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HNF-SD-WM-DP-240, REV. 0A

ANALYTICAL SERVICES

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CASE NARRATIVE ON THE ANALYTICAL RESULTS FOR THE 105-N BASIN SEDIMENT DISPOSITION, SAMPLE CHARACTERIZATION PROJECT, PHASE ONE

Project Coordinator: George L. Miller

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

by

222-S Laboratory
Waste Management of Hanford Inc.
P.O. Box 700
Richland, Washington

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 633369

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 []	George L. Miller, Production Planning & Control, T6-06, 373-4739	[] Yes [X] No	12/04/97
	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
	105-N Basin	105-N Basin	Q
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.)	10. Related ECN No(s).	11. Related PO No.
	HNF-SD-WM-DP-240, 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 update/add additional information to the existing document.

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: DEC 05 1997

STA: 4

HANFORD RELEASE

ID: 2

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

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) ECN-633369

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. G. L. Miller		12/9/97	PE		
Cog. Mgr. A. D. Rice		12.4.97	QA		
QA C Dormant		12-4-97	Safety		
Safety			Design		
Environ.			Environ.		
Other			Other		

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

Case Narrative on the Analytical Results for the 105-N Basin Sediment Disposition, Sample Characterization Project, Phase One

George L. Miller
Waste Management of Hanford, Inc., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: ECN-633369 UC: 2070
Org Code: 7576B Charge Code: N4K2C
B&R Code: EW 3120074 Total Pages: 73

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Abstract: N/A

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Release Approval 12/5/97 Date

DATE: HANFORD RELEASE
STA: 4 ID: 2
DEC 05 1997
Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number HNF-SD-WM-DP-240	Page 1

(2) Title
Case Narrative on the Analytical Results for the 105-N Basin sediment Disposition, Sample Characterization Project, Phase One

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 04/22/97 on EDT-620396	G.L. Miller 12/4/97	A.D. Rice 12.4.97
0A RS	Incorporate per ECN-633369	G.L. Miller 12/4/97	A.D. Rice 12.4.97

A-7320-005 (08/91) WEF168

CASE NARRATIVE ON THE ANALYTICAL RESULTS FOR THE 105-N BASIN SEDIMENT DISPOSITION, SAMPLE CHARACTERIZATION PROJECT, PHASE ONE

INTRODUCTION

Project Documentation and Direction

Analytical direction for this project was provided in the following References.

1. Duncan, G. M., BHI-00975, Rev. 0, *105-N Basin Sediment Disposition Phase One, Sampling and Analysis Plan*, published on January 16, 1997, Bechtel Hanford, Inc., Richland, Washington 99352.

2. Logan, T. E., *Letter of Instruction for 105-N Basin Sediment Disposition Phase-One Sample Analysis*, written to C. G. Mattsson, Fluor Daniel Hanford, Inc. on January 31, 1997.

3. Meznarich, H. K., WHC-SD-CP-QAPP-016, Rev. 1A, *222-S Laboratory Quality Assurance Plan*, released on August 31, 1995, Westinghouse Hanford Company, Richland, WA 99352.

Project Description

Analyses for this project were to be performed using SW-846 procedures whenever possible, however the project was not a Resource Conservation Recovery Act (RCRA) protocol project. Of the analyses reported in this revised report, all were prepared and performed at the 222-S Laboratory.

Three issues delayed the delivery of the original report: waste handling issues at the 222-S Laboratory, the finding of polychlorinated biphenyl hydrocarbons (PCBs) in the N-Basin samples, and a change in quality control acceptance criteria.

Upon finding significant concentrations of PCBs in these samples, it was determined that any analyses uncompleted at that time would be placed on hold until a legally compliant method of segregating and disposal of PCB laden analytical waste could be implemented. Consequently the following analyses were not included in the Revision 0 report: viscosity, particle size distribution and (for one sample) laser ablation/mass spectrometry. An increase in workscope, including sieve and ICP/MS analyses on three samples, was requested by the program after delivery of the Revision 0 report. Consequently they were not included in the Revision 0 report. The results of these analyses are reported in this Revision 0A.

SAMPLE COLLECTION AND RECEIVING

Table 1 provides dates associated with sample collection, and the receiving and analyses of samples at the 222-S Laboratory. Table 1 also indicates RCRA sample holding times.

ANALYTICAL REQUIREMENTS

Although the quality control (QC) limits for accuracy were changed verbally just prior to completion of the Revision 0 report, they did not impact the evaluation of analytical results reported here. The original project requirements were specified in References 1 and 2. The revised QC limits are documented in an electronic mail message from Richard Weiss on 4/18/97, which is provided in this report in Appendix A, Correspondence. The quality control requirements for those analytes reported here, and which are summarized in Table 2 of this report, were not changed by the QC limit revision. No impact occurred because of the technical aspects of these procedures. It is not technically possible to provide a single precision estimate due to the spectrum of values generated for the particle size distribution and viscosity analyses, and the analytes in these procedures are not able to be spiked to determine accuracy. No QC criteria were specified for ICP/MS and for the sieve test because they were not requested in References 1 and 2. The laser ablation/mass spectrometry analysis is considered to be only a semi-quantitative screen, consequently the application of QC criteria is inappropriate.

Table 1. Sample Collection and Analytical Dates

Sample Collection		Sample Receiving		Sample Identification			Analytical Operations		
Date	Time	Date	Time	Customer Sample Number	Laboratory Sample Number	Sample Description	Analyte or Procedure	Analysis Date	Sample Holding Time, days
2/11/97	1320	2/12/97	1235	BOJY49	S97N000001	Original Sample	Settled Density	3/24/97	41
							Centrifuged Density	3/25/97	42
					S97N000006	Settled Solid	Particle Size Distribution	4/21/97	69
							Sieve (100 mesh)	5/28/97	106
							Viscosity	not analyzed	n/a
					S97N000012	Centrifuged Solid, Direct	Laser Ablation/Mass Spec	4/24/97	72
					S97N000011	Centrifuged Solid, Acid Digest	Acid Digestion	3/29/97	46
							ICP/MS Isotopic U/Th	5/2/97	80
2/24/97	1240	2/24/97	1830	BOJY50	S97N000002	Original Sample	Settled Density	3/24/97	28
							Centrifuged Density	3/25/97	29
					S97N000013	Settled Solid	Particle Size Distribution	4/18/97	53
							Sieve (100 mesh)	5/28/97	93
							Viscosity	5/5/97	70
					S97N000016	Centrifuged Solid, Direct	Laser Ablation/Mass Spec	4/2/97	37
					S97N000020	Centrifuged Solid, Acid Digest	Acid Digestion	3/29/97	33
							ICP/MS Isotopic U/Th	5/2/97	67
3/7/97	2230	3/10/97	1300	BOJY51	S97N000005	Original Sample	Settled Density	3/25/97	18
							Centrifuged Density	3/26/97	19
					S97N000014	Settled Solid	Particle Size Distribution	4/18/97	42
							Sieve (100 mesh)	5/28/97	82
							Viscosity	5/5/97	59
					S97N000017	Centrifuged Solid, Direct	Laser Ablation/Mass Spec	4/1/97	25
					S97N000021	Centrifuged Solid, Acid Digest	Acid Digestion	3/29/97	22
							ICP/MS Isotopic U/Th	5/2/97	56

Table 2. Project QC Requirements for 105-N Basin (Phase 1)

Procedure	Analyte	Procedure Number	QC Requirements		Target MDA / MDL µCi/g or µg/g
			Duplicate RPD	Spike % Recovery	
Particle Size Distribution (Analyzer)	Particle Size	LT-519-101	n/a	n/a	n/s
Viscosity	Viscosity	LT-519-115	n/a	n/a	n/s
Sieve Test (100 mesh)	Sieve	LT-519-103	n/s	n/s	n/s
Inductively Coupled Plasma/Mass Spectrometer	Isotopic U/Th	LT-506-101	n/s	n/s	n/s
Laser Ablation/Mass Spectrometer	LA/MS screen	LT-506-102	n/a	n/a	n/s

Notes:
n/a indicates that the parameter was not applicable for technical reasons
n/s indicates that the parameter was not specified in References 2 or 3

DISCUSSION OF ANALYTICAL RESULTS

Settled and Centrifuged Density

These data were provided in the revision 0 report, but are provided in this revision because they were discussed in the same chemists's narrative that included the previously unreported particle size distribution results. That narrative and analytical results are provided beginning on page 11.

The method of analysis, a test plan, was provided in Attachment 1 of the revision 0 report. Consequently, a formalized procedure number is not available.

Procedural Anomalies/Difficulties:	none noted
Required RCRA Procedure:	not specified
Procedure Used:	Test Plan
Required Precision:	±30 RPD
Met Precision Requirement?:	yes
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a
Target Practical Quant Limit (PQL):	not specified
Samples Not Meeting Target PQL:	n/a
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blanks Contaminated?:	n/a

Particle Size Distribution

The chemist's narrative and analytical results are provided beginning on page 11.

Procedural Anomalies/Difficulties:	none noted
Required RCRA Procedure:	not specified
Procedure Used:	LT-519-101, Rev. A-1
Required Precision:	n/a
Met Precision Requirement?:	n/a
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a
Target Practical Quant Limit (PQL):	not specified
Samples Not Meeting Target PQL:	n/a
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blanks Contaminated?:	n/a

Wet Sieve Test (Gravimetric, 100 mesh)

The chemist's narrative and analytical results are provided beginning on page 28.

Required RCRA Procedure:	not specified
Procedure Used:	LT-519-103, Rev. A-0
Required Precision:	not specified
Met Precision Requirement?:	n/a
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a
Target Practical Quant Limit (PQL):	not specified
Samples Not Meeting Target PQL:	n/a
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	n/a

Viscosity

The chemist's narrative and analytical results are provided on page 29.
Procedural Anomalies/Difficulties:
The viscosity of sample S97N000006 was not measured because the sample primarily consisted of pebbles and other objects which exceeded the gap size of the viscometer.

Required RCRA Procedure:	not specified
Procedure Used:	LT-519-116, Rev. B-0
Required Precision:	n/a
Met Precision Requirement?:	n/a
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a
Target Practical Quant Limit (PQL):	not specified
Samples Not Meeting Target PQL:	n/a
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	n/a

Laser Ablation/Mass Spectrometry Screen

The chemist's narrative and analytical results are provided beginning on page 53.
Procedural Anomalies/Difficulties:
The initial data package (Rev. 0) did not include LA/MS data for sample S97N000012 due to data acquisition and reduction problems. Sample S97N000012 was rerun and the results are reported in Appendix 5 of this report. Furthermore, it was discovered by the Pacific Northwest National Laboratory scientist responsible for LA/MS data reduction that the two samples originally reported (S97N000016 and S97N000017) were not corrected for laser efficiency. In order to maintain consistency between the three samples, the data for all

three samples were reprocessed and corrected for laser efficiency. Consequently, the attached data replace all LA/MS data previously reported.

Required RCRA Procedure:	not specified
Procedure Used:	LT-506-102, Rev. A-0
Required Precision:	n/a
Met Precision Requirement?:	n/a
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a
Target Practical Quant Limit (PQL):	not specified
Samples Not Meeting Target PQL:	n/a
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	n/a

Inductively Coupled Plasma/Mass Spectrometry

The chemist's narrative and analytical results are provided beginning on page 58.

Procedural Anomalies/Difficulties:

Although it was neither an anomaly nor a difficulty, it is noted that the samples contained an appreciable concentration of copper (^{63}Cu and ^{65}Cu). Copper-63 is an isobaric interferant of ^{63}Ni, an analyte that was specifically requested to be quantified by the program. As a consequence, ^{63}Ni was not quantifiable.

Required RCRA Procedure:	none specified
Procedure Used:	LT-506-101, Rev. A-1
Required Precision:	not specified
Met Precision Requirement?:	n/a
Precision attained:	^{234}U: 27.7 RPD at 0.33 ppm ^{235}U: 11.4 RPD at 22.8 ppm ^{238}U: 10.4 RPD at 2790 ppm All Th isotopes were <DL
Required Spike Accuracy:	not specified
Met Accuracy Requirement?:	n/a
Spike accuracy attained:	^{238}U: 80.8 %Recovery
Target Practical Quant Limit (PQL):	not specified
Samples Not Meeting Target PQL:	n/a
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a

Blank Contaminated?:

The blank had an insignificant amount of ^{238}U

Numatec Hanford Corporation

Internal Memo

8C510-97-007

From: Process Chemistry
Phone: 373-4995 T6-07
Date: April 22, 1997
Subject: 105-N BASIN PHYSICAL TESTING RESULTS (Revision 1)

To: G. L. Miller T6-06

cc: D. L. Herting T6-07
J. R. Jewett T6-07
A. D. Rice T6-06
JFO File/LB

Reference: Internal Memo, J. F. O'Rourke to G. L. Miller, "Test Plan for Processing Sediment Samples from 105-N Basin", dated March 12, 1997.

This letter has been revised to include the correct notebook number for the 105-N Basin sample preparation.

This letter reports the results of the physical testing conducted by Process Chemistry on sediment samples collected from the 105-N Basin. All information associated with this testing was recorded in laboratory notebooks HNF-N-22-1 and RHO-RE-NB-208.

The settled and centrifuged solids densities from samples S97N000001, S97N000002, and S97N000005 are presented in Attachment I. The settled and centrifuged solids measurements were made as directed in the reference. The settled solids densities were measured after the samples were allowed to sit overnight. The cones were then centrifuged for greater than an hour and the centrifuged solids densities were measured. The settled and centrifuged solids measurements were completed on March 25, 1997.

The results of the particle size analyses on samples S97N000006, S97N000013, and S97N000014 are presented in Attachment II. Most of the particles in the three samples were less than 10 μm in diameter. The particulate mass was spread over diameter ranges up to 150 μm. The sediment samples also likely contain particles with diameters less than 0.5 μm and greater than 150 μm, which would not be detected by this instrument.

