# WEST VALLEY DEMONSTRATION PROJECT

# VITRIFICATION FEED DATA PACKAGE

## BATCH #76

## PART B

JANUARY 2, 2002

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Vitrification Feed Data Package
(Supporting Data)

Part B

Batch #76

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SEE NOTE ON REVERSE

NOTE: Part A of this Feed Data Package contains those sections identified as "HLW" and are to be considered as a complete set.

Vitrification Feed Data Package
(High-Level Waste Sections Only)

Part A

Batch #76

Table of Contents


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# Summary

# Batch 76 Summary

| Evolution | Date (in 2002) |
|---|---|
| SBSR → CFMT, 1st | Jan 2 |
| SBSR → CFMT, 2nd | Jan 2 |
| 5 Hydraguard sampled 76WH1-5 | Jan 2 |
| Concentration #1 | Jan 2 - Jan 4 |
| 8D-4 Flush #1 | Jan ~~11~~ 9 MP 3-18-03 |
| Concentration #2 | Jan ~~12~~ 10-14 MP 3-18-03 |
| 8D-4 to CFMT Transfer #2 | Jan 14 |
| Concentration #3 | Jan 14-16 |
| 8D-4 to CFMT Transfer #3 | Jan ~~19~~ 18 MP 3-18-03 |
| Conc'n after 8D-4 to CFMT #3 | Jan 19 - Jan 20 |
| 8D-4 to CFMT Transfer #4 | Jan 20 |
| Conc'n after 8D-4 to CFMT #4 | Jan 20 - 23 |
| SMS transfer line flushes to CFMT | Jan 24 |
| 9 samples 76WH6 - 76WH14 | Jan 25 |
| 4 samples 76WH15 - 76WH18 | Feb 14 |
| 65D-09 to CFMT transfer | Feb 19 |
| 65-D-09 to CFMT transfer | Feb 25 |
| Added Sodium Metasilicate 24.9 Kg | Mar. 4. |
| Transferred 4300 L from 5D-15A2 to CFMT | Mar. 4 |
| SBS to CFMT transfer | Mar. 4 |
| 20 Samples 76WI1 - 76WI20 | Mar. 4 |
| SMS FLUSH TRANSFER ~~8D4 to CFMT~~ 8D4 to CFMT TRANSFER #1 MP 3-18-03 | March ~~19~~ 19 MP 3-18-03 |
| SMS FLUSH TRANSFER #2 FROM 8D4 to CFMT 6 samples 76WH19 - 76WH24 | March 20 |
| North Sump pit flush transfer to CFMT | March 24 |
| 6 samples after North Sump transfer 76WH25 - 76WH30 | March 24 |

Continues - next page

Transferred 18,289 liters from 15A2 (LWTS flush) to CFMT 3/27/02

Samples 76WH31 – 76WH36 (6 Samples) Taken on Sunday 3/31/02

Transferred 2,900 liters from Pit flush #2 to CFMT 4/8/02

Samples 76WH37 – 76WH42 (6 Samples) taken 4/9/02

Transferred 15,300 liters from A2 (2nd Transfer) to CFMT and six Samples 76WH43 – 76WH48 were taken. Boiled down started 4/12/02 (43 MP 3-18-03)

Completed pit flush pass #2, transfer N-sump to CFMT 4/15/02

~~76WH49~~ – 76WH54 were taken. No Boiledown was done 4/17/02 (MP 3-18-03; 76WH49)

~~GAMMALET FLUSH WAS DONE & A BOILDOWN SAMPLE WAS GIVEN. 5/2/02~~ (MP 3-18-03)

~~5-6-02 Demin Water flush of SBS to CFMT 5/3-4/02~~ (MP)

WH55-60 samples for analysis of Gammalet flush 5/3/02

Demin Water flush of SBS to CFMT 5/4/02

Sodium metasilicate addition 5/6/02

WI 21-40 samples taken (Waste Initial) 5/6/02

Waste Initial results were obtained & glass former addition calculation done. 5/9/02

Boiled down sheet given to Voss. Glass former sheet given to Voss 5/9/02 (MP 3-18-03)

Replace The glass former addition sheet, Split The GF to two Tanks. Give the two GF add Sheets to VOSS 5/10/02

Glass former added to premix tank D03. Samples taken for analysis ICP, $NO_3$, Density and Total Solids (76GF7-12) 5/15/02

Glass formers Preheating in Tank D02 Complete. Sample taken for ICP, $NO_3$, Density & total Solids (76GF1-6) 5/17/02

Sample 76GF1-12 results received, checked mass balance, Stamstad. Transferred D02 glass former to CFMT, Boiled down sheet given 5/20/02

Double checked glass former mass balance Samstad – CFMT Boiledown continues 5/21/02

Boiled down complete, D03-Tank glass former Transferred to CFMT. 5/22/02

Samples 76WGF1 to 76WGF20 taken & Sent to lab 5/22/02

Boiledown sheet (from 104.4" to 80") given 5/22/02

CFMT Boiled down completed 5/24/02

76WGF1 – 76WGF20 results received, evaluated "Species range" and "pct Check" performed. RAP 3-18-03 Sugar Recipe given to Voss 5/25/02 Saturday

Problem with 'pct Check' program. Sugar to be added only after 'pct Check' program is fixed. 5/25/02 Saturday

PCT_CHECK program was missing a table within the program itself. Alice Probst fixed it.

Completed Species_Range and PCT_CHECK. 5-28-02

Transferred sugar shim to CFMT – 5-28-02

Samples 76SF1 – 8 taken 5-28-02

Class yield was calculated & given to Voss 5/29/02

~~5/30/02~~ 5/30/02 RAP 3-18-03

IFO Calculation was done

RAP 3-18-03 ~~Final~~ Final (2nd) transfer from CFMT → MFHT was done 5/30/02

Transfer 200 L of water to CFMT 5/31/02

Transfer from CFMT → MFHT

# Completion Review Sign-off Sheet

**APPENDIX B**
**Feed Data Package Completion Review Sign-Off Sheet**
(Page 1 of 1)

SLURRY BATCH IDENTIFICATION NUMBER 76

*This sheet is to be included in the front of the FDP Binder and shall be signed after all FDP actions have been completed.*

1. Satisfactory SAE FDP completion review.

(SAE) R.A. Palmer Date 6-17-02 [FDP Complete]

2. Satisfactory QA FDP completion review.

(QA) Amy L. Brown Date 6/18/02 [FDP Complete]

# Slurry Traveler

Slurry Batch Identification Number 76

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 01 | 1,2 | Transfer SBS content to CFMT. | 63-34, Appendix C | SAE R A Palmer 5-6-02 0800 |
| 02 | 1,2 | Transfer LWTS content to CFMT. | 63-34, Appendix C | SAE R A Palmer 5-6-02 0800 |
| 03 | 1 | Transfer sodium meta silicate to CFMT | 63-34, Appendix C or E | SAE R A Palmer 5-6-02 1200 |
| 04 | 1,2 | Transfer North Sump to CFMT | 63-34, Appendix C | SAE R A Palmer 5-6-02 0800 |
| 05 | 1,2 | Transfer 8D-2/8D-4 waste to CFMT. (WQR 1.1) | 63-34, Appendix C | SAE N/A R A Palmer 5-6-02 |
| 06 | 1 | CFMT sampling level, density, volume and analytical requirements are properly recorded for "WI" (WQR 1.1) | | SAE R A Palmer 5-6-02 1500 |
| 07 | | Sample transfer complete per SOP 63-22. (WQR 1.1) | | VOSS [illegible] 5-7-02 1720 |
| 08 | | Using analytical results, determine required cold chemical additions. | Form WV-2756 | SAE V.K. Sharma 5-9-02 1600 |

1 Steps 01 through 05 can be done in any order but must be done prior to step 06.

2 Steps 01, 02, 04, and 05 are documented by signature after final transfer to the CFMT for the batch.

Slurry Batch Identification Number 76

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 09 | | Cold chemical feed batch sampling, level, density, volume and analytical requirements are properly recorded "GF" (WQR 1.1) | | SAE 5-17-02 1500 |
| 10 | | Sample transfer complete per SOP 65-18. (WQR 1.1) | | VOSS 5-17-02 1600 |
| 11 | | Execute codes SAMPSTAT COLDCHEM and MASSBAL. Verify current composition of cold chemical feed batch. **NOTE: The initial composition may have been changed if the initial verification of composition was unacceptable.** (WQR 1.1) | Programs' outputs, form WV-2756, and/or surveillance results. | SAE 5-20-02 2345 |

Slurry Batch Identification Number 76

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 12 | 1 | Verify CFMT concentration complete. | 63-34, Appendix D | SAE 5-20-02 2300 |
| 13 | | Transfer cold chemical feed batch to CFMT. | 63-34, Appendix C | SAE 5-22-02 1400 |
| 14 | | CFMT sampling level, density, volume and analytical requirements are properly recorded for "WGF" (WQR 1.1) | | SAE 5-22-02 1700 |
| 15 | | Sample transfer complete per SOP 63-22. | | VOSS 5-22-02 1745 |
| 16 | | Verify additional CFMT concentration complete. If no concentration is done, N/A this step. | 63-34, Appendix D | SAE 5-24-02 1200 |
| 17 | | CFMT sampling level, density, volume and analytical requirements are properly recorded for "WGF". If sample not required, N/A this step. (WQR 1.1) | | SAE N/A 5-25-02 0900 |

1 Step 11 is documented by signature after final concentration for the batch before transfer of cold chemicals to the CFMT.

Slurry Batch Identification Number 76

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 18 | | Sample transfer complete per SOP 63-22. If sample not required, N/A this step. (WQR 1.1) | | VOSS N/A 5-25-02 0900 |
| 19 | | Using analytical results, execute codes SPECIES RANGE and PCT_CHECK and compare results with required model domain. | SPECIES_RANGE and PCT_CHECK output | PASS 5-28-02 1115 SAE<br>FAIL N/A SAE |
| 20 | | Using analytical results, execute code PCTCHECK and compare results with required leach rate.<br><br>(WQR 1.1) | PCT_CHECK output | PASS 5-28-02 1115 SAE<br>FAIL N/A SAE |

Slurry Batch Identification Number 76

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 21 | | Verify sugar solution makeup and addition to CFMT. | 63-34, Appendix C | SAE 1245 5/28/02 |
| 22 | | Verify Appendix F completed (all waste qualification prerequisites for transferring slurry from CFMT to MFHT have been completed) | 63-34, Appendix F | SAE 5-28-02 1540 |
| 23 | | If directed, perform a partial transfer of slurry feed batch to MFHT. If full transfer N/A this step. | 63-34, Appendix C | SAE 5/29/02 |
| 24 | 1 | CFMT sampling level, density, volume and analytical requirements are properly recorded for"SF" | | SAE 5-28-02 1545 |
| 25 | | Sample transfer complete per SOP 63-22. | | VOSS 5-29-02 0859 |
| 26 | | Complete transfer of slurry feed batch to MFHT. | 63-34, Appendix C | SAE 6-3-02 1500 |

1 This step can be completed any time after Traveler step #20 (sugar addition to CFMT) but must be completed prior to Traveler step #25 (complete transfer of slurry to MFHT).

# SBS to CFMT Transfer

Section 1

Slurry Batch # 76

55"

AVG. 42.4"

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | |
|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | |
| Tank Number | 63-V-031 | | | 63-V-001 | | |
| Date | 5-3-02 | | | 5-3-02 | | |
| Time | 1930 | | | 1930 | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | ~~[illegible]~~ 5-28-02 61 | N/A | N/A | 42.5 | 42.6 | 42.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.01 | N/A | N/A | 1.40 | 1.363 | 1.330 |
| Temp. (°C) | 30° | | | N/A | | |
| Average Volume (L) | 5816.1 L | | | 7583.2 L | | |

AVG. 1.368

* Instantaneous Readings

1.36

Section 2

Volume to be transferred 5000L (maximum)

SAE Signature [signature] Date 5-3-02

Shift Engineer Signature [signature] FOR RG MYERS Date 5-3-02
Per Telcom 5-3-02 @ 1940

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | |
|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | |
| Tank Number | 63-V-031 | | | 63-V-001 | | |
| Date | 5-4-02 | | | 5-4-02 | | |
| Time | NLP 5-28-02 ~~2000~~ 0003 | | | NLP 5-28-02 ~~2000~~ 0003 | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 9.0 | N/A | N/A | 79.7 | 79.9 | 79.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.00 | N/A | N/A | 1.251 | 1.201 | 1.170 |
| Temp. (°C) | 28° | | | N/A | | |
| Average Volume (L) | 1659 L | | | 14,437.9 L ☆ | | |

AVG. 79.6"

AVG. 1.207

Total Flush Water (L) N/A

VOSS Signature [signature] Date 5-5-02

☆ Two transfers were done at this time. Initially the SBS was brought to 8", then re-filled to 28", the emptied to 9". The initial l.m.7 of 5000 L was based on one transfer. At no time was there a danger of over-filling the CFMT.

[signature]
5-28-02

**APPENDIX C**
**Transfer Data Sheet**
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Section 1

Slurry Batch # 76

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | | |
| Tank Number | 63-V-031 | | | 63-V-001 | | | |
| Date | 3-4-02 | | | 3-4-02 | | | |
| Time | 1734 | | | 1734 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 9.5 | N/A | 97.6 | 98.0 | 96.9 | Ave 97.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | 1.01 | N/A | 1.160 | 1.116 | 1.077 | 1.117 |
| Temp. (°C) | 29 | | | 33.5 | | | |
| Average Volume (L) | 1716.5 | | | 17736.3 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred 2500

112.5 @ 1.117

SAE Signature [signature] for H. Dingra per Telecon Date 3-4-02

Shift Engineer Signature [signature] Date 3-4-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | | |
| Tank Number | 63 V 031 | | | 63 V 001 | | | |
| Date | 3-4-02 | | | 3-4-02 | | | |
| Time | 18:48 | | | 18:48 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | ~~108.8~~ JD 3.4.02 | ~~109.1~~ | ~~+ 16 in.~~ | 108.8 | 109.1 | 108.0 | 108.6 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | — | — | 1.00 sp gr | 1.150 | 1.103 | ~~1.018~~ | 1.107 |
| Temp. (°C) | 29°C | | | 35.2°C | | | |
| Average Volume (L) | N/A | | | 19,781.7 | | | |

Total Flush Water (L) 0

VOSS Signature [signature] Date 3-4-02

**APPENDIX C**
**Transfer Data Sheet**
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Section 1

Slurry Batch # 76

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | | |
| Tank Number | 63-V-051 | | | 63-V-001 | | | |
| Date | 3-4-02 | | | 3-4-02 | | | |
| Time | 15:58 | | | 1552 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 31.3 | N/A | 84.6 | 84.8 | 83.8 | Ave 84.4 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | 1.00 | N/A | 1.174 | 1.132 | 1.092 | Ave 1.133 |
| Temp. (°C) | 28 | | | 26.9 | | | |
| Average Volume (L) | 4091 | | | 15322.4 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred 2438

SAE Signature [illegible] for H. Dingra per Telecon Date 3-4-02

Shift Engineer Signature [illegible] Date 3-4-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | | |
| Tank Number | 63V-051 | | | 63-V-001 | | | |
| Date | 3-4-02 | | | 3-4-02 | | | |
| Time | 1720 | | | 1720 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 9.5 | N/A | 99.6 | 98.0 | 96.9 | 97.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | 1.01 | N/A | 1.160 | 1.116 | 1.077 | 1.117 |
| Temp. (°C) | 29 | | | 33.5 | | | |
| Average Volume (L) | 1712.5 | | | 17736.3 | | | |

Total Flush Water (L) 0

VOSS Signature [illegible] Date 3-4-02

APPENDIX C
Transfer Data Sheet
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Second Transfer

Section 1

Slurry Batch # 76

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | SBS | CFMT | | | |
| Tank Number | 63-V-031 | 63-V-001 | | | |
| Date | 1-2-02 | 1-2-02 | | | |
| Time | 1400 | 1340 | | | Avg |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 60 | 27.5 | 27.8 | 27.1 | 27.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.00 | 1.139 | 1.118 | 1.105 | 1.122 |
| Temp. (°C) | 35 C | 63C | | | |
| Average Volume (L) | 5766.8 L | 4837.7 L | | | |

* Instantaneous Readings

Section 2

Volume to be transferred ~3500 L

SAE Signature [signature] Date 1-2-02

Shift Engineer Signature [signature] Date 1-2-02 1,23

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | SBS | CFMT | | | |
| Tank Number | 63-V-031 | 63-V-001 | | | |
| Date | 1-2-02 | 1-2-02 | | | |
| Time | 1517 | 1517 | | | Avg |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 12 | 49.8 | 50.0 | 49.4 | 49.8 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.00 | 1.105 | 1.082 | 1.072 | 1.086 |
| Temp. (°C) | 35°C | 51.9C | | | |
| Average Volume (L) | 2004.4 L | 8946.8 L | | | |

Total Flush Water (L) ~340 L (Jet Dilution

VOSS Signature [signature] Date 1-2-01

APPENDIX C
Transfer Data Sheet
(Page 1 of 1)

First Transfer

Section 1

Slurry Batch # 76

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | | |
| Tank Number | 63-V-031 | | | 63-V-001 | | | |
| Date | 1-2-02 | | | 1-2-02 | | | |
| Time | 1040 | | | 1010 | | | Avg |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 62 | MP 1-2-02 | | 6.1 | 6.2 | 5.8 | 6.0 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.02 | MP 1-2-02 | | 1.220 | 1.032 | 1.184 | 1.146 |
| Temp. (°C) | 40 C | | | 29 C | | | |
| Average Volume (L) | 5865.4 L | | | 1098.4 L | | | |

* Instantaneous Readings

Section 2

Volume to be transferred ~3630 L

SAE Signature [signature] Date 1-2-02

Shift Engineer Signature [signature] Date 1-2-02 1.1 @ 27"

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | | |
| Tank Number | 63-V-031 | | | 63-V-001 | | | |
| Date | 1-2-02 | | | 1-2-02 | | | |
| Time | To 1240 ~~1135~~ | 1250 | | 1340 | | | Avg |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 14 | MP 1-2-02 | | 27.5 | 27.8 | 27.1 | 27.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.02 | MP 1-2-02 | | 1.139 | 1.118 | 1.108 | 1.122 |
| Temp. (°C) | 37°C | | | 63 C | | | |
| Average Volume (L) | 2234.6 L | | | 4837.7 L | | | |

Total Flush Water (L) ~108 L (Jet Dilution)

VOSS Signature [signature] Date 1-2-02

# 8D-4 and Other Flushes to CFMT Transfer

Section 1

Pit Flush #3 Slurry Batch # 76

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | North Sump (Pit Flush | CFMT | | | |
| Tank Number | | 63-V-001 | | | |
| Date | | 4-16-02 | | | |
| Time | | 0540 | | | 26.93 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 26.947 | 27.101 | 26.753 | ~~30.7~~ 4-16-02 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | 1.580 | 1.535 | 1.501 | ~~1.496~~ DIXX - 1.539 |
| Temp. (°C) | 4-15-02 | 25 | | | |
| Average Volume (L) | | 4745 | | | 3-18-03 |

* Instantaneous Readings

Section 2

Volume to be transferred 2000 L (maximum) 682 l

SAE Signature [signature] Date 4-15-02

Shift Engineer Signature [signature] Date 4-15-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | North Sump (Pit Flush) | CFMT | | | |
| Tank Number | | 63-V-001 | | | |
| Date | | 4-16-02 | | | |
| Time | | 0555 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 30.9 | 30.9 | 30.7 | 30.7 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | 1.533 | 1.489 | 1.456 | 1.496 |
| Temp. (°C) | 4-15-02 | 32 | | | |
| Average Volume (L) | | 5427 | | | |

Total Flush Water (L) N/A

VOSS Signature [signature] Date 4-17-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 76
A2 TRANSFER #2
LWTS FLUSH

| | Send Tank BEFORE | Receipt Tank BEFORE | |
|---|---|---|---|
| Tank Name | WTF | CFMT | |
| Tank Number | 5D-15A2 | 63-V-001 | |
| Date 4-12-02 | NA | 4-12-02 | |
| Time 2355 | NA | 1710 | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | ___ ___ ___ | 25.9 26.0 25.6 | 25.8 AVG. |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | ___ N/A ___ | 1.569 1.522 1.490 | 1.527 AVG. |
| Temp. (°C) | | 29° | |
| Average Volume (L) | N/A | 4524.4 | |

* Instantaneous Readings

Section 2

Volume to be transferred 16,000 liters Max (DO NOT Exceed 112.5" level)

SAE Signature [signature] Date 4-12-02

Shift Engineer Signature [signature] Date 4-13-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | |
|---|---|---|---|
| Tank Name | WTF | CFMT | |
| Tank Number | 5D-15A2 | 63-V-001 | |
| Date 4-13-02 | NA | 4-13-02 | |
| Time | NA | 0355 | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A 0 N/A | 108.9 109.3 108.3 | 108.8 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A 1 N/A | 1.200 1.153 1.118 | 1.157 |
| Temp. (°C) | 21 | 25°C | |
| Average Volume (L) | 8 | 19818.5 | |

Total Flush Water (L) 1500 l

VOSS Signature [signature] Date 4-13-02

**APPENDIX C**
**Transfer Data Sheet**
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Section 1

Slurry Batch # 76
Pit flush #2

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | North Sump (Pit Flush) | | | CFMT | | | |
| Tank Number | N/A | | | 63-V-001 | | | |
| Date | N/A | | | 4-8-02 | | | |
| Time | N/A | | | 1732 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 29.2 | 29.2 | 28.8 | 29.1 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 1.537 | 1.492 | 1.458 | 1.495 |
| Temp. (°C) | N/A | | | 28.5 °C | | | |
| Average Volume (L) | N/A | | | 5132.5 L | | | |

* Instantaneous Readings

Section 2

Volume to be transferred ~14,000 L (maximum)

SAE Signature R C Palmer Date 4-8-02

Shift Engineer Signature [illegible] Date 4-8-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | North Sump (Pit Flush) | | | CFMT | | | |
| Tank Number | | | | 63-V-001 | | | |
| Date | | | | 4-9-02 | | | |
| Time | | | | 4-9-02 08:55 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | N/A | | 45 | 45 | 44.6 | 44.9 Avg |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | [illegible] 4-8-02 | | 1.382 | 1.338 | 1.303 | 1.341 Avg |
| Temp. (°C) | | | | 26.8 °C | | | |
| Average Volume (L) | | | | 8043.9 | | | |

Total Flush Water (L) Ø

VOSS Signature [illegible] Date 4-9-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 76
LWTS FLUSH TRANSFER #1

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | WTF | CFMT | | | |
| Tank Number | 5D-15A2 | 63-V-001 | | | |
| Date | | 3/26/02 | | | |
| Time | N/A | 1442 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | ___ ___ 3/26/02 | 26.4 | 26.5 | 26.1 | Ave: 26.3 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | ___ ___ ___ | 1.476 | 1.431 | 1.397 | 1.434 |
| Temp. (°C) | | 27.7 | | | |
| Average Volume (L) | | 4616.5 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred Transfer 4000 gallons from 5D-15A2 TO CFMT. (DO NOT EXCEED 112.5" level of CFMT.)

SAE Signature [signature] Date 3/26/02 1,101 @ 109

Shift Engineer Signature [signature] SELECT Date 3-27-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | WTF | CFMT | | | |
| Tank Number | 5D-15A2 | 63-V-001 | | | |
| Date | | 3/27/02 | | | |
| Time | | 2253 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | ___ N/A ___ | 100.6 | 101.0 | 100.0 | Ave 100.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | ___ ___ 3/28/02 | 1.209 | 1.162 | ~~1.166~~ 1.166 3/27/02 | |
| Temp. (°C) | | 25°C | | | |
| Average Volume (L) | | 18289.1 | | | |

3,612.31 GALLONS

Total Flush Water (L) 1135.5

VOSS Signature [signature] Date 3-27-02

Section 1

Slurry Batch # 76

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | North Sump (Pre-Flush) | | | CFMT | | | |
| Tank Number | NA | | | 63-V-001 | | 3-24-02 | NAP 3-18-03 |
| Date | NA | | | ~~03/23/02~~ | | ~~3/24/02~~ | HKD 3/24/03 |
| Time | NA | | | 0830 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 25.9 | 25.9 | 25.4 | 25.7 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 1.485 | 1.441 | 1.406 | 1.444 |
| Temp. (°C) | N/A | | | ASM 6/24/02 ~~31.6~~ | | 27.7 | |
| Average Volume (L) | N/A | | | 4506.0 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred <13,000 l

SAE Signature H. S. [illegible] Date 3/23/02

Shift Engineer Signature [illegible] Date 3-25-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | North Sump | | | CFMT | | | |
| Tank Number | N/A | | | 63-V-001 | | | |
| Date | N/A | | | ~~3/24/02~~ | | 3/24/02 | NAP 3-18-03 |
| Time | N/A | | | ASM 3/24/03 ~~0853~~ | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 44.6 | 44.8 | 44.2 | 44.6 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 1.308 | 1.261 | 1.228 | 1.265 |
| Temp. (°C) | N/A | | | 31.6 | | | |
| Average Volume (L) | N/A | | | 7988.6 | | | |

Total Flush Water (L) N/A

VOSS Signature [illegible] Date 3-25-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 76
SMS FLUSH TRANSFER #2
W.O. "SMS-61950"

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | Tank Farm | CFMT | | | |
| Tank Number | 8D-4 | 63-V-001 | | | |
| Date | 3/20/02 | 3/20/02 | | | |
| Time | | 1002 | | | Ave. |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 41.2 | 41.2 | 40.7 | 41.0 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A VSK 3/20/02 | 1.326 | 1.280 | 1.245 | 1.284 |
| Temp. (°C) | | 27.8 | | | |
| Average Volume (L) | | 7325.3 | | | |

* Instantaneous Readings

Section 2

MAXIMUM 1500 gallons
DO NOT EXCEED 112.5" LEVEL IN CFMT.

Volume to be transferred As per WO. "SMS-61950"

SAE Signature [signature] Date 3/20/02

Shift Engineer Signature [signature] Date 3-20-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | TANK FARM | CFMT | | | |
| Tank Number | 8D-4 | 63-V-001 | | | |
| Date | 3/20/02 | 3/20/02 | | | |
| Time | N/A | | | | AVG |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 58.2 | 58.4 | 57.8 | 58.1" |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A per VOSS | 1.253 | 1.207 | 1.174 | AVG. 1.211 SPGR |
| Temp. (°C) | | 27.5 | | | |
| Average Volume (L) | | 10,476.2 | | | |

Total Flush Water (L) MM 3-20-02 90 TOTAL

VOSS Signature [signature] Date 3-20-02

Section 1

Slurry Batch # 76
SMS FLUSH TRANSFER #1
W.O. 'SMS-61950'

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | Tank Farm | CFMT | | | |
| Tank Number | 8D-4 | 63-V-001 | | | |
| Date | 3/19/02 | 3/19/02 | | | |
| Time | N/A | 2006 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 28.3 | 28.4 | 27.9 | Avg 28.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | NA VKS 3/19/02 | 1.429 | 1.365 | 1.350 | Avg 1.388 |
| Temp. (°C) | | 27.4 | | | |
| Average Volume (L) | | 4966.6 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred As per W.O. 'SMS-61950' – Maximum 1500 gallons
DO NOT EXCEED 112'5" LEVEL IN CFMT

SAE Signature V.K. Sharma Date 3/19/02

Shift Engineer Signature [illegible] Date 3-19-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | Tank Farm | CFMT | | | |
| Tank Number | 8D-4 | 63-V-001 | | | |
| Date | 3/19/02 | 3-19-02 | | | |
| Time | N/A | 2153 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 41.0 | 41.1 | 40.6 | 40.9 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A AD 3/19/02 | 1.328 | 1.284 | 1.249 | 1.287 |
| Temp. (°C) | | 23.3 | | | |
| Average Volume (L) | | 7306.8 | | | |

Total Flush Water (L) 0

VOSS Signature [illegible] Date 3-19-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 76

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | Decon Tank | | | CFMT | | | |
| Tank Number | 65-D-09 | | | 63-V-001 | | | |
| Date | 2-25-02 | | | 2-25-02 | | | |
| Time | 1640 | | | 1640 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 61.5 | 61.7 | 61.1 | average 61.4 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 1.194 | 1.099 | 1.145 | average 1.146 |
| Temp. (°C) | N/A | | | 26.7 | | | |
| Average Volume (L) | 100 | | | 11084.3 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred 100 L

SAE Signature [signature] FOR ROY PALMER PER telcon 1600 Date 2-25-02

Shift Engineer Signature [signature] Date 2-25-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | Decon Tank | | | CFMT | | | |
| Tank Number | 65-D-09 | | | 63-V-001 | | | |
| Date | 2-25-02 | | | 2-25-02 | | | |
| Time | 1655 | | | 1655 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | Ø | N/A | N/A | 61.8 | 61.9 | 61.3 | AVER. 61.7 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 1.194 | 1.099 | 1.145 | AVER. 1.146 |
| Temp. (°C) | N/A | | | 26.7° | | | |
| Average Volume (L) | Ø | | | 11139.6 | | | |

Total Flush Water (L) N/A

VOSS Signature [signature] Date 2-25-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Transfer from LWTS

Slurry Batch # 76

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | | CFMT | | | |
| Tank Number | 5D-15A2 | 63-V-001 | | | |
| Date | | 3-4-02 | | | |
| Time | | 10:00 | | | AVRAGE |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 59.3 | 59.4 | 58.7 | 59.1 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 3/4/02 | 1.199 | 1.153 | 1.118 | AVERAGE 1.156 |
| Temp. (°C) | H(SD) | 26.5 | | | |
| Average Volume (L) | | 10660.5 l | | | |

* Instantaneous Readings

Section 2

Volume to be transferred 4,300 liters (1136 gallons)

SAE Signature H.S. Dhingra Date 3/4/02

Shift Engineer Signature [illegible] Date 3-4-02

82.5 inches @ 1.17

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | | CFMT | | | |
| Tank Number | 5D-15A2 | 63-V-001 | | | |
| Date | | 3-4-02 | | | |
| Time | | 1424 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 84.7 | 84.9 | 84.0 | Ave 84.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | H(SD) 3/4/02 | 1.171 | 1.129 | 1.092 | Ave 1.132 |
| Temp. (°C) | | 26.7 | | | |
| Average Volume (L) | | 15340.8 | | | |

Total Flush Water (L) 757

VOSS Signature [illegible] Date 3-4-02

Section 1

Slurry Batch # 76
CFMT Demister flushing

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | DECON TANK | | | CFMT | | | |
| Tank Number | 65-D-09 | | | 63-V-001 | | | |
| Date | 2/19/02 | | | 2/19/02 | | | |
| Time | 15:55 | | | 15:50 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | .37 | N/A | N/A | 63.8 | 64.0 | 63.5 | 63.8 AVG. |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 1.189 | 1.095 | 1.141 | 1.142 AVE |
| Temp. (°C) | 68F | | | 26.3°C | | | |
| Average Volume (L) | 100L | | | 11526.5 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred 100L

SAE Signature V.K. SHARMA Date 2-20-02

Shift Engineer Signature [illegible] Date 2-19-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | Decon Tank | | | Cfmt | | | |
| Tank Number | 65-D-09 | | | 63-V-001 | | | |
| Date | 2/19/02 | | | 2/19/02 | | | |
| Time | 17:15 | | | 17:15 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | .32 | N/A | N/A | 64.1 | 64.2 | 63.7 | 64.0 in |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 1.189 | 1.095 | 1.141 | 1.142 |
| Temp. (°C) | 68F | | | 26.3°C | | | |
| Average Volume (L) | 0 | | | 11563.4 | | | |

Total Flush Water (L) N/A

VOSS Signature [illegible] Date 2-19-02

Section 1

Slurry Batch # 76
After Pit (North Sump) flushing

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | | |
| Tank Number | | |
| Date | N.A. | N.A. |
| Time | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | |
| Temp. (°C) | | |
| Average Volume (L) | | |

* Instantaneous Readings

Section 2

Volume to be transferred N/A

SAE Signature V.K. SHARMA Date 2/14/02

Shift Engineer Signature Date 2-14-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | | CFMT | | | |
| Tank Number | | 63-V-001 | | | |
| Date | N.A | 2-14-02 | | | |
| Time | | 1400 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 63.0 | 63.9 | 63.3 | 63.4 Level |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1.188 | 1.141 | 1.138 | 1.155 Avg Dens. |
| Temp. (°C) | | N/A | | | |
| Average Volume (L) | | 11452.8 | | | |

Total Flush Water (L) N/A

VOSS Signature Date 2-14-02

**APPENDIX C**
**Transfer Data Sheet**
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Section 1

Slurry Batch # 76

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | North Sump | | | Cfmt | | | |
| Tank Number | N/A | | | 163-V-001 | | | |
| Date | 2.13.02 | | | 2.13.02 | | | |
| Time | 01:20 | | | 01:25 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 13.5 | — | — | 54.8 | 54.9 | 54.4 | Ave 54.7 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | — | — | 1.208 | 1.162 | 1.160 | |
| Temp. (°C) | N/A | | | 26.3 C | | | |
| Average Volume (L) | N/A | | | 9850 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred ENTIRE CONTENTS OF NORTH SUMP

SAE Signature N/A Date

Shift Engineer Signature [signature] Date 2-13-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | North Sump | | | Cfmt | | | |
| Tank Number | N/A | | | 63-V-001 | | | |
| Date | 2.13.02 | | | 2.13.02 | | | |
| Time | 01:44 | | | 0:146 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 11.8 | N/A | N/A | 63.7 | 63.9 | 63.4 | Ave 63.7 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A | N/A | 1.186 | 1.139 | 1.137 | |
| Temp. (°C) | N/A | | | 28.5 | | | |
| Average Volume (L) | N/A | | | 11508.1 | | | |

Total Flush Water (L) N/A

VOSS Signature [signature] Date 12-13-02

Section 1

Slurry Batch # 76
Before & After line flush - SD4

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | | CFMT | | | |
| Tank Number | NA | 63-V-001 | | | |
| Date | 1/24/02 | 1/24/02 | | | |
| Time | | 2150 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 38.3 | 38.4 | 37.9 | AVG. 38.2" |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1.251 | 1.222 | 1.221 | AVG. 1.232 |
| Temp. (°C) | | 27.3 | | | |
| Average Volume (L) | | 6809.3 | | | |

* Instantaneous Readings

~~13,691~~ 1/24/02

Section 2

Volume to be transferred ~13251

SAE Signature V.K. Sharma Date 1/24/02

Shift Engineer Signature Date 1-24-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | | CFMT | | | |
| Tank Number | NA | 63-V-001 | | | |
| Date | 1/24/02 | 1.25.02 | | | |
| Time | | 0140 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 42.6 | 42.7 | 42.2 | AVG. 42.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1.231 | 1.202 | 1.201 | AVG. 1.211 |
| Temp. (°C) | | 27.0 | | | |
| Average Volume (L) | | 7601.7 | | | |

Total Flush Water (L) N/A

VOSS Signature Date 1.25-02

**APPENDIX C**
**Transfer Data Sheet**
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Section 1

4th 8D-4 to CFMT Transfer

Slurry Batch # 76

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | 8-D-4 | CFMT | | | |
| Tank Number | 8D-4 | 63-V-001 | | | |
| Date | 1/20/02 | 1/20/02 | | | |
| Time | 2000 | 2011 | | | AVG. |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 60.2 N/A AD 1-21-02 | 41 | 41.1 | 40.6 | 40.9 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.01 | 1.189 | 1.146 | 1.160 | 1.165 |
| Temp. (°C) | 17 | 26 | | | |
| Average Volume (L) | 155601 | 73068 | | | |

* Instantaneous Readings

Section 2

92.5@1.07

Volume to be transferred 9462.5 L

Alice Drobot 1-21-02

SAE Signature Alice Drobot Date 1-20-02

Shift Engineer Signature Date 1-20-02

Projected Dens 1.07

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | |
|---|---|---|---|---|
| Tank Name | 8D-4 | CFMT | | |
| Tank Number | 8-D4 | 63-V-001 | | |
| Date | | 1-20-02 | | |
| Time | | 23:00 | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | AD 1-21-02 | 87.9 | 88.1 | 87.4 AVG. 87.8 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1.133 | 1.103 | 1.100 Avg. 1.112 |
| Temp. (°C) | | 26 | | |
| Average Volume (L) | | 158752 | | |

Total Flush Water (L) 0

VOSS Signature Date 1-20-02

**APPENDIX C**
**Transfer Data Sheet**
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Section 1

3rd 8D-4 to CFMT Transfer

Slurry Batch # 76

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | Tank Farm | CFMT |
| Tank Number | 8D-4 | 63-V-001 |
| Date | 1-19-02 | 1-18-02 |
| Time | 0323 | 1410 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 26.6 26.8 26.3 Avg 26.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A AD 1-18-02 | 1.327 1.298 1.298 Avg 1.308 |
| Temp. (°C) | | 27.3 |
| Average Volume (L) | | ~~4616.5~~ 4653.4 |

* Instantaneous Readings

AD 1-18-02

Section 2

Volume to be transferred 15846.9L (fill to 112.5" in CFMT)

SAE Signature Alvi Drobot Date 1-18-02

Shift Engineer Signature [illegible] Date 1-18-02 112.5 @ 1.07

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | Tank Farm | CFMT |
| Tank Number | 8D-4 | 63-V-001 |
| Date | 1-19-02 | 1-19-02 |
| Time | 0323 | 03:23 |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 103.4 103.8 102.8 AVG - 103.3 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A AD 1-18-02 | ~~18.6~~ 1.117 ~~19.0~~ 1.087 1.084 |
| Temp. (°C) | | 19.0 |
| Average Volume (L) | | 18805.1 |

Total Flush Water (L) 0

VOSS Signature [illegible] Date 1-19-02

2nd 8D-4 FLUSH

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)



Section 1

Slurry Batch # 76

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | Tank Farm | CFMT | | | |
| Tank Number | 8D-4 | 63-V-001 | | | |
| Date | | 1-14-02 | | | |
| Time | | 1506 | | | Avg |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 26.7 | 26.9 | 26.4 | 26.6 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | 1.248 | 1.219 | 1.219 | 1.229 |
| Temp. (°C) | 1-14-02 | 71°C | | | |
| Average Volume (L) | | 4671.8 L | | | |

* Instantaneous Readings

Section 2

Volume to be transferred ~15,000 L

SAE Signature [signature] Date 1-14-02

Shift Engineer Signature [signature] Date 1-14-02 103" @ 1.05

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | Tank Farm | CFMT | | | |
| Tank Number | 8D-4 | 63-V-001 | | | |
| Date | | 1-14-02 | | | |
| Time | | 2340 | | | AVE. |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 75.3 | 75.5 | 74.9 | 75.3 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1.147 | 1.118 | 1.115 | 1.126 |
| Temp. (°C) | N/A 1-14-01 | 19°C | | | |
| Average Volume (L) | | 13645.6 L | | | |

Total Flush Water (L) N/A

VOSS Signature [signature] Date 1-15-02

First 8-D4 FLUSH

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)



Section 1

Slurry Batch # 76

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | Tank Farm | CFMT |
| Tank Number | 8D-4 | 63-V-001 |
| Date | 1-9-02 | 1-9-02 |
| Time | 1520 | 1520 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 29.3 29.4 28.9 Avg 29.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A AD 1-9-02 | 1.165 1.135 1.134 Avg 1.145 |
| Temp. (°C) | | 26.9 |
| Average Volume (L) | | 5150.9 |

* Instantaneous Readings

Section 2

Volume to be transferred approx. 15349L (fill CFMT to 112.5")

SAE Signature [illegible] Date 1-9-02

Shift Engineer Signature [illegible] Date 1-14-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | Tank Farm | CFMT |
| Tank Number | 8D-4 | 63-V-001 |
| Date | | ~~1-14-02~~ 1-11-02 |
| Time | | 1100 |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | N/A |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1-14-02 |
| Temp. (°C) | 1-14-02 | N/A 1-14-02 |
| Average Volume (L) | | 18,768.2 |

Avg 103.1

1.082

Total Flush Water (L) N/A 1-14-02

VOSS Signature [illegible] Date 1-14-02

# Sodium Metasilicate Addition

**APPENDIX E**
**Sodium Metasilicate Preparation and Transfer to CFMT**
(Page 1 of 1)

Slurry Batch # 76

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Sodium metasilicate | 25 ± 2 kg | 25.15 | C2133 | 90971/1.1 | DS |
| Demineralize water | 60 ± 6 L | 60L | N/A | N/A | JK |

Transfer complete _____ VOSS  5-6-02 / 1040 Date/Time

**APPENDIX E**
**Sodium Metasilicate Preparation and Transfer to CFMT**
(Page 1 of 1)

Slurry Batch # 76

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Sodium metasilicate | 25 ± 2 kg | 24.9 Kg | C2133 | 90971/1.1 | [illegible] |
| Demineralize water | 60 ± 6 L | 60 L | N/A | N/A | [illegible] |

Transfer complete [signature] VOSS 3-4-02 / 1020
Date/Time

# CFMT Concentration

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76
After glassformer addition completion and sampling

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 104.4 Density 1.42

Target Post Boildown Level (LIXX 0153 with agitator off) 80" Density N/A

SAE Signature _____ Date 5/22/02

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 82.6 Density 1.484

VOSS Signature _____ Date 5-24-02

Comments: _____

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 74.6 Density 1.392

Target Post Boildown Level (LIXX 0153 with agitator off) 50~ Density N/A

SAE Signature _____ Date 5-20-02

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 49.9 Density 1.550

VOSS Signature _____ Date 5-22-02

Comments: _____

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76
After WI Samples.

