W	96-2190	96-2498	8.31E-02	6.54E-02	7.43E-02	23.84	8.85E-03	1.30E-01
143-5BL	96-2509	96-2664	1.06E-01	1.21E-01	1.14E-01	13.22	7.50E-03	1.61E-01
144-1W	96-2492	96-2648	6.24E-01	6.44E-01	6.34E-01	3.15	1.00E-02	6.97E-01
144-2L	96-2493	96-2649	1.63E-01	1.58E-01	1.61E-01	3.12	2.50E-03	1.76E-01
144-3L	96-2494	96-2662	1.21E-01	1.29E-01	1.25E-01	6.40	4.00E-03	1.50E-01
144-4L	96-2628	96-2796	3.45E-01	3.47E-01	3.46E-01	0.58	1.00E-03	3.52E-01
144-5L	96-2629	96-2797	1.66E-01	1.67E-01	1.67E-01	0.60	5.00E-04	1.70E-01
144-6L	96-2630	96-2798	8.49E-02	8.18E-02	8.34E-02	3.72	1.55E-03	9.31E-02
144-6AW	96-2510	96-3610	6.53E-02	7.03E-02	6.78E-02	7.37	2.50E-03	8.36E-02
Core-Segment (Drainable Liquid)	**Extrusion ID Number**	**Analysis ID Number**	**Sample (μCi/mL)**	**Duplicate (μCi/mL)**	**Average (μCi/mL)**	**RPD (%)**	**STD of Average**	**95% Upper limit**
143-1D	96-2186	96-2323	2.72E-02	2.60E-02	2.66E-02	4.51	6.00E-04	3.04E-02
144-1D	96-2492	96-2549	2.93E-02	4.24E-02	3.59E-02	36.54	6.55E-03	7.72E-02

TANK VAPOR SPACE FLAMMABILITY RESULTS

During core sampling, the vapor composition of the tank dome space was measured. These results are used to address the vapor flammability issue described in the safety screening DQO. The measurements were performed on risers 9 and 7 at the depth of at least 3 feet below the risers. The LFL results and other vapor concentration measurements are given in Table 5.

Table 5. Dome Space Flammability and Vapor Concentrations of Tank U-102.

Vapor Characteristic Measured	Results		
	Riser 9,	Riser 7	
	3 ft. Below	3 ft. Below	20 ft Below
Flammability vapor concentration as percent of the LFL	0 %	0 %	0%
Volume percent oxygen gas	21.1 %	20.7 %	20.7 %
Concentration of ammonia gas	500 ppm	300 ppm	400 ppm
Concentration of total organic carbon vapor	18 ppm	15 ppm	21 ppm

EVALUATION OF SAFETY SCREENING DQO'S ACTION LIMIT

Based on the analytical results of safety screening primary analyses, this section evaluates the criteria of safety screening issues including the dome space gas composition for the flammable gas issue, total fuel energy content for the heat propagation issue and total alpha concentration for the criticality issue.

Flammable Gas Composition

As shown in Table 5, the combustible gas meter reading was 0 percent of the LFL, indicating no flammability concerns with this tank. Note that ammonia level is above the National Institute of Safety and Health (NIOSH) threshold as being too hazardous to breathe. However, these measurement are in the tank riser and dome space not in the breathing zone.

Moisture Content

Moisture content is needed to calculate the exothermic data on a dry weight basis. The moisture contents was measured by the TGA. As shown in Table 2, the moisture content ranged from 9.1% to 52.8% with overall mean of 35%. The lowest wt% water appeared in the subsample from core 144, segment 3 upper half.

Total Fuel Energy Content

The fuel energy content was determined by measuring the exotherm and endotherm reaction of the waste. The safety screening DQO's notification limit for the exothermic condition in DSC analysis is 480 joules/gram. As shown in Table 3, most of DSC results showed exothermic reactions and two subsample's exothermic values on a dry weight basis exceeded 480 joules/gram. The DSC results of these two subsamples were 534 joules/gram and 617 joules/gram, which came from core 143, segment 2 upper and lower half sludge. The average moisture content for these two samples was 51% and 50% respectively. The tank was conditionally safe in this respect, and no immediate action was taken by Tank Operations. These results have been presented to the TWRS Tank Data Review Committee (Kirch 1996), and a notification letter was sent out to 200 West Tank Farm Operations Shift Manager and the other concerned parties (Hu 1996b). Secondary safety screening analyses have been initiated by the laboratory. The results will be reported in the next revision. In addition, the calculated 95% confidence upper limit for subsample from core 144,segment 5 lower half was 570 joules/gram which exceeded the 480 joules/gram limit, while the derived DSC results in dry weight basis of sample and duplicate were 226.2 joules/gram and 96.8 joules/gram. This high upper one-sided 95% confidence limit was primarily due to the high standard deviation of the measurements. The rerun data was performed and the results were quoted in Table 3. The rerun RPD is 26.7% and upper limit of 95% confidence interval is 321.6 joules/gram. The analytical raw data can be found in the attached data summary.

Fissile Material/Total Alpha

To consider the potential of a criticality condition, the threshold of total alpha is given as 1 g/L of $^{239}Pu/^{240}Pu$ concentration. This is equivalent to 61.5 (μCi/mL)/density for the sludge and 61.5 (μCi/mL) for drainable liquid. For the given density measurement in Table 1, the lowest total alpha criteria is 32.7 (μCi/g) for sludge and was derived from the highest sludge density 1.88 g/mL. As shown in the Table 4, all the total alpha concentrations of sludge and drainable liquid are a couple of orders of magnitude smaller than this criteria. This indicates that there is no possibility of creating a criticality condition.

CONCLUSION

Two DSC dry weight basis results and one calculated upper limit at one-sided 95% confidence level exceeded the threshold of 480 joules/gram. Secondary safety screening analyses will be performed to investigate the high heat source. The tank is conditionally "Conditionally Safe" with respect to the Safety Screening criteria.

Tank Project Coordinator: T Albert Hu

REFERENCES

Dukelow, G.T., J.W. Hunt, H. Babad, and J.E Meacham, 1995, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

Fowler, K.D., 1995, *Data Quality Objective for Tank Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Hu, T. A., 1996a, *Tank 241-U-102 Push Mode Core Sampling and Analysis Plan*, WHC-SD-WM-TSAP-0182, Rev. 0-A, Westinghouse Hanford Company, Richland, Washington.

Hu, T. A., 1996b, *Immediate Notification : Violation of Limits for Exothermic Reaction for Samples from Tank 241-U-102,* (Internal Memo 79400-96-149 to H. Babad et. al., June 20), Westinghouse Hanford Company, Richland, Washington.