J. F. O'Rourke, Advanced Engineer
Process Chemistry
Numatec Hanford Corporation

Attachments (2)

8C510-PCS97-007

Attachment I

105-N BASIN SEDIMENT SETTLED AND CENTRIFUGED SOLIDS DENSITIES

Consisting of 2 Pages including the cover page

TABLE 1 105-N BASIN SETTLED AND CENTRIFUGED SOLIDS DENSITIES

SAMPLE	SETTLED SOLIDS DENSITY (g/mL)	CENTRIFUGED SOLIDS DENSITY (g/mL)
S97N000001	1.35	1.64
	1.59	1.67
		1.68
		1.65
S97N000002	1.06	1.10
	1.03	1.15
S97N000005	1.23	1.36
	1.32	1.53

8C510-PCS97-007

Attachment II

105-N BASIN SEDIMENT PARTICLE SIZE DISTRIBUTION RESULTS

Consisting of 13 Pages including the cover page

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

HNF-SD-WM-DP-240, REV. 0A

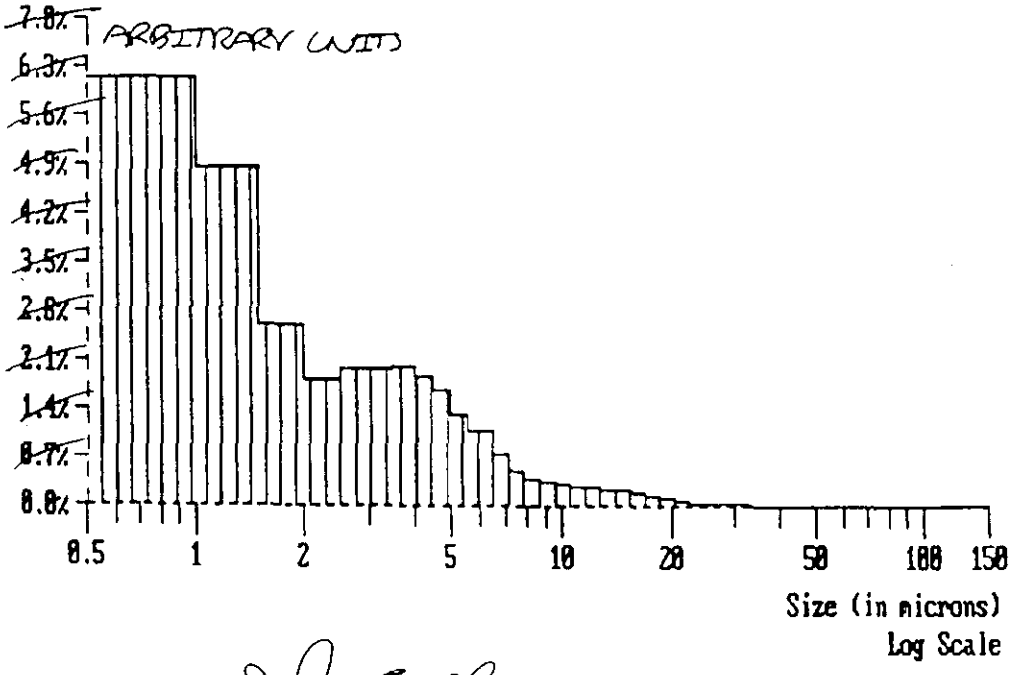
SAMPLE NAME : ~~S97N06B~~ S97N000006 J.M.O 4/21/97
FILE NAME : S97N06A

DATE	: 21/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 435451
TIME	: 12:11	ACQ. MODE	: SAMPLE	S.N.F.	: 0.54
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 2918 SEC	S.D.U.	: 5227
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5	CONCENTR.	: 1.1E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 2.0E-02 %

PROBABILITY NUMBER DENSITY GRAPH

Name: S97N06B
1.1E+06 #/ml(100.0%)
Mode at 0.75 µm
<< SCALE RANGE (µm): ADJUSTED >>

Median : 1.12µm
Mean(nl): 2.10µm
S.D.(nl): 3.20µm
Conf(nl):100.00 %



4-21-97

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

NUMBER DISTRIBUTION TABLE (RANGES)

SAMPLE NAME : ~~S97N06B~~ S97N000006 JTO 4/21/97 HNF-SD-WM-DP-240, REV. 0A
FILE NAME : S97N06A

DATE	: 21/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 435451
TIME	: 12:11	ACQ. MODE	: SAMPLE	S.N.F.	: 0.54
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 2918 SEC	S.D.U.	: 5227
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5	CONCENTR.	: 1.1E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 2.0E-02 %

RANGE (microns)	LOCAL (%)	UNDER(%)	-CUMULATIVE-	OVER(%)
0.0 - 1.0	44.94	44.94		55.06
1.0 - 2.0	28.86	73.79		26.21
2.0 - 3.0	8.11	81.90		18.10
3.0 - 4.0	6.10	88.00		12.00
4.0 - 5.0	4.22	92.22		7.78
5.0 - 6.0	2.51	94.73		5.27
6.0 - 7.0	1.44	96.18		3.82
7.0 - 8.0	0.76	96.94		3.06
8.0 - 9.0	0.47	97.41		2.59
9.0 - 10.0	0.39	97.80		2.20
10.0 - 20.0	1.69	99.48		0.52
20.0 - 30.0	0.33	99.82		0.18
30.0 - 40.0	0.09	99.90		0.10
40.0 - 50.0	0.06	99.96		0.04
50.0 - 60.0	0.02	99.98		0.02
60.0 - 70.0	0.01	99.99		0.01
70.0 - 80.0	0.00	99.99		0.01
80.0 - 90.0	0.00	100.00		0.00
90.0 - 100.0	0.00	100.00		0.00
100.0 - 150.0	0.00	100.00		0.00

G A L A I - C I S - 1

Computerized Inspection System

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

HNF-SD-WM-DP-240, REV. 0A

SAMPLE NAME : ~~S97N06B~~ S97N000006 JRO 4/21/97
FILE NAME : S97N06A

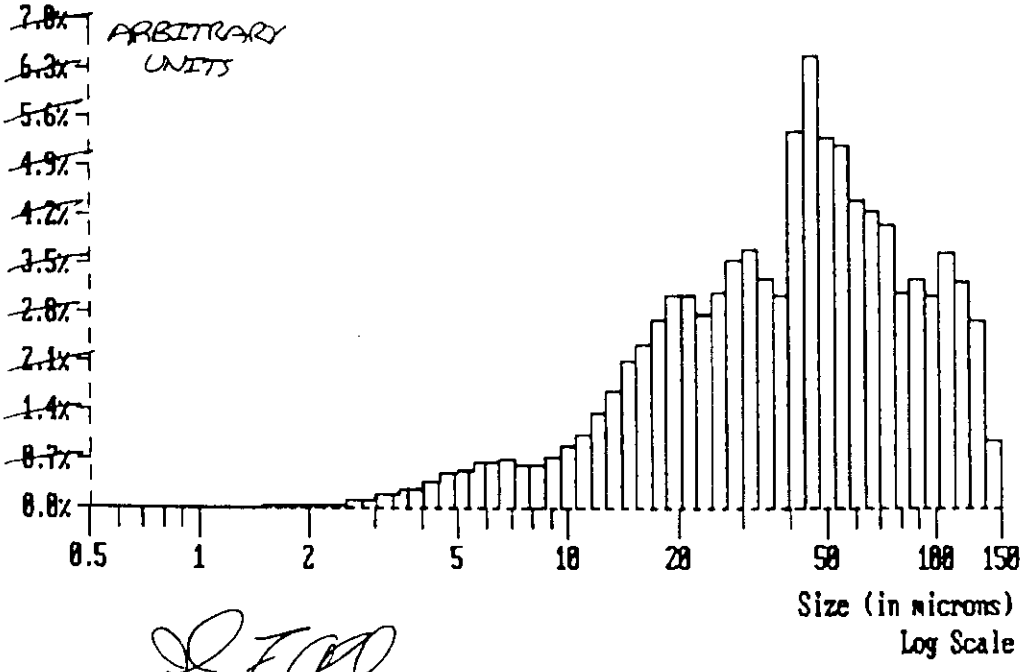
DATE	: 21/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 435451
TIME	: 12:11	ACQ. MODE	: SAMPLE	S.N.F.	: 0.54
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 2918 SEC	S.D.U.	: 5227
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5	CONCENTR.	: 1.1E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 2.0E-02 %

PROBABILITY VOLUME DENSITY GRAPH

Name: S97N06B
2.0E-04 cc/ml(100.0%)
Mode at 45.76 µm
<< SCALE RANGE (µm): ADJUSTED >>

Mean(nv): 7.05µm
S.D.(nv): 5.90µm

Median : 43.41µm
Mean(vm): 49.69µm
S.D.(vm): 33.88µm
Conf(vm): 100.00 %



4-21-97

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

VOLUME DISTRIBUTION TABLE (RANGES)

SAMPLE NAME : ~~S97N06B~~ S97N000006 JPO 4/4/97
FILE NAME : S97N06A

HNF-SD-WM-DP-240, REV. 0A

DATE	: 21/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 435451
TIME	: 12:11	ACQ. MODE	: SAMPLE	S.N.F.	: 0.54
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 2918 SEC	S.D.U.	: 5227
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5	CONCENTR.	: 1.1E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 2.0E-02 %

RANGE (microns)	LOCAL (%)	UNDER(%)	CUMULATIVE	OVER(%)
0.0 - 1.0	0.05	0.05		99.95
1.0 - 2.0	0.24	0.29		99.71
2.0 - 3.0	0.37	0.66		99.34
3.0 - 4.0	0.75	1.41		98.59
4.0 - 5.0	1.09	2.50		97.50
5.0 - 6.0	1.19	3.68		96.32
6.0 - 7.0	1.12	4.80		95.20
7.0 - 8.0	0.90	5.71		94.29
8.0 - 9.0	0.83	6.54		93.46
9.0 - 10.0	0.95	7.48		92.52
10.0 - 20.0	14.27	21.76		78.24
20.0 - 30.0	13.38	35.13		64.87
30.0 - 40.0	10.01	45.15		54.85
40.0 - 50.0	14.03	59.18		40.82
50.0 - 60.0	9.91	69.09		30.91
60.0 - 70.0	6.68	75.78		24.22
70.0 - 80.0	5.29	81.07		18.93
80.0 - 90.0	4.50	85.57		14.43
90.0 - 100.0	3.06	88.63		11.37
100.0 - 150.0	11.37	100.00		0.00

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

SAMPLE NAME : S97N000013 105-N
FILE NAME : s97n13

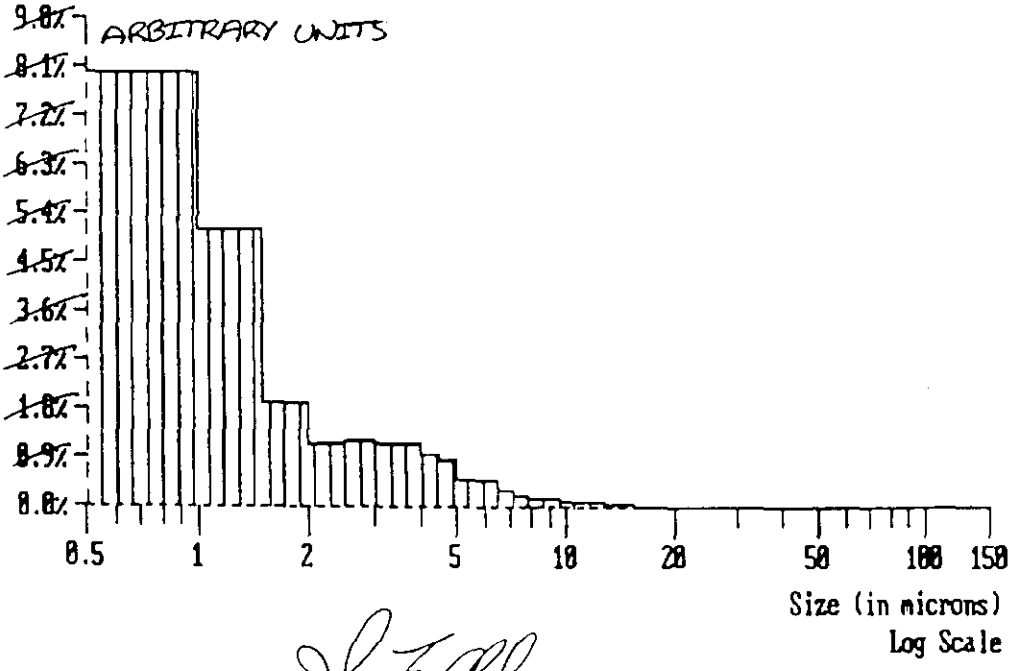
HNF-SD-WM-DP-240, REV. 0A

DATE	: 18/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 478393
TIME	: 09:34	ACQ. MODE	: SAMPLE	S.N.F.	: 0.50
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 6785 SEC	S.D.U.	: 3961
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5 (ABORTED)	CONCENTR.	: 5.7E+05 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 2.9E-03 %

PROBABILITY NUMBER DENSITY GRAPH

Name: S97N000013 105-N
5.7E+05 #/ml(100.0%)
Mode at 0.75 µm
<< SCALE RANGE (µm): ADJUSTED >>

Median : 0.93µm
Mean(nl): 1.43µm
S.D.(nl): 1.88µm
Conf(nl):100.00 %



4-21-97

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

NUMBER DISTRIBUTION TABLE (RANGES)

HNF-SD-WM-DP-240, REV. 0A

SAMPLE NAME : S97N000013 105-N
FILE NAME : s97n13

DATE	: 18/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 478393
TIME	: 09:34	ACQ. MODE	: SAMPLE	S.N.F.	: 0.50
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 6785 SEC	S.D.U.	: 3961
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5 (ABORTED)	CONCENTR.	: 5.7E+05 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 2.9E-03 %

RANGE (microns)	LOCAL (%)	UNDER(%)	-CUMULATIVE-	OVER(%)
0.0 - 1.0	58.49	58.49		41.51
1.0 - 2.0	27.54	86.03		13.97
2.0 - 3.0	5.12	91.16		8.84
3.0 - 4.0	3.56	94.72		5.28
4.0 - 5.0	2.19	96.91		3.09
5.0 - 6.0	1.01	97.91		2.09
6.0 - 7.0	0.69	98.60		1.40
7.0 - 8.0	0.32	98.91		1.09
8.0 - 9.0	0.23	99.15		0.85
9.0 - 10.0	0.16	99.31		0.69
10.0 - 20.0	0.57	99.88		0.12
20.0 - 30.0	0.07	99.95		0.05
30.0 - 40.0	0.02	99.97		0.03
40.0 - 50.0	0.02	99.99		0.01
50.0 - 60.0	0.01	99.99		0.01
60.0 - 70.0	0.00	100.00		0.00
70.0 - 80.0	0.00	100.00		0.00
80.0 - 90.0	0.00	100.00		0.00
90.0 - 100.0	0.00	100.00		0.00
100.0 - 150.0	0.00	100.00		0.00

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

HNF-SD-WM-DP-240, REV. 0A

SAMPLE NAME : S97N000013 105-N
FILE NAME : S97N13

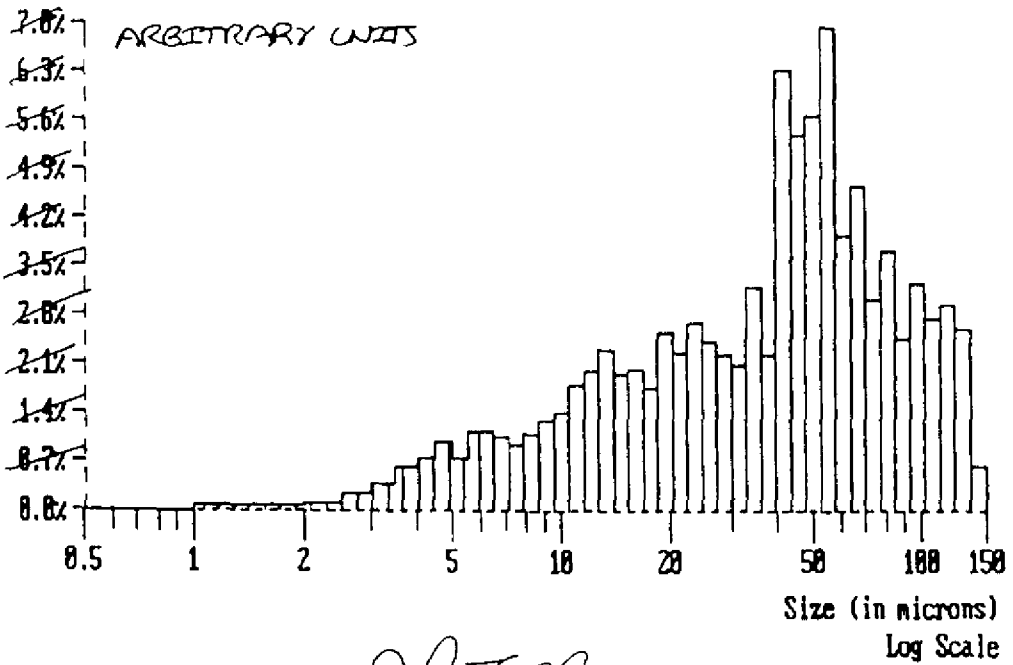
DATE	: 18/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 478393
TIME	: 09:34	ACQ. MODE	: SAMPLE	S.N.F.	: 0.50
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 6785 SEC	S.D.U.	: 3961
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5 (ABORTED)	CONCENTR.	: 5.7E+05 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 2.9E-03 %