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 80.7" Density 1.21

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

SAE Signature V. K. SHARMA Date 5/9/02

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 26.1 Density 1.575
44.0°C

VOSS Signature Date 5-14-02

Comments:

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76
After 1st GAMMAJET FLUSH

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 60.3" Density 1.393

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

H. S. Dhingra 5/2/02
SAE Signature Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 42.3" Density 1.01

5-3-02
VOSS Signature Date

Comments:

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76
A2 Transfer #2
(LWTS FLUSH)

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 108.8 Density 1.157

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

for Vinod Sharma per telecon
SAE Signature

4-13-02
Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 27.0 Density 1.539

VOSS Signature

4-15-02
Date

Comments:

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76
Post pit flush #2

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 44.9" Density 1.341

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

SAE Signature 4/9/02 Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 26.9 Density 1.494

VOSS Signature 4-10-02 Date

Comments:

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 101.1 Density 1.164

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

SAE Signature 3/26/02 Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 27.5 Density 1.490

VOSS Signature 3-31-02 Date

Comments:

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 44.6 Density 1.265

Target Post Boildown Level (LIXX 0153 with agitator off) 27.4 Density N/A MM 3-18-03

H. S. [illegible]
SAE Signature

3/23/02
Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 26.5 Density 1.421

[illegible]
VOSS Signature

3-25-02
Date

Comments:

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 108.6 Density 1.107

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

H.S. Dhuja
SAE Signature

3/4/02
Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 26.6 Density 1.398

VOSS Signature

3-7-02
Date

Comments:

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

after 4th 8D-4 to CFMT Xfer

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 87.8" Density 1.112

Target Post Boildown Level (LIXX 0153 with agitator off) 40" Density N/A AD 1-20-02

Alice Drobot 1-20-02
SAE Signature Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 39.7 Density 1.173

[illegible] 1-23-02
VOSS Signature Date

Comments:

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

after 3rd 8D-4 to CFMT Transfer

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 103.3 Density 1.07

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A AD 1-18-02

Alice Drobot
SAE Signature

1-19-02
~~1-18-02~~ AD 1-21-02
Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 41.7 Density 1.088

VOSS Signature

1-20-02
Date

Comments: BELL SECURED EARLY TO RECEIVE WTR FLUSH TRANSFER

After 2nd SD-4 FLUSH



**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 75.3 Density 1.126

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

SAE Signature 1-14-01 Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 27.6 Density 1.251

VOSS Signature 1-16-02 Date

Comments:

After First 8D-4 FLUSH 2nd Concentration

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 103.7 Density 1.079

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density —

SAE Signature V.K. Sharma Date 1/10/02

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 27.4 Density 1.195

VOSS Signature Date 1-14-02

Comments:

First Concentration
(After first two
SBS Transfers
and samples 76WH1-5)



**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 76

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 49.8" Density 1.086

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

R a Palmer 1-2-02
SAE Signature Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 26.8 Density 1.13

1-4-02
VOSS Signature Date

Comments:

# Waste Initial Analyses

# APPENDIX C
## Transfer Data Sheet
(Page 1 of 1)

WI ~~Samples~~ Samples 21-40 3-18-03

Section 1

Slurry Batch # 76

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | |
|---|---|---|---|---|---|---|
| Tank Name | CFMT | | | | | |
| Tank Number | 63.V-001 | | | | | |
| Date | 5-6-02 | | | | | |
| Time | 1430 | | | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) 80.7 | 80.8 | 81.1 | 80.3 | | | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) 1.210 | 1.254 | 1.203 | 1.172 | | | |
| Temp. (°C) | 27.6 °C | | | | | |
| Average Volume (L) | 14,640.6 L | | | | | |

* Instantaneous Readings

Section 2

Volume to be transferred _____

SAE Signature _____ Date _____

Shift Engineer Signature _____ Date _____

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | |
|---|---|---|---|---|---|---|
| Tank Name | | | | | | |
| Tank Number | | | | | | |
| Date | | | | | | |
| Time | | | | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | | | | | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | | | | | |
| Temp. (°C) | | | | | | |
| Average Volume (L) | | | | | | |

Total Flush Water (L) _____

VOSS Signature _____ Date _____

WEST VALLEY DEMONSTRATION PROJECT
ANALYTICAL REQUEST

~~Page 1 of 1~~ 5/6/02

VAST Sample ID: 02-0701 Login Date: 5-6-02

**To be Completed by the Customer**

Customer Department: HLW Completion Project

Sample Point: CEMT

Sample Type (check one):

X liquid ☐ solid ☐ powder/dust

☐ smear ☐ coupon ☐ other:

Customer's Sample ID No.: 76WI21 -76WI29, 76WI38 - 76WI40

Collection Date/Time: 5-6-02 / 1418

Collection Location: MNOA

Sample Collector: Chad Erlandson

Report Recipients: SAE, MS-48, FAX 4169

Is this sample suspected to contain radioactive material? ___no X yes

If yes, is the gross activity suspected to be > 5E-03 µCi/mL or > 5E-03 µCi/g?
___no X yes

If dose rate is >10mR/hr w/c or >100 mR/hr w/o, contact lab management prior to delivery of sample

Survey Results (To be completed by Radiation Protection as applicable):

___ cpm α direct * ___ cpm βγ direct *

___ mR/hr w/c ___ mR/hr w/o

RP Tech: ___ Date: ___

* on contact with sample material

Sample Charge Number: WH1210006

Hazards (acid, base, solvent, Cr, Ba, etc.):

___no X yes - list: Acid

Sample Disposal Instructions (check appropriate):

☐ return to customer
☐ upon completion of analyses
X with customer approval
☐ other:

Requested Due Date: 5/9/02
(Date Only)

Is the sampling designated HLW? ___yes X no ___n/a

If yes or no, is the activity identified on the WVDP HLW Items and Activities List? X yes ___no

If yes, Is the HLW Screening Form Attached? ___yes X no

Comments:

Samples 38 - 40 are spare

Supervisor / Manager Signature: [signature]

To be filled in after sample delivery to the laboratory:

Delivered by: RB Date: 5/6/02 Time: 1740 Received by: MSK/CW Date: 5/6/02 Time: 1740

**ANALYSES TO BE COMPLETED**

List below the analyses to be performed, the desired units, and any applicable notes (to duplicate the analysis, etc.). Completed analyses will be reported to the Report Recipient on a separate form.

| Analysis | Units | Note | Analysis | Units | Note | Analysis | Units | Note |
|---|---|---|---|---|---|---|---|---|
| ICP-WI | µg/g | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

VAST

Vitrification Analytical Sample Tracking

# A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** ☐ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page* 1 *of* 15

***Login Date:*** ***06-May-02*** ***VAST Sample ID:*** ***02-0701***

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | 76WI21-76WI29 |
| **Collected:** | 5/6/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Al | 4.76E+3 | ug/g | | Rep1 (76WI 21): U1 |
| Al | 4.67E+3 | ug/g | | Rep2 (76WI 22): U1 |
| Al | 4.72E+3 | ug/g | | Rep3 (76WI 23): U1 |
| Al | 4.69E+3 | ug/g | | Rep4 (76WI 24): U1 |
| Al | 4.66E+3 | ug/g | | Rep5 (76WI 25): U1 |
| Al | 4.56E+3 | ug/g | | Rep6 (76WI 26): U1 |
| Al | 4.69E+3 | ug/g | | Rep7 (76WI 27): U1 |
| U AR MP 3-18-03 | 4.64E+3 | ug/g | | Rep8 (76WI 28): U1 |
| Al | 4.46E+3 | ug/g | | Rep9 (76WI 29): U1 |
| B | 5.52E+3 | ug/g | | Rep1 (76WI 21): U1 |
| B | 5.35E+3 | ug/g | | Rep2 (76WI 22): U1 |
| B | 5.43E+3 | ug/g | | Rep3 (76WI 23): U1 |
| B | 5.42E+3 | ug/g | | Rep4 (76WI 24): U1 |
| B | 5.34E+3 | ug/g | | Rep5 (76WI 25): U1 |
| B | 5.23E+3 | ug/g | | Rep6 (76WI 26): U1 |
| B | 5.41E+3 | ug/g | | Rep7 (76WI 27): U1 |
| B | 5.36E+3 | ug/g | | Rep8 (76WI 28): U1 |
| B | 5.11E+3 | ug/g | | Rep9 (76WI 29): U1 |
| Ca | 2.20E+3 | ug/g | | Rep1 (76WI 21): U1 |
| Ca | 2.15E+3 | ug/g | | Rep2 (76WI 22): U1 |

**Approved By**

Jackie McElhy — **Name**

5-8-02 1610 — **Date & Time**

***Report Date:*** ***08-May-02***

VIT

**Login Date:** 06-May-02 **VAST Sample ID:** 02-0701

| | | | |
|---|---|---|---|
| Sample Point: | CFMT | Department | HLWO (VIT) |
| Sample Type: | WI (ACT #11) | Customer's ID: | 76WI21-76WI29 |
| Collected: | 5/6/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Ca | 2.18E+3 | ug/g | | Rep3 (76WI 23): U1 |
| Ca | 2.15E+3 | ug/g | | Rep4 (76WI 24): U1 |
| Ca | 2.15E+3 | ug/g | | Rep5 (76WI 25): U1 |
| Ca | 2.09E+3 | ug/g | | Rep6 (76WI 26): U1 |
| Ca | 2.15E+3 | ug/g | | Rep7 (76WI 27): U1 |
| Ca | 2.15E+3 | ug/g | | Rep8 (76WI 28): U1 |
| Ca | 2.05E+3 | ug/g | | Rep9 (76WI 29): U1 |
| Fe | 4.73E+3 | ug/g | | Rep1 (76WI 21): U1 |
| Fe | 4.63E+3 | ug/g | | Rep2 (76WI 22): U1 |
| Fe | 4.71E+3 | ug/g | | Rep3 (76WI 23): U1 |
| Fe | 4.62E+3 | ug/g | | Rep4 (76WI 24): U1 |
| Fe | 4.64E+3 | ug/g | | Rep5 (76WI 25): U1 |
| Fe | 4.49E+3 | ug/g | | Rep6 (76WI 26): U1 |
| Fe | 4.66E+3 | ug/g | | Rep7 (76WI 27): U1 |
| Fe | 4.62E+3 | ug/g | | Rep8 (76WI 28): U1 |
| Fe | 4.45E+3 | ug/g | | Rep9 (76WI 29): U1 |
| K | 5.74E+3 | ug/g | | Rep1 (76WI 21): U1 |
| K | 5.25E+3 | ug/g | | Rep2 (76WI 22): U1 |
| K | 5.57E+3 | ug/g | | Rep3 (76WI 23): U1 |
| K | 5.61E+3 | ug/g | | Rep4 (76WI 24): U1 |
| K | 5.50E+3 | ug/g | | Rep5 (76WI 25): U1 |
| K | 4.79E+3 | ug/g | | Rep6 (76WI 26): U1 |
| K | 5.28E+3 | ug/g | | Rep7 (76WI 27): U1 |
| K | 5.36E+3 | ug/g | | Rep8 (76WI 28): U1 |
| K | 5.22E+3 | ug/g | | Rep9 (76WI 29): U1 |
| Li | 1.17E+3 | ug/g | | Rep1 (76WI 21): U1 |
| Li | 1.16E+3 | ug/g | | Rep2 (76WI 22): U1 |

**Approved By**

Name: [signature]

Date & Time: 5-8-02 1610

**Login Date:** 06-May-02

**VAST Sample ID:** 02-0701

| | |
|---|---|
| Sample Point: | CFMT |
| Sample Type: | WI (ACT #11) |
| Collected: | 5/6/2002 1500 |

| | |
|---|---|
| Department | HLWO (VIT) |
| Customer's ID: | 76WI21-76WI29 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Li | 1.16E+3 | ug/g | | Rep3 (76WI 23): U1 |
| Li | 1.16E+3 | ug/g | | Rep4 (76WI 24): U1 |
| Li | 1.15E+3 | ug/g | | Rep5 (76WI 25): U1 |
| Li | 1.12E+3 | ug/g | | Rep6 (76WI 26): U1 |
| Li | 1.15E+3 | ug/g | | Rep7 (76WI 27): U1 |
| Li | 1.16E+3 | ug/g | | Rep8 (76WI 28): U1 |
| Li | 1.12E+3 | ug/g | | Rep9 (76WI 29): U1 |
| Mg | 6.39E+2 | ug/g | | Rep1 (76WI 21): U1 |
| Mg | 6.18E+2 | ug/g | | Rep2 (76WI 22): U1 |
| Mg | 6.37E+2 | ug/g | | Rep3 (76WI 23): U1 |
| Mg | 6.19E+2 | ug/g | | Rep4 (76WI 24): U1 |
| Mg | 6.28E+2 | ug/g | | Rep5 (76WI 25): U1 |
| Mg | 5.99E+2 | ug/g | | Rep6 (76WI 26): U1 |
| Mg | 6.23E+2 | ug/g | | Rep7 (76WI 27): U1 |
| Mg | 6.25E+2 | ug/g | | Rep8 (76WI 28): U1 |
| Mg | 5.85E+2 | ug/g | | Rep9 (76WI 29): U1 |
| Mn | 2.99E+2 | ug/g | | Rep1 (76WI 21): U1 |
| Mn | 2.90E+2 | ug/g | | Rep2 (76WI 22): U1 |
| Mn | 2.96E+2 | ug/g | | Rep3 (76WI 23): U1 |
| Mn | 2.90E+2 | ug/g | | Rep4 (76WI 24): U1 |
| Mn | 2.95E+2 | ug/g | | Rep5 (76WI 25): U1 |
| Mn | 2.81E+2 | ug/g | | Rep6 (76WI 26): U1 |
| Mn | 2.91E+2 | ug/g | | Rep7 (76WI 27): U1 |
| Mn | 2.93E+2 | ug/g | | Rep8 (76WI 28): U1 |
| Mn | 2.73E+2 | ug/g | | Rep9 (76WI 29): U1 |
| Na | 2.63E+4 | ug/g | | Rep1 (76WI 21): U1 |
| Na | 2.58E+4 | ug/g | | Rep2 (76WI 22): U1 |

**Approved By**

Name: [signature]

Date & Time: 5-8-02 1610

**Login Date:** 06-May-02 **VAST Sample ID:** 02-0701

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | 76WI21-76WI29 |
| **Collected:** | 5/6/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Na | 2.56E+4 | ug/g | | Rep3 (76WI 23): U1 |
| Na | 2.57E+4 | ug/g | | Rep4 (76WI 24): U1 |
| Na | 2.59E+4 | ug/g | | Rep5 (76WI 25): U1 |
| Na | 2.52E+4 | ug/g | | Rep6 (76WI 26): U1 |
| Na | 2.79E+4 | ug/g | | Rep7 (76WI 27): U1 |
| Na | 2.56E+4 | ug/g | | Rep8 (76WI 28): U1 |
| Na | 2.47E+4 | ug/g | | Rep9 (76WI 29): U1 |
| P | <5.42E+2 | ug/g | | Rep1 (76WI 21): no flags |
| P | <5.75E+2 | ug/g | | Rep2 (76WI 22): no flags |
| P | <5.47E+2 | ug/g | | Rep3 (76WI 23): no flags |
| P | 6.25E+2 | ug/g | | Rep4 (76WI 24): U1 |
| P | 5.19E+2 | ug/g | | Rep5 (76WI 25): U1 |
| P | 5.88E+2 | ug/g | | Rep6 (76WI 26): U1 |
| P | 5.79E+2 | ug/g | | Rep7 (76WI 27): U1 |
| P MAY 3-18-03 | 5.86E+2 | ug/g | | Rep8 (76WI 28): U1 |
| P | <5.68E+2 | ug/g | | Rep9 (76WI 29): no flags |
| Si | 7.11E+3 | ug/g | | Rep1 (76WI 21): U1 |
| Si | 7.47E+3 | ug/g | | Rep2 (76WI 22): U1 |
| Si | 7.71E+3 | ug/g | | Rep3 (76WI 23): U1 |
| Si | 7.58E+3 | ug/g | | Rep4 (76WI 24): U1 |
| Si | 7.67E+3 | ug/g | | Rep5 (76WI 25): U1 |
| Si | 7.30E+3 | ug/g | | Rep6 (76WI 26): U1 |
| Si | 7.72E+3 | ug/g | | Rep7 (76WI 27): U1 |
| Si | 7.45E+3 | ug/g | | Rep8 (76WI 28): U1 |
| Si | 7.37E+3 | ug/g | | Rep9 (76WI 29): U1 |
| Th | 1.17E+3 | ug/g | | Rep1 (76WI 21): U1 |
| Th | 1.45E+3 | ug/g | | Rep2 (76WI 22): U1 |

**Approved By**

| | |
|---|---|
| [signature] | 5-8-02 1610 |
| **Name** | **Date & Time** |

**Login Date:** 06-May-02

**VAST Sample ID:** 02-0701

| | |
|---|---|
| **Sample Point:** | CFMT |
| **Sample Type:** | WI (ACT #11) |
| **Collected:** | 5/6/2002 1500 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | 76WI21-76WI29 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Th | 1.18E+3 | ug/g | | Rep3 (76WI 23): U1 |
| Th | 1.13E+3 | ug/g | | Rep4 (76WI 24): U1 |
| Th | 1.21E+3 | ug/g | | Rep5 (76WI 25): U1 |
| Th | 1.20E+3 | ug/g | | Rep6 (76WI 26): U1 |
| Th | 1.24E+3 | ug/g | | Rep7 (76WI 27): U1 |
| Th | 1.21E+3 | ug/g | | Rep8 (76WI 28): U1 |
| Th | 1.23E+3 | ug/g | | Rep9 (76WI 29): U1 |
| Ti | 1.60E+2 | ug/g | | Rep1 (76WI 21): U1 |
| Ti | 2.22E+2 | ug/g | | Rep2 (76WI 22): U1 |
| Ti | 1.68E+2 | ug/g | | Rep3 (76WI 23): U1 |
| Ti | 1.71E+2 | ug/g | | Rep4 (76WI 24): U1 |
| Ti | 1.83E+2 | ug/g | | Rep5 (76WI 25): U1 |
| Ti | 1.65E+2 | ug/g | | Rep6 (76WI 26): U1 |
| Ti | 1.72E+2 | ug/g | | Rep7 (76WI 27): U1 |
| Ti Ti MP 3-18-03 | 1.76E+2 | ug/g | | Rep8 (76WI 28): U1 |
| Ti | 1.79E+2 | ug/g | | Rep9 (76WI 29): U1 |
| U | 5.90E+3 | ug/g | | Rep1 (76WI 21): U1 |
| U | 5.78E+3 | ug/g | | Rep2 (76WI 22): U1 |
| U | 5.15E+3 | ug/g | | Rep3 (76WI 23): U1 |
| U | 5.96E+3 | ug/g | | Rep4 (76WI 24): U1 |
| U | 5.37E+3 | ug/g | | Rep5 (76WI 25): U1 |
| U | 5.88E+3 | ug/g | | Rep6 (76WI 26): U1 |
| U | 5.96E+3 | ug/g | | Rep7 (76WI 27): U1 |
| U | 5.74E+3 | ug/g | | Rep8 (76WI 28): U1 |
| U | 5.99E+3 | ug/g | | Rep9 (76WI 29): U1 |
| Zr | 4.22E+2 | ug/g | | Rep1 (76WI 21): U1 |
| Zr | 4.10E+2 | ug/g | | Rep2 (76WI 22): U1 |

**Approved By**

| | |
|---|---|
| [signature] | 5-8-02 1610 |
| **Name** | **Date & Time** |

**Login Date:** 06-May-02 **VAST Sample ID:** 02-0701

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | 76WI21-76WI29 |
| **Collected:** | 5/6/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Zr | 4.09E+2 | ug/g | | Rep3 (76WI 23): U1 |
| Zr | 4.04E+2 | ug/g | | Rep4 (76WI 24): U1 |
| Zr | 4.03E+2 | ug/g | | Rep5 (76WI 25): U1 |
| Zr | 3.91E+2 | ug/g | | Rep6 (76WI 26): U1 |
| Zr | 4.10E+2 | ug/g | | Rep7 (76WI 27): U1 |
| Zr | 4.03E+2 | ug/g | | Rep8 (76WI 28): U1 |
| Zr | 3.85E+2 | ug/g | | Rep9 (76WI 29): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

| | |
|---|---|
| [illegible] | 5-8-02 1610 |
| **Name** | **Date & Time** |

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** ☐ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page 1 of 3*

***Login Date:*** *06-May-02* ***VAST Sample ID:*** *02-0702*

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | B76WI30-B76WI33 |
| **Collected:** | 5/6/2002 1500 | | |

| Analysis | Result *** | Uncertainty | Lab Use Only |
|---|---|---|---|
| Density | 1.19 (30.0 °C) g/mL | | Rep1 (B76WI 30-33): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

| | |
|---|---|
| [signature] | 5-8-02 2230 |
| **Name** | **Date & Time** |

*Report Date:* *08-May-02*

VIT

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** N/A **FAXed to Recipients** ✓ **Copied for File** ✓

*package page 1 of 8*

***Login Date:*** *06-May-02* ***VAST Sample ID:*** *02-0704*

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | 76WI35-76WI37 |
| **Collected:** | 5/6/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| NO2 | <4.29E+4 | ug/g | | Rep1 (B76WI #35): no flags |
| NO2 | <4.17E+4 | ug/g | | Rep2 (B76WI #36): no flags |
| NO2 | <4.19E+4 | ug/g | | Rep3 (B76WI #37): no flags |
| NO3 | 1.66E+5 | ug/g | | Rep1 (B76WI #35): U1 |
| NO3 | 1.59E+5 | ug/g | | Rep2 (B76WI #36): U1 |
| NO3 | 1.58E+5 | ug/g | | Rep3 (B76WI #37): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Lawrence A. Yeager — **Name**

5/7/02 0835 — **Date & Time**

***Report Date:*** *07-May-02*

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4 2169 5/7/02

**Copied for Recipients** ☐ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page 1 of 4*

***Login Date: 06-May-02*** ***VAST Sample ID: 02-0703***

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | 76WI34 |
| **Collected:** | 5/6/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| pH | <1.0 (25 °C) | su | | Rep1 (B76WI #34): no flags |
| Tot Solids | 18.49 | % | | Rep1 (B76WI #34): U1 |
| | | | | |
| | | | | |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

| Approved By | |
|---|---|
| Name | Date & Time: 5/7/02 2315 |

***Report Date: 07-May-02***

Waste Initial SAMPSTAT/CHEMADD

76 WI-21 to
76 WI-29

```
##############################################################################
##############################################################################
##############################################################################
##        SSSSSS    AAAAA    MMM    MMM  PPPPPPP    SSSSSS  TTTTTTTT   AAAAA  ##
##      SS        AA   AA   MM M  M MM  PP    PP  SS          TT     AA   AA  ##
##     SS        AA   AA   MM  M   MM  PP    PP  SS          TT     AA   AA  ##
##     SSSSS    AAAAAAA   MM      MM  PPPPPP     SSSSS      TT     AAAAAAA   ##
##        SS   AA   AA   MM      MM  PP             SS     TT     AA   AA     ##
##       SS   AA   AA   MM      MM  PP             SS     TT     AA   AA     ##
## SSSSSS    AA   AA   MM      MM  PP        SSSSSS      TT     AA   AA      ##
##############################################################################
##############################################################################
#########                                                            #########
#########       WVNS   VITRIFICATION   LAB   SAMPLE   STATISTICS      #########
#########                        (Version 2.0)                       #########
##############################################################################
##############################################################################
##############################################################################
#########                                                            #########
#########   Statistically analyzes each component in a batch of waste #########
#########   samples from a mixing tank, deletes the outliers, and    #########
#########   computes a two-sided, 95% confidence limit. The true mean #########
#########   of an infinite population of samples lies in the range of #########
#########   the mean +/- the percent error of the sample mean.        #########
#########                                                            #########
##############################################################################
##############################################################################
##############################################################################
#########                                                            #########
#########   SAMPLE DATA IDS:  hsd76wi                                #########
#########   SAMPLE DATA FILE: HSD76                                  #########
#########   THU MAY  9, 2002                              07:59:55   #########
#########   SYSTEM: ALPHA1                                           #########
#########                                                            #########
##############################################################################
##############################################################################
##############################################################################
```

H. S. Deuga 5/9/02

R. A. Palmer 5-9-02

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd76wi
SAMPLE FILE: HSD76

THU MAY 9, 2002
07:59:55
DENSITY (g/ml): N/A

*** LAB SAMPLE DATA ***

Element NH 3-18-03

| Element | Sample Data (ug/g) | | | | *-Denotes Outlier |
|---|---|---|---|---|---|
| Al | 4760.00 | 4670.00 | 4720.00 | 4690.00 | 4660.00 |
| | 4560.00 | 4690.00 | 4640.00 | 4460.00 | |
| B | 5520.00 | 5350.00 | 5430.00 | 5420.00 | 5340.00 |
| | 5230.00 | 5410.00 | 5360.00 | 5110.00 | |
| Ca | 2200.00 | 2150.00 | 2180.00 | 2150.00 | 2150.00 |
| | 2090.00 | 2150.00 | 2150.00 | 2050.00 | |
| Fe | 4730.00 | 4630.00 | 4710.00 | 4620.00 | 4640.00 |
| | 4490.00 | 4660.00 | 4620.00 | 4450.00 | |
| K | 5740.00 | 5250.00 | 5570.00 | 5610.00 | 5500.00 |
| | 4790.00 | 5280.00 | 5360.00 | 5220.00 | |
| Li | 1170.00 | 1160.00 | 1160.00 | 1160.00 | 1150.00 |
| | 1120.00 | 1150.00 | 1160.00 | 1120.00 | |
| Mg | 639.00 | 618.00 | 637.00 | 619.00 | 628.00 |
| | 599.00 | 623.00 | 625.00 | 585.00 | |
| Mn | 299.00 | 290.00 | 296.00 | 290.00 | 295.00 |
| | 281.00 | 291.00 | 293.00 | 273.00 | |
| Na | 26300.00 | 25800.00 | 25600.00 | 25700.00 | 25900.00 |
| | 25200.00 | 27900.00 | 25600.00 | 24700.00 | |
| P | 542.00 | 575.00 | 547.00 | 625.00 | 519.00 |
| | 588.00 | 579.00 | 586.00 | 568.00 | |
| Si | 7110.00 | 7470.00 | 7710.00 | 7580.00 | 7670.00 |
| | 7300.00 | 7720.00 | 7450.00 | 7370.00 | |
| Th | 1170.00 | 1450.00 | 1180.00 | 1130.00 | 1210.00 |
| | 1200.00 | 1240.00 | 1210.00 | 1230.00 | |
| Ti | 160.00 | 222.00 | 168.00 | 171.00 | 183.00 |
| | 165.00 | 172.00 | 176.00 | 179.00 | |
| U | 5900.00 | 5780.00 | 5150.00 | 5960.00 | 5370.00 |
| | 5880.00 | 5960.00 | 5740.00 | 5990.00 | |
| Zr | 422.00 | 410.00 | 409.00 | 404.00 | 403.00 |
| | 391.00 | 410.00 | 403.00 | 385.00 | |

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd76wi
SAMPLE FILE: HSD76

THU MAY 9, 2002
07:59:55
DENSITY (g/ml): N/A

*** LAB SAMPLE STATISTICS ***

| Elem | N | OL | Mean | Maximum | Minimum | Std Dev | Conf Limit | %Error |
|---|---|---|---|---|---|---|---|---|
| Al | 09 | 00 | 4650.00 | 4760.00 | 4460.00 | 90.14 | 69.29 | 1.49 |
| B | 09 | 00 | 5352.22 | 5520.00 | 5110.00 | 120.39 | 92.54 | 1.73 |
| Ca | 09 | 00 | 2141.11 | 2200.00 | 2050.00 | 45.12 | 34.68 | 1.62 |
| Fe | 09 | 00 | 4616.67 | 4730.00 | 4450.00 | 92.20 | 70.87 | 1.54 |
| K | 09 | 00 | 5368.89 | 5740.00 | 4790.00 | 281.27 | 216.20 | 4.03 |
| Li | 09 | 00 | 1150.00 | 1170.00 | 1120.00 | 18.03 | 13.86 | 1.20 |
| Mg | 09 | 00 | 619.22 | 639.00 | 585.00 | 17.37 | 13.35 | 2.16 |
| Mn | 09 | 00 | 289.78 | 299.00 | 273.00 | 8.07 | 6.21 | 2.14 |
| Na | 09 | 00 | 25855.55 | 27900.00 | 24700.00 | 887.57 | 682.25 | 2.64 |
| P | 09 | 00 | 569.89 | 625.00 | 519.00 | 30.88 | 23.74 | 4.17 |
| Si | 09 | 00 | 7486.67 | 7720.00 | 7110.00 | 205.73 | 158.14 | 2.11 |
| Th | 09 | 00 | 1224.44 | 1450.00 | 1130.00 | 90.84 | 69.83 | 5.70 |
| Ti | 09 | 00 | 177.33 | 222.00 | 160.00 | 18.17 | 13.96 | 7.87 |
| U | 09 | 00 | 5747.78 | 5990.00 | 5150.00 | 293.80 | 225.84 | 3.93 |
| Zr | 09 | 00 | 404.11 | 422.00 | 385.00 | 10.91 | 8.39 | 2.08 |

N = Number of data samples.
OL = Number of outlier samples.
N - OL = Number of samples used for statistics.

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd76wi
SAMPLE FILE: HSD76

THU MAY 9, 2002
07:59:55
DENSITY (g/ml): N/A

*** Oxide Data Generated From Mean Samples ***

ICP Desc:
Volume (l): 14640.60
Density (g/ml): 1.2100
Total Oxides (kg): 1900.454

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 4650.00 | Al2O3 | 155.6219 | 8.1887 |
| B | 3.219334 | 5352.22 | B2O3 | 305.2421 | 16.0615 |
| Ca | 1.399052 | 2141.11 | CaO | 53.0661 | 2.7923 |
| Fe | 1.429584 | 4616.67 | Fe2O3 | 116.9183 | 6.1521 |
| K | 1.204537 | 5368.89 | K2O | 114.5642 | 6.0283 |
| Li | 2.152139 | 1150.00 | Li2O | 43.8442 | 2.3070 |
| Mg | 1.658054 | 619.22 | MgO | 18.1882 | 0.9570 |
| Mn | 1.291128 | 289.78 | MnO | 6.6279 | 0.3488 |
| Na | 1.347862 | 25855.55 | Na2O | 617.3672 | 32.4852 |
| P | 2.290963 | 569.89 | P2O5 | 23.1288 | 1.2170 |
| Si | 2.138930 | 7486.67 | SiO2 | 283.6804 | 14.9270 |
| Th | 1.137931 | 1224.44 | ThO2 | 24.6831 | 1.2988 |
| Ti | 1.665027 | 177.33 | TiO2 | 5.2307 | 0.2752 |
| U | 1.204267 | 5747.78 | UO3 | 122.6216 | 6.4522 |
| Zr | 1.350669 | 404.11 | ZrO2 | 9.6693 | 0.5088 |

```
*****************************************************************************
*****************************************************************************
*****************************************************************************
                                                                          **
      CCCC    HH   HH   EEEEEEE   MMM   MMM    AAAAA    DDDD      DDDD    **
    CC   C    HH   HH   EE        MM M M MM   AA   AA   DD  DD    DD  DD  **
   CC         HH   HH   EE        MM  M  MM   AA   AA   DD   DD   DD   DD  **
  CC         HHHHHHH   EEEE       MM  M  MM   AAAAAAA   DD   DD   DD   DD  **
 CC         HH   HH   EE         MM     MM   AA   AA   DD   DD   DD   DD  **
CC   C    HH   HH   EE         MM     MM   AA   AA   DD  DD    DD  DD    **
CCCC     HH   HH   EEEEEEE   MM     MM   AA   AA   DDDD      DDDD        **
                              (Version 3.1)                               **
*****************************************************************************
*****************************************************************************
*******                                                          *********
*******      WVNS  VITRIFICATION  FEED  ADDITIVE  CALCULATOR      *********
*******                                                          *********
*****************************************************************************
*****************************************************************************
*****************************************************************************
*******                                                          *********
*******  CHEMADD determines the amount of chemicals to be added  *********
*******  to the feed tank.  The following results are based on   *********
*******  specified oxide percentages, additive material makeup,  *********
*******  and CFMT chemical analysis.                             *********
*******                                                          *********
*******                                                          *********
*****************************************************************************
*****************************************************************************
*****************************************************************************
*******                                                          *********
*******  USER:    HARDIP                              08:02:41   *********
*******  BADGE#:  0000                       THU MAY  9, 2002    *********
*******  SYSTEM:  ALPHA1                                         *********
*******                                                          *********
*****************************************************************************
*******                                                          *********
*******  RUN: HSD76          TANK: CFMT          ADD: WI         *********
*******                                                          *********
*****************************************************************************
*****************************************************************************
```

H.S. Shuzgra 5/9/02

R A Palmer 5-9-02

HEMADD VITRIFICATION FEED ADDITIVES RUN: HSD76 TANK: CFMT ADD: WI
ARDIP BADGE#: 0000 THU MAY 9, 2002 08:02:41

*** Target Glass Composition and Needed Amounts ***

```
*************************************************************
*****    SINGLE ELEMENT OPTIMIZATION OF TOTAL WEIGHT    *****
*****                                                   *****
***** Total Oxides Weight in Tank:        1900.454 (kg) *****
***** Desired Total Oxides Weight:       10000.000 (kg) *****
***** Optimized Total Oxides Weight:       972.698 (kg) *****
***** Optimized Weight Determined by:             Fe2O3 *****
*************************************************************
```

| Oxide Name | Target% | Target Amt.(kg) | Waste Amt.(kg) | Needed Amt.(kg) |
|---|---|---|---|---|
| Al2O3 | 6.000 | 600.000 | 155.622 | 444.378 |
| B2O3 | 12.890 | 1289.000 | 305.242 | 983.758 |
| BaO | 0.000 | 0.000 | 0.000 | 0.000 |
| CaO | 0.480 | 48.000 | 53.066 | -5.066 |
| Ce2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cs2O | 0.080 | 8.000 | 0.000 | 8.000 |
| CuO | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe2O3 | 12.020 | 1202.000 | 116.918 | 1085.082 |
| K2O | 5.000 | 500.000 | 114.564 | 385.436 |
| La2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Li2O | 3.710 | 371.000 | 43.844 | 327.156 |
| MgO | 0.890 | 89.000 | 18.188 | 70.812 |
| MnO | 0.820 | 82.000 | 6.628 | 75.372 |
| MoO3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Na2O | 8.000 | 800.000 | 617.367 | 182.633 |
| Nd2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 | 0.000 | 0.000 |
| P2O5 | 1.200 | 120.000 | 23.129 | 96.871 |
| ThO2 | 3.560 | 356.000 | 24.683 | 331.317 |
| Pr6O11 | 0.000 | 0.000 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 | 0.000 | 0.000 |
| SiO2 | 40.980 | 4098.000 | 283.680 | 3814.320 |
| SrO | 0.000 | 0.000 | 0.000 | 0.000 |
| TiO2 | 0.800 | 80.000 | 5.231 | 74.769 |
| UO3 | 0.630 | 63.000 | 122.622 | -59.622 |
| ZnO | 0.000 | 0.000 | 0.000 | 0.000 |
| ZrO2 | 1.320 | 132.000 | 9.669 | 122.331 |
| TOTALS: | 98.380 | 9838.000 | 1900.454 | 7937.546 |

MoO3 Na2O MH 3-18-03

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD76 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 THU MAY 9, 2002 08:02:41

*** Initial Slurry Composition from ICP Measurements ***

ICP Desc:
Volume (l): 14640.60
Density (g/ml): 1.2100
Total Oxides (kg): 1900.454

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 4650.00 | Al2O3 | 155.6219 | 8.1887 |
| B | 3.219334 | 5352.22 | B2O3 | 305.2421 | 16.0615 |
| Ba | 1.116464 | 0.00 | BaO | 0.0000 | 0.0000 |
| Ca | 1.399052 | 2141.11 | CaO | 53.0661 | 2.7923 |
| Ce | 1.171269 | 0.00 | Ce2O3 | 0.0000 | 0.0000 |
| Cr | 1.461401 | 0.00 | Cr2O3 | 0.0000 | 0.0000 |
| Cs | 1.060173 | 0.00 | Cs2O | 0.0000 | 0.0000 |
| Cu | 1.251692 | 0.00 | CuO | 0.0000 | 0.0000 |
| Fe | 1.429584 | 4616.67 | Fe2O3 | 116.9183 | 6.1521 |
| K | 1.204537 | 5368.89 | K2O | 114.5642 | 6.0283 |
| La | 1.172721 | 0.00 | La2O3 | 0.0000 | 0.0000 |
| Li | 2.152139 | 1150.00 | Li2O | 43.8442 | 2.3070 |
| Mg | 1.658054 | 619.22 | MgO | 18.1882 | 0.9570 |
| Mn | 1.291128 | 289.78 | MnO | 6.6279 | 0.3488 |
| Mo | 1.500125 | 0.00 | MoO3 | 0.0000 | 0.0000 |
| Na | 1.347862 | 25855.55 | Na2O | 617.3672 | 32.4852 |
| Nd | 1.166400 | 0.00 | Nd2O3 | 0.0000 | 0.0000 |
| Ni | 1.272470 | 0.00 | NiO | 0.0000 | 0.0000 |
| P | 2.290963 | 569.89 | P2O5 | 23.1288 | 1.2170 |
| Pr | 1.170300 | 0.00 | Pr6O11 | 0.0000 | 0.0000 |
| S | 2.496631 | 0.00 | SO3 | 0.0000 | 0.0000 |
| Si | 2.138930 | 7486.67 | SiO2 | 283.6804 | 14.9270 |
| Sr | 1.182538 | 0.00 | SrO | 0.0000 | 0.0000 |
| Th | 1.137931 | 1224.44 | ThO2 | 24.6831 | 1.2988 |
| Ti | 1.665027 | 177.33 | TiO2 | 5.2307 | 0.2752 |
| U | 1.204267 | 5747.78 | UO3 | 122.6216 | 6.4522 |
| Zn | 1.244631 | 0.00 | ZnO | 0.0000 | 0.0000 |
| Zr | 1.350669 | 404.11 | ZrO2 | 9.6693 | 0.5088 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD76 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 THU MAY 9, 2002 08:02:41

*** CHEMADD Raw Material/Oxide Factors List ***

| No | Material Name | Primary Oxide | Batch Factor | Purity Factor | Contrib. Factor | Secondary Oxide | Batch Factor |
|---|---|---|---|---|---|---|---|
| 01 | Al(OH)3 | Al2O3 | 0.6537 | 0.9847 | 1.0000 | None | 1.0000 |
| 05 | B2O3oxide | B2O3 | 1.0000 | 1.0000 | 1.0000 | None | 1.0000 |
| 07 | CaCO3 | CaO | 0.5603 | 0.9765 | 1.0000 | None | 1.0000 |
| 13 | Fe(OH)3 | Fe2O3 | 0.7474 | 0.1325 | 1.0000 | None | 1.0000 |
| 18 | KOH | K2O | 0.8394 | 0.4462 | 1.0000 | None | 1.0000 |
| 22 | Li(OH) | Li2O | 0.3556 | 0.9849 | 1.0000 | None | 1.0000 |
| 26 | Mg(OH)2 | MgO | 0.6911 | 0.9640 | 1.0000 | None | 1.0000 |
| 28 | ThO2 | ThO2 | 0.9999 | 1.0000 | 1.0000 | None | 1.0000 |
| 29 | MnO | MnO | 0.8159 | 1.0000 | 1.0000 | None | 1.0000 |
| 32 | NaOH | Na2O | 0.7750 | 0.5070 | 1.0000 | None | 1.0000 |
| 33 | NaH2PO4 | P2O5 | 0.5927 | 1.0000 | 1.0000 | Na2O | 0.2588 |
| 40 | SiO2 | SiO2 | 1.0000 | 1.0000 | 1.0000 | None | 1.0000 |
| 42 | ZrO(NO3)2.2H2O | ZrO2 | 0.4610 | 0.4261 | 1.0000 | None | 1.0000 |
| 44 | TiOXIDEsrc | TiO2 | 1.0000 | 1.0000 | 1.0000 | None | 1.0000 |
| 49 | UO3 | UO3 | 0.9990 | 1.0000 | 1.0000 | None | 1.0000 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD76 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 THU MAY 9, 2002 08:02:41

