Calculation of Demonstration Bulk Vitrification System Melter Inleakage And Off-Gas Generation Rate

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Key Words: DBVS, ICV inleakage, gas generation

Abstract: This calculation estimates the DBVS melter inleakage and gas generation rate based on test data. Inleakage is estimated before the melt was initiated, at one point during the melt, and at the end of the melt. Maximum gas generation rate is also estimated.

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Calculation Review Checklist.

Calculation Reviewed: DBVS Melter Inleakage and Off-Gas Generation Estimate

Scope of Review: Entire
(e.g., document section or portion of calculation)

Engineer/Analyst: T.H. May *[signature]* Date: 4/15/08

Organizational Manager: D.H. Shuford Date: ______

This document consists of _____ pages and the following attachments (if applicable):

Yes	No	NA*		
[X]	[ ]	[ ]	1.	Analytical and technical approaches and results are reasonable and appropriate.
[X]	[ ]	[ ]	2.	Necessary assumptions are reasonable, explicitly stated, and supported.
[ ]	[ ]	[X]	3.	Ensure calculations that use software include a paper printout, microfiche, CD ROM, or other electronic file of the input data and identification to the computer codes and versions used, or provide alternate documentation to uniquely and clearly identify the exact coding and execution process.*
[X]	[ ]	[ ]	4.	Input data were checked for consistency with original source information.
[X]	[ ]	[ ]	5.	Key input data (e.g., dimensions, performance characteristics) that may affect equipment design is identified.
[X]	[ ]	[ ]	6.	For both qualitative and quantitative data, uncertainties are recognized and discussed and the data is presented in a manner to minimize design interpretations.
[X]	[ ]	[ ]	7.	Mathematical derivations were checked, including dimensional consistency of results.
[X]	[ ]	[ ]	8.	Calculations are sufficiently detailed such that a technically qualified person can understand the analysis without requiring outside information.
[ ]	[ ]	[X]	9.	Software verification and validation are addressed adequately.
[X]	[ ]	[ ]	10.	Limits/criteria/guidelines applied to the analysis results are appropriate and referenced. Limits/criteria/guidelines were checked against references.
[X]	[ ]	[ ]	11.	Conclusions are consistent with analytical results and applicable limits.
[X]	[ ]	[ ]	12.	Results and conclusions address all points in the purpose.
[X]	[ ]	[ ]	13.	Referenced documents are retrievable or otherwise available.
[X]	[ ]	[ ]	14.	The version or revision of each reference is cited.
[X]	[ ]	[ ]	15.	The document was prepared in accordance with Attachment A, "Calculation Format and Preparation Instructions."
[X]	[ ]	[ ]	16.	Impacts on requirements have been assessed and change documentation initiated to incorporate revisions to affected documents, as appropriate.
[X]	[ ]	[ ]	17.	All checker comments have been dispositioned and the design media matches the calculations.**

M.W. Leonard *M.W. L[signature]* 4/15/08
Checker (printed name and signature) Date

* No software was used in this calcuation

** All checker comments have been dispositioned. The test data matches the calculations.

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ICV FLOW AND TEMPERATURE DATA

LIST OF TERMS

ACFM	Actual Cubic Feet per Minute
DBVS	Demonstration Bulk Vitrification System
ICV	In-Container Vitrification
OGTS	Off-Gas Treatment System
RPP	River Protection Project
SCFM	Standard Cubic Feet per Minute
SVF	Spreadsheet Verification Form

TITLE: CALCULATION OF DEMONSTRATION BULK VITRIFICATION SYSTEM MELTER INLEAKAGE AND OFF-GAS GENERATION RATE

ORIGINATOR: T.H. MAY THM **DATE: 4/15/08**
CHECKER: M.W. LEONARD MWL **DATE: 4/15/08**
ORGANIZATIONAL MANAGER: D.H. SHUFORD **DATE: 4/15/08**

1.0 OBJECTIVE

The River Protection Project (RPP) mission is to safely store, retrieve, treat, immobilize, and dispose of the Hanford Site tank waste. The Demonstration Bulk Vitrification System (DBVS) is a research and development project whose objective is to demonstrate the suitability of Bulk Vitrification treatment technology waste form for disposing of low-activity waste from the Tank Farms.

The objective of this calculation is to determine the DBVS melter inleakage and off-gas generation rate based on full scale testing data from 38D.

2.0 SUMMARY OF RESULTS AND CONCLUSIONS

		scfm		inches water
ICV inleakage before melt	=	250	@	-2.9
ICV inleakage during melt	=	150	@	-1.5
ICV inleakage post melt	=	140	@	-2.0
ICV peak off-gas generation rate	=	290	@	-3.0

3.0 BACKGROUND

The Demonstration Bulk Vitrification System is a treatment technology that is currently being used domestically and internationally for radioactive, hazardous, and mixed waste treatment. Bulk Vitrification can be conducted in large containers (e.g., 20 to 30 cubic meters) resulting in waste forms with small surface area to volume ratio, and thereby minimizing the potential for waste form leaching. The melter used to vitrify the waste is also the waste container and is, therefore, disposed with the waste upon completion of treatment.