PROBABILITY VOLUME DENSITY GRAPH

Name: S97N000013 105-N
2.9E-05 cc/ml(100.0%)
Mode at 55.35 µm
<< SCALE RANGE (µm): ADJUSTED >>

Mean(nv): 4.59µm
S.D.(nv): 3.68µm

Median : 42.54µm
Mean(vm): 46.60µm
S.D.(vm): 33.97µm
Conf(vm): 100.00 %



4-21-97

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

VOLUME DISTRIBUTION TABLE (RANGES)

HNF-SD-WM-DP-240, REV. 0A

SAMPLE NAME : S97N000013 105-N
FILE NAME : s97n13

DATE	: 18/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 478393
TIME	: 09:34	ACQ. MODE	: SAMPLE	S.N.F.	: 0.50
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 6785 SEC	S.D.U.	: 3961
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5 (ABORTED)	CONCENTR.	: 5.7E+05 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 2.9E-03 %

RANGE (microns)	LOCAL (%)	UNDER(%)	CUMULATIVE	OVER(%)
0.0 - 1.0	0.26	0.26		99.74
1.0 - 2.0	0.76	1.01		98.99
2.0 - 3.0	0.83	1.84		98.16
3.0 - 4.0	1.57	3.42		96.58
4.0 - 5.0	2.05	5.46		94.54
5.0 - 6.0	1.73	7.20		92.80
6.0 - 7.0	1.91	9.10		90.90
7.0 - 8.0	1.35	10.46		89.54
8.0 - 9.0	1.48	11.94		88.06
9.0 - 10.0	1.44	13.38		86.62
10.0 - 20.0	14.69	28.06		71.94
20.0 - 30.0	10.27	38.33		61.67
30.0 - 40.0	7.53	45.87		54.13
40.0 - 50.0	13.98	59.85		40.15
50.0 - 60.0	11.82	71.66		28.34
60.0 - 70.0	6.97	78.64		21.36
70.0 - 80.0	5.03	83.66		16.34
80.0 - 90.0	3.66	87.32		12.68
90.0 - 100.0	2.36	89.69		10.31
100.0 - 150.0	10.31	100.00		0.00

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

HNF-SD-WM-DP-240, REV. 0A

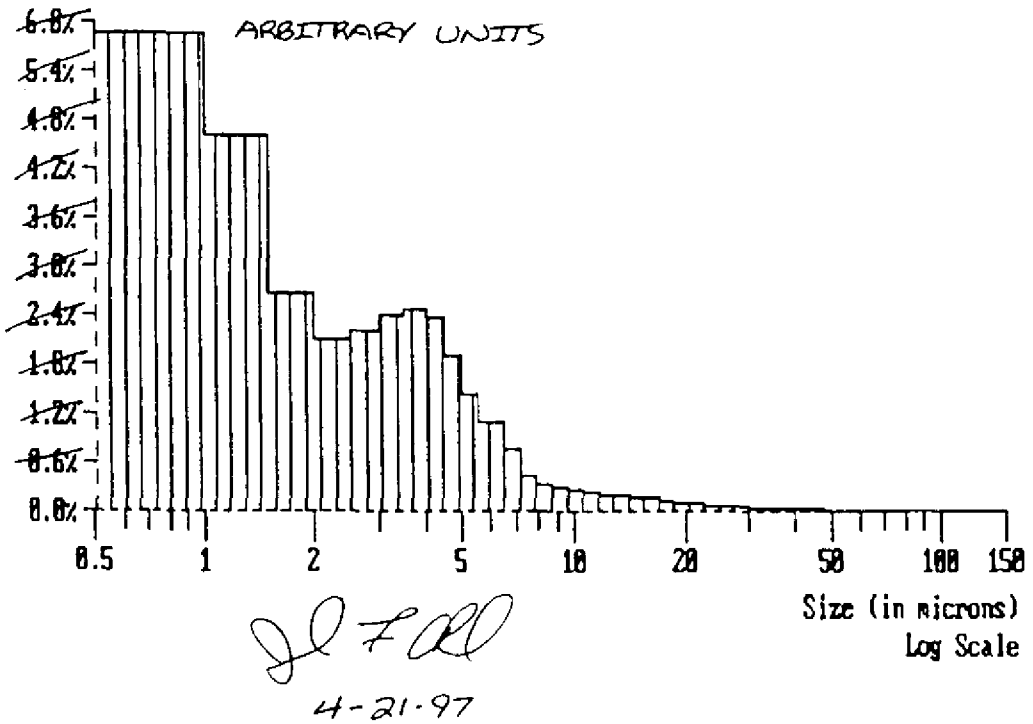
SAMPLE NAME : S97N000014 105-N
FILE NAME : S97N14

DATE	: 18/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 533937
TIME	: 11:35	ACQ. MODE	: SAMPLE	S.N.F.	: 0.52
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 4432 SEC	S.D.U.	: 5052
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5 (ABORTED)	CONCENTR.	: 5.2E+05 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 1.6E-02 %

PROBABILITY NUMBER DENSITY GRAPH

Name: S97N000014 105-N
5.2E+05 #/ml(100.0%)
Mode at 0.75 µm
<< SCALE RANGE (µm): ADJUSTED >>

Median : 1.18µm
Mean(nl): 2.21µm
S.D.(nl): 3.67µm
Conf(nl):100.00 %



4-21-97

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

NUMBER DISTRIBUTION TABLE (RANGES)

SAMPLE NAME : S97N000014 105-N
FILE NAME : S97N14

HNF-SD-WM-DP-240, REV. 0A

DATE	: 18/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 533937
TIME	: 11:35	ACQ. MODE	: SAMPLE	S.N.F.	: 0.52
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 4432 SEC	S.D.U.	: 5052
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5 (ABORTED)	CONCENTR.	: 5.2E+05 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 1.6E-02 %

RANGE (microns)	LOCAL (%)	UNDER(%)	-CUMULATIVE-	OVER(%)
0.0 - 1.0	42.95	42.95		57.05
1.0 - 2.0	27.77	70.71		29.29
2.0 - 3.0	9.20	79.91		20.09
3.0 - 4.0	7.42	87.33		12.67
4.0 - 5.0	5.07	92.40		7.60
5.0 - 6.0	2.56	94.96		5.04
6.0 - 7.0	1.51	96.47		3.53
7.0 - 8.0	0.66	97.13		2.87
8.0 - 9.0	0.40	97.53		2.47
9.0 - 10.0	0.32	97.85		2.15
10.0 - 20.0	1.43	99.29		0.71
20.0 - 30.0	0.40	99.68		0.32
30.0 - 40.0	0.13	99.81		0.19
40.0 - 50.0	0.10	99.91		0.09
50.0 - 60.0	0.05	99.96		0.04
60.0 - 70.0	0.02	99.98		0.02
70.0 - 80.0	0.01	99.99		0.01
80.0 - 90.0	0.00	99.99		0.01
90.0 - 100.0	0.00	99.99		0.01
100.0 - 150.0	0.01	100.00		0.00

G A L A I - C I S - 1

Computerized Inspection System

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

HNF-SD-WM-DP-240, REV. 0A

SAMPLE NAME : S97N000014 105-N
FILE NAME : S97N14

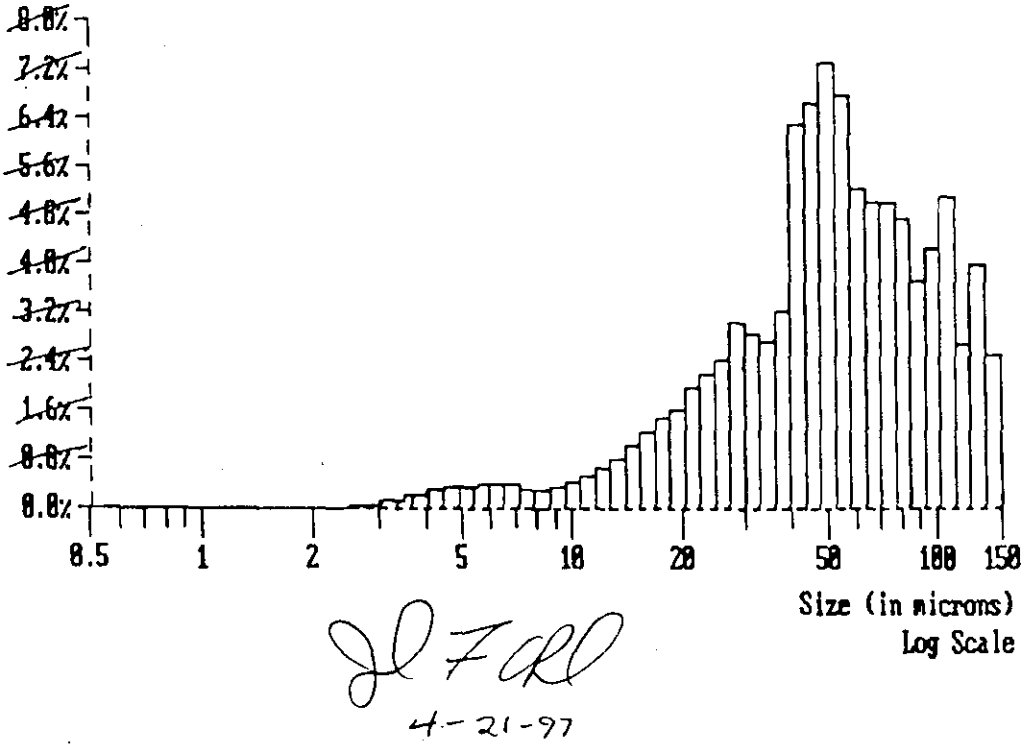
DATE	: 18/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 533937
TIME	: 11:35	ACQ. MODE	: SAMPLE	S.N.F.	: 0.52
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 4432 SEC	S.D.U.	: 5052
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5 (ABORTED)	CONCENTR.	: 5.2E+05 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 1.6E-02 %

PROBABILITY VOLUME DENSITY GRAPH

Name: S97N000014 105-N
1.6E-04 cc/ml(100.0%)
Mode at 50.33 µm
<< SCALE RANGE (µm): ADJUSTED >>

Mean(nv): 8.32µm
S.D.(nv): 7.12µm

Median : 52.13µm
Mean(vm): 58.84µm
S.D.(vm): 34.55µm
Conf(vm):100.00 %



4-21-97

GALAI CIS1 VERSION 4.3 (WHC PROCESS CHEM. LABS)

VOLUME DISTRIBUTION TABLE (RANGES)

HNF-SD-WM-DP-240, REV. 0A

SAMPLE NAME : S97N000014 105-N
FILE NAME : S97N14

DATE	: 18/04/1997	ACQ. RANGE	: 0.5-150	COUNTS	: 533937
TIME	: 11:35	ACQ. MODE	: SAMPLE	S.N.F.	: 0.52
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 4432 SEC	S.D.U.	: 5052
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 5 (ABORTED)	CONCENTR.	: 5.2E+05 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: None	SOLIDS	: 1.6E-02 %

RANGE (microns)	LOCAL (%)	UNDER(%)	-CUMULATIVE-	OVER(%)
0.0 - 1.0	0.03	0.03		99.97
1.0 - 2.0	0.14	0.17		99.83
2.0 - 3.0	0.25	0.42		99.58
3.0 - 4.0	0.55	0.98		99.02
4.0 - 5.0	0.79	1.77		98.23
5.0 - 6.0	0.73	2.50		97.50
6.0 - 7.0	0.71	3.21		96.79
7.0 - 8.0	0.47	3.69		96.31
8.0 - 9.0	0.43	4.11		95.89
9.0 - 10.0	0.47	4.59		95.41
10.0 - 20.0	7.39	11.97		88.03
20.0 - 30.0	10.26	22.23		77.77
30.0 - 40.0	8.90	31.14		68.86
40.0 - 50.0	16.05	47.19		52.81
50.0 - 60.0	12.61	59.80		40.20
60.0 - 70.0	8.15	67.96		32.04
70.0 - 80.0	7.25	75.21		24.79
80.0 - 90.0	4.68	79.88		20.12
90.0 - 100.0	4.62	84.50		15.50
100.0 - 150.0	15.50	100.00		0.00

LABCORE Data Entry Template for Worklist# 17959

Analyst: _____ **Instrument:** NONE _____ **Book#** _____

Method: LT-519-101 Rev/Mod _____ HNF-SD-WM-DP-240, REV. 0A

Worklist Comment: 105N BASIN (PARTICLE SIZE) SEGREGATE FOR PCB CONTROL RTS

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	SAMPLE	S97N000006	0		PARTSZ01	SOLID	97000164	105N PHASE 1
		Analytes Requested: PARTSZ01						
2	SAMPLE	S97N000013	0		PARTSZ01	SOLID	97000164	105N PHASE 1
		Analytes Requested: PARTSZ01						
3	SAMPLE	S97N000014	0		PARTSZ01	SOLID	97000164	105N PHASE 1
		Analytes Requested: PARTSZ01						

Final page for worklist # 17959

5/7/97
Analyst Signature **Date**

5-13-97
Analyst Signature **Date**

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

NHC
Numatec
Hanford Corporation
An SGN/Cogema, Inc. Company

Internal Memo

From: Process Chemistry 8C510-97-014
Phone: 373-4995 T6-07
Date: June 4, 1997
Subject: RESULTS OF WET SIEVE TESTS ON 105-N BASIN (PHASE 1) SAMPLES

To: G. L. Miller T6-06

cc: D. L. Herting DLH T6-07
J. R. Jewett T6-07
K. L. Powell T6-12
A. D. Rice T6-06
C. M. Seidel T6-14
JFO File/LB

This letter reports the results of wet sieves tests conducted by Process Chemistry on sediment samples collected from the 105-N Basin. All information associated with this testing was recorded in laboratory notebook HNF-N-22-1.

Laboratory Technology Procedure LT-519-103 (Revision A-0) was followed for the wet sieve tests on the 105-N Basin samples. The sieve tests consisted of washing sediment through #100 mesh (150 µm) sieves. The sediment was then dried and weighed to determine the weight percent of particles greater than 150 µm in diameter. On a dry weight basis, 93.3%, 41.6%, and 77.0% of the particulates in samples S97N000006, S97N0000013, and S97N0000014 were retained on the #100 mesh sieves. The sieve tests were completed on May 28, 1997.

If you have any questions on this letter, feel free to call me at 373-4995.

J. F. O'Rourke
Process Chemistry
Numatec Hanford Corporation

Numatec Hanford Corporation | **Internal Memo**

From: Process Chemistry
Phone: 373-4995 T6-07
Date: May 13, 1997
Subject: 105-N BASIN VISCOSITY RESULTS

8C510-97-010

To: G. L. Miller T6-06

cc: D. L. Herting T6-07
J. R. Jewett T6-07
A. D. Rice T6-06
JFO File/LB

This letter summarizes the viscosity measurements recently performed on settled sediment from 105-N Basin samples S97N000013 and S97N000014. The viscosity of sample S97N000006 was not measured because the sample primarily consisted of pebbles and other objects which exceeded the gap size for the viscometer. Laboratory Technology Procedure LT-519-115 (Revision B-0) was followed for all of the viscosity analyses.

The sediment in samples S97N000013 and S97N0000014 had not been disturbed for two weeks prior to the analyses on May 5, 1997. The viscosities were measured with shear rates increasing from 0 s^{-1} to 300 s^{-1} and decreasing from 300 s^{-1} to 0 s^{-1}. At the viscosities observed in these samples, the lower shear rate limit for the ME-45 sensor system is approximately 20 s^{-1}. Measurements with shear rates below 20 s^{-1} should be considered highly questionable. The viscosity analyses were performed at ambient temperature (approximately 24°C).