*** CHEMADD Single Element Solutions ***

MP 3-18-03

| Oxide Name | Needed Amount(kg) | Source Material | Oxide from Source(kg) | Oxide from Others(kg) | Required Source(kg) |
|---|---|---|---|---|---|
| Al2O3 | 444.38 | Al(OH)3 | 444.38 | 0.00 | 690.35 |
| B2O3 | 983.76 | B2O3oxide | 983.76 | 0.00 | 983.76 |
| CaO | -5.07 | CaCO3 | 0.00 | 0.00 | 0.00 |
| Fe2O3 | 1085.08 | Fe(OH)3 | 1085.08 | 0.00 | 10957.05 |
| K2O | 385.44 | KOH | 385.44 | 0.00 | 1029.09 |
| Li2O | 327.16 | Li(OH) | 327.16 | 0.00 | 934.12 |
| MgO | 70.81 | Mg(OH)2 | 70.81 | 0.00 | 106.29 |
| ThO2 | 331.32 | ThO2 | 331.32 | 0.00 | 331.35 |
| MnO | 75.37 | MnO | 75.37 | 0.00 | 92.38 |
| Na2O | 182.63 | NaOH | 140.33 | 42.30 | 357.15 |
| P2O5 | 96.87 | NaH2PO4 | 96.87 | 0.00 | 163.44 |
| SiO2 | 3814.32 | SiO2 | 3814.32 | 0.00 | 3814.32 |
| ZrO2 | 122.33 | ZrO(NO3)2.2H2O | 122.33 | 0.00 | 622.76 |
| TiO2 | 74.77 | TiOXIDEsrc | 74.77 | 0.00 | 74.77 |
| UO3 | -59.62 | UO3 | 0.00 | 0.00 | 0.00 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD76 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 THU MAY 9, 2002 08:02:41

*** CHEMADD Solutions - Required Additive Amounts ***

| Material Name | Required Amt (Kg) |
|---|---|
| Al(OH)3 | 690.351 |
| B2O3oxide | 983.758 |
| CaCO3 | 0.000 |
| Fe(OH)3 | 10957.047 |
| KOH | 1029.090 |
| Li(OH) | 934.116 |
| Mg(OH)2 | 106.289 |
| ThO2 | 331.350 |
| MnO | 92.379 |
| NaOH | 357.153 |
| NaH2PO4 | 163.441 |
| SiO2 | 3814.320 |
| ZrO(NO3)2.2H2O | 622.764 |
| TiOXIDEsrc | 74.769 |
| UO3 | 0.000 |
| Total Kg | 20156.828 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD76 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 THU MAY 9, 2002 08:02:41

*** Required Glass Former Additions for Target Amounts ***

| Amount (Kg) | Additive Description |
|---|---|
| 690.351 | ALUMINUM HYDROXIDE |
| 983.758 | BORON OXIDE |
| 0.000 | CALCIUM CARBONATE |
| 10957.047 | IRON HYDROXIDE(SLURRY) |
| 1029.090 | POTASSIUM HYDROXIDE |
| 934.116 | LITHIUM HYDROXIDE |
| 106.289 | MAGNESIUM HYDROXIDE |
| 331.350 | THORIUM OXIDE |
| 92.379 | MANGANESE DIOXIDE |
| 357.153 | SODIUM HYDROXIDE |
| 163.441 | SODIUM PHOSPHATE MONOBASIC |
| 3814.320 | SILICON DIOXIDE |
| 622.764 | ZIRCONYL NITRATE DIHYDRATE |
| 74.769 | TITANIUM DIOXIDE |
| 0.000 | URANIUM OXIDE |
| 20156.828 | |

ADD VITRIFICATION FEED ADDITIVES RUN: HSD76 TANK: CFMT ADD: WI
IP BADGE#: 0000 THU MAY 9, 2002 08:02:41

*** Glass Former Acid Addition Calculation ***

| Mass of Cold Chemical Acid to be added to Glass: 12.241 kg |

Input Data:

| Input Parameter | Value | Units |
|---|---|---|
| CHEMADD Oxide Prediction for Batch | 10000.000 | kg |
| NO3 Analysis from A&PC | 161000.000 | ug/g |
| NO2 Analysis from A&PC | 42166.000 | ug/g |
| Zr Analysis from A&PC | 404.111 | ug/g |
| Slurry Density from A&PC | 1.210 | g/ml |
| Slurry Volume | 14640.600 | liters |
| CHEMADD Source Material Quantity | 622.764 | kg |
| Source Material Yield Factor | 42.610 | percent |
| Source Material Purity Factor | 100.000 | percent |
| Source Material Acid Yield Factor | 0.000 | percent |
| Cold Chemical Acid Yield Factor | 68.000 | percent |
| NO3 Fraction of Target Mass | 0.400 | ratio |
| Source Material: | ZrO(NO3)2.2H2O | |

Calculations:

| Calculated Item | Amount (Kg) |
|---|---|
| NO3 Target Mass | 4000.000 |
| CFMT NO3 from NO3 | 2852.135 |
| CFMT NO3 from NO2 | 1006.794 |
| CFMT NO3 from ZrO(NO3)2.2H2O | 9.734 |
| Total CFMT NO3 Contribution | 3868.663 |
| NO3 from ZrO(NO3)2.2H2O | 123.146 |
| NO3 from Solvent | 0.000 |
| Total Glass Former Contribution | 123.146 |
| Additional NO3 Needed | 8.192 |
| Mass of Cold Chemical Acid to Add | 12.241 |

# Glass Former Makeup

# Cold Chemical Feed Batch Preparation

Slurry Batch # 76

Tank # 65-D-03 Description Pre-Mix SAE R. Palmer Date 5-6-02

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Demin Water | 700 ± 7 L | 5-6-02 700L | NA | NA | [illegible] |
| Concentrated Nitric Acid | 400 ± 4 L | 400.19 L | NA | NA | [illegible] |
| Ferric Hydroxide (15 drums) | 3402 ± 40 kg | 3397 Kg | C2150 | 100937/1.3 | [illegible] |
| Aluminum Hydroxide (2 drums) | 250 ± 3 kg | 250.1 Kgs | C2102 | 98682/1.1 | [illegible] |
| Lithium Hydroxide Monohydrate (3 drums) | 480 ± 5 kg | 471.8 Kgs | C2108 | 58081/1.2 | [illegible] |
| Silicon Dioxide (4 drums) | 889 ± 10 kg | 889.0 Kgs | C2107 | 97714/1.1 | [illegible] |
| Potassium Hydroxide (2 drums) | 480 ± 5 kg | 455.0 Kgs | C2112 | 46509/1.1 58444/1.1 | [illegible] |
| | | | | | |
| | | | | | |
| | Nothing further | | | | |
| | [illegible] 5-6-02 | | | | |
| | | | | | |
| | | | | | |

VOSS Signature [illegible] Date 5-7-02 SAE Review [illegible] Date 5/10/02

WV-2756, Rev. 1

**APPENDIX G**
**Cold Chemical Feed Batch Preparation**
(Page 1 of 1)

Slurry Batch # 76

Tank # 65-D-02 Description Final Glass Former (2nd Mix tank) SAE V. K. Sharma Date 5-13-02

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Demin Water | 400 ± 4 liter | 400 l | N/A | Column N/A per Section 10.0 [1] | J Kahn |
| Ferric Hydroxide | 5478 ± 54.8 Kg | 5483 Kg. | C2150 | | [illegible] |
| Demin Water | 20 liter per drum | 369 l | N/A | | [illegible] |
| Zirconyl Nitrate | 311 ± 3.1 Kg | 310.9 Kg | C2147 | | DS |
| Sodium Hydroxide | 78 ± 0.8 liter | 78.14 l | N/A | | J Kahn |
| Sodium Phosphate Monobasic | 81 ± 0.8 Kg | 81 Kg | C2144 | | DS |
| Boron Oxide | 439 ± 4.4 Kg | 439.2 Kg | C2129 | | DS |
| Silicon Dioxide | 667 ± 6.7 Kg | 667 Kg | C2107 | | DS |
| Aluminum Hydroxide | 345 ± 3.5 Kg | 345 Kg | C2102 | | [illegible] |
| Magnesium Hydroxide | 53 ± 0.5 Kg | 59.4 Kg | C2119 | | CDC |
| Manganese Dioxide | 46 ± 0.5 Kg | 45.9 Kg. | C2137 | | CDC |
| Titanium Dioxide | 37 ± 0.4 Kg | 36.9 Kg | C2126 | | CDC |
| Silicon Dioxide | 1240 ± 12.4 Kg | 1240.4 Kg | C2107 | | CM |
| Lithium Hydroxide Monohydrate | 463 ± 4.6 Kg | 464.0 Kg | C2108 | | CM |
| Potassium Hydroxide | 514 ± 5.1 Kg | 514.2 kg | C2112 | | TJP/JK |
| Demin Water | 20 liter per drum | 38 l | N/A | | TJP/JK |
| Borax | 134 ± 1.3 Kg | 134.1 kg | C2143 | | TJP/JK |
| P-1200 Antifoam | 18 ± 0.2 Kg | 18.05 kg | C493 | | TJP |

VOSS Signature [signature] Date 5-28-02 SAE Review [signature] Date 5/28/02

# APPENDIX G
## Cold Chemical Feed Batch Preparation
(Page 1 of 1)

Slurry Batch # 76

Tank # 65-D-03 Description Final Glass Former Adds to Premix SAE V. K. Sharma Date 5-13-02

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Ferric Hydroxide | 2082 ± 20.8 Kg | 2081.9 Kg | C2150 | Column N/A per Section 10.0 [1] | [illegible] |
| Demin Water | 20 liter per drum | 180L | N/A | | [illegible] |
| Zirconyl Nitrate | 312 ± 3.1 Kg | 312 Kg | C2147 | | [illegible] |
| Sodium Hydroxide | 78 ± 0.8 liter | 78.04 LT | N/A | | [illegible] |
| Sodium Phosphate Monobasic | 82 ± 0.8 Kg | ~~82~~ 5-13-02 82 Kg | C2144 | | [illegible] |
| Boron Oxide | 439 ± 4.4 Kg | 439.5 | C2129 | | [illegible] |
| Silicon Dioxide | 667 ± 6.7 Kg | 667 Kg | C2107 | | [illegible] |
| Aluminum Hydroxide | 95 ± 1.0 Kg | 95.1 Kg | C2102 | | [illegible] |
| Magnesium Hydroxide | 53 ± 0.5 Kg | 52.8 Kg | C2119 | | [illegible] |
| Manganese Dioxide | 46 ± 0.5 Kg | 46.0 Kg | C2137 | | [illegible] |
| Titanium Dioxide | 37 ± 0.4 Kg | 37.0 | C2126 | | [illegible] |
| Silicon Dioxide | 352 ± 3.5 Kg | 352.1 Kg | C2107 | | DS |
| Potassium Hydroxide | 60 ± 0.6 Kg | 60.1 Kg | C2112 | | DS |
| Demin Water | 20 liter per drum | N/A | ~~C2143~~ 5-15-02 JK | | N/A |
| Borax | 134 ± 1.3 kg | 134.2 Kg | C2143 | | DS |
| P-1200 | 18 ± 0.2 Kg | 18.0 Kg | N/A | | DS |
| | | | | | |
| | | | | | |

Nothing Follows
6-18-02

VOSS Signature [illegible] Date 5-28-02 SAE Review [illegible] Date 5/28/02

# Glass Former Analyses

APPENDIX C
Transfer Data Sheet
(Page 1 of 1)

Density & Level for glass Formers Samples

Section 1

Slurry Batch # 76

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | |
|---|---|---|---|---|---|---|
| Tank Name | MIX TANK | | | | | |
| Tank Number | D-02 | | | | | |
| Date | 5/17/02 | | | | | |
| Time | 900 | | | N/A | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 51.9 | 51.8 | 51.8 | [illegible] 5/17/02 | | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.402 | 1.404 | 1.404 | | | |
| Temp. (°C) | 26 | | | | | |
| Average Volume (L) | 7,617 | | | | | |

* Instantaneous Readings

NF 3-18-03
51.83
51.83 Ag
1.403 Ag

Section 2

Volume to be transferred _____

SAE Signature _____ Date _____

Shift Engineer Signature _____ Date _____

N/A

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | |
|---|---|---|---|---|---|---|
| Tank Name | [illegible] | | | | | |
| Tank Number | | | | | | |
| Date | 5/17/02 | | | | | |
| Time | | | | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | | | | | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | | | | | |
| Temp. (°C) | | | | | | |
| Average Volume (L) | | | | | | |

Total Flush Water (L) _____

VOSS Signature _____ Date _____

Density & Level for Glass Formers

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)



Section 1

Slurry Batch # 76

GLASSFORMER ADDED TO PREMIX

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | Mix Tank | |
| Tank Number | D-03 | |
| Date | 3/15/02 | |
| Time | (3:15PM) 15:15 | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 58.6 58.9 58.7 | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.322 1.322 1.324 | |
| Temp. (°C) | 26.6 (80°F) | 5-14-02 |
| Average Volume (L) | 8740 | |

58.73
1.322

* Instantaneous Readings

Section 2

Volume to be transferred _____

SAE Signature _____ Date _____

Shift Engineer Signature _____ Date _____

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | | |
| Tank Number | | |
| Date | | |
| Time | | 5-14-02 |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | |
| Temp. (°C) | | |
| Average Volume (L) | | |

Total Flush Water (L) _____

VOSS Signature _____ Date _____

COMBINING GLASS FORMER BATCHES BATCH #76
GLASS FORMERS ARE IN D-02 AND D-03

COMBINING
NW
3-18-03

| | D-02 | D-03 | COMBINED |
|---|---|---|---|
| VOLUME | 7617 | 8740 | 16357 |
| DENSITY | 1.403 | 1.322 | 1.36 |

| | D-02 DATA | | | D-03 DATA | | | COMBINED DATA | | |
|---|---|---|---|---|---|---|---|---|---|
| Al | 10900 | 11000 | 10400 | 9800 | 9680 | 9770 | 10326 | 10312 | 10071 |
| B | 13200 | 13300 | 12800 | 12100 | 12700 | 12500 | 12626 | 12986 | 12642 |
| Ca | 178 | 162 | 165 | 156 | 162 | 151 | 167 | 162 | 158 |
| Fe | 34000 | 32200 | 34100 | 31400 | 31000 | 31300 | 32643 | 31570 | 32639 |
| K | 14800 | 13500 | 14300 | 13100 | 13300 | 13500 | 13914 | 13393 | 13882 |
| Li | 6900 | 7000 | 6610 | 6750 | 6730 | 7000 | 6821 | 6858 | 6811 |
| Mg | 3550 | 3550 | 3400 | 2960 | 2900 | 2930 | 3243 | 3212 | 3155 |
| Mn | 2560 | 2380 | 2550 | 2320 | 2290 | 2280 | 2435 | 2333 | 2409 |
| Na | 6900 | 6500 | 6750 | 5950 | 6180 | 6630 | 6405 | 6332 | 6686 |
| P | 1820 | 1650 | 1860 | 1640 | 1620 | 1730 | 1726 | 1634 | 1792 |
| Si | 90400 | 89400 | 86100 | 80900 | 80500 | 79900 | 85447 | 84759 | 82862 |
| Ti | 2040 | 2010 | 2000 | 1870 | 1820 | 1840 | 1951 | 1911 | 1916 |
| Zr | 4250 | 3960 | 4180 | 3880 | 3820 | 3870 | 4057 | 3886 | 4018 |

RB76GF

Data for Glass
Former analysis
Batch 76
R A Palmer
5-20-02

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** N/A **FAXed to Recipients** ✓ **Copied for File** ✓

*package page ____ of ____*

***Login Date:*** *15-May-02* ***VAST Sample ID:*** *02-0768*

| | |
|---|---|
| **Sample Point:** | GLASSFORMERS |
| **Sample Type:** | ICP/NO3 |
| **Collected:** | 5/15/2002 1500 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | 76GF7-76GF9 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| NO3 | 3.71E+4 | ug/g | | Rep1 (B76GF#7): U1 |
| NO3 | 3.75E+4 | ug/g | | Rep2 (B76GF#7 DUP): U1 |
| NO3 | 3.73E+4 | ug/g | | Rep3 (B76GF#8): U1 |
| NO3 | 3.74E+4 | ug/g | | Rep4 (B76GF#8 DUP): U1 |
| NO3 | 3.68E+4 | ug/g | | Rep5 (B76GF#9): U1 |
| NO3 | 3.73E+4 | ug/g | | Rep6 (B76GF#9 DUP): U1 |
| Al | 9.80E+3 | ug/g | | Rep1 (B76GF #7): U1 |
| Al | 9.68E+3 | ug/g | | Rep2 (B76GF #8): U1 |
| Al | 9.77E+3 | ug/g | | Rep3 (B76GF #9): U1 |
| Al | * | ug/g | | Rep4 (B76GF #7): U1 |
| Al | * | ug/g | | Rep5 (B76GF #8): U1 |
| Al | * | ug/g | | Rep6 (B76GF #9): U1 |
| B | 1.21E+4 | ug/g | | Rep1 (B76GF #7): U1 |
| B | 1.27E+4 | ug/g | | Rep2 (B76GF #8): U1 |
| B | 1.25E+4 | ug/g | | Rep3 (B76GF #9): U1 |
| B | * | ug/g | | Rep4 (B76GF #7): U1 |
| B | * | ug/g | | Rep5 (B76GF #8): U1 |
| B | * | ug/g | | Rep6 (B76GF #9): U1 |
| Ca | <1.56E+2 | ug/g | | Rep1 (B76GF #7): no flags |
| Ca | <1.62E+2 | ug/g | | Rep2 (B76GF #8): no flags |

**Approved By**

Lawrence O. Gaert — **Name**

5/20/02 2255 — **Date & Time**

package page ____ of ____

**Login Date:** 15-May-02 **VAST Sample ID:** 02-0768

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | ICP/NO3 | **Customer's ID:** | 76GF7-76GF9 |
| **Collected:** | 5/15/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Ca | <1.51E+2 | ug/g | | Rep3 (B76GF #9): no flags |
| Ca | * | ug/g | | Rep4 (B76GF #7): U1 |
| Ca | * | ug/g | | Rep5 (B76GF #8): U1 |
| Ca | * | ug/g | | Rep6 (B76GF #9): U1 |
| Fe | 3.14E+4 | ug/g | | Rep1 (B76GF #7): U1 |
| Fe | 3.10E+4 | ug/g | | Rep2 (B76GF #8): U1 |
| Fe | 3.13E+4 | ug/g | | Rep3 (B76GF #9): U1 |
| Fe | * | ug/g | | Rep4 (B76GF #7): U1 |
| Fe | * | ug/g | | Rep5 (B76GF #8): U1 |
| Fe | * | ug/g | | Rep6 (B76GF #9): U1 |
| K | Not Measured | ug/g | | Rep1 (B76GF #7): U1 |
| K | Not Measured | ug/g | | Rep2 (B76GF #8): U1 |
| K | Not Measured | ug/g | | Rep3 (B76GF #9): U1 |
| K | 1.31E+4 | ug/g | | Rep4 (B76GF #7): U1 |
| K | 1.33E+4 | ug/g | | Rep5 (B76GF #8): U1 |
| K | 1.35E+4 | ug/g | | Rep6 (B76GF #9): U1 |
| Li | 6.75E+3 | ug/g | | Rep1 (B76GF #7): U1 |
| Li | 6.73E+3 | ug/g | | Rep2 (B76GF #8): U1 |
| Li | 7.00E+3 | ug/g | | Rep3 (B76GF #9): U1 |
| Li | * | ug/g | | Rep4 (B76GF #7): U1 |
| Li | * | ug/g | | Rep5 (B76GF #8): U1 |
| Li | * | ug/g | | Rep6 (B76GF #9): U1 |
| Mg | 2.96E+3 | ug/g | | Rep1 (B76GF #7): U1 |
| Mg | 2.90E+3 | ug/g | | Rep2 (B76GF #8): U1 |
| Mg | 2.93E+3 | ug/g | | Rep3 (B76GF #9): U1 |
| Mg | * | ug/g | | Rep4 (B76GF #7): U1 |
| Mg | * | ug/g | | Rep5 (B76GF #8): U1 |

**Approved By**

Lawrence A. Guest — Name

5/20/02 2255 — Date & Time

package page ____ of ____

**Login Date:** 15-May-02 **VAST Sample ID:** 02-0768

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | ICP/NO3 | **Customer's ID:** | 76GF7-76GF9 |
| **Collected:** | 5/15/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Mg | * | ug/g | | Rep6 (B76GF #9): U1 |
| Mn | 2.32E+3 | ug/g | | Rep1 (B76GF #7): U1 |
| Mn | 2.29E+3 | ug/g | | Rep2 (B76GF #8): U1 |
| Mn | 2.28E+3 | ug/g | | Rep3 (B76GF #9): U1 |
| Mn | * | ug/g | | Rep4 (B76GF #7): U1 |
| Mn | * | ug/g | | Rep5 (B76GF #8): U1 |
| Mn | * | ug/g | | Rep6 (B76GF #9): U1 |
| Na | 5.95E+3 | ug/g | | Rep1 (B76GF #7): U1 |
| Na | 6.18E+3 | ug/g | | Rep2 (B76GF #8): U1 |
| Na | 6.63E+3 | ug/g | | Rep3 (B76GF #9): U1 |
| Na | * | ug/g | | Rep4 (B76GF #7): U1 |
| Na | * | ug/g | | Rep5 (B76GF #8): U1 |
| Na | * | ug/g | | Rep6 (B76GF #9): U1 |
| P | 1.64E+3 | ug/g | | Rep1 (B76GF #7): U1 |
| P | 1.62E+3 | ug/g | | Rep2 (B76GF #8): U1 |
| P | 1.73E+3 | ug/g | | Rep3 (B76GF #9): U1 |
| P | * | ug/g | | Rep4 (B76GF #7): U1 |
| P | * | ug/g | | Rep5 (B76GF #8): U1 |
| P | * | ug/g | | Rep6 (B76GF #9): U1 |
| Si | 8.09E+4 | ug/g | | Rep1 (B76GF #7): U1 |
| Si | 8.05E+4 | ug/g | | Rep2 (B76GF #8): U1 |
| Si | 7.99E+4 | ug/g | | Rep3 (B76GF #9): U1 |
| Si | * | ug/g | | Rep4 (B76GF #7): U1 |
| Si | * | ug/g | | Rep5 (B76GF #8): U1 |
| Si | * | ug/g | | Rep6 (B76GF #9): U1 |
| Ti | 1.87E+3 | ug/g | | Rep1 (B76GF #7): U1 |
| Ti | 1.82E+3 | ug/g | | Rep2 (B76GF #8): U1 |

**Approved By**

Lawrence A. Gest — Name

5/20/02 7:7:55 — Date & Time

package page ____ of ____

**Login Date: 15-May-02** **VAST Sample ID: 02-0768**

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | ICP/NO3 | **Customer's ID:** | 76GF7-76GF9 |
| **Collected:** | 5/15/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Ti | 1.84E+3 | ug/g | | Rep3 (B76GF #9): U1 |
| Ti | * | ug/g | | Rep4 (B76GF #7): U1 |
| Ti | * | ug/g | | Rep5 (B76GF #8): U1 |
| Ti | * | ug/g | | Rep6 (B76GF #9): U1 |
| Zr | 3.88E+3 | ug/g | | Rep1 (B76GF #7): U1 |
| Zr | 3.82E+3 | ug/g | | Rep2 (B76GF #8): U1 |
| Zr | 3.87E+3 | ug/g | | Rep3 (B76GF #9): U1 |
| Zr | * | ug/g | | Rep4 (B76GF #7): U1 |
| Zr | * | ug/g | | Rep5 (B76GF #8): U1 |
| Zr | * | ug/g | | Rep6 (B76GF #9): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined, U2 - uncertainty not entered

* not measured

**Approved By**

Lawrence A. Frost — Name

5/20/02 2255 — Date & Time

WEST VALLEY DEMONSTRATION PROJECT
ANALYTICAL REQUEST



VAST Sample ID: 02-0768 Locin Date: 5/15/02

**To be Completed by the Customer**

Customer Department: HLW Completion

Sample Point: D-03

Sample Type (check one):

☒ liquid ☐ solid (powder/dust

☐ smear ☐ coupon ☐ other:

Customer's Sample ID No.: 76GF7 - 76GF9

Collection Date/Time: 5/15/02 1500

Collection Location: Cold Chem

Sample Collector: Larry Keeys

Report Recipients: fax to 4169; SAE (MS-46)

Is this sample suspected to contain radioactive material? X no ___ yes

If yes, is the gross activity suspected to be > 5E-03 µCi/mL or > 5E-03 µCi/g?
X no ___ yes

If dose rate is >10mR/hr w/c or >100 mR/hr w/o, contact lab management prior to delivery of sample

Survey Results (To be completed by Radiation Protection as applicable):

N/A cpm α direct * ___ cpm βγ direct *

___ mR/hr w/c ___ mR/hr w/o

RP Tech: N/A Date:

* on contact with sample material

Sample Charge Number: WH1210006

Hazards (acid, base, solvent, Cr, Ba, etc.):

___ no X yes - list: Acid

Sample Disposal Instructions (check appropriate):

☐ return to customer
☐ upon completion of analyses
☒ with customer approval
☐ other:

Requested Due Date: 05/16/02 (Date Only)

Is the sampling designated HLW? ___ yes X no ___ n/a

If yes or no, is the activity identified on the WVDP HLW Items and Activities List? X yes ___ no

If yes, Is the HLW Screening Form Attached? ___ yes X no

Comments:
Notify SAE when complete. Include copy of this form with results.

Supervisor / Manager Signature: [signature]

To be filled in after sample delivery to the laboratory:

Delivered by: LK Date: 5-15-02 Time: 1552 Received by: JDN Date: 5/15/02 Time: 1700

**ANALYSES TO BE COMPLETED**

List below the analyses to be performed, the desired units, and any applicable notes (to duplicate the analysis, etc.). Completed analyses will be reported to the Report Recipient on a separate form.

| Analysis | Units | Note | Analysis | Units | Note | Analysis | Units | Note |
|---|---|---|---|---|---|---|---|---|
| ICP-GF | µg/g | 60mL bottle | | | | | | |
| NO3 (with dups) | µg/g | 60mL bottle | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

5/20/02 5/20/02

# WEST VALLEY DEMONSTRATION PROJECT
## ANALYTICAL REQUEST



VAST Sample ID: 02-0769 Login Date: 5/15/02

### To be Completed by the Customer

Customer Department: HLW Completion

Sample Point: D-03

Sample Type (check one):

☒liquid ☐solid ☐powder/dust

☐ smear ☐coupon ☐other:

Customer's Sample ID No.: 76GF10 - 76GF12

Collection Date/Time:

Collection Location: Cold Chem

Sample Collector: Larry Keeys

Report Recipients: fax to 4169; SAE (MS-48)

Is this sample suspected to contain radioactive material? x no ____ yes

If yes, is the gross activity suspected to be > 5E-03 µCi/mL or > 5E-03 µCi/g?
x no ____ yes

If dose rate is >10mR/hr w/c or >100 mR/hr w/o, contact lab management prior to delivery of sample

Survey Results (To be completed by Radiation Protection as applicable):

N/A cpm α direct * ____ cpm βγ direct *

____ mR/hr w/c ____ mR/hr w/o

RP Tech: N/A Date:

* on contact with sample material

Sample Charge Number: WW1210006

Hazards (acid, base, solvent, Cr, Ba, etc.):

____no x yes - list: Acid

Sample Disposal Instructions (check appropriate):

☐ return to customer
☐ upon completion of analyses
☒ with customer approval
☐ other:

Requested Due Date: 05/16/02
(Date Only)

Is the sampling designated HLW? ____yes x no ____n/a

If yes or no, is the activity identified on the WVDP HLW Items and Activities List? X yes ____no

If yes, Is the HLW Screening Form Attached? ____yes x no

Comments:
Notify SAE when complete. Include copy of this form with results.

Supervisor / Manager Signature: [signature]

To be filled in after sample delivery to the laboratory:

Delivered by: LK Date: 5-15-02 Time: 1552 Received by: JDH Date: 5/15/02 Time: 1700

### ANALYSES TO BE COMPLETED

List below the analyses to be performed, the desired units, and any applicable notes (to duplicate the analysis, etc.). Completed analyses will be reported to the Report Recipient on a separate form.

| Analysis | Units | Note | Analysis | Units | Note | Analysis | Units | Note |
|---|---|---|---|---|---|---|---|---|
| Density | g/mL | 250mL bottle ✓ | | | | | | |
| Total Solids | % | 250mL bottle ✓ | | | | | | |
| pH | S.U. | ✓ | | | | | | |
| | | | | | | | | |

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** N/A **FAXed to Recipients** ✓ **Copied for File** ✓

*package page 1 of 6*

***Login Date:*** *15-May-02* ***VAST Sample ID:*** *02-0769*

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | LIQUID | **Customer's ID:** | 76GF10-76GF12 |
| **Collected:** | 5/15/2002 1500 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Density | 1.32 (20.0 °C) | g/mL | | Rep1 (B76GF #10): U1 |
| Density | 1.31 (20.0 °C) | g/mL | | Rep2 (B76GF #11): U1 |
| Density | 1.29 (20.0 °C) | g/mL | | Rep3 (B76GF #12): U1 |
| pH | 9.8 (20 °C) | su | 0.1 | Rep1 (REP 10): no flags |
| pH | 9.9 (20 °C) | su | 0.1 | Rep2 (REP 11): no flags |
| pH | 9.8 (20 °C) | su | 0.1 | Rep3 (REP 12): no flags |
| Tot Solids | 42.21 | % | | Rep1 (B76GF#10): U1 |
| Tot Solids | 42.03 | % | | Rep2 (B76GF#11): U1 |
| Tot Solids | 42.24 | % | | Rep3 (B76GF#12): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Lawrence A. Just — **Name**

5/20/02 2120 — **Date & Time**

***Report Date:*** *20-May-02*

VIT

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** N/A **FAXed to Recipients** ✓ **Copied for File** ✓

*package page 1 of 5*

***Login Date:*** *17-May-02* ***VAST Sample ID:*** *02-0791*

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | LIQUID | **Customer's ID:** | 76GF4-76GF6 |
| **Collected:** | 5/17/2002 1430 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Density | 1.40 (20.0 °C) | g/mL | | Rep1 (B76GF #4): U1 |
| Density | 1.39 (20.0 °C) | g/mL | | Rep2 (B76GF #5): U1 |
| Density | 1.40 (20.0 °C) | g/mL | | Rep3 (B76GF #6): U1 |
| pH | >12.4 (20 °C) | su | 0.1 | Rep1 (REP 4): no flags |
| pH | >12.4 (20 °C) | su | 0.1 | Rep2 (REP 5): no flags |
| pH | >12.4 (20 °C) | su | 0.1 | Rep3 (REP 6): no flags |
| Tot Solids | 46.14 | % | | Rep1 (B76GF#4): U1 |
| Tot Solids | 46.70 | % | | Rep2 (B76GF#5): U1 |
| Tot Solids | 45.92 | % | | Rep3 (B76GF#6): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Lawrence A. Faust — **Name**

5/20/02 2115 — **Date & Time**

***Report Date:*** *20-May-02*

WEST VALLEY DEMONSTRATION PROJECT
ANALYTICAL REQUEST

Page 2 of 5

VAST Sample ID: 02-0791 Login Date: 5/17/02

**To be Completed by the Customer**

Customer Department: HLW Completion

Sample Point: D-02

Sample Type (check one):

☒liquid ☐solid ☐powder/dust

☐ smear ☐coupon ☐other:

Customer's Sample ID No.: 76GF4 - 76GF6

Collection Date/Time: 5/17/02 1430

Collection Location: Cold Chem

Sample Collector: ASMorgan

Report Recipients: fax to 4169; SAE (MS-48)

Is this sample suspected to contain radioactive material? X no ____ yes

If yes, is the gross activity suspected to be > 5E-03 µCi/mL or > 5E-03 µCi/g?
x no ____ yes

If dose rate is >10mR/hr w/c or >100 mR/hr w/o, contact lab management prior to delivery of sample

Survey Results (To be completed by Radiation Protection as applicable):

N/A cpm α direct * ____ cpm βγ direct *

____ mR/hr w/c ____ mR/hr w/o

RP Tech: N/A Date: ____

* on contact with sample material

Sample Charge Number: WH1210006

Hazards (acid, base, solvent, Cr, Ba, etc.):

____no x yes - list: Acid

Sample Disposal Instructions (check appropriate):

☐ return to customer
☐ upon completion of analyses
☒ with customer approval
☐ other:

Requested Due Date: 05/16/02
(Date Only)

Is the sampling designated HLW? ____yes x no ____n/a

If yes or no, is the activity identified on the WVDP HLW Items and Activities List? X yes ____no

If yes, Is the HLW Screening Form Attached? ____yes x no

Comments:
Notify SAE when complete Include copy of this form with results.

Supervisor / Manager Signature: [signature]

To be filled in after sample delivery to the laboratory:

Delivered by: ASM Date: 5/17/02 Time: 1500 Received by: [signature] for CW Date: 5/17/02 Time: 1655

**ANALYSES TO BE COMPLETED**

List below the analyses to be performed, the desired units, and any applicable notes (to duplicate the analysis, etc.). Completed analyses will be reported to the Report Recipient on a separate form.

| Analysis | Units | Note | Analysis | Units | Note | Analysis | Units | Note |
|---|---|---|---|---|---|---|---|---|
| Density | g/mL | 250mL bottle ✓ | | | | | | |
| Total Solids | % | 250mL bottle ✓ | | | | | | |
| pH | S.U. | ✓ | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** ☑ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page ____ of ____*

***Login Date:*** *17-May-02* ***VAST Sample ID:*** *02-0792*

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | ICP/NO3 | **Customer's ID:** | B76GF1-B76GF3 |
| **Collected:** | 5/17/2002 1430 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| NO3 | 6.11E+3 | ug/g | | Rep1 (B76GF#1): U1 |
| NO3 | 6.27E+3 | ug/g | | Rep2 (B76GF#1 DUP): U1 |
| NO3 | 6.10E+3 | ug/g | | Rep3 (B76GF#2): U1 |
| NO3 | 6.15E+3 | ug/g | | Rep4 (B76GF#2 DUP): U1 |
| NO3 | 6.28E+3 | ug/g | | Rep5 (B76GF#3): U1 |
| NO3 | 6.15E+3 | ug/g | | Rep6 (B76GF#3 DUP): U1 |
| Al | 1.09E+4 | ug/g | | Rep1 (B76GF #1): U1 |
| Al | 1.10E+4 | ug/g | | Rep2 (B76GF #2): U1 |
| Al | 1.04E+4 | ug/g | | Rep3 (B76GF #3): U1 |
| B | 1.32E+4 | ug/g | | Rep1 (B76GF #1): U1 |
| B | 1.33E+4 | ug/g | | Rep2 (B76GF #2): U1 |
| B | 1.28E+4 | ug/g | | Rep3 (B76GF #3): U1 |
| Ca | <1.78E+2 | ug/g | | Rep1 (B76GF #1): no flags |
| Ca | <1.62E+2 | ug/g | | Rep2 (B76GF #2): no flags |
| Ca | <1.65E+2 | ug/g | | Rep3 (B76GF #3): no flags |
| Fe | 3.40E+4 | ug/g | | Rep1 (B76GF #1): U1 |
| Fe | 3.22E+4 | ug/g | | Rep2 (B76GF #2): U1 |
| Fe | 3.41E+4 | ug/g | | Rep3 (B76GF #3): U1 |
| K | Not Measured | ug/g | | Rep1 (B76GF #1): U1 |
| K | Not Measured | ug/g | | Rep2 (B76GF #2): U1 |

**Approved By**

Lawrence A. Hurst — **Name**

5/20/02 2300 — **Date & Time**

***Report Date:*** *20-May-02*

VIT

package page ____ of ____

**Login Date:** 17-May-02 **VAST Sample ID:** 02-0792

| | | | |
|---|---|---|---|
| Sample Point: | GLASSFORMERS | Department | HLWO (VIT) |
| Sample Type: | ICP/NO3 | Customer's ID: | B76GF1-B76GF3 |
| Collected: | 5/17/2002 1430 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| K | Not Measured | ug/g | | Rep3 (B76GF #3): U1 |
| K | 1.48E+4 | ug/g | | Rep4 (B76GF #1): U1 |
| K | 1.35E+4 | ug/g | | Rep5 (B76GF #2): U1 |
| K | 1.43E+4 | ug/g | | Rep6 (B76GF #3): U1 |
| Li | 6.90E+3 | ug/g | | Rep1 (B76GF #1): U1 |
| Li | 7.00E+3 | ug/g | | Rep2 (B76GF #2): U1 |
| Li | 6.61E+3 | ug/g | | Rep3 (B76GF #3): U1 |
| Mg | 3.55E+3 | ug/g | | Rep1 (B76GF #1): U1 |
| Mg | 3.55E+3 | ug/g | | Rep2 (B76GF #2): U1 |
| Mg | 3.40E+3 | ug/g | | Rep3 (B76GF #3): U1 |
| Mn | 2.56E+3 | ug/g | | Rep1 (B76GF #1): U1 |
| Mn | 2.38E+3 | ug/g | | Rep2 (B76GF #2): U1 |
| Mn | 2.55E+3 | ug/g | | Rep3 (B76GF #3): U1 |
| Na | 6.90E+3 | ug/g | | Rep1 (B76GF #1): U1 |
| Na | 6.50E+3 | ug/g | | Rep2 (B76GF #2): U1 |
| Na | 6.75E+3 | ug/g | | Rep3 (B76GF #3): U1 |
| P | 1.82E+3 | ug/g | | Rep1 (B76GF #1): U1 |
| P | 1.65E+3 | ug/g | | Rep2 (B76GF #2): U1 |
| P | 1.86E+3 | ug/g | | Rep3 (B76GF #3): U1 |
| Si | 9.04E+4 | ug/g | | Rep1 (B76GF #1): U1 |
| Si | 8.94E+4 | ug/g | | Rep2 (B76GF #2): U1 |
| Si | 8.61E+4 | ug/g | | Rep3 (B76GF #3): U1 |
| Ti | 2.04E+3 | ug/g | | Rep1 (B76GF #1): U1 |
| Ti | 2.01E+3 | ug/g | | Rep2 (B76GF #2): U1 |
| Ti | 2.00E+3 | ug/g | | Rep3 (B76GF #3): U1 |
| Zr | 4.25E+3 | ug/g | | Rep1 (B76GF #1): U1 |
| Zr | 3.96E+3 | ug/g | | Rep2 (B76GF #2): U1 |

**Approved By**

Lawrence A. Frost — Name

5/20/02 2340 — Date & Time

package page ____ of ____

**Login Date: 17-May-02** **VAST Sample ID: 02-0792**

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | ICP/NO3 | **Customer's ID:** | B76GF1-B76GF3 |
| **Collected:** | 5/17/2002 1430 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Zr | 4.18E+3 | ug/g | | Rep3 (B76GF #3): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Laurence A. Yount — **Name**

5/20/02 2300 — **Date & Time**

WEST VALLEY DEMONSTRATION PROJECT
ANALYTICAL REQUEST



VAST Sample ID: 02- 0792 Login Date: 5/17/02

**To be Completed by the Customer**

Customer Department: HLW Completion

Sample Point: D-02

Sample Type (check one):

☒liquid ☐solid ☐powder/dust

☐ ☐smear ☐coupon ☐other:

Customer's Sample ID No.: 76GF1 - 76GF3

Collection Date/Time: 5/17/02 1430

Collection Location: Cold Chem

Sample Collector: [signature]

Report Recipients: fax to 4169; SAE (MS-48)

Is this sample suspected to contain radioactive material? X no ____ yes

If yes, is the gross activity suspected to be > 5E-03 µCi/mL or > 5E-03 µCi/g?
X no ____ yes

If dose rate is >10mR/hr w/c or >100 mR/hr w/o, contact lab management prior to delivery of sample

Survey Results (To be completed by Radiation Protection as applicable):

N/A cpm α direct * ____ cpm βγ direct *

____ mR/hr w/c ____ mR/hr w/o

RP Tech: N/A Date: ____

* on contact with sample material

Sample Charge Number: WH1210006

Hazards (acid, base, solvent, Cr, Ba, etc.):

____no X yes - list: Acid

Sample Disposal Instructions (check appropriate):

☒ return to customer
☐ upon completion of analyses
☒ with customer approval
☐ other:
5-17-02

Requested Due Date: 05/16/02
(Date Only)

Is the sampling designated HLW? ____yes X no ____n/a

If yes or no, is the activity identified on the WVDP HLW Items and Activities List? X yes ____no

If yes, Is the HLW Screening Form Attached? ____yes X no

Comments:
Notify SAE when complete. Include copy of this form with results.