Bulk Vitrification is performed by mixing the waste with glass-forming materials of appropriate chemical composition in the process vessel. Vitrification is achieved by inserting electrodes into the process vessel and applying electrical power. Additional waste handling considerations are obviated by using the process vessel as the immobilized waste form disposal container.

Full scale testing was performed in 2007 to demonstrate the technology and to determine design inputs such as melter inleakage and off-gas generation rate.

4.0 INPUT DATA

Input data used in the calculation was collected during a full scale test called the Integrated Dryer Melt Test also called the 38D test. Off-gas data was recorded by a subcontractor and quoted in the calculation below. Excerpts from the data are attached in Appendix A.

Flow, temperature, and pressure data collected early in the melt is considered to be valid. Later in the melt, instrumentation down stream of the ICV was exposed to dirty and corrosive gases which may have compromised data quality. To ensure validity of the data, where possible, different instrument readings were correlated such as box ICV vacuum and ICV inleakage.

The following input data was used in the calculations.

One 60% dryer batch (initial charge to ICV) = 9776 pounds	SVF-1319
One 20% dryer batch = 3331 pounds	SVF-1319
One 20% dryer batched contains 231 pounds cellulose	SVF-1319
One 20% dryer batch contains 1135# dry simulant	SVF-1319
0.85 # nitrates/nitrites / # dry simulant	SVF-1319
Sufficient cellulose added to react with 75% of the nitrates/nitrites	SVF-1319

1 pound mole of gas at Standard Pressure and Temperature = 378 standard ft^3 at 60 °F

5.0 ASSUMPTIONS

Cellulose reaction: $2C_6H_{10}O_5 + 8NO_3 \Longrightarrow 4N_2 + 12\ CO_2 + 10\ H_2O$

Moles of gas generated per mole of cellulose = 26 /2 = 13 moles

6.0 METHOD OF ANALYSIS

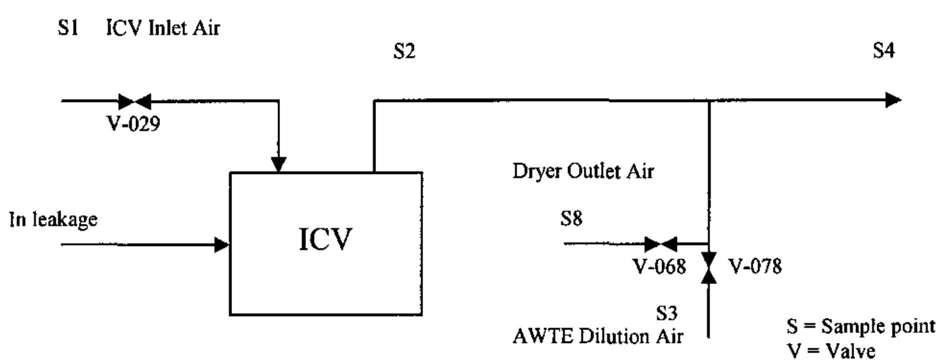
Hand calculations were performed to estimate ICV inleakage and off-gas generation rates. Inleakage was estimated before the melt was initiated, at one point during the melt, and at the end of the melt. Maximum off-gas generation rates were calculated during the initial phases of the melt when there was the greatest quantity of reactant in the ICV.

6.1 INLEAKAGE CALCULATION BEFORE THE MELT

Input data from AMEC log book data from 8/7/07 (see Appendix):

ICV Off-Gas Treatment System (OGTS) was balanced at 10:30	
Inlet valve (V-029) was 40% open	
S1 (ICV inlet air flow)	= 180 acfm
ICV Vacuum was -2.9" water	
S2 (ICV outlet air flow)	= 430 acfm
S3 (see below)	= 500 acfm
Inlet valve (V-068) was 20% open	
Inlet valve (V-078) was 20% open	
S4 (see Figure 6-1 below)	= 1280 acfm

6-1 SIMPLIFIED IDMT ICV OGTS FLOWSHEET



Calculate Inleakage

S2 – S1 = 430 – 180 = 250 scfm (acfm and scfm are equal at time of balancing)

6.2 INLEAKAGE CALCULATION AT ONE POINT DURING THE MELT

IDMT Data:
From 8:09 to 8:39 on 8/14/07 1838# dried product was transferred to the melter at 3% moisture

TRC Data (see Appendix):

From 8:40 to 8:50 on 8/14/07 S1 (ICV Inlet air) = 11 acfm
From 8:40 to 8:50 on 8/14/07 S2 (ICV Outlet air) = 300 acfm at 183 °F
At 9:11 on 8/14/07 S2 (ICV Outlet air) = 358 acfm at 209 °F (peak)
From 8:40 to 8:50 on 8/14/07 S3 (AWTE dilution air) = 340 acfm at 72 °F
From 8:40 to 8:50 on 8/14/07, the flow at S8 was 0 acfm.
From 8:40 to 8:50 on 8/14/07 S4 (ICV Outlet plus AWTE Dilution air) = 670 acfm
ICV Outlet plus AWTE dilution air temperature is not available but is calculated as as a mass weighted temperature average as follows:

((358 X (60 + 459) / (209 + 459)) X 209 + 340 X 72) / ((358 X (60 + 459) / (209 + 459) + 340) = 134 °F

Check flow sum for S2, S3, S8, and S4 to Validate Flow Measurement

S2	300 acfm X (60 + 459) / (183 + 459)	= 240 scfm
S3	340 acfm X (60 + 459) / (72 + 459)	= 330 scfm
S8	0 acfm	= 0
Sum		= 570 scfm
S4	670 acfm X (60 + 459) / (134 + 459)	= 590 scfm

This is a good match and indicates valid flow measurement

Calculate Steam generation:

1838 # dried product X 3 wt% moisture = 55 # water

55 # water / 18 #/#mole X 378 scf/#mole = 1160 scf

Calculate theoretical gas evolution:

1838 # dried product X 231 # cellulose per 20% batch / 3331 # dried product per 20% batch = 127 # cellulose (see table "IDMT DRYER TO ICV TRANSFER DATA" contained in appendix)

127 #cellulose / 162#/#mole X 13 #moles gas/#mole X 378 ft^3/#mole gas = 3870 scf

1838# dried product X (1135 # simulant solids / 3331 # dried product) X 0.85 # nitrates/nitrites per # simulant solids X 0.25 fraction unreacted nitrates/nitrites / 46 #/#mole X 378 scf/#mole = 1090 scf from unreacted nitrates/nitrites.

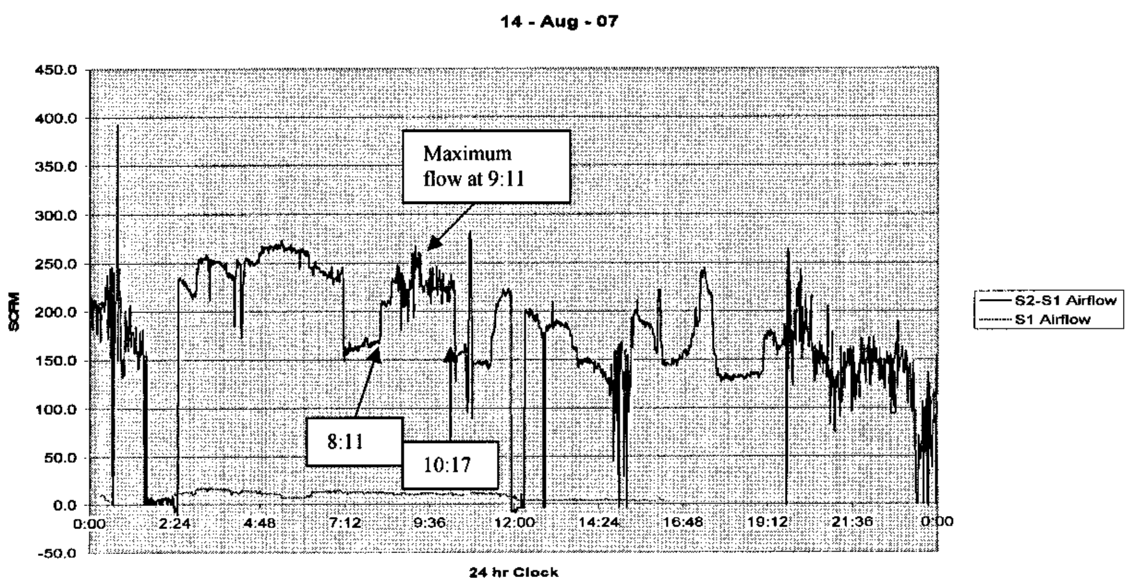
Total Off-Gas Volume

1160 scf + 3870 scf + 1090= 6120 scf

Off-Gas Evolution Duration

At 8:40 on 8/14/07, 3525 # dried product was added to melt. Assume that gas evolution begins at 8:40 and continues until ICV outlet flow (minus ICV inlet flow) drops back to the same flow rate as the flow rate at 8:40. From Figure 6-2 below, the flow rate drops back to the same flow at 10:17. This duration is 1 hour and 37 minutes.