Sample S97N000014 contained a number of metal shavings, the majority of which were removed prior to the analysis. The objects ranged in size from several millimeters to two centimeters. A few metal shavings were discovered in the cup during cleanup after the run. The metal pieces probably caused a large degree of the variability observed in the results. One or two metal shavings were also discovered in the sample cup during cleanup of the sample S97N000013 run.

The attachment contains viscosity curves (viscosity vs. shear rate and shear stress vs. shear rate) and raw data for the sample runs. Both samples appear to be somewhat thixotropic with the increasing shear rate curve having greater viscosities than the decreasing curve.

All information associated with this testing was recorded in the controlled laboratory notebooks HNF-N-22-1 and WHC-N-1272-1. If you have any questions on this letter, feel free to call me at 373-4995.

J. F. O'Rourke
Process Chemistry
Numatec Hanford Corporation

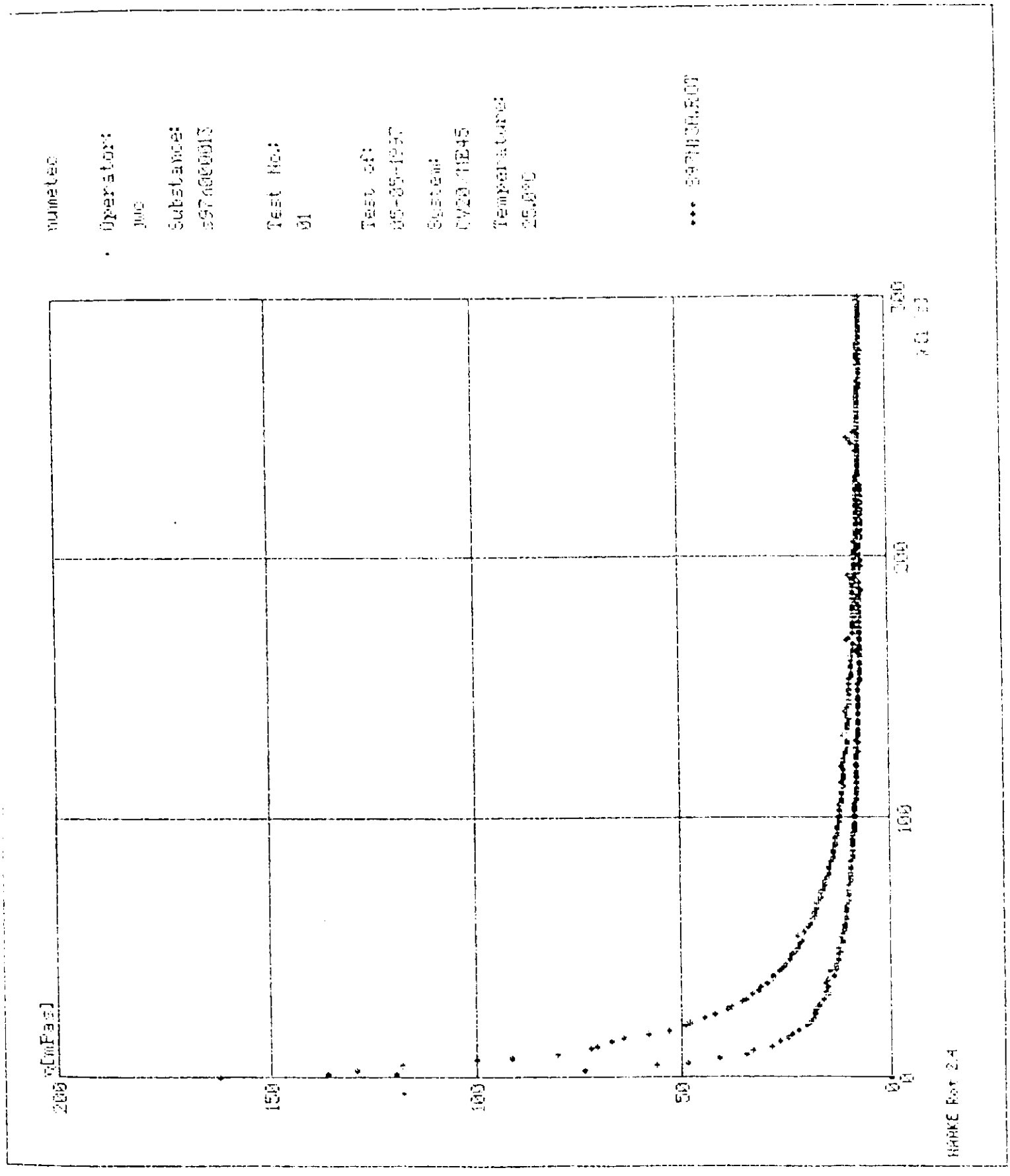
Attachments (2)

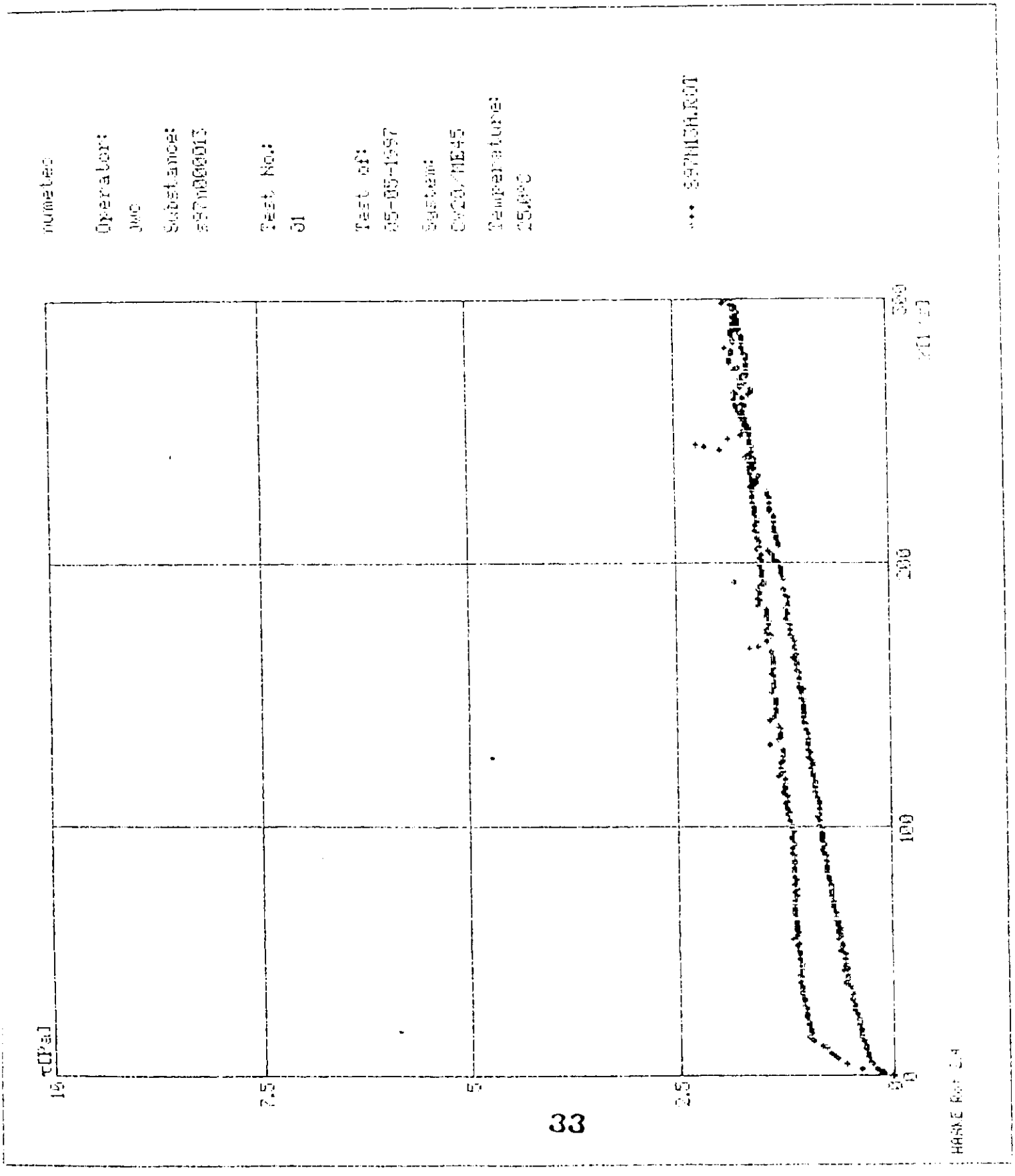
8C510-PCS97-010

Attachment I

VISCOSITY RESULTS FOR S97N000013

Consisting of 11 Pages including the cover page


numeter
Operator:
jmc
Substance:
Test No.:
01
Test at:
Temperature:
25.0°C
200
150
100
50
0
0
100
200
300
t[min]
MARKE Ref 2.4


numeber
Operator:
JWC
Substance:
s97n000013
Test No.:
01
Test on:
25-05-1997
Substance:
CaCO3/MEG5
Temperature:
25.000
... 97PHIGH.RGT
τ[Pa]
10
7.5
5
2.5
0
0
100
200
300
HASKE Rot 2.4

Date : 05-05-1997 Testdate : 05-05-1997
Substance : s97n000013
Test number : 01
Operator : jwc
Sensor : ME45 Meas. system : CV20
%Tau : 100% %D : 100%
Factor A : 0.800 Factor M : 3.000 Gap : 0.000 mm
Data stored in file C:\HAAKE\S97N13A.ROT

Segment number 1 of type 'Tau/D' is defined as :
D from 0.000 to 300.0 1/s in 4.00 min at 25.0xC.
Area is 403.9 Pa/s
200 steps are defined, 200 are actually present.

Apparent viscosity:
Eta(min)=0.000 Eta(max)=161.8 Etam=17.31 s(n-1)=23.07

Point	D[1/s]	Tau[Pa]	Eta[mPas]	t[min]	Temp[xC]
1	0.000	0.000	0.000	0.00	27.4
2	0.142	0.023	161.800	0.02	27.5
3	1.114	0.152	136.400	0.03	27.5
4	2.991	0.387	129.200	0.05	27.5
5	4.770	0.564	118.200	0.08	27.5
6	6.535	0.653	99.850	0.10	27.5
7	7.419	0.677	91.280	0.11	27.4
8	9.189	0.739	80.370	0.14	27.5
9	10.940	0.789	72.160	0.16	27.5
10	11.870	0.840	70.800	0.17	27.6
11	13.750	0.926	67.340	0.20	27.5
12	15.520	0.994	64.030	0.22	27.6
13	16.420	0.952	57.980	0.23	27.6
14	18.190	0.967	53.150	0.25	27.6
15	19.950	0.981	49.180	0.28	27.6
16	20.810	0.995	47.830	0.29	27.6
17	22.710	1.011	44.510	0.31	27.6
18	24.530	1.024	41.750	0.34	27.6
19	26.290	1.025	39.000	0.36	27.5
20	27.190	1.034	38.040	0.37	27.7
21	29.230	1.041	35.610	0.40	27.6
22	30.060	1.041	34.630	0.41	27.6
23	31.920	1.057	33.100	0.44	27.7
24	33.720	1.054	31.250	0.46	27.6
25	34.600	1.066	30.790	0.47	27.7
26	36.510	1.077	29.510	0.50	27.6
27	38.270	1.064	27.810	0.52	27.6
28	39.150	1.081	27.620	0.53	27.7
29	40.910	1.072	26.210	0.56	27.7
30	42.670	1.070	25.070	0.58	27.7
31	43.550	1.073	24.650	0.59	27.7
32	45.410	1.088	23.960	0.62	27.7
33	47.210	1.101	23.320	0.64	27.7
34	48.090	1.096	22.780	0.65	27.8
35	49.850	1.085	21.770	0.68	27.8
36	51.660	1.102	21.330	0.70	27.8
37	52.490	1.097	20.900	0.71	27.7
38	54.250	1.169	21.540	0.74	27.7
39	56.160	1.127	20.070	0.76	27.8
40	57.870	1.109	19.160	0.78	27.8
41	58.800	1.111	18.900	0.80	28.0

44	54.250	1.[illegible]5	17.[illegible]70	0.36	27.8
45	54.950	1.127	17.[illegible]50	0.38	27.8
46	56.850	1.139	17.[illegible]30	0.30	27.7
47	57.690	1.144	16.[illegible]00	0.31	27.8
48	59.450	1.145	16.490	0.34	27.8
49	71.260	1.143	16.[illegible]30	0.36	27.8
50	72.140	1.148	15.510	0.37	27.8
51	73.900	1.123	15.200	1.00	27.7
52	75.660	1.145	15.140	1.02	28.0
53	76.740	1.127	14.890	1.03	27.8
54	78.450	1.132	14.430	1.06	27.5
55	80.210	1.127	14.050	1.08	27.8
56	81.090	1.139	14.040	1.09	28.1
57	82.990	1.128	13.590	1.12	27.8
58	84.750	1.129	13.330	1.14	27.7
59	86.560	1.143	13.200	1.17	28.0
60	87.540	1.140	13.020	1.18	28.0
61	89.440	1.149	12.850	1.20	27.7
62	90.180	1.163	12.900	1.22	27.8
63	92.030	1.161	12.610	1.24	27.9
64	93.840	1.149	12.240	1.26	28.0
65	95.600	1.161	12.140	1.29	27.8
66	96.480	1.167	12.100	1.30	27.8
67	98.240	1.152	11.720	1.32	27.8
68	100.000	1.165	11.650	1.35	28.0
69	100.800	1.174	11.640	1.36	27.8
70	102.600	1.183	11.530	1.38	27.9
71	104.500	1.205	11.530	1.41	27.9
72	105.400	1.202	11.410	1.42	28.2
73	107.100	1.226	11.440	1.44	27.9
74	108.900	1.245	11.430	1.47	28.0
75	109.800	1.218	11.090	1.48	27.9
76	111.600	1.219	10.920	1.50	28.0
77	113.500	1.278	11.260	1.52	28.0
78	114.400	1.234	10.790	1.54	27.7
79	116.100	1.239	10.670	1.56	27.8
80	117.900	1.238	10.490	1.58	27.8
81	119.600	1.313	10.980	1.61	27.7
82	120.600	1.264	10.480	1.62	28.0
83	122.300	1.300	10.630	1.64	27.9
84	124.200	1.281	10.310	1.67	28.0
85	125.200	1.264	10.090	1.68	28.0
86	126.900	1.257	9.905	1.70	28.0
87	128.700	1.273	9.887	1.73	28.3
88	129.600	1.268	9.780	1.74	28.1
89	131.400	1.423	10.830	1.76	27.9
90	133.100	1.308	9.825	1.79	27.8
91	134.000	1.294	9.653	1.80	28.0
92	135.800	1.303	9.595	1.82	28.0
93	137.600	1.291	9.384	1.85	27.8
94	138.500	1.320	9.528	1.86	27.8
95	140.400	1.419	10.110	1.88	28.1
96	142.100	1.376	9.680	1.91	28.0
97	143.000	1.339	9.368	1.92	28.0
98	144.700	1.346	9.300	1.94	28.0
99	146.500	1.347	9.194	1.97	27.9
100	148.300	1.339	9.029	1.99	28.0
101	149.200	1.345	9.014	2.00	28.0
102	151.000	1.381	9.144	2.03	28.0
103	152.800	1.375	8.996	2.05	28.1
104	153.700	1.389	8.911	2.06	28.0
105	155.400	1.364	8.777	2.08	28.0
106	157.200	1.363	8.670	2.11	27.9
107	158.100	1.394	8.820	2.12	28.2