Supervisor / Manager Signature: [signature]

To be filled in after sample delivery to the laboratory:

Delivered by: HSM Date: 5/17/02 Time: 1500 Received by: CW Date: 5/17/02 Time: 1655

**ANALYSES TO BE COMPLETED**

List below the analyses to be performed, the desired units, and any applicable notes (to duplicate the analysis, etc.). Completed analyses will be reported to the Report Recipient on a separate form.

| Analysis | Units | Note | Analysis | Units | Note | Analysis | Units | Note |
|---|---|---|---|---|---|---|---|---|
| ICP-GF | µg/g | 60mL bottle | | | | | | |
| NO3 (with dups) | µg/g | 60mL bottle | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

# Glass Former SAMPSTAT, COLDCHEM, & MASSBAL

```
##############################################################################
##############################################################################
##############################################################################
##         SSSSSS    AAAAA    MMM    MMM  PPPPPPP    SSSSSS  TTTTTTTT   AAAAA  ##
##       SS         AA   AA   MM M  M MM  PP    PP  SS          TT     AA   AA  ##
##      SS         AA   AA   MM  M   MM  PP    PP  SS          TT     AA   AA  ##
##      SSSSS    AAAAAAA   MM      MM  PPPPPP     SSSSS      TT     AAAAAAA    ##
##         SS   AA   AA   MM      MM  PP             SS     TT     AA   AA     ##
##        SS   AA   AA   MM      MM  PP             SS     TT     AA   AA      ##
## SSSSSS    AA   AA   MM      MM  PP        SSSSSS      TT     AA   AA       ##
##############################################################################
##############################################################################
#########                                                            #########
#########       WVNS   VITRIFICATION   LAB   SAMPLE   STATISTICS      #########
#########                        (Version 2.0)                       #########
##############################################################################
##############################################################################
##############################################################################
#########                                                            #########
#########   Statistically analyzes each component in a batch of waste #########
#########   samples from a mixing tank, deletes the outliers, and    #########
#########   computes a two-sided, 95% confidence limit.  The true mean #########
#########   of an infinite population of samples lies in the range of #########
#########   the mean +/- the percent error of the sample mean.        #########
#########                                                            #########
##############################################################################
##############################################################################
##############################################################################
#########                                                            #########
#########   SAMPLE DATA IDS:  BATCH 76 GLASS FORMERS                 #########
#########   SAMPLE DATA FILE: RB76GF                                 #########
#########   MON MAY 20, 2002                                 23:17:15 #########
#########   SYSTEM: ALPHA1                                           #########
#########                                                            #########
##############################################################################
##############################################################################
##############################################################################
```

R A Palmer
5-20-02
2320

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: BATCH 76 GLASS FORMERS
SAMPLE FILE: RB76GF

MON MAY 20, 2002
23:17:15
DENSITY (g/ml): N/A

Element MP 3-18-03

*** LAB SAMPLE DATA ***

| ement | Sample Data (ug/g) | | | *-Denotes Outlier |
|---|---|---|---|---|
| Al | 10326.00 | 10312.00 | 10071.00 | |
| B | 12626.00 | 12986.00 | 12642.00 | |
| Ca | 167.00 | 162.00 | 158.00 | |
| Fe | 32643.00 | 31570.00 | 32639.00 | |
| K | 13914.00 | 13393.00 | 13882.00 | |
| Li | 6821.00 | 6858.00 | 6811.00 | |
| Mg | 3243.00 | 3212.00 | 3155.00 | |
| Mn | 2435.00 | 2333.00 | 2409.00 | |
| Na | 6405.00 | 6332.00 | 6686.00 | |
| P | 1726.00 | 1634.00 | 1792.00 | |
| Si | 85447.00 | 84759.00 | 82862.00 | |
| Ti | 1951.00 | 1911.00 | 1916.00 | |
| Zr | 4057.00 | 3886.00 | 4018.00 | |

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: BATCH 76 GLASS FORMERS
SAMPLE FILE: RB76GF

MON MAY 20, 2002
23:17:15
DENSITY (g/ml): N/A

*** LAB SAMPLE STATISTICS ***

| Elem | N | OL | Mean | Maximum | Minimum | Std Dev | Conf Limit | %Error |
|---|---|---|---|---|---|---|---|---|
| Al | 03 | 00 | 10236.33 | 10326.00 | 10071.00 | 143.35 | 356.11 | 3.48 |
| B | 03 | 00 | 12751.33 | 12986.00 | 12626.00 | 203.38 | 505.24 | 3.96 |
| Ca | 03 | 00 | 162.33 | 167.00 | 158.00 | 4.51 | 11.20 | 6.90 |
| Fe | 03 | 00 | 32284.00 | 32643.00 | 31570.00 | 618.35 | 1536.06 | 4.76 |
| K | 03 | 00 | 13729.67 | 13914.00 | 13393.00 | 292.00 | 725.37 | 5.28 |
| Li | 03 | 00 | 6830.00 | 6858.00 | 6811.00 | 24.76 | 61.50 | 0.90 |
| Mg | 03 | 00 | 3203.33 | 3243.00 | 3155.00 | 44.64 | 110.88 | 3.46 |
| Mn | 03 | 00 | 2392.33 | 2435.00 | 2333.00 | 53.00 | 131.67 | 5.50 |
| Na | 03 | 00 | 6474.33 | 6686.00 | 6332.00 | 186.91 | 464.30 | 7.17 |
| P | 03 | 00 | 1717.33 | 1792.00 | 1634.00 | 79.36 | 197.13 | 11.48 |
| Si | 03 | 00 | 84356.00 | 85447.00 | 82862.00 | 1338.79 | 3325.74 | 3.94 |
| Ti | 03 | 00 | 1926.00 | 1951.00 | 1911.00 | 21.79 | 54.14 | 2.81 |
| Zr | 03 | 00 | 3987.00 | 4057.00 | 3886.00 | 89.62 | 222.62 | 5.58 |

N = Number of data samples.
OL = Number of outlier samples.
N - OL = Number of samples used for statistics.

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: BATCH 76 GLASS FORMERS
SAMPLE FILE: RB76GF

MON MAY 20, 2002
23:17:15
DENSITY (g/ml): N/A

*** Oxide Data Generated From Mean Samples ***

ICP Desc:
Volume (l): 16357.00
Density (g/ml): 1.3600
Total Oxides (kg): 7743.452

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 10236.33 | Al2O3 | 430.1902 | 5.5555 |
| B | 3.219334 | 12751.33 | B2O3 | 913.1964 | 11.7931 |
| Ca | 1.399052 | 162.33 | CaO | 5.0522 | 0.0652 |
| Fe | 1.429584 | 32284.00 | Fe2O3 | 1026.6906 | 13.2588 |
| K | 1.204537 | 13729.67 | K2O | 367.8940 | 4.7510 |
| Li | 2.152139 | 6830.00 | Li2O | 326.9893 | 4.2228 |
| Mg | 1.658054 | 3203.33 | MgO | 118.1526 | 1.5258 |
| Mn | 1.291128 | 2392.33 | MnO | 68.7122 | 0.8874 |
| Na | 1.347862 | 6474.33 | Na2O | 194.1257 | 2.5070 |
| P | 2.290963 | 1717.33 | P2O5 | 87.5216 | 1.1303 |
| Si | 2.138930 | 84356.00 | SiO2 | 4013.7944 | 51.8347 |
| Ti | 1.665027 | 1926.00 | TiO2 | 71.3379 | 0.9213 |
| Zr | 1.350669 | 3987.00 | ZrO2 | 119.7947 | 1.5470 |

```
##############################################################################
##############################################################################
##############################################################################
##          CCCC     CCCC     CCCC    HH   HH   EEEEEEE    CCCC    KK   KK    ##
##        CC   C   CC   C   CC   C   HH   HH   EE         CC   C   KK  KK     ##
##       CC       CC       CC       HH   HH   EE        CC       KK K         ##
##      CC       CC       CC       HHHHHHH   EEEE      CC       KK            ##
##     CC       CC       CC       HH   HH   EE        CC       KK K          ##
##    CC   C   CC   C   CC   C   HH   HH   EE        CC   C   KK  KK          ##
##    CCCC     CCCC     CCCC    HH   HH   EEEEEEE    CCCC    KK    KK         ##
##############################################################################
##############################################################################
#########                                                            #########
#########        WVNS   VITRIFICATION   COLD   CHEMICAL   CHECK      #########
#########                      (Version 2.2)                         #########
##############################################################################
##############################################################################
##############################################################################
#########                                                            #########
#########   The Cold Chemical Check program allows verification of   #########
#########   the cold chemical makeup in a mixing tank.  The oxide    #########
#########   content for a given batch is determined from elemental   #########
#########   analysis.  The cold chemical check values are determined #########
#########   by comparing the makeup in the mixing tank against the   #########
#########   amount of oxides required by CHEMADD calculations.       #########
#########                                                            #########
##############################################################################
##############################################################################
##############################################################################
#########                                                            #########
#########   USER:    RON                                   23:23:58  #########
#########   BADGE#:  0783                        MON MAY 20, 2002    #########
#########   SYSTEM:  ALPHA1                                          #########
#########                                                            #########
##############################################################################
##############################################################################
##############################################################################
```

5-20-02
2330

VITRIFICATION COLD CHEMICAL CHECK
RON

BADGE#: 0783

MON MAY 20, 2002
23:23:58

*** Cold Chemical Check Data ***

MMT File: RB76_MMT_GF_ICP.DAT
Recipe File: HSD76_CFMT_WI.RCP

| Oxide Name | Mix Tank Wt(kg) | Needed Wt(kg) | Excess(kg) or deficit(-) | % Difference |
|---|---|---|---|---|
| Al2O3 | 430.190 | 444.378 | -14.188 | -3.193 |
| B2O3 | 913.196 | 983.758 | -70.562 | -7.173 |
| BaO | 0.000 | 0.000 | 0.000 | 0.000 |
| CaO | 5.052 | -5.066 | 10.118 | -199.726 |
| Ce2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cs2O | 0.000 | 8.000 | -8.000 | -100.000 |
| CuO | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe2O3 | 1026.691 | 1085.082 | -58.391 | -5.381 |
| K2O | 367.894 | 385.436 | -17.542 | -4.551 |
| La2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Li2O | 326.989 | 327.156 | -0.166 | -0.051 |
| MgO | 118.153 | 70.812 | 47.341 | 66.854 |
| MnO | 68.712 | 75.372 | -6.660 | -8.836 |
| MoO3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Na2O | 194.126 | 182.633 | 11.493 | 6.293 |
| Nd2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 | 0.000 | 0.000 |
| 2O5 | 87.522 | 96.871 | -9.350 | -9.652 |
| Pr6O11 | 0.000 | 0.000 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 | 0.000 | 0.000 |
| SiO2 | 4013.794 | 3814.320 | 199.475 | 5.230 |
| SrO | 0.000 | 0.000 | 0.000 | 0.000 |
| ThO2 | 0.000 | 331.317 | -331.317 | -100.000 |
| TiO2 | 71.338 | 74.769 | -3.431 | -4.589 |
| UO3 | 0.000 | -59.622 | 59.622 | -100.000 |
| ZnO | 0.000 | 0.000 | 0.000 | 0.000 |
| ZrO2 | 119.795 | 122.331 | -2.536 | -2.073 |
| Totals: | 7743.452 | 7937.546 | -194.094 | -2.445 |

NiO
P2O5) 3-18-03

Too much Mg, but
should still pass
PC TCHECK
5-20-02

VITRIFICATION COLD CHEMICAL CHECK
RON

BADGE#: 0783

MON MAY 20, 2002
23:23:58

*** Mix Tank Composition from ICP Measurements ***

Data File: RB76_MMT_GF_ICP.DAT
ICP Desc:
Volume (l): 16357.00
Density (g/ml): 1.3600
Total Oxides (kg): 7743.452

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 10236.33 | Al2O3 | 430.1902 | 5.5555 |
| B | 3.219334 | 12751.33 | B2O3 | 913.1964 | 11.7931 |
| Ba | 1.116464 | 0.00 | BaO | 0.0000 | 0.0000 |
| Ca | 1.399052 | 162.33 | CaO | 5.0522 | 0.0652 |
| Ce | 1.171269 | 0.00 | Ce2O3 | 0.0000 | 0.0000 |
| Cr | 1.461401 | 0.00 | Cr2O3 | 0.0000 | 0.0000 |
| Cs | 1.060173 | 0.00 | Cs2O | 0.0000 | 0.0000 |
| Cu | 1.251692 | 0.00 | CuO | 0.0000 | 0.0000 |
| Fe | 1.429584 | 32284.00 | Fe2O3 | 1026.6906 | 13.2588 |
| K | 1.204537 | 13729.67 | K2O | 367.8940 | 4.7510 |
| La | 1.172721 | 0.00 | La2O3 | 0.0000 | 0.0000 |
| Li | 2.152139 | 6830.00 | Li2O | 326.9893 | 4.2228 |
| Mg | 1.658054 | 3203.33 | MgO | 118.1526 | 1.5258 |
| Mn | 1.291128 | 2392.33 | MnO | 68.7122 | 0.8874 |
| Mo | 1.500125 | 0.00 | MoO3 | 0.0000 | 0.0000 |
| Na | 1.347862 | 6474.33 | Na2O | 194.1257 | 2.5070 |
| Nd | 1.166400 | 0.00 | Nd2O3 | 0.0000 | 0.0000 |
| Ni | 1.272470 | 0.00 | NiO | 0.0000 | 0.0000 |
| P | 2.290963 | 1717.33 | P2O5 | 87.5216 | 1.1303 |
| Pr | 1.170300 | 0.00 | Pr6O11 | 0.0000 | 0.0000 |
| S | 2.496631 | 0.00 | SO3 | 0.0000 | 0.0000 |
| Si | 2.138930 | 84356.00 | SiO2 | 4013.7944 | 51.8347 |
| Sr | 1.182538 | 0.00 | SrO | 0.0000 | 0.0000 |
| Th | 1.137931 | 0.00 | ThO2 | 0.0000 | 0.0000 |
| Ti | 1.665027 | 1926.00 | TiO2 | 71.3379 | 0.9213 |
| U | 1.204267 | 0.00 | UO3 | 0.0000 | 0.0000 |
| Zn | 1.244631 | 0.00 | ZnO | 0.0000 | 0.0000 |
| Zr | 1.350669 | 3987.00 | ZrO2 | 119.7947 | 1.5470 |

VITRIFICATION COLD CHEMICAL CHECK
RON

BADGE#: 0783

MON MAY 20, 2002
23:23:58

*** Recipe Requirements Data ***

Data File: HSD76_CFMT_WI.RCP
Number of Oxides: 34

| Oxide | Recipe Wt(kg) | Current Wt(kg) | Needed Wt(kg) |
|---|---|---|---|
| Al2O3 | 600.000 | 155.622 | 444.378 |
| B2O3 | 1289.000 | 305.242 | 983.758 |
| BaO | 0.000 | 0.000 | 0.000 |
| CaO | 48.000 | 53.066 | -5.066 |
| Ce2O3 | 0.000 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 | 0.000 |
| Cs2O | 8.000 | 0.000 | 8.000 |
| CuO | 0.000 | 0.000 | 0.000 |
| Fe2O3 | 1202.000 | 116.918 | 1085.082 |
| K2O | 500.000 | 114.564 | 385.436 |
| La2O3 | 0.000 | 0.000 | 0.000 |
| Li2O | 371.000 | 43.844 | 327.156 |
| MgO | 89.000 | 18.188 | 70.812 |
| MnO | 82.000 | 6.628 | 75.372 |
| MoO3 | 0.000 | 0.000 | 0.000 |
| Na2O | 800.000 | 617.367 | 182.633 |
| Nd2O3 | 0.000 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 | 0.000 |
| P2O5 | 120.000 | 23.129 | 96.871 |
| Pr6O11 | 0.000 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 | 0.000 |
| SiO2 | 4098.000 | 283.680 | 3814.320 |
| SrO | 0.000 | 0.000 | 0.000 |
| ThO2 | 356.000 | 24.683 | 331.317 |
| TiO2 | 80.000 | 5.231 | 74.769 |
| UO3 | 63.000 | 122.622 | -59.622 |
| ZnO | 0.000 | 0.000 | 0.000 |
| ZrO2 | 132.000 | 9.669 | 122.331 |
| Totals: | 9838.000 | 1900.454 | 7937.546 |

```
##############################################################################
##############################################################################
##############################################################################
##        MMM     MMM     AAAAA      SSSSSS     SSSSSS    BBBBBB      AAAAA     LL     ##
##       MM M   M MM    AA    AA    SS         SS         BB    BB    AA    AA    LL     ##
##      MM  M    MM    AA    AA    SS         SS         BB    BB    AA    AA    LL     ##
##     MM   M    MM    AAAAAAA     SSSSS      SSSSS     BBBBBB     AAAAAAA    LL     ##
##    MM        MM    AA    AA         SS         SS    BB    BB    AA    AA    LL     ##
##   MM        MM    AA    AA         SS         SS    BB    BB    AA    AA    LL     ##
## MM        MM    AA    AA    SSSSSS     SSSSSS     BBBBBB     AA    AA    LLLLLLL     ##
##############################################################################
##############################################################################
#########                                                                #########
#########          WVNS   VITRIFICATION   OXIDE   MASS   BALANCE         #########
#########                          (Version 2.2)                         #########
##############################################################################
##############################################################################
##############################################################################
#########                                                                #########
#########   MASSBAL calculates the oxide masses in the main mix tank     #########
#########   and the concentrator feed makeup tank from elemental         #########
#########   metal composition.    This is compared against the target    #########
#########   mass producing balance values for each oxide.                #########
#########                                                                #########
##############################################################################
##############################################################################
##############################################################################
#########                                                                #########
#########   USER:    RON                                     23:32:46    #########
#########   BADGE#:  0783                              MON MAY 20, 2002   #########
#########   SYSTEM:  ALPHA1                                              #########
#########                                                                #########
##############################################################################
##############################################################################
##############################################################################
```

R A Palm
5-20-02
2340

FICATION OXIDE MASS BALANCE

BADGE#: 0783

MON MAY 20, 2002
23:32:46

*** Oxide Mass Balance Data ***

MMT File: RB76_MMT_GF_ICP.DAT
CFMUT File: HSD76_CFMT_WI_ICP.DAT
Target File: FEED.DAT

| le Name | MMT Wt(kg) | CFMUT Wt(kg) | Target Wt(kg) | MMT Excess(kg) or Deficit(-) | % Difference |
|---|---|---|---|---|---|
| )3 | 430.190 | 155.622 | 600.000 | -14.188 | -2.365 |
| 3 | 913.196 | 305.242 | 1289.000 | -70.562 | -5.474 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | 5.052 | 53.066 | 48.000 | 10.118 | 21.080 |
| )3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| O3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| O | 0.000 | 0.000 | 8.000 | -8.000 | -100.000 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| O3 | 1026.691 | 116.918 | 1202.000 | -58.391 | -4.858 |
| ) | 367.894 | 114.564 | 500.000 | -17.542 | -3.508 |
| :O3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| :O | 326.989 | 43.844 | 371.000 | -0.166 | -0.045 |
| ) | 118.153 | 18.188 | 89.000 | 47.341 | 53.192 |
| ) | 68.712 | 6.628 | 82.000 | -6.660 | -8.122 |
| )3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2O | 194.126 | 617.367 | 800.000 | 11.493 | 1.437 |
| 2O3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| )5 $P_2O_5$ | 87.522 | 23.129 | 120.000 | -9.350 | -7.791 |
| 6O11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| O2 | 4013.794 | 283.680 | 4098.000 | 199.475 | 4.868 |
| O | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| O2 | 0.000 | 24.683 | 356.000 | -331.317 | -93.067 |
| O2 | 71.338 | 5.231 | 80.000 | -3.431 | -4.289 |
| 3 | 0.000 | 122.622 | 63.000 | 59.622 | 94.637 |
| O | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| O2 | 119.795 | 9.669 | 132.000 | -2.536 | -1.921 |
| Totals: | 7743.452 | 1900.454 | 10000.000 | -356.094 | -3.561 |

3-18-03

Too much Mg, but
should still pass
PCTCHECK
RA Plum
5-20-02

VITRIFICATION OXIDE MASS BALANCE
RON

BADGE#: 0783

MON MAY 20, 2002
23:32:46

*** Main Mix Tank (MMT) Composition from ICP Measurements ***

Data File: RB76_MMT_GF_ICP.DAT
ICP Desc:
Volume (l): 16357.00
Density (g/ml): 1.3600
Total Oxides (kg): 7743.452

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 10236.33 | Al2O3 | 430.1902 | 5.5555 |
| B | 3.219334 | 12751.33 | B2O3 | 913.1964 | 11.7931 |
| Ba | 1.116464 | 0.00 | BaO | 0.0000 | 0.0000 |
| Ca | 1.399052 | 162.33 | CaO | 5.0522 | 0.0652 |
| Ce | 1.171269 | 0.00 | Ce2O3 | 0.0000 | 0.0000 |
| Cr | 1.461401 | 0.00 | Cr2O3 | 0.0000 | 0.0000 |
| Cs | 1.060173 | 0.00 | Cs2O | 0.0000 | 0.0000 |
| Cu | 1.251692 | 0.00 | CuO | 0.0000 | 0.0000 |
| Fe | 1.429584 | 32284.00 | Fe2O3 | 1026.6906 | 13.2588 |
| K | 1.204537 | 13729.67 | K2O | 367.8940 | 4.7510 |
| La | 1.172721 | 0.00 | La2O3 | 0.0000 | 0.0000 |
| Li | 2.152139 | 6830.00 | Li2O | 326.9893 | 4.2228 |
| Mg | 1.658054 | 3203.33 | MgO | 118.1526 | 1.5258 |
| Mn | 1.291128 | 2392.33 | MnO | 68.7122 | 0.8874 |
| Mo | 1.500125 | 0.00 | MoO3 | 0.0000 | 0.0000 |
| Na | 1.347862 | 6474.33 | Na2O | 194.1257 | 2.5070 |
| Nd | 1.166400 | 0.00 | Nd2O3 | 0.0000 | 0.0000 |
| Ni | 1.272470 | 0.00 | NiO | 0.0000 | 0.0000 |
| P | 2.290963 | 1717.33 | P2O5 | 87.5216 | 1.1303 |
| Pr | 1.170300 | 0.00 | Pr6O11 | 0.0000 | 0.0000 |
| S | 2.496631 | 0.00 | SO3 | 0.0000 | 0.0000 |
| Si | 2.138930 | 84356.00 | SiO2 | 4013.7944 | 51.8347 |
| Sr | 1.182538 | 0.00 | SrO | 0.0000 | 0.0000 |
| Th | 1.137931 | 0.00 | ThO2 | 0.0000 | 0.0000 |
| Ti | 1.665027 | 1926.00 | TiO2 | 71.3379 | 0.9213 |
| U | 1.204267 | 0.00 | UO3 | 0.0000 | 0.0000 |
| Zn | 1.244631 | 0.00 | ZnO | 0.0000 | 0.0000 |
| Zr | 1.350669 | 3987.00 | ZrO2 | 119.7947 | 1.5470 |

VITRIFICATION OXIDE MASS BALANCE
RON

BADGE#: 0783

MON MAY 20, 2002
23:32:46

*** Concentrator Feed Makeup Tank (CFMUT) Composition from ICP Measurements ***

Data File: HSD76_CFMT_WI_ICP.DAT
ICP Desc:
Volume (l): 14640.60
Density (g/ml): 1.2100
Total Oxides (kg): 1900.454

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 4650.00 | Al2O3 | 155.6219 | 8.1887 |
| B | 3.219334 | 5352.22 | B2O3 | 305.2421 | 16.0615 |
| Ba | 1.116464 | 0.00 | BaO | 0.0000 | 0.0000 |
| Ca | 1.399052 | 2141.11 | CaO | 53.0661 | 2.7923 |
| Ce | 1.171269 | 0.00 | Ce2O3 | 0.0000 | 0.0000 |
| Cr | 1.461401 | 0.00 | Cr2O3 | 0.0000 | 0.0000 |
| Cs | 1.060173 | 0.00 | Cs2O | 0.0000 | 0.0000 |
| Cu | 1.251692 | 0.00 | CuO | 0.0000 | 0.0000 |
| Fe | 1.429584 | 4616.67 | Fe2O3 | 116.9183 | 6.1521 |
| K | 1.204537 | 5368.89 | K2O | 114.5642 | 6.0283 |
| La | 1.172721 | 0.00 | La2O3 | 0.0000 | 0.0000 |
| Li | 2.152139 | 1150.00 | Li2O | 43.8442 | 2.3070 |
| Mg | 1.658054 | 619.22 | MgO | 18.1882 | 0.9570 |
| Mn | 1.291128 | 289.78 | MnO | 6.6279 | 0.3488 |
| Mo | 1.500125 | 0.00 | MoO3 | 0.0000 | 0.0000 |
| Na | 1.347862 | 25855.55 | Na2O | 617.3672 | 32.4852 |
| Nd | 1.166400 | 0.00 | Nd2O3 | 0.0000 | 0.0000 |
| Ni | 1.272470 | 0.00 | NiO | 0.0000 | 0.0000 |
| P | 2.290963 | 569.89 | P2O5 | 23.1288 | 1.2170 |
| Pr | 1.170300 | 0.00 | Pr6O11 | 0.0000 | 0.0000 |
| S | 2.496631 | 0.00 | SO3 | 0.0000 | 0.0000 |
| Si | 2.138930 | 7486.67 | SiO2 | 283.6804 | 14.9270 |
| Sr | 1.182538 | 0.00 | SrO | 0.0000 | 0.0000 |
| Th | 1.137931 | 1224.44 | ThO2 | 24.6831 | 1.2988 |
| Ti | 1.665027 | 177.33 | TiO2 | 5.2307 | 0.2752 |
| U | 1.204267 | 5747.78 | UO3 | 122.6216 | 6.4522 |
| Zn | 1.244631 | 0.00 | ZnO | 0.0000 | 0.0000 |
| Zr | 1.350669 | 404.11 | ZrO2 | 9.6693 | 0.5088 |

VITRIFICATION OXIDE MASS BALANCE
RON

BADGE#: 0783

MON MAY 20, 2002
23:32:46

*** Target Glass Composition ***

Data File: FEED.DAT
Number of Oxides: 28
Desired Total Oxides (kg): 10000.000

| Oxide Name | Target Wt % | Target Wt (kg) |
|---|---|---|
| Al2O3 | 6.000 | 600.000 |
| B2O3 | 12.890 | 1289.000 |
| BaO | 0.000 | 0.000 |
| CaO | 0.480 | 48.000 |
| Ce2O3 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 |
| Cs2O | 0.080 | 8.000 |
| CuO | 0.000 | 0.000 |
| Fe2O3 | 12.020 | 1202.000 |
| K2O | 5.000 | 500.000 |
| La2O3 | 0.000 | 0.000 |
| Li2O | 3.710 | 371.000 |
| MgO | 0.890 | 89.000 |
| MnO | 0.820 | 82.000 |
| MoO3 | 0.000 | 0.000 |
| Na2O | 8.000 | 800.000 |
| Nd2O3 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 |
| P2O5 | 1.200 | 120.000 |
| Pr6O11 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 |
| SiO2 | 40.980 | 4098.000 |
| SrO | 0.000 | 0.000 |
| ThO2 | 3.560 | 356.000 |
| TiO2 | 0.800 | 80.000 |
| UO3 | 0.630 | 63.000 |
| ZnO | 0.000 | 0.000 |
| ZrO2 | 1.320 | 132.000 |

# Glass Former to CFMT Transfer

# APPENDIX C
## Transfer Data Sheet
(Page 1 of 1)

Section 1

Slurry Batch # 76

65D03 glassformer addition to CFMT

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | Mix Tank | | | CFMT | | | |
| Tank Number | 65-D-03 | | | 63-V-001 | | | |
| Date | 3/15/02 | | | 5-22-02 | | | |
| Time | 15:15 | | | 0905 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) Avg. 58.73 | 58.6 | 58.9 | 58.7 | 48.3 | 48.3 | 47.8 | Avg. 48.1 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) Avg. 1.322 | 1.322 | 1.322 | 1.324 | 1.643 | 1.602 | 1.579 | Avg. 1.608 |
| Temp. (°C) | 80°F / 26.6°C | | | 40.5°C | | | |
| Average Volume (L) | 8,740 | | | 8633.5 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred Whole Tank + flush Water as needed. 9,000 liters approx.

SAE Signature V.K. SHARMA Date 5/21/02

Shift Engineer Signature Date 5-22-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | Mix Tank | | | CFMT | | | |
| Tank Number | 65-D-03 | | | 63-V-001 | | | |
| Date | | | | 5-22-02 | | | |
| Time | N/A | | | 1320 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 5/21/02 | | 104.4 | 104.7 | 104.0 | Avg. 104.4 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | | | 1.464 | 1.413 | 1.388 | Avg. 1.421 |
| Temp. (°C) | | | | 26°C | | | |
| Average Volume (L) | | | | | | | |

Total Flush Water (L) 6176

VOSS Signature Date 5-22-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 7C

65D02- Glass Former addition to CFMT

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | M.X Tank | | | CFMT | | | |
| Tank Number | 65-D-02 | | | 63-V-001 | | | |
| Date | 5-21-02 | | | 5-21-02 | | | |
| Time | 0151 | | | 0152 | | | |
| LIX* (Inches) AGITATOR OFF 52.6 (1, 2, or 3 readings) | ~~28.0~~ 28.0 5/21 ~~27.9~~ 52.6 | ~~27.9~~ 52.6 | 52.6 | 28.0 | 27.9 | 27.6 | 27.8 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) 1.393 | 1.392 | 1.392 | 1.394 | 1.589 | 1.539 | 1.508 | 1.546 |
| Temp. (°C) | 25°C | | | 29.0°C | | | |
| Average Volume (L) | 7747.2 | | | 4892.9 L | | | |

* Instantaneous Readings

Section 2

Volume to be transferred ~8000L (whole tank, use as much flush water as necessary) 5-20-02

SAE Signature [signature] Date 5-20-02

Shift Engineer Signature [signature] Date 5-21-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | M.X Tank | | | CFMT | | | |
| Tank Number | 65-D-02 | | | 63-V-001 | | | |
| Date | | | | 5-21-02 | | | |
| Time | | | | 0300 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | | | 74.6 | 74.8 | 74.2 | 74.6 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | | | 1.437 | 1.387 | 1.352 | 1.39 |
| Temp. (°C) | [illegible] | | | 25 | | | |
| Average Volume (L) | 5-20-02 | | | 13516.6 | | | |

Total Flush Water (L) 282 (L)

VOSS Signature [signature] Date 5-21-02

Section 1

Slurry Batch # 76

ADDITION OF WATER TO HEEL

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | MIX TANK MP 5-31-02 | CFMT |
| Tank Number | 65-D-002 3 | 63-V-001 |
| Date | 5/31/02 | 5/31/02 |
| Time | 1110 | 1110 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | | 5" N/A N/A |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A HSD 5/31/02 | 1.43 N/A N/A |
| Temp. (°C) | | |
| Average Volume (L) | 5-31-02 2000 L HSD | 965.6 L |

* Instantaneous Readings

Section 2

Volume to be transferred ~~2500 L~~ 2500 MP 3-18-03 ~~2000 L~~ 5-31-02 2500 L for R. PALMER per Telcon 1348 5-31-02

SAE Signature [signature] Date 5-31-02

Shift Engineer Signature [signature] Date 5-31-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | MIX TANK | CFMT |
| Tank Number | 65-D-03 | 63-V-001 |
| Date | | 5-31-02 |
| Time | | 1402 |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A HSD | ~~92~~ 23.3 ~~92~~ 23.5 ~~93~~ 22.9 ~~92.5~~ LK 5/31/02 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 5/31/02 | ~~1.46~~ 1.176 ~~1.48~~ 1.150 ~~1.40~~ 1.148 ~~1.44~~ LK 5-31-02 |
| Temp. (°C) | | 26 °C |
| Average Volume (L) | | 4045.3 |

Total Flush Water (L) 850 L

VOSS Signature [signature] Date 5-31-02

This water was added to further dilute the heel, minimizing the amount of waste remaining for the next (final) Batch (#77). [signature] 6-3-02

# Sugar Addition & Transfer to CFMT

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 76
Sugar Addition

| | Send Tank BEFORE | Receipt Tank BEFORE | |
|---|---|---|---|
| Tank Name | SHIM MIX TANK | CFMT | |
| Tank Number | 65-D-04 | 63-V-001 | |
| Date | 5-28-02 | 5-28-02 | |
| Time | 1120 | 1131 | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 35.79 35.79 35.79 Ave = 35.79 | 82.0 82.2 81.5 | Ave. = 81.9 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.336 1.336 1.336 Ave = 1.336 | 1.590 1.415 1.536 | Ave. = 1.513 |
| Temp. (°C) | 21 | 28.5 | |
| Average Volume (L) | 1230.5 | 14861.8 | |

* Instantaneous Readings

Section 2

Volume to be transferred Transfer entire contant of Tank 65-D-04

SAE Signature Gary Lin Date 5/28/02

Shift Engineer Signature [illegible] Date 5-28-02

1.500 @ 88.6" CFMT

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | |
|---|---|---|---|
| Tank Name | SHIM MIX TANK | CFMT | |
| Tank Number | 65-D-04 | 63-V-001 | |
| Date | | 5-28-02 | |
| Time | NA | 1205 | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | KR 5/28/02 | 90.2 90.4 89.7 | Ave = 90.1 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1.566 1.382 1.516 | Ave = 1.488 |
| Temp. (°C) | | 28.2 | |
| Average Volume (L) | | 16372.7 | |

Total Flush Water (L) 150

VOSS Signature [illegible] Date 5-28-02

SUGAR CALCULATION

BATCH NUMBER 76

WGF DATA

| | | |
|---|---|---|
| NO3 | 120333 | ppm |
| TOC | 355 | ppm |
| Zr | 3771 | ppm |
| CFMT VOL. | 19007.7 | LITERS |
| CFMT DEN | 1.42 | g/mL |

MEASURABLE NITRATE CALCULATION 3250.19 kg NO3

NO3 FROM ZIRCONYL NITRATE 138.46 kg NO3

TOTAL NITRATE 3388.64 kg NO3

MEASURED TOC 9.59 kg TOC

ASSUME IFO=3 AND TS=0.55

TOC TO BE ADDED 498.71 kg TOC

SUGAR TO BE ADDED 1183.81 kg SUGAR

ASSUMING A 70% SOLUTION IN WATER, ALSO ADD 507.35 L WATER

5-25-02

Cold Chemical Feed Batch Preparation

Slurry Batch # 76

Tank # D-04 Description Sugar Shim SAE R. A. Palmer Date 5-25-02

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Demin Water | 507 ± 5 L | 507 L. | N/A | N/A | J Weed |
| Sugar (Sucrose) | 1184 kg ± 12 | 1184.1 kg | C2140 | 58279/1.3 | J. Weed |

Nothing further

R A Palmer

5-25-02

VOSS Signature [signature] Date 5/25/02 SAE Review [signature] Date 5/28/02

WV-2756, Rev. 1

# Sugared Feed Analyses

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** ☐ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page 1 of 10*

***Login Date:*** *28-May-02* ***VAST Sample ID:*** *02-0870*

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | SF (ACT #25C) | **Customer's ID:** | 76SF1-76SF3, 76SF8 |
| **Collected:** | 5/28/2002 1315 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| TOC | 2.4E+4 | ug/g | | Rep1 (B76SF#1): U1 |
| TOC | 2.3E+4 | ug/g | | Rep2 (B76SF#1DUP): U1 |
| TOC | 2.1E+4 | ug/g | | Rep3 (B76SF#2): U1 |
| TOC | 2.1E+4 | ug/g | | Rep4 (B76SF#2DUP): U1 |
| TOC | 2.1E+4 | ug/g | | Rep5 (B76SF#3): U1 |
| TOC | 2.1E+4 | ug/g | | Rep6 (B76SF#3DUP): U1 |
| NO3 | 1.47E+5 | ug/g | | Rep1 (B76SF#1): U1 |
| NO3 | 1.35E+5 | ug/g | | Rep2 (B76SF#1DUP): U1 |
| NO3 | 1.29E+5 | ug/g | | Rep3 (B76SF#2): U1 |
| NO3 | 1.27E+5 | ug/g | | Rep4 (B76SF#2DUP): U1 |
| NO3 | 1.28E+5 | ug/g | | Rep5 (B76SF#3): U1 |
| NO3 | 1.26E+5 | ug/g | | Rep6 (B76SF#3DUP): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

William B Shyder — **Name**

05-29-02 1645 — **Date & Time**

***Report Date:*** *29-May-02*

VIT

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** [N/a] **FAXed to Recipients** [✓] **Copied for File** [✓]

*package page* 1 *of* 2

***Login Date:*** ***28-May-02*** ***VAST Sample ID:*** ***02-0872***

| | |
|---|---|
| **Sample Point:** | CFMT |
| **Sample Type:** | SF (ACT #25C) |
| **Collected:** | 5/28/2002 1315 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | 76SF5- 76SF7 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| pH | 6.5 (28 °C) | su | 0.1 | Rep1 (B76SF #05): no flags |
| pH | 6.6 (28 °C) | su | 0.1 | Rep2 (B76SF #06): no flags |
| pH | 6.5 (28 °C) | su | 0.1 | Rep3 (B76SF #07): no flags |
| Tot Solids | 61.54 | % | | Rep1 (B76 SF #5): U1 |
| Tot Solids | 66.02 | % | | Rep2 (B76 SF #6): U1 |
| Tot Solids | 62.18 | % | | Rep3 (B76 SF #7): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

| Approved By | |
|---|---|
| Jacqueline D. Hill | 5/30/02 1432 |
| **Name** | **Date & Time** |

***Report Date:*** *30-May-02*

02-0870 WEST VALLEY DEMONSTRATION PROJECT
ANALYTICAL REQUEST

Page 1 of 1

VAST Sample ID: ~~02-0872~~ 5/28/02 Login Date: 5/28/02 05-29-02

**To be Completed by the Customer**

Customer Department: HLW Completion

Sample Point: CFMT

Sample Type (check one):

☒liquid ☐solid ☐powder/dust

☐ ☐smear ☐coupon ☐other:

Customer's Sample ID No.: 76SF1 - 76SF3, 76SF7 - 76SF8

Collection Date/Time: 5/28/02 1315

Collection Location: MNOA

Sample Collector: [signature]

Report Recipients: fax to 4159; SAE (MS-48)

Is this sample suspected to contain radioactive material? ___no __X__ yes

If yes, is the gross activity suspected to be > 5E-03 µCi/mL or > 5E-03 µCi/g?
___no __X__ yes

If dose rate is >10mR/hr w/c or >100 mR/hr w/o, contact lab management prior to delivery of sample

Survey Results (To be completed by Radiation Protection as applicable):

___ cpm α direct * ___ cpm βγ direct *

___ mR/hr w/c ___ mR/hr w/o

RP Tech: ___ Date: ___

* on contact with sample material

Sample Charge Number: WH1210006

Hazards (acid, base, solvent, Cr, Ba, etc.):

___no __x__ yes - list: Acid

Sample Disposal Instructions (check appropriate):

☐ return to customer
☐ upon completion of analyses
☒ with customer approval
☐ other:

Requested Due Date: 05/28/02
(Date Only)

Is the sampling designated HLW? ___yes __x__ no ___n/a

If yes or no, is the activity identified on the WVDP HLW Items and Activities List? __X__ yes ___no

If yes, Is the HLW Screening Form Attached? ___yes __x__ no

Comments:
Notify SAE when complete. Include copy of this form with results. Samples 7-8 are spares.

