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Data Transmittal Package for 241-A-103
Waste Tank Characterization

Program

Waste Management

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Abstract:

This document contains information relating
to the sampling of wastes contained in the
single-shell tank 241-A-103 in fiscal year
1986. Observations and data taken during
sampling, sample breakdown and preparation,
and the results of analytical determinations
are recorded.

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941796.1016

I. INTRODUCTION

The following report contains information and data gathered from the characterization effort for the wastes contained in tank 241-A-103. Its purpose is to compile in a standardized format all pertinent information to allow future retrieval and comparisons with other tanks similarly sampled. The report roughly follows the order in which information was originally obtained: sample recovery from the tank, breakdown, preparation for analysis, and analytical results. No attempts to interpret results or reach conclusions are made in this report. Additional information regarding specific portions of the characterization effort can be found in the following:

- Definition of program scope - Reference 2
- Tank sampling operations - Reference 1
- Sample ID nomenclature - Reference 3
- Sampler breakdown - Reference 3
- Segment and core compositing - Reference 3
- Analytical sample preparation - Reference 3
- Specific analysis requested - References 1 and 3
- Analytical procedures - Reference 3
- Analytical result report spreadsheet - Reference 4
- Analysis quality assurance - Reference 5

Every effort has been taken to ensure that all pertinent information has been included in this report.

II. SAMPLE IDENTIFICATION NUMBER CROSS-REFERENCE TABLE

Three numbering systems are used to keep track of the samples as they are carried through characterization. As each segment is taken from the tank it is given an ID number by Tank Farms Operations personnel. On receipt and extrusion at 222-S laboratory each segment and any freely draining liquid is assigned a unique ID number. The core composite (solid and liquid) is formed by blending all segments of the total core and assigning an eight digit ID number. The first four digits identify the specific base sample; the remaining four are used for individual subsample identification during analysis. The following table gives a cross-reference for the samples recovered from tank 241-A-103.

Sample ID# Cross-Reference

Tank	Tank Farm Operation ID#	Breakdown ID#	Analysis ID#
A-103 core 1	1-3A17-1	1111	
	1-3A17-2	1112	
	1-3A17-3	1113	
	1-3A17-4	1114	
	1-3A17-5	1115	
	1-3A17-6	1116	
	1-3A17-7	1117	
	1-3A17-8	1118	
	1-3A17-9	1119	
	1-3A17-10	11110	
	1-3A17-R10	11110R	B1XD00XX B1XC00XX

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Sample ID# Cross-Reference

(continued)

Tank	Tank Farm Operation ID#	Breakdown ID#	Analysis ID#
A-103			
core 2	2-3A12-1*	1121	
	2-3A12-R1*	1121R	
	2-3A12-2	1122	
	2-3A12-3	1123	
	2-3A12-4	1124	
	2-3A12-5	1125	
	2-3A12-6	1126	
	2-3A12-7	1127	
	2-3A12-8	1128	
	2-3A12-9	1129	
	2-3A12-10	11210	
	2-3A12-NCF11	11211	B2XD00XX B2XC00XX

* These segments were taken above the waste due to an error in the riser elevation.

III. TANK SAMPLING OPERATION LOG

The following log contains observations taken during tank sampling by Tank Farm Operations personnel and a copy of the four pen strip chart records taken during sampling.

0591 960716

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TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-1

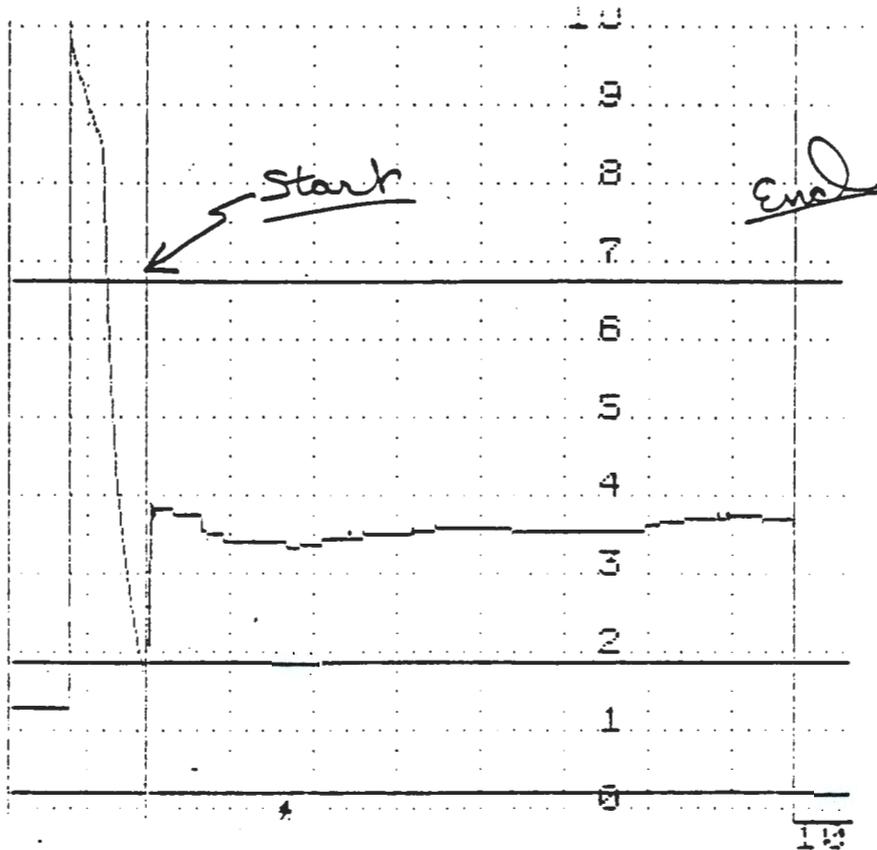
EXPECTED: 15.6 inches
RESULTS: 15.6 inches

RECOVERY: 100%
DATE: 03/20/86

FIELD OBSERVATIONS: The zip cord indicated a waste level of 38.3 ft and photographs indicated a liquid level. The sludge level was measured at 41 ft using the doughnut, indicating a waste level of 186.8 inches of which 32.76 inches was liquid. Therefore, the sample was taken in the push mode. The radiation reading was 1300 mrad on contact through the drill string and 31 inches of NPH were added to the drill string.

15919607
27096.1651

1-3A17-1
3/20/86
1300 mRADS



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Rev. 0

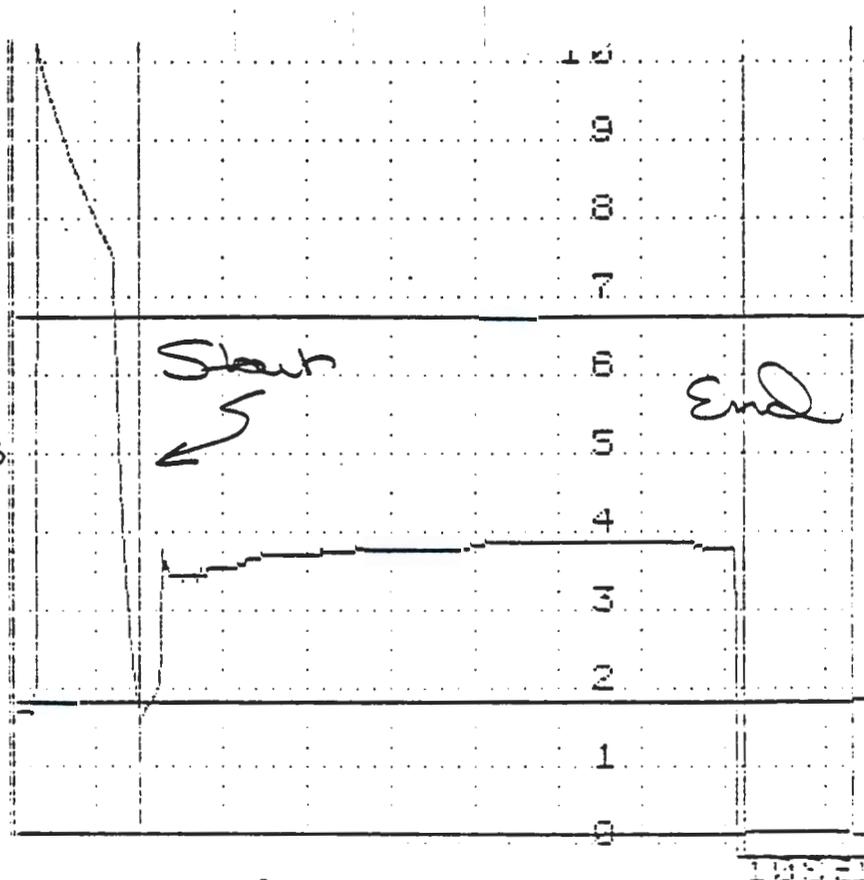
TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-2

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 03/20/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1400 mrad on contact through the drill string and 38 inches of NPH were added to the drill string.

1-3A17-2
3/20/86
1400mrads



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Rev. 0

TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-3

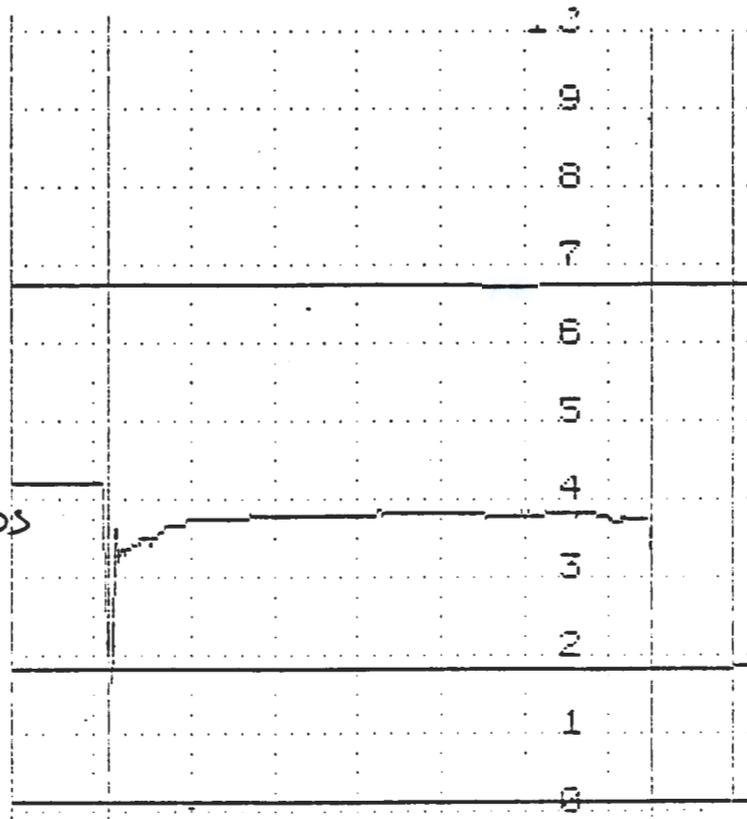
EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 03/20/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1400 mrad on contact through the drill string and 40 inches of NPH were added to the drill string.

911096.1653

1-3A17-3
3/20/86
1400 mRADS



SD-RE-TI-198
Rev. 0

TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-4

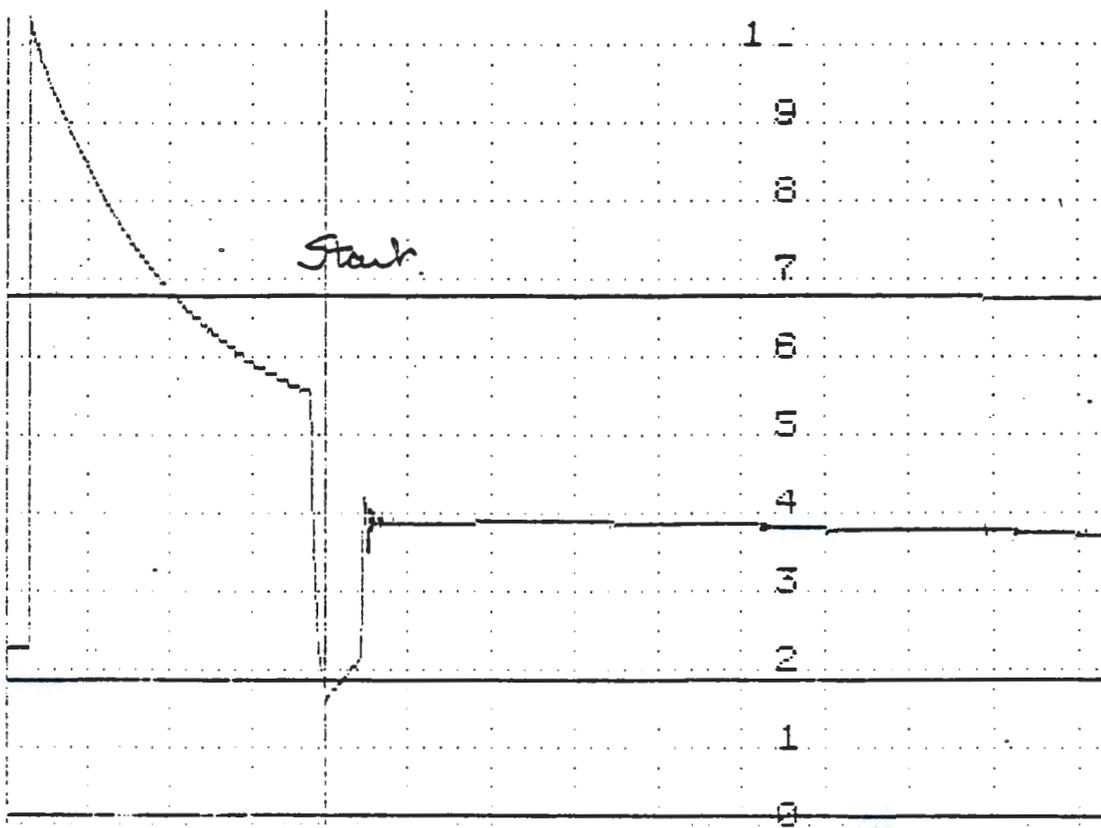
EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 03/20/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1200 mrad on contact through the drill string and 42 inches of NPH were added to the drill string.

1591 967
2096.1654

1-3A17-4
3/25
5#6
1021
1200 mrad



SD-RE-TI-198

Rev. 0

TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-5

EXPECTED: 19 inches

RECOVERY: 100%

RESULTS: 19 inches

DATE: 03/25/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1000 mrad on contact through the drill string and 37 inches of NPH were added to the drill string.

591 50116

1-3A17-5
3/25
1000mrads



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Rev. 0

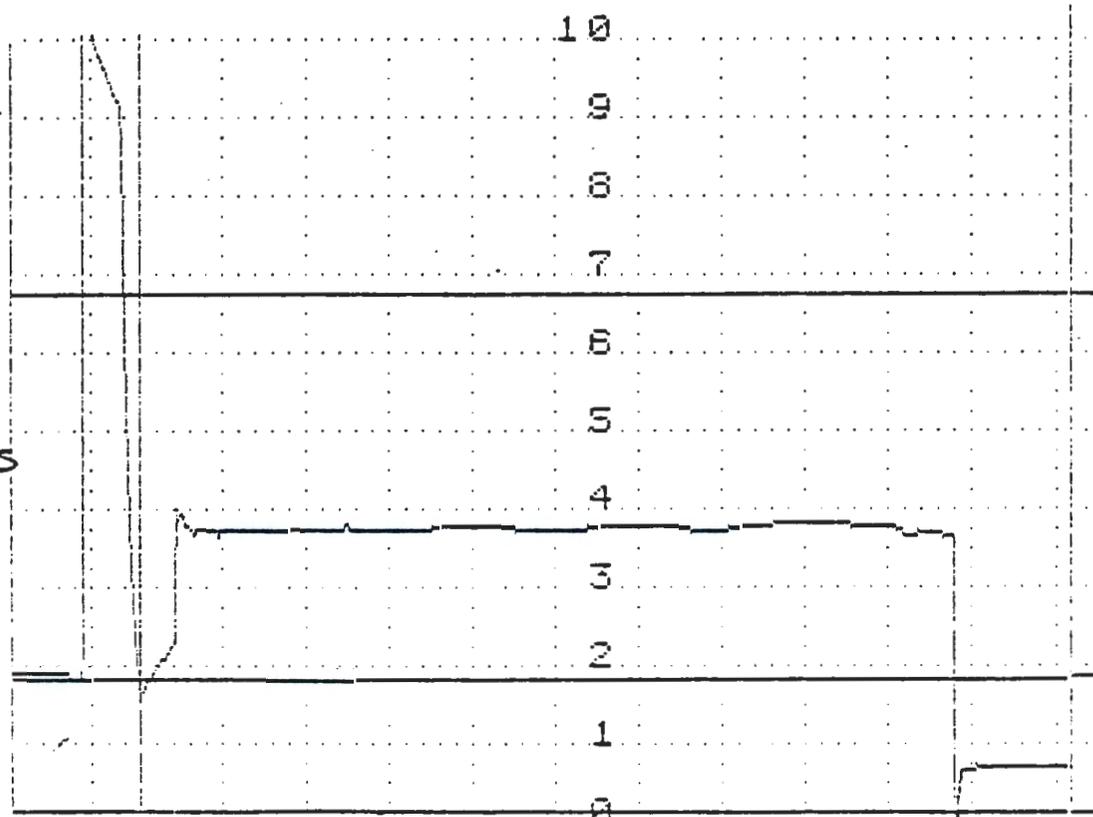
TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-6

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 03/25/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 900 mrad on contact through the drill string. During inspection of the sampler through the sight-glass, a small amount of waste was located around the valve body and was subsequently sprayed off with NPH. Also, 37 inches of NPH were added to the drill string.

1-3A17-6
3/25
900mrads



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TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-7

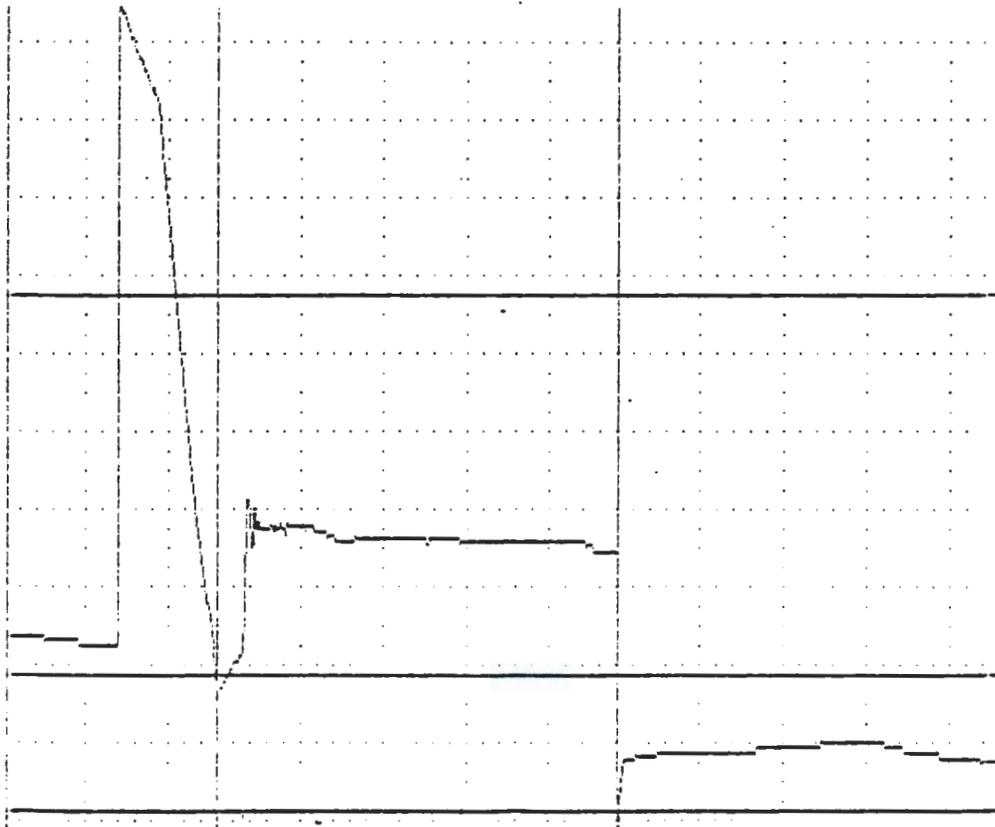
EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 03/26/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1100 mrad on contact through the drill string. Small amounts of waste were located around the valve body and sprayed off with NPH. Also, 36 inches of NPH were added to the drill string.