Kirch, N.W., 1996, *Meeting Minutes of Tank Data Review Committee*, (to H Babad et. al., July 1), Westinghouse Hanford Company, Richland, Washington.

Mousel, A.P., 1996, *U102 RMCS Core Profile*, (letter to T.A. Hu, May 17), Westinghouse Hanford Company, Richland, Washington.

Simpson, B.C., and D.J. McCain, 1995, *Historical Model Evaluation Data Requirements*, WHC-SD-WM-DQO-018, Rev. 0-A, Westinghouse Hanford Company, Richland, Washington.

Steen, F. H, 1996, *45-Day Safety Screening Results for Tank 241-U-102, Push Mode Cores 143 and 144*, WHC-SD-WM-DP-189, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

9613458.0863

Data Summary

LABCORE Data Entry Template for Worklist# 10467

Analyst: DCD Instrument: TGA0 _____ Book # 82N8A

Method: LA-514-114 Rev/Mod _____

Worklist Comment: U-102 TGAs RUSH Run under N2.

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	STD				TGA-03	SOLID			N/A	%
96000569	U-102	2	SAMPLE	S96T003609	0		TGA-03	SOLID	N/A			%
96000569	U-102	3	DUP	S96T003609	0		TGA-03	SOLID			N/A	%

Final page for worklist # 10467

David Dunlap 6-28-96
Analyst Signature Date

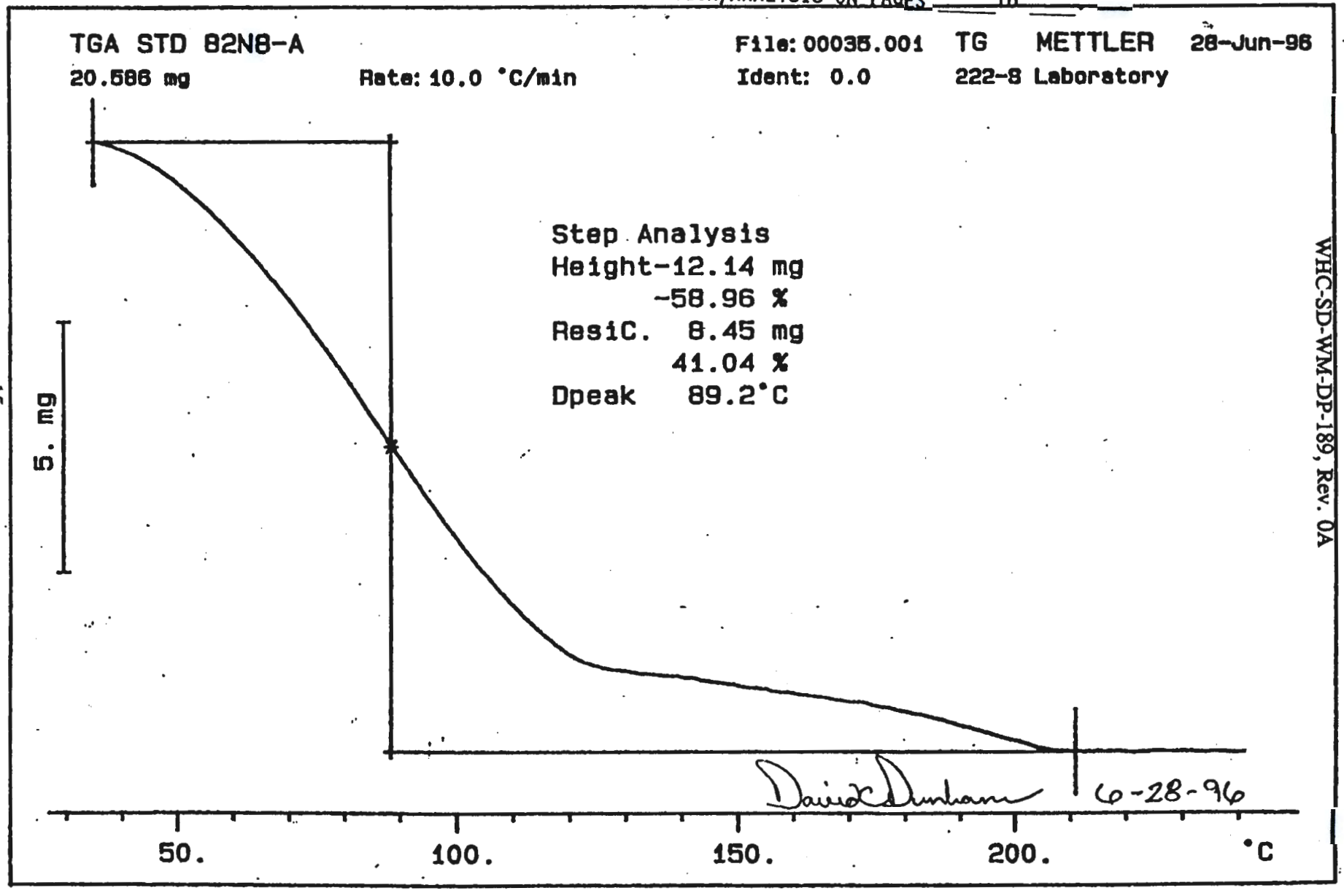
Analyst Signature Date

TGA-01 instrument
was used.
6-7-1-96
Blandina Valenzuela

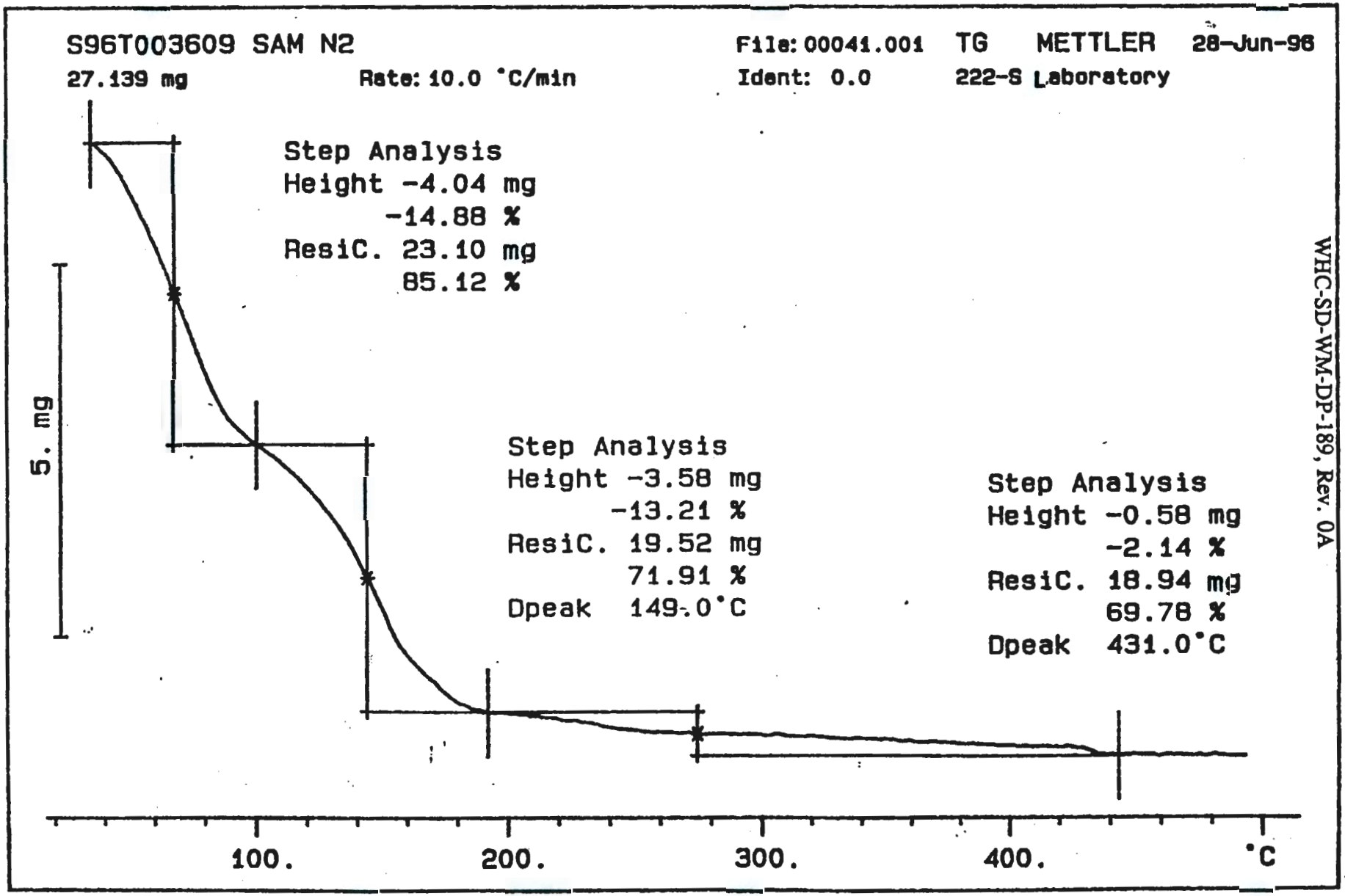
Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

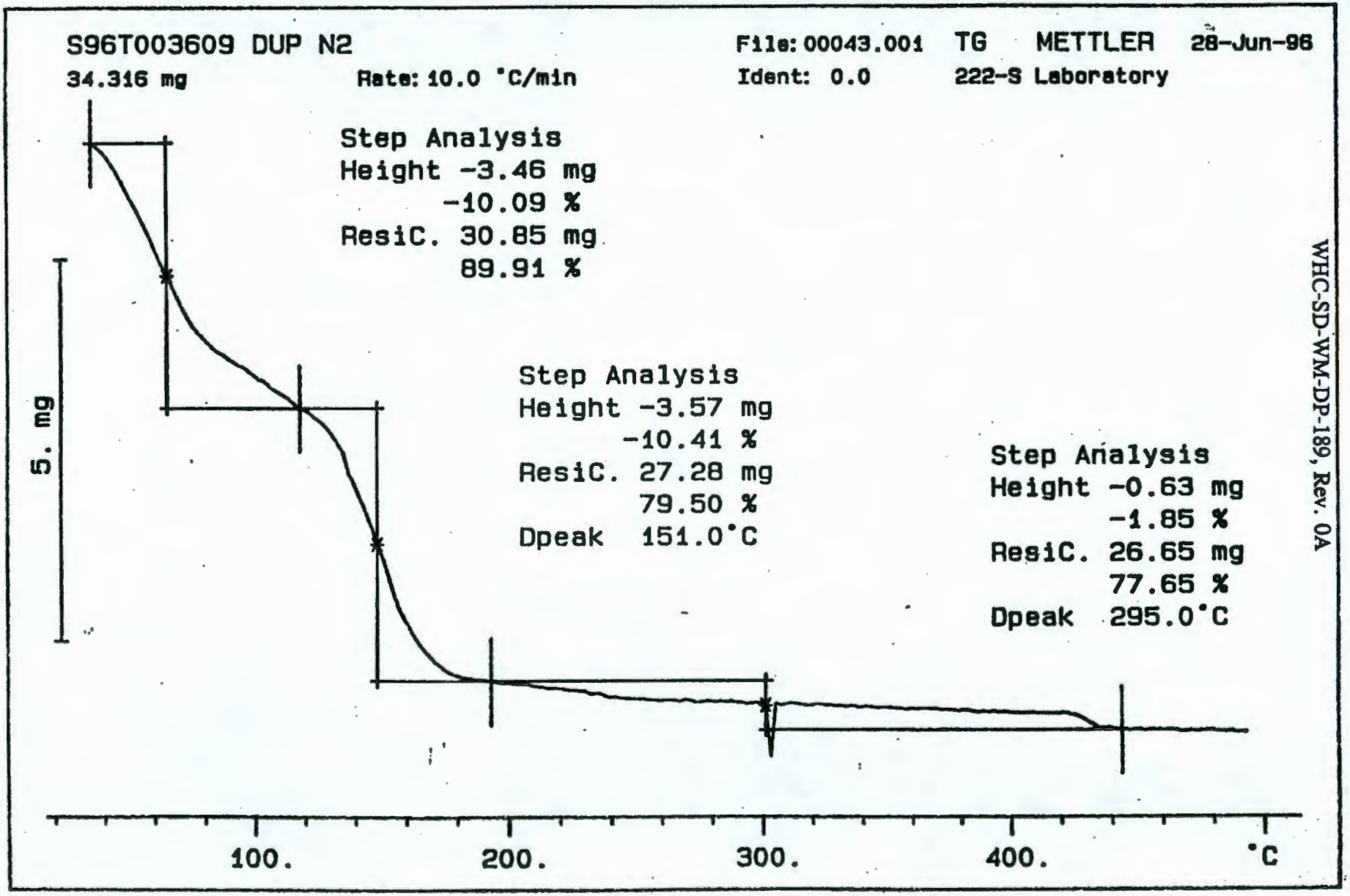
SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES ____ TO ____



9613458.0865


S96T003609 SAM N2
27.139 mg
Rate: 10.0 °C/min
File: 00041.001
Ident: 0.0
TG METTLER 28-Jun-96
222-S Laboratory
Step Analysis
Height -4.04 mg
-14.88 %
ResiC. 23.10 mg
85.12 %
Step Analysis
Height -3.58 mg
-13.21 %
ResiC. 19.52 mg
71.91 %
Dpeak 149.0°C
Step Analysis
Height -0.58 mg
-2.14 %
ResiC. 18.94 mg
69.78 %
Dpeak 431.0°C
5. mg
100.
200.
300.
400.
°C

9613458.0867



9613458.0868

LABCORE Data Entry Template for Worklist# 10466

Analyst: DCD **Instrument:** DSC0 1 **Book #** 12N148

Method: LA-514-113 Rev/Mod C-1

Worklist Comment: U-102 DSC RUSH Run under N2.