Supervisor / Manager Signature: [signature]

To be filled in after sample delivery to the laboratory:

Delivered by: SGN Date: 5/28/02 Time: ~~02~~ 1430 Received by: [signature] Date: 5/28/02 Time: 1558

**ANALYSES TO BE COMPLETED**

List below the analyses to be performed, the desired units, and any applicable notes (to duplicate the analysis, etc.). Completed analyses will be reported to the Report Recipient on a separate form.

| Analysis | Units | Note | Analysis | Units | Note | Analysis | Units | Note |
|---|---|---|---|---|---|---|---|---|
| TOC (with dups) | µg/g | ✓ | | | | | | |
| NO3 (with dups) | µg/g | ✓ | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

# Waste + Glass Formers SAMPSTAT

```
##################################################################################
##################################################################################
##################################################################################
##        SSSSSS    AAAAA    MMM    MMM  PPPPPPP    SSSSSS  TTTTTTTT   AAAAA  ##
##      SS        AA   AA   MM M   M MM  PP    PP  SS          TT     AA   AA  ##
##     SS        AA   AA   MM  M    MM  PP    PP  SS          TT     AA   AA  ##
##     SSSSS    AAAAAAA   MM       MM  PPPPPP     SSSSS      TT     AAAAAAA   ##
##        SS   AA   AA   MM       MM  PP             SS     TT     AA   AA    ##
##       SS   AA   AA   MM       MM  PP             SS     TT     AA   AA     ##
## SSSSSS    AA   AA   MM       MM  PP        SSSSSS      TT     AA   AA     ##
##################################################################################
##################################################################################
##########                                                                #########
##########       WVNS   VITRIFICATION   LAB   SAMPLE   STATISTICS        #########
##########                          (Version 2.0)                         #########
##################################################################################
##################################################################################
##################################################################################
##########                                                                #########
##########   Statistically analyzes each component in a batch of waste   #########
##########   samples from a mixing tank, deletes the outliers, and       #########
##########   computes a two-sided, 95% confidence limit.  The true mean  #########
##########   of an infinite population of samples lies in the range of   #########
##########   the mean +/- the percent error of the sample mean.           #########
##########                                                                #########
##################################################################################
##################################################################################
##################################################################################
##########                                                                #########
##########   SAMPLE DATA IDS:  vks76wi                                    #########
##########   SAMPLE DATA FILE: VKS76                                      #########
##########   SAT MAY 25, 2002                                 08:27:47    #########
##########   SYSTEM: ALPHA1                                               #########
##########                                                                #########
##################################################################################
##################################################################################
##################################################################################
```

VK SHARMA

5/25/02

08:30

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: vks76wi
SAMPLE FILE: VKS76

SAT MAY 25, 2002
08:27:47
DENSITY (g/ml): N/A

*** LAB SAMPLE DATA ***

Element Element MP 3-18-03

| Element | Sample Data (ug/g) | | | | *-Denotes Outlier |
|---|---|---|---|---|---|
| Al | 12200.00 | 12200.00 | 13400.00 | 11900.00 | 12500.00 |
| | 12300.00 | 12300.00 | 12100.00 | 12200.00 | |
| B | 14800.00 | 14900.00 | 16900.00 | 15100.00 | 15900.00 |
| | 15500.00 | 15300.00 | 15100.00 | 15300.00 | |
| Ca | 1330.00 | 1320.00 | 1490.00 | 1310.00 | 1400.00 |
| | 1340.00 | 1340.00 | 1320.00 | 1350.00 | |
| Fe | 30000.00 | 30400.00 | 33400.00 | 30300.00 | 31600.00 |
| | 30100.00 | 30600.00 | 29800.00 | 30800.00 | |
| K | 15500.00 | 15200.00 | 17300.00 | 15400.00 | 16800.00 |
| | 16100.00 | 16200.00 | 15800.00 | 16100.00 | |
| Li | 8690.00 | 8630.00 | 7470.00 | 6590.00 | 6970.00 |
| | 6820.00 | 6750.00 | 6660.00 | 6780.00 | |
| Mg | 3210.00 | 3230.00 | 3600.00 | 3230.00 | 3410.00 |
| | 3300.00 | 3300.00 | 3240.00 | 3340.00 | |
| Mn | 2340.00 | 2510.00 | 2470.00 | 2280.00 | 2470.00 |
| | 2160.00 | 2320.00 | 2310.00 | 2340.00 | |
| Na | 21500.00 | 21300.00 | 23700.00 | 20900.00 | 22400.00 |
| | 22000.00 | 21600.00 | 21200.00 | 21900.00 | |
| P | 1960.00 | 1840.00 | 2240.00 | 2000.00 | 1920.00 |
| | 1890.00 | 1970.00 | 1950.00 | 2040.00 | |
| Si | 75300.00 | 77600.00 | 84700.00 | 75900.00 | 80000.00 |
| | 78500.00 | 77500.00 | 77400.00 | 77800.00 | |
| Th | 653.00 | 672.00 | 644.00 | 676.00 | 749.00 |
| | 588.00 | 712.00 | 752.00 | 687.00 | |
| Ti | 1770.00 | 1710.00 | 1790.00 | 1750.00 | 1780.00 |
| | 1780.00 | 1800.00 | 1780.00 | 1760.00 | |
| U | 3500.00 | 3520.00 | 4430.00 | 3540.00 | 3730.00 |
| | 3430.00 | 3560.00 | 3610.00 | 3590.00 | |
| Zr | 3670.00 | 3730.00 | 4110.00 | 3670.00 | 3850.00 |
| | 3750.00 | 3740.00 | 3690.00 | 3730.00 | |

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: vks76wi
SAMPLE FILE: VKS76

SAT MAY 25, 2002
08:27:47
DENSITY (g/ml): N/A

*** LAB SAMPLE STATISTICS ***

| Elem | N | OL | Mean | Maximum | Minimum | Std Dev | Conf Limit | %Error |
|---|---|---|---|---|---|---|---|---|
| Al | 09 | 00 | 12344.44 | 13400.00 | 11900.00 | 427.53 | 328.62 | 2.66 |
| B | 09 | 00 | 15422.22 | 16900.00 | 14800.00 | 643.77 | 494.85 | 3.21 |
| Ca | 09 | 00 | 1355.56 | 1490.00 | 1310.00 | 56.81 | 43.67 | 3.22 |
| Fe | 09 | 00 | 30777.78 | 33400.00 | 29800.00 | 1116.67 | 858.35 | 2.79 |
| K | 09 | 00 | 16044.44 | 17300.00 | 15200.00 | 676.59 | 520.08 | 3.24 |
| Li | 09 | 00 | 7262.22 | 8690.00 | 6590.00 | 832.39 | 639.83 | 8.81 |
| Mg | 09 | 00 | 3317.78 | 3600.00 | 3210.00 | 123.67 | 95.06 | 2.87 |
| Mn | 09 | 00 | 2355.56 | 2510.00 | 2160.00 | 110.58 | 85.00 | 3.61 |
| Na | 09 | 00 | 21833.33 | 23700.00 | 20900.00 | 833.67 | 640.81 | 2.94 |
| P | 09 | 00 | 1978.89 | 2240.00 | 1840.00 | 114.18 | 87.76 | 4.43 |
| Si | 09 | 00 | 78300.00 | 84700.00 | 75300.00 | 2757.72 | 2119.77 | 2.71 |
| Th | 09 | 00 | 681.44 | 752.00 | 588.00 | 51.92 | 39.91 | 5.86 |
| Ti | 09 | 00 | 1768.89 | 1800.00 | 1710.00 | 26.67 | 20.50 | 1.16 |
| U | 09 | 00 | 3656.67 | 4430.00 | 3430.00 | 301.58 | 231.81 | 6.34 |
| Zr | 09 | 00 | 3771.11 | 4110.00 | 3670.00 | 138.24 | 106.26 | 2.82 |

N = Number of data samples.
OL = Number of outlier samples.
N - OL = Number of samples used for statistics.

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: vks76wi
SAMPLE FILE: VKS76

SAT MAY 25, 2002
08:27:47
DENSITY (g/ml): N/A

*** Oxide Data Generated From Mean Samples ***

ICP Desc:
Volume (l): 19007.70
Density (g/ml): 1.4210
Total Oxides (kg): 10183.338

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 12344.44 | Al2O3 | 629.8959 | 6.1856 |
| B | 3.219334 | 15422.22 | B2O3 | 1341.0242 | 13.1688 |
| Ca | 1.399052 | 1355.56 | CaO | 51.2242 | 0.5030 |
| Fe | 1.429584 | 30777.78 | Fe2O3 | 1188.4216 | 11.6703 |
| K | 1.204537 | 16044.44 | K2O | 521.9976 | 5.1260 |
| Li | 2.152139 | 7262.22 | Li2O | 422.1468 | 4.1455 |
| Mg | 1.658054 | 3317.78 | MgO | 148.5832 | 1.4591 |
| Mn | 1.291128 | 2355.56 | MnO | 82.1460 | 0.8067 |
| Na | 1.347862 | 21833.33 | Na2O | 794.8572 | 7.8055 |
| P | 2.290963 | 1978.89 | P2O5 | 122.4512 | 1.2025 |
| Si | 2.138930 | 78300.00 | SiO2 | 4523.5771 | 44.4214 |
| Th | 1.137931 | 681.44 | ThO2 | 20.9445 | 0.2057 |
| Ti | 1.665027 | 1768.89 | TiO2 | 79.5510 | 0.7812 |
| U | 1.204267 | 3656.67 | UO3 | 118.9411 | 1.1680 |
| Zr | 1.350669 | 3771.11 | ZrO2 | 137.5757 | 1.3510 |

# MFHT Oxide Loading and IFO

# IFO Calculation

Batch 76

Nitrate and TOC data from A&PC VAST report 02-0870
Total Solids data from A&PC Vast report 02-0872

CFMT Level:(WGF) 14861.8 Density: 1.513

CFMT Level:(Suger feed) 16372.7 Density: 1.488

| | NO3, ug/g | TOC, ug/g | Total Solids | Zirconium |
|---|---|---|---|---|
| 1 | 147000 | 24000 | 61.54 | 3670 |
| 2 | 135000 | 23000 | 66.02 | 3730 |
| 3 | 129000 | 21000 | 62.18 | 4110 |
| 4 | 127000 | 21000 | | 3670 |
| 5 | 128000 | 21000 | | 3850 |
| 6 | 126000 | 21000 | | 3750 |
| 7 | | | | 3740 |
| 8 | | | | 3690 |
| 9 | | | | 3730 |
| Averag | 132000 | 21833.3333 | 63.24666667 | 3771.111 |

Amount of TOC in CFMT:= Avg. TOC * Density * Volume = 531.916 Kg. TOC

Amount of fee NO3 in CFMT = Avg. NO3 * Density * Volume = 3215.860 Kg. NO3

Amount of NO3 bound with Zirconyl Nitrate, ZrO(NO3)2 =
Avg. Zr * Density * Volume * (231.24/91.22) * (2*62.00/231.24) = 115.269 Kg. NO3
(At. Wt.. for Zr = 91.22, N = 14, O = 16)

Total amount of NO3 = NO3 in CFMT + NO3 bound with Zr = 3331.129

IFO = NO3 * (100- TS)/TOC * 100

IFO = 2.302

Prepared by: H. S. [illegible]

Date: 5/30/02

**APPENDIX H**
**GLASS YIELD CALCULATION**
(Page 1 of 1)

After Transfer of diluted heel,

SLURRY BATCH # 76

INITIAL MFHT OXIDE INVENTORY:

$V_{MFHT,\ I}$ = 16 352.6 L

$(GLASS\ YIELD)_{MFHT,i}$ = 0.5903 KG/L (FROM PRIOR BATCH CALCULATION)

$$OXIDE_{MFHT,i} = V_{MFHT,i}\ (GLASS\ YIELD)_{MFHT,i}$$

$OXIDE_{MFHT,\ I}$ = 9653 KG

OXIDES ADDED, FROM CFMT:

$OXIDE_{CFMT,\ I}$ = 632 KG (remaining after first two transfers) (FROM SAMPSTAT OUTPUT, "TOTAL OXIDES IN TANK," + 0.4582 * $Li_2O$ PRIOR TO TRANSFER)

$V_{CFMT,\ I}$ = 4045.3 L (after demin water addition for dilution)

$$(GLASS\ YIELD)_{CFMT} = \frac{OXIDE_{CFMT,i}}{V_{CFMT,i}}$$

$(GLASS\ YIELD)_{CFMT}$ = 0.1562 KG/L[1]

$V_{CFMT,\ f}$ = 1181.7 L

$$OXIDE\ TRANSFERRED = (GLASS\ YIELD)_{CFMT}\ (V_{CFMT,i} - V_{CFMT,f})$$

OXIDE TRANSFERRED = 447 KG

FINAL MFHT GLASS YIELD:

$V_{MFHT,\ f}$ = 19,218.8 L

$$OXIDE_{MFHT,f} = OXIDE_{MFHT,i} + OXIDE\ TRANSFERRED$$

$$(GLASS\ YIELD)_{MFHT,f} = \frac{OXIDE_{MFHT,f}}{V_{MFHT,f}}$$

$(GLASS\ YIELD)_{MFHT,\ f}$ = 0.526 KG/L

R A Palmer — 6-3-02

SAE — DATE

1 For second transfer to MFHT, recompute to include oxides transferred in first transfer and using current volume.

**APPENDIX H**
**GLASS YIELD CALCULATION**
(Page 1 of 1)

SLURRY BATCH # 76

AFTER 2ND CFMT → MFHT TRANSFER

INITIAL MFHT OXIDE INVENTORY:

$V_{MFHT,\ I}$ = 8842.6 L

$(GLASS\ YIELD)_{MFHT,i}$ = 0.5498 KG/L (FROM PRIOR BATCH CALCULATION)

$$OXIDE_{MFHT,i} = V_{MFHT,i}\ (GLASS\ YIELD)_{MFHT,i}$$

$OXIDE_{MFHT,\ I}$ = 4861.7 KG

OXIDES ADDED, FROM CFMT:

$OXIDE_{CFMT,\ I}$ = N/A KG (FROM SAMPSTAT OUTPUT, "TOTAL OXIDES IN TANK," + 0.4582 * $Li_2O$ PRIOR TO TRANSFER)

$V_{CFMT,\ I}$ = 10623.6 L

$$(GLASS\ YIELD)_{CFMT} = \frac{OXIDE_{CFMT,i}}{V_{CFMT,i}}$$

$(GLASS\ YIELD)_{CFMT}$ = 0.6338 KG/L[1]

$V_{CFMT,\ f}$ = 1071.3 L

$$OXIDE\ TRANSFERRED = (GLASS\ YIELD)_{CFMT}\ (V_{CFMT,i} - V_{CFMT,f})$$

OXIDE TRANSFERRED = 6054.2 KG

FINAL MFHT GLASS YIELD:

$V_{MFHT,\ f}$ = 18493.2 L

$$OXIDE_{MFHT,f} = OXIDE_{MFHT,i} + OXIDE\ TRANSFERRED$$

$$(GLASS\ YIELD)_{MFHT,f} = \frac{OXIDE_{MFHT,f}}{V_{MFHT,f}}$$

$(GLASS\ YIELD)_{MFHT,\ f}$ = 0.5903 KG/L

H. S. Deringer — SAE

5/31/02 — DATE

1 For second transfer to MFHT, recompute to include oxides transferred in first transfer and using current volume.

**APPENDIX H**
**GLASS YIELD CALCULATION**
(Page 1 of 1)

SLURRY BATCH # 76

AFTER 1st CFMT → MFHT TRANSFER

INITIAL MFHT OXIDE INVENTORY:

$V_{MFHT,\ I}$ = 7681.6 L

$(GLASS\ YIELD)_{MFHT,i}$ = 0.468 KG/L (FROM PRIOR BATCH CALCULATION)

$$OXIDE_{MFHT,i} = V_{MFHT,i}\ (GLASS\ YIELD)_{MFHT,i}$$

$OXIDE_{MFHT,\ I}$ = 3595 KG

OXIDES ADDED, FROM CFMT:

$OXIDE_{CFMT,\ I}$ = 10376.8 KG (FROM SAMPSTAT OUTPUT, "TOTAL OXIDES IN TANK," + 0.4582 * $Li_2O$ PRIOR TO TRANSFER)

$V_{CFMT,\ I}$ = 16372.7 L

$$(GLASS\ YIELD)_{CFMT} = \frac{OXIDE_{CFMT,i}}{V_{CFMT,i}}$$

$(GLASS\ YIELD)_{CFMT}$ = 0.6338 KG/L[1]

$V_{CFMT,\ f}$ = 10549.9 L

$$OXIDE\ TRANSFERRED = (GLASS\ YIELD)_{CFMT}\ (V_{CFMT,i} - V_{CFMT,f})$$

OXIDE TRANSFERRED = 3690.5 KG

FINAL MFHT GLASS YIELD:

$V_{MFHT,\ f}$ = 13250.7 L

$$OXIDE_{MFHT,f} = OXIDE_{MFHT,i} + OXIDE\ TRANSFERRED$$

$$(GLASS\ YIELD)_{MFHT,f} = \frac{OXIDE_{MFHT,f}}{V_{MFHT,f}}$$

$(GLASS\ YIELD)_{MFHT,\ f}$ = 0.5498 KG/L

H. S. [signature] 5/29/02
SAE DATE

1 For second transfer to MFHT, recompute to include oxides transferred in first transfer and using current volume.

# WEST VALLEY DEMONSTRATION PROJECT

# VITRIFICATION FEED DATA PACKAGE

## BATCH #77

## PART B

JUNE 5, 2002

# Table of Contents

Vitrification Feed Data Package
(Supporting Data)

Part B

Batch #77

Table of Contents


| | # of Pages |
|---|---|
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| Completion Review Sign-off Sheet | 1 Page |
| Slurry Traveler | 5 Pages |
| SBS to CFMT Transfer | 1 Page |
| Sodium Metasilicate Addition | 1 Page |
| 8D-4 and Other Flushes to CFMT Transfer | 10 Pages |
| CFMT Concentration | 8 Pages |
| Waste Initial Analyses | 12 Pages |
| Waste Initial SAMPSTAT/CHEMADD | 13 Pages |
| Glass Former Makeup | 3 Pages |
| Glass Former Analyses | 6 Pages |
| Glass Former SAMPSTAT, COLDCHEM, & MASSBAL | 13 Pages |
| Glass Former to CFMT Transfer | 1 Page |
| Sugar Addition & Transfer to CFMT | 3 Pages |
| Sugared Feed Analyses | 2 Pages |
| Waste + Glass Formers SAMPSTAT | 4 Pages |
| MFHT Oxide Loading and IFO | 4 Pages |
| Copies of Referenced Documents | 4 Pages |


SEE NOTE ON REVERSE

NOTE: Part A of this Feed Data Package contains those sections identified as "HLW" and are to be considered as a complete set.

Vitrification Feed Data Package
(High-Level Waste Sections Only)

Part A

Batch #77

Table of Contents


| | # of Pages |
|---|---|
| Signature Cards | 39 Pages |
| Completion Review Sign-off Sheet | 1 Page |
| Acceptance of Feed for Transfer to MFHT | 1 Page |
| Waste + Glass Former Analyses. | 10 Pages |
| Waste + Glass Former Species_Range & PCT_CHECK | 3 Pages |
| CFMT to MFHT Transfer | 1 Page |

# Summary

# Batch #77 Summary



Transfer 50-15A2 To CFMT 6-5-02

Transfer from SBS to 80-4 6-5-02

Completed 1st CFMT flush 6-16-02

Boil down CFMT to 27" level 6-16-02

Gave ~~TO~~ AR 77WH1-6 to Voss for MF 3-28-03

after CFMT flush 6-17-02

Gave Transfer Sheet for MFHT → CFMT transfer

and after transfer boil down sheet to Voss 6-17-02

Transfer 130 liter from Decon tank 65-0-08 to CFMT 6-17-02

Took 6 Samples after CFMT flush 6-19-02

SBS → CFMT Transfer 6/24/02

Received CFMT Boil down sheet 6/26/02

gave AR 77WH7-11 to Voss for after

MFHT → CFMT transfer 6/26/02

MFHT transferred to CFMT, received transfer sheet 6/27/02

Took 5 samples 77WH7-77WH11 after

MFHT → CFMT transfer 6/27/02

MF 3-28-03 CFMT boiled down to ~60", received

CFMT boil down sheet 7/3/02

Gave North Sump → CFMT transfer sheet, KE 7/3/02

MFHT → CFMT transfer Sheet, and CFMT

boil down sheet to Voss 7/3/02

Received MFHT → CFMT Transfer Sheet 7/9/02

Boil down complete 7-10-02

2nd MFHT → CFMT Transfer 7-10-02

Boil down complete 7-12-02

Batch #77 Summary (cont)

| | |
|---|---|
| 3rd MFHT → CFMT Transfer | 7-12-02 |
| Boildown complete | 7-16-02 |
| 1st 80-4 → CFMT Transfer | 7-16-02 |
| Metasilicate addition | 7-17-02 |
| Boil down complete | 7-17-02 |
| 2nd 80-4 → CFMT Transfer | 7-15-02 |
| WI Samples | 7-18-02 |
| Boildown complete | 7-22-02 |
| WI SAMPSTAT/CHEMADD | 7-22-02 |
| GF recipe to Ops | 7-22-02 |
| GF Samples | 7-24-02 |
| GF Analysis complete | 7-25-02 |
| GF → CFMT | 7-25-02 |
| WGF Samples | 7-25-02 |
| WGF Species Range & PCT CHECK | 7-30-02 |
| MP ~~Sugar~~ Sugar Addition 3-28-03 | 7-30-02 |
| SF Samples | 7-30-02 |
| CFMT → MFHT Transfer | 7-31-02 |
| MFHT dilution MP 3-28-03 | 8-13-02 |
| Final Glass ~~Pour~~ Pour | 8-14-02 |

[End of Vit.]

# Completion Review Sign-off Sheet

**APPENDIX B**
**Feed Data Package Completion Review Sign-Off Sheet**
(Page 1 of 1)

SLURRY BATCH IDENTIFICATION NUMBER 77

*This sheet is to be included in the front of the FDP Binder and shall be signed after all FDP actions have been completed.*

1. Satisfactory SAE FDP completion review.

(SAE) R A Palmer Date 10-2-02 [FDP Complete]
R. A. Palmer

2. Satisfactory QA FDP completion review.

(QA) Amy L Brown Date 10/04/02 [FDP Complete]
Amy L. Brown

# Slurry Traveler

77

Slurry Batch Identification Number ~~77~~ 78

3-28-03

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 01 | 1,2 | Transfer SBS content to CFMT. | 63-34, Appendix C | SAE N/A [signature] 7-18-02 1815 |
| 02 | 1,2 | Transfer LWTS content to CFMT. | 63-34, Appendix C | SAE [signature] 7-18-02 1815 |
| 03 | 1 | Transfer sodium meta silicate to CFMT | 63-34, Appendix C or E | SAE [signature] 7-18-02 1815 |
| 04 | 1,2 | Transfer North Sump to CFMT | 63-34, Appendix C | SAE N/A [signature] 7-18-02 1815 |
| 05 | 1,2 | Transfer 8D-2/8D-4 waste to CFMT. (WQR 1.1) | 63-34, Appendix C | SAE [signature] 7-18-02 1815 |
| 06 | 1 | CFMT sampling level, density, volume and analytical requirements are properly recorded for "WI" (WQR 1.1) | | SAE [signature] 7-18-02 1815 |
| 07 | | Sample transfer complete per SOP 63-22. (WQR 1.1) | | VOSS [signature] 7-18-02 2059 |
| 08 | | Using analytical results, determine required cold chemical additions. | Form WV-2756 | SAE [signature] 7/22/02 1310 |

1 Steps 01 through 05 can be done in any order but must be done prior to step 06.

2 Steps 01, 02, 04, and 05 are documented by signature after final transfer to the CFMT for the batch.

Slurry Batch Identification Number 77

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 09 | | Cold chemical feed batch sampling, level, density, volume and analytical requirements are properly recorded "GF" (WQR 1.1) | | SAE 7-24-02 0930 |
| 10 | | Sample transfer complete per SOP 65-18. (WQR 1.1) | | VOSS 7-25-02 1115 |
| 11 | | Execute codes SAMPSTAT COLDCHEM and MASSBAL. Verify current composition of cold chemical feed batch. **NOTE: The initial composition may have been changed if the initial verification of composition was unacceptable.** (WQR 1.1) | Programs' outputs, form WV-2756, and/or surveillance results. | SAE 7-25-02 1200 |

Slurry Batch Identification Number 77

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 12 | 1 | Verify CFMT concentration complete. | 63-34, Appendix D | SAE 7-23-02 0800 |
| 13 | | Transfer cold chemical feed batch to CFMT. | 63-34, Appendix C | SAE 7-25-02 1500 |
| 14 | | CFMT sampling level, density, volume and analytical requirements are properly recorded for "WGF" (WQR 1.1) | | SAE 7-25-02 1500 |
| 15 | | Sample transfer complete per SOP 63-22. | | VOSS 7-28-02 1300 |
| 16 | | Verify additional CFMT concentration complete. If no concentration is done, N/A this step. | 63-34, Appendix D | SAE N/A 7-26-02 1200 |
| 17 | | CFMT sampling level, density, volume and analytical requirements are properly recorded for "WGF". If sample not required, N/A this step. (WQR 1.1) | | SAE N/A 7-26-02 1200 |

1 Step 11 is documented by signature after final concentration for the batch before transfer of cold chemicals to the CFMT.

Slurry Batch Identification Number 77

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 18 | | Sample transfer complete per SOP 63-22. If sample not required, N/A this step. (WQR 1.1) | | VOSS 7-25-02 |
| 19 | | Using analytical results, execute codes SPECIES RANGE and PCT_CHECK and compare results with required model domain. | SPECIES_RANGE and PCT_CHECK output | PASS 7-30-02 SAE 0730<br>FAIL NA SAE |
| 20 | | Using analytical results, execute code PCTCHECK and compare results with required leach rate.<br>(WQR 1.1) | PCT_CHECK output | PASS 7-30-02 SAE 0730<br>FAIL NA SAE |

Slurry Batch Identification Number 77

FC1>

| STEP # | FOOTNOTE # | TASK DESCRIPTION | DOCUMENTATION SUPPORTING SIGNATURE | SIGNATURE/DATE/TIME |
|---|---|---|---|---|
| 21 | | Verify sugar solution makeup and addition to CFMT. | 63-34, Appendix C | SAE 7-30-02 0230 |
| 22 | | Verify Appendix F completed (all waste qualification prerequisites for transferring slurry from CFMT to MFHT have been completed) | 63-34, Appendix F | SAE 7-31-02 1000 |
| 23 | | If directed, perform a partial transfer of slurry feed batch to MFHT. If full transfer N/A this step. | 63-34, Appendix C | SAE N/A |
| 24 | 1 | CFMT sampling level, density, volume and analytical requirements are properly recorded for"SF" | | SAE 7-30-02 1200 |
| 25 | | Sample transfer complete per SOP 63-22. | | VOSS R.G. MYERS 7/30/02 2200 |
| 26 | | Complete transfer of slurry feed batch to MFHT. | 63-34, Appendix C | SAE 7-31-02 1000 |

1 This step can be completed any time after Traveler step #20 (sugar addition to CFMT) but must be completed prior to Traveler step #25 (complete transfer of slurry to MFHT).

# SBS to CFMT Transfer

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 77

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | | |
| Tank Number | 63-V031 | | | 63-V-001 | | | |
| Date | 6-24-02 | | | 6-24-02 | | | |
| Time | 10:05 | | | 10:10 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 30. | N/A | 65.1 | 65.3 | 64.8 | 65.1 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1.01 | | 1.100 | 1.084 | 1.081 | 1.088 |
| Temp. (°C) | | 30 | | | 27.4 | | |
| Average Volume (L) | | 4066.5 | | | 11761.1 | | |

* Instantaneous Readings

Section 2

Volume to be transferred 2407.5 L

SAE Signature H.S. Dhaigne Date 6/24/02

Shift Engineer Signature [illegible] Date 6-24-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SBS | | | CFMT | | | |
| Tank Number | 63-V-03 | | | 63-V-001 | | | |
| Date | 6/24/02 | | | 6/24/02 | | | |
| Time | 1055 | | | 1105 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | N/A | 10.8 | N/A | 78.4 | 78.9 | 78.2 | 78.5 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 1.04 | | 1.088 | 1.071 | 1.067 | 1.075 |
| Temp. (°C) | | 32 | | | 34.9 | | |
| Average Volume (L) | | 1866.2 | | | 14235.2 | | |

Total Flush Water (L) N/A

VOSS Signature [illegible] Date 6-24-02

# Sodium Metasilicate Addition

**APPENDIX E**
**Sodium Metasilicate Preparation and Transfer to CFMT**
(Page 1 of 1)

Slurry Batch # 77

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Sodium metasilicate | 25 ± 3 kg | 25 kg | C2133 | 90971/1.1 | JK |
| Demineralize water | 60 ± 6 L | 60 L | N/A | N/A | JK |

Transfer complete [signature] 7-17-02 / 1821
VOSS Date/Time

# 8D-4 and Other Flushes to CFMT Transfer

Section 1

Second (Final) Tank Farm Flush

Slurry Batch # 77

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | Tank Farm | CFMT |
| Tank Number | 8D-4 | 63-V-001 |
| Date | 7-18-02 | 7-18-02 |
| Time | 1504 | 1508 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 58 | 55.6 55.8 55.4 Ave= 55.6 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1 N/A RE 7/18/02 | 1.325 1.328 1.323 Ave= 1.326 |
| Temp. (°C) | | 27.9 |
| Average Volume (L) | 14993 | 10015.5 |

* Instantaneous Readings

Section 2

Volume to be transferred 10,000 liter (not to exceed 112" in CFMT)

SAE Signature [signature] Date 7/18/02

Shift Engineer Signature [signature] Date 7-18-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | |
|---|---|---|---|
| Tank Name | Tank Farm | CFMT | |
| Tank Number | 8D-4 | 63-V-001 | |
| Date | 7-18-02 | 7-18-02 | |
| Time | 1758 | 1758 | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 26 N/A | 102.2 102.6 101.6 | 102.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.0 | 1.183 1.185 1.180 | 1.18 |
| Temp. (°C) | N/A | 26.1 | |
| Average Volume (L) | N/A | 18,602.4 L | |

Total Flush Water (L) 140 GALLONS

VOSS Signature [signature] Date 7-18-02

Use this level/density for WI Samples [signature] 7-18-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 77

| | Send Tank BEFORE | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|
| Tank Name | Tank Farm | CFMT | | | |
| Tank Number | SD-4 | 63-V-001 | | | |
| Date | 7-16-02 | 7-16-02 | | | |
| Time | 1320 | 0750 | | | Avg |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 76 | 35.4 | 35.4 | 35.0 | 35.3 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.0 | 1.452 | 1.460 | 1.452 | 1.456 |
| Temp. (°C) | N/A | 40C | | | |
| Average Volume (L) | 19646 L | 6274.9 L | | | |

* Instantaneous Readings

Section 2

Volume to be transferred maximum of ~~13,000~~ 14,000 L (not to exceed 112" in CFMT)

SAE Signature [signature] Date 7-16-02

Shift Engineer Signature [signature] Date 7-16-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|
| Tank Name | Tank Farm | CFMT | | | |
| Tank Number | SD-4 | 63-V-001 | | | |
| Date | 7-16-02 | 7-16-02 | | | |
| Time | 2305 | 2305 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 29 | 99.1 | 99.5 | 98.8 | 99.1 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.0 | 1.188 | 1.192 | 1.186 | 1.189 |
| Temp. (°C) | N/A | 21.0 | | | |
| Average Volume (L) | 7496.5 | 18,031.1 | | | |

Total Flush Water (L) 140

VOSS Signature [signature] Date 7-16-02

12150
3,210

11756.2
3106.44

Section 1

Slurry Batch # 77

3rd MHFT TRANSFER

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | MFHT | CFMT |
| Tank Number | 63-V-011 | 63-V-001 |
| Date | 7/11/02 | 7/11/02 |
| Time | 1300 | 1300 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 46 46 47 46.2 | 35.9 35.9 35.6 35.8 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.02 0.90 1.00 0.98 | 1.454 1.457 1.458 1.456 |
| Temp. (°C) | 29°C | 37 |
| Average Volume (L) | 9151.0 | 6367.1 |

* Instantaneous Readings

Section 2

Volume to be transferred ENTIRE CONTENTS OF MFHT NOT TO EXCEED CFMT LEVEL OF 112"

SAE Signature H. S. Dhuiger Date 7/11/02

Shift Engineer Signature [illegible] Date 7-12-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | MFHT | CFMT |
| Tank Number | 63-V-011 | 63-V-001 |
| Date | 7-12-02 | 7-12-02 |
| Time | 1512 | 1519 |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 1 -2 0 -.3 | 81.2 81.9 81.3 81.6 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.02 0.90 1.00 .097 | 1.205 1.209 1.205 1.206 |
| Temp. (°C) | 27 | 37 |
| Average Volume (L) | 770.2 | 1480L.5 |

Total Flush Water (L) N/A

VOSS Signature [illegible] Date 7-12-02

Section 1

Slurry Batch # 77

2nd flush of MFHT

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | |
|---|---|---|---|---|---|---|
| Tank Name | MFHT | | | CFMT | | |
| Tank Number | 63-V-011 | | | 63-V-001 | | |
| Date | 7-10-02 | | | 7-10-02 | | |
| Time | 2230 | | | 2230 | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 44 | 43 | 44 | 44.6 | 44.7 | 44.4 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.04 | 1.06 | 1.02 | 1.393 | 1.369 | 1.371 |
| Temp. (°C) | 29°C | | | 43.6°C | | |
| Average Volume (L) | 8661.2 | | | 8007.0 | | |

* Instantaneous Readings

Section 2

Volume to be transferred All of MFHT, not to exceed 112" in CFMT

SAE Signature [signature] Date 7-10-02

Shift Engineer Signature [signature] Date 7-10-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | MFHT | | | CFMT | | | |
| Tank Number | 63-V-011 | | | 63-V-001 | | | |
| Date | 7-10-02 | | | 7-10-02 | | | |
| Time | 2250 | | | 2250 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 1 | -2 | 0 | 90.6 | 90.9 | 90.3 | 90.6 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.03 | 1.01 | .99 | 1.210 | 1.188 | 1.185 | 1.19 |
| Temp. (°C) | 28°C | | | 38.7°C | | | |
| Average Volume (L) | 770.2 L | | | 16501.7 L | | | |

Total Flush Water (L) N/A

VOSS Signature [signature] Date 7-10-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 77
1st flush of MFHT

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | MFHT | | | CFMT | | | |
| Tank Number | 63-V-011 | | | 63-V-001 | | | |
| Date | 7/8/02 | | | 7/8/02 | | | |
| Time | 1745 | | | 15:51 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 33 | 33 | 34 AVE 33.4 | 58.2 | 58.4 | 57.9 | 58.2 AVE. |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.05 | 1.06 | 1.02 AVE 1.04 | 1.299 | 1.283 | 1.281 | 1.288 AVE. |
| Temp. (°C) | 27°C | | | 28°C | | | |
| Average Volume (L) | 6829.0 | | | 10494.6 L | | | |

* Instantaneous Readings

Section 2

Volume to be transferred Entire contents of MFHT; not to exceed CFMT level of 112"

SAE Signature [signature] Date 7-8-02

Shift Engineer Signature [signature] Date 7-8-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | MFHT | | | CFMT | | | |
| Tank Number | 63-V-011 | | | 63-V-001 | | | |
| Date 7-8-02 | 7-8-02 | | | 7-8-02 | | | |
| Time 1850 | 1850 | | | 1850 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 1 | -2 -0.4 | 0 | 94.3 | 94.6 | 94.0 | 94.3 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.04 | 1.06 | 1.02 | 1.202 | 1.185 | 1.181 | 1.190 |
| Temp. (°C) | 27°C | | | 33°C | | | |
| Average Volume (L) | 710.2 L | | | 17146.7 | | | |

Total Flush Water (L) N/A

VOSS Signature [signature] Date 7.8.02

Section 1

Slurry Batch # 77

MFHT HEEL TRANSFER

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | MFHT | CFMT |
| Tank Number | 63-V-011 | 63-V-001 |
| Date | 6-17-02 | 6-26-02 |
| Time | 1430 | 1430 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 29 29 30 Ave=29.3 | 63.2 63.4 62.9 63.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.39 1.39 1.35 Ave=1.38 | 1.105 1.089 1.086 |
| Temp. (°C) | 28.0 | 28.0°C |
| Average Volume (L) | 6085.3 | 11416.0 |

* Instantaneous Readings

Section 2

Volume to be transferred entire contents of MFHT

SAE Signature [signature] Date 6/17/02

Shift Engineer Signature [signature] Date 6-26-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | MFHT | CFMT |
| Tank Number | 63-V-011 | 63-V-001 |
| Date | 6-27-02 | 6-27-02 |
| Time | 0045 | 0050 |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 1 -2 0 | 97.3 97.6 96.9 97.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.38 1.38 1.34 | 1.191 1.174 1.171 1.178 |
| Temp. (°C) | 27.7°C | 35.0°C |
| Average Volume (L) | 0.0 | 17681.0 l. |

Total Flush Water (L) N/A

VOSS Signature [signature] Date 6-27-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

After Flush CFMT Level & Density
For Samples analysis purpose

Section 1

Slurry Batch # 77

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | CFMT | |
| Tank Number | 63-V-001 | |
| Date | 6-19-02 | |
| Time | 1625 | N/A KB 6/17/02 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 63.9" 64.2" 63.6" | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.161 1.086 1.081 | |
| Temp. (°C) | 27°C | |
| Average Volume (L) | 11,545 L | |

AVG. 63.9"
AVG. 1.089

* Instantaneous Readings

Section 2

Volume to be transferred N/A

SAE Signature N/A Date N/A

Shift Engineer Signature [signature] Date 6-19-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | | |
| Tank Number | | |
| Date | | |
| Time | N/A KB 6/17/02 | N/A KB 6/17/02 |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | |
| Temp. (°C) | | |
| Average Volume (L) | | |

Total Flush Water (L) N/A

VOSS Signature [signature] Date 6-19-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 77

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | 65-D-08 Decon Tank | CFMT |
| Tank Number | 65-D-08 | 63-V-001 |
| Date | 6-17-02 | 6-17-02 |
| Time | 1500 | 1500 |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 53.95 N/A | 26.6 26.8 26.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A 6/20/02 | 1.204 1.189 1.188 |
| Temp. (°C) | 74°F | 27.5°C |
| Average Volume (L) | 949.5 L | 4653.4 L |

* Instantaneous Readings

Section 2

Volume to be transferred 150 l

SAE Signature [signature] Date 6-17-02

Shift Engineer Signature [signature] Date 6-17-02

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | Decon tank | CFMT |
| Tank Number | 65-D-08 | 63-V-001 |
| Date | 6-17-02 | 6-17-02 |
| Time | 1510 | 1510 |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 45.6 6/20/02 | 27.4 27.7 27.1 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | N/A | 1.199 1.184 1.183 |
| Temp. (°C) | 74°F | 27.3°C |
| Average Volume (L) | 819.0 | 4819.2 L |

Total Flush Water (L) 75 L

VOSS Signature [signature] Date 6-17-02

**APPENDIX C**
**Transfer Data Sheet**
(Page 1 of 1)

Section 1

Slurry Batch # 77

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | LWTS | | | CFMT | | | |
| Tank Number | SD-15-A2 | | | 63-V-001 | | | |
| Date | 6-5-02 | | | 6-5-02 | | | |
| Time | 0900 | | | 0900 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 32.3 | N/A | N/A | 8.4 | 8.7 | 8.2 | 8.4 Ave |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.23 | N/A | N/A | 1.035 | 0.860 | 1.002 | 0.965 Ave |
| Temp. (°C) | N/A | | | 27.5 | | | |
| Average Volume (L) | 5213L | | | 1445.6 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred ~ 2900 L

SAE Signature [signature] Date 6-5-02

Shift Engineer Signature [signature] Date 6-5-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | LWTS | | | CFMT | | | |
| Tank Number | A2 | | | 63-V-001 | | | |
| Date | 6-5-02 | | | 6-5-02 | | | |
| Time | | | | 1237 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 18 | N/A | N/A | 30.1 | 30.4 | 29.9 | 30.1 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.21 | N/A | N/A | 1.179 | 1.162 | 1.158 | 1.166 |
| Temp. (°C) | N/A | | | 25.1 | | | |
| Average Volume (L) | 2283 | | | 5316.7 | | | |

Total Flush Water (L) 454.2

VOSS Signature [signature] Date 6-5-02

LWTS transfer:

Sodium metal concentration from earlier samples (VAST ID: 02-0838)
114,000 μg/mL

Planning to make a batch yielding 7500kg of glass, which will be 8 wt% sodium oxide (600kg). We would like to have LWTS provide 75% of that amount, or 450kg of oxide. The portion of oxide that is metal would be 334kg.

To provide 334kg of sodium metal from the LWTS liquid with the above concentration, please transfer 2928L.

Thanks.