591-957
5 1986.165

1-3A17-7
3/26
1100mrad



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TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-8

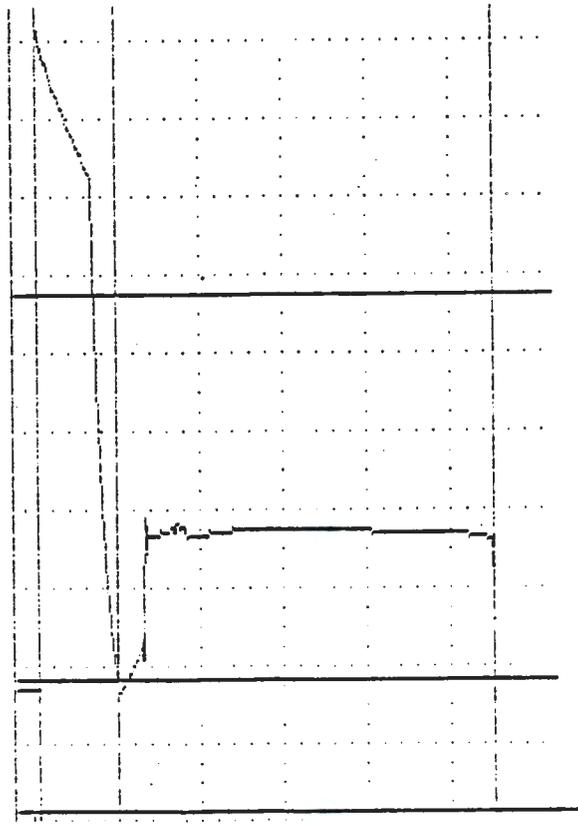
EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 03/26/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1100 mrad on contact through the drill string. Small amounts of waste were located around the valve body and sprayed off with NPH. Also, 36 inches of NPH were added to the drill string.

03/26/86 1659

1-3A17-8
3/26



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TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-9

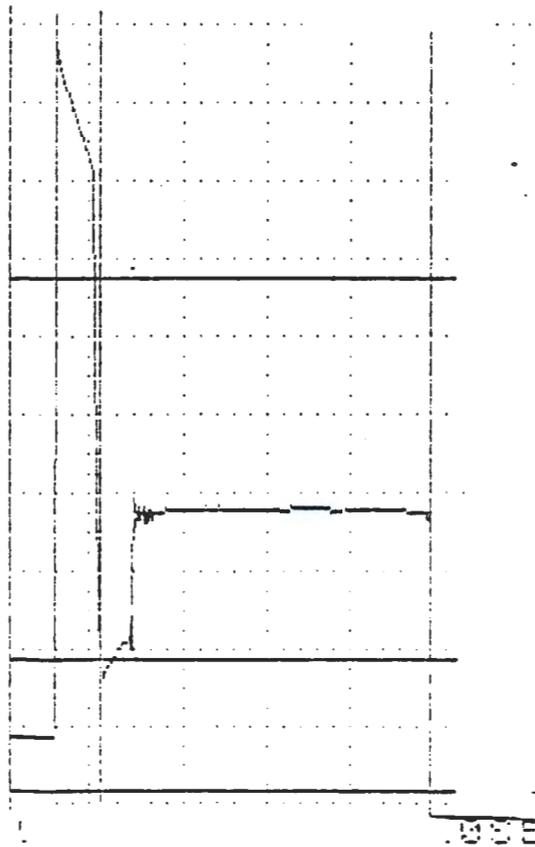
EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 03/26/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1050 mrad on contact through the drill string. Small amounts of waste were located around the valve body and sprayed off with NPH. Also, 38 inches of NPH were added to the drill string.

9413096.159

1-3A17-9
3/26



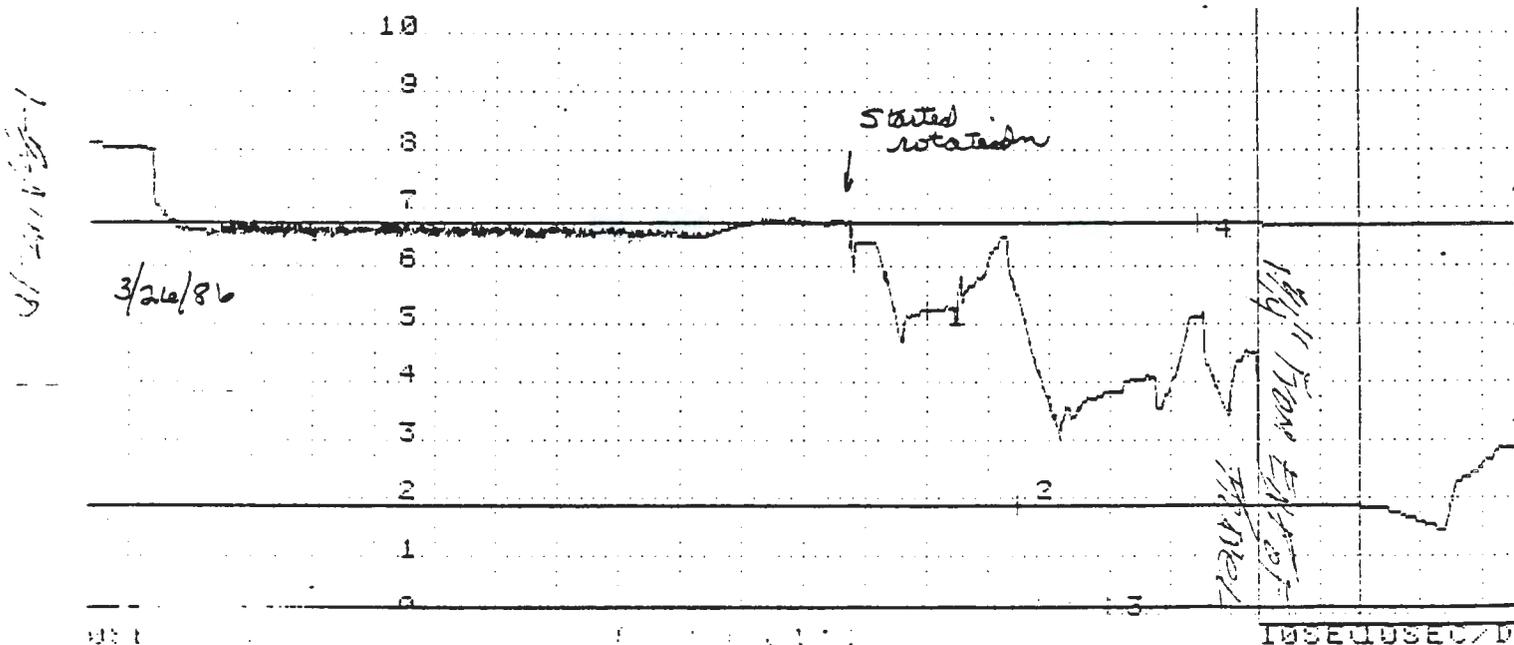
SD-RE-TI-198
Rev. 0

TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-10

EXPECTED: 19 inches
RESULTS: 0 inches

RECOVERY: 0%
DATE: 03/26/86

FIELD OBSERVATIONS: The sample had been planned to be taken in the push mode but no sample was obtained due to an open valve in the sampler. This was verified when the sight-glass was looked through and the "T" bar seen in the down position. The radiation reading was 50 mrad on contact through the drill string and 36 inches of NPH were added to the drill string. This sample will be retaken.



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TANK A-103, RISER R-17
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-1 SEGMENT-R10

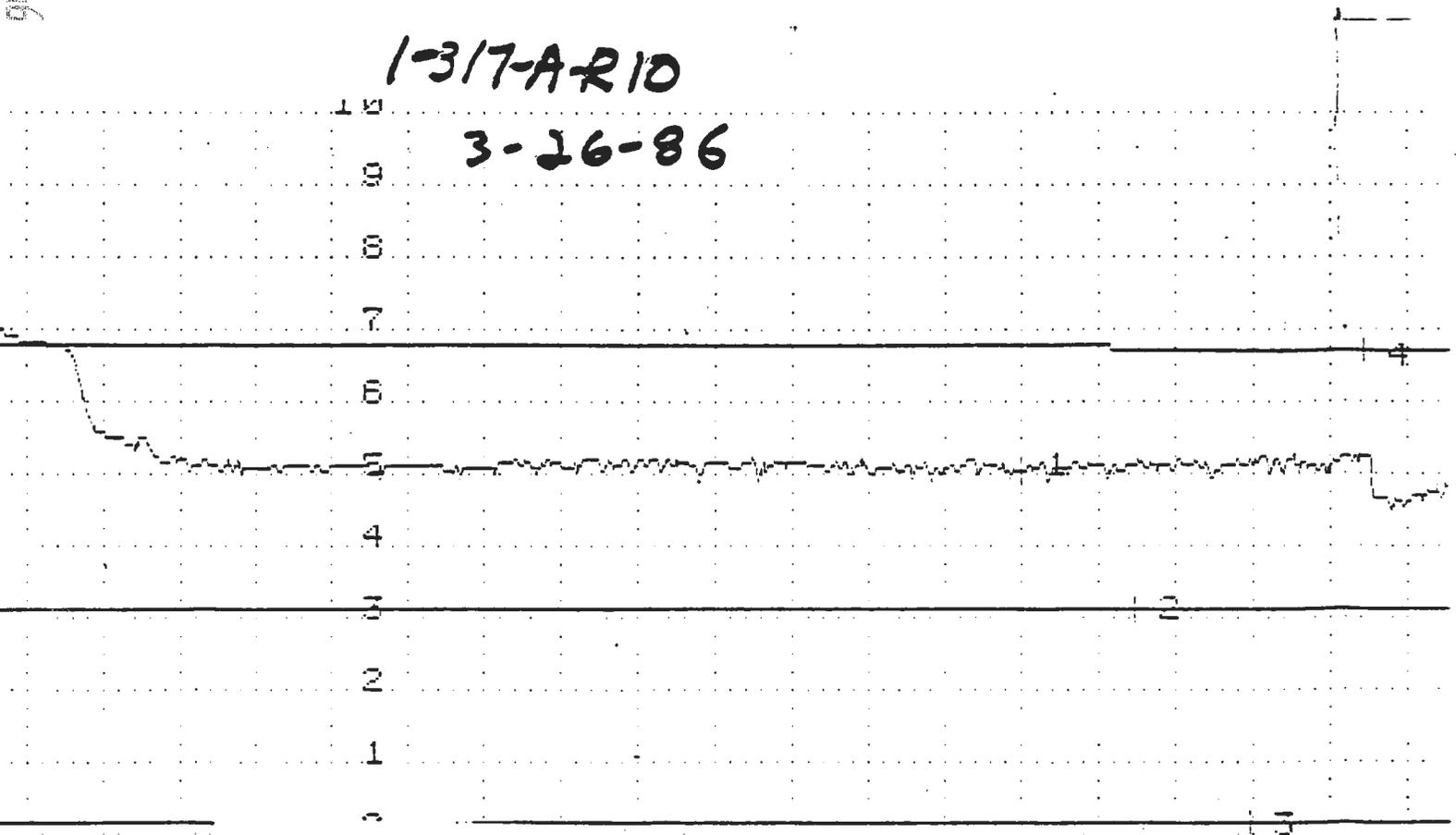
EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 03/26/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1000 mrad on contact through the drill string. It was verified that the "T" bar was in position to obtain the sample. Also, 36 inches of NPH were added to the drill string.

03/26/86

1-317-A-R10
3-26-86



REC'D IN

SD-RE-TI-198

Rev. 0

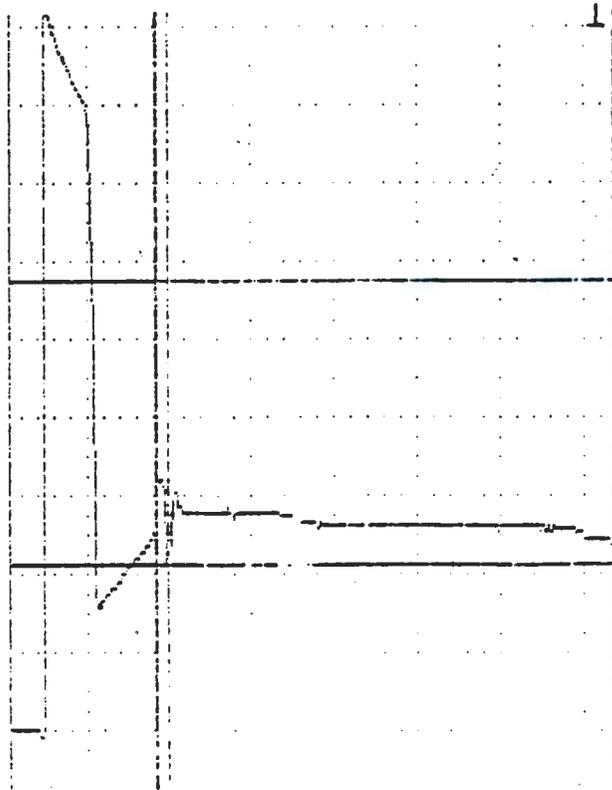
TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-1

EXPECTED: 15.6 inches
RESULTS: 0 inches

RECOVERY: 0%
DATE: 03/31/86

FIELD OBSERVATIONS: No sample was obtained in this segment. The sampler did not latch in the core barrel. The drill string had 30 inches of MPH added to it.

2-3A12-1
3/31/86
Did not
latch.



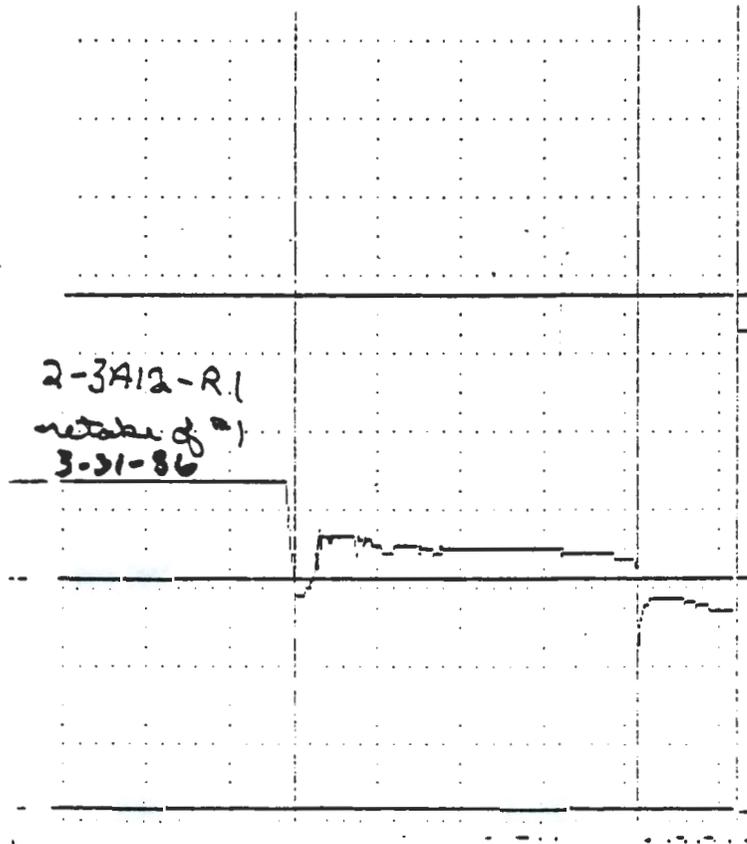
SD-RE-TI-198
Rev. 0

TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-R1

EXPECTED: 15.6 inches
RESULTS: 0 inches

RECOVERY: 0%
DATE: 03/31/86

FIELD OBSERVATIONS: No sample due to calculation error. The sampler was above the waste. The drill string had 30 inches of NPH added.



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TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-2

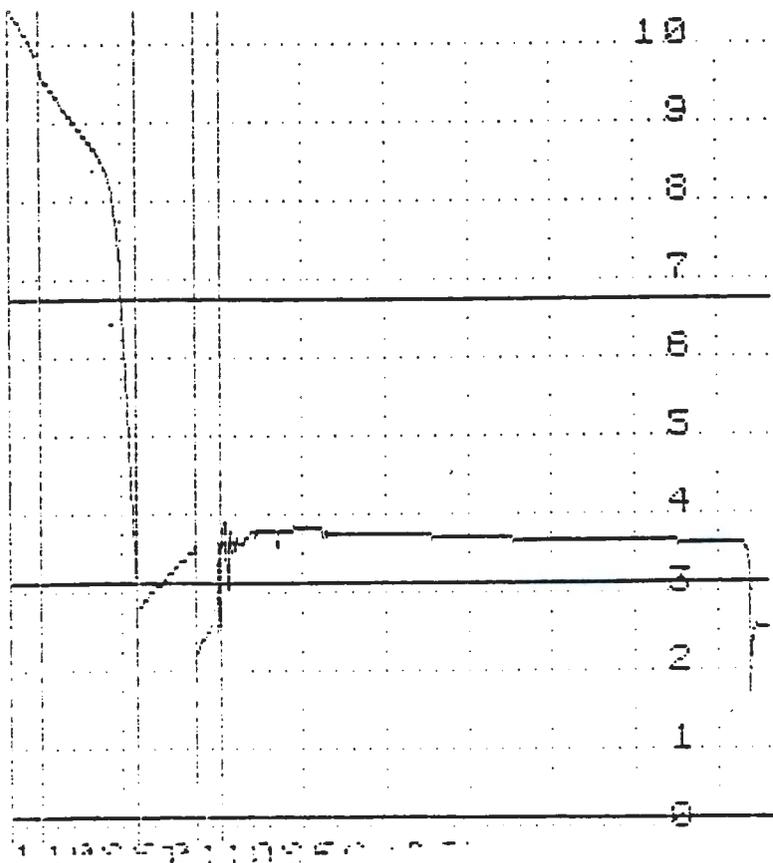
EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/01/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1500 mrad on contact through the drill string and 35 inches of NPH were added to the drill string.