6-2 ICV INLET AND MELT GAS PLUS INLEAKAGE FLOW 8/14/07



Calculate Off-Gas Evolution Rate on 8/14/07

6120 scf X (3525 # dried product / 1838 # dried product) / 97 min = 121 scfm

Calculate Nominal Difference between ICV inlet flow and outlet flow

S2 – S1 = 240 scfm – 11 scfm = 230 scfm

Calculate Nominal Inleakage

230 scfm – 121 scfm = 109 scfm ==> round up to 110 scfm nominal

Calculate Peak Difference between ICV inlet flow and outlet flow

S2 – S1 = 358 acfm X (60 + 459) / (209 + 459) – 11 scfm = 270 scfm

Calculate Peak Inleakage

270 scfm – 121 scfm = 150 scfm @ -1.5 "water

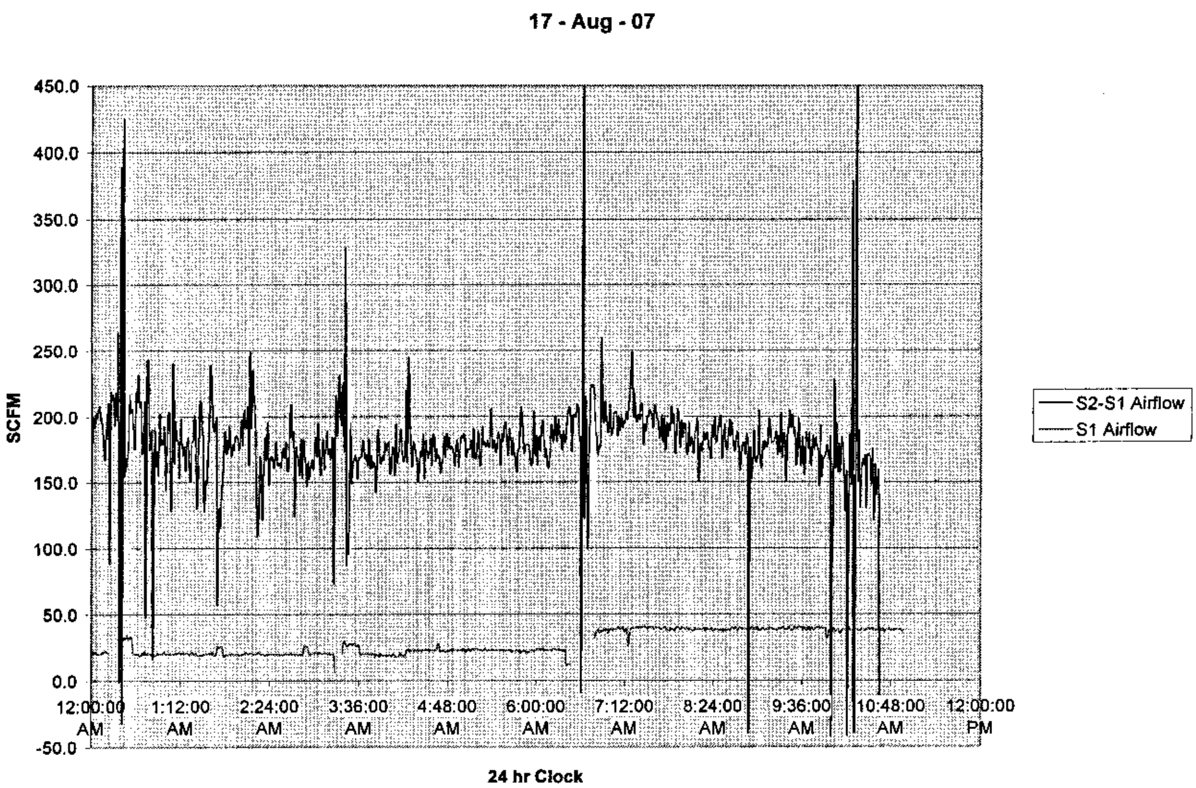
Peak inleakage on 8/14/07 is lower than that measured during the pre-melt HVAC balancing because the vacuum is only -1.5 "water versus the pre-melt vacuum of -2.9" water.

6.3 INLEAKAGE CALCULATION AT THE END OF THE MELT

Feed while melt was terminated at 4:16 and power was turned off to the melt at 6:17 on 8/17/07. Four hours later, the melt gas generation rate is near zero. TRC data available at 10:37 on 8/17/07 indicates an S2 flow rate of 311.9 acfm at 444.7 °F and an S1 flow rate of 38 acfm at 76.2 °F.

S2 flow = 311.9 X (60 +459) / (444.7 + 459)	= 179 scfm
S1 flow = 38 X (60 +459) / (76.2 + 459)	= 37 scfm
Difference (inleakage)	= 140 scfm @ -2.0" water

6-3 ICV INLET AND MELT GAS PLUS INLEAKAGE FLOW 8/17/07



6.4 CALCULATE MAXIMUM OFF-GAS GENERATION RATE

The maximum off-gas generation rate occurred during startup of the melt when 9776 # of dried product was contained in the ICV (SVF-1319). As melt off-gas generation rate increased, the box negative pressure decayed to less than -1" water gage at 18:06. As can be seen from the graph of 8/8/07 data below, at 18:06 the ICV air inlet dropped to 0 acfm. This may have been caused by an instrument failure or if the ICV inlet air valve was closed in order to preserve vacuum during the peak generation rate. The ICV off-gas exhaust line was not occluded at this time. Off-Gas generation rates are calculated below for three time periods.