Ron Palmer

6-5-02

# CFMT Concentration

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

After Second (Final) Tank Farm Flush

Slurry Batch # 77

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 102.2 Density 1.183

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

SAE Signature 7/18/02 Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 26.8" Density 1.613

VOSS Signature 7/22/02 Date

Comments: N/A

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

After first
8D-4 Transfer

Slurry Batch # 77

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 99.1 Density 1.189

Target Post Boildown Level (LIXX 0153 with agitator off) 28" Density N/A

R A Palmer
SAE Signature

7-16-02
Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 55.6 Density 1.326

[illegible]
VOSS Signature

7-17-02
Date

Comments: N/A

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 77

After 3rd MFHT washdown transfer to CFMT

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 81.6 Density 1.206

Target Post Boildown Level (LIXX 0153 with agitator off) 27'' Density N/A

H. S. [illegible] 7/11/02
SAE Signature Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 35.3 Density 1.456

[illegible] 7-16-02
VOSS Signature Date

Comments: N/A

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

After 2nd MFHT FLUSH

Slurry Batch # 77

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 90.8" 28" Density 1.19

Target Post Boildown Level (LIXX 0153 with agitator off) ~~58"~~ 7-11-02 Density N/A

FOR R. PALMER PER TELECON 7-10-02
SAE Signature Date

7-12-02

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 37.4 Density 1.393

7/12/02
WOSS Signature Date

Comments: N/A

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

After MFHT flush #1
AND MFHT TO CFMT TRANSFER

Slurry Batch # 77

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 94.3 Density 1.190

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

SAE Signature [signature] Date 7/3/02

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 47.3" Density 1.177

VOSS Signature [signature] Date 7-10-02

Comments: N/A

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

After MFHT TO CFMT transfer

Slurry Batch # 77

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 91.3 Density 1.18

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

SAE Signature [signature] Date 6/17/02

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 160.1 Density 1.238

VOSS Signature [signature] Date 7-3-02

Comments: N/A

Buildown after SBS → CFMT TRANSFER

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

Slurry Batch # 77

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 78.5 Density 1.075

Target Post Boildown Level (LIXX 0153 with agitator off) 60" Density N/A

H.S. [illegible] 6/24/02
SAE Signature Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 65.8 Density 1.051

[illegible] 6-25-02
VOSS Signature Date

Comments: N/A

**APPENDIX D**
**Concentrating the CFMT**
(Page 1 of 1)

After 1st Gamma-Jet cleaning

Slurry Batch # 77

Section 1

Initial CFMT Level (LIXX 0153 with agitator off) 63.6 Density 1.159

Target Post Boildown Level (LIXX 0153 with agitator off) 27" Density N/A

SAE Signature 6/14/02 Date

Section 2

Final Post Boildown Level (LIXX 0153 with agitator off) 27" Density 1.146

VOSS Signature 6/16/02 Date

Comments: N/A

# Waste Initial Analyses

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** ☐ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page 1 of 15*

***Login Date:*** *18-Jul-02* ***VAST Sample ID:*** *02-1129*

| | |
|---|---|
| **Sample Point:** | CFMT |
| **Sample Type:** | WI (ACT #11) |
| **Collected:** | 7/18/2002 2000 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | B77WI1-B77WI9, 21-23 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Al | 4.23E+3 | ug/g | | Rep1 (B77WI#1): U1 |
| Al | 4.15E+3 | ug/g | | Rep2 (B77WI#2): U1 |
| Al | 4.16E+3 | ug/g | | Rep3 (B77WI#3): U1 |
| Al | 4.21E+3 | ug/g | | Rep4 (B77WI#4): U1 |
| Al | 4.14E+3 | ug/g | | Rep5 (B77WI#5): U1 |
| Al | 4.24E+3 | ug/g | | Rep6 (B77WI#6): U1 |
| Al | 4.31E+3 | ug/g | | Rep7 (B77WI#7): U1 |
| Al | 4.40E+3 | ug/g | | Rep8 (B77WI#8): U1 |
| Al | 4.26E+3 | ug/g | | Rep9 (B77WI#9): U1 |
| B | 6.05E+3 | ug/g | | Rep1 (B77WI#1): U1 |
| B | 5.84E+3 | ug/g | | Rep2 (B77WI#2): U1 |
| B | 5.84E+3 | ug/g | | Rep3 (B77WI#3): U1 |
| B | 5.99E+3 | ug/g | | Rep4 (B77WI#4): U1 |
| B | 5.82E+3 | ug/g | | Rep5 (B77WI#5): U1 |
| B | 6.13E+3 | ug/g | | Rep6 (B77WI#6): U1 |
| B | 6.11E+3 | ug/g | | Rep7 (B77WI#7): U1 |
| B | 6.10E+3 | ug/g | | Rep8 (B77WI#8): U1 |
| B | 6.14E+3 | ug/g | | Rep9 (B77WI#9): U1 |
| Ca | 4.26E+2 | ug/g | | Rep1 (B77WI#1): U1 |
| Ca | 4.22E+2 | ug/g | | Rep2 (B77WI#2): U1 |

**Approved By**

Jacqueline D. Hill — **Name**

7/21/02 1825 — **Date & Time**

***Report Date:*** *21-Jul-02*

**Login Date:** 18-Jul-02 **VAST Sample ID:** 02-1129

| | | | |
|---|---|---|---|
| Sample Point: | CFMT | Department | HLWO (VIT) |
| Sample Type: | WI (ACT #11) | Customer's ID: | B77WI1-B77WI9, 21-23 |
| Collected: | 7/18/2002 2000 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Ca | 4.29E+2 | ug/g | | Rep3 (B77WI#3): U1 |
| Ca | 4.25E+2 | ug/g | | Rep4 (B77WI#4): U1 |
| Ca | 4.15E+2 | ug/g | | Rep5 (B77WI#5): U1 |
| Ca | 4.30E+2 | ug/g | | Rep6 (B77WI#6): U1 |
| Ca | 4.41E+2 | ug/g | | Rep7 (B77WI#7): U1 |
| Ca | 4.53E+2 | ug/g | | Rep8 (B77WI#8): U1 |
| Ca | 4.46E+2 | ug/g | | Rep9 (B77WI#9): U1 |
| Fe | 1.06E+4 | ug/g | | Rep1 (B77WI#1): U1 |
| Fe | 1.03E+4 | ug/g | | Rep2 (B77WI#2): U1 |
| Fe | 1.04E+4 | ug/g | | Rep3 (B77WI#3): U1 |
| Fe | 1.03E+4 | ug/g | | Rep4 (B77WI#4): U1 |
| Fe | 1.01E+4 | ug/g | | Rep5 (B77WI#5): U1 |
| Fe | 1.07E+4 | ug/g | | Rep6 (B77WI#6): U1 |
| Fe | 1.08E+4 | ug/g | | Rep7 (B77WI#7): U1 |
| Fe | 1.07E+4 | ug/g | | Rep8 (B77WI#8): U1 |
| Fe | 1.07E+4 | ug/g | | Rep9 (B77WI#9): U1 |
| K | 5.89E+3 | ug/g | | Rep1 (B77WI#1): U1 |
| K | 5.68E+3 | ug/g | | Rep2 (B77WI#2): U1 |
| K | 5.64E+3 | ug/g | | Rep3 (B77WI#3): U1 |
| K | 5.77E+3 | ug/g | | Rep4 (B77WI#4): U1 |
| K | 5.75E+3 | ug/g | | Rep5 (B77WI#5): U1 |
| K | 5.84E+3 | ug/g | | Rep6 (B77WI#6): U1 |
| K | 5.98E+3 | ug/g | | Rep7 (B77WI#7): U1 |
| K | 6.05E+3 | ug/g | | Rep8 (B77WI#8): U1 |
| K | 5.74E+3 | ug/g | | Rep9 (B77WI#9): U1 |
| Li | 2.20E+3 | ug/g | | Rep1 (B77WI#1): U1 |
| Li | 2.19E+3 | ug/g | | Rep2 (B77WI#2): U1 |

**Approved By**

Jacqueline D. Hill — Name

7/21/02 1825 — Date & Time

**Login Date:** 18-Jul-02 **VAST Sample ID:** 02-1129

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | B77WI1-B77WI9, 21-23 |
| **Collected:** | 7/18/2002 2000 | | |

| Analysis | Result ** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Li | 2.18E+3 | ug/g | | Rep3 (B77WI#3): U1 |
| Li | 2.24E+3 | ug/g | | Rep4 (B77WI#4): U1 |
| Li | 2.19E+3 | ug/g | | Rep5 (B77WI#5): U1 |
| Li | 2.31E+3 | ug/g | | Rep6 (B77WI#6): U1 |
| Li | 2.23E+3 | ug/g | | Rep7 (B77WI#7): U1 |
| Li | 2.28E+3 | ug/g | | Rep8 (B77WI#8): U1 |
| Li | 2.28E+3 | ug/g | | Rep9 (B77WI#9): U1 |
| Mg | 1.11E+3 | ug/g | | Rep1 (B77WI#1): U1 |
| Mg | 1.08E+3 | ug/g | | Rep2 (B77WI#2): U1 |
| Mg | 1.09E+3 | ug/g | | Rep3 (B77WI#3): U1 |
| Mg | 1.10E+3 | ug/g | | Rep4 (B77WI#4): U1 |
| Mg | 1.08E+3 | ug/g | | Rep5 (B77WI#5): U1 |
| Mg | 1.14E+3 | ug/g | | Rep6 (B77WI#6): U1 |
| Mg | 1.14E+3 | ug/g | | Rep7 (B77WI#7): U1 |
| Mg | 1.14E+3 | ug/g | | Rep8 (B77WI#8): U1 |
| Mg | 1.15E+3 | ug/g | | Rep9 (B77WI#9): U1 |
| Mn | 7.86E+2 | ug/g | | Rep1 (B77WI#1): U1 |
| Mn | 7.80E+2 | ug/g | | Rep2 (B77WI#2): U1 |
| Mn | 8.04E+2 | ug/g | | Rep3 (B77WI#3): U1 |
| Mn | 8.00E+2 | ug/g | | Rep4 (B77WI#4): U1 |
| Mn | 7.86E+2 | ug/g | | Rep5 (B77WI#5): U1 |
| Mn | 7.76E+2 | ug/g | | Rep6 (B77WI#6): U1 |
| Mn | 8.07E+2 | ug/g | | Rep7 (B77WI#7): U1 |
| Mn | 9.59E+2 | ug/g | | Rep8 (B77WI#8): U1 |
| Mn | 8.23E+2 | ug/g | | Rep9 (B77WI#9): U1 |
| Na | 2.07E+4 | ug/g | | Rep1 (B77WI#1): U1 |
| Na | 2.02E+4 | ug/g | | Rep2 (B77WI#2): U1 |

**Approved By**

Jacqueline D. Hill — Name

7/21/02 1825 — Date & Time

**Login Date:** 18-Jul-02 **VAST Sample ID:** 02-1129

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | B77WI1-B77WI9, 21-23 |
| **Collected:** | 7/18/2002 2000 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Na | 2.04E+4 | ug/g | | Rep3 (B77WI#3): U1 |
| Na | 2.08E+4 | ug/g | | Rep4 (B77WI#4): U1 |
| Na | 2.04E+4 | ug/g | | Rep5 (B77WI#5): U1 |
| Na | 2.13E+4 | ug/g | | Rep6 (B77WI#6): U1 |
| Na | 2.17E+4 | ug/g | | Rep7 (B77WI#7): U1 |
| Na | 2.17E+4 | ug/g | | Rep8 (B77WI#8): U1 |
| Na | 2.15E+4 | ug/g | | Rep9 (B77WI#9): U1 |
| P | 6.60E+2 | ug/g | | Rep1 (B77WI#1): U1 |
| P | 6.88E+2 | ug/g | | Rep2 (B77WI#2): U1 |
| P | 7.16E+2 | ug/g | | Rep3 (B77WI#3): U1 |
| P | 6.95E+2 | ug/g | | Rep4 (B77WI#4): U1 |
| P | 6.86E+2 | ug/g | | Rep5 (B77WI#5): U1 |
| P | 7.31E+2 | ug/g | | Rep6 (B77WI#6): U1 |
| P | 7.14E+2 | ug/g | | Rep7 (B77WI#7): U1 |
| P | 6.74E+2 | ug/g | | Rep8 (B77WI#8): U1 |
| P | 7.31E+2 | ug/g | | Rep9 (B77WI#9): U1 |
| Si | 2.59E+4 | ug/g | | Rep1 (B77WI#1): U1 |
| Si | 2.55E+4 | ug/g | | Rep2 (B77WI#2): U1 |
| Si | 2.58E+4 | ug/g | | Rep3 (B77WI#3): U1 |
| Si | 2.59E+4 | ug/g | | Rep4 (B77WI#4): U1 |
| Si | 2.56E+4 | ug/g | | Rep5 (B77WI#5): U1 |
| Si | 2.59E+4 | ug/g | | Rep6 (B77WI#6): U1 |
| Si | 2.66E+4 | ug/g | | Rep7 (B77WI#7): U1 |
| Si | 2.85E+4 | ug/g | | Rep8 (B77WI#8): U1 |
| Si | 2.62E+4 | ug/g | | Rep9 (B77WI#9): U1 |
| Th | 4.36E+2 | ug/g | | Rep1 (B77WI#1): U1 |
| Th | 4.83E+2 | ug/g | | Rep2 (B77WI#2): U1 |

**Approved By**

Jacqueline D. Hill — Name

7/21/02 1825 — Date & Time

**Login Date:** 18-Jul-02 **VAST Sample ID:** 02-1129

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | B77WI1-B77WI9, 21-23 |
| **Collected:** | 7/18/2002 2000 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Th | 5.27E+2 | ug/g | | Rep3 (B77WI#3): U1 |
| Th | 4.27E+2 | ug/g | | Rep4 (B77WI#4): U1 |
| Th | 4.69E+2 | ug/g | | Rep5 (B77WI#5): U1 |
| Th | 4.56E+2 | ug/g | | Rep6 (B77WI#6): U1 |
| Th | 4.92E+2 | ug/g | | Rep7 (B77WI#7): U1 |
| Th | 4.68E+2 | ug/g | | Rep8 (B77WI#8): U1 |
| Th | 4.93E+2 | ug/g | | Rep9 (B77WI#9): U1 |
| Ti | 6.45E+2 | ug/g | | Rep1 (B77WI#1): U1 |
| Ti | 6.44E+2 | ug/g | | Rep2 (B77WI#2): U1 |
| Ti | 6.46E+2 | ug/g | | Rep3 (B77WI#3): U1 |
| Ti | 6.45E+2 | ug/g | | Rep4 (B77WI#4): U1 |
| Ti | 6.66E+2 | ug/g | | Rep5 (B77WI#5): U1 |
| Ti | 6.33E+2 | ug/g | | Rep6 (B77WI#6): U1 |
| Ti | 6.52E+2 | ug/g | | Rep7 (B77WI#7): U1 |
| Ti | 6.47E+2 | ug/g | | Rep8 (B77WI#8): U1 |
| Ti | 6.43E+2 | ug/g | | Rep9 (B77WI#9): U1 |
| U | 1.05E+3 | ug/g | | Rep1 (B77WI#1): U1 |
| U | 1.05E+3 | ug/g | | Rep2 (B77WI#2): U1 |
| U | 1.06E+3 | ug/g | | Rep3 (B77WI#3): U1 |
| U | 1.05E+3 | ug/g | | Rep4 (B77WI#4): U1 |
| U | 1.04E+3 | ug/g | | Rep5 (B77WI#5): U1 |
| U | 1.16E+3 | ug/g | | Rep6 (B77WI#6): U1 |
| U | 1.23E+3 | ug/g | | Rep7 (B77WI#7): U1 |
| U | 1.24E+3 | ug/g | | Rep8 (B77WI#8): U1 |
| U | 1.19E+3 | ug/g | | Rep9 (B77WI#9): U1 |
| Zr | 1.26E+3 | ug/g | | Rep1 (B77WI#1): U1 |
| Zr | 1.22E+3 | ug/g | | Rep2 (B77WI#2): U1 |

**Approved By**

Jacqueline D. Hill — Name

7/21/02 1825 — Date & Time

**Login Date:** 18-Jul-02 **VAST Sample ID:** 02-1129

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | B77WI1-B77WI9, 21-23 |
| **Collected:** | 7/18/2002 2000 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Zr | 1.22E+3 | ug/g | | Rep3 (B77WI#3): U1 |
| Zr | 1.23E+3 | ug/g | | Rep4 (B77WI#4): U1 |
| Zr | 1.21E+3 | ug/g | | Rep5 (B77WI#5): U1 |
| Zr | 1.26E+3 | ug/g | | Rep6 (B77WI#6): U1 |
| Zr | 1.27E+3 | ug/g | | Rep7 (B77WI#7): U1 |
| Zr | 1.28E+3 | ug/g | | Rep8 (B77WI#8): U1 |
| Zr | 1.26E+3 | ug/g | | Rep9 (B77WI#9): U1 |

NOTES: **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Jacqueline D. Hill — Name

7/21/02 1825 — Date & Time

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX ~~2189~~ 4169 7/21/02

**Copied for Recipients** na **FAXed to Recipients** ✓ **Copied for File** ✓

*package page* 1 *of* 4

***Login Date:*** *18-Jul-02* ***VAST Sample ID:*** *02-1132*

| | |
|---|---|
| **Sample Point:** | CFMT |
| **Sample Type:** | WI (ACT #11) |
| **Collected:** | 7/18/2002 2000 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | B77WI14 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| pH | 3.7 (32 °C) | su | 0.1 | Rep1 (B77WI 14): no flags |
| Tot Solids | 26.43 | % | | Rep: (B77WI 14): U1 |

NOTES: **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Jacqueline D. Hill — **Name**

7/21/02 1720 — **Date & Time**

***Report Date:*** *21-Jul-02*

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** ☐ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page* 1 *of* 3

***Login Date:*** *18-Jul-02* ***VAST Sample ID:*** *02-1131*

| | |
|---|---|
| **Sample Point:** | CFMT |
| **Sample Type:** | WI (ACT #11) |
| **Collected:** | 7/18/2002 2000 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | B77WI10-B77WI13 |

| Analysis | Result *** | Uncertainty | Lab Use Only |
|---|---|---|---|
| Density | 1.17 (30.9 °C) g/mL | | Rep1 (B77 WI #10-13): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Jacqueline D. Hill — **Name**

7/21/02 1850 — **Date & Time**

***Report Date:*** *21-Jul-02*

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

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*package page* 1 *of* 18

***Login Date:*** ***18-Jul-02*** ***VAST Sample ID:*** ***02-1133***

| | |
|---|---|
| **Sample Point:** | CFMT |
| **Sample Type:** | WI (ACT #11) |
| **Collected:** | 7/18/2002 2007 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | B77WI15-B77WI17 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| NO2 | 1.32E+3 | ug/g | | Rep1 (B77 WI #15): U1 |
| NO2 | Not Measured | ug/g | | Rep2 (B77 WI #15): U1 |
| NO2 | 1.26E+3 | ug/g | | Rep3 (B77 WI #15 DUP): U1 |
| NO2 | Not Measured | ug/g | | Rep4 (B77 WI #15 DUP): U1 |
| NO2 | 1.76E+3 | ug/g | | Rep5 (B77 WI #16): U1 |
| NO2 | Not Measured | ug/g | | Rep6 (B77 WI #16): U1 |
| NO2 | 1.33E+3 | ug/g | | Rep7 (B77 WI #16 DUP): U1 |
| NO2 | Not Measured | ug/g | | Rep8 (B77 WI #16 DUP): U1 |
| NO2 | 1.63E+3 | ug/g | | Rep9 (B77 WI #17): U1 |
| NO2 | Not Measured | ug/g | | Rep10 (B77 WI #17): U1 |
| NO2 | 1.80E+3 | ug/g | | Rep11 (B77 WI #17 DUP): U1 |
| NO2 | Not Measured | ug/g | | Rep12 (B77 WI #17 DUP): U1 |
| NO3 | Not Measured | ug/g | | Rep1 (B77 WI #15): U1 |
| NO3 | 7.57E+4 | ug/g | | Rep2 (B77 WI #15): U1 |
| NO3 | Not Measured | ug/g | | Rep3 (B77 WI #15 DUP): U1 |
| NO3 | 7.44E+4 | ug/g | | Rep4 (B77 WI #15 DUP): U1 |
| NO3 | Not Measured | ug/g | | Rep5 (B77 WI #16): U1 |
| NO3 | 7.51E+4 | ug/g | | Rep6 (B77 WI #16): U1 |
| NO3 | Not Measured | ug/g | | Rep7 (B77 WI #16 DUP): U1 |
| NO3 | 7.37E+4 | ug/g | | Rep8 (B77 WI #16 DUP): U1 |

**Approved By**

Name: [signature]

Date & Time: 7/22/02 0805

**Login Date:** 18-Jul-02 **VAST Sample ID:** 02-1133

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | WI (ACT #11) | **Customer's ID:** | B77WI15-B77WI17 |
| **Collected:** | 7/18/2002 2007 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| NO3 | Not Measured | ug/g | | Rep9 (B77 WI #17): U1 |
| NO3 | 7.55E+4 | ug/g | | Rep10 (B77 WI #17): U1 |
| NO3 | Not Measured | ug/g | | Rep11 (B77 WI #17 DUP): U1 |
| NO3 | 7.48E+4 | ug/g | | Rep12 (B77 WI #17 DUP): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Name: [signature] Date & Time: 7/22/02 0805

**WEST VALLEY DEMONSTRATION PROJECT** ~~Page 4 of 5~~
**ANALYTICAL REQUEST**

VAST Sample ID: 02-1133 Login Date: 7/18/02

**To be Completed by the Customer**

Customer Department: HLW Completion Project

Sample Point: CFMT

Sample Type (check one):

☒ liquid ☐ solid ☐ powder/dust

☐ smear ☐ coupon ☐ other: _____

Customer's Sample ID No.: 77WI15 - 77WI17

Collection Date/Time: 7-18-02 2207

Collection Location: MNOA

Sample Collector: [signature]

Report Recipients: SAE, MS-48, FAX 4169

Is this sample suspected to contain radioactive material? ___ no X yes

If yes, is the gross activity suspected to be > 5E-03 µCi/mL or > 5E-03 µCi/g?
___ no X yes

If dose rate is >10mR/hr w/c or >100 mR/hr w/o, contact lab management prior to delivery of sample

Survey Results (To be completed by Radiation Protection as applicable):

___ cpm α direct * ___ cpm βγ direct *

___ mR/hr w/c ___ mR/hr w/o

RP Tech: _____ Date: _____

* on contact with sample material

Sample Charge Number: WH1210006

Hazards (acid, base, solvent, Cr, Ba, etc.):

___ no X yes - list: Acid

Sample Disposal Instructions (check appropriate):

☐ return to customer
☐ upon completion of analyses
X with customer approval
☐ other: _____

Requested Due Date: 7/24/02 (Date Only)

Is the sampling designated HLW? ___ yes X no ___ n/a

If yes or no, is the activity identified on the WVDP HLW Items and Activities List? X yes ___ no

If yes, Is the HLW Screening Form Attached? ___ yes X no

Comments:

Supervisor / Manager Signature: Lawrence A. Ferst for R. Myers

To be filled in after sample delivery to the laboratory:

Delivered by: SGN Date: 7-18-02 Time: 2150 Received by: [signature] for MTM Date: 7/18/02 Time: 2300

**ANALYSES TO BE COMPLETED**

List below the analyses to be performed, the desired units, and any applicable notes (to duplicate the analysis, etc.). Completed analyses will be reported to the Report Recipient on a separate form.

| Analysis | Units | Note | Analysis | Units | Note | Analysis | Units | Note |
|---|---|---|---|---|---|---|---|---|
| $NO_2$ | µg/g | with duplicates | | | | | | |
| $NO_3$ | µg/g | with duplicates | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

# A&PC Contingent Data Form



## SECTION ONE

Sample Name 77WH 15-17

VAST Sample ID # 02-1133 ACM 1501

## SECTION TWO

| QC Parameter | Within Limits | Outside Limits | Analytes | Comments |
|---|---|---|---|---|
| QC Standard | ✓ | | | |
| Blank | ✓ | | | |
| Duplicate | | ✓ | NO2 | Duplicate % RPD #16 &16 duplicate 27.8%. Upper limit 20%. |
| Spike | ✓ | | | |
| Other _____ | | | | |

Completed by: Jacqueline D. Hill Date: 7/22/02

## SECTION THREE

Contingent Data Level One X Contingent Data Level Two ____
(approval must be by ACO, CT Manager or A&PC Manager only)

Contingent Data Approved X Contingent Data Rejected ____

Justification for approval or action taken if data rejected:

R. Palmer contacted and the data is acceptable . %rpd VALUES FOR sample 15 & 17 within limits.

Approved By: [signature] Date: 7/22/02

cc: AQAC, Report Recipient

Additional pages may be attached.

Waste Initial SAMPSTAT/CHEMADD

```
##############################################################################
##############################################################################
##############################################################################
##        SSSSSS    AAAAA    MMM    MMM  PPPPPPP    SSSSSS  TTTTTTTT   AAAAA  ##
##      SS        AA   AA   MM M  M MM  PP    PP  SS          TT     AA   AA  ##
##     SS        AA   AA   MM  M   MM  PP    PP  SS          TT     AA   AA  ##
##     SSSSS    AAAAAAA   MM      MM  PPPPPP     SSSSS      TT     AAAAAAA   ##
##        SS   AA   AA   MM      MM  PP             SS     TT     AA   AA    ##
##       SS   AA   AA   MM      MM  PP             SS     TT     AA   AA    ##
## SSSSSS    AA   AA   MM      MM  PP        SSSSSS      TT     AA   AA     ##
##############################################################################
##############################################################################
##########                                                          ##########
##########       WVNS   VITRIFICATION   LAB   SAMPLE   STATISTICS     ##########
##########                        (Version 2.0)                     ##########
##############################################################################
##############################################################################
##############################################################################
##########                                                          ##########
##########   Statistically analyzes each component in a batch of waste ##########
##########   samples from a mixing tank, deletes the outliers, and  ##########
##########   computes a two-sided, 95% confidence limit.  The true mean ##########
##########   of an infinite population of samples lies in the range of ##########
##########   the mean +/- the percent error of the sample mean.      ##########
##########                                                          ##########
##############################################################################
##############################################################################
##############################################################################
##########                                                          ##########
##########   SAMPLE DATA IDS:  hsd77wi                              ##########
##########   SAMPLE DATA FILE: HSD77                                ##########
##########   MON JUL 22, 2002                          08:23:48     ##########
##########   SYSTEM: ALPHA1                                         ##########
##########                                                          ##########
##############################################################################
##############################################################################
##############################################################################
```

H. S. Dhugga 7/22/02

7-22-02

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77wi
SAMPLE FILE: HSD77

MON JUL 22, 2002
08:23:48
DENSITY (g/ml): N/A

*** LAB SAMPLE DATA ***

| Element | Sample Data (ug/g) | | | | *-Denotes Outlier |
|---|---|---|---|---|---|
| Al | 4230.00 | 4150.00 | 4160.00 | 4210.00 | 4140.00 |
| | 4240.00 | 4310.00 | 4400.00 | 4260.00 | |
| B | 6050.00 | 5840.00 | 5840.00 | 5990.00 | 5820.00 |
| | 6130.00 | 6110.00 | 6100.00 | 6140.00 | |
| Ca | 426.00 | 422.00 | 429.00 | 425.00 | 415.00 |
| | 430.00 | 441.00 | 453.00 | 446.00 | |
| Fe | 10600.00 | 10300.00 | 10400.00 | 10300.00 | 10100.00 |
| | 10700.00 | 10800.00 | 10700.00 | 10700.00 | |
| K | 5890.00 | 5680.00 | 5640.00 | 5770.00 | 5750.00 |
| | 5840.00 | 5980.00 | 6050.00 | 5740.00 | |
| Li | 2200.00 | 2190.00 | 2180.00 | 2240.00 | 2190.00 |
| | 2310.00 | 2280.00 | 2280.00 | 2280.00 | |
| Mg | 1110.00 | 1080.00 | 1090.00 | 1100.00 | 1080.00 |
| | 1140.00 | 1140.00 | 1140.00 | 1150.00 | |
| Mn | 786.00 | 780.00 | 804.00 | 800.00 | 786.00 |
| | 776.00 | 807.00 | 959.00 | 823.00 | |
| Na | 20700.00 | 20200.00 | 20400.00 | 20800.00 | 20400.00 |
| | 21800.00 | 21700.00 | 21700.00 | 21500.00 | |
| P | 660.00 | 688.00 | 716.00 | 695.00 | 686.00 |
| | 731.00 | 714.00 | 674.00 | 731.00 | |
| Si | 25900.00 | 25500.00 | 25800.00 | 25900.00 | 25600.00 |
| | 25900.00 | 26600.00 | 28500.00 | 26200.00 | |
| Th | 436.00 | 483.00 | 527.00 | 427.00 | 459.00 |
| | 456.00 | 492.00 | 468.00 | 493.00 | |
| Ti | 645.00 | 644.00 | 646.00 | 645.00 | 666.00 |
| | 633.00 | 652.00 | 647.00 | 643.00 | |
| U | 1050.00 | 1050.00 | 1060.00 | 1050.00 | 1040.00 |
| | 1160.00 | 1230.00 | 1240.00 | 1190.00 | |
| Zr | 1260.00 | 1220.00 | 1220.00 | 1230.00 | 1210.00 |
| | 1260.00 | 1270.00 | 1280.00 | 1260.00 | |

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77wi
SAMPLE FILE: HSD77

MON JUL 22, 2002
08:23:48
DENSITY (g/ml): N/A

*** LAB SAMPLE STATISTICS ***

| Elem | N | OL | Mean | Maximum | Minimum | Std Dev | Conf Limit | %Error |
|---|---|---|---|---|---|---|---|---|
| Al | 09 | 00 | 4233.33 | 4400.00 | 4140.00 | 83.67 | 64.31 | 1.52 |
| B | 09 | 00 | 6002.22 | 6140.00 | 5820.00 | 134.52 | 103.40 | 1.72 |
| Ca | 09 | 00 | 431.89 | 453.00 | 415.00 | 12.27 | 9.43 | 2.18 |
| Fe | 09 | 00 | 10511.11 | 10800.00 | 10100.00 | 242.10 | 186.09 | 1.77 |
| K | 09 | 00 | 5815.56 | 6050.00 | 5640.00 | 136.67 | 105.05 | 1.81 |
| Li | 09 | 00 | 2238.89 | 2310.00 | 2180.00 | 49.86 | 38.33 | 1.71 |
| Mg | 09 | 00 | 1114.44 | 1150.00 | 1080.00 | 28.33 | 21.78 | 1.95 |
| Mn | 09 | 00 | 813.44 | 959.00 | 776.00 | 56.59 | 43.50 | 5.35 |
| Na | 09 | 00 | 21022.22 | 21800.00 | 20200.00 | 647.65 | 497.82 | 2.37 |
| P | 09 | 00 | 699.44 | 731.00 | 660.00 | 25.03 | 19.24 | 2.75 |
| Si | 09 | 00 | 26211.11 | 28500.00 | 25500.00 | 917.12 | 704.96 | 2.69 |
| Th | 09 | 00 | 471.22 | 527.00 | 427.00 | 31.11 | 23.91 | 5.08 |
| Ti | 09 | 00 | 646.78 | 666.00 | 633.00 | 8.77 | 6.74 | 1.04 |
| U | 09 | 00 | 1118.89 | 1240.00 | 1040.00 | 84.92 | 65.27 | 5.83 |
| Zr | 09 | 00 | 1245.56 | 1280.00 | 1210.00 | 25.55 | 19.64 | 1.58 |

N = Number of data samples.
OL = Number of outlier samples.
N - OL = Number of samples used for statistics.

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77wi
SAMPLE FILE: HSD77

MON JUL 22, 2002
08:23:48
DENSITY (g/ml): N/A

*** Oxide Data Generated From Mean Samples ***

ICP Desc:
Volume (l): 18602.40
Density (g/ml): 1.1800
Total Oxides (kg): 3255.683

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 4233.33 | Al2O3 | 175.5525 | 5.3922 |
| B | 3.219334 | 6002.22 | B2O3 | 424.1594 | 13.0283 |
| Ca | 1.399052 | 431.89 | CaO | 13.2635 | 0.4074 |
| Fe | 1.429584 | 10511.11 | Fe2O3 | 329.8445 | 10.1313 |
| K | 1.204537 | 5815.56 | K2O | 153.7667 | 4.7230 |
| Li | 2.152139 | 2238.89 | Li2O | 105.7679 | 3.2487 |
| Mg | 1.658054 | 1114.44 | MgO | 40.5609 | 1.2459 |
| Mn | 1.291128 | 813.44 | MnO | 23.0541 | 0.7081 |
| Na | 1.347862 | 21022.22 | Na2O | 621.9780 | 19.1044 |
| P | 2.290963 | 699.44 | P2O5 | 35.1740 | 1.0804 |
| Si | 2.138930 | 26211.11 | SiO2 | 1230.6456 | 37.7999 |
| Th | 1.137931 | 471.22 | ThO2 | 11.7704 | 0.3615 |
| Ti | 1.665027 | 646.78 | TiO2 | 23.6389 | 0.7261 |
| U | 1.204267 | 1118.89 | UO3 | 29.5775 | 0.9085 |
| Zr | 1.350669 | 1245.56 | ZrO2 | 36.9286 | 1.1343 |

```
*****************************************************************************
*****************************************************************************
*****************************************************************************
**                                                                         **
**       CCCC    HH   HH   EEEEEEE   MMM   MMM    AAAAA    DDDD      DDDD  **
**     CC   C   HH   HH   EE        MM M M MM   AA   AA   DD  DD    DD  DD **
**    CC        HH   HH   EE        MM  M  MM   AA   AA   DD   DD   DD   DD **
**   CC        HHHHHHH   EEEE       MM  M  MM   AAAAAAA   DD   DD   DD   DD **
**  CC        HH   HH   EE         MM     MM   AA   AA   DD   DD   DD   DD  **
** CC   C    HH   HH   EE         MM     MM   AA   AA   DD  DD    DD  DD    **
** CCCC     HH   HH   EEEEEEE    MM     MM   AA   AA   DDDD      DDDD       **
**                              (Version 3.1)                              **
*****************************************************************************
*****************************************************************************
*********                                                         *********
*********      WVNS  VITRIFICATION  FEED  ADDITIVE  CALCULATOR    *********
*********                                                         *********
*****************************************************************************
*****************************************************************************
*****************************************************************************
*********                                                         *********
*********  CHEMADD determines the amount of chemicals to be added *********
*********  to the feed tank.  The following results are based on  *********
*********  specified oxide percentages, additive material makeup, *********
*********  and CFMT chemical analysis.                            *********
*********                                                         *********
*********                                                         *********
*****************************************************************************
*****************************************************************************
*****************************************************************************
*********                                                         *********
*********  USER:    HARDIP                              10:18:54  *********
*********  BADGE#:  0000                       MON JUL 22, 2002   *********
*********  SYSTEM:  ALPHA1                                        *********
*********                                                         *********
*****************************************************************************
*********                                                         *********
*********  RUN: HSD77          TANK: CFMT          ADD: WI        *********
*********                                                         *********
*****************************************************************************
*****************************************************************************
```

H. S. Shuyra 7/22/02

R A Fellows 7-22-02

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD77 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 MON JUL 22, 2002 10:18:54

*** Target Glass Composition and Needed Amounts ***

```
*************************************************************
*****    SINGLE ELEMENT OPTIMIZATION OF TOTAL WEIGHT    *****
*****                                                   *****
***** Total Oxides Weight in Tank:        3255.683 (kg) *****
***** Desired Total Oxides Weight:        8000.000 (kg) *****
***** Optimized Total Oxides Weight:      2744.131 (kg) *****
***** Optimized Weight Determined by:             Fe2O3 *****
*************************************************************
```

| Oxide Name | Target% | Target Amt.(kg) | Waste Amt.(kg) | Needed Amt.(kg) |
|---|---|---|---|---|
| Al2O3 | 6.000 | 480.000 | 175.553 | 304.447 |
| B2O3 | 12.890 | 1031.200 | 424.159 | 607.041 |
| BaO | 0.000 | 0.000 | 0.000 | 0.000 |
| CaO | 0.480 | 38.400 | 13.263 | 25.137 |
| Ce2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cs2O | 0.080 | 6.400 | 0.000 | 6.400 |
| CuO | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe2O3 | 12.020 | 961.600 | 329.845 | 631.755 |
| K2O | 5.000 | 400.000 | 153.767 | 246.233 |
| La2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Li2O | 3.710 | 296.800 | 105.768 | 191.032 |
| MgO | 0.890 | 71.200 | 40.561 | 30.639 |
| MnO | 0.820 | 65.600 | 23.054 | 42.546 |
| MoO3 | 0.000 | 0.000 | 0.000 | 0.000 |
| a2O Na2O | 8.000 | 640.000 | 621.978 | 18.022 |
| Nd2O3 Nd2O3 3-31-03 | 0.000 | 0.000 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 | 0.000 | 0.000 |
| P2O5 | 1.200 | 96.000 | 35.174 | 60.826 |
| ThO2 | 3.560 | 284.800 | 11.770 | 273.030 |
| Pr6O11 | 0.000 | 0.000 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 | 0.000 | 0.000 |
| SiO2 | 40.980 | 3278.400 | 1230.646 | 2047.754 |
| SrO | 0.000 | 0.000 | 0.000 | 0.000 |
| TiO2 | 0.800 | 64.000 | 23.639 | 40.361 |
| UO3 | 0.630 | 50.400 | 29.577 | 20.823 |
| ZnO | 0.000 | 0.000 | 0.000 | 0.000 |
| ZrO2 | 1.320 | 105.600 | 36.929 | 68.671 |
| TOTALS: | 98.380 | 7870.400 | 3255.683 | 4614.718 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD77 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 MON JUL 22, 2002 10:18:54

*** Initial Slurry Composition from ICP Measurements ***

ICP Desc:
Volume (l): 18602.40
Density (g/ml): 1.1800
Total Oxides (kg): 3255.683

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 4233.33 | Al2O3 | 175.5525 | 5.3922 |
| B | 3.219334 | 6002.22 | B2O3 | 424.1594 | 13.0283 |
| Ba | 1.116464 | 0.00 | BaO | 0.0000 | 0.0000 |
| Ca | 1.399052 | 431.89 | CaO | 13.2635 | 0.4074 |
| Ce | 1.171269 | 0.00 | Ce2O3 | 0.0000 | 0.0000 |
| Cr | 1.461401 | 0.00 | Cr2O3 | 0.0000 | 0.0000 |
| Cs | 1.060173 | 0.00 | Cs2O | 0.0000 | 0.0000 |
| Cu | 1.251692 | 0.00 | CuO | 0.0000 | 0.0000 |
| Fe | 1.429584 | 10511.11 | Fe2O3 | 329.8445 | 10.1313 |
| K | 1.204537 | 5815.56 | K2O | 153.7667 | 4.7230 |
| La | 1.172721 | 0.00 | La2O3 | 0.0000 | 0.0000 |
| Li | 2.152139 | 2238.89 | Li2O | 105.7679 | 3.2487 |
| Mg | 1.658054 | 1114.44 | MgO | 40.5609 | 1.2459 |
| Mn | 1.291128 | 813.44 | MnO | 23.0541 | 0.7081 |
| Mo | 1.500125 | 0.00 | MoO3 | 0.0000 | 0.0000 |
| Na | 1.347862 | 21022.22 | Na2O | 621.9780 | 19.1044 |
| Nd | 1.166400 | 0.00 | Nd2O3 | 0.0000 | 0.0000 |
| Ni | 1.272470 | 0.00 | NiO | 0.0000 | 0.0000 |
| P | 2.290963 | 699.44 | P2O5 | 35.1740 | 1.0804 |
| Pr | 1.170300 | 0.00 | Pr6O11 | 0.0000 | 0.0000 |
| S | 2.496631 | 0.00 | SO3 | 0.0000 | 0.0000 |
| Si | 2.138930 | 26211.11 | SiO2 | 1230.6456 | 37.7999 |
| Sr | 1.182538 | 0.00 | SrO | 0.0000 | 0.0000 |
| Th | 1.137931 | 471.22 | ThO2 | 11.7704 | 0.3615 |
| Ti | 1.665027 | 646.78 | TiO2 | 23.6389 | 0.7261 |
| U | 1.204267 | 1118.89 | UO3 | 29.5775 | 0.9085 |
| Zn | 1.244631 | 0.00 | ZnO | 0.0000 | 0.0000 |
| Zr | 1.350669 | 1245.56 | ZrO2 | 36.9286 | 1.1343 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD77 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 MON JUL 22, 2002 10:18:54

*** CHEMADD Raw Material/Oxide Factors List ***

| No | Material Name | Primary Oxide | Batch Factor | Purity Factor | Contrib. Factor | Secondary Oxide | Batch Factor |
|---|---|---|---|---|---|---|---|
| 01 | Al(OH)3 | Al2O3 | 0.6537 | 0.9847 | 1.0000 | None | 1.0000 |
| 05 | B2O3oxide | B2O3 | 1.0000 | 1.0000 | 1.0000 | None | 1.0000 |
| 07 | CaCO3 | CaO | 0.5603 | 0.9765 | 1.0000 | None | 1.0000 |
| 13 | Fe(OH)3 | Fe2O3 | 0.7474 | 0.1325 | 1.0000 | None | 1.0000 |
| 18 | KOH | K2O | 0.8394 | 0.4462 | 1.0000 | None | 1.0000 |
| 22 | Li(OH) | Li2O | 0.3556 | 0.9849 | 1.0000 | None | 1.0000 |
| 26 | Mg(OH)2 | MgO | 0.6911 | 0.9640 | 1.0000 | None | 1.0000 |
| 28 | ThO2 | ThO2 | 0.9999 | 1.0000 | 1.0000 | None | 1.0000 |
| 29 | MnO | MnO | 0.8159 | 1.0000 | 1.0000 | None | 1.0000 |
| 32 | NaOH | Na2O | 0.7750 | 0.5070 | 1.0000 | None | 1.0000 |
| 33 | NaH2PO4 | P2O5 | 0.5927 | 1.0000 | 1.0000 | Na2O | 0.2588 |
| 40 | SiO2 | SiO2 | 1.0000 | 1.0000 | 1.0000 | None | 1.0000 |
| 42 | ZrO(NO3)2.2H2O | ZrO2 | 0.4610 | 0.4261 | 1.0000 | None | 1.0000 |
| 44 | TiOXIDEsrc | TiO2 | 1.0000 | 1.0000 | 1.0000 | None | 1.0000 |
| 49 | UO3 | UO3 | 0.9990 | 1.0000 | 1.0000 | None | 1.0000 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD77 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 MON JUL 22, 2002 10:18:54