1979066

2-3A12-2
4/1/86
1500mrad



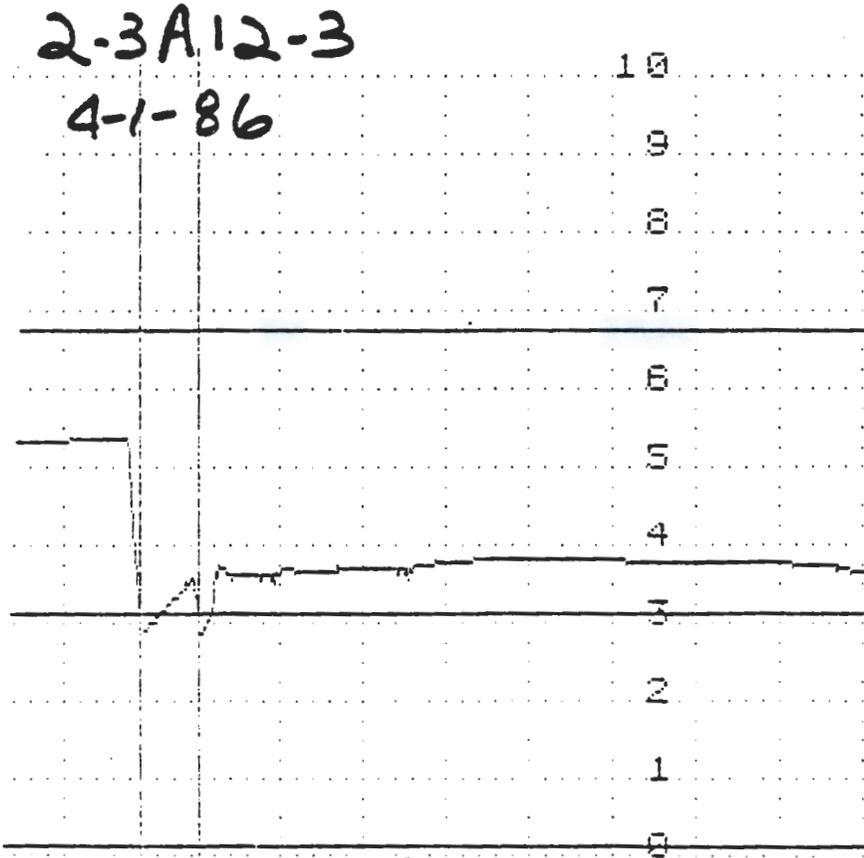
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TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-3

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/01/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1500 mrad on contact through the drill string and 35 inches of NPH were added to the drill string.



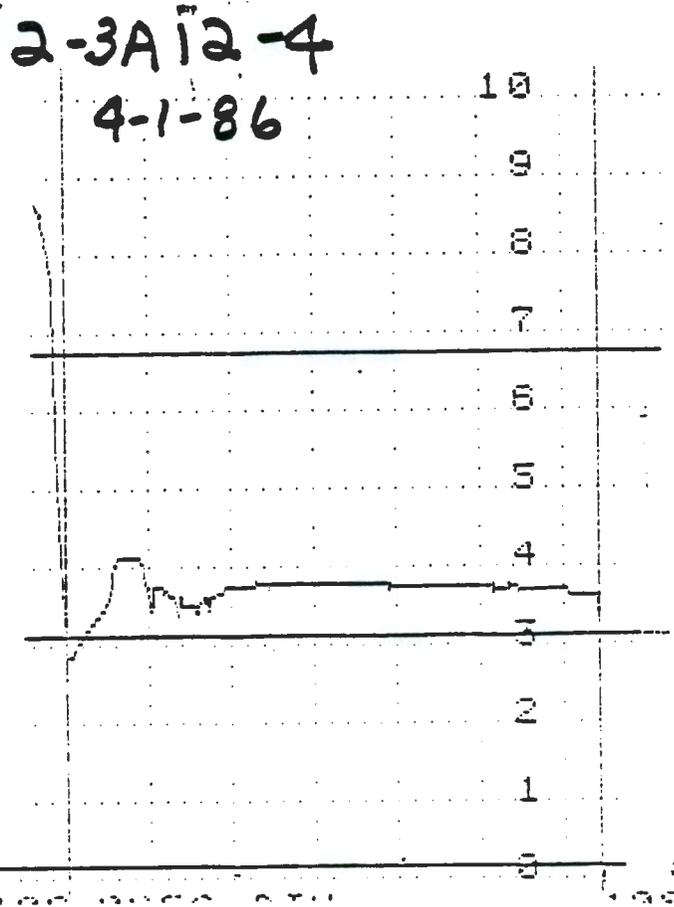
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TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-4

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/01/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1200 mrad on contact through the drill string and 35 inches of NPH were added to the drill string.



944396.1666

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TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-5

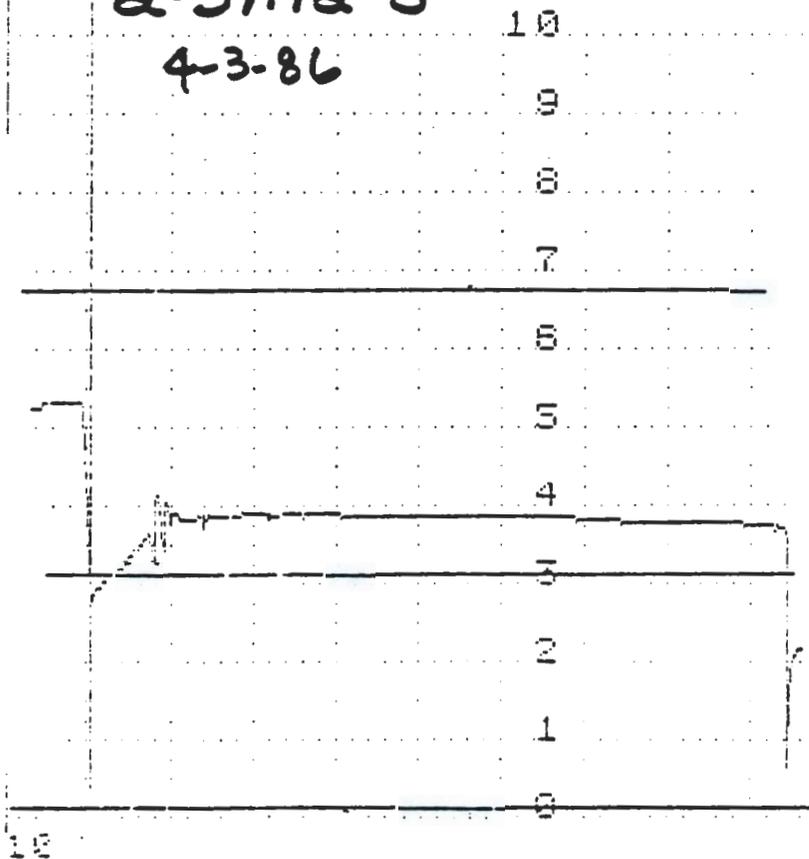
EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/03/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1150 mrad on contact through the drill string. Small amounts of waste were located around the valve body and sprayed off with NPH. Also, 35 inches of NPH were added to the drill string.

2-3A12-5

4-3-86



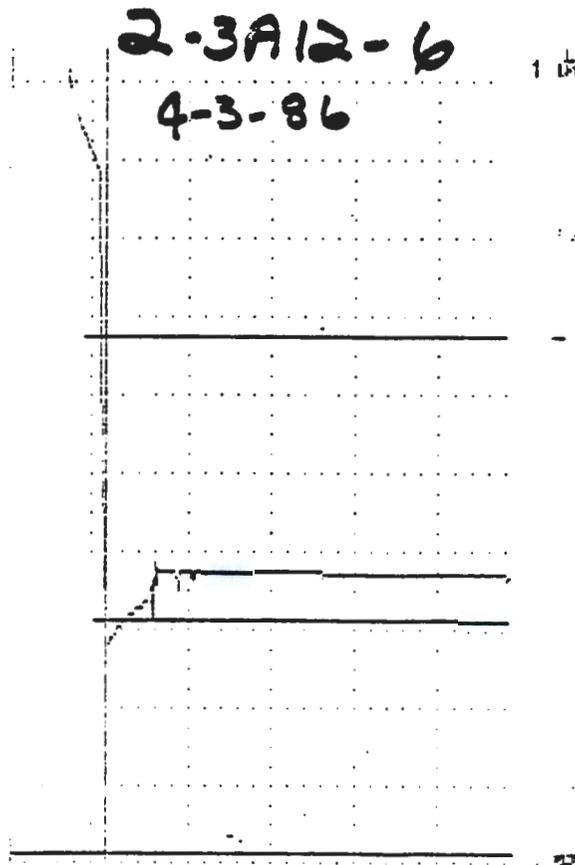
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TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-6

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/03/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1100 mrad on contact through the drill string. Small amounts of waste were located around the valve body and sprayed off with NPH. Also, 35 inches of NPH were added to the drill string.



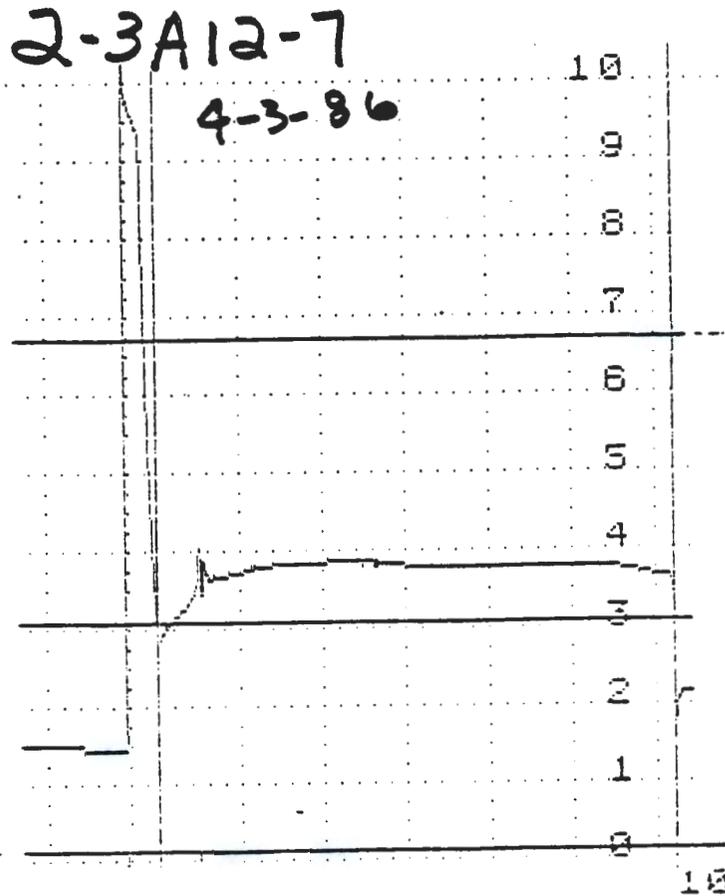
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TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-7

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/03/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1100 mrad on contact through the drill string. Small amounts of waste were located around the valve body and sprayed off with NPH. Also, 36 inches of NPH were added to the drill string.



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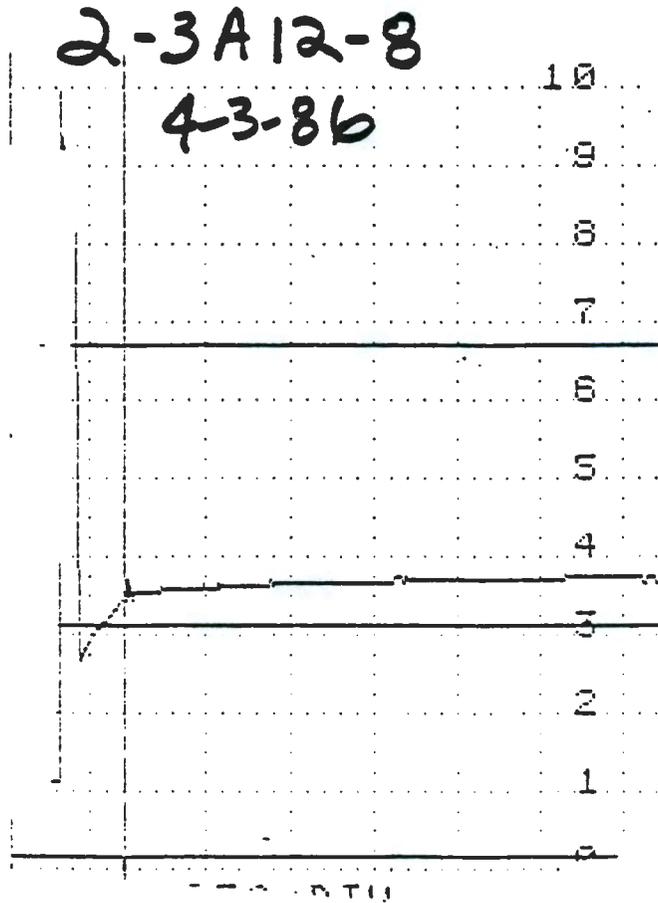
TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-8

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/03/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1100 mrad on contact through the drill string. Small amounts of waste were located around the valve body and sprayed off with NPH. Also, 38 inches of NPH were added to the drill string.

0291 920116



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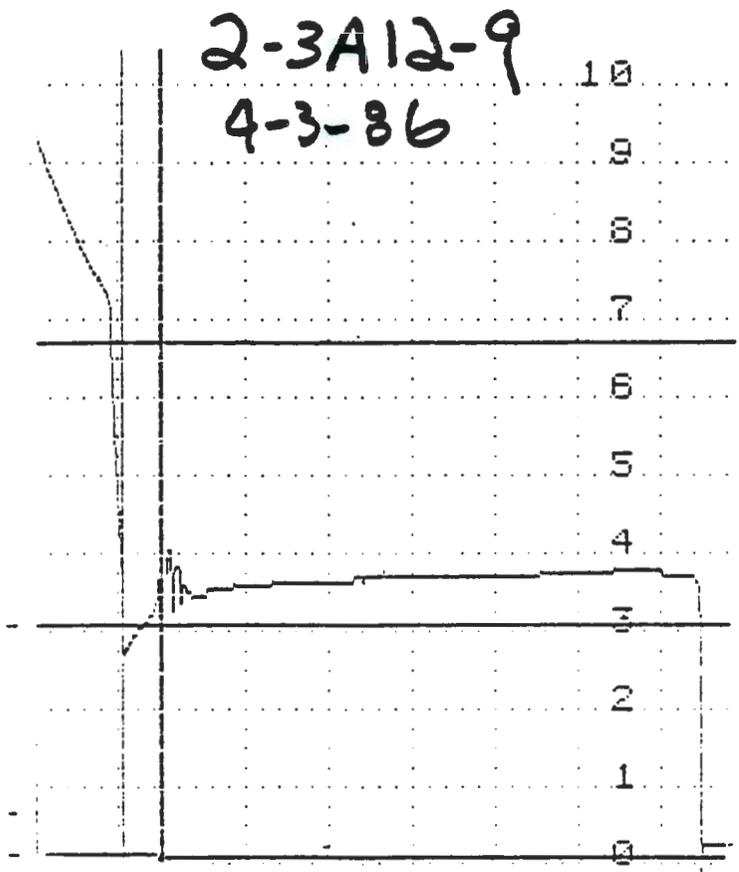
TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-9

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/03/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1200 mrad on contact through the drill string and 35 inches of NPH were added to the drill string.

9473096.167



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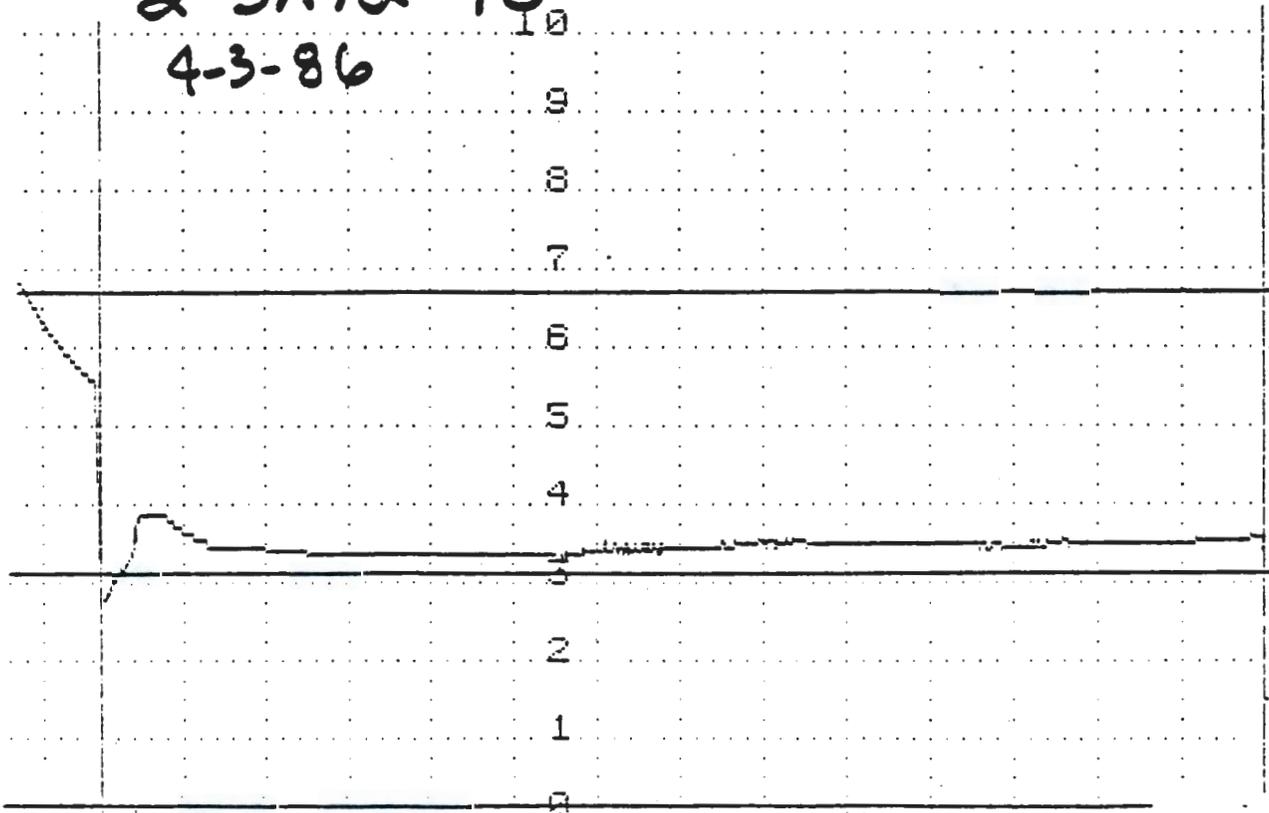
TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-10

EXPECTED: 19 inches
RESULTS: 19 inches

RECOVERY: 100%
DATE: 04/03/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1250 mrad on contact through the drill string. Small amounts of waste were located around the valve body and sprayed off with NPH. Also, 35 inches of NPH were added to the drill string.