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	STD				DSC-01	SOLID	28.45	28.6	N/A	Joules/g
96000569	U-102	2	SAMPLE	S96T003609	0		DSC-01	SOLID	N/A	15.8		Joules/g
96000569	U-102	3	DUP	S96T003609	0		DSC-01	SOLID	15.8	14.8	N/A	Joules/g

Final page for worklist # 10466

See attached for signatures

Analyst Signature Date 7-1-96 BBV

Analyst Signature Date

Verified/Validated by Blandina Valenzuela 7-1-96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist# 10466

Analyst: DCD **Instrument:** DSC0 _____ **Book #** 12N14B

Method: LA-514-114 Rev/Mod _____

Worklist Comment: U-102 DSC RUSH Run under N2.

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	STD				DSC-03	SOLID			N/A	Joules/g
96000569	U-102	2	SAMPLE	S96T003609	0		DSC-03	SOLID	N/A			Joules/g
96000569	U-102	3	DUP	S96T003609	0		DSC-03	SOLID			N/A	Joules/g

Final page for worklist # 10466

David C Dunham 6-28-96
Analyst Signature Date

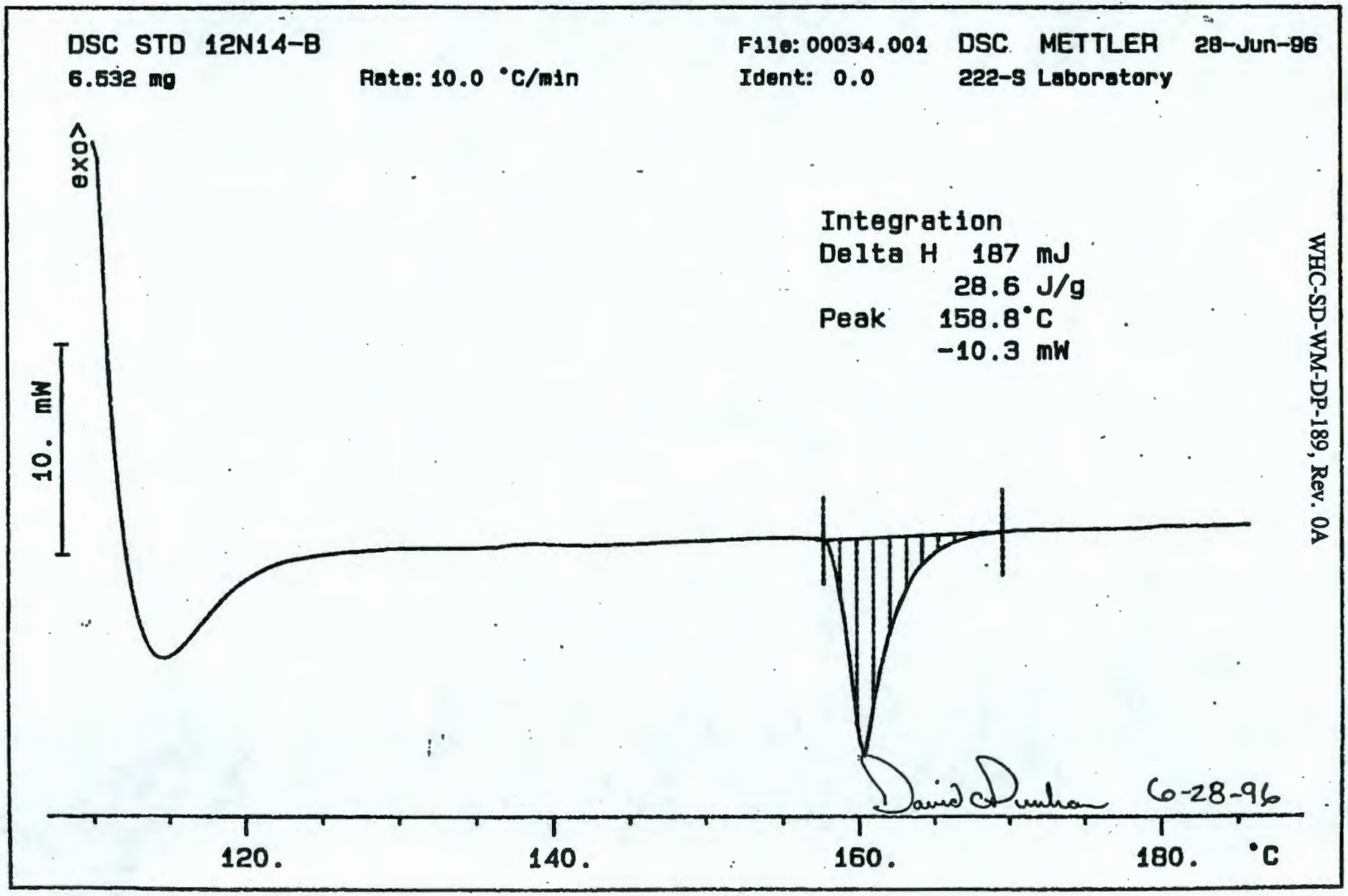
Analyst Signature Date

DSC-01 instrument
was used
7-1-96
Blandina
Valenzuela

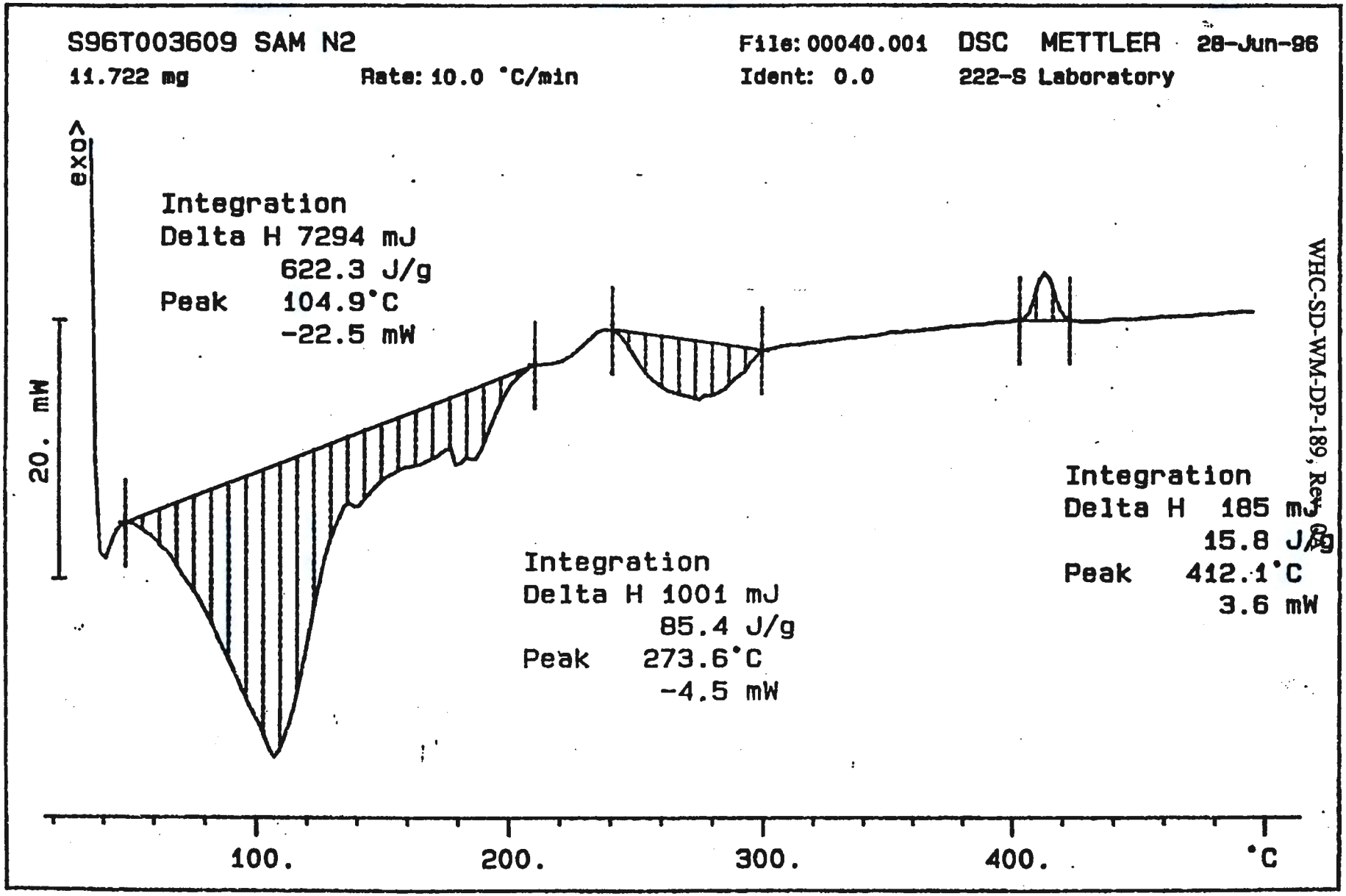
Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

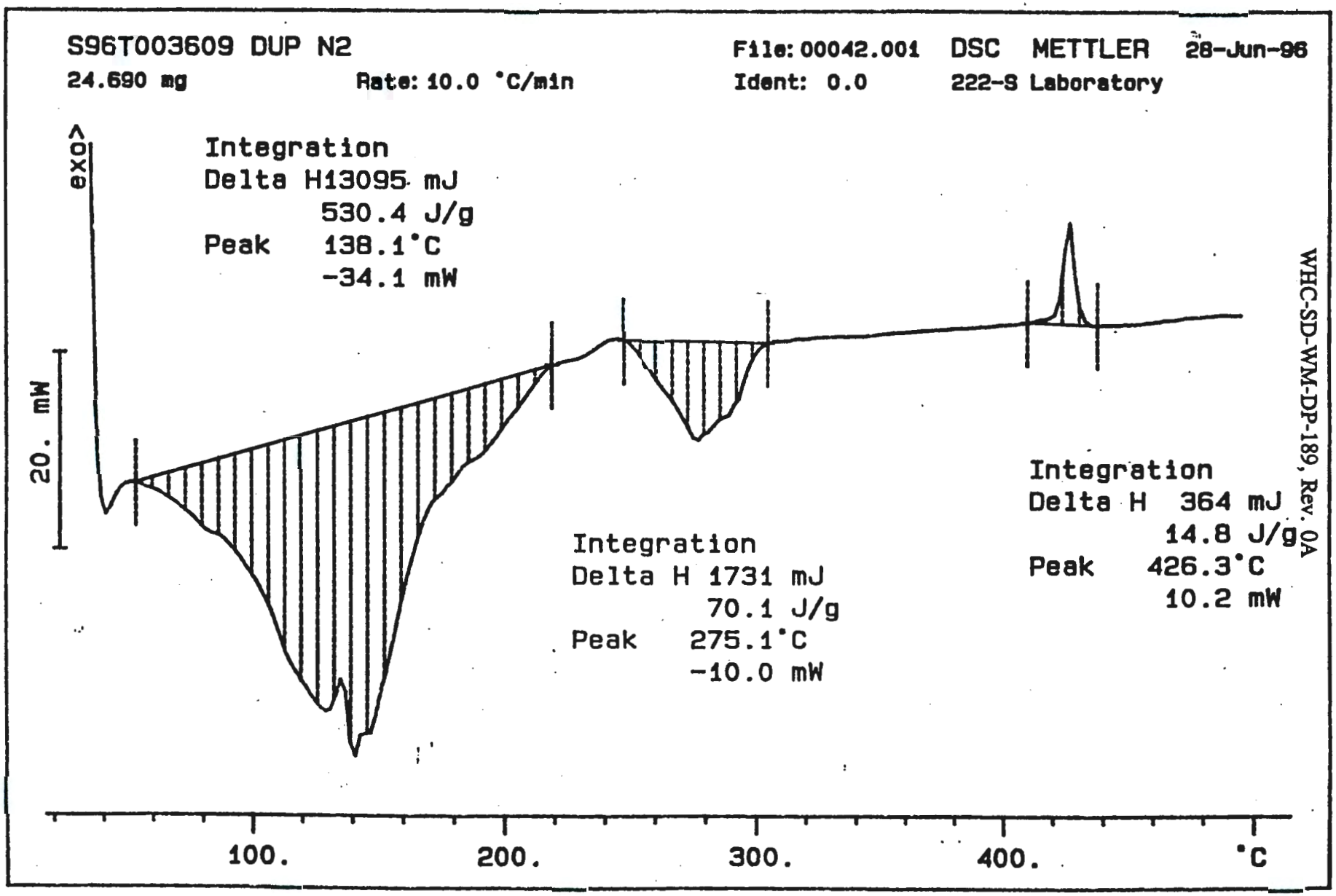
SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES _____TO ____.