MP 3-31-03

*** CHEMADD Single Element Solutions ***

| ( .de Oxide Name | Needed Amount(kg) | Source Material | Oxide from Source(kg) | Oxide from Others(kg) | Required Source(kg) |
|---|---|---|---|---|---|
| Al2O3 | 304.45 | Al(OH)3 | 304.45 | 0.00 | 472.97 |
| B2O3 | 607.04 | B2O3oxide | 607.04 | 0.00 | 607.04 |
| CaO | 25.14 | CaCO3 | 25.14 | 0.00 | 45.94 |
| Fe2O3 | 631.76 | Fe(OH)3 | 631.76 | 0.00 | 6379.40 |
| K2O | 246.23 | KOH | 246.23 | 0.00 | 657.43 |
| Li2O | 191.03 | Li(OH) | 191.03 | 0.00 | 545.45 |
| MgO | 30.64 | Mg(OH)2 | 30.64 | 0.00 | 45.99 |
| ThO2 | 273.03 | ThO2 | 273.03 | 0.00 | 273.06 |
| MnO | 42.55 | MnO | 42.55 | 0.00 | 52.15 |
| Na2O | 18.02 | NaOH | 0.00 | 26.56 | 0.00 |
| P2O5 | 60.83 | NaH2PO4 | 60.83 | 0.00 | 102.63 |
| SiO2 | 2047.75 | SiO2 | 2047.75 | 0.00 | 2047.75 |
| ZrO2 | 68.67 | ZrO(NO3)2.2H2O | 68.67 | 0.00 | 349.59 |
| TiO2 | 40.36 | TiOXIDEsrc | 40.36 | 0.00 | 40.36 |
| UO3 | 20.82 | UO3 | 20.82 | 0.00 | 20.84 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD77 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 MON JUL 22, 2002 10:18:54

*** CHEMADD Solutions - Required Additive Amounts ***

| Material Name | Required Amt (Kg) |
|---|---|
| Al(OH)3 | 472.966 |
| B2O3oxide | 607.041 |
| CaCO3 | 45.942 |
| Fe(OH)3 | 6379.404 |
| KOH | 657.428 |
| Li(OH) | 545.447 |
| Mg(OH)2 | 45.989 |
| ThO2 | 273.057 |
| MnO | 52.146 |
| NaOH | 0.000 |
| NaH2PO4 | 102.625 |
| SiO2 | 2047.754 |
| ZrO(NO3)2.2H2O | 349.594 |
| TiOXIDEsrc | 40.361 |
| UO3 | 20.843 |
| Total Kg | 11640.598 |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD77 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 MON JUL 22, 2002 10:18:54

*** Required Glass Former Additions for Target Amounts ***

| Amount (Kg) | Additive Description |
|---|---|
| 472.966 | ALUMINUM HYDROXIDE |
| 607.041 | BORON OXIDE |
| 45.942 | CALCIUM CARBONATE |
| 6379.404 | IRON HYDROXIDE(SLURRY) |
| 657.428 | POTASSIUM HYDROXIDE |
| 545.447 | LITHIUM HYDROXIDE |
| 45.989 | MAGNESIUM HYDROXIDE |
| 273.057 | THORIUM OXIDE |
| 52.146 | MANGANESE DIOXIDE |
| 0.000 | SODIUM HYDROXIDE |
| 102.625 | SODIUM PHOSPHATE MONOBASIC |
| 2047.754 | SILICON DIOXIDE |
| 349.594 | ZIRCONYL NITRATE DIHYDRATE |
| 40.361 | TITANIUM DIOXIDE |
| 20.843 | URANIUM OXIDE |
| 11640.598 | |

CHEMADD VITRIFICATION FEED ADDITIVES RUN: HSD77 TANK: CFMT ADD: WI
HARDIP BADGE#: 0000 MON JUL 22, 2002 10:18:54

*** Glass Former Acid Addition Calculation ***

| Mass of Cold Chemical Acid to be added to Glass: 1170.459 kg |

Input Data:

| Input Parameter | Value | Units |
|---|---|---|
| CHEMADD Oxide Prediction for Batch | 8000.000 | kg |
| NO3 Analysis from A&PC | 74866.664 | ug/g |
| NO2 Analysis from A&PC | 1516.666 | ug/g |
| Zr Analysis from A&PC | 1245.556 | ug/g |
| Slurry Density from A&PC | 1.180 | g/ml |
| Slurry Volume | 18602.400 | liters |
| CHEMADD Source Material Quantity | 349.594 | kg |
| Source Material Yield Factor | 42.610 | percent |
| Source Material Purity Factor | 1000.000 | percent |
| Source Material Acid Yield Factor | 0.000 | percent |
| Cold Chemical Acid Yield Factor | 68.000 | percent |
| NO3 Fraction of Target Mass | 0.400 | ratio |
| Source Material: | ZrO(NO3)2.2H2O | |

Calculations:

| Calculated Item | Amount (Kg) |
|---|---|
| NO3 Target Mass | 3200.000 |
| CFMT NO3 from NO3 | 1643.385 |
| CFMT NO3 from NO2 | 44.872 |
| CFMT NO3 from ZrO(NO3)2.2H2O | 37.174 |
| Total CFMT NO3 Contribution | 1725.432 |
| NO3 from ZrO(NO3)2.2H2O | 691.290 |
| NO3 from Solvent | 0.000 |
| Total Glass Former Contribution | 691.290 |
| Additional NO3 Needed | 783.279 |
| Mass of Cold Chemical Acid to Add | 1170.459 |

Date: 7/22/02

By: H. S. Dhingra

ıch 77

## Borox and B2O3 Calculations

From Chemadd:

Na2O needed ——> 18.02 kg

B2O3 needed ——> 607.04 kg

Na2O produced from NaH2PO4 (per chemadd) ——> 0 kg

So Na2O needed will be = 18.02 kg

Borax needed to produce 18.02 kg of Na2O = 18.02/.177 = 101.8 kg

B2O3 produced from 101.8 kg of Borox = 101.8 * .4 = 40.72 kg

**B2O3 to be added = 607.04 - 40.72 = 588.32 kg**

**Borax to be added = 101.8 kg**

# Glass Former Makeup

# Cold Chemical Feed Batch Preparation

Slurry Batch # 77

Tank # 65-D-02 Description Final Glass Formers SAE H. S. Dhingra Date 7/22/02

| Chemical | Amount Required | Amount Addded | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Demin Water | 500 +/- 5 L | 500 l | N/A | N/A | |
| Nitric Acid | 430 +/- 4 L | 430.2 l | N/A | N/A | |
| Ferric Hydroxide | 2969 +/- 30 kg | 2974.8 | C2150 | 98429/1.3 98429/1.4 98429/1.6 | |
| Demin Water | 250 +/- 2 L | N/A 7-24-02 | | 98638 | |
| Zirconyl Nitrate | 350 +/- 4 kg | 350.1 kg | C2147 C2147 | 98638/1.1 98638/1.1 | |
| Demin Water | 20 +/- 0.2 L | 20 l | N/A | N/A | |
| Sodium Phosphate Monobase | 103 +/- 1 kg | 102.9 kg | C2144 C2144 | 98627 1.1 98627 1.1 | |
| Boron Oxide | 588 +/- 6 kg | 588.2 kg | C2129 C2129 C2129 | 58235 1.1 98616 1.1 98605 1.1 | |
| Aluminum Hydroxide | 223 +/- 2 kg | 224.1 kg | C2102 C2102 C2102 | 51052/1.1 98682/1.1 98682/1.1 | |
| Magnesium Hydroxide | 46 +/- 0.5 kg | 46 kg | C2119 | 47334/1.1 | |
| Manganese Dioxide | 52 +/- 0.5 kg | 52 kg | C2137 | 97657/1.1 | |
| Silicon Dioxide | 1159 +/- 12 kg | 1159.8 kg | C2107 | 97714/1.1 51030/1.2 | |

VOSS Signature Date 7-23-02 SAE Review Date 7-24-02

WV-2756, Rev. 1

# Cold Chemical Feed Batch Preparation

Slurry Batch # 77

Tank # 65-D-02 Description Final Glass Former SAE H.S. Dhingra Date 7/22/02

| Chemical | Amount Required | Amount Addded | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Titanium Dioxide | 40 +/- 0.4 kg | 44.5 | C2126 | 45079/1.1<br>98737/1.1 | J Wieden |
| Lithium Hyroxide Monohydrate | 65 +/- .7 kg | 65 | C2108 | 97615/1.1 | J Wieden |
| Borox | 102 +/- 1 kg | 102 | C2143 | 48159/1.2 | J Wieden |
| Potassium Hydroxide | 177 +/- 2 kg | 177 | C2112 | 46509/1.1<br>58444/1.1 | J Wieden |
| P-1200 Anti Foam | 18 +/- 0.2 kg | 18.2 | N/A | PE22010883<br>PE22010883 | J Wieden |
| | | | | | |
| | | | | | |
| | | Nothing further | to be added | | |
| | | | | | |
| | | 7-24-02 | | | |
| | | | | | |

VOSS Signature Date 7-23-02 SAE Review Date 7-24-02

WV-2756, Rev. 1

# Cold Chemical Feed Batch Preparation

Slurry Batch # 77

Tank # 65-0-02 Description Premix SAE R. Palmer Date 7-10-02

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Demin Water | 700 ± 7 L | 700 L | NA | NA | J Weeks |
| Concentrated Nitric Acid | 400 ± 4 L | 400.05 L | NA | NA | J Weeks |
| Ferric Hydroxide (20 L/drum Flush) (15 drums) | 3402 ± 40 kg | 3406.6 KG. | C2150 | 100937/1.20 98429/1.5 | [illegible] |
| Aluminum Hydroxide (2 drums) | 250 ± 3 kg | 249.9 KG. | C2102 | 98682/1.1 | [illegible] |
| Lithium Hydroxide Monohydrate (3 drums) | 480 ± 5 kg | 480.0 KG. | C2108 | 97615/1.1 | [illegible] |
| Silicon Dioxide (4 drums) | 889 ± 10 kg | 889.1 KG. | C2107 | 97714/1.2 | [illegible] |
| Potassium Hydroxide (2 drums) | 480 ± 5 kg | 480.3 Kg | C2112 | 46509/1.1 | [illegible] |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Nothing further 7-10-02

VOSS Signature [illegible] Date 7-17-02 SAE Review [illegible] Date 7-18-02

# Glass Former Analyses

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** ☐ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page 1 of 5*

***Login Date:*** *24-Jul-02* ***VAST Sample ID:*** *02-1151*

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | Density/Total S | **Customer's ID:** | B77GF4-6 |
| **Collected:** | 7/24/2002 0900 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| Density | 1.32 (19.6 °C) | g/mL | | Rep1 (B77 GF #4): U1 |
| Density | 1.31 (19.6 °C) | g/mL | | Rep2 (B77 GF #5): U1 |
| Density | 1.33 (19.6 °C) | g/mL | | Rep3 (B77 GF #6): U1 |
| Tot Solids | 42.16 | WT % | | Rep1 (B77 GF #4): U1 |
| Tot Solids | 42.18 | WT % | | Rep2 (B77 GF #5): U1 |
| Tot Solids | 42.41 | WT % | | Rep3 (B77 GF #6): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Name: [signature]

Date & Time: 07-24-02 1615

***Report Date:*** *24-Jul-02*

2 of 5

**WEST VALLEY DEMONSTRATION PROJECT**
**ANALYTICAL REQUEST**

Page ~~2 of 2~~

VAST Sample ID: 02-1151 Login Date: 7/24/02 WSM 07-24-0

**To be Completed by the Customer**

Customer Department: HLW Completion

Sample Point: D-02

Sample Type (check one):

☒liquid ☐solid ☐powder/dust

☐ smear ☐coupon ☐other:

Customer's Sample ID No.: 77GF4 - 77GF5

Collection Date/Time: 7/24/02 0900

Collection Location: Cold Chem

Sample Collector: [signature]

Report Recipients: fax to 4169; SAE (MS-08)

Is this sample suspected to contain radioactive material? X no ____ yes

If yes, is the gross activity suspected to be > 5E-03 µCi/mL or > 5E-03 uCi/g?
X no ____ yes

If dose rate is >10mR/hr w/c or >100 mR/hr w/o, contact lab management prior to delivery of sample

Survey Results (To be completed by Radiation Protection as applicable):

N/A cpm α direct * ____ cpm βγ direct *

____ mR/hr w/c ____ mR/hr w/o

RP Tech: ____ Date: ____

* on contact with sample material

Sample Charge Number: WH1210006

Hazards (acid, base, solvent, Cr, Ba, etc.):

__ no X yes - list: Acid

Sample Disposal Instructions (check appropriate):

☐ return to customer
☐ upon completion of analyses
☒ with customer approval
☐ other:

Requested Due Date: 7/02 7/25/02 (Date Only)

Is the sampling designated HLW? __ yes X no __ n/a

If yes or no, is the activity identified on the WVDP HLW Items and Activities List? X yes __ no

If yes, Is the HLW Screening Form Attached? __ yes X no

Comments:
Notify SAE when complete. Include copy of this form with results.

Supervisor / Manager Signature: [signature]

To be filled in after sample delivery to the laboratory:

Delivered by: [signature] Date: 7/24/02 Time: 0930 Received by: JDH Date: 7/24/02 Time: 1000

**ANALYSES TO BE COMPLETED**

List below the analyses to be performed, the desired units, and any applicable notes (to duplicate the analysis, etc.). Completed analyses will be reported to the Report Recipient on a separate form.

| Analysis | Units | Note | Analysis | Units | Note | Analysis | Units | Note |
|---|---|---|---|---|---|---|---|---|
| Density | g/mL | 250mL bottle ✓ | | | | | | |
| Total Solids | % WT | 250mL bottle ✓ | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

APPENDIX C
Transfer Data Sheet
(Page 1 of 1)

Level for Glass Former Samples

Section 1

Slurry Batch # 77

| | Send Tank BEFORE | Receipt Tank BEFORE |
|---|---|---|
| Tank Name | Mix Tank | |
| Tank Number | D-02 | |
| Date | 7-24-02 | |
| Time | 0920 | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) 77.4 | 77.3 77.4 77.4 | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) 1.205 | 1.208 1.204 1.204 | |
| Temp. (°C) | N/A | |
| Average Volume (L) | 11,798 L | |

* Instantaneous Readings

7-23-02

Section 2

Volume to be transferred _____

SAE Signature _____ Date _____

Shift Engineer Signature _____ Date _____

Section 3

| | Send Tank AFTER | Receipt Tank AFTER |
|---|---|---|
| Tank Name | | |
| Tank Number | | |
| Date | | |
| Time | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | 7-23-02 | |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | |
| Temp. (°C) | | |
| Average Volume (L) | | |

Total Flush Water (L) _____

VOSS Signature _____ Date _____

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(WV-48);SAE FAX 4169

**Copied for Recipients** ☑ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page* 1 *of* 15

***Login Date:*** *24-Jul-02* ***VAST Sample ID:*** *02-1150*

| | |
|---|---|
| **Sample Point:** | GLASSFORMERS |
| **Sample Type:** | ICP/NO3 |
| **Collected:** | 7/24/2002 0900 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | B77GF1-3 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| NO3 | 5.90E+4 | ug/g | | Rep1 (B77GF #1): U1 |
| NO3 | 5.84E+4 | ug/g | | Rep2 (B77GF #1 DUP): U1 |
| NO3 | 5.99E+4 | ug/g | | Rep3 (B77GF #2): U1 |
| NO3 | 5.85E+4 | ug/g | | Rep4 (B77GF #2 DUP): U1 |
| NO3 | 6.74E+4 | ug/g | | Rep5 (B77GF #3): U1 |
| NO3 | 5.88E+4 | ug/g | | Rep6 (B77GF #3 DUP): U1 |
| Al | 1.19E+4 | ug/g | | Rep1 (B77GF #1): U1 |
| Al | 1.18E+4 | ug/g | | Rep2 (B77GF #2): U1 |
| Al | 1.19E+4 | ug/g | | Rep3 (B77GF #3): U1 |
| B | 1.35E+4 | ug/g | | Rep1 (B77GF #1): U1 |
| B | 1.35E+4 | ug/g | | Rep2 (B77GF #2): U1 |
| B | 1.34E+4 | ug/g | | Rep3 (B77GF #3): U1 |
| Ca | <1.82E+2 | ug/g | | Rep1 (B77GF #1): no flags |
| Ca | <1.79E+2 | ug/g | | Rep2 (B77GF #2): no flags |
| Ca | <1.61E+2 | ug/g | | Rep3 (B77GF #3): no flags |
| Fe | 3.02E+4 | ug/g | | Rep1 (B77GF #1): U1 |
| Fe | 3.03E+4 | ug/g | | Rep2 (B77GF #2): U1 |
| Fe | 2.95E+4 | ug/g | | Rep3 (B77GF #3): U1 |
| K | 1.44E+4 | ug/g | | Rep1 (B77GF #1): U1 |
| K | 1.44E+4 | ug/g | | Rep2 (B77GF #2): U1 |

**Approved By**

Jacqueline D. Hill — **Name**

7/25/02 0930 — **Date & Time**

***Report Date:*** *25-Jul-02*

**Login Date:** 24-Jul-02 **VAST Sample ID:** 02-1150

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | ICP/NO3 | **Customer's ID:** | B77GF1-3 |
| **Collected:** | 7/24/2002 0900 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| K | 1.40E+4 | ug/g | | Rep3 (B77GF #3): U1 |
| Li | 6.39E+3 | ug/g | | Rep1 (B77GF #1): U1 |
| Li | 6.38E+3 | ug/g | | Rep2 (B77GF #2): U1 |
| Li | 6.38E+3 | ug/g | | Rep3 (B77GF #3): U1 |
| Mg | 2.39E+3 | ug/g | | Rep1 (B77GF #1): U1 |
| Mg | 2.41E+3 | ug/g | | Rep2 (B77GF #2): U1 |
| Mg | 2.52E+3 | ug/g | | Rep3 (B77GF #3): U1 |
| Mn | 2.13E+3 | ug/g | | Rep1 (B77GF #1): U1 |
| Mn | 2.12E+3 | ug/g | | Rep2 (B77GF #2): U1 |
| Mn | 2.14E+3 | ug/g | | Rep3 (B77GF #3): U1 |
| Na | <2.73E+3 | ug/g | | Rep1 (B77GF #1): no flags |
| Na | <2.68E+3 | ug/g | | Rep2 (B77GF #2): no flags |
| Na | <2.41E+3 | ug/g | | Rep3 (B77GF #3): no flags |
| P | 1.85E+3 | ug/g | | Rep1 (B77GF #1): U1 |
| P | 1.93E+3 | ug/g | | Rep2 (B77GF #2): U1 |
| P | 1.91E+3 | ug/g | | Rep3 (B77GF #3): U1 |
| Si | 6.86E+4 | ug/g | | Rep1 (B77GF #1): U1 |
| Si | 6.89E+4 | ug/g | | Rep2 (B77GF #2): U1 |
| Si | 6.96E+4 | ug/g | | Rep3 (B77GF #3): U1 |
| Ti | 1.93E+3 | ug/g | | Rep1 (B77GF #1): U1 |
| Ti | 1.92E+3 | ug/g | | Rep2 (B77GF #2): U1 |
| Ti | 1.92E+3 | ug/g | | Rep3 (B77GF #3): U1 |
| Zr | 3.59E+3 | ug/g | | Rep1 (B77GF #1): U1 |
| Zr | 3.57E+3 | ug/g | | Rep2 (B77GF #2): U1 |
| Zr | 3.55E+3 | ug/g | | Rep3 (B77GF #3): U1 |

**Approved By**

Jacqueline D. Hill — Name

7/25/02 0930 — Date & Time

**Login Date: 24-Jul-02** **VAST Sample ID: 02-1150**

| | | | |
|---|---|---|---|
| **Sample Point:** | GLASSFORMERS | **Department** | HLWO (VIT) |
| **Sample Type:** | ICP/NO3 | **Customer's ID:** | B77GF1-3 |
| **Collected:** | 7/24/2002 0900 | | |

| Analysis | Result *** | Uncertainty | Lab Use Only |
|---|---|---|---|
| | | | |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Jacqueline D. Hill — **Name**

7/25/02 0930 — **Date & Time**

# Glass Former SAMPSTAT, COLDCHEM, & MASSBAL

```
##################################################################################
##################################################################################
##################################################################################
##        SSSSSS    AAAAA    MMM    MMM  PPPPPPP    SSSSSS  TTTTTTTT   AAAAA  ##
##      SS         AA   AA   MM M  M MM  PP    PP  SS          TT     AA   AA  ##
##     SS         AA   AA   MM  M   MM  PP    PP  SS          TT     AA   AA  ##
##     SSSSS    AAAAAAA   MM      MM  PPPPPP      SSSSS      TT     AAAAAAA   ##
##        SS   AA   AA   MM      MM  PP              SS     TT     AA   AA     ##
##       SS   AA   AA   MM      MM  PP              SS     TT     AA   AA     ##
## SSSSSS    AA   AA   MM      MM  PP        SSSSSS      TT     AA   AA       ##
##################################################################################
##################################################################################
#########                                                                #########
#########       WVNS   VITRIFICATION   LAB   SAMPLE   STATISTICS        #########
#########                          (Version 2.0)                         #########
##################################################################################
##################################################################################
##################################################################################
#########                                                                #########
#########   Statistically analyzes each component in a batch of waste   #########
#########   samples from a mixing tank, deletes the outliers, and       #########
#########   computes a two-sided, 95% confidence limit.  The true mean  #########
#########   of an infinite population of samples lies in the range of   #########
#########   the mean +/- the percent error of the sample mean.           #########
#########                                                                #########
##################################################################################
##################################################################################
##################################################################################
#########                                                                #########
#########   SAMPLE DATA IDS:  hsd77gfwi                                  #########
#########   SAMPLE DATA FILE: HSD77GF                                    #########
#########   THU JUL 25, 2002                                 10:02:26    #########
#########   SYSTEM: ALPHA1                                               #########
#########                                                                #########
##################################################################################
##################################################################################
##################################################################################
```

H.S. [illegible]
7/26/02
11[illegible]

[illegible]
7-25-02
1200

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77gfwi
SAMPLE FILE: HSD77GF

THU JUL 25, 2002
10:02:26
DENSITY (g/ml): N/A

*** LAB SAMPLE DATA ***

Element NP 3-31-03

| Element | Sample Data (ug/g) | | | *-Denotes Outlier |
|---|---|---|---|---|
| Al | 11900.00 | 11800.00 | 11900.00 | |
| B | 13500.00 | 13500.00 | 13400.00 | |
| Ca | 182.00 | 179.00 | 161.00 | |
| Fe | 30200.00 | 30300.00 | 29500.00 | |
| K | 14400.00 | 14400.00 | 14000.00 | |
| Li | 6390.00 | 6380.00 | 6380.00 | |
| Mg | 2390.00 | 2410.00 | 2520.00 | |
| Mn | 2130.00 | 2120.00 | 2140.00 | |
| Na | 2730.00 | 2880.00 | 2410.00 | |
| P | 1850.00 | 1930.00 | 1910.00 | |
| Si | 68600.00 | 68900.00 | 69600.00 | |
| Ti | 1930.00 | 1920.00 | 1920.00 | |
| Zr | 3590.00 | 3570.00 | 3550.00 | |

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77gfwi
SAMPLE FILE: HSD77GF

THU JUL 25, 2002
10:02:26
DENSITY (g/ml): N/A

*** LAB SAMPLE STATISTICS ***

| Elem | N | OL | Mean | Maximum | Minimum | Std Dev | Conf Limit | %Error |
|---|---|---|---|---|---|---|---|---|
| Al | 03 | 00 | 11866.67 | 11900.00 | 11800.00 | 57.74 | 143.42 | 1.21 |
| B | 03 | 00 | 13466.67 | 13500.00 | 13400.00 | 57.74 | 143.42 | 1.07 |
| Ca | 03 | 00 | 174.00 | 182.00 | 161.00 | 11.36 | 28.21 | 16.22 |
| Fe | 03 | 00 | 30000.00 | 30300.00 | 29500.00 | 435.89 | 1082.81 | 3.61 |
| K | 03 | 00 | 14266.67 | 14400.00 | 14000.00 | 230.94 | 573.69 | 4.02 |
| Li | 03 | 00 | 6383.33 | 6390.00 | 6380.00 | 5.77 | 14.34 | 0.22 |
| Mg | 03 | 00 | 2440.00 | 2520.00 | 2390.00 | 70.00 | 173.89 | 7.13 |
| Mn | 03 | 00 | 2130.00 | 2140.00 | 2120.00 | 10.00 | 24.84 | 1.17 |
| Na | 03 | 00 | 2673.33 | 2880.00 | 2410.00 | 240.07 | 596.37 | 22.31 |
| P | 03 | 00 | 1896.67 | 1930.00 | 1850.00 | 41.63 | 103.42 | 5.45 |
| Si | 03 | 00 | 69033.34 | 69600.00 | 68600.00 | 513.16 | 1274.76 | 1.85 |
| Ti | 03 | 00 | 1923.33 | 1930.00 | 1920.00 | 5.77 | 14.34 | 0.75 |
| Zr | 03 | 00 | 3570.00 | 3590.00 | 3550.00 | 20.00 | 49.68 | 1.39 |

N = Number of data samples.
OL = Number of outlier samples.
N - OL = Number of samples used for statistics.

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77gfwi
SAMPLE FILE: HSD77GF

THU JUL 25, 2002
10:02:26
DENSITY (g/ml): N/A

*** Oxide Data Generated From Mean Samples ***

ICP Desc:
Volume (l): 11798.00
Density (g/ml): 1.2050
Total Oxides (kg): 4410.718

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 11866.67 | Al2O3 | 318.7115 | 7.2258 |
| B | 3.219334 | 13466.67 | B2O3 | 616.3417 | 13.9737 |
| Ca | 1.399052 | 174.00 | CaO | 3.4608 | 0.0785 |
| Fe | 1.429584 | 30000.00 | Fe2O3 | 609.7143 | 13.8235 |
| K | 1.204537 | 14266.67 | K2O | 244.3083 | 5.5390 |
| Li | 2.152139 | 6383.33 | Li2O | 195.3050 | 4.4280 |
| Mg | 1.658054 | 2440.00 | MgO | 57.5154 | 1.3040 |
| Mn | 1.291128 | 2130.00 | MnO | 39.0971 | 0.8864 |
| Na | 1.347862 | 2673.33 | Na2O | 51.2264 | 1.1614 |
| P | 2.290963 | 1896.67 | P2O5 | 61.7738 | 1.4005 |
| Si | 2.138930 | 69033.34 | SiO2 | 2099.1858 | 47.5928 |
| Ti | 1.665027 | 1923.33 | TiO2 | 45.5272 | 1.0322 |
| Zr | 1.350669 | 3570.00 | ZrO2 | 68.5508 | 1.5542 |

```
##############################################################################
##############################################################################
##############################################################################
##          CCCC     CCCC     CCCC    HH   HH   EEEEEEE    CCCC    KK   KK    ##
##        CC   C   CC   C   CC   C   HH   HH   EE         CC   C   KK  KK     ##
##       CC       CC       CC       HH   HH   EE        CC       KK K        ##
##      CC       CC       CC       HHHHHHH   EEEE      CC       KK           ##
##     CC       CC       CC       HH   HH   EE       CC       KK K          ##
##    CC   C   CC   C   CC   C   HH   HH   EE       CC   C   KK  KK          ##
##    CCCC     CCCC     CCCC    HH   HH   EEEEEEE    CCCC    KK    KK        ##
##############################################################################
##############################################################################
#########                                                            #########
#########        WVNS   VITRIFICATION   COLD   CHEMICAL   CHECK      #########
#########                        (Version 2.2)                       #########
##############################################################################
##############################################################################
##############################################################################
#########                                                            #########
#########   The Cold Chemical Check program allows verification of   #########
#########   the cold chemical makeup in a mixing tank.  The oxide    #########
#########   content for a given batch is determined from elemental   #########
#########   analysis.  The cold chemical check values are determined #########
#########   by comparing the makeup in the mixing tank against the   #########
#########   amount of oxides required by CHEMADD calculations.       #########
#########                                                            #########
##############################################################################
##############################################################################
##############################################################################
#########                                                            #########
#########   USER:    HARDIP                                 10:06:11 #########
#########   BADGE#:  0000                          THU JUL 25, 2002  #########
#########   SYSTEM:  ALPHA1                                          #########
#########                                                            #########
##############################################################################
##############################################################################
##############################################################################
```

H.S. [illegible]
7/26/02
11[illegible]

VITRIFICATION COLD CHEMICAL CHECK
HARDIP

BADGE#: 0000

THU JUL 25, 2002
10:06:11

*** Cold Chemical Check Data ***

MMT File: HSD77_MMT_GF_ICP.DAT
Recipe File: HSD77_CFMT_WI.RCP

| Oxide Name | Mix Tank Wt(kg) | Needed Wt(kg) | Excess(kg) or deficit(-) | % Difference |
|---|---|---|---|---|
| Al2O3 | 318.712 | 304.448 | 14.264 | 4.685 |
| B2O3 | 616.342 | 607.041 | 9.301 | 1.532 |
| BaO | 0.000 | 0.000 | 0.000 | 0.000 |
| CaO | 3.461 | 25.137 | -21.676 | -86.232 |
| Ce2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cs2O | 0.000 | 6.400 | -6.400 | -100.000 |
| CuO | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe2O3 | 609.714 | 631.755 | -22.041 | -3.489 |
| K2O | 244.308 | 246.233 | -1.925 | -0.782 |
| La2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Li2O | 195.305 | 191.032 | 4.273 | 2.237 |
| MgO | 57.515 | 30.639 | 26.876 | 87.719 |
| MnO | 39.097 | 42.546 | -3.449 | -8.106 |
| MoO3 | 0.000 | 0.000 | 0.000 | 0.000 |
| Na2O | 51.226 | 18.022 | 33.204 | 184.244 |
| Nd2O3 | 0.000 | 0.000 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 | 0.000 | 0.000 |
| P2O5 $P_2O_5$ MA 3-31-03 | 61.774 | 60.826 | 0.948 | 1.558 |
| Pr6O11 $Pr_6O_{11}$ | 0.000 | 0.000 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 | 0.000 | 0.000 |
| SiO2 | 2099.186 | 2047.754 | 51.431 | 2.512 |
| SrO | 0.000 | 0.000 | 0.000 | 0.000 |
| ThO2 | 0.000 | 273.030 | -273.030 | -100.000 |
| TiO2 | 45.527 | 40.361 | 5.166 | 12.800 |
| UO3 | 0.000 | 20.823 | -20.823 | -100.000 |
| ZnO | 0.000 | 0.000 | 0.000 | 0.000 |
| ZrO2 | 68.551 | 68.671 | -0.121 | -0.176 |
| Totals: | 4410.718 | 4614.718 | -204.000 | -4.421 |

VITRIFICATION COLD CHEMICAL CHECK THU JUL 25, 2002
HARDIP BADGE#: 0000 10:06:11

*** Mix Tank Composition from ICP Measurements ***

Data File: HSD77_MMT_GF_ICP.DAT
ICP Desc:
Volume (l): 11798.00
Density (g/ml): 1.2050
Total Oxides (kg): 4410.718

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 11866.67 | Al2O3 | 318.7115 | 7.2258 |
| B | 3.219334 | 13466.67 | B2O3 | 616.3417 | 13.9737 |
| Ba | 1.116464 | 0.00 | BaO | 0.0000 | 0.0000 |
| Ca | 1.399052 | 174.00 | CaO | 3.4608 | 0.0785 |
| Ce | 1.171269 | 0.00 | Ce2O3 | 0.0000 | 0.0000 |
| Cr | 1.461401 | 0.00 | Cr2O3 | 0.0000 | 0.0000 |
| Cs | 1.060173 | 0.00 | Cs2O | 0.0000 | 0.0000 |
| Cu | 1.251692 | 0.00 | CuO | 0.0000 | 0.0000 |
| Fe | 1.429584 | 30000.00 | Fe2O3 | 609.7143 | 13.8235 |
| K | 1.204537 | 14266.67 | K2O | 244.3083 | 5.5390 |
| La | 1.172721 | 0.00 | La2O3 | 0.0000 | 0.0000 |
| Li | 2.152139 | 6383.33 | Li2O | 195.3050 | 4.4280 |
| Mg | 1.658054 | 2440.00 | MgO | 57.5154 | 1.3040 |
| Mn | 1.291128 | 2130.00 | MnO | 39.0971 | 0.8864 |
| Mo | 1.500125 | 0.00 | MoO3 | 0.0000 | 0.0000 |
| Na | 1.347862 | 2673.33 | Na2O | 51.2264 | 1.1614 |
| Nd | 1.166400 | 0.00 | Nd2O3 | 0.0000 | 0.0000 |
| Ni | 1.272470 | 0.00 | NiO | 0.0000 | 0.0000 |
| P | 2.290963 | 1896.67 | P2O5 | 61.7738 | 1.4005 |
| Pr | 1.170300 | 0.00 | Pr6O11 | 0.0000 | 0.0000 |
| S | 2.496631 | 0.00 | SO3 | 0.0000 | 0.0000 |
| Si | 2.138930 | 69033.34 | SiO2 | 2099.1858 | 47.5928 |
| Sr | 1.182538 | 0.00 | SrO | 0.0000 | 0.0000 |
| Th | 1.137931 | 0.00 | ThO2 | 0.0000 | 0.0000 |
| Ti | 1.665027 | 1923.33 | TiO2 | 45.5272 | 1.0322 |
| U | 1.204267 | 0.00 | UO3 | 0.0000 | 0.0000 |
| Zn | 1.244631 | 0.00 | ZnO | 0.0000 | 0.0000 |
| Zr | 1.350669 | 3570.00 | ZrO2 | 68.5508 | 1.5542 |

VITRIFICATION COLD CHEMICAL CHECK
HARDIP

BADGE#: 0000

THU JUL 25, 2002
10:06:11

*** Recipe Requirements Data ***

Data File: HSD77_CFMT_WI.RCP
Number of Oxides: 34

| Oxide | Recipe Wt(kg) | Current Wt(kg) | Needed Wt(kg) |
|---|---|---|---|
| Al2O3 | 480.000 | 175.553 | 304.448 |
| B2O3 | 1031.200 | 424.159 | 607.041 |
| BaO | 0.000 | 0.000 | 0.000 |
| CaO | 38.400 | 13.263 | 25.137 |
| Ce2O3 | 0.000 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 | 0.000 |
| Cs2O | 6.400 | 0.000 | 6.400 |
| CuO | 0.000 | 0.000 | 0.000 |
| Fe2O3 | 961.600 | 329.845 | 631.755 |
| K2O | 400.000 | 153.767 | 246.233 |
| La2O3 | 0.000 | 0.000 | 0.000 |
| Li2O | 296.800 | 105.768 | 191.032 |
| MgO | 71.200 | 40.561 | 30.639 |
| MnO | 65.600 | 23.054 | 42.546 |
| MoO3 | 0.000 | 0.000 | 0.000 |
| Na2O | 640.000 | 621.978 | 18.022 |
| Nd2O3 | 0.000 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 | 0.000 |
| P2O5 | 96.000 | 35.174 | 60.826 |
| Pr6O11 | 0.000 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 | 0.000 |
| SiO2 | 3278.400 | 1230.646 | 2047.754 |
| SrO | 0.000 | 0.000 | 0.000 |
| ThO2 | 284.800 | 11.770 | 273.030 |
| TiO2 | 64.000 | 23.639 | 40.361 |
| UO3 | 50.400 | 29.577 | 20.823 |
| ZnO | 0.000 | 0.000 | 0.000 |
| ZrO2 | 105.600 | 36.929 | 68.671 |
| Totals: | 7870.401 | 3255.683 | 4614.718 |

```
##############################################################################
##############################################################################
##############################################################################
##        MMM     MMM     AAAAA      SSSSSS    SSSSSS   BBBBBB      AAAAA     LL     ##
##       MM M   M MM    AA   AA    SS         SS         BB   BB    AA   AA    LL      ##
##      MM  M    MM    AA   AA    SS         SS         BB   BB    AA   AA    LL      ##
##     MM  M    MM    AAAAAAA     SSSSS      SSSSS     BBBBBB     AAAAAAA    LL      ##
##    MM       MM    AA   AA         SS         SS    BB   BB    AA   AA    LL        ##
##   MM       MM    AA   AA         SS         SS    BB   BB    AA   AA    LL        ##
## MM       MM    AA   AA    SSSSSS     SSSSSS     BBBBBB     AA   AA    LLLLLLL     ##
##############################################################################
##############################################################################
##########                                                            ##########
##########        WVNS   VITRIFICATION   OXIDE   MASS   BALANCE        ##########
##########                        (Version 2.2)                       ##########
##############################################################################
##############################################################################
##############################################################################
##########                                                            ##########
##########   MASSBAL calculates the oxide masses in the main mix tank ##########
##########   and the concentrator feed makeup tank from elemental     ##########
##########   metal composition.    This is compared against the target ##########
##########   mass producing balance values for each oxide.           ##########
##########                                                            ##########
##############################################################################
##############################################################################
##############################################################################
##########                                                            ##########
##########   USER:    HARDIP                                 10:10:45 ##########
##########   BADGE#:  0000                          THU JUL 25, 2002  ##########
##########   SYSTEM:  ALPHA1                                          ##########
##########                                                            ##########
##############################################################################
##############################################################################
##############################################################################
```

H.S. Dhaliwal
7/25/02
11:02

VITRIFICATION OXIDE MASS BALANCE
HARDIP

BADGE#: 0000

THU JUL 25, 2002
10:10:45

*** Oxide Mass Balance Data ***

MMT File: HSD77_MMT_GF_ICP.DAT
CFMUT File: HSD77_CFMT_WI_ICP.DAT
Target File: FEED.DAT

| Oxide Name | MMT Wt(kg) | CFMUT Wt(kg) | Target Wt(kg) | MMT Excess(kg) or Deficit(-) | % Difference |
|---|---|---|---|---|---|
| Al2O3 | 318.712 | 175.553 | 480.000 | 14.264 | 2.972 |
| B2O3 | 616.342 | 424.159 | 1031.200 | 9.301 | 0.902 |
| BaO | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| CaO | 3.461 | 13.263 | 38.400 | -21.676 | -56.447 |
| Ce2O3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cs2O | 0.000 | 0.000 | 6.400 | -6.400 | -100.000 |
| CuO | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe2O3 | 609.714 | 329.845 | 961.600 | -22.041 | -2.292 |
| K2O | 244.308 | 153.767 | 400.000 | -1.925 | -0.481 |
| La2O3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Li2O | 195.305 | 105.768 | 296.800 | 4.273 | 1.440 |
| MgO | 57.515 | 40.561 | 71.200 | 26.876 | 37.748 |
| MnO | 39.097 | 23.054 | 65.600 | -3.449 | -5.257 |
| MoO3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Na2O | 51.226 | 621.978 | 640.000 | 33.204 | 5.188 |
| Nd2O3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ni O | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| P2O5 | 61.774 | 35.174 | 96.000 | 0.948 | 0.987 |
| Pr6O11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| SiO2 | 2099.186 | 1230.646 | 3278.400 | 51.432 | 1.569 |
| SrO | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| ThO2 | 0.000 | 11.770 | 284.800 | -273.030 | -95.867 |
| TiO2 | 45.527 | 23.639 | 64.000 | 5.166 | 8.072 |
| UO3 | 0.000 | 29.577 | 50.400 | -20.823 | -41.315 |
| ZnO | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| ZrO2 | 68.551 | 36.929 | 105.600 | -0.121 | -0.114 |
| Totals: | 4410.718 | 3255.683 | 8000.000 | -333.599 | -4.170 |

NiO MgP
P2O5 3-31-03

Too much Mg, but it should still pass PCT check

H.S. [illegible]
7/25/02

VITRIFICATION OXIDE MASS BALANCE
HARDIP

BADGE#: 0000

THU JUL 25, 2002
10:10:45

*** Main Mix Tank (MMT) Composition from ICP Measurements ***

Data File: HSD77_MMT_GF_ICP.DAT
ICP Desc:
Volume (l): 11798.00
Density (g/ml): 1.2050
Total Oxides (kg): 4410.718