2-3A12-10
4-3-86



1000

00:01:00

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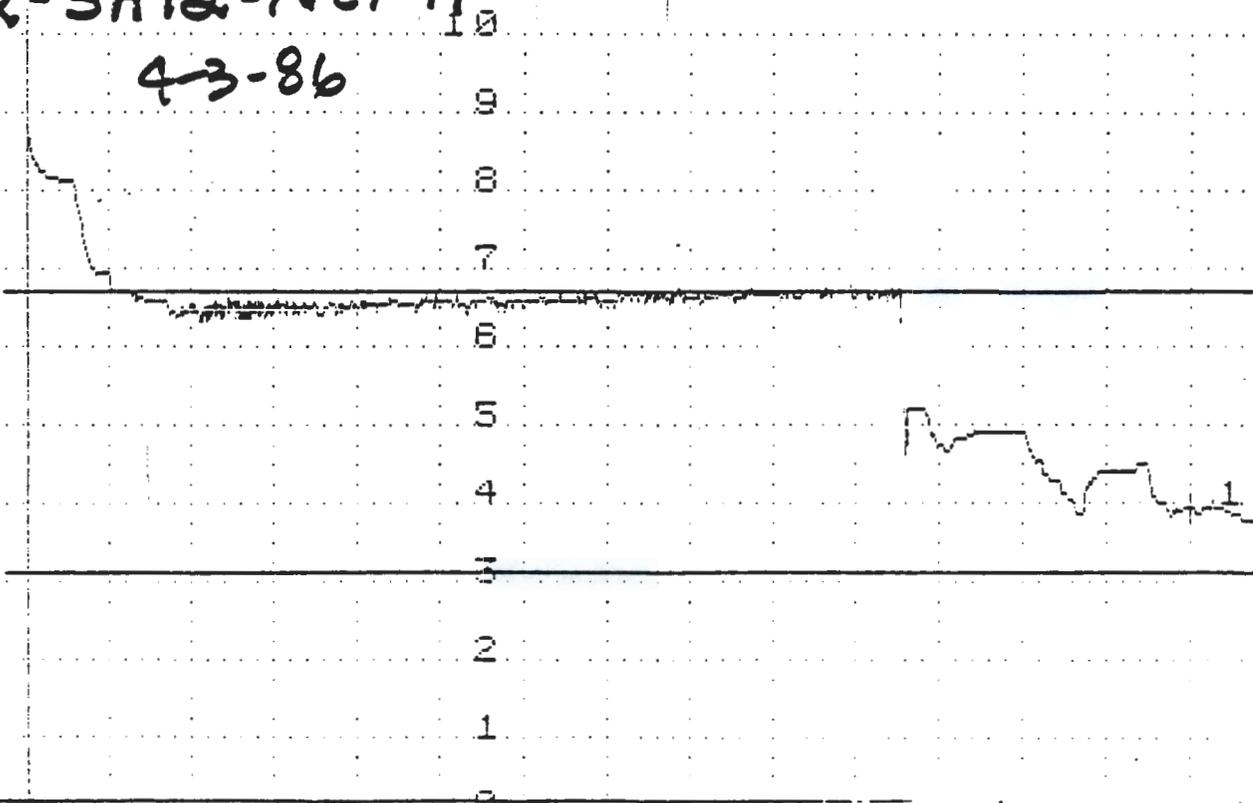
TANK A-103, RISER R-12
EQUIVALENT WASTE INCHES 187.6 INCHES
CORE-2 SEGMENT-11

EXPECTED: 17 inches
RESULTS: 17 inches

RECOVERY: 100%
DATE: 04/03/86

FIELD OBSERVATIONS: The sample was taken in the push mode. The radiation reading was 1150 mrad on contact through the drill string and 35 inches of NPH were added to the drill string. There were still two inches of ram travel available before the bottom detection alarm went off.

2-3A12-NCF11
4-3-86



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Percent recoveries were calculated based on volume (length) of waste expected vs. the volume (length) of waste actually recovered.

241-A-103 Tank Core Percent Sample Recovery

<u>Core/Segment</u>	<u>Percent Recovery</u>	<u>Overall Recovery</u>
1st Core		100%
Segment 1	100%	
Segment 2	100%	
Segment 3	100%	
Segment 4	100%	
Segment 5	100%	
Segment 6	100%	
Segment 7	100%	
Segment 8	100%	
Segment 9	100%	
Segment 10	0%	
Segment 10 repeat	100%	
2nd Core		100%
Segment 1*	0%	
Segment 1* repeat	0%	
Segment 2	100%	
Segment 3	100%	
Segment 4	100%	
Segment 5	100%	
Segment 6	100%	
Segment 7	100%	
Segment 8	100%	
Segment 9	100%	
Segment 10	100%	
Segment 11	100%	

* These samples were taken above the waste due to an error in the riser elevation.

V. SAMPLER BREAKDOWN, SEGMENT, AND CORE COMPOSITE DATA

The following contains observations made during extrusion of the wastes from the samplers including: sample weights, observations regarding bulk physical properties (e.g., color, texture) of the waste, weights of material used for core composites, and a copy of the photograph taken of each waste segment.

Sampler Breakdown and Core Compositing

Sample ID #1111

There were 241.69 g of sample: 11.3 g solid and 160 mL liquid. The solids were clear crystals and the liquid was clear.

Sample ID #1112

There were 263.0 g of sample: 47.98 g solid and 146 mL liquid. The solids were gray and slushy.

Sample ID #1113

There were 330.1 g of sample: 306.47 g solid and 14 mL liquid. The solids were gray, slushy and granular.

Sample ID #1114

There were 329.70 g of sample: 299.77 g solid and 22 mL liquid. The solids were gray, sloppy and looked like wet cement.

Sample ID #1115

There were 327.08 g of sample: 326.13 g solid and 8 mL liquid. The solids were similar to those in sample ID #1114.

Sample ID #1116

There were 322.09 g of sample: 311.30 g solid and 7 mL liquid. The solids were similar to those in sample ID #1114.

Sample ID #1117

There were 313.77 g of solids in this sample. There was no liquid. The solids were gray, looked like wet cement and had small "holes" throughout - like swiss cheese.

Sample ID #1118

There were 326.71 g of solids in this sample. There was no measurable liquid. The solids were similar to those in sample ID #1117 but a little more wet.

Sample ID #1119

There were 338.27 g of sample: 331.12 g solid and 6 mL liquid. The solids were similar to those in sample ID #1118.

Sample ID #11110

There were 358.54⁵ g of sample: 358.54 g solid and 12 mL liquid. The solids were similar to those in sample ID #1118.

Drainable Liquid (ID #B1XD00XX): Combined all liquid from sample ID #'s 1111-11110 for a 375 mL total. The resultant solution was bright yellow.

Core Composite (ID #B1XC00XX): Combined all solids from sample ID #'s 1111-11110 in the hot cell with a masher. The resultant mixture had a greenish-brown color.

Sample ID #1122

There were 322.85 g of sample: 22.48 g solid and 206 mL liquid. The shoe on the sampler could not be removed. Consequently, the valve was opened over a jar and the sampler contents drained into it.

Sample ID #1123

There were 321.98 g of sample: 123.26 g solid and 138 mL liquid. There were black, slushy solids on the bottom end of the segment, white solids on the top end, and liquid in between.

Sample ID #1124

There were 314.40 g of sample: 290.48 g solid and 23 mL liquid. The solids were gray, a little sloppy and looked like wet cement.

Sample ID #1125

There were 296.20 g of sample: 290.22 g solid and 7 mL liquid. The shoe on the sampler could not be removed. Consequently, the valve was opened over a jar and a few drops of liquid from the sampler drained into it. The sampler was then mounted and most of the sample extruded. Some sample and the piston remained in the sampler. The sampler was washed in an attempt to remove the rest of the sample. The solids looked like wet cement.

Sample ID #1126

There were 325.41 g of sample: 316.59 g solid and 6 mL liquid. The solids were a little sticky and looked like wet cement.

Sample ID #1127

There were 286.00 g of solids in this sample. There was no liquid. The solids were similar to those in sample ID #1126 but somewhat drier.

Sample ID #1128

There were 325.74 g of sample: 324.13 g solid and 3 mL liquid. The solids were similar to those in sample ID #1127.

Sample ID #1129

There were 225.94^S g of sample: 311.29 g solid and 6 mL liquid. The solids were similar to those in sample ID #1127.

Sample ID #11210

There were 348.19 g of solids in this sample. There was no liquid. The solids were similar to those in sample ID #1127.

Sample ID #11211

There were 282.94 g of sample: 270.47 g solid and 13 mL liquid. The solids were similar to those in sample ID #11110 but a little drier on the bottom end of the segment.

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Drainable Liquid (ID #B2XD00XX): Combined all liquid from sample ID #'s 1122-11211 for a 402 mL total. The resultant solution was bright yellow.

Core Composite (ID #B2XC00XX): Combined all solids from sample ID #'s 1122-11211 in the hot cell with a masher. The resultant mixture had a greenish-brown color.

* The gray color seen in the hot cell in all of the segments in tank 241-A-I03 usually was brown when the sample was taken out.

§ The difference between the bulk weights and the component weights cannot be accounted for.

943096.1678

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A-103

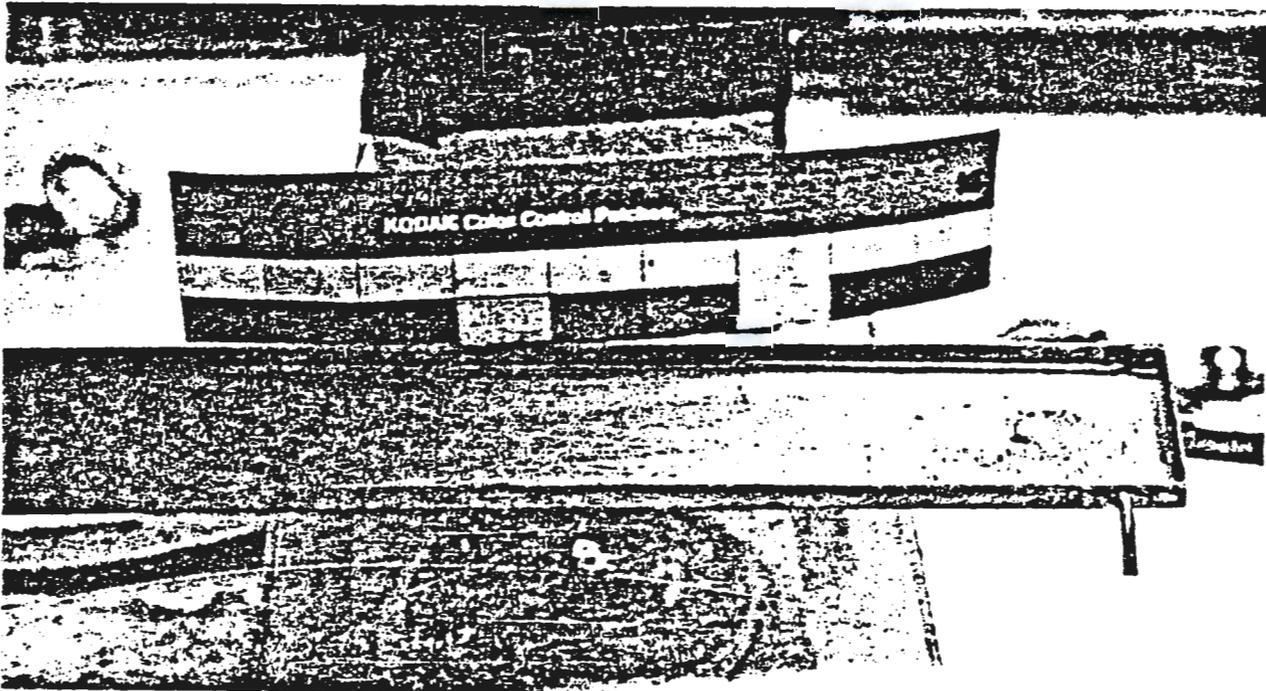
Riser-17

Core-1

Segment-1

241.7gm

9413096.1679



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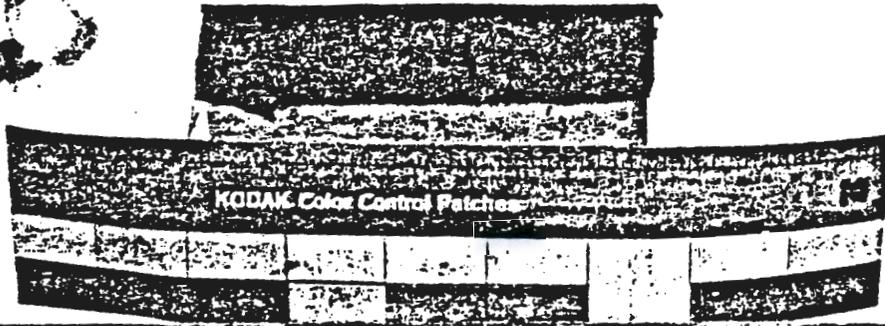
A-103