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
111	154.500	1.378	8.381	2.20	28.1
112	156.100	1.388	8.352	2.23	28.1
113	157.900	1.652	9.641	2.25	27.9
114	158.800	1.536	9.102	2.23	27.9
115	170.600	1.434	8.407	2.29	28.1
116	172.500	1.401	8.120	2.31	28.2
117	173.300	1.442	8.322	2.32	28.0
118	175.100	1.440	8.223	2.35	28.0
119	176.800	1.421	8.038	2.37	27.6
120	177.700	1.419	7.984	2.38	28.0
121	179.500	1.433	7.985	2.41	27.8
122	181.400	1.442	7.952	2.43	28.2
123	182.300	1.445	7.928	2.44	28.0
124	184.100	1.543	8.381	2.47	28.1
125	185.800	1.509	8.119	2.49	28.1
126	186.700	1.531	8.200	2.50	28.1
127	188.400	1.526	8.098	2.53	27.7
128	190.200	1.552	8.158	2.55	28.2
129	192.100	1.464	7.622	2.57	28.4
130	193.000	1.470	7.616	2.58	28.2
131	194.800	1.480	7.599	2.61	27.9
132	196.500	1.480	7.533	2.63	28.1
133	197.400	1.502	7.610	2.64	27.9
134	199.100	1.509	7.577	2.67	28.4
135	201.000	1.498	7.453	2.69	27.7
136	201.900	1.507	7.466	2.70	28.1
137	203.700	1.492	7.323	2.73	28.0
138	205.500	1.534	7.463	2.75	28.1
139	206.300	1.518	7.357	2.76	28.2
140	208.100	1.511	7.262	2.79	28.3
141	209.800	1.541	7.346	2.81	28.4
142	211.700	1.549	7.317	2.83	28.3
143	212.600	1.574	7.403	2.85	27.7
144	214.400	1.579	7.366	2.87	28.1
145	216.200	1.552	7.178	2.89	28.0
146	217.000	1.543	7.109	2.91	28.1
147	218.800	1.578	7.211	2.93	28.1
148	220.600	1.560	7.071	2.95	28.3
149	221.600	1.566	7.069	2.97	27.9
150	223.300	1.584	7.095	2.99	27.9
151	225.100	1.600	7.109	3.01	27.9
152	226.000	1.605	7.104	3.03	27.8
153	227.800	1.583	6.950	3.05	28.0
154	229.500	1.616	7.041	3.07	28.3
155	230.400	1.603	6.954	3.08	27.9
156	232.300	1.592	6.855	3.11	27.9
157	234.000	1.614	6.898	3.13	28.1
158	235.800	1.630	6.913	3.16	27.9
159	236.700	1.629	6.881	3.17	28.2
160	238.500	1.629	6.830	3.19	28.2
161	240.200	1.673	6.966	3.22	28.2
162	241.100	1.647	6.831	3.23	28.2
163	243.100	1.969	8.100	3.25	28.2
164	244.700	2.145	8.766	3.27	28.0
165	245.600	2.257	9.191	3.29	28.3
166	247.300	1.875	7.582	3.31	28.1
167	249.100	1.713	6.878	3.33	28.1
168	250.000	1.685	6.739	3.35	28.0
169	251.900	1.659	6.584	3.37	28.1
170	253.700	1.678	6.616	3.39	28.2
171	254.500	1.683	6.615	3.41	28.3
172	256.300	1.690	6.593	3.43	28.3
173	258.100	1.691	6.554	3.45	28.1

174	259.800	1.681	6.469	3.48	28.3
175	260.700	1.682	6.452	3.49	28.1
176	262.600	1.694	6.450	3.51	28.1
177	264.400	1.771	6.698	3.54	28.1
178	265.200	1.803	6.799	3.55	28.3
179	267.000	1.728	6.471	3.57	28.1
180	268.800	1.713	6.375	3.60	28.5
181	269.600	1.713	6.354	3.61	28.4
182	271.400	1.700	6.265	3.63	28.4
183	273.300	1.784	6.526	3.66	28.1
184	274.200	1.733	6.320	3.67	28.1
185	276.000	1.852	6.710	3.69	28.2
186	277.700	1.842	6.634	3.72	28.2
187	279.500	1.818	6.504	3.74	28.4
188	280.400	1.814	6.470	3.75	28.6
189	282.100	1.905	6.753	3.77	28.5
190	284.000	1.806	6.360	3.80	28.3
191	284.800	1.794	6.299	3.81	28.1
192	286.700	1.810	6.314	3.83	27.8
193	288.300	1.820	6.313	3.86	28.3
194	289.200	1.788	6.180	3.87	28.2
195	291.000	1.797	6.174	3.89	28.1
196	292.900	1.793	6.121	3.92	28.4
197	293.800	1.792	6.097	3.93	28.1
198	295.600	1.798	6.084	3.95	28.1
199	297.300	1.785	6.005	3.98	28.1
200	298.100	1.827	6.127	3.99	27.7

Segment number 2 of type 'Tau/D' is defined as :
D from 300.0 to 0.000 1/s in 4.00 min at 25.0xC.
Area is 321.2 Pa/s
200 steps are defined, 200 are actually present.

Apparent viscosity: -
Eta(min)=5.880 Eta(max)=119.8 Etam=10.31 s(n-1)=11.23

Point	D[1/s]	Tau[Pa]	Eta[mPas]	t[min]	Temp[xC]
1	299.900	1.882	6.274	4.00	28.4
2	299.700	1.827	6.095	4.02	28.2
3	298.700	1.932	6.470	4.03	28.3
4	296.900	1.768	5.955	4.05	28.2
5	295.200	1.756	5.951	4.08	28.1
6	294.300	1.781	6.053	4.09	28.1
7	292.500	1.739	5.947	4.11	28.2
8	290.700	1.749	6.016	4.14	28.1
9	288.900	1.726	5.977	4.16	28.7
10	288.000	1.734	6.021	4.17	28.3
11	286.300	1.700	5.940	4.20	28.1
12	284.500	1.699	5.973	4.22	28.1
13	283.700	1.700	5.994	4.23	28.3
14	281.800	1.689	5.993	4.26	28.2
15	280.000	1.670	5.965	4.28	27.8
16	279.200	1.642	5.880	4.29	28.1
17	277.400	1.655	5.966	4.32	28.5
18	275.700	1.639	5.946	4.34	28.1
19	274.700	1.638	5.961	4.35	28.0
20	272.900	1.643	6.020	4.37	27.9
21	271.100	1.650	6.084	4.40	27.9
22	269.400	1.695	6.293	4.42	28.0
23	268.400	1.673	6.233	4.43	28.2
24	266.700	1.604	6.015	4.46	28.0
25	264.900	1.601	6.045	4.48	28.1
26	264.000	1.610	6.099	4.49	28.0
27	262.300	1.784	6.801	4.52	28.1
28	260.400	1.775	6.816	4.54	28.2
29	259.500	1.762	6.789	4.55	28.3
30	257.700	1.746	6.776	4.58	28.2
31	255.900	1.708	6.675	4.60	28.3
32	255.000	1.673	6.560	4.61	28.3
33	253.300	1.664	6.568	4.64	28.1
34	251.500	1.621	6.446	4.66	28.2
35	250.600	1.621	6.468	4.67	28.4
36	248.800	1.612	6.479	4.70	27.8
37	247.000	1.626	6.583	4.72	28.3
38	245.300	1.625	6.625	4.74	28.2
39	244.400	1.605	6.567	4.76	28.4
40	242.700	1.597	6.583	4.78	28.2
41	240.800	1.588	6.597	4.80	28.3
42	239.900	1.574	6.561	4.82	28.3
43	238.100	1.573	6.606	4.84	28.2
44	236.300	1.571	6.649	4.86	28.2
45	235.500	1.587	6.739	4.87	28.3
46	233.700	1.523	6.517	4.90	28.2
47	232.000	1.531	6.600	4.92	28.2
48	231.000	1.547	6.695	4.93	28.3
49	229.200	1.601	6.987	4.96	28.3

52	224.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
53	223.300	1.358	5.[illegible]	5.04	28.2
54	221.300	1.354	5.253	5.07	28.2
55	220.200	1.358	5.300	5.08	28.1
56	218.500	1.352	5.290	5.10	28.1
57	216.700	1.350	5.228	5.12	27.9
58	215.800	1.342	5.219	5.14	28.4
59	214.100	1.345	6.282	5.16	28.0
60	212.300	1.334	6.284	5.18	28.2
61	211.400	1.324	6.260	5.20	28.4
62	209.500	1.316	6.280	5.22	28.3
63	207.700	1.296	6.241	5.24	28.3
64	206.900	1.290	6.234	5.26	28.1
65	205.100	1.406	6.853	5.28	28.1
66	203.400	1.373	6.752	5.30	28.4
67	201.600	1.337	6.630	5.33	28.2
68	200.700	1.300	6.479	5.34	28.3
69	198.800	1.261	6.343	5.36	27.9
70	197.100	1.266	6.426	5.39	28.0
71	196.200	1.256	6.402	5.40	28.2
72	194.400	1.251	6.434	5.42	28.3
73	192.600	1.811	9.403	5.45	28.2
74	191.800	1.530	7.976	5.46	28.3
75	189.900	1.234	6.497	5.48	28.0
76	188.100	1.214	6.454	5.51	28.4
77	187.200	1.200	6.408	5.52	28.3
78	185.400	1.201	6.478	5.54	28.3
79	183.700	1.192	6.488	5.56	28.2
80	182.800	1.208	6.605	5.58	28.4
81	181.100	1.200	6.626	5.60	28.3
82	179.200	1.209	6.747	5.62	28.2
83	177.400	1.192	6.719	5.65	28.2
84	176.500	1.170	6.627	5.66	28.3
85	174.800	1.158	6.625	5.68	28.0
86	173.000	1.154	6.673	5.71	28.2
87	172.100	1.129	6.561	5.72	28.0
88	170.300	1.118	6.564	5.74	28.3
89	168.400	1.118	6.636	5.77	28.2
90	167.600	1.118	6.669	5.78	28.0
91	165.800	1.094	6.599	5.80	28.1
92	164.100	1.135	6.916	5.83	27.9
93	163.100	1.101	6.747	5.84	28.1
94	161.400	1.084	6.716	5.86	28.0
95	159.600	1.093	6.849	5.89	28.4
96	158.700	1.062	6.692	5.90	28.2
97	156.900	1.071	6.825	5.92	28.4
98	155.100	1.067	6.878	5.95	28.0
99	153.400	1.053	6.863	5.97	28.5
100	152.500	1.016	6.663	5.98	28.3
101	150.700	1.045	6.934	6.01	28.3
102	148.900	1.032	6.930	6.03	28.1
103	147.900	1.025	6.930	6.04	28.2
104	146.200	1.023	6.995	6.06	28.1
105	144.400	1.021	7.071	6.09	28.2
106	143.500	1.019	7.097	6.10	28.2
107	141.800	1.006	7.093	6.12	28.2
108	140.000	1.007	7.191	6.15	28.2
109	139.100	0.994	7.145	6.16	28.4
110	137.200	0.986	7.185	6.18	28.3
111	135.500	0.968	7.144	6.21	28.1
112	133.800	0.963	7.196	6.23	28.3
113	132.800	0.968	7.286	6.24	28.2
114	131.100	0.959	7.314	6.27	28.2
115	129.300	0.965	7.464	6.28	28.3

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	28.2
119	123.900	0.625	7.435	6.35	28.4
120	122.100	0.637	7.630	6.39	28.2
121	120.400	0.616	7.634	6.41	28.0
122	119.500	0.613	7.6[illegible]	6.42	28.2
123	117.500	0.594	7.536	6.45	28.3
124	115.800	0.575	7.557	6.47	28.2
125	115.000	0.586	7.705	6.48	28.4
126	113.200	0.578	7.756	6.51	28.0
127	1[illegible].400	0.574	7.843	6.53	28.2
128	109.700	0.848	7.731	6.55	28.3
129	108.700	0.845	7.773	6.56	28.0
130	106.900	0.845	7.909	6.59	28.1
131	105.100	0.834	7.933	6.61	28.1
132	104.300	0.860	8.246	6.62	28.4
133	102.500	0.831	8.108	6.65	28.2
134	100.700	0.827	8.211	6.67	28.3
135	99.850	0.823	8.244	6.68	28.2
136	97.950	0.817	8.338	6.71	28.0
137	96.190	0.808	8.396	6.73	28.2
138	95.260	0.802	8.423	6.74	28.3
139	93.550	0.796	8.507	6.77	28.4
140	91.790	0.800	8.713	6.79	28.3
141	90.030	0.782	8.680	6.81	28.3
142	89.200	0.763	8.557	6.83	28.2
143	87.240	0.758	8.689	6.85	28.4
144	85.480	0.757	8.852	6.87	28.2
145	84.600	0.752	8.883	6.89	28.2
146	82.840	0.758	9.150	6.91	28.2
147	81.090	0.744	9.172	6.93	28.4
148	80.210	0.735	9.159	6.95	28.2
149	78.450	0.715	9.115	6.97	28.2
150	76.540	0.707	9.240	6.99	28.2
151	75.660	0.705	9.313	7.00	28.1
152	73.900	0.699	9.464	7.03	28.2
153	72.140	0.696	9.640	7.05	28.0
154	71.260	0.675	9.467	7.06	28.1
155	69.500	0.677	9.744	7.09	28.2
156	67.690	0.666	9.831	7.11	28.2
157	65.840	0.656	9.970	7.14	28.2
158	64.810	0.647	9.972	7.15	28.2
159	63.200	0.641	10.140	7.17	28.1
160	61.440	0.634	10.320	7.20	28.1
161	60.510	0.632	10.440	7.21	28.2
162	58.800	0.619	10.520	7.23	28.1
163	56.890	0.609	10.710	7.25	28.2
164	56.010	0.602	10.740	7.27	28.2
165	54.250	0.625	11.520	7.29	28.2
166	52.490	0.594	11.310	7.31	28.3
167	51.610	0.583	11.300	7.33	28.1
168	49.850	0.619	12.410	7.35	28.1
169	48.090	0.574	11.940	7.37	28.2
170	47.210	0.570	12.080	7.39	28.2
171	45.310	0.555	12.240	7.41	28.2
172	43.550	0.548	12.590	7.43	28.3
173	41.790	0.523	12.530	7.46	28.2
174	40.910	0.580	14.160	7.47	28.1
175	39.150	0.523	13.370	7.49	28.1
176	37.390	0.546	14.590	7.52	28.1
177	36.360	0.548	15.080	7.53	28.1
178	34.600	0.503	14.520	7.55	28.1
179	32.800	0.495	15.090	7.58	28.1
180	31.960	0.473	14.780	7.59	28.1
181	30.210	0.482	15.950	7.61	28.3