The ICV outlet flow rate (S2) peaked at approximately 16:37 at 847 acfm at 235 °F. S1 flow rate at 16:37 was reported as 160 acfm. Hood vacuum at 16:37 was -2.2" water which is assumed to result in 250 scfm air inleakage similar to the value calculated in section 6.1.

The ICV outlet flow rate (S2) at approximately 22:47 was 823 acfm at 248 °F. S1 flow rate at 22:47 was reported as 0 acfm but this appears to be an instrument problem. It was assumed that the S1 flow rate was actually 70 cfm. Hood vacuum at 22:47 was -3.0" water which is assumed to result in 250 scfm air inleakage similar to the value calculated in section 6.1.

The ICV outlet flow rate (S2) at approximately 22:14 was 790 acfm at 216 °F. S1 flow rate at 22:14 was reported as 0 acfm but this appears to be an instrument problem. It was assumed that the S1 flow rate was actually 70 cfm. Hood vacuum at 22:14 was -3.0" water which is assumed to result in 250 scfm air inleakage similar to the value calculated in section 6.1.

Calculate Off-Gas Generation Rate for 16:37

847 acfm X (60 + 459) / (235 + 459) = 633 scfm S2 flow

633 scfm S2 flow - 160 scfm S1 flow = 473 scfm S2-S1 flow

473 scfm – 250 scfm air inleakage = 223 scfm off-gas generation rate

Calculate Off-Gas Generation Rate for 22:47

823 acfm X (60 + 459) / (248 + 459) = 604 scfm S2 flow

604 scfm S2 flow - 70 scfm S1 flow = 534 scfm S2-S1 flow

534 scfm – 250 scfm air inleakage = 284 scfm off-gas generation rate

Calculate Off-Gas Generation Rate for 22:14

790 acfm X (60 + 459) / (215 + 459) = 607 scfm S2 flow

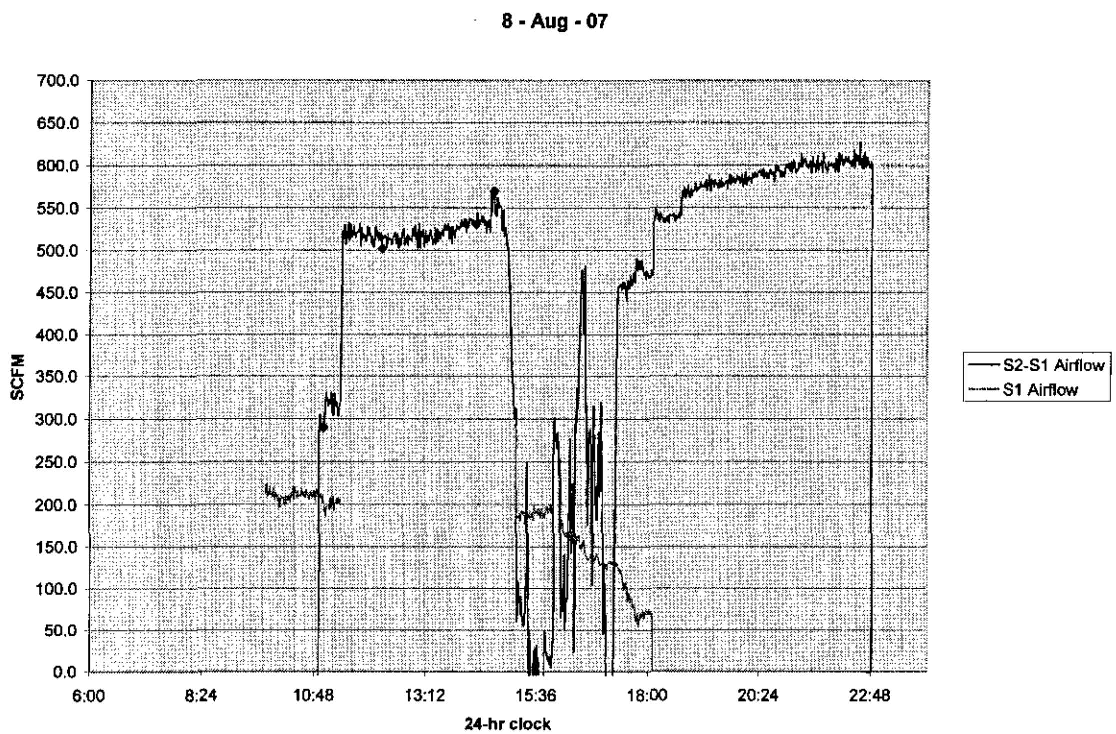
607 scfm S2 flow - 70 scfm S1 flow = 537 scfm S2-S1 flow

537 scfm – 250 scfm air inleakage = 287 scfm off-gas generation rate

Maximum Off-Gas Generation Rate

Round 287 scfm up to 290 scfm

6-4 ICV INLET AND MELT GAS PLUS INLEAKAGE FLOW 8/8/07



7.0 USE OF COMPUTER SOFTWARE

No computer software was used in this calculation.