Riser-17

Core-1

Segment-2

263.0gm



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Rev. 0

A-103

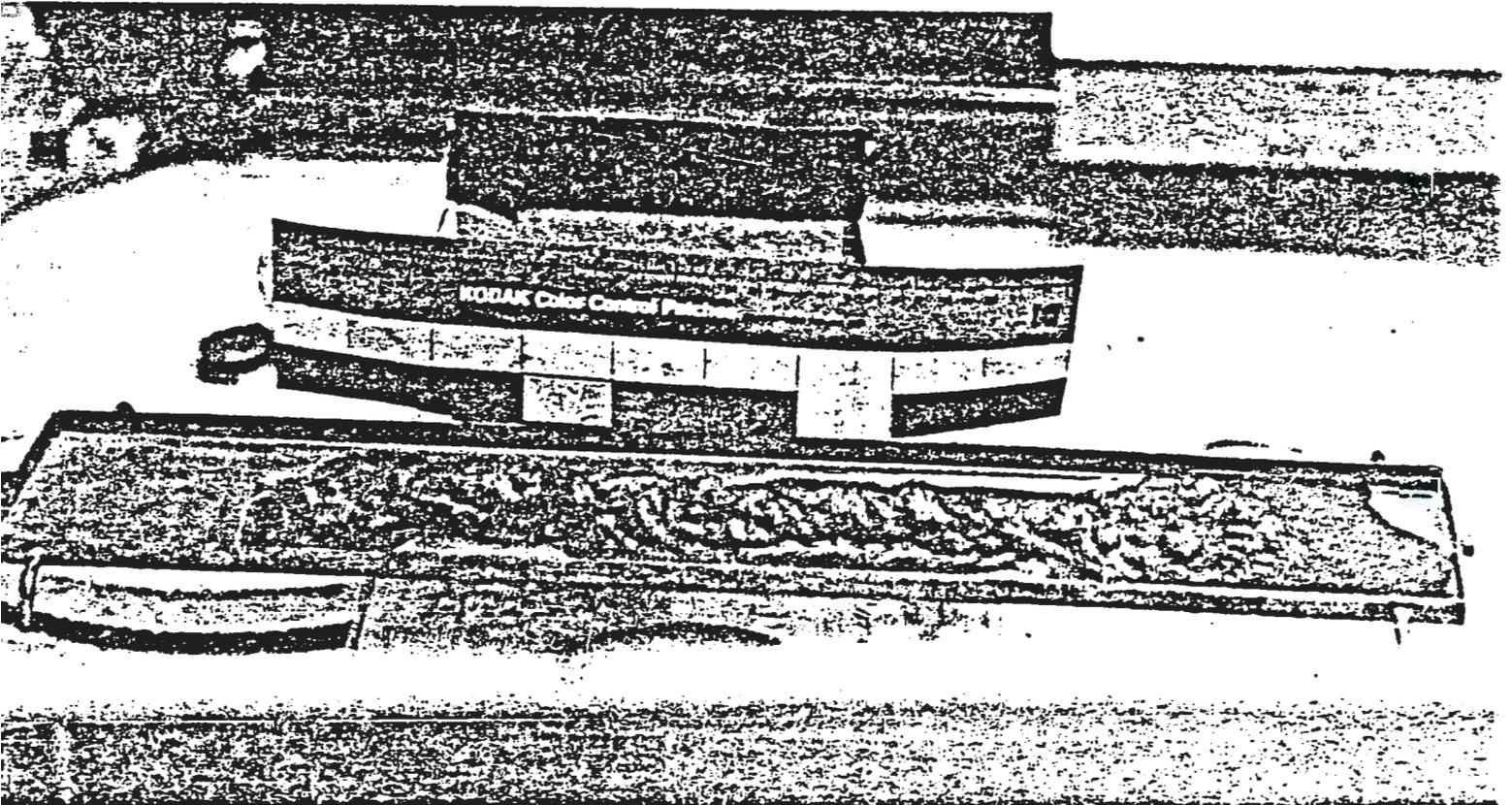
Riser-17

Core-1

Segment-3

330.1gm

1891 96014



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Rev. 0

A-103

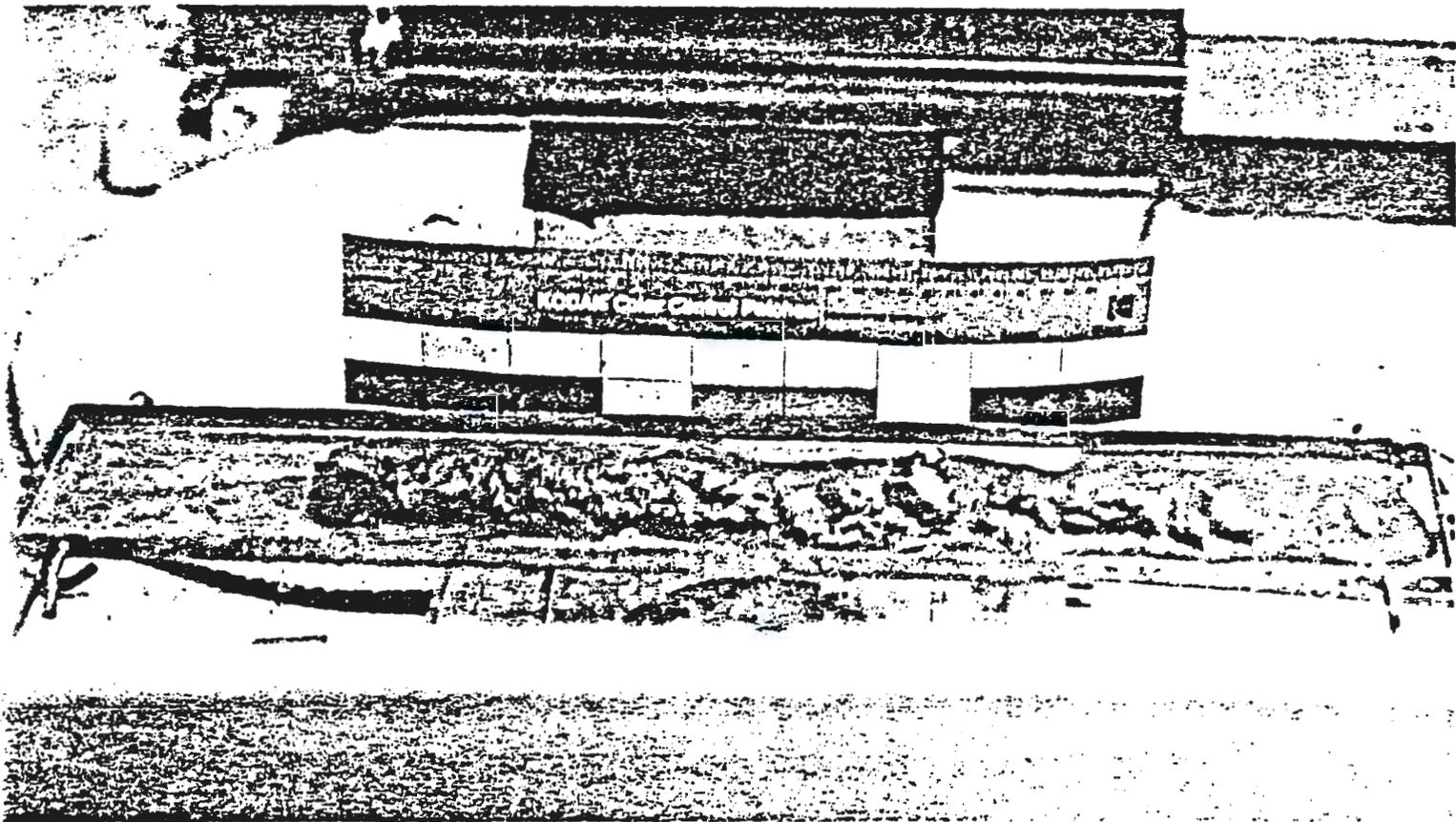
Riser-17

Core-1

Segment-4

329.7gm

943096.1682



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Rev. 0

A-103

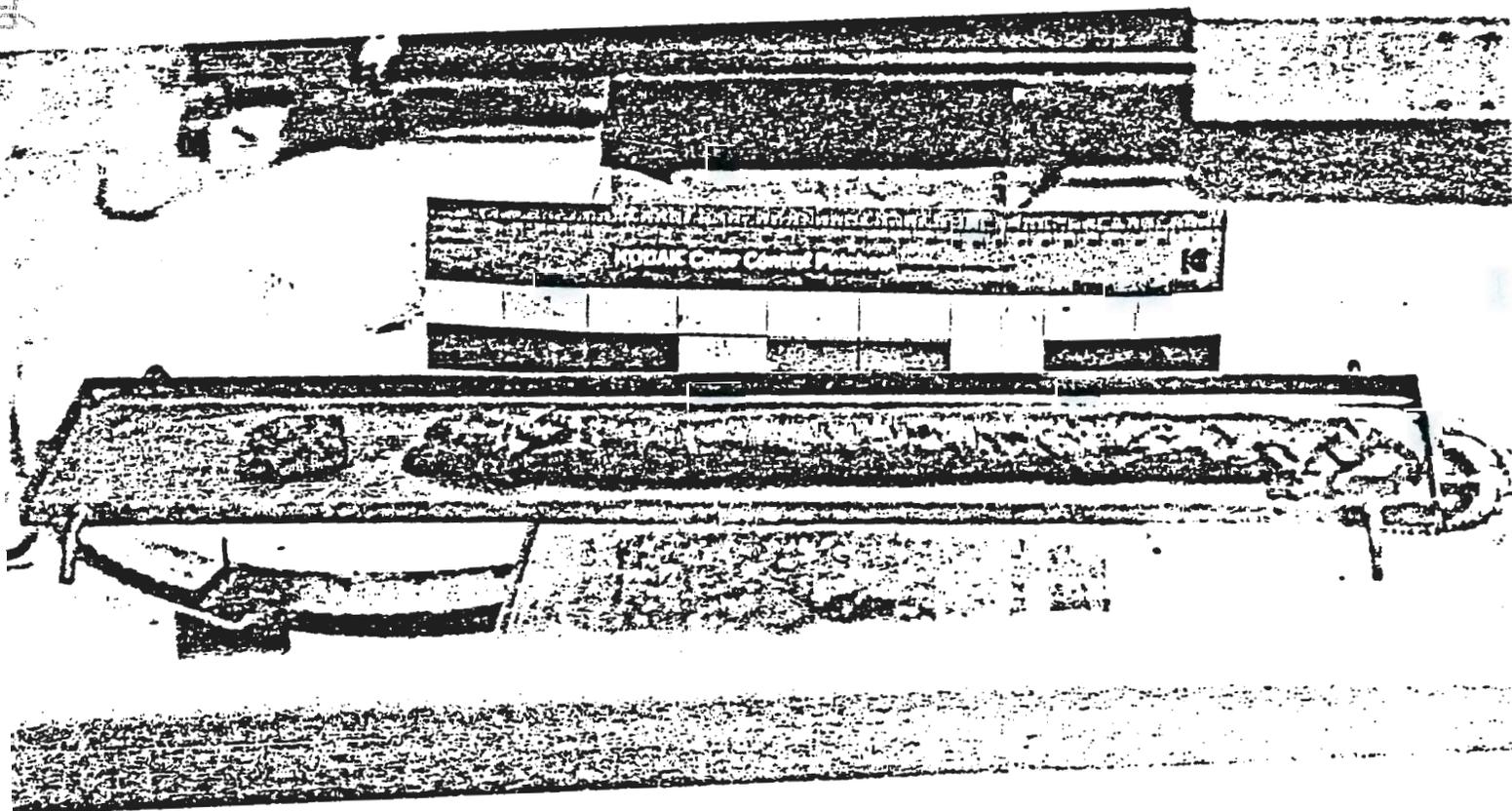
Riser-17

Core-1

Segment-5

327.1gm

911096.1683



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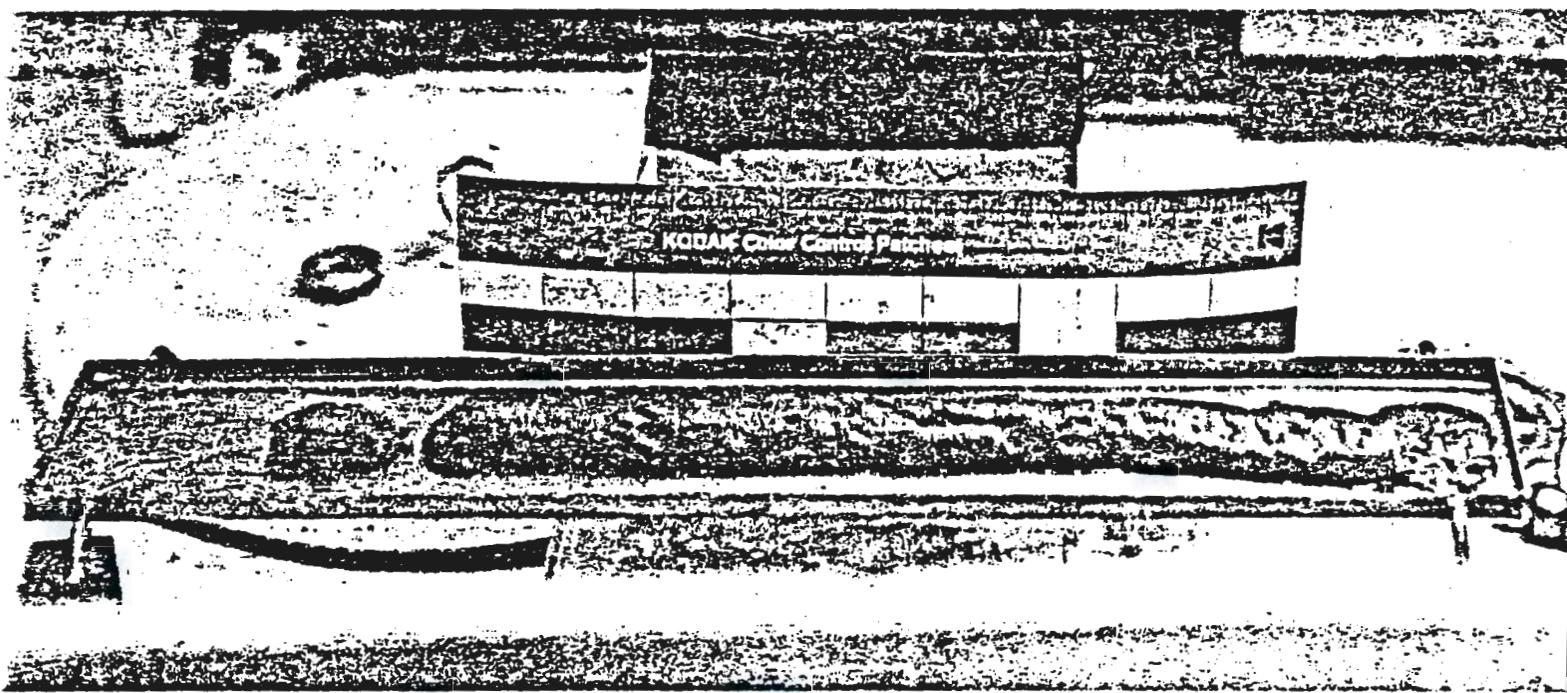
Riser-17

Core-1

Segment-6

322.1gm

9473096.1684



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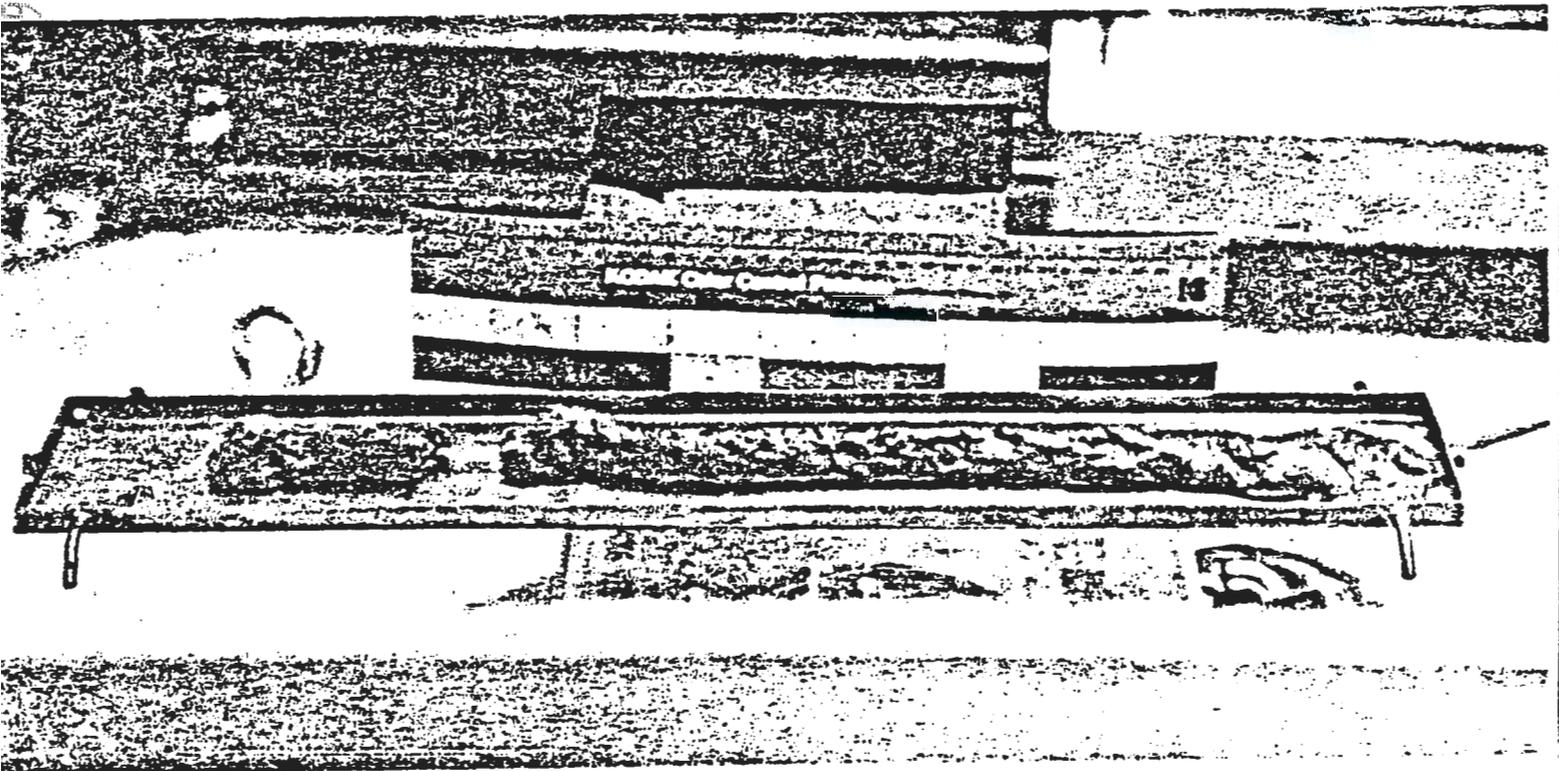
Riser-17

Core-1

Segment-8

327gm

9413096.1685



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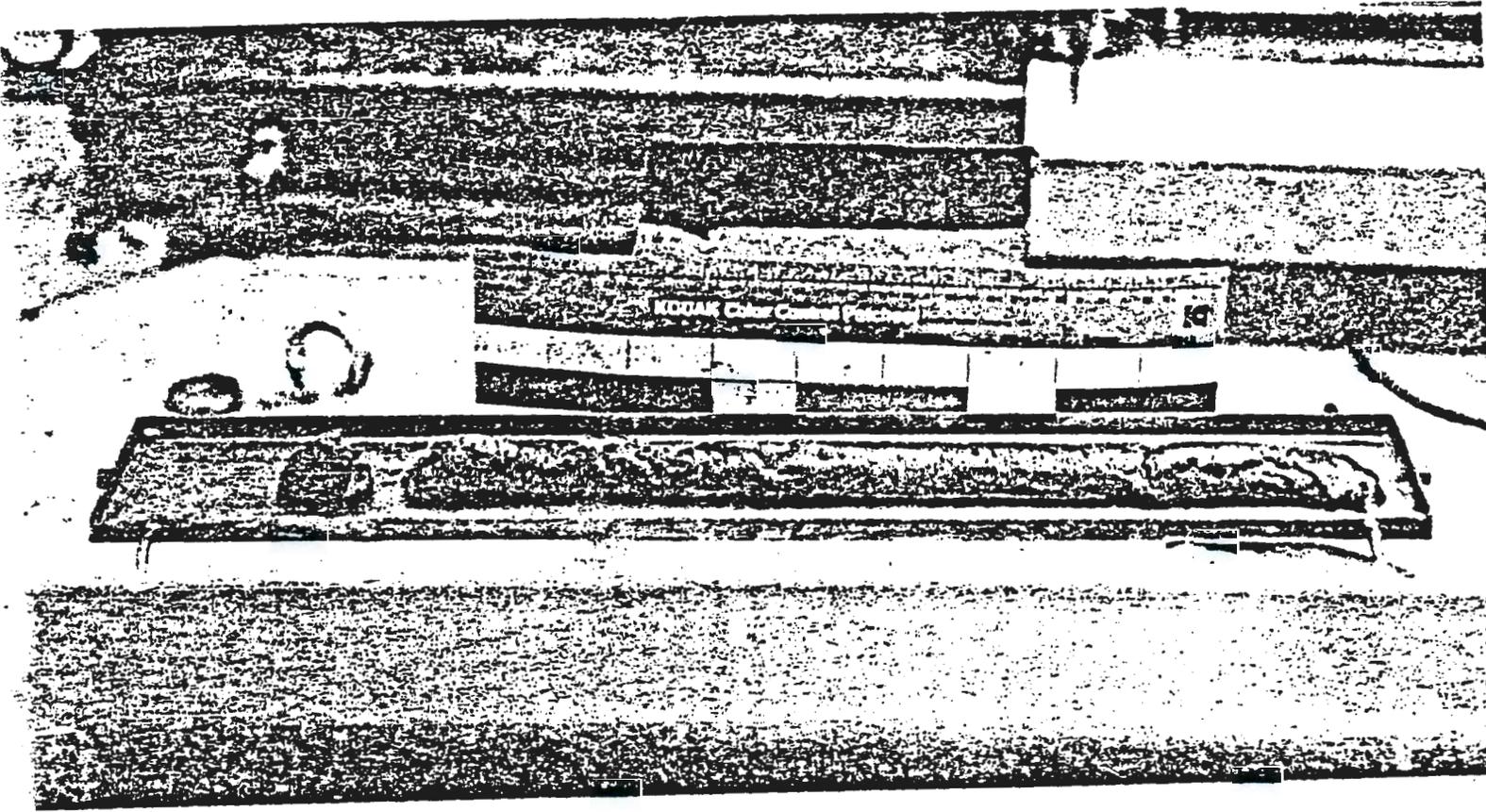
Riser-17