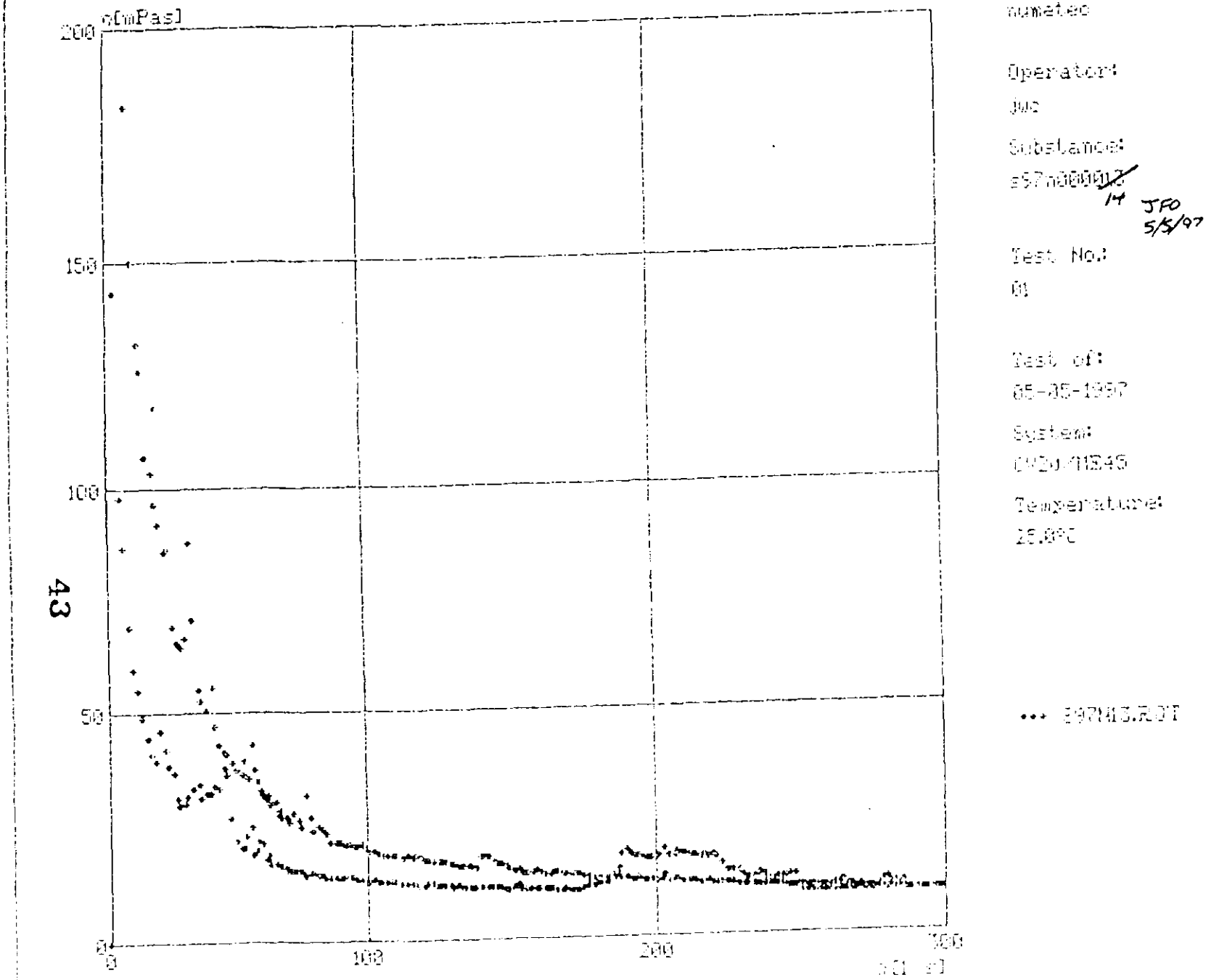
182	28.090	0.465	16.540	7.64	28.1
183	27.330	0.454	16.620	7.65	28.1
184	25.420	0.450	17.720	7.68	28.1
185	24.490	0.437	17.860	7.69	28.0
186	22.600	0.411	18.200	7.71	28.1
187	20.810	0.406	19.510	7.74	28.1
188	19.960	0.397	19.890	7.75	28.1
189	18.180	0.393	21.630	7.77	28.0
190	16.410	0.381	23.240	7.80	28.0
191	15.510	0.376	24.250	7.81	28.1
192	13.620	0.361	26.480	7.83	27.8
193	11.820	0.333	28.180	7.86	28.0
194	10.070	0.332	32.940	7.88	28.0
195	9.169	0.316	34.480	7.89	28.1
196	7.405	0.302	40.770	7.91	28.0
197	5.630	0.273	48.520	7.94	28.0
198	4.765	0.288	56.230	7.95	28.1
199	2.859	0.211	73.660	7.97	28.0
200	1.095	0.131	119.800	8.00	28.1

8C510-PCS97-010

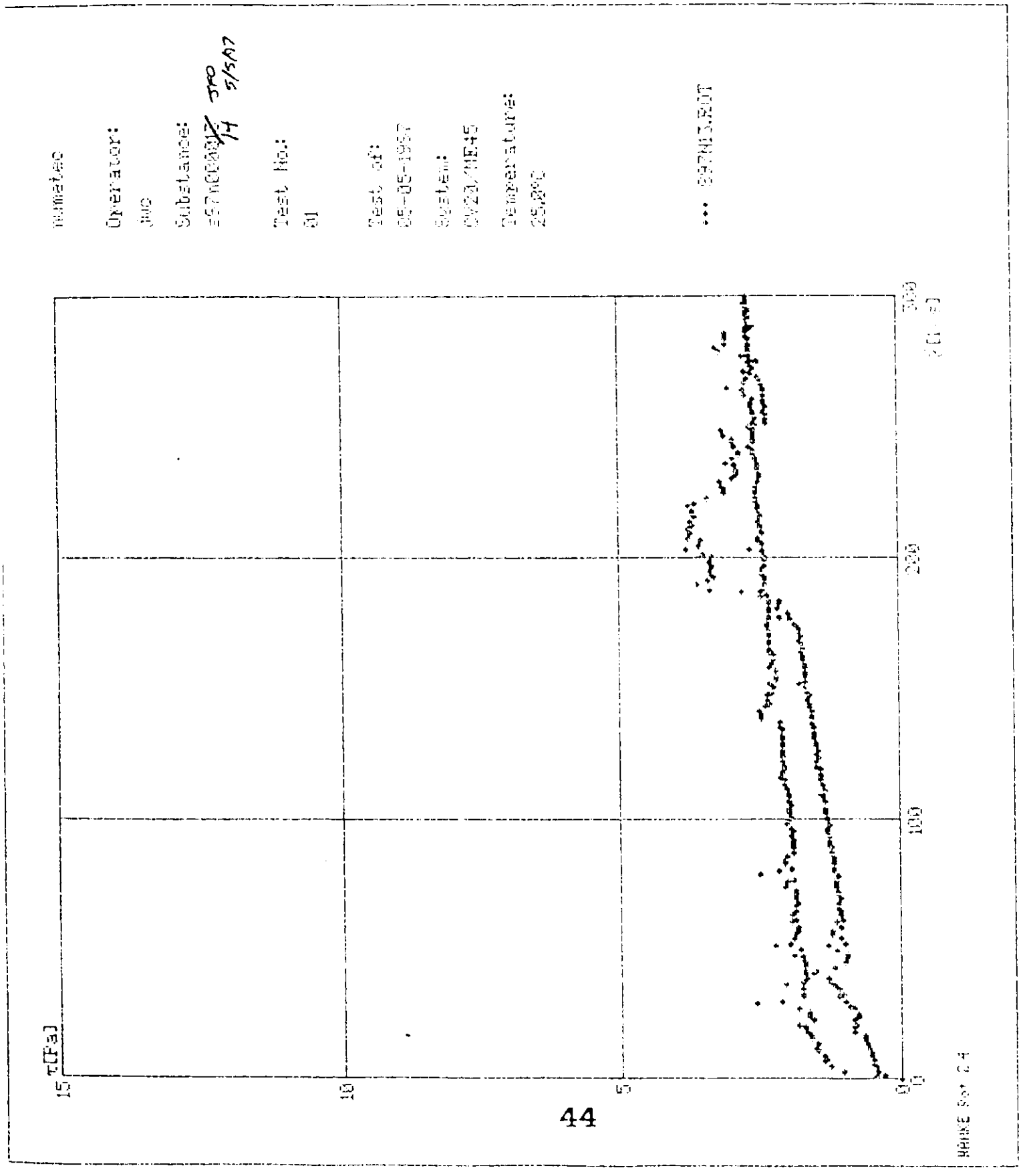
Attachment II

VISCOSITY RESULTS FOR S97N000014

Consisting of 11 Pages including the cover page


η[mPas]
200
150
100
50
0
0
100
200
300
t[s]
numatec
Operator:
JWC
Substance:
e57n000014
JFO
5/5/97
Test No.:
01
Test of:
05-05-1997
System:
CM20-115A5
Temperature:
20.0°C
... 970413.RDT

NAAKE Rev 2.4


numatec
Operator:
JHG
Subtlamce:
=57n00001
Test No:
01
Test of:
05-05-1997
System:
6V20/MEAS
Temperature:
25.0°C
... SETPOINT
τ[Pa]
15
10
5
0
0
100
200
300
t[s]
HHNE Rot 2.4

Date : 05-05-1997 Testdate : 05-05-1997
Substance : s97n000~~13~~14 JFO 5/13/97
Test number : 01
Operator : jwc
Sensor : ME45 Meas. system : CV20
%Tau : 100% %D : 100%
Factor A : 0.800 Factor M : 3.000 Gap : 0.000 mm
Data stored in file C:\HAAKE\S97N13.ROT

Interpolation

f()	D[1/s]	Tau[Pa]	Eta[mPas]	t[min]	Temp[xC]
D	0.000	0.000	0.000	0.00	24.1

Date : 05-05-1997 Testdate : 05-05-1997
Substance : s97n000~~13~~14 JFO 5/5/97
Test number : 01
Operator : jwc
Sensor : ME45 Meas. system : CV20
%Tau : 100% %D : 100%
Factor A : 0.800 Factor M : 3.000 Gap : 0.000 mm
Data stored in file C:\HAAKE\S97N13.ROT

Segment number 1 of type 'Tau/D' is defined as :
D from 0.000 to 300.0 1/s in 4.00 min at 25.0xC.
Area is 654.0 Pa/s
200 steps are defined, 200 are actually present.

Apparent viscosity:
Eta(min)=0.000 Eta(max)=405.3 Etam=29.85 s(n-1)=48.59

Point	D[1/s]	Tau[Pa]	Eta[mPas]	t[min]	Temp[xC]
1	0.000	0.000	0.000	0.00	24.1
2	0.161	0.000	0.000	0.02	24.1
3	1.109	0.450	405.300	0.03	24.0
4	2.972	1.043	350.900	0.05	24.1
5	4.751	1.250	263.100	0.08	24.1
6	6.525	1.363	208.900	0.10	24.0
7	7.380	1.350	183.000	0.11	24.2
8	9.213	1.379	149.700	0.14	24.1
9	11.090	1.466	132.200	0.16	24.1
10	11.960	1.509	126.200	0.17	24.2
11	13.800	1.474	106.800	0.20	24.2
12	15.650	1.615	103.200	0.22	24.1
13	16.530	1.590	96.200	0.23	24.3
14	18.310	1.683	91.900	0.26	24.3
15	20.090	1.719	85.580	0.28	24.1
16	20.970	1.806	86.150	0.29	24.1
17	22.750	1.577	69.320	0.32	24.2
18	24.660	1.620	65.700	0.34	24.1
19	25.560	1.650	64.560	0.35	24.2
20	27.330	1.817	66.490	0.38	24.2
21	29.420	2.585	87.840	0.40	24.2
22	30.210	2.141	70.900	0.42	24.2
23	32.060	1.762	54.960	0.44	24.2
24	32.990	1.735	52.580	0.45	24.2

27	37.540	1.761	46.910	0.51	24.2
28	39.300	1.680	42.750	0.54	24.3
29	41.060	1.697	41.330	0.56	24.2
30	41.890	1.718	41.010	0.57	23.9
31	43.700	1.692	38.720	0.60	24.5
32	45.450	1.706	37.530	0.62	24.1
33	47.360	1.735	36.630	0.64	24.2
34	48.240	1.904	39.470	0.65	24.2
35	50.050	1.769	35.340	0.68	24.3
36	51.760	2.226	43.010	0.70	24.1
37	52.690	1.981	37.600	0.71	24.2
38	54.400	1.911	35.120	0.74	24.3
39	56.210	1.853	32.970	0.76	24.3
40	57.140	1.829	32.000	0.77	24.2
41	58.940	1.834	31.110	0.80	24.2
42	60.700	1.924	31.690	0.82	24.1
43	61.580	1.843	29.930	0.83	24.1
44	63.340	1.934	30.530	0.86	24.2
45	65.100	1.853	28.470	0.88	24.3
46	67.010	1.844	27.520	0.90	24.3
47	67.890	1.827	26.920	0.92	24.2
48	69.650	1.877	26.950	0.94	24.3
49	71.460	1.869	26.160	0.96	24.3
50	72.290	1.852	25.620	0.98	24.2
51	74.050	2.046	27.630	1.00	24.2
52	75.810	1.999	26.370	1.02	24.4
53	76.690	1.904	24.830	1.04	24.3
54	78.590	2.500	31.810	1.06	24.3
55	80.350	2.170	27.010	1.08	24.3
56	81.280	1.954	24.040	1.10	24.2
57	82.990	2.040	24.580	1.12	24.3
58	84.750	2.062	24.330	1.14	24.2
59	85.630	2.008	23.460	1.15	24.3
60	87.540	1.885	21.530	1.18	24.3
61	89.300	1.896	21.240	1.20	24.3
62	91.060	1.916	21.040	1.23	24.3
63	91.980	1.912	20.790	1.24	24.1
64	93.700	1.939	20.700	1.26	24.4
65	95.450	1.912	20.030	1.29	24.3
66	96.330	1.934	20.080	1.30	24.3
67	98.240	2.019	20.550	1.32	24.4
68	100.000	1.962	19.620	1.35	24.3
69	100.900	1.930	19.130	1.36	24.5
70	102.600	1.959	19.090	1.38	24.3
71	104.400	1.968	18.840	1.40	24.2
72	105.300	1.949	18.510	1.42	24.3
73	107.000	1.965	18.360	1.44	24.1
74	108.900	1.968	18.060	1.46	24.2
75	109.900	1.990	18.110	1.48	24.1
76	111.600	2.010	18.000	1.50	24.4
77	113.300	2.042	18.020	1.52	24.3
78	115.100	2.054	17.850	1.55	24.3
79	116.000	2.127	18.340	1.56	24.3
80	117.800	2.071	17.580	1.58	24.2
81	119.600	2.045	17.090	1.61	24.2
82	120.500	2.051	17.020	1.62	24.5
83	122.300	2.071	16.940	1.64	24.4
84	124.100	2.081	16.770	1.67	24.4
85	125.000	2.083	16.670	1.68	24.2
86	126.700	2.091	16.500	1.70	24.2
87	128.600	2.096	16.300	1.73	24.2
88	129.500	2.089	16.130	1.74	24.4
89	131.300	2.098	15.980	1.76	24.3
90	133.000	2.083	15.660	1.79	24.3