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 11866.67 | Al2O3 | 318.7115 | 7.2258 |
| B | 3.219334 | 13466.67 | B2O3 | 616.3417 | 13.9737 |
| Ba | 1.116464 | 0.00 | BaO | 0.0000 | 0.0000 |
| Ca | 1.399052 | 174.00 | CaO | 3.4608 | 0.0785 |
| Ce | 1.171269 | 0.00 | Ce2O3 | 0.0000 | 0.0000 |
| Cr | 1.461401 | 0.00 | Cr2O3 | 0.0000 | 0.0000 |
| Cs | 1.060173 | 0.00 | Cs2O | 0.0000 | 0.0000 |
| Cu | 1.251692 | 0.00 | CuO | 0.0000 | 0.0000 |
| Fe | 1.429584 | 30000.00 | Fe2O3 | 609.7143 | 13.8235 |
| K | 1.204537 | 14266.67 | K2O | 244.3083 | 5.5390 |
| La | 1.172721 | 0.00 | La2O3 | 0.0000 | 0.0000 |
| Li | 2.152139 | 6383.33 | Li2O | 195.3050 | 4.4280 |
| Mg | 1.658054 | 2440.00 | MgO | 57.5154 | 1.3040 |
| Mn | 1.291128 | 2130.00 | MnO | 39.0971 | 0.8864 |
| Mo | 1.500125 | 0.00 | MoO3 | 0.0000 | 0.0000 |
| Na | 1.347862 | 2673.33 | Na2O | 51.2264 | 1.1614 |
| Nd | 1.166400 | 0.00 | Nd2O3 | 0.0000 | 0.0000 |
| Ni | 1.272470 | 0.00 | NiO | 0.0000 | 0.0000 |
| P | 2.290963 | 1896.67 | P2O5 | 61.7738 | 1.4005 |
| Pr | 1.170300 | 0.00 | Pr6O11 | 0.0000 | 0.0000 |
| S | 2.496631 | 0.00 | SO3 | 0.0000 | 0.0000 |
| Si | 2.138930 | 69033.34 | SiO2 | 2099.1858 | 47.5928 |
| Sr | 1.182538 | 0.00 | SrO | 0.0000 | 0.0000 |
| Th | 1.137931 | 0.00 | ThO2 | 0.0000 | 0.0000 |
| Ti | 1.665027 | 1923.33 | TiO2 | 45.5272 | 1.0322 |
| U | 1.204267 | 0.00 | UO3 | 0.0000 | 0.0000 |
| Zn | 1.244631 | 0.00 | ZnO | 0.0000 | 0.0000 |
| Zr | 1.350669 | 3570.00 | ZrO2 | 68.5508 | 1.5542 |

VITRIFICATION OXIDE MASS BALANCE
HARDIP

BADGE#: 0000

THU JUL 25, 2002
10:10:45

*** Concentrator Feed Makeup Tank (CFMUT) Composition from ICP Measurements ***

Data File: HSD77_CFMT_WI_ICP.DAT
ICP Desc:
Volume (l): 18602.40
Density (g/ml): 1.1800
Total Oxides (kg): 3255.683

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 4233.33 | Al2O3 | 175.5525 | 5.3922 |
| B | 3.219334 | 6002.22 | B2O3 | 424.1594 | 13.0283 |
| Ba | 1.116464 | 0.00 | BaO | 0.0000 | 0.0000 |
| Ca | 1.399052 | 431.89 | CaO | 13.2635 | 0.4074 |
| Ce | 1.171269 | 0.00 | Ce2O3 | 0.0000 | 0.0000 |
| Cr | 1.461401 | 0.00 | Cr2O3 | 0.0000 | 0.0000 |
| Cs | 1.060173 | 0.00 | Cs2O | 0.0000 | 0.0000 |
| Cu | 1.251692 | 0.00 | CuO | 0.0000 | 0.0000 |
| Fe | 1.429584 | 10511.11 | Fe2O3 | 329.8445 | 10.1313 |
| K | 1.204537 | 5815.56 | K2O | 153.7667 | 4.7230 |
| La | 1.172721 | 0.00 | La2O3 | 0.0000 | 0.0000 |
| Li | 2.152139 | 2238.89 | Li2O | 105.7679 | 3.2487 |
| Mg | 1.658054 | 1114.44 | MgO | 40.5609 | 1.2459 |
| Mn | 1.291128 | 813.44 | MnO | 23.0541 | 0.7081 |
| Mo | 1.500125 | 0.00 | MoO3 | 0.0000 | 0.0000 |
| Na | 1.347862 | 21022.22 | Na2O | 621.9780 | 19.1044 |
| Nd | 1.166400 | 0.00 | Nd2O3 | 0.0000 | 0.0000 |
| Ni | 1.272470 | 0.00 | NiO | 0.0000 | 0.0000 |
| P | 2.290963 | 699.44 | P2O5 | 35.1740 | 1.0804 |
| Pr | 1.170300 | 0.00 | Pr6O11 | 0.0000 | 0.0000 |
| S | 2.496631 | 0.00 | SO3 | 0.0000 | 0.0000 |
| Si | 2.138930 | 26211.11 | SiO2 | 1230.6456 | 37.7999 |
| Sr | 1.182538 | 0.00 | SrO | 0.0000 | 0.0000 |
| Th | 1.137931 | 471.22 | ThO2 | 11.7704 | 0.3615 |
| Ti | 1.665027 | 646.78 | TiO2 | 23.6389 | 0.7261 |
| U | 1.204267 | 1118.89 | UO3 | 29.5775 | 0.9085 |
| Zn | 1.244631 | 0.00 | ZnO | 0.0000 | 0.0000 |
| Zr | 1.350669 | 1245.56 | ZrO2 | 36.9286 | 1.1343 |

VITRIFICATION OXIDE MASS BALANCE
HARDIP

BADGE#: 0000

THU JUL 25, 2002
10:10:45

*** Target Glass Composition ***

Data File: FEED.DAT
Number of Oxides: 28
Desired Total Oxides (kg): 8000.000

| Oxide Name | Target Wt % | Target Wt (kg) |
|---|---|---|
| Al2O3 | 6.000 | 480.000 |
| B2O3 | 12.890 | 1031.200 |
| BaO | 0.000 | 0.000 |
| CaO | 0.480 | 38.400 |
| Ce2O3 | 0.000 | 0.000 |
| Cr2O3 | 0.000 | 0.000 |
| Cs2O | 0.080 | 6.400 |
| CuO | 0.000 | 0.000 |
| Fe2O3 | 12.020 | 961.600 |
| K2O | 5.000 | 400.000 |
| La2O3 | 0.000 | 0.000 |
| Li2O | 3.710 | 296.800 |
| MgO | 0.890 | 71.200 |
| MnO | 0.820 | 65.600 |
| MoO3 | 0.000 | 0.000 |
| Na2O | 8.000 | 640.000 |
| Nd2O3 | 0.000 | 0.000 |
| NiO | 0.000 | 0.000 |
| P2O5 | 1.200 | 96.000 |
| Pr6O11 | 0.000 | 0.000 |
| SO3 | 0.000 | 0.000 |
| SiO2 | 40.980 | 3278.400 |
| SrO | 0.000 | 0.000 |
| ThO2 | 3.560 | 284.800 |
| TiO2 | 0.800 | 64.000 |
| UO3 | 0.630 | 50.400 |
| ZnO | 0.000 | 0.000 |
| ZrO2 | 1.320 | 105.600 |

# Glass Former to CFMT Transfer

Section 1

Slurry Batch # 77

65-D-02 glass former addition to CFMT

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | Mix Tank | | | CFMT | | | |
| Tank Number | 65-D-02 | | | 63-V-001 | | | |
| Date | 7/25/02 | | | 7/25/02 | | | |
| Time | 1120 | | | 1120 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 77.4 | N/A | N/A | 27.4 | 27.4 | 27.1 | 27.3 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.205 | N/A | N/A | 1.589 | 1.663 | 1.660 | 1.630 |
| Temp. (°C) | N/A | | | 29.1 | | | |
| Average Volume (L) | 11799 | | 7.31.02 | 4800.8 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred Entire Contents of 65-D-02

SAE Signature H.S. [illegible] Date 7/25/02

Shift Engineer Signature [illegible] Date 7-25-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | Mix Tank | | | CFMT | | | |
| Tank Number | 65-D-02 | | | 63-V-001 | | | |
| Date | | | | 7/25/02 | | | |
| Time | | | | ~~1430~~ 1430 7-25-02 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | N/A | | 88.3 | 88.5 | 87.9 | 88.2 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | 7/25/02 | | 1.339 | 1.428 | 1.424 | 1.397 |
| Temp. (°C) | | | | 26° | | | |
| Average Volume (L) | | | | 16022.6 | | | |

Total Flush Water (L) 252

VOSS Signature [illegible] Date 7-25-02

# Sugar Addition & Transfer to CFMT

Section 1

Slurry Batch # 77

SUGAR ADDITION

| | Send Tank BEFORE | | | Receipt Tank BEFORE | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SHIM TANK | | | CFMT | | | |
| Tank Number | D-04 | | | 63-V-001 | | | |
| Date | 7/30/02 | | | 7/30/02 | | | |
| Time | 1035 | | | 1030 | | | |
| LIX* (Inches) AGITATOR OFF (1, 2, or 3 readings) | 18.46 | 18.46 | 18.46 | 90.6 | 88.9 | 90.2 | 89.9 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | 1.332 | 1.332 | 1.332 | 1.329 | 1.418 | 1.409 | 1.385 |
| Temp. (°C) | 70°F | | | 78°C | | | |
| Average Volume (L) | 736 | | | 16335.9 | | | |

* Instantaneous Readings

Section 2

Volume to be transferred 736 L (EMPTY THE SHIM TANK)

SAE Signature H.S. [illegible] Date 7/30/02

Shift Engineer Signature [illegible] Date 7-30-02

Section 3

| | Send Tank AFTER | | | Receipt Tank AFTER | | | |
|---|---|---|---|---|---|---|---|
| Tank Name | SHIM TANK | | | CFMT | | | |
| Tank Number | D-04 | | | 63-V-001 | | | |
| Date | | | | 7-30-02 | | | |
| Time | | | | 1114 | | | |
| LIX (Inches) AGITATOR OFF (1, 2, or 3 readings) | | | | 96.3 | 96.5 | 95.9 | 96.3 |
| DIX (Sp.Gr.) AGITATOR OFF (1, 2, or 3 readings) | | | | 1.321 | 1.406 | 1.402 | 1.376 |
| Temp. (°C) | | | | 28°C | | | |
| Average Volume (L) | | | | 17515.2 | | | |

N/A HSD 7/30/02

Total Flush Water (L) 150

VOSS Signature [illegible] Date 7-30-02

# SUGAR CALCULATION

H.S. Dhingra
Date: 7-30-02

BATCH NUMBER 77

WGF DATA

| | | |
|---|---|---|
| NO3 | 114333 | ppm |
| TOC | 4666 | ppm |
| Zr | 3388 | ppm |
| CFMT VOL | 16022.6 | LITERS |
| CFMT DEN | 1.40 | g/mL |

MEASURABLE NITRATE CALCULATION 2559.18 kg NO3

NO3 FROM ZIRCONYL NITRATE 103.09 kg NO3

TOTAL NITRATE 2662.27 kg NO3

MEASURED TOC 104.44 kg TOC

ASSUME IFO=3 AND TS=0.55

TOC TO BE ADDED 294.90 kg TOC

SUGAR TO BE ADDED 700.02 kg SUGAR

ASSUMING A 70% SOLUTION IN WATER, ALSO ADD 300.01 L WATER

# Cold Chemical Feed Batch Preparation

Slurry Batch # 77

Tank # D-4 Description Sugar Shim SAR R. Palmer Date 7-29-02

| Chemical | Amount Required | Amount Added | Code # | Lot # | Added By |
|---|---|---|---|---|---|
| Demin Water | 300 ± 3 L | 300 L | — | — | [illegible] |
| Sucrose (Sugar) | 700 ± 7 Kg | 700 Kg | C2140 | 51107/1.1<br>58279/1.3 | [illegible] |
| | | Nothing further | | | |
| | | [illegible] 7-29-02 | | | |

VOSS Signature [illegible] Date 7-29-02 SAR Review R G Palmer Date 7-30-02

# Sugared Feed Analyses

# VAST

*Vitrification Analytical Sample Tracking*

## A&PC Report of Analysis

**Report Recipients:** SAE(MS-48);SAE FAX 4169

**Copied for Recipients** ☐ **FAXed to Recipients** ☒ **Copied for File** ☒

*package page* 1 *of* 16

***Login Date:*** *31-Jul-02* ***VAST Sample ID:*** *02-1183*

| | | | |
|---|---|---|---|
| **Sample Point:** | CFMT | **Department** | HLWO (VIT) |
| **Sample Type:** | SF (ACT #25C) | **Customer's ID:** | 77SF 1-3,7-8 |
| **Collected:** | 7/30/2002 2100 | | |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| TOC | 1.6E+4 | ug/g | | Rep1 (B77SF#1): U1 |
| TOC | 1.4E+4 | ug/g | | Rep2 (B77SF#1DUP): U1 |
| TOC | 1.6E+4 | ug/g | | Rep3 (B77SF#2): U1 |
| TOC | 1.6E+4 | ug/g | | Rep4 (B77SF#2DUP): U1 |
| TOC | 1.6E+4 | ug/g | | Rep5 (B77SF#3): U1 |
| TOC | 1.6E+4 | ug/g | | Rep6 (B77SF#3DUP): U1 |
| NO3 | 9.94E+4 | ug/g | | Rep1 (B77SF#1): U1 |
| NO3 | 8.75E+4 | ug/g | | Rep2 (B77SF#1DUP): U1 |
| NO3 | 9.78E+4 | ug/g | | Rep3 (B77SF#2): U1 |
| NO3 | 9.88E+4 | ug/g | | Rep4 (B77SF#2DUP): U1 |
| NO3 | 9.59E+4 | ug/g | | Rep5 (B77SF#3): U1 |
| NO3 | 9.82E+4 | ug/g | | Rep6 (B77SF#3DUP): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Chet W. Weam — **Name**

8/2/02 22:40 — **Date & Time**

***Report Date:*** *02-Aug-02*

VAST

Vitrification Analytical Sample Tracking

# A&PC Report of Analysis

**Report Recipients:** SAE(MS-48);SAE FAX 4169

**Copied for Recipients** ☐ **FAXed to Recipients** ☑ **Copied for File** ☑

*package page 1 of 5*

**Login Date:** *31-Jul-02* **VAST Sample ID:** *02-1184*

| | |
|---|---|
| **Sample Point:** | CFMT |
| **Sample Type:** | SF (ACT #25C) |
| **Collected:** | 7/30/2002 2100 |

| | |
|---|---|
| **Department** | HLWO (VIT) |
| **Customer's ID:** | 77SF 4-6 |

| Analysis | Result *** | | Uncertainty | Lab Use Only |
|---|---|---|---|---|
| pH | 6.5 (34 °C) | su | 0.1 | Rep1 (B77SF #4): no flags |
| pH | 6.5 (34 °C) | su | 0.1 | Rep2 (B77SF #5): no flags |
| pH | 6.5 (34 °C) | su | 0.1 | Rep3 (B77SF #6): no flags |
| Tot Solids | 49.86 | % | | Rep1 (B77SF-4): U1 |
| Tot Solids | 50.03 | % | | Rep2 (B77SF-5): U1 |
| Tot Solids | 49.57 | % | | Rep3 (B77SF-6): U1 |

**NOTES:** **(Contact the A&PC Supervisor if you have questions.)**

The uncertainty, if provided, pertains to the 95% confidence level on counting statistics.

*** The instrument used to determine gamma measurements is calibrated for samples of a specified matrix. The density associated with oil samples is not consistent with that of the specified sample matrix. Therefore, due to matrix of the sample and the unknown accuracy in which the sample was prepared, gamma results associated with oil samples are approximate.

'Lab Use Only' Flags: A0 - unknown approval error; A1 - approval not defined; A2 - approval not entered; A3 - result rejected

U0 - unknown uncertainty error; U1 - uncertainty not defined; U2 - uncertainty not entered

**Approved By**

Daryl A. Barlow — **Name**

8/1/02 1405 — **Date & Time**

***Report Date:*** *01-Aug-02*

VIT

# Waste + Glass Formers SAMPSTAT

```
##############################################################################
##############################################################################
##############################################################################
##         SSSSSS    AAAAA    MMM    MMM  PPPPPPP    SSSSSS  TTTTTTTT   AAAAA  ##
##       SS         AA   AA   MM M  M MM  PP    PP  SS          TT      AA   AA  ##
##      SS         AA   AA   MM  M   MM  PP    PP  SS          TT      AA   AA  ##
##      SSSSS    AAAAAAA   MM      MM  PPPPPP      SSSSS       TT      AAAAAAA   ##
##         SS   AA   AA   MM      MM  PP              SS      TT      AA   AA    ##
##        SS   AA   AA   MM      MM  PP              SS      TT      AA   AA    ##
## SSSSSS    AA   AA   MM      MM  PP        SSSSSS       TT      AA   AA      ##
##############################################################################
##############################################################################
##########                                                            ##########
##########       WVNS   VITRIFICATION   LAB   SAMPLE   STATISTICS      ##########
##########                          (Version 2.0)                     ##########
##############################################################################
##############################################################################
##############################################################################
##########                                                            ##########
##########   Statistically analyzes each component in a batch of waste ##########
##########   samples from a mixing tank, deletes the outliers, and     ##########
##########   computes a two-sided, 95% confidence limit.  The true mean ##########
##########   of an infinite population of samples lies in the range of ##########
##########   the mean +/- the percent error of the sample mean.         ##########
##########                                                            ##########
##############################################################################
##############################################################################
##############################################################################
##########                                                            ##########
##########   SAMPLE DATA IDS:  hsd77gfwi                              ##########
##########   SAMPLE DATA FILE: HSD77GF                                ##########
##########   TUE JUL 30, 2002                              09:55:47   ##########
##########   SYSTEM: ALPHA1                                           ##########
##########                                                            ##########
##############################################################################
##############################################################################
##############################################################################
```

R A Palmer
3-31-03

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77gfwi
SAMPLE FILE: HSD77GF

TUE JUL 30, 2002
09:55:47
DENSITY (g/ml): N/A

*** LAB SAMPLE DATA ***

Element mf 3-31-03

| Element | Sample Data (ug/g) | | | | *-Denotes Outlier |
|---|---|---|---|---|---|
| Al | 10900.00 | 11300.00 | 11400.00 | 11000.00 | 11300.00 |
| | 11300.00 | 11300.00 | 11200.00 | 10800.00 | |
| B | 13900.00 | 14600.00 | 14900.00 | 14900.00 | 14700.00 |
| | 14700.00 | 14700.00 | 14500.00 | 14100.00 | |
| Ca | 384.00 | 420.00 | 413.00 | 405.00 | 410.00 |
| | 392.00 | 418.00 | 434.00 | 384.00 | |
| Fe | 27900.00 | 29200.00 | 29500.00 | 28600.00 | 29400.00 |
| | 29300.00 | 29600.00 | 28900.00 | 28100.00 | |
| K | 14100.00 | 14400.00 | 14700.00 | 14900.00 | 14800.00 |
| | 14600.00 | 14900.00 | 14300.00 | 13800.00 | |
| Li | 5700.00 | 5960.00 | 5990.00 | 5810.00 | 6010.00 |
| | 5960.00 | 5960.00 | 5880.00 | 5780.00 | |
| Mg | 2570.00 | 2720.00 | 2760.00 | 2640.00 | 2740.00 |
| | 2720.00 | 2730.00 | 2680.00 | 2610.00 | |
| Mn | 2010.00 | 2100.00 | 2150.00 | 2090.00 | 2150.00 |
| | 2100.00 | 2130.00 | 2070.00 | 2040.00 | |
| Na | 19800.00 | 22200.00 | 22600.00 | 20100.00 | 22300.00 |
| | 22300.00 | 21500.00 | 22200.00 | 21400.00 | |
| P | 1720.00 | 1680.00 | 1710.00 | 1700.00 | 1700.00 |
| | 1730.00 | 2070.00 | 1880.00 | 1770.00 | |
| Si | 65800.00 | 69100.00 | 69700.00 | 67400.00 | 69200.00 |
| | 69200.00 | 69400.00 | 68700.00 | 66100.00 | |
| Th | 484.00 | 487.00 | 489.00 | 522.00 | 470.00 |
| | 463.00 | 447.00 | 544.00 | 482.00 | |
| Ti | 1720.00 | 1680.00 | 1710.00 | 1700.00 | 1700.00 |
| | 1730.00 | 1680.00 | 1670.00 | 1610.00 | |
| U | 794.00 | 1290.00 | 1360.00 | 813.00 | 1260.00 |
| | 1290.00 | 1110.00 | 1280.00 | 1160.00 | |
| Zr | 3280.00 | 3420.00 | 3460.00 | 3370.00 | 3450.00 |
| | 3410.00 | 3440.00 | 3380.00 | 3280.00 | |

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77gfwi
SAMPLE FILE: HSD77GF

TUE JUL 30, 2002
09:55:47
DENSITY (g/ml): N/A

*** LAB SAMPLE STATISTICS ***

| Elem | N | OL | Mean | Maximum | Minimum | Std Dev | Conf Limit | %Error |
|---|---|---|---|---|---|---|---|---|
| Al | 09 | 00 | 11166.67 | 11400.00 | 10800.00 | 212.13 | 163.06 | 1.46 |
| B | 09 | 00 | 14555.56 | 14900.00 | 13900.00 | 343.19 | 263.80 | 1.81 |
| Ca | 09 | 00 | 406.67 | 434.00 | 384.00 | 17.14 | 13.17 | 3.24 |
| Fe | 09 | 00 | 28944.45 | 29600.00 | 27900.00 | 618.69 | 475.57 | 1.64 |
| K | 09 | 00 | 14500.00 | 14900.00 | 13800.00 | 380.79 | 292.70 | 2.02 |
| Li | 09 | 00 | 5894.44 | 6010.00 | 5700.00 | 108.18 | 83.15 | 1.41 |
| Mg | 09 | 00 | 2685.56 | 2760.00 | 2570.00 | 65.21 | 50.13 | 1.87 |
| Mn | 09 | 00 | 2093.33 | 2150.00 | 2010.00 | 47.70 | 36.66 | 1.75 |
| Na | 09 | 00 | 21600.00 | 22600.00 | 19800.00 | 1014.89 | 780.11 | 3.61 |
| P | 09 | 00 | 1773.33 | 2070.00 | 1680.00 | 126.29 | 97.08 | 5.47 |
| Si | 09 | 00 | 68288.89 | 69700.00 | 65800.00 | 1478.55 | 1136.51 | 1.66 |
| Th | 09 | 00 | 487.56 | 544.00 | 447.00 | 29.53 | 22.70 | 4.65 |
| Ti | 09 | 00 | 1688.89 | 1730.00 | 1610.00 | 35.51 | 27.30 | 1.62 |
| U | 09 | 00 | 1150.78 | 1360.00 | 794.00 | 210.45 | 161.76 | 14.06 |
| Zr | 09 | 00 | 3387.78 | 3460.00 | 3280.00 | 67.97 | 52.24 | 1.54 |

N = Number of data samples.
OL = Number of outlier samples.
N - OL = Number of samples used for statistics.

VITRIFICATION LAB SAMPLE STATISTICS
SAMPLE IDS: hsd77gfwi
SAMPLE FILE: HSD77GF

TUE JUL 30, 2002
09:55:47
DENSITY (g/ml): N/A

*** Oxide Data Generated From Mean Samples ***

ICP Desc:
Volume (l): 16022.60
Density (g/ml): 1.4000
Total Oxides (kg): 7532.087

| Element | O/M Ratio | ICP Value (ug/g) | Oxide Name | Oxide Wt (kg) | Oxide Wt % |
|---|---|---|---|---|---|
| Al | 1.889181 | 11166.67 | Al2O3 | 473.2146 | 6.2826 |
| B | 3.219334 | 14555.56 | B2O3 | 1051.1285 | 13.9553 |
| Ca | 1.399052 | 406.67 | CaO | 12.7624 | 0.1694 |
| Fe | 1.429584 | 28944.45 | Fe2O3 | 928.1879 | 12.3231 |
| K | 1.204537 | 14500.00 | K2O | 391.7862 | 5.2016 |
| Li | 2.152139 | 5894.44 | Li2O | 284.5602 | 3.7780 |
| Mg | 1.658054 | 2685.56 | MgO | 99.8835 | 1.3261 |
| Mn | 1.291128 | 2093.33 | MnO | 60.6274 | 0.8049 |
| Na | 1.347862 | 21600.00 | Na2O | 653.0707 | 8.6705 |
| P | 2.290963 | 1773.33 | P2O5 | 91.1317 | 1.2099 |
| Si | 2.138930 | 68288.89 | SiO2 | 3276.4810 | 43.5003 |
| Th | 1.137931 | 487.56 | ThO2 | 12.4452 | 0.1652 |
| Ti | 1.665027 | 1688.89 | TiO2 | 63.0788 | 0.8375 |
| U | 1.204267 | 1150.78 | UO3 | 31.0867 | 0.4127 |
| Zr | 1.350669 | 3387.78 | ZrO2 | 102.6419 | 1.3627 |

# MFHT Oxide Loading and IFO

**APPENDIX H**
**GLASS YIELD CALCULATION**
(Page 1 of 1)

SLURRY BATCH # 77

INITIAL MFHT OXIDE INVENTORY:

$V_{MFHT,\ I}$ = 1169.3 L

$(GLASS\ YIELD)_{MFHT,i}$ = 0.526 KG/L (FROM PRIOR BATCH CALCULATION)

$$OXIDE_{MFHT,i} = V_{MFHT,i}\ (GLASS\ YIELD)_{MFHT,i}$$

$OXIDE_{MFHT,\ I}$ = 615.1 KG

OXIDES ADDED, FROM CFMT:

$OXIDE_{CFMT,\ I}$ = 7662.5 KG (FROM SAMPSTAT OUTPUT, "TOTAL OXIDES IN TANK," + 0.4582 * $Li_2O$ PRIOR TO TRANSFER)

$V_{CFMT,\ I}$ = 17,515.2 L

$$(GLASS\ YIELD)_{CFMT} = \frac{OXIDE_{CFMT,i}}{V_{CFMT,i}}$$

$(GLASS\ YIELD)_{CFMT}$ = 0.437 KG/L[1]

$V_{CFMT,\ f}$ = 16,523.7 L

$$OXIDE\ TRANSFERRED = (GLASS\ YIELD)_{CFMT}\ (V_{CFMT,i} - V_{CFMT,f})$$

OXIDE TRANSFERRED = 7228.7 KG

FINAL MFHT GLASS YIELD:

$V_{MFHT,\ f}$ = 18,547.6 L

$$OXIDE_{MFHT,f} = OXIDE_{MFHT,i} + OXIDE\ TRANSFERRED$$

$$(GLASS\ YIELD)_{MFHT,f} = \frac{OXIDE_{MFHT,f}}{V_{MFHT,f}}$$

$(GLASS\ YIELD)_{MFHT,\ f}$ = 0.423 KG/L

R A Pahm — 7-31-02

SAE — DATE

1 For second transfer to MFHT, recompute to include oxides transferred in first transfer and using current volume.

IFO CALCULATIONS FOR BATCH #77

Zr concentration (from WGF SAMPSTAT)
3387.78

CFMT Volume
16022.6

Nitrates from Zr
103.3511

CFMT Density
1.4

CFMT info from Sugar Additions

| Volume | Mass |
|---|---|
| 17515.2 | 24100.92 |

Density
1.376

TOC concentration from AR-02-1183
15666.7

Mass of TOC
377.5818

NO3 concentration from AR-02-1183
96266.7

Mass of NO3
2320.116

Total Solids from AR-02-1184
49.8%

IFO
3.22

R A Palm
9-26-02
0900

## EMPTYING THE MFHT

Batch #77 was the last batch of the vitrification campaign. In order to leave a minimal amount of radioactive material behind in the mixing tanks, the water jets in the MFHT were used to dilute the final batch. This naturally would reduce the glass yield.

Attached is the summary sheet of the mass balance calculation for the final canister (WV-412). Following the eighth airlift, water was added continuously through the jets while continuing to feed the melter. Based on the amount of water added, an estimate of the glass yield was made and included in the mass balance analysis.

The dilution was started on August 13, 2002. The final pour into canister WV-412 was completed at 1020 hours on August 14, 2002.

This calculation is not critical to the performance of the melter nor is it important from a Waste Acceptance standpoint. The information is included here for completeness.

R. A. Palmer
October 2, 2002

R. A. Palmer
10-2-02

| | | | | | |
|---|---|---|---|---|---|
| Canister | Glass yield | 0.42 | 423.00 | (Varies after Airlift 8 due to the addition of water to the MFHT) | |
| WV-412 | Melter den | 2.40 | | | |

| | airlift # | Airlift start time | Airlift end time | LIX2009 Start Level | LIX2009 End Level | delta V | Melter glas density | Airlift time | glass yield | feed rate | Mass airlift kg | Total Glass |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Feed | last level | | | | 25.10 | | | | | | | |
| | 1.00 | 8.22 | 8.43 | 25.90 | 25.20 | 38.88 | 2.40 | 0.22 | 0.42 | 150.00 | 107.1 | 107.1 |
| | 2.00 | 10.67 | 11.08 | 25.90 | 25.20 | 38.88 | 2.40 | 0.42 | 0.42 | 150.00 | 119.7 | 226.8 |
| | 3.00 | 13.23 | 13.42 | 25.90 | 25.20 | 38.88 | 2.40 | 0.18 | 0.42 | 150.00 | 104.9 | 331.7 |
| | 4.00 | 15.67 | 15.97 | 25.96 | 25.20 | 42.23 | 2.40 | 0.30 | 0.42 | 150.00 | 120.4 | 452.1 |
| | 5.00 | 17.88 | 18.08 | 25.92 | 25.18 | 41.10 | 2.40 | 0.20 | 0.42 | 150.00 | 111.3 | 563.4 |
| | 6.00 | 19.97 | 20.13 | 25.93 | 25.16 | 42.76 | 2.40 | 0.17 | 0.42 | 150.00 | 113.2 | 676.6 |
| | 7.00 | 22.33 | 22.43 | 25.90 | 25.18 | 39.98 | 2.40 | 0.10 | 0.42 | 150.00 | 102.3 | 778.9 |
| | 8.00 | 0.83 | 1.00 | 25.87 | 25.12 | 41.61 | 2.40 | 0.17 | 0.42 | 150.00 | 110.4 | 889.4 |
| | 9.00 | 3.88 | 4.13 | 25.95 | 25.10 | 47.19 | 2.40 | 0.25 | 0.40 | 150.00 | 128.3 | 1017.7 |
| | 10.00 | 6.68 | 7.38 | 25.92 | 25.20 | 40.00 | 2.40 | 0.70 | 0.38 | 150.00 | 136.1 | 1153.8 |
| | 11.00 | 9.88 | 10.80 | 25.90 | 25.20 | 38.88 | 2.40 | 0.92 | 0.36 | 150.00 | 142.8 | 1296.6 |
| | 12.00 | 12.02 | 12.40 | 25.09 | 24.80 | 15.92 | 2.40 | 0.38 | 0.35 | 150.00 | 58.3 | 1355.0 |
| | 13.00 | 21.38 | 21.58 | 26.00 | 25.20 | 44.47 | 2.40 | 0.20 | 0.29 | 200.00 | 118.4 | 1473.4 |
| | 14.00 | 23.88 | 0.67 | 25.90 | 25.16 | 41.08 | 2.40 | 0.78 | 0.27 | 200.00 | 141.2 | 1614.6 |
| | 15.00 | 3.88 | 4.08 | 25.90 | 25.12 | 43.29 | 2.40 | 0.20 | 0.25 | 200.00 | 113.9 | 1728.5 |
| | 16.00 | 9.48 | 10.28 | 25.95 | 24.38 | 86.57 | 2.40 | 0.80 | 0.21 | 200.00 | 241.7 | 1970.2 |
| | | | | | | | | | | | | 1685.8 |
| | | | | | | | | | | | | -284.4 |

MFHT mass balance

| Airlift number | MFHT vol start | MFHT vol end | Change V | Glass Yield | Melter glas denisty | delta V melter | Mass Airlift kg | Total Glass |
|---|---|---|---|---|---|---|---|---|
| 1.00 | 7645.00 | 7337.00 | 308.00 | 0.42 | 2.40 | -5.51 | 117.1 | 117.1 |
| 2.00 | 7337.00 | 6756.00 | 581.00 | 0.42 | 2.40 | 0.00 | 245.8 | 362.8 |
| 3.00 | 6756.00 | 6684.00 | 72.00 | 0.42 | 2.40 | 0.00 | 30.5 | 393.3 |
| 4.00 | 6684.00 | 6321.00 | 363.00 | 0.42 | 2.40 | 0.00 | 153.5 | 546.8 |
| 5.00 | 6321.00 | 6103.00 | 218.00 | 0.42 | 2.40 | 1.10 | 94.9 | 641.7 |
| 6.00 | 6103.00 | 5632.00 | 471.00 | 0.42 | 2.40 | 1.10 | 201.9 | 843.6 |
| 7.00 | 5632.00 | 5341.00 | 291.00 | 0.42 | 2.40 | -1.10 | 120.4 | 964.0 |
| 8.00 | 5341.00 | 5264.00 | 77.00 | 0.42 | 2.40 | 3.31 | 40.5 | 1004.5 |
| 9.00 | 5264.00 | 5170.00 | 94.00 | 0.40 | 2.40 | 1.10 | 40.4 | 1045.0 |
| 10.00 | 5170.00 | 5072.50 | 97.50 | 0.38 | 2.40 | -5.51 | 24.0 | 1069.0 |
| 11.00 | 5072.50 | 4970.00 | 102.50 | 0.36 | 2.40 | 0.00 | 36.9 | 1105.9 |
| 12.00 | 4970.00 | 4922.00 | 48.00 | 0.35 | 2.40 | 21.99 | 69.6 | 1175.4 |
| 13.00 | 4922.00 | 4187.33 | 734.67 | 0.29 | 2.40 | -21.99 | 161.8 | 1337.2 |
| 14.00 | 4187.33 | 3940.67 | 246.67 | 0.27 | 2.40 | 2.21 | 72.4 | 1409.6 |
| 15.00 | 3940.67 | 3667.33 | 273.33 | 0.25 | 2.40 | 2.20 | 73.9 | 1483.5 |
| 16.00 | 3667.33 | 3171.33 | 496.00 | 0.21 | 2.40 | 40.48 | 202.3 | 1685.8 |

Airlifts 8-16 have been adjusted to take into account the continuous flushing of the MFHT with water, thus adding volume to the liquid in the tank.

Copies of Referenced Documents

**IR-723**

The transfer of Batch #77 feed from the CFMT to the MFHT was done before the QA Hold Point was completed. This in no way affected the quality of the batch or the glass produced. An Issue Report (IR-723, attached) was produced to document this oversight.

R. A. Palmer R A Palmer
October 2, 2002 10-2-02

# West Valley Demonstration Project

## Issue Documentation Form

(Note: Only one issue to be documented on each form)

WCC# 221604

Issue Report # IR - 723

Date IR Issued: - 7/31/02

Time: 0700 Date .7/31/02 (Issue was Identified)

Originator: R. Palmer Ext. 4934

Department: HLW Completion MS WV-48

Discussed with IM [x ] yes Date/Time .7/31/02 0730

**ISSUE DESCRIPTION**

Issue Initiated By: [ ] QA [ ] RP [x ] Other

Facility/Location: Annex Assessment/Surveillance No. (or N/A) N?A

Description of Issue: (Attach additional pages as required) Transfer of Batch #77 feed from CFMT to MFHT was done before QA Hold Point completed.

Requirement (Cite References):SOP63-34 Section 11.0, Step 1

Descriptions: "Review the information generated through this procedure, including analytical results of tank compositions, transfer data sheets, results of the software programs, comparison between Wste Initial "target" composition and Waste plus Glass Former measured composition, and if acceptable, sign off on Appendix F., "Acceptance for Transfer of the CFMT to the MFHT" and obtain concurring signatures of another SAE and Quality Assurance and proceed with step [3]."

Immediate Actions Taken (if any): Notified Vit Operations to NOT feed the melter until this issue is resolved. Contacted QA to review the appropriate information, as described above.

QA Hold Tag Issued [ ] Yes [X ] No

Assigned Issue Manager J. Paul Ext. 4448 MS WV-48

**ISSUE EVALUATION**

Cognizant Program(s) [x ] QA [ ] EA [ ] IH&S [ ] RP [ ] SA&I [ ] Other (Specify) Vit Completion

**Check One:** [x ] Deficiency [ ] Improvement [ ] No Action (Justification Required)

Significant Condition Yes [ ] No [x ] (If yes, root cause analysis or SWO may be required)

Expected Closure Date: .7/31/02 Cause Code 3a

Response Type (hardware only)
[ ] *Repair [ ] Rework [ ] *Use-as-is [ ] Scrap [ ] Return to Vendor

Summary of Proposed Action(s), or Justification for No Action(s): (If a significant yes, this summary must include a discussion of what caused the issue, to what extent the issue effects other items or activities, what remedial actions are necessary, and what preventive actions will be taken) Attach additional pages as necessary.
The error was detected before any irrevocable actions were taken. This is the last time the procedure will be used as this is the final vitrification batch. QA was contacted and asked to review the appropriate information as soon as the error was noted. The only action necessary is to have QA review that data.

Number of Action Documentation Forms Issued: 1

*Is a USQ Safety Evaluation (USQD Form WV-3306, Sections V, VI, and VII) required? ☐ NO ☐ YES

USQD Originator or Safety Analyst Signature Printed Date

If yes, attach the completed USQD Form WV-3306, Sections V, VI, and VII.

Cognizant Program Representative Concurrence: Amy L Brown Date 7/31/02 MS AA03
Signature/Print

Issue Manager Approval: J Paul Date 7/31/02 MS 48
Signature/Print

Completion Verification to be Completed by: [X] QA [ ] EA [ ] IH&S [ ] RP [ ] SA&I [ ] Other (Specify)

Action Verifier (Note: This signature not required when Action Documentation Forms are Issued or there is no action required)

N/A
Signature/Print Organization Date

CC:

**West Valley Demonstration Project**

**Action Documentation Form**
(Note: Only one action to be documented on each action form)

WCC# 221005
Action Report # IR - 723 - 1
Date: 07/31/02

Action Manager: J. Paul Ext. 4448
Department: Vit Completion Mail Stop WV-48

Facility/Location: Annex

Requirement (Cite Reference): SOP63-34 Section 11.0, Step 1

Descriptions: "Review the information generated through this procedure, including analytical results of tank compositions, transfer data sheets, results of the software programs, comparison between Wste Initial "target" composition and Waste plus Glass Former measured composition, and if acceptable, sign off on Appendix F., "Acceptance for Transfer of the CFMT to the MFHT" and obtain concurring signatures of another SAE and Quality Assurance and proceed with step [3]."

Action : Have QA review the appropriate information (Feed Data Package for Batch #77).

[ ] Action Must be Completed as Written Required Completion Date 07/31/02

Cognizant Program(s) [x] QA [ ] EA [ ] IH&S [ ] RP [ ] SA&I [x] Other (Specify) Vit Completion

[x] Corrective Action [ ] Improvement Action

Approval of Action: Signature/Print Name Date MS

Action Manager: J. Paul 7/31/02 48

Cognizant Program Rep.: Amy L. Brown 7/31/02 AA03

Issue Manager: 7/31/02 48

Completion Verification to be Completed by: [x] QA [ ] EA [ ] IH&S [ ] RP [ ] SA&I [ ] Other (Specify)

Description of Completed Action: QA has reviewed feed data package for batch 77. (See attached)

Actual Completion Date: 7/31/02

Action Complete: Action Manager Date 7/31/02

Acceptance of Completed Action (Describe Verification Conducted for Completion): QA Complete & review per SOP63-34. See attached page 2 of 2.

Action Verifier: R.A. CARTER Signature/Print Name QA Organization 7/31/02 Date

Action Determination

Action Completion

**APPENDIX F**
**Acceptance for Transfer from the CFMT to the MFHT**
(Page 1 of 1)

Slurry Batch # 77

The following items have been determined to meet the acceptable range or limit (place a check mark in the space provided):

✓ Results of comparison of WI "Target Amt" composition to WGF "Oxide Wt" composition

✓ Results of SPECIES RANGE program

✓ Results of PCTCHECK program

Slurry Acceptance Engineer 1 — Signature: R.A. Palmer — Date: 7-30-02

Slurry Acceptance Engineer 2 — Signature: H.S. [illegible] — Date: 7/30/02

Quality Assurance[1] — Signature: [illegible] — Date: 7/31/02

For IR-723
R.A. Palmer
7-31-02

1 QA Hold Point: Process point beyond which previous steps are no longer repeatable. This point requires indicated verification signature before proceeding.

IR # 723
pg 2 of 2