9613458.0870



9613458.0871


S96T003609 DUP N2
24.690 mg
Rate: 10.0 °C/min
File: 00042.001
Ident: 0.0
DSC METTLER
222-S Laboratory
28-Jun-96
exo>
20. mW
Integration
Delta H13095 mJ
530.4 J/g
Peak 138.1°C
-34.1 mW
Integration
Delta H 1731 mJ
70.1 J/g
Peak 275.1°C
-10.0 mW
Integration
Delta H 364 mJ
14.8 J/g
Peak 426.3°C
10.2 mW
100.
200.
300.
400.
°C

9613458.0873

worklistrpt Version 2.1 05/15/95
07/02/96 16:15
WHC-SD-WM-DP-189, Rev. 0A
Page: 1

LABCORE Data Entry Template for Worklist# 10529

Analyst: HLA **Instrument:** DSC0 1 **Book #** NA

Wrong Re

Method: LA-514-113 Rev/Mod D-1

Worklist Comment: U-102 Dry DSC hla

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
96000569	U-102	1	SAMPLE	S96T003609	0		DSC-02	SOLID	N/A	20.87		Joules/g Dry
96000569	U-102	2	DUP	S96T003609	0		DSC-02	SOLID	20.87	19.55	N/A	Joules/g Dry

Final page for worklist # 10529

Jason Fuse 7/2/96
Analyst Signature Date

Analyst Signature Date

Validated 7-2-96 Hla

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

U-102

CALCULATED DRY DSC			
SAMPLE NO.	DSC RESULT (J/g)	TGA RESULT (% water)	DRY DSC RESULT
S96T003609	15.8	24.295	20.87
S96T003609dup	14.8	24.295	19.55

9613458.0875

worklistrpt Version 2.1 05/15/95
07/11/96 13:34
WHC-SD-WM-DP-189, Rev. 0A
Page: 1

LABCORE Data Entry Template for Worklist# 10728

Analyst: ADP **Instrument:** DSC0 1 **Book #** 12N14B

Method: LA-514-113 Rev/Mod C-1

Worklist Comment: U-102 DSC, RUN UNDER N2. RCJ

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	STD				DSC-01	SOLID	28.45	30.6 *	N/A	Joules/g
96000569	U-102	2	SAMPLE	S96T002778	1		DSC-01	SOLID	N/A	71.4		Joules/g
96000569	U-102	3	DUP	S96T002778	1		DSC-01	SOLID	71.4	93.4	N/A	Joules/g

Final page for worklist # 10728

Anthony Purenton 7-11-96
Analyst Signature Date

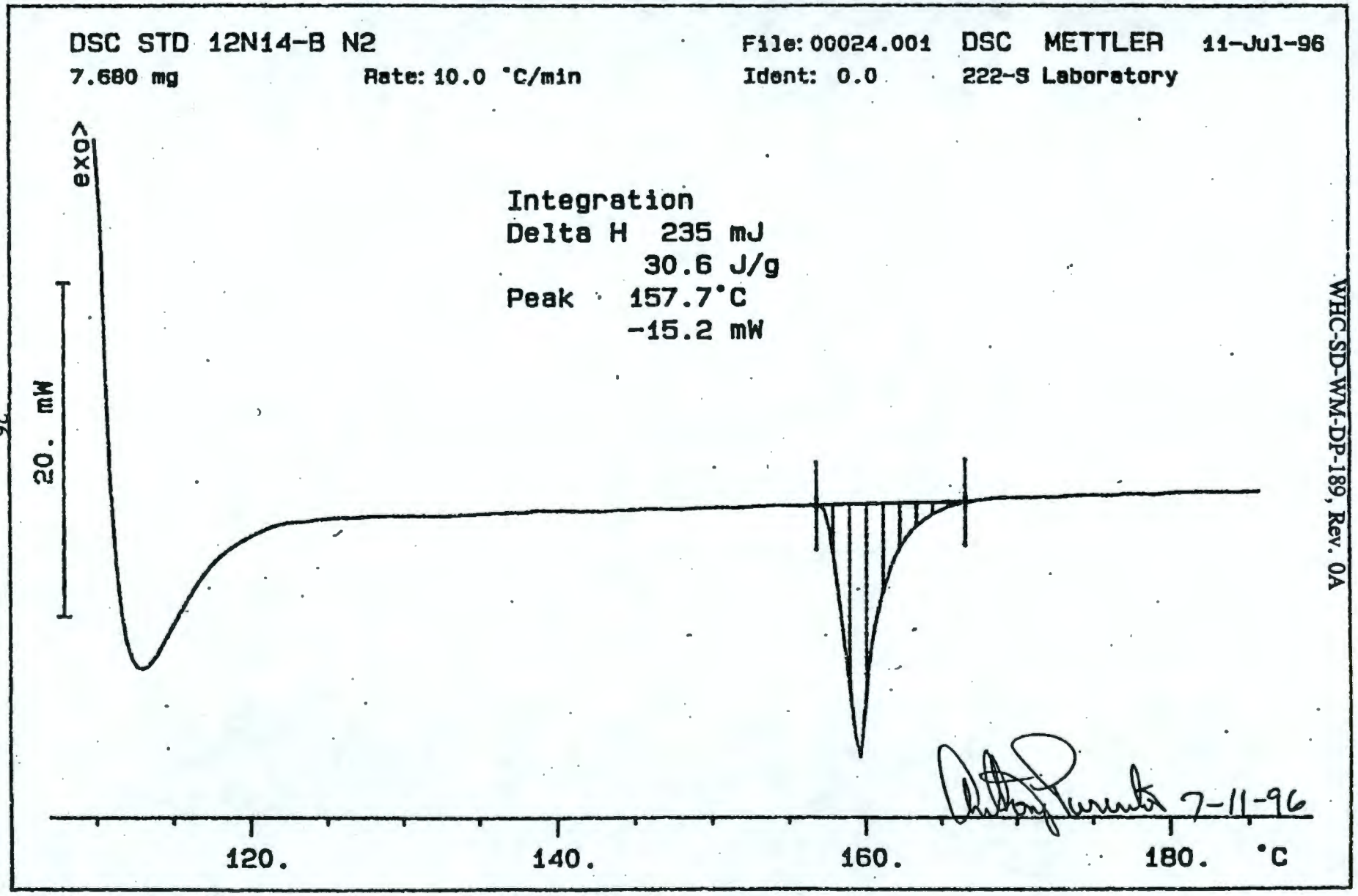
Gary Hammond 7-12-96
Analyst Signature Date

Verified/Validated by
Blandina
Valenzuela 7-15-96

Data Entry Comments: Sample results are the sum of two exotherms.