94	139.300	2.479	17.800	1.87	24.4
95	140.200	2.472	17.640	1.88	24.3
96	142.000	2.502	17.620	1.90	24.6
97	143.700	2.372	16.510	1.93	24.4
98	144.600	2.332	16.120	1.94	24.5
99	146.400	2.349	16.040	1.96	24.6
100	148.100	2.345	15.830	1.99	24.4
101	149.100	2.268	15.210	2.00	24.2
102	150.900	2.238	14.830	2.02	24.5
103	152.600	2.306	15.110	2.05	24.3
104	153.500	2.208	14.390	2.06	24.3
105	155.300	2.210	14.240	2.08	24.6
106	157.000	2.216	14.110	2.11	24.3
107	158.900	2.303	14.490	2.13	24.6
108	159.800	2.294	14.360	2.14	24.4
109	161.600	2.221	13.740	2.17	24.4
110	163.300	2.251	13.780	2.19	24.5
111	164.200	2.310	14.060	2.20	24.6
112	166.000	2.326	14.020	2.23	24.3
113	167.700	2.319	13.820	2.25	24.7
114	168.700	2.324	13.780	2.26	24.3
115	170.500	2.299	13.480	2.29	24.4
116	172.200	2.330	13.530	2.31	24.4
117	173.100	2.370	13.690	2.32	24.5
118	174.900	2.342	13.390	2.34	24.4
119	176.700	2.307	13.060	2.37	24.5
120	177.600	2.328	13.110	2.38	24.4
121	179.400	2.299	12.810	2.40	24.5
122	181.200	2.315	12.770	2.43	24.5
123	182.900	2.321	12.690	2.45	24.1
124	183.900	2.319	12.610	2.46	24.4
125	185.600	2.346	12.640	2.49	24.3
126	187.300	2.452	13.090	2.51	24.4
127	188.300	2.410	12.800	2.52	24.4
128	190.100	2.373	12.480	2.55	24.2
129	191.900	2.390	12.450	2.57	24.5
130	192.800	2.396	12.420	2.58	24.3
131	194.600	2.461	12.650	2.61	24.5
132	196.400	2.446	12.460	2.63	24.7
133	197.300	2.399	12.160	2.64	24.5
134	199.000	2.388	12.000	2.67	24.2
135	200.900	2.384	11.870	2.69	24.3
136	202.600	2.446	12.070	2.71	23.9
137	203.500	2.663	13.080	2.73	24.4
138	205.300	2.411	11.750	2.75	24.0
139	207.000	2.486	12.010	2.77	24.2
140	207.900	2.514	12.090	2.79	24.6
141	209.700	2.446	11.670	2.81	24.3
142	211.600	2.450	11.580	2.83	24.5
143	212.500	2.472	11.640	2.84	24.4
144	214.200	2.486	11.600	2.87	24.2
145	216.000	2.472	11.450	2.89	24.7
146	216.900	2.483	11.450	2.90	24.4
147	218.700	2.522	11.530	2.93	24.6
148	220.500	2.502	11.350	2.95	24.4
149	221.400	2.536	11.460	2.96	24.6
150	223.200	2.532	11.350	2.99	24.5
151	224.900	2.534	11.260	3.01	24.4
152	226.700	2.548	11.240	3.04	24.4
153	227.600	2.556	11.230	3.05	24.7
154	229.300	2.499	10.900	3.07	24.4
155	231.200	2.480	10.730	3.09	24.5
156	232.100	2.483	10.700	3.11	24.4

157	233.900	2.488	10.640	3.13	24.6
158	235.600	2.510	10.650	3.15	24.3
159	236.500	2.518	10.650	3.17	24.4
160	238.300	2.538	10.650	3.19	24.4
161	240.100	2.583	10.760	3.21	24.6
162	241.100	2.587	10.730	3.23	24.5
163	242.900	2.643	10.880	3.25	24.5
164	244.500	2.577	10.540	3.27	24.4
165	246.300	2.561	10.400	3.30	24.4
166	247.200	2.581	10.440	3.31	24.6
167	249.000	2.570	10.320	3.33	24.5
168	250.700	2.553	10.180	3.36	24.6
169	251.800	2.578	10.240	3.37	24.4
170	253.500	2.551	10.060	3.39	24.4
171	255.300	2.598	10.180	3.42	24.3
172	256.200	2.592	10.120	3.43	24.4
173	257.900	2.631	10.200	3.45	24.7
174	259.700	2.630	10.130	3.48	24.5
175	260.600	2.583	9.914	3.49	24.1
176	262.500	2.744	10.450	3.51	24.8
177	264.200	2.781	10.530	3.53	24.6
178	265.100	3.021	11.400	3.55	24.4
179	266.900	2.729	10.230	3.57	24.4
180	268.600	2.710	10.090	3.59	24.6
181	270.400	2.616	9.675	3.62	24.5
182	271.300	2.622	9.667	3.63	24.6
183	273.200	2.626	9.614	3.65	24.5
184	274.900	2.641	9.605	3.68	24.3
185	275.800	2.622	9.508	3.69	24.8
186	277.500	2.643	9.524	3.71	24.5
187	279.300	2.646	9.472	3.74	24.6
188	280.200	2.645	9.439	3.75	24.5
189	282.000	2.664	9.447	3.77	24.5
190	283.800	2.665	9.391	3.80	24.3
191	284.700	2.698	9.476	3.81	24.5
192	286.400	2.701	9.429	3.83	24.7
193	288.200	2.674	9.279	3.86	24.2
194	289.100	2.664	9.217	3.87	24.4
195	290.900	2.690	9.249	3.89	24.7
196	292.700	2.688	9.181	3.92	24.6
197	294.500	2.684	9.112	3.94	24.4
198	295.400	2.701	9.143	3.95	24.5
199	297.200	2.740	9.219	3.98	24.8
200	298.900	2.707	9.056	4.00	24.1

Segment number 2 of type 'Tau/D' is defined as :
D from 300.0 to 0.000 1/s in 4.00 min at 25.0xC.
Area is 585.1 Pa/s
200 steps are defined, 200 are actually present.

Apparent viscosity:
Eta(min)=8.964 Eta(max)=284.5 Etam=19.16 n(n-1)=24.26

Point	D[1/s]	Tau[Pa]	Eta[mPas]	t[min]	Temp[xC]
1	300.000	2.693	8.976	4.00	24.5
2	299.700	2.711	9.045	4.02	24.4
3	298.800	2.704	9.052	4.03	24.6
4	296.900	2.688	9.051	4.05	24.8
5	295.100	2.646	8.965	4.08	24.5
6	294.300	2.638	8.964	4.09	24.4
7	292.400	2.638	9.023	4.11	24.5
8	290.600	2.668	9.180	4.14	24.7
9	288.900	2.594	8.978	4.16	24.5
10	288.000	2.624	9.109	4.17	24.6
11	286.300	3.065	10.710	4.20	24.8
12	284.500	3.085	10.840	4.22	24.6
13	283.600	3.071	10.830	4.23	24.6
14	281.800	3.075	10.910	4.26	24.5
15	280.100	3.274	11.690	4.28	24.3
16	279.100	3.187	11.420	4.29	24.5
17	277.400	2.780	10.020	4.32	24.4
18	275.600	2.513	9.117	4.34	24.5
19	274.700	2.504	9.115	4.35	24.6
20	272.900	2.565	9.398	4.37	25.0
21	271.100	2.712	10.010	4.40	24.5
22	269.300	2.501	9.287	4.42	24.4
23	268.400	2.469	9.196	4.43	24.4
24	266.600	2.433	9.127	4.46	24.2
25	264.900	2.406	9.082	4.48	24.4
26	264.000	2.402	9.098	4.49	24.3
27	262.300	2.388	9.104	4.52	24.7
28	260.300	2.381	9.148	4.54	24.1
29	259.500	2.375	9.152	4.55	24.4
30	257.700	2.367	9.186	4.58	24.5
31	256.000	2.372	9.267	4.60	24.5
32	255.100	2.346	9.197	4.61	24.3
33	253.300	2.341	9.240	4.64	24.5
34	251.400	2.368	9.419	4.66	24.3
35	250.500	2.671	10.660	4.67	24.6
36	248.800	3.165	12.720	4.70	24.3
37	247.000	3.116	12.620	4.72	24.6
38	245.300	2.960	12.070	4.74	24.4
39	244.400	2.969	12.150	4.76	24.2
40	242.700	2.929	12.070	4.78	24.6
41	240.800	2.826	11.740	4.80	24.3
42	239.900	2.852	11.890	4.82	24.5
43	238.100	2.976	12.500	4.84	24.5
44	236.400	3.086	13.060	4.86	24.6
45	235.500	2.938	12.480	4.87	24.5
46	233.700	2.878	12.310	4.90	24.2
47	231.900	2.882	12.430	4.92	24.3
48	230.900	2.949	12.770	4.93	24.5
49	228.200	3.178	13.870	4.96	24.7

52	224.800	3.090	13.750	5.02	24.6
53	223.000	3.411	15.320	5.04	24.7
54	221.300	3.655	16.520	5.07	24.4
55	220.200	3.765	17.090	5.08	24.3
56	218.500	3.690	16.890	5.10	24.4
57	216.700	3.687	17.010	5.12	24.4
58	215.800	3.640	16.870	5.14	24.5
59	214.100	3.703	17.300	5.16	24.5
60	212.300	3.659	17.240	5.18	24.4
61	211.400	3.741	17.690	5.20	24.3
62	209.500	3.716	17.730	5.22	24.6
63	207.800	3.754	18.070	5.24	24.5
64	206.900	3.540	17.110	5.26	24.7
65	205.200	3.561	17.350	5.28	24.9
66	203.400	3.802	18.690	5.30	24.5
67	201.600	3.503	17.380	5.33	24.5
68	200.700	3.330	16.590	5.34	24.5
69	198.800	3.364	16.920	5.36	24.3
70	197.100	3.342	18.960	5.39	24.7
71	196.200	3.320	16.920	5.40	24.6
72	194.400	3.372	17.340	5.42	24.5
73	192.700	3.308	17.170	5.45	24.5
74	191.800	3.423	17.850	5.46	24.6
75	189.900	3.584	18.880	5.48	24.5
76	188.100	3.382	17.980	5.51	24.4
77	187.200	2.800	14.950	5.52	24.8
78	185.500	2.475	13.340	5.54	24.4
79	183.700	2.132	11.610	5.56	24.5
80	182.800	2.114	11.560	5.58	24.5
81	181.100	2.156	11.900	5.60	24.4
82	179.200	1.969	10.990	5.62	24.6
83	177.400	2.135	12.040	5.65	24.5
84	176.500	1.946	11.020	5.66	24.5
85	174.800	1.855	10.610	5.68	24.7
86	173.000	1.803	10.420	5.71	24.4
87	172.100	1.770	10.280	5.72	24.5
88	170.300	1.762	10.350	5.74	24.5
89	168.500	1.779	10.560	5.77	24.6
90	167.600	1.740	10.380	5.78	24.8
91	165.800	1.697	10.230	5.80	24.6
92	164.100	1.733	10.560	5.83	24.4
93	163.200	1.714	10.500	5.84	24.5
94	161.400	1.703	10.550	5.86	24.8
95	159.600	1.685	10.560	5.89	24.6
96	158.700	1.688	10.640	5.90	24.6
97	156.900	1.684	10.730	5.92	24.5
98	155.100	1.655	10.670	5.95	24.8
99	153.400	1.655	10.790	5.97	24.8
100	152.500	1.782	11.680	5.98	24.4
101	150.700	1.654	10.970	6.01	24.5
102	148.800	1.627	10.930	6.03	24.6
103	148.000	1.604	10.840	6.04	24.4
104	146.200	1.620	11.080	6.06	24.5
105	144.500	1.591	11.010	6.09	24.7
106	143.500	1.595	11.110	6.10	24.6
107	141.800	1.569	11.070	6.12	24.7
108	140.000	1.548	11.060	6.15	24.5
109	139.100	1.551	11.150	6.16	24.8
110	137.300	1.559	11.350	6.18	24.8
111	135.500	1.525	11.260	6.21	24.5
112	133.700	1.505	11.260	6.23	24.4
113	132.900	1.517	11.420	6.24	24.5
114	131.100	1.513	11.540	6.27	24.6
115	129.300	1.475	11.410	6.29	24.5

118	124.800	1.471	11.790	6.35	24.8
119	123.900	1.463	11.790	6.36	24.6
120	122.000	1.479	12.110	6.39	24.5
121	120.400	1.481	12.300	6.41	24.6
122	119.500	1.415	11.840	6.42	24.4
123	117.500	1.401	11.910	6.45	24.7
124	115.800	1.410	12.170	6.47	24.5
125	115.300	1.395	12.130	6.48	24.6
126	113.200	1.382	12.200	6.51	24.4
127	111.400	1.350	12.120	6.53	24.5
128	109.700	1.397	12.740	6.55	24.5
129	108.800	1.383	12.710	6.56	24.7
130	106.900	1.337	12.510	6.59	24.5
131	105.100	1.319	12.550	6.61	24.6
132	104.300	1.329	12.750	6.62	24.7
133	102.500	1.342	13.100	6.65	24.6
134	100.700	1.298	12.890	6.67	24.5
135	99.850	1.288	12.900	6.68	24.5
136	97.950	1.272	12.990	6.71	24.6
137	96.140	1.283	13.340	6.73	24.4
138	95.310	1.286	13.500	6.74	24.5
139	93.550	1.272	13.600	6.77	24.3
140	91.790	1.243	13.550	6.79	24.5
141	90.030	1.247	13.850	6.81	24.6
142	89.200	1.224	13.720	6.83	24.6
143	87.290	1.216	13.930	6.85	24.5
144	85.480	1.190	13.920	6.87	24.4
145	84.650	1.196	14.130	6.89	24.6
146	82.840	1.173	14.160	6.91	24.5
147	81.090	1.180	14.550	6.93	24.5
148	80.210	1.173	14.630	6.95	24.7
149	78.400	1.121	14.300	6.97	24.5
150	76.590	1.159	15.130	6.99	24.6
151	75.660	1.151	15.210	7.00	24.5
152	73.900	1.131	15.310	7.03	24.6
153	72.090	1.104	15.310	7.05	24.8
154	71.260	1.101	15.450	7.06	24.5
155	69.500	1.079	15.530	7.09	24.6
156	67.740	1.100	16.240	7.11	24.6
157	65.840	1.104	16.770	7.14	24.6
158	64.960	1.061	16.330	7.15	24.7
159	63.200	1.069	16.910	7.17	24.6
160	61.390	1.037	16.900	7.20	24.4
161	60.560	1.148	18.960	7.21	24.6
162	58.800	1.053	17.910	7.23	24.5
163	56.890	1.216	21.370	7.25	24.3
164	56.010	1.232	21.990	7.27	24.6
165	54.250	1.067	19.680	7.29	24.6
166	52.490	0.975	18.570	7.31	24.6
167	51.610	1.293	25.050	7.33	24.4
168	49.850	1.138	22.820	7.35	24.5
169	48.090	0.972	20.220	7.37	24.7
170	47.210	0.962	20.370	7.39	24.5
171	45.310	0.992	21.890	7.41	24.5
172	43.500	1.176	27.030	7.43	24.5
173	41.790	1.512	36.180	7.46	24.5
174	40.910	1.560	38.140	7.47	24.4
175	39.150	1.302	33.260	7.49	24.5
176	37.340	1.260	33.750	7.52	24.7
177	36.360	1.176	32.330	7.53	24.4
178	34.600	1.113	32.170	7.55	24.6
179	32.840	1.026	31.230	7.58	24.5
180	31.920	1.097	34.380	7.59	24.5
181	30.210	1.007	33.350	7.61	24.5

184	25.390	0.753	29.670	7.68	24.4
185	24.500	0.764	31.180	7.69	24.5
186	22.620	0.833	36.810	7.71	24.5
187	20.820	0.802	38.510	7.74	24.5
188	19.940	0.839	42.090	7.75	24.4
189	18.160	0.839	46.210	7.77	24.5
190	16.410	0.649	39.560	7.80	24.4
191	15.510	0.639	41.180	7.81	24.4
192	13.610	0.604	44.350	7.83	24.3
193	11.810	0.580	49.100	7.86	24.4
194	10.070	0.557	55.250	7.88	24.4
195	9.189	0.546	59.430	7.89	24.5
196	7.419	0.515	69.390	7.91	24.4
197	5.635	0.489	86.730	7.94	24.2
198	4.761	0.467	98.010	7.95	24.3
199	2.869	0.411	143.100	7.97	24.4
200	1.095	0.312	284.500	8.00	24.3

NHC
Numatec
Hanford Corporation

An SGN/Cogema, Inc. Company

Internal Memo

From: Analytical Technology
Phone: 372-2653 T6-50
Date: May 19, 1997
Subject: LASER ABLATION/MASS SPECTROMETRY (LA/MS) RERUN AND REPROCESSED DATA FOR 105-N BASIN SAMPLES

To:	G. L. Miller	T6-06
cc:	J. Y. Bourges	T6-07
	B. A. Crawford	T6-50
	C. M. Seidel	T6-14
	G. L. Troyer	T6-50
	W. I. Winters	T6-50
	JWB File/LB	

Attached is the updated data for the LA/MS analysis of 105-N Basin samples. The initial 105-N Basin data package (HNF-SD-WM-DP-240, Rev. 0) did not include LA/MS data for sample S97N000012 due to data acquisition and reduction problems. Sample S97N000012 was rerun and is reported in the attached tables. Furthermore, it was discovered by the PNNL scientist responsible for LA/MS data reduction that the original two samples reported (S97N000016 and S97N000017) were not corrected for laser efficiency. In order to maintain consistency between the three 105-N Basin samples, the data for all three samples were reprocessed and corrected for laser efficiency. As a result, the attached data replaces all LA/MS data previously reported in HNF-SD-WM-DP-240, Rev. 0.