8.0 RESULTS

		scfm		inches water
ICV inleakage before melt	=	250	@	-2.9
ICV inleakage during melt	=	150	@	-1.5
ICV inleakage post melt	=	140	@	-2.0
ICV peak off-gas generation rate	=	290	@	-3.0

9.0 CONCLUSIONS

These results will provide input to DBVS design calculations. There are no conclusions from this calculation.

10.0 REFERENCES

SVF-1319, "*DBVS 38D Recipe*", Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington

APPENDIX A

ICV FLOW AND TEMPERATURE DATA

TITLE: CALCULATION OF DEMONSTRATION BULK VITRIFICATION SYSTEM MELTER INLEAKAGE AND OFF-GAS GENERATION RATE
ORIGINATOR: T.H. MAY THM **DATE: 4/15/08**
CHECKER: M.W. LEONARD MWL **DATE: 4/15/08**
ORGANIZATIONAL MANAGER: D.H. SHUFORD **DATE: 4/15/08**

DBVS FS-38D Pre-Test OGTS Air Flow and Pressure Balancing Operation - Datasheet

Date: 07 August 2007
Start Time: 0745
Operator Staff: KW, DW, TB, ED, GL(GEC), JM, TD

Circle One: (SMF Only) / BH Only / BH in Series with SMF

Box Inlet		Plenum	Box Outlet	Prime Dilut.			Pre SMF Htr	SMF	Sup. Dilut	Prim HEPA	NOx Scrub.	B/U Dilution	Backup Inlet	Venturi Scrub/B		BH Dilution	Baghouse	BH Dilution	Notes
PIC-101	PIC-101	DPIT-001	SP2	SP3	V-068	V-078	SP4	DPIT-002	FN-006	DPIT-004/5	PIT-124	SP7	HV-012	DPI-201	DPI-201	V-069	DPIT-003	SP8	
% Open	ACFM	inch WC	ACFM	ACFM	% Open	% Open	ACFM	inch WC	% Output	inch WC	inch WC	ACFM	% Open	inch WC	% Output	% Open	inch WC	ACFM	
					20				49.8		15	1256	20	4.35	60	/			Process Info. [illegible]
																			After [illegible] Both [illegible] ΔP 8.4" wc
40	180	2.9	435	500	20	20	1281	3.4	75	1.5	17	436	10	4.35 /	60				[illegible]

DBVS IDMT FS-38D Pre-Test Pressure and Air-flow Balancing Plan, Rev. 2 Page 6

TITLE: CALCULATION OF DEMONSTRATION BULK VITRIFICATION SYSTEM MELTER INLEAKAGE AND OFF-GAS GENERATION RATE

ORIGINATOR: T.H. MAY THM **DATE: 4/15/08**
CHECKER: M.W. LEONARD MWL **DATE: 4/15/08**
ORGANIZATIONAL MANAGER: D.H. SHUFORD **DATE: 4/15/08**

TRC DATA												
Unit 38D - Site 1				**Unit 38D - Site 2**			**Unit 38D - Site 3**			**Unit 38D - Site 4**		
Stack Temp	Stack Gas Velocity	Stack Gas Airflow	Time	Stack Temp	Stack Gas Velocity	Stack Gas Airflow	Inlet Gas Temp	Airflow	Airflow	Inlet Gas Temp	Airflow	
August 14, 2007												
(° F)	(fm)	(acfm)	time	(° F)	(ft/sec)	(acfm)	(° F)	(fpm)	(acfm)	(° F)	(acfm)	time
75.8	53.63	10.5	8:40	181.40	38.84	317.77	71	1240.0	243.5		561.2	8:40
75.4	53.63	10.5	8:41	181.70	38.98	318.87	71	2238.0	439.4		758.3	8:41
75.5	52.09	10.2	8:42	181.84	34.90	285.53	71.36	2252.0	442.2		727.7	8:42
76.0	51.32	10.1	8:43	182.11	38.62	315.93	71	2201.0	432.2		748.1	8:43
76.2	52.09	10.2	8:44	182.51	36.00	294.52	71.36	2130.0	418.2		712.7	8:44
76.0	51.7	10.2	8:45	182.75	35.85	293.34	72.08	2242.0	440.2		733.6	8:45
76.3	50.93	10.0	8:46	182.94	37.55	307.18	71		0.0		307.2	8:46
76.2	50.93	10.0	8:47	183.37	28.88	236.24	72.08	2130.0	418.2		654.5	8:47
76.3	59.42	11.7	8:48	183.81	33.82	276.68	71.72	2163.0	424.7		701.4	8:48
76.5	60.58	11.9	8:49	184.53	38.07	311.49	72.8	2157.0	423.5		735.0	8:49
76.7	59.8	11.7	8:50	185.27	35.23	288.24	72.8	2285.0	448.7		736.9	8:50
76.9	59.42	11.7	8:51	186.25	37.58	307.46	72.8	2157.0	423.5		731.0	8:51
77.1	59.03	11.6	8:52	187.22	32.80	268.32	73.5	2075.0	407.4		675.7	8:52
77.3	57.1	11.2	8:53	188.01	36.72	300.41	73.5	2023.0	397.2		697.6	8:53
77.7	55.95	11.0	8:54	188.87	34.43	281.72	72.8	2141.0	420.4		702.1	8:54
77.8	54.79	10.8	8:55	189.84	33.10	270.82	72.44	2185.0	429.0		699.8	8:55
77.8	53.24	10.5	8:56	190.89	35.29	288.68	73.14	2315.0	454.5		743.2	8:56
77.9	51.7	10.2	8:57	192.05	35.70	292.07	73.5	1913.0	375.6		667.7	8:57
78.1	51.7	10.2	8:58	193.58	31.28	255.92	72.8	1925.0	378.0		633.9	8:58
78.6	51.7	10.2	8:59	194.85	30.78	251.78	73.86	1941.0	381.1		632.9	8:59
78.9	48.61	9.5	9:00	196.00	35.38	289.44	73.5	1799.0	353.2		642.7	9:00
79.4	48.61	9.5	9:01	197.63	37.48	306.66	73.14	1805.0	354.4		661.1	9:01
79.2	54.02	10.6	9:02	199.07	36.16	295.82	74.22	1958.0	384.5		680.3	9:02