Core-1

Segment-9

338gm

9413096.1686



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A-103

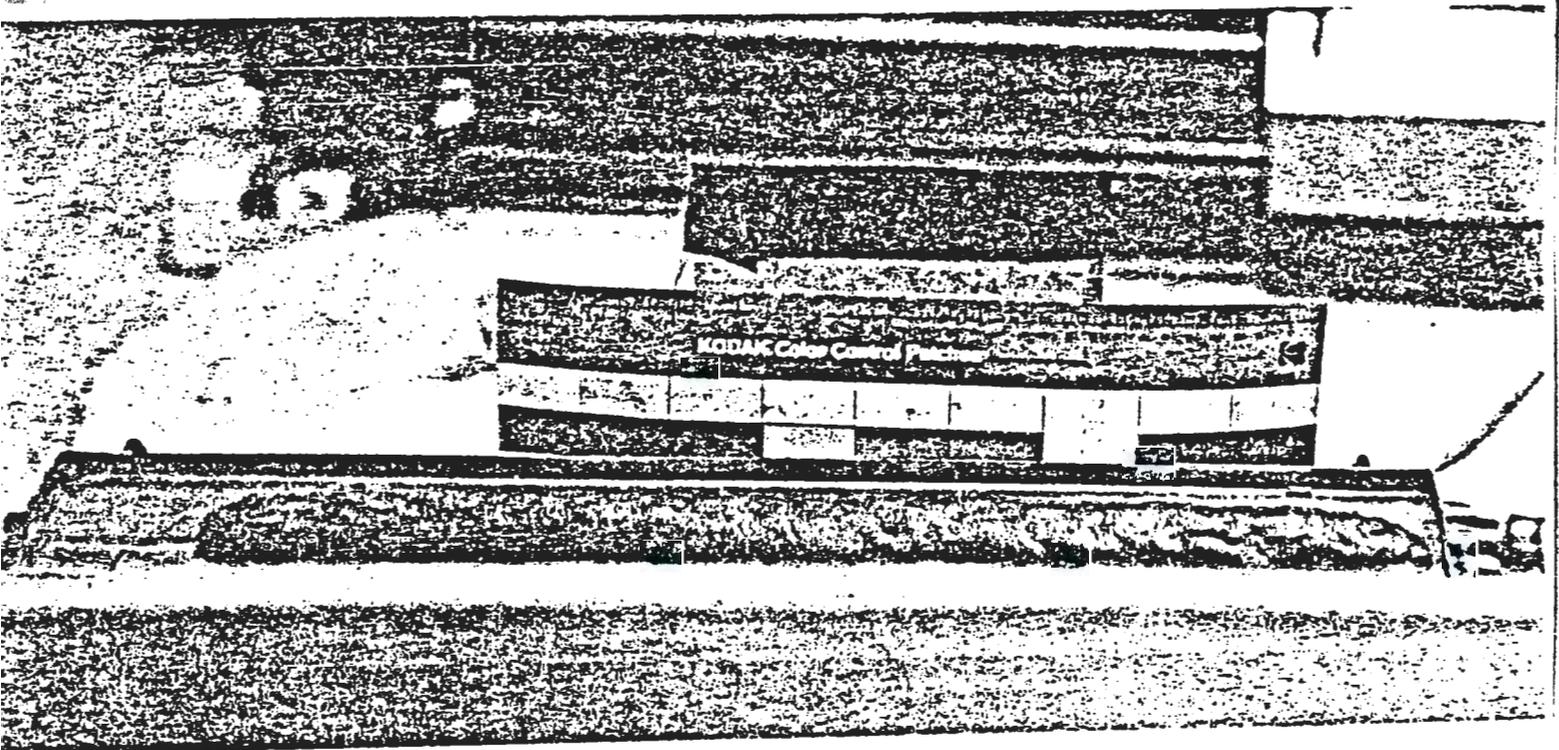
Riser-17

Core-1

Segment-10

356gm

9413096.1687



A-163

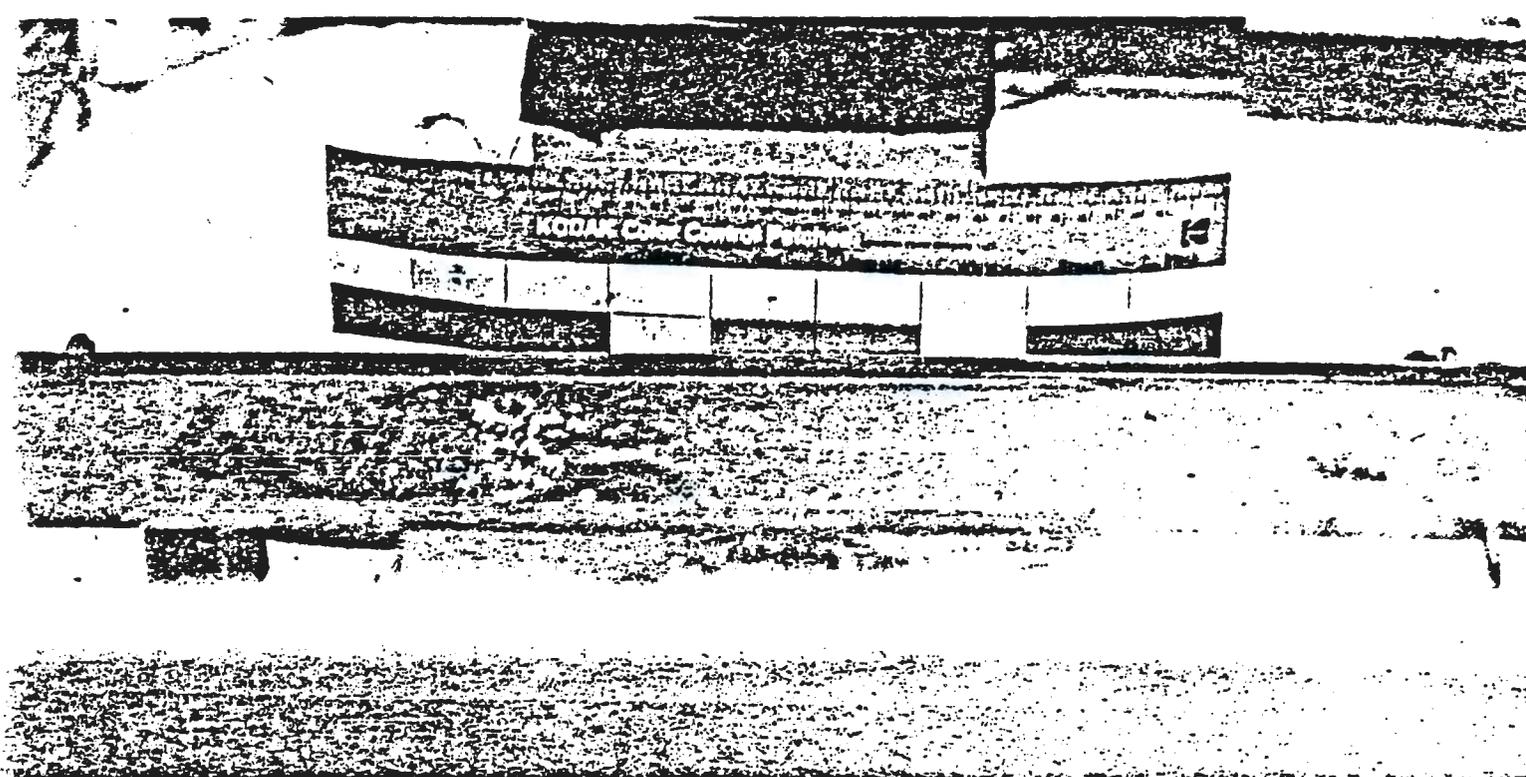
Riser-12

Core-2

Segment-3

322gm

993096.1680



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A-103

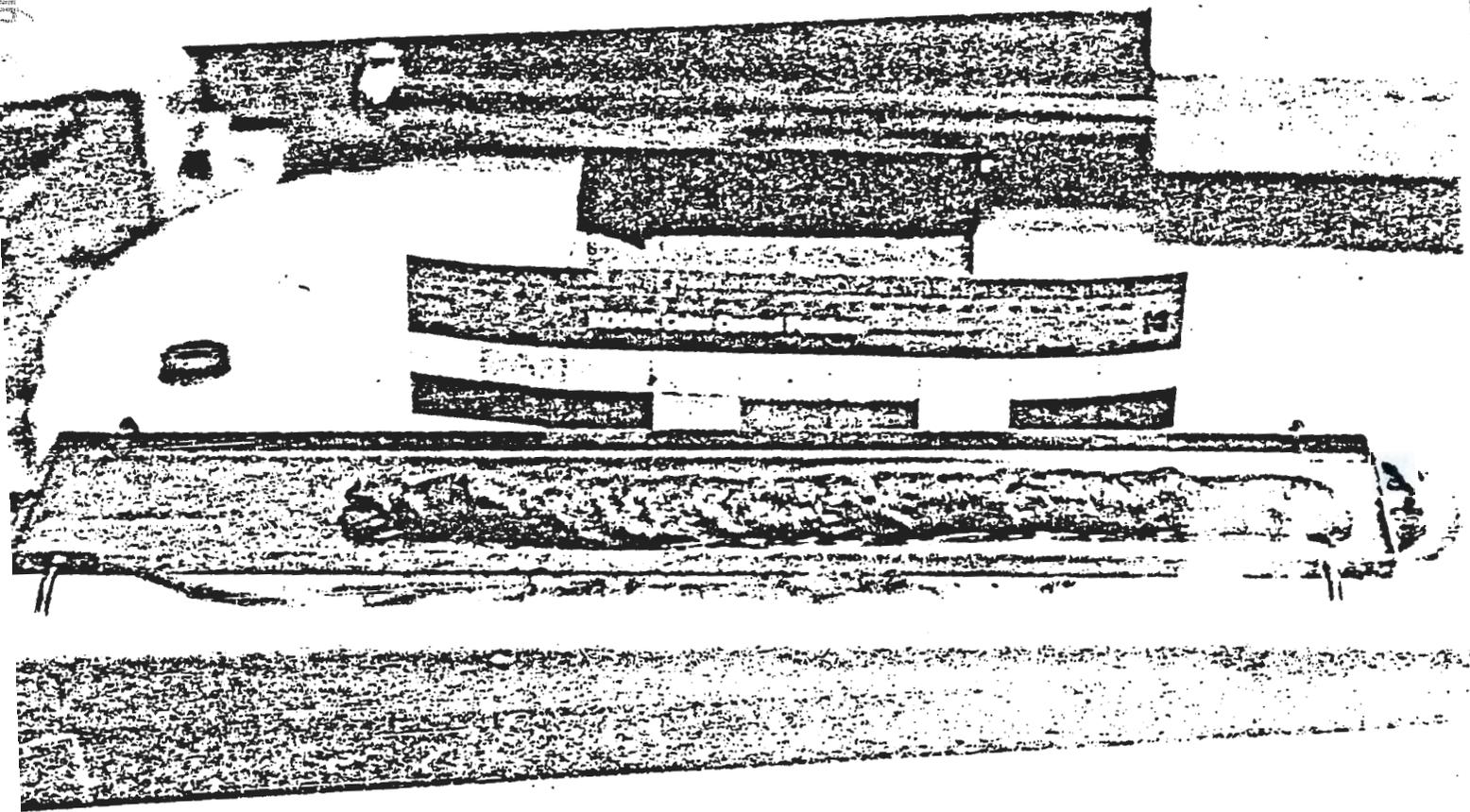
Riser-12

Core-2

Segment-4

314gm

01/01/96 1589



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A-103

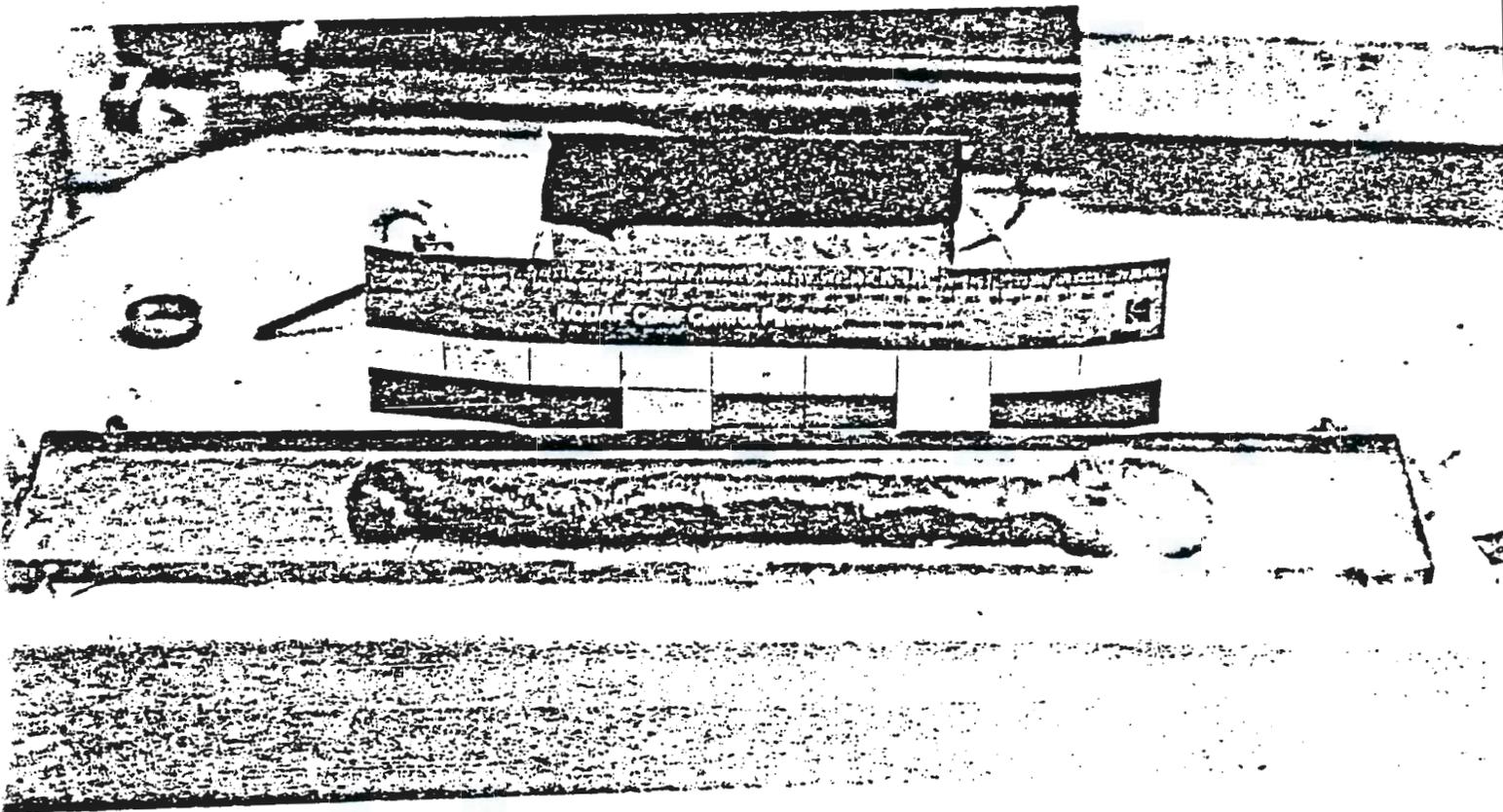
Riser-12

Core-2

Segment-5

296gm

0691-9608117



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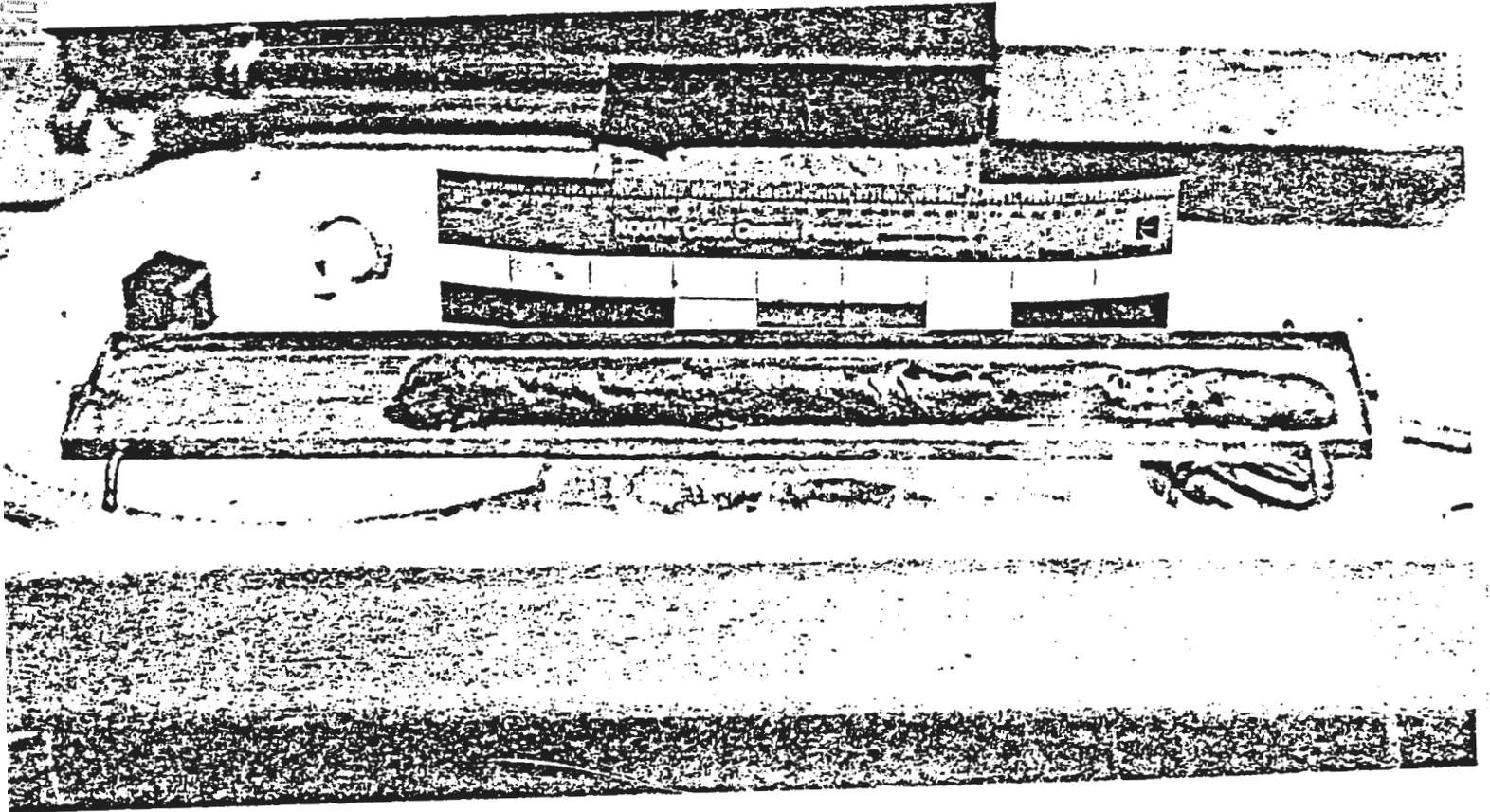
Riser-12

Core-2

Segment-6

325gm

1996.169



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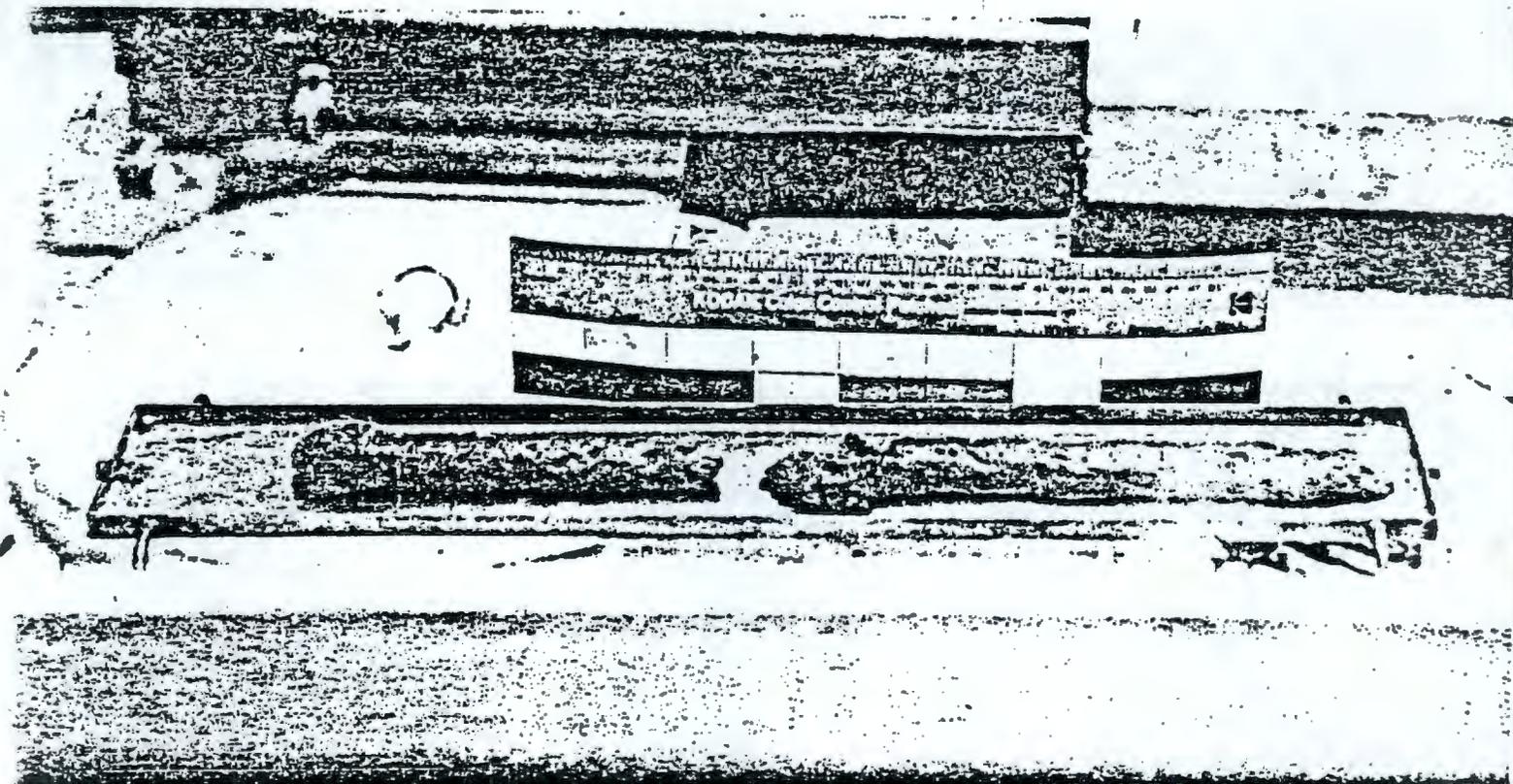
Riser-12

Core-2

Segment-7

286gm

9413096.1682



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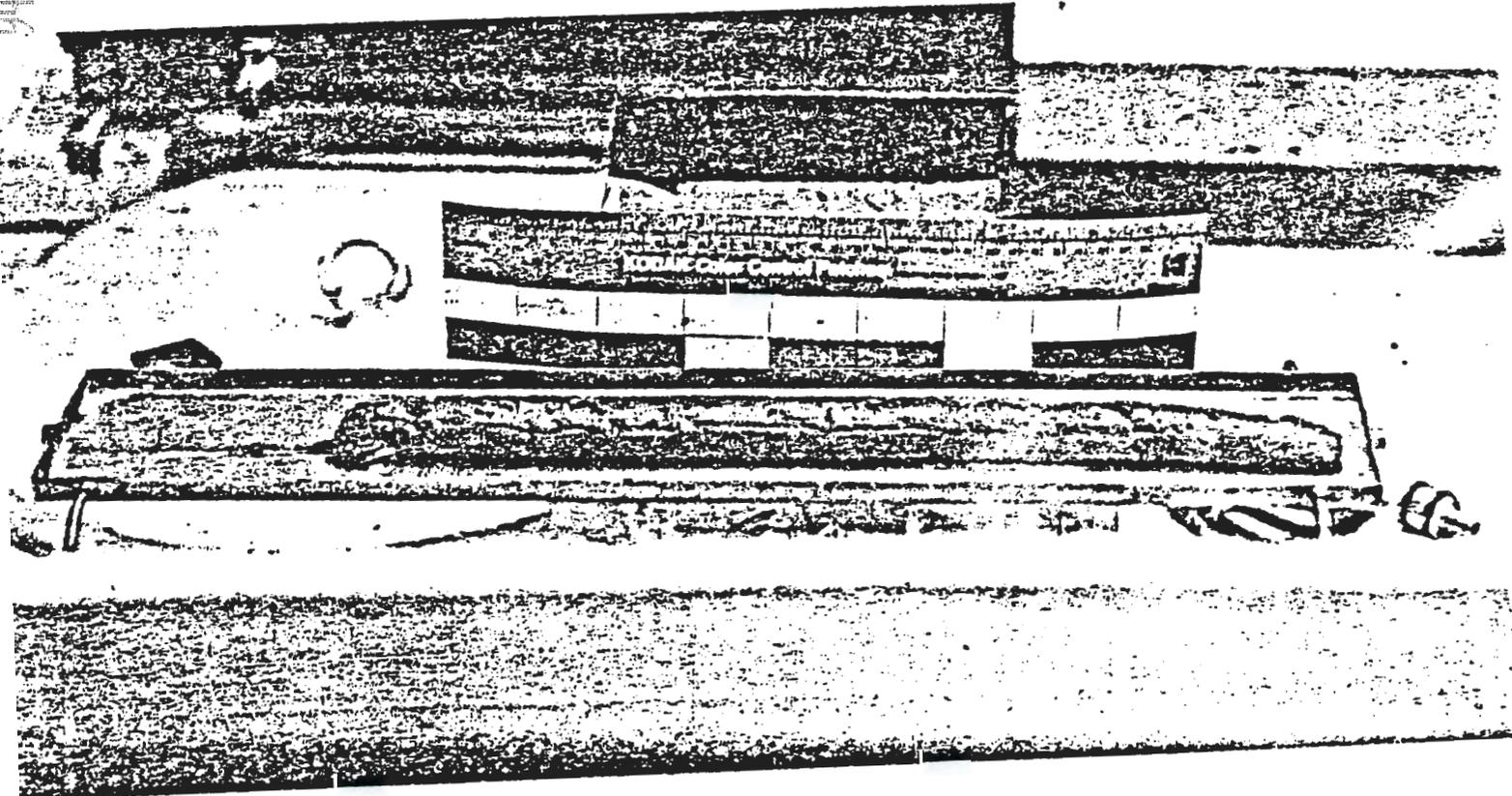
Riser-12