Table 1 lists the elemental concentrations for all naturally occurring constituents. The concentrations were computed using the naturally occurring isotopic abundances. For several elements (e.g. Mg and Si), more than one isotope was used to compute the elemental concentration. In these cases, the average concentration is reported and the masses used in the computation are listed in the second column, "Mass (amu)."

Table 2 lists isotopes that may be natural or radiogenic. As a result, isotopic corrections were not performed. The concentrations listed are mass concentrations, not necessarily elemental. For some masses (e.g. 96 and 98) more than one element may have a contributing isotope. In these cases, the probable elements are listed in column one, "Element(s)."

The data for the rerun sample (S97N000012) was recorded on April 24, 1997. This sample was unique from the other two sludges: it had the consistency of sand with an orange tint in spots. The instrument calibration and data acquisition were performed identically to the first two samples. Details are described in HNF-SD-WM-DP-240, Rev. 0.

As indicated in the original report, LA/MS data is not yet a quantitative technique. Therefore, the results reported should not be used as absolute concentrations. Instead the data indicate the presence of constituents of interest and their relative abundances.

Please feel free to contact me at 372-2653 if you have any questions regarding this data.

J. W. Ball, Ph.D.
Scientist I

cw

Attachment

Table 1: Element Concentrations (Isotopically Corrected)

Element	Mass (amu)	S97N000012 (µg/g)	S97N000016 (µg/g)	S97N000017 (µg/g)
Li	6,7	6.9	72	37
Be	9	2.0	2.9	1.6
B	11	5700	2900	2100
C	13	1400	1800	1400
Na	23	3000	3100	5700
Mg	24,25,26	1800	840	1100
Al	27	120000	67000	71000
Si	28,29	50000	30000	28000
P	31	1400	5600	2800
S	34	4900	5300	3800
Cl	35	46	33	19
Ca	44	14000	11000	9000
Ti	47,49	2400	1400	1100
V	51	46	110	110
Cr	52,53	340	460	570
Mn	55	880	6500	2900
Fe	56,57	360000	320000	400000
Co	59	28	27	30
Ni	60.61,62	160	480	370
Cu	63,65	560	1000	1200
Zn	66,67	3000	13000	9300
Hf	178	0.5	< 0.1	0.5
Ta	181	0.1	< 0.1	0.1
W	182	8.8	18	14
Hg	199,200,201,202	0.3	4 6	2 4
Tl	203, 205	0.4	0.6	0 3
Pb	206, 207, 208	490	1000	940
Bi	209	0.6	0.4	0.5

Table 2: Mass Concentrations (Not Isotopically Corrected)

Element(s)	Mass (amu)	S97N000012 (µg/g)	S97N000016 (µg/g)	S97N000017 (µg/g)
Ga	69	31	93	40
Ge	70	9.6	42	31
Ga	71	11	8.3	8.7
As	75	12	23	15
Kr	84	0.7	1.5	0.5
Rb	85	1.3	0.6	0.6
Sr	86	14	20	13
Sr,Rb	87	9.0	13	6.6
Sr	88	96	150	93
Y	89	1.6	6.0	3.3
Zr	90	17	37	30
Zr	91	4.3	13	9.7
Zr	92	14	21	15
Nb,Zr	93	1.3	5.2	4.7
Zr,Mo	94	9.7	21	16
Mo	95	6.4	3.6	4.0
Zr, Mo, Ru	96	7.1	9.7	7.6
Mo	97	4.2	2.7	2.5
Mo, Ru	98	9.0	5.6	5.2
Tc,Ru	99	0.4	0.8	0.5
Mo,Ru	100	4.9	3.0	3.1
Ru	101	0.3	4.2	4.2
Ru,Pd	102	0.2	4.5	3.8
Rh	103	0.2	2.1	2.3
Ru,Pd	104	0.2	3.1	2.2
Pd	105	< 0.1	0.4	0.6
Pd, Cd	106	0.3	1.2	0.9
Pd, Ag	107	0.2	0.5	1.4
Pd, Cd	108	< 0.1	0.4	0.4
Ag	109	0.3	0.3	1.1
Pd, Cd	110	2.1	8.0	4.7
Cd	111	2.7	9.4	5.0
Cd, Sn	112	6.6	20	11
Cd,In	113	2.3	8.1	4.3
Cd, Sn	114	7.4	23	12
In,Sn	115	0.3	0.6	0.5
Cd,Sn	116	7.1	24	13
Sn	117	3.5	11	6.3
Sn	118	11	34	20
Sn, U++	119	32	260	48
Sn, Te	120	15	47	27
Sb	121	17	25	19
Sn, Te	122	2.3	7.1	4.2
Sb,Te	123	13	20	14
Sn, Te, Xe	124	2.4	8.8	5.3
I	127	0.4	1.5	1.0
Xe, I	129	< 0.1	< 0.1	< 0.1

Table 2 (continued):

Element(s)	Mass (amu)	S97N000012 (ug/g)	S97N000016 (ug/g)	S97N000017 (ug/g)
Te. Xe.Ba	130	2.4	15	4.3
Xe	131	0.2	< 0.1	< 0.1
Xe, Ba	132	2.2	14	6.9
Cs	133	0.2	< 0.1	< 0.1
Xe, Ba	134	55	260	85
Cs, Ba	135	170	900	180
Ba, Ce	136	200	1200	350
Cs,Ba	137	300	1600	380
Ba,La,Ce	138	1100	3200	1600
La	139	2.0	12	6.9
Ce	140	19	14	10
Pr	141	1.3	8.6	6.3
Cd,Nd	142	1.5	10	6.6
Nd	143	1.2	6.5	4.9
Nd, Sm	144	1.0	8.2	5.5
Nd	145	0.7	5.8	3.7
Nd	146	0.5	5.0	3.1
Sm	147	0.4	2.6	2.0
Nd, Sm	148	0.5	2.3	1.8
Sm	149	< 0.1	0.2	0.1
Nd, Sm	150	0.2	2.5	2.0
Sm, Eu	151	0.2	0.4	0.2
Sm, Gd	152	< 0.1	1.0	0.9
Eu	153	< 0.1	0.6	0.5
Sm, Gd	154	< 0.1	0.5	0.5
Gd	155	< 0.1	0.5	0.3
Gd, Dy	156	< 0.1	0.3	0.2
Gd	157	0.1	0.1	0.2
Gd, Dy	158	< 0.1	< 0.1	0.2
Tb	159	< 0.1	< 0.1	0.1
Gd, Dy	160	0.1	0.1	0.1
Dy	161	< 0.1	< 0.1	< 0.1
Dy, Er	162	0.2	0.1	0.1
Dy	163	0.2	0.3	0.1
Dy, Er	164	< 0.1	0.2	0.1
Ho	165	< 0.1	< 0.1	0.1
Th	232	0.6	< 0.1	0.3
U	235	73	540	120
U,Np,Pu	236	7.9	36	11
Np	237	0.2	0.2	0.2
U,Pu	238	9900	42000	8900
Pu	239	18	99	70
Pu	240	0.6	7.5	9.2
Pu,Am	241	< 0.1	1.5	1.8
Pu	242	< 0.1	< 0.1	< 0.1
Am	243	< 0.1	< 0.1	< 0.1
Pu,Cm	244	< 0.1	0.2	< 0.1

From: Analytical Technology
Phone: 372-2653 T6-50
Date: May 15, 1997
Subject: Inductively Coupled Plasma Mass Spectrometry (ICP/MS) Results for 105-N and 107-N Basin Samples

To: G. L. Miller T6-06

cc: J. Y. Bourges T6-07
B. A. Crawford T6-50
C. M. Seidel T6-14
G. L. Troyer T6-50
W. I. Winters T6-50
JWB File/LB

Attached is the ICP/MS data for 105-N and 107-N Basin samples. Isotopic thorium and uranium data were collected on May 2, 1997. The instrument was mass and response calibrated in the actinide region using thorium and uranium calibration standards. The preliminary data was distributed on May 5, 1997 for the customer to review.

In order to monitor the isotopic uranium performance, a certified natural uranium test standard was utilized (NIST SRM-4321B). As indicated by the data tables, recoveries within 1% of the certified value were achieved for the U-235/U-238 ratio.

Although the levels of U-235 and U-238 can be accurately computed, the U-234 concentrations are estimated based on the U-234 response relative to U-235. The mass response at 234 was not directly calibrated due to the small concentration of U-234 in available standards. As a result, the U-234 results are estimated to be accurate within 50%.

Only one sample, S97N0000051, indicated U-235 enrichment above 1%. SRM-4321B was analyzed with a 99.4 % recovery immediately following the analysis of this sample. It was concluded that the instrument calibration hadn't drifted and that the isotopic uranium determination for sample S97N000051 remained within calibration.

As indicated by the data tables, detection limits may vary between samples. This is due to different digest and dilution factors that were necessary for each sample. The results collected using the smallest dilution (lowest detection limit) were reported wherever possible.

Scans of these samples indicated appreciable levels of copper (Cu-63 and Cu-65). As a result, Ni-63 could not be recorded with this isobaric interference present. Although a Ni-63 separation is under development, laboratory tests indicate that it is not capable of removing copper. In order to determine Ni-63 in these copper containing samples, radiochemical methods must be utilized rather than ICP/MS.

If you have any questions regarding these results, please feel free to call me at 372-2653.

J. W. Ball, Ph.D.
Scientist I

cw

Attachment

ICP/MS RESULTS FOR 105-N BASIN

INSTRUMENT QC (initial)

	Th-228	Th-230	Th-232	U-234	U-235	U-238
ICB	< 45 ppt	< 45 ppt	< 45 ppt	< 20 ppt	< 20 ppt	< 20 ppt
ICV	NA	NA	102%	NA	NA	101%

ISOTOPIC URANIUM CERTIFIED CHECK STANDARD

	U-234	U-235	U-238	235/238	235/238 (certified ratio)	Recovery
SRM 4321B	< 20 ppt	0.783 ppb	107 ppb	0.00732	0.00725	101%

SAMPLE RESULTS

	Th-228	Th-230	Th-232	U-234	U-235	U-238	235/238
S97N000011	< 0.65 ppm	< 0.65 ppm	< 0.65 ppm	0.28 ppm	18.5 ppm	2400 ppm	0.00771
S97N000020	< 1.31 ppm	< 1.31 ppm	< 1.31 ppm	0.76 ppm	62.5 ppm	6970 ppm	0.00897
S97N000021	< 0.63 ppm	< 0.63 ppm	< 0.63 ppm	0.37 ppm	24.1 ppm	2880 ppm	0.00837
S97N...21_DUP	< 0.65 ppm	< 0.65 ppm	< 0.65 ppm	0.28 ppm	21.5 ppm	2590 ppm	0.00830

PREP QC

	Th-228	Th-230	Th-232	U-234	U-235	U-238	U-238 Rec.
Prep Blank	< 45 ppt	< 45 ppt	< 45 ppt	< 20 ppt	< 20 ppt	0.110 ppb	NA
LCS Std	NA	NA	NA	NA	NA	8215 ppb	82.20%
S97N...21_SPK	NA	NA	NA	NA	NA	8080 ppb	80.80%

INSTRUMENT QC (final)

	Th-228	Th-230	Th-232	U-234	U-235	U-238
CCB	< 45 ppt	< 45 ppt	< 45 ppt	< 20 ppt	< 20 ppt	< 20 ppt
CCV	NA	NA	98.1%	NA	NA	99.6%

APPENDIX A

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Author: Richard L Weiss at ~BHI012
Date: 4/18/97 5:04 PM
Subject: "Accuracy" Requirements for N-Area Sediment LATEST
---------- Message Contents ----------

Folks,

I'm sorry but some things never seem to go as one hopes. I had a discussion with George Miller and Cliff Tung earlier this week regarding interpretation of the 105-N Basin Phase I SAP section on Accuracy requirements for the analysis work. The current wording doesn't make complete sense regarding 222-S operations. At the time of the discussions, requirements of +/- 2 sigma as a warning level with +/- 3 sigma as the control level for Laboratory Control Samples and +/- 25% on any sample spike recoveries were agreed to as adequate control limits. At that time I agreed to provide documentation for this interpretation.

Subsequent to that discussion, I determined that similar wording also existed in the 107-N Sediment SAP but that the SAP for 105-N Sediment Phase II work was probably OK. The correction appeared to be best handled through a revision to the affected SAPs. To that end I provided a CC:Mail message this morning outlining the proposed changes to the SAPs. For convenience sake, and continuity, I duplicated the wording in the 105-N Sediment Phase II SAP.

I have since learned two things: 1.) That my client is extremely reluctant to issue formal revisions to the SAPs. and 2.) That the wording in the Phase II SAP is different enough from what was discussed earlier (primarily specifying +/- 30% recovery controls not 25%) to cause concern at the laboratory.

So, we are essentially back to square one and the data report is functionally being held hostage.

At this point, I am unsure as to how this clarification will be formally transmitted to the laboratory. It will likely be done using a letter clarification to the affected SAPs. In the meantime, the requirements outlined in the first paragraph of this CC:Mail message will be considered to apply to the 105-N Sediment Phase I work. Please do not withhold issuance of the data report on this issue. We will work whatever it takes to neutralize any potential future impacts resulting from this issue.

If there is anything else that can be done please call me or Joan Kessner.

Richard Weiss

Author: Richard L Weiss at ~BHI012
Date: 4/9/97 10:37 AM
Subject: Re: Viscosity analysis on 105-N Phase 1

---------- Message Contents ----------

There is no appropriate approach available to obtain viscosity for this sample. Cancel the viscosity analysis request for this sample and note in the case narrative that the bulk of the material was too large to "fit" into the equipment.

Rich

_____ Reply Separator _____

Subject: Viscosity analysis on 105-N Phase 1
Author: George L Miller at ~HANFORD03C
Date: 4/4/97 2:29 PM

Rich,

I spoke with John O'Rourke about the viscosity analysis on one of the phase 1 samples, which was composed primarily of sand particles greater than 1mm diameter. Particles of this size are too large for the viscometer (cause plugging). Before I realized that this sample was composed predominantly of these particles, I suggested that he sieve out these larger particles, but now realize that this is an inappropriate approach.

How do you want us to proceed with the viscosity analysis, or do we have your concurrence that the requirement for analysis of viscosity on this sample can be waived?

George