TITLE: CALCULATION OF DEMONSTRATION BULK VITRIFICATION SYSTEM MELTER INLEAKAGE AND OFF-GAS GENERATION RATE

ORIGINATOR: T.H. MAY THM **DATE: 4/15/08**

CHECKER: M.W. LEONARD MWL **DATE: 4/15/08**

ORGANIZATIONAL MANAGER: D.H. SHUFORD **DATE: 4/15/08**

TRC DATA												
Unit 38D - Site 1				Unit 38D - Site 2			Unit 38D - Site 3			Unit 38D - Site 4		
Stack Temp	Stack Gas Velocity	Stack Gas Airflow	Time	Stack Temp	Stack Gas Velocity	Stack Gas Airflow	Inlet Gas Temp	Airflow	Airflow	Inlet Gas Temp	Airflow	
78.8	55.17	10.8	9:03	199.87	36.19	296.09	73.5	1891.0	371.3		667.4	9:03
79.0	52.47	10.3	9:04	200.81	36.20	296.16	73.86	1870.0	367.2		663.3	9:04
79.3	50.16	9.8	9:05	202.06	41.98	343.44	73.86	1844.0	362.1		705.5	9:05
79.4	50.54	9.9	9:06	203.38	41.69	341.07	73.86	1952.0	383.3		724.3	9:06
79.6	50.93	10.0	9:07	204.99	38.65	316.18	74.22	1935.0	379.9		696.1	9:07
79.9	50.54	9.9	9:08	206.11	31.85	260.55	73.5	2655.0	521.3		781.9	9:08
80.8	49.77	9.8	9:09	207.22	42.28	345.87	74.94		0.0		345.9	9:09
81.4	51.7	10.2	9:10	208.14	39.46	322.86	74.58	1702.0	334.2		657.0	9:10
81.3	52.86	10.4	9:11	209.35	43.71	357.61	74.58	1809.0	355.2		712.8	9:11
81.1	50.93	10.0	9:12	210.06	41.88	342.67	74.94	1683.0	330.5		673.1	9:12
81.3	52.47	10.3	9:13	210.88	41.87	342.52	74.58	803.2	157.7		500.2	9:13
81.3	51.32	10.1	9:14	211.48	40.86	334.26	74.58	803.2	157.7		492.0	9:14
81.6	49.39	9.7	9:15	212.43	40.32	329.90	75.3	803.2	157.7		487.6	9:15
81.9	54.4	10.7	9:16	213.38	43.01	351.88	74.94	838.6	164.7		516.5	9:16
81.5	55.95	11.0	9:17	213.99	42.31	346.12	74.94	761.8	149.6		495.7	9:17
80.9	55.17	10.8	9:18	214.74	37.45	306.36	75.66	0.0	0.0		306.4	9:18
81.7	55.95	11.0	9:19	215.05	38.16	312.19	76.02	0.0	0.0		312.2	9:19
82.1	55.95	11.0	9:20	215.21	42.97	351.58	76.02	0.0	0.0		351.6	9:20
August 17, 2007												
Unit 38D - Site 1				Unit 38D - Site 2								
76.9	196	38.5	10:34	445.9	45.8	374.8						
76.8	194.1	38.1	10:35	445.2	34.0	278.5						
76.8	194.5	38.2	10:36	444.8	43.0	351.7						
76.2	193.3	38.0	10:37	444.7	38.1	311.9						
76.9	196	38.5	10:34	444.7	39.7	324.7						

