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Impacts of the Addition of Sodium Reactor Experiment (SRE) and DR-3 Fuel from H-Canyon to Tank 40 on Acid Stoichiometry and Hydrogen Production

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PREFACE OR ACKNOWLEDGEMENTS

Thanks to Spencer Isom, Dave Henley, Terri Fellinger and Mike Bennett for providing needed reference documents.

Thanks to Jeremiah Ledbetter for providing the DWPF PI data for hydrogen concentration in the SRAT and SME for SB9 and for reviewing the acid calculations.

Thanks to Mason Clark for providing DWPF data concerning hydrogen generation calculations and SB9 hydrogen interlocks.

Thanks to Matt Siegfried for performing the OLI predictions of the precipitated solids after neutralization of the Tank 16.4 solution.

Thanks to Bruce Wiersma and his corrosion evaluation of the impact from adding SRE to Tank 40.

EXECUTIVE SUMMARY

H-Canyon plans to discard Sodium Reactor Experiment (SRE) material that is currently stored in Tanks 16.3 and 16.4. Savannah River Remediation (SRR) determined that a portion of the SRE material can be added to Sludge Batch 9 (SB9) in Tank 40 and the remainder will be added to Sludge Batch 10 (SB10) that is currently being prepared in Tank 51. A processing flowsheet for both the nitric-formic acid flowsheet and the nitric-glycolic acid flowsheet were previously developed for SB9 sludge-only and coupled operation with the Actinide Removal Process – Modular Caustic Side Solvent Extraction Unit (ARP-MCU) and the Salt Waste Processing Facility (SWPF). Due to the compositional change in Tank 40 after the addition of SRE material, it is necessary to determine the influence on the acid stoichiometry operating window and hydrogen production for SB9 processing.

An assessment was completed to address the influence of an addition of SRE and DR-3 Fuel from H-Canyon on the chemistry of Tank 40, the defined acid stoichiometry window (with and without SWPF streams) for the nitric-formic and nitric-glycolic acid flowsheets, and the resulting influence of the hydrogen production. Hydrogen production during the SRAT/SME cycles consists of thermolytic, radiolytic, and catalytic hydrogen. For the nitric-formic acid flowsheet, catalytic hydrogen dominates the hydrogen production during DWPF operation mode for the SRAT and SME vessels. This report was written to summarize that assessment.

No SRNL testing is needed prior to adding up to 7,100 additional gallons of SRE and DR-3 Fuel from H-Canyon to Tank 40. Also, the addition of SRE will not exceed the Shielded Cells reported values for catalytic hydrogen for either the nitric-formic acid flowsheet (Technical Safety Requirement (TSR) limit of 0.15 lb/h) or the nitric-glycolic acid flowsheet (TSR limit 0.024 lb/h). The addition of the ARP stream from SWPF and the use of the nitric-glycolic acid flowsheet are both expected to decrease hydrogen generation, leading to a larger safety margin in the CPC.

The justification for this recommendation is summarized below:

- Approximately 15,700 gallons of SRE has already been added in the preparation of Sludge Batch 9 (SB9). The addition of 7,100 gallons of SRE will increase the SRE volume in the remaining portion of SB9 by 48-65%, depending on when it is added.
- As of SRAT batch 794, there have been 21 SB9 Sludge Receipt and Adjustment Tank (SRAT) and 20 Slurry Mix Evaporator Cycles completed in the Defense Waste Processing Facility (DWPF). SRAT processing has been performed at a Hsu acid stoichiometry of 110-112% and a Reduction/Oxidation (REDOX) target of 0.05-0.15. The peak hydrogen was 0.029 volume % in the SRAT and 0.064 volume % in the SME. The peak hydrogen generation was 0.020 lb/h in the SRAT and 0.017 lb/h in the SME during all SB9 processing. Because of the low hydrogen generation during SB9 processing in the CPC, there is a larger margin for any unexpected increase in hydrogen due to processing variability.
- The most significant factor in hydrogen generation is the concentration of active noble metals catalysts. The SRE addition is only 2.2% by volume even if it is added in October 2020[a]. The noble metal concentration will decrease slightly with the addition of SRE. As SRE is already present in Tank 40, it is unlikely the SRE noble metals are more reactive than the noble metals already in Tank 40.
- Adding SRE to SB9 in Tank 40 will not require the addition of depleted uranium and manganese to protect the slurry from a criticality. If the SRE is later added to Tank 51 during SB10 sludge preparation, the addition of depleted uranium and manganese may be needed to protect the slurry

[a] The analysis does not depend on the date of the transfers but does depend on the amount of slurry in Tank 40 at the time of the transfer and the amount of SRE that is added.

from a criticality. This addition has the potential to impact the rheology of the SB10 slurry along with adding more Mn and U that would be incorporated into the final glass waste form.

- SB9 SRAT processing started at 110% Hsu acid stoichiometry and was later increased to 112% Hsu acid stoichiometry. No increase in hydrogen was noted with this increase in acid. This is consistent with a low noble metal concentration and/or a low concentration of active noble metals.
- The most significant process influence as a result of the SRE addition is an increase in nitrate and free hydroxide. To account for the increase in hydroxide, additional acid will need to be added to neutralize the base. Since DWPF is using a Reduction/Oxidation (REDOX) target of 0.1, more formic acid and less nitric acid will be added during each SRAT cycle to offset the nitrate increase as a result of SRE addition, so that the resulting SRAT product would be 8.3% higher in formate and 5.7% higher in nitrate.
- Based on a corrosion evaluation of Tank 40 after the SRE addition, which was performed due to the large increase in nitrate and fluoride, no significant increase in stress corrosion cracking or pitting is expected. However, because of the large nitrate addition, a small addition of sodium nitrite will likely be required to meet SRS corrosion chemistry requirements if the SRE is added when the Tank 40 volume is lowest (October 2020).
- The antifoam strategy that has been used in SB9 should be adequate for controlling foaming during processing of Tank 40 sludge after SRE is added.
- For the nitric-formic acid process, it is expected that the hydrogen generation in SRAT and SME processing will be similar or lower than the hydrogen generation in completed SB9 processing. Thus, it is expected that the hydrogen generation will not exceed the TSR limit during similar processing. It is also expected that the Hsu acid stoichiometry operating window would be approximately 110-125%.
- For the nitric-glycolic acid process, it is expected that the hydrogen generation in SRAT and SME processing will be similar to SRNL laboratory testing. Thus, it is expected that the hydrogen generation will not exceed the TSR limit during similar processing.

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LIST OF ABBREVIATIONS

ARP	Actinide Removal Process
CPC	Chemical Processing Cell
DWPF	Defense Waste Processing Facility
GC	gas chromatograph
ICP-ES	Inductively Coupled Plasma – Emissions Spectroscopy
LFL	Lower Flammability Limit
MCU	Modular Caustic Side Solvent Extraction Unit
MST	monosodium titanate
NA	not applicable
REDOX	reduction/oxidation
SB9	Sludge Batch 9