Core-2

Segment-8

326gm

54195-1693



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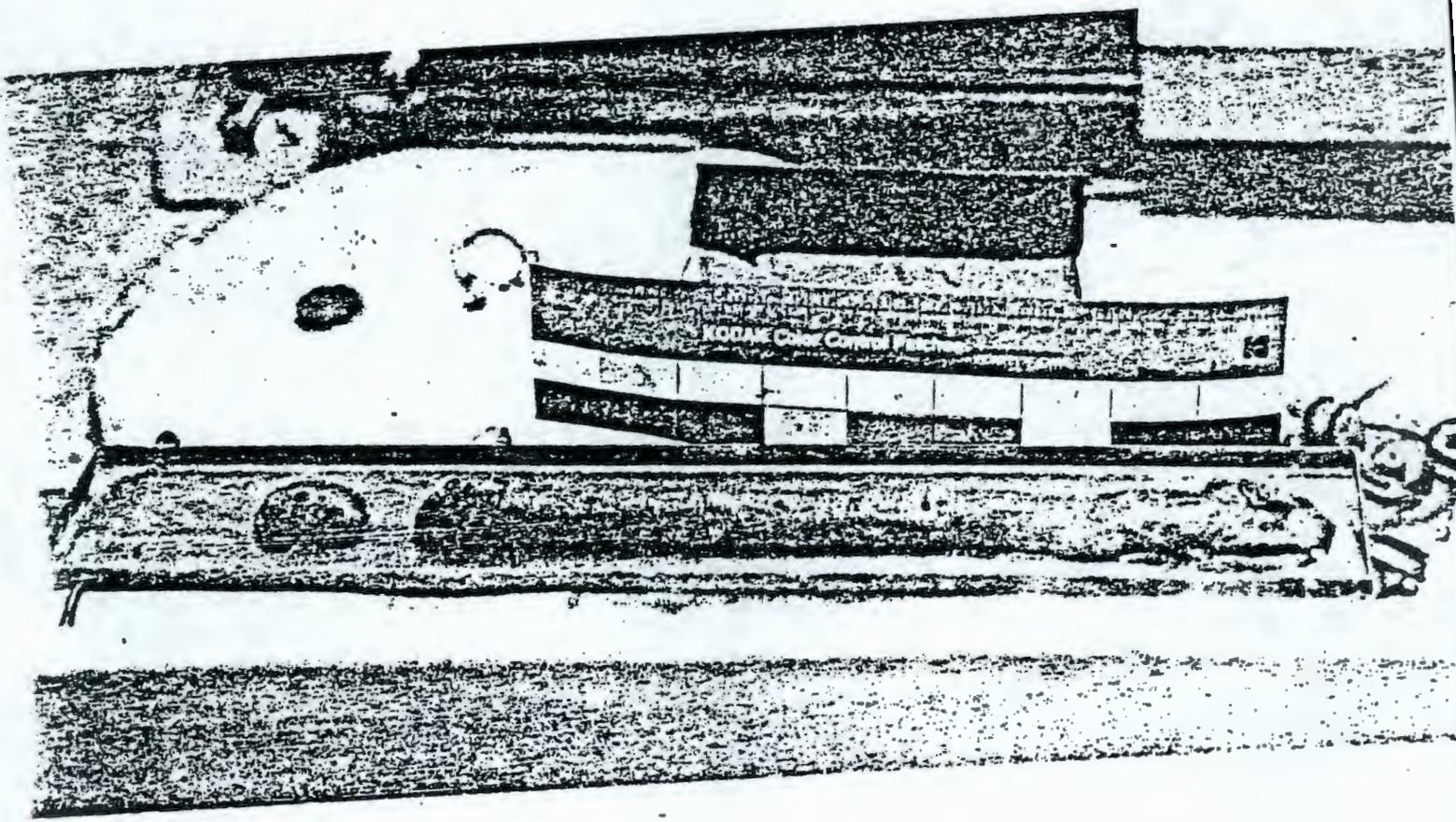
Riser-12

Core-2

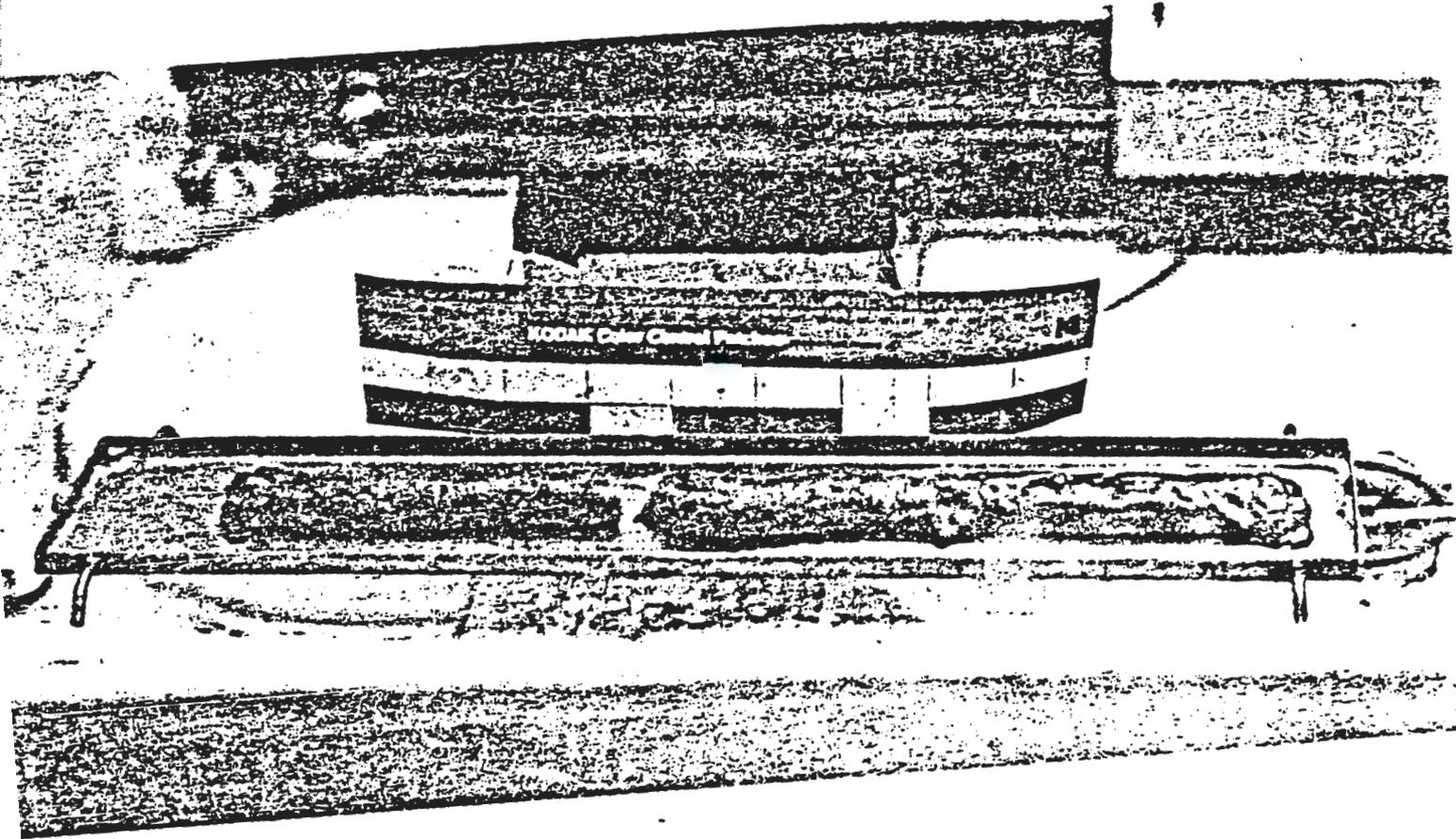
Segment-9

226gm

9413096.1689



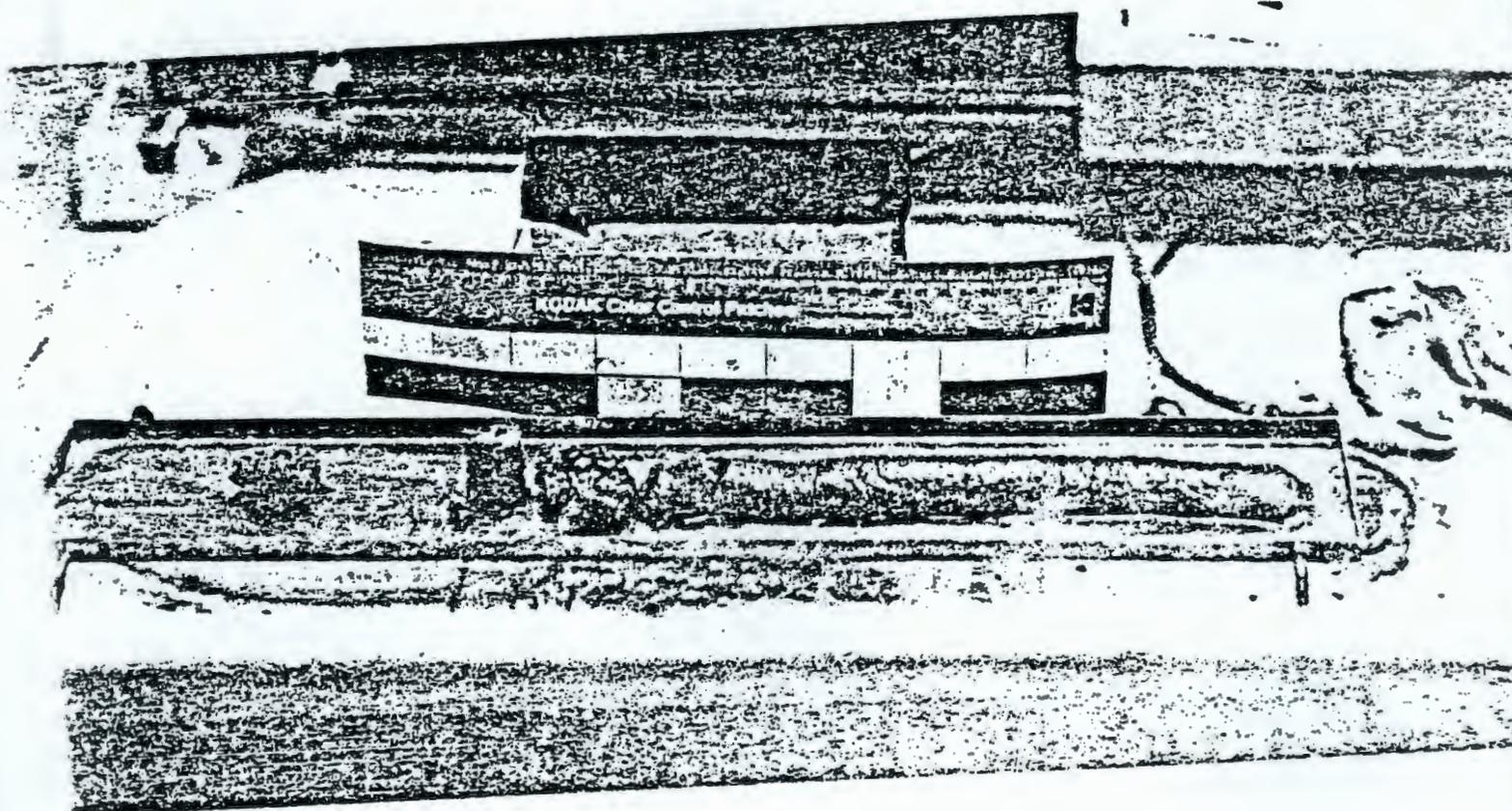
A-103 Riser-12
Core-2 Segment-10
339gm



SD-RE-TI-198
Rev. 0

A-103 Riser-12
Core-2 Segment-11
283gm

9413096.1696



VI. ANALYTICAL SAMPLE PREPARATION DATA

The actual weights and volumes generated during analytical sample preparation (solution leaching) for the core composites from tank 241-A-103 are shown. Peptization of the solid may occur in some of the water leaches (third contact). This forms an unseparable solid-liquid suspension broken by adding concentrated HCl to the leach to bring the acid concentration to 5M. In these cases, effectively no third water leach occurred and the acidified solution becomes the first acid leach.

No analytical sample preparation was required, except filtering, for the drainable liquor core composites.

Composite ID #B1XC00XX

Initial weight of sample 5.0766 g
Volume 3.8 mL

Residual weight:

- Water leach -- 0.2272 g
- Acid leach -- 0.1952 g
- HNO₃-HF-HCl dissolution -- trace.

Final solution volume:

- Water leach -- 40 mL
- Acid leach -- 25 mL
- HNO₃-HF-HCl dissolution -- 20 mL.

Composite ID #A2XC00XX

Initial weight of sample 5.1348 g
Volume 3.8 mL

Residual weight:

- Water leach -- 0.2551 g
- Acid leach -- 0.2424 g
- HNO₃-HF-HCl dissolution -- trace.

Final solution volume:

- Water leach -- 40 mL
- Acid leach -- 25 mL
- HNO₃-HF-HCl dissolution -- 20 mL.

VII. ANALYTICAL RESULTS

A spreadsheet program on a dedicated microcomputer is used to convert raw analytical data to concentration values for the components in the water. The following are copies of the spreadsheet printouts for the core composite samples from tank 241-A-103. For the solid phase core composites, concentration values from the individual leaching solutions (water, HCl-HNO₃-HF pressure dissolution) are reported along with overall results. Two overall results are reported: REPORT TOTAL - sum of all values reported greater than the limit of confirmation ("less than values" not summed) and MAXIMUM TOTAL - sum of all values reported with limit of confirmation values taken as actual value (worst case).

Physical data determined are shown on the spreadsheet reports.

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Rev. 0

B1XCXXX 24 Feb-87	A-103 CORE COMPOSITE	R-17	B1XC00XP R9394	B1XC00X1 R9615	B1XC00X3 R9619	
PROCEDURE	COMPONENT	LAB UNIT	LAB VALUE Direct	LAB VALUE Water	LAB VALUE Acid	LAB VALUE Fusion
LA-510-112	Density	g/mL				
LA-505-143	Aluminum	ug/L		1850.000		162.000
LA-505-143	Barium	ug/L		0.330		60.100
LA-505-143	Bismuth	ug/L		11.000		7.160
LA-505-143	Boron	ug/L		4.140		
LA-505-143	Cadmium	ug/L		8.900		0.800
LA-505-143	Calcium	ug/L		18.800		164.000
LA-505-143	Chromium	ug/L		5.330		145.000
LA-505-143	Cobalt	ug/L				0.147
LA-505-143	Copper	ug/L		0.251		1.300
LA-505-143	Iron	ug/L		0.814		36.300
LA-505-143	Lead	ug/L		33.000		8.770
LA-505-143	Magnesium	ug/L		0.450		82.700
LA-505-143	Manganese	ug/L		3.630		7.640
LA-505-143	Nickel	ug/L		4.920		4.910
LA-505-143	Phosphorus	ug/L		246.000		2.960
LA-505-143	Potassium	ug/L		310.000		14.200
LA-505-143	Silicon	ug/L		34.300		1320.000
LA-505-143	Silver	ug/L		0.233		1.760
LA-505-143	Sodium	ug/L		25100.000		467.000
LA-505-143	Strontium	ug/L				0.930
LA-505-143	Zinc	ug/L				9.600
LA-505-143	Zirconium	ug/L		1.76		14.800
LA-925-106	Uranium	g/L		0.001		0.168
LA-533-103	Nitrate	M		0.234		
LA-344-101	TDC	g/L		1.020		
LA-212-102	pH	log(I/M)	13.300			
LA-560-111	Water Loss					
	Room to 400 C	%	40.100			
	400 to 1000 C	%	20.200			
LA-503-155	Po-239,40	uCi/L		5.430		9.240
LA-348-102	C-14	uCi/L		0.334		
LA-220-101	Sr-90	uCi/L		234.000		5220.000
LA-438-101	Tc-99	uCi/L		15.500		1.530
LA-503-155	Am-241	uCi/L		0.971		9.930
LA-548-121	Co-60	uCi/L		4.660		6.300
LA-548-121	Cs-137	uCi/L		25400.000		189.000
NOT YET	I-129	uCi/g				
LA-548-121	Total Gamma	uCi/L		25800.000		2180.000
LA-519-151	Visual		GREENISH BRO	LIGHT YELLOW		CLEAR LIGHT
	Volume (total)	mL				
	Mass (total)	g	2633.730			
	Tank volume	gallons	313000.000			
	Radiation	ar/h	100.000	50.000		8.000
LA-514-121	Specific Heat	J/g deg C	0.162			
LA-514-121	Softening Point	deg C	166.000			
LA-560-101	Bulk Density	g/mL	1.340			
NO AL EQUAL	Particle Size	um	20.3 um mean 50.6 um at 5%			
LA-517-121	Viscosity	cP	too solid			
LA-519-151	Volume (ore.)	mL		40.000		45.000
LA-519-151	Mass (ore.)	g		5.077		0.227
LA-519-151	Fraction used	-	1.000	1.000	1.000	1.000