TITLE: CALCULATION OF DEMONSTRATION BULK VITRIFICATION SYSTEM MELTER INLEAKAGE AND OFF-GAS GENERATION RATE

ORIGINATOR: T.H. MAY THM **DATE: 4/15/08**
CHECKER: M.W. LEONARD MWL **DATE: 4/15/08**
ORGANIZATIONAL MANAGER: D.H. SHUFORD **DATE: 4/15/08**

TRC DATA												
Unit 38D - Site 1				Unit 38D - Site 2			Unit 38D - Site 3			Unit 38D - Site 4		
Stack Temp	Stack Gas Velocity	Stack Gas Airflow	Time	Stack Temp	Stack Gas Velocity	Stack Gas Airflow	Inlet Gas Temp	Airflow	Airflow	Inlet Gas Temp	Airflow	
August 8, 2007												
Unit 38D - Site 1				Unit 38D - Site 2								
	753.9	148.0	16:31	228.2	90.8	742.7						
	778.5	152.9	16:32	229.5	99.0	809.7						
	744.7	146.2	16:33	230.8	101.1	827.3						
	784.6	154.1	16:34	229.4	100.7	823.8						
	766.2	150.4	16:35	230.4	94.8	775.6						
	803	157.7	16:36	233.8	91.3	747.3						
	773.9	152.0	16:37	235.1	103.5	846.5						
	715.5	140.5	16:38	237.6	86.9	711.1						
	706.3	138.7	16:39	235.5	73.2	598.7						
	698.6	137.2	16:40	235.6	73.7	602.7						
			22:13	214.4	96.9	792.5						
			22:14	215.5	96.6	790.2						
			22:15	216.8	96.3	788.1						
			22:16	218.8	96.5	789.2						
			22:17	219.0	97.5	797.9						
			22:18	220.6	96.6	790.3						
			22:19	220.8	97.0	793.3						
			22:20	221.1	95.9	784.9						
			22:21	221.1	97.0	793.5						
			22:22	220.9	95.9	784.7						
			22:39	236.2	100.8	825.0						
			22:40	238.6	98.2	803.6						

TITLE: CALCULATION OF DEMONSTRATION BULK VITRIFICATION SYSTEM MELTER INLEAKAGE AND OFF-GAS GENERATION RATE

ORIGINATOR: T.H. MAY THM **DATE: 4/15/08**

CHECKER: M.W. LEONARD MWL **DATE: 4/15/08**

ORGANIZATIONAL MANAGER: D.H. SHUFORD **DATE: 4/15/08**

TRC DATA												
Unit 38D - Site 1				Unit 38D - Site 2			Unit 38D - Site 3			Unit 38D - Site 4		
Stack Temp	Stack Gas Velocity	Stack Gas Airflow	Time	Stack Temp	Stack Gas Velocity	Stack Gas Airflow	Inlet Gas Temp	Airflow	Airflow	Inlet Gas Temp	Airflow	
			22:41	241.0	99.5	813.7						
			22:42	241.5	100.5	822.5						
			22:43	241.4	100.2	819.6						
			22:44	241.8	98.8	808.4						
			22:45	242.7	98.9	808.9						
			22:46	244.5	99.0	810.0						
			22:47	247.8	100.6	823.3						
			22:48	248.3	98.9	809.2						

IDMT DRYER TO ICV TRANSFER DATA

DATE/TIME	DRYER LOAD CELL WEIGHT	UNITS	NOTES	DRYER RPM	ROTARY VALVE RPM
	58370	#	end simulant feed		
8/14/07 4:09	60900	#	open AOV-013	30	15
8/14/07 4:19	60200	#	close AOV-013		
delta	700	#			
divided by .8	875	#			
		#	end simulant feed		
8/14/07 4:25	60100	#	open AOV-013	30	15
8/14/07 4:35	59450	#	close AOV-013		
delta	650	#			

TITLE: CALCULATION OF DEMONSTRATION BULK VITRIFICATION SYSTEM MELTER INLEAKAGE AND OFF-GAS GENERATION RATE

ORIGINATOR: T.H. MAY THM **DATE: 4/15/08**

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ORGANIZATIONAL MANAGER: D.H. SHUFORD **DATE: 4/15/08**

divided by .8	813	#			
		#	end simulant feed		
8/14/07 8:09	58770	#	open AOV-013	30	14
8/14/07 8:21	58000	#	close AOV-013		
delta	770	#			
divided by .8	963	#			
		#	end simulant feed		
8/14/07 8:25	57950	#	open AOV-013	30	13
8/14/07 8:38	57250	#	close AOV-013		
delta	700	#			
divided by .8	875	#			
Total #	3525	#			
Added batch 6-2 to melter					

TITLE: CALCULATION OF DEMONSTRATION BULK VITRIFICATION SYSTEM MELTER INLEAKAGE AND OFF-GAS GENERATION RATE

ORIGINATOR: T.H. MAY TAM **DATE: 4/15/08**
CHECKER: M.W. LEONARD MWL **DATE: 4/15/08**
ORGANIZATIONAL MANAGER: D.H. SHUFORD **DATE: 4/15/08**