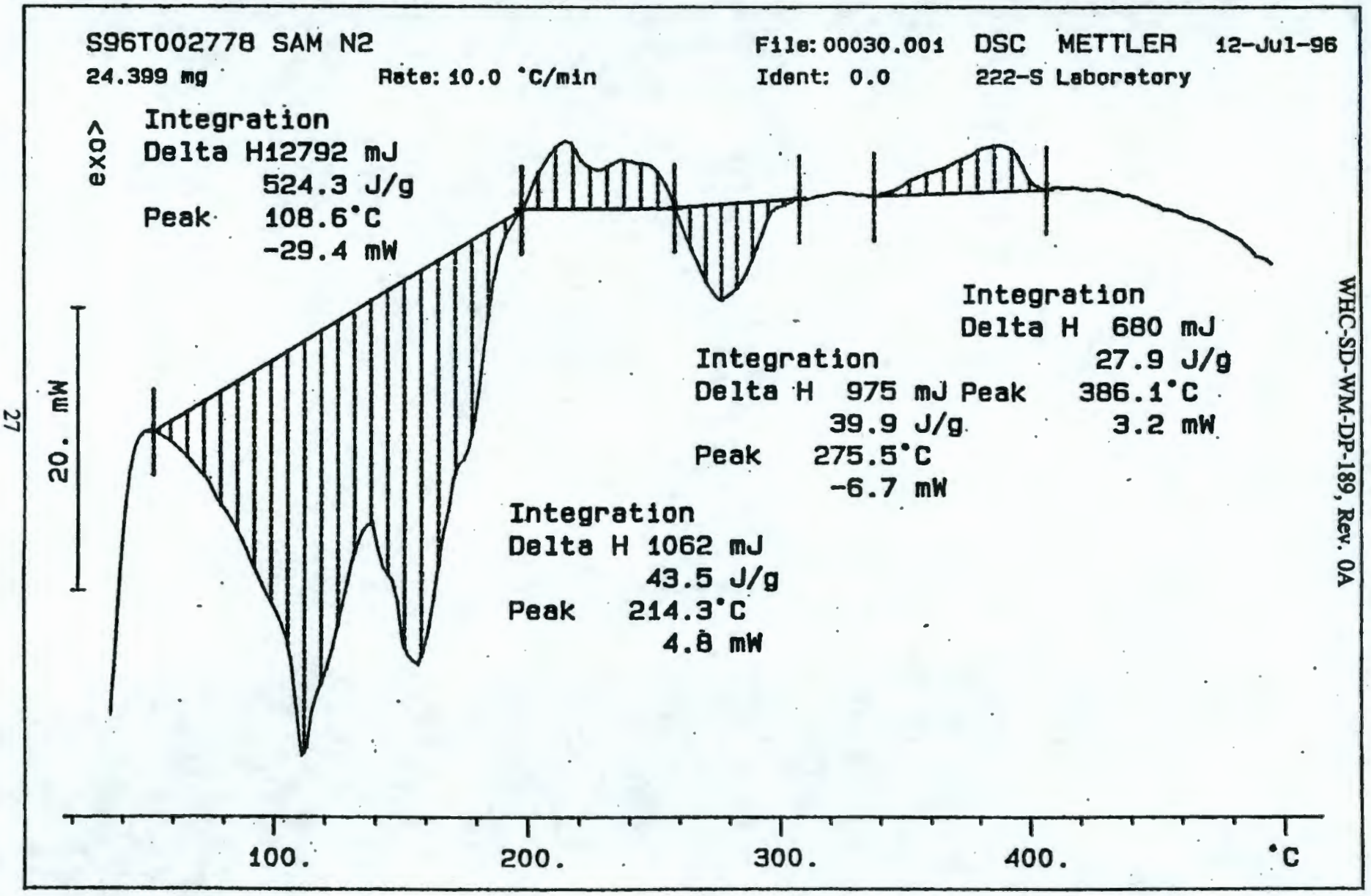
Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES ____ TO ____.