84-124 37.7
84-125 62.9
84-126 14.1
84-127 56.9

24-Feb-97

A-103 R-17 SIXCIII CORE COMPOSITE	COMPONENT	REPORT UNIT	REPORT VALUE:	REPORT VALUE:	REPORT VALUE:	REPORT VALUE:	REPORT TOTAL	MAXIMUM TOTAL
			Direct	Water	Acid	Fusion		
	Density	g/mL						
	Aluminum	ug/g	<	1.46E+04	0.00E+00		1.49E+03	1.51E+04
	Barium	ug/g	<	4.52E+00	0.00E+00		5.32E+02	5.37E+02
	Bismuth	ug/g	<	8.67E+01	0.00E+00		6.32E+01	1.50E+02
	Boron	ug/g		3.26E+01	0.00E+00		0.00E+00	3.26E+01
	Cadmium	ug/g	<	6.93E+01	0.00E+00		7.09E+00	7.64E+01
	Calcium	ug/g		1.48E+02	0.00E+00		1.42E+03	1.60E+03
	Chromium	ug/g		5.16E+01	0.00E+00		1.27E+03	1.34E+03
	Cobalt	ug/g		0.00E+00	0.00E+00		1.30E+00	1.30E+00
	Copper	ug/g		1.98E+00	0.00E+00		1.12E+01	1.22E+01
	Iron	ug/g	<	6.41E+00	0.00E+00		3.22E+02	3.22E+02
	Lead	ug/g	<	2.60E+02	0.00E+00		7.77E+01	7.23E+02
	Magnesium	ug/g		3.52E+00	0.00E+00		7.32E+02	7.37E+02
	Manganese	ug/g	<	2.86E+01	0.00E+00		6.77E+01	6.77E+01
	Nickel	ug/g		3.88E+00	0.00E+00		4.22E+01	8.22E+01
	Phosphorus	ug/g		1.94E+03	0.00E+00		2.62E+01	1.96E+03
	Potassium	ug/g		2.44E+03	0.00E+00		1.26E+02	2.57E+03
	Silicon	ug/g		2.74E+02	0.00E+00		1.17E+04	1.20E+04
	Silver	ug/g	<	1.97E+00	0.00E+00		1.56E+01	1.76E+01
	Sodium	ug/g		1.98E+05	0.00E+00		4.14E+03	2.02E+05
	Strontium	ug/g		0.00E+00	0.00E+00		8.24E+00	9.24E+00
	Zinc	ug/g		0.00E+00	0.00E+00		8.51E+01	8.51E+01
	Zirconium	ug/g	<	1.37E+01	0.00E+00		1.31E+02	1.45E+02
	Uranium	ug/g		9.06E+00	0.00E+00		1.49E+03	1.50E+03
	Nitrate	ug/g		1.14E+05				1.14E+05
	TOC	ug/g		8.04E+03				8.04E+03
	pH	log(I/10)	>	1.32E+01				
	Mass Loss							
	Room to 400 C	ug/g		4.01E+05				4.01E+05
	400 to 1000 C	ug/g		2.02E+05				2.02E+05
	Pu-239,40	uCi/g		4.28E-02	0.00E+00		8.19E-02	1.22E-01
	C-14	uCi/g		2.63E-03	0.00E+00			2.63E-03
	Sr-90	uCi/g		1.94E+00	0.00E+00		4.63E+01	4.81E+01
	Tc-99	uCi/g		1.22E-01	0.00E+00		0.00E+00	1.22E-01
	Am-241	uCi/g	<	7.65E-03	0.00E+00		9.90E-02	8.80E-02
	Co-60	uCi/g		3.67E-02	0.00E+00		5.52E-02	9.26E-02
	Cs-137	uCi/g		2.00E+02	0.00E+00		1.68E+00	2.02E+02
	I-129	uCi/g		0.00E+00				0.00E+00
	Total Gamma	uCi/g		2.03E+02	0.00E+00		1.93E+01	2.22E+02
	Visual		NOTE 1:	NOTE 2:	NOTE 3:	NOTE 4:		
	Volume (total)	ml	0.00E+00				0.00E+00	0.00E+00
	Mass (total)	g	2.63E+03				2.63E+03	2.63E+03
	Tank Volume	gal	3.13E+05					
	Radiation	mR/h	1.00E+02	3.00E+01	0.00E+00	7.20E+01	1.00E+02	1.00E+02
	Specific Heat	J/g deg C	1.62E-01				1.62E-01	1.62E-01
	Softening Point	deg C	1.66E+02				1.66E+02	1.66E+02
	Bulk Density	g/mL	1.34E+00				1.34E+00	1.34E+00
	Particle Size	um	NOTE 5:					
	Viscosity		too solid					

- NOTE 1: GREENISH BROWN
- NOTE 2: LIGHT YELLOW/CLEAR
- NOTE 3: NONE
- NOTE 4: CLEAR LIGHT GREEN
- NOTE 5: 20.3 um mean agglomeration
60.0 um at 50% of total by volume

9413096.1700

82100111 03-Mar-37	A-103 CORE COMPOSITE	R-12	8210001P R9595	82100011 R9616	82100013 R9620	
PROCEDURE	COMPONENT	LAB UNIT	LAB VALUE Direct	LAB VALUE Water	LAB VALUE Acid	LAB VALUE Fusion
LA-510-112	Density	g/mL				
LA-505-143	Aluminum	mg/L		1940.000		223.000
LA-505-143	Barium	mg/L	<	0.530		69.500
LA-505-143	Bismuth	mg/L	<	11.000		13.400
LA-505-143	Boron	mg/L		1.530		
LA-505-143	Cadmium	mg/L	<	8.800		1.640
LA-505-143	Calcium	mg/L		17.100		194.000
LA-505-143	Chromium	mg/L		5.160		192.000
LA-505-143	Cobalt	mg/L				0.248
LA-505-143	Copper	mg/L		0.575		0.755
LA-505-143	Iron	mg/L	<	0.814		42.300
LA-505-143	Lead	mg/L	<	33.000		15.200
LA-505-143	Magnesium	mg/L		0.290		97.200
LA-505-143	Manganese	mg/L	<	3.630		14.100
LA-505-143	Nickel	mg/L		4.520		7.880
LA-505-143	Phosphorus	mg/L		298.000		6.220
LA-505-143	Potassium	mg/L		293.000		25.200
LA-505-143	Silicon	mg/L		63.200		1099.000
LA-505-143	Silver	mg/L	<	0.253		3.410
LA-505-143	Sodium	mg/L		25900.000		579.000
LA-505-143	Strontium	mg/L				1.790
LA-505-143	Zinc	mg/L				2.61
LA-505-143	Zirconium	mg/L	<	1.76		29.6
LA-725-106	Uranium	g/L		0.001		0.155
LA-533-103	Nitrate	M		0.233		
LA-344-101	TOC	g/L		0.992		
LA-212-102	pH	log(1/10)	> 13.300			
LA-560-111	Water Loss					
	Room to 400 C	%	40.300			
	400 to 1000 C	%	20.700			
LA-503-155	Pu-239,40	uCi/L		6.120		9.920
LA-348-102	C-14	uCi/L		0.322		
LA-220-101	Sr-90	uCi/L		224.000		5420.000
LA-438-101	Tc-99	uCi/L		14.400		1.260
LA-503-155	Am-241	uCi/L		7.650		9.940
LA-548-121	Co-60	uCi/L	<	3.900		6.550
LA-548-121	Cs-137	uCi/L		25600.000		231.000
NOT YET	I-129	uCi/g	0.000019			
LA-548-121	Total Gamma	uCi/L		26100.000		585.000
LA-519-151	Visual		GREENISH BRO	CLEAR YELLOW		CLEAR LIGHT
	Volume (total)	mL				
	Mass (total)	g	2623.110			
	Tank volume	gallons	313000.000			
	Radiation	mR/h	50.000	50.000		8.000
LA-514-121	Specific Heat	J/g deg C	0.096			
LA-514-121	Softening Point	deg C	168.300			
LA-560-101	Bulk Density	g/mL	1.330			
NO AL EQUAL	Particle Size	um	19.9 um mean 53.4 um at 5%			
LA-519-121	Viscosity	cP	too solid			
LA-519-151	Volume (prep.)	mL		40.000		45.000
LA-519-151	Mass (prep.)	g		5.135		0.255
LA-519-151	Fraction used	-	1.000	1.000	1.000	1.000

EU-154 37.7
EU-155 57.5
NA-22 13.4

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03-Mar-37

A-103
R-12
82101111
CORE COMPOSITE

COMPONENT	REPORT UNIT	REPORT VALUE: Direct	REPORT VALUE: Metar	REPORT VALUE: Acid	REPORT VALUE: Fusion	REPORT TOTAL	MAXIMUM TOTAL
Density	g/mL						
Aluminum	ug/g		1.51E+04	0.00E+00	1.92E+03	1.71E+04	1.71E+04
Barium	ug/g	<	4.22E+00	0.00E+00	6.09E+02	6.09E+02	6.13E+02
Bismuth	ug/g	<	8.57E+01	0.00E+00	1.17E+02	1.17E+02	2.03E+02
Boron	ug/g		1.19E+01	0.00E+00	0.00E+00	1.19E+01	1.19E+01
Cadmium	ug/g	<	6.86E+01	0.00E+00	1.44E+01	1.44E+01	8.29E+01
Calcium	ug/g		1.33E+02	0.00E+00	1.70E+03	1.83E+03	1.83E+03
Chromium	ug/g		4.02E+01	0.00E+00	1.68E+03	1.72E+03	1.72E+03
Cobalt	ug/g		0.00E+00	0.00E+00	2.17E+00	2.17E+00	2.17E+00
Copper	ug/g		4.48E+00	0.00E+00	6.62E+00	1.11E+01	1.11E+01
Iron	ug/g	<	6.34E+00	0.00E+00	3.73E+02	3.73E+02	3.81E+02
Lead	ug/g	<	2.57E+02	0.00E+00	1.33E+02	1.33E+02	3.90E+02
Magnesium	ug/g		2.26E+00	0.00E+00	8.52E+02	8.54E+02	8.54E+02
Manganese	ug/g	<	2.83E+01	0.00E+00	1.24E+02	1.24E+02	1.52E+02
Nickel	ug/g		3.52E+01	0.00E+00	6.91E+01	1.04E+02	1.04E+02
Phosphorus	ug/g		2.32E+03	0.00E+00	5.43E+01	2.38E+03	2.38E+03
Potassium	ug/g		2.23E+03	0.00E+00	2.21E+02	2.50E+03	2.50E+03
Silicon	ug/g		4.92E+02	0.00E+00	9.63E+03	1.01E+04	1.01E+04
Silver	ug/g	<	1.97E+00	0.00E+00	2.99E+01	2.99E+01	3.19E+01
Sodium	ug/g		2.10E+05	0.00E+00	5.07E+03	2.15E+05	2.15E+05
Strontium	ug/g		0.00E+00	0.00E+00	1.57E+01	1.57E+01	1.57E+01
Zinc	ug/g		0.00E+00	0.00E+00	2.29E+01	2.29E+01	2.29E+01
Zirconium	ug/g	<	1.37E+01	0.00E+00	2.57E+02	2.57E+02	2.73E+02
Uranium	ug/g		1.03E+01	0.00E+00	1.36E+03	1.37E+03	1.37E+03
Nitrate	ug/g		1.13E+05			1.13E+05	1.13E+05
TDC	ug/g		7.73E+03			7.73E+03	7.73E+03
pH	log(I/NO)	>	1.33E+01				
Mass Loss							
Room to 400 C	ug/g		4.03E+05			4.03E+05	4.03E+05
400 to 1000 C	ug/g		2.07E+05			2.07E+05	2.07E+05
Po-210,40	uCi/g		4.77E-02	0.00E+00	8.69E-02	1.33E-01	1.33E-01
C-14	uCi/g		2.51E-03	0.00E+00		2.51E-03	2.51E-03
Sr-90	uCi/g		1.74E+00	0.00E+00	4.72E+01	4.72E+01	4.72E+01
Tc-99	uCi/g		1.12E-01	0.00E+00	0.00E+00	1.12E-01	1.12E-01
Am-241	uCi/g		5.96E-02	0.00E+00	8.71E-02	1.47E-01	1.47E-01
Co-60	uCi/g	<	3.04E-02	0.00E+00	5.74E-02	8.78E-02	8.78E-02
Cs-137	uCi/g		1.99E+02	0.00E+00	2.02E+00	2.01E+02	2.01E+02
I-129	uCi/g		1.90E-05			1.90E-05	1.90E-05
Total Gamma	uCi/g		2.03E+02	0.00E+00	5.13E+00	2.08E+02	2.08E+02
Visual			NOTE 1:	NOTE 2:	NOTE 3:	NOTE 4:	
Volume (total)	mL		0.00E+00			0.00E+00	0.00E+00
Mass (total)	g		2.62E+03			2.62E+03	2.62E+03
Tank Volume	gal		3.13E+05				
Radiation	mR/h		5.00E+01	5.00E+01	0.00E+00	7.20E+01	5.00E+01
Specific Heat	J/g deg C		9.63E-02			9.63E-02	9.63E-02
Softening Point	deg C		1.68E+02			1.68E+02	1.68E+02
Bulk Density	g/mL		1.33E+00			1.33E+00	1.33E+00
Particle Size	um		NOTE 5:				
Viscosity	tor solid						

NOTE 1: GREENISH BROWN

total ug/g
total uCi/g

3.31E+05
4.05E+02

0.00E+00
0.00E+00

2.43E+04
3.49E+01

NOTE 2: CLEAR YELLOW

NOTE 3: NONE

NOTE 4: CLEAR LIGHT GREEN

NOTE 5: 19.9 um mean particle size
53.4 um at 50% population

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31XDYXX 19-May-97	A-103 Drainable Liquor	R-17	31XD00YD R9578
PROCEDURE	COMPONENT	LAB UNIT	LAB VALUE Direct
LA-510-112	Density	g/mL	1.476E+00
LA-505-143	Aluminum	ng/L	3.400E+04
LA-505-143	Barium	ng/L	< 1.000E+01
LA-505-143	Bismuth	ng/L	< 2.210E+02
LA-505-143	Boron	ng/L	< 5.020E+01
LA-505-143	Cadmium	ng/L	< 1.350E+02
LA-505-143	Calcium	ng/L	2.590E+02
LA-505-143	Chromium	ng/L	< 1.810E+01
LA-505-143	Cobalt	ng/L	< 1.630E+02
LA-505-143	Copper	ng/L	< 4.020E+02
LA-505-143	Iron	ng/L	8.410E+01
LA-505-143	Lead	ng/L	1.020E+03
LA-505-143	Magnesium	ng/L	5.060E+03
LA-505-143	Manganese	ng/L	1.710E+02
LA-505-143	Nickel	ng/L	< 2.010E+01
LA-505-143	Phosphorus	ng/L	2.520E+05
LA-505-143	Potassium	ng/L	< 9.230E+01
LA-505-143	Silicon	ng/L	2.380E-03
LA-505-143	Silver	ng/L	3.260E+00
LA-505-143	Sodium	ng/L	8.360E+00
LA-505-143	Strontium	ng/L	1.294E+01
LA-505-143	Zinc	ng/L	5.090E+01
LA-505-143	Zirconium	ng/L	1.180E+01
LA-975-106	Uranium	g/L	2.850E+01
LA-533-103	Nitrate	M	1.100E+00
LA-344-101	TOC	g/L	3.210E+03
LA-212-102	pH	log(1/10)	2.610E+02
LA-560-111	Water Loss		
	Room to 400 C	%	< 1.470E+00
	400 to 1000 C	%	< 2.220E+01
LA-503-155	Po-210,40	uCi/L	3.870E+05
LA-548-102	C-14	uCi/L	7.900E-02
LA-220-101	Sr-90	uCi/L	3.790E+05
LA-438-101	Tc-99	uCi/L	
LA-503-155	Am-241	uCi/L	
LA-548-121	Co-60	uCi/L	
LA-548-121	Cs-137	uCi/L	
NOT YET	I-129	uCi/L	
LA-548-121	Total Gamma	uCi/L	
LA-519-151	Visual		Bright yellow
	Volume (total)	mL	3.750E+02
	Mass (total)	g	
	Tank volume	gallons	2.030E+05
	Radiation	mR/h	1.500E+02
LA-514-121	Specific Heat	J/g deg C	
LA-514-121	Softening Point	deg C	
LA-560-101	Bulk Density	g/mL	
NO AL EQUAL	Particle Size	um	
LA-519-121	Viscosity	cP	1.300E+01
LA-519-151	Volume (prep.)	mL	
LA-519-151	Mass (prep.)	g	
LA-519-151	Fraction used	-	

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PROCEDURE	COMPONENT	LAB UNIT	LAB VALUE
92XD111X 19-May-87	A-103 Drainable Liquor	R-12	92XD001D R9599
			Direct
LA-510-112	Density	g/mL	1.480E+00
LA-505-143	Aluminum	mg/L	3.710E+04
LA-505-143	Barium	mg/L	1.900E+01
LA-505-143	Bismuth	mg/L	2.210E+02
LA-505-143	Boron	mg/L	3.010E+01
LA-505-143	Cadmium	mg/L	5.020E+01
LA-505-143	Calcium	mg/L	1.520E+02
LA-505-143	Chromium	mg/L	3.530E+02
LA-505-143	Cobalt	mg/L	
LA-505-143	Copper	mg/L	
LA-505-143	Iron	mg/L	1.810E+01
LA-505-143	Lead	mg/L	1.630E+02
LA-505-143	Magnesium	mg/L	2.520E+00
LA-505-143	Manganese	mg/L	4.020E+02
LA-505-143	Nickel	mg/L	1.050E+02
LA-505-143	Phosphorus	mg/L	1.570E+03
LA-505-143	Potassium	mg/L	5.820E+03
LA-505-143	Silicon	mg/L	5.120E+02
LA-505-143	Silver	mg/L	2.010E+01
LA-505-143	Sodium	mg/L	1.880E+05
LA-505-143	Strontium	mg/L	
LA-505-143	Zinc	mg/L	4.750E+01
LA-505-143	Zirconium	mg/L	9.230E+01
LA-925-106	Uranium	g/L	6.410E-03
LA-533-103	Nitrate	M	3.280E+00
LA-544-101	TOC	g/L	8.260E+00
LA-212-102	pH	log(L/MD)	1.200E+01
LA-560-111	Water Loss		
	Room to 400 C %		5.100E+01
	400 to 1060 C %		2.200E+01
LA-503-155	Pu-239, 40	uCi/L	2.520E+01
LA-548-102	C-14	uCi/L	9.440E-01
LA-220-101	Sr-90	uCi/L	2.570E+03
LA-438-101	Tc-99	uCi/L	2.160E+02
LA-503-155	Am-241	uCi/L	1.690E+00
LA-548-121	Co-60	uCi/L	1.590E+01
LA-548-121	Cs-137	uCi/L	4.060E+05
NOT YET	I-129	uCi/L	1.200E-01
LA-548-121	Total Gamma	uCi/L	4.150E+05
LA-519-151	Visual		Bright yellow
	Volume (total)	ml	4.020E+02
	Mass (total)	g	
	Tank volume	gallons	2.030E+05
	Radiation	mr/h	1.000E+02
LA-514-121	Specific Heat	J/g deg C	
LA-514-121	Softening Point	deg C	
LA-560-101	Bulk Density	g/mL	
NO AL EDLWL	Particle Size	um	
LA-519-121	Viscosity	cP	1.560E-01
LA-519-151	Volume (prep.)	ml	
LA-519-151	Mass (prep.)	g	
LA-519-151	Fraction used	-	

VIII. REFERENCES

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3. Bowton, E. J. and J. M. Hiller, 1985, Waste Tank Characterization Program Sample Handling and Analysis Plan, SD-WM-LB-004, Rockwell Hanford Operations, Richland, Washington.
4. Hiller, J. M., 1986, Waste Tank Spreadsheet Documentation, SD-WM-LB-006, Rockwell Hanford Operations, Richland, Washington.
5. Bowton, E. J. and J. M. Hiller, 1985, Waste Tank Characterization Laboratory Quality Assurance Plan, SD-WM-LB-005, Rockwell Hanford Operations, Richland, Washington.

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Title **WASTE TANK CHARACTERIZATION, SINGLE SHELL TANK, 241-A-103 WASTE TANK, TANK SAMPLING, RADIOACTIVE WASTE, NONRADIOACTIVE WASTE ANALYSIS** Unclassified Category **UC-** Impact Level

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