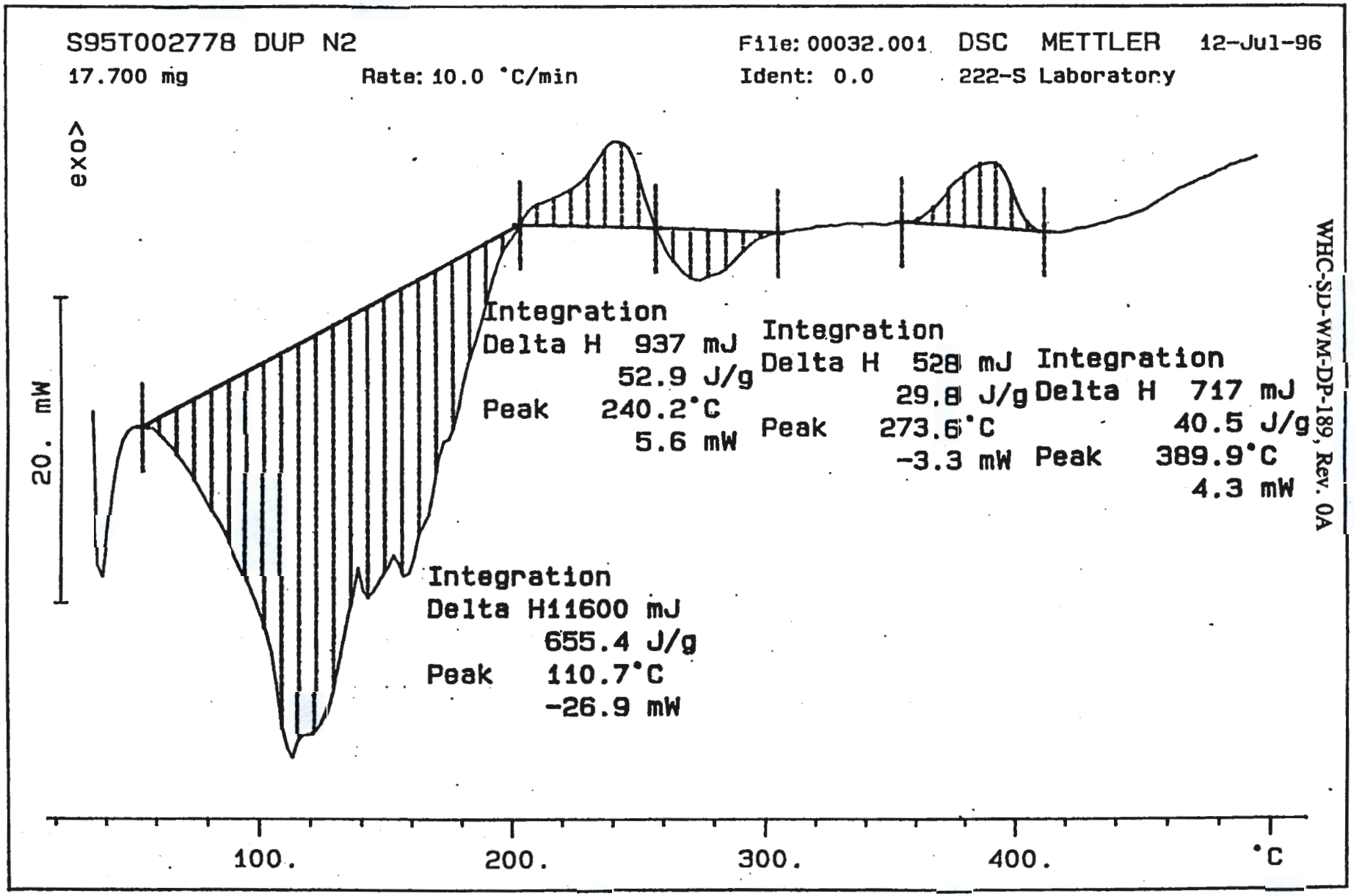


WHC-SD-WM-DP-189, Rev. 0A

9613458.0876



9613458.0877



9613458.0878

INTERIM

45-Day Safety Screening Report
U-102

CORE NUMBER: 144
SEGMENT #: 6A

SEGMENT PORTION: U Upper Half of Segment

Sample#	R	A#	Analyte	Unit	Action Limits Lower	Action Limits Upper	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S96T003609			DSC Exotherm using Mettler	Joules/g	*1.0e+03	480.0	100.5	n/a	15.80	14.80	15.30	6.54	n/a	n/a	n/a
S96T003609			DSC Exotherm Dry Calculated	Joules/g Dry	*1.0e+03	480.0	n/a	n/a	20.87	19.55	20.21	6.53	n/a	n/a	n/a
S96T003609			% Water by TGA using Mettler	%	None	None	99.59	n/a	28.09	20.50	24.30	31.2	n/a	n/a	n/a
S96T003610	F		Alpha of Digested Solid	uCi/g	*1.0e+03	32.70	106.2	<2.28e-03	6.53e-02	7.03e-02	6.78e-02	7.37	78.55	5.00e-03	1.46E+01

=> Limit violated
=> Selected Limit

INTERIM

INTERIM

45-Day Safety Screening Report
U-102

CORE NUMBER: 144
SEGMENT #: 5

SEGMENT PORTION: L Lower Half of Segment

Sample#	R	A#	Analyte	Unit	Action Limits Lower	Action Limits Upper	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S96T002778			DSC Exotherm using Mettler	Joules/g	1.0e+03	480.0	113.2	n/a	1.39e+02	59.50	99.25	80.1	n/a	n/a	n/a
S96T002778	1		DSC Exotherm using Mettler	Joules/g	1.0e+03	480.0	107.6	n/a	71.40	93.40	82.40	26.7	n/a	n/a	n/a
S96T002778			DSC Exotherm Dry Calculated	Joules/g Dry	1.0e+03	480.0	n/a	n/a	2.26e+02	96.81	161.5	80.1	n/a	n/a	n/a
S96T002778	1		DSC Exotherm Dry Calculated	Joules/g Dry	1.0e+03	480.0	n/a	n/a		n/a	n/a	n/a	n/a	n/a	n/a
S96T002778			% Water by TGA using Mettler	%	None	None	99.39	n/a	40.04	37.04	38.54	7.78	n/a	n/a	n/a
S96T002784			Bulk Density of Sample	g/mL	None	None	n/a	n/a	1.770	n/a	n/a	n/a	n/a	5.00e-01	n/a
S96T002797		F	Alpha of Digested Solid	uCi/g	1.0e+03	32.70	114.8	n/a	1.66e-01	1.67e-01	1.67e-01	0.60	n/a	1.30e-02	1.72E+01

=> Limit violated
=> Selected Limit

INTERIM

9613458.0881

DISTRIBUTION SHEET

To Distribution	From Data Assessment and Interpretation	Page 1 of 1
		Date: 08/06/96
Project Title/Work Order **WHC-SD-WM-DP-189, Rev. 0-A, "45-Day Safety Screening Report for Tank 241-U-102, Push Mode Cores 143 and 144"**		EDT NO.: N/A
		ECN NO.: ECN-633320

Name	MSIN	Text With all Attach	EDT/ECN ONLY
Pacific Northwest Laboratory			
J. R. Gormsen	K7-28		X
S. J. Harris	K7-22	X	
K. L. Silvers	P7-27		X
U.S. Department of Energy, RL			
C. A. Babel	S7-54	X	
Westinghouse Hanford Company			
J. N. Appel	G3-21		X
D. C. Hetzer	S6-31		X
T. A. Hu	R2-12	X	
J. E. Hyatt	S3-31	X	
T. J. Kelley	S7-21	X	
N. W. Kirch	R2-11		X
M. J. Kupfer	H5-49		X
J. E. Meacham	S7-15	X	
K. L. Powell	T6-04		X
J. B. Schaffer (SD COV. SHT., DST. SHT, ROR)	R2-12		X*
M. J. Sutey	T4-08		X*
T. T. Tran (LATA)	B1-44	X	
J. A. Voogd	H5-03		X
L. R. Webb (SD COV. SHT., DST. SHT, ROR)	T6-06		X*
A. E. Young (Narrative & Sample Data Summary)	R2-12		X
Central Files	A3-88	2	
EDMC	H6-08	X	
LTIC	T6-03		X
U. S. Department of Energy			
Jim Poppiti 12800 Middlebrook Rd. Trevion II, EM-36 Germantown, MD 20874			X
Defense Nuclear Federal Safety Board			
Rich Tontodonato 625 Indiana Ave. N. W. Washington D.C. 20004		X	

* Needs only releasing paperwork, not a copy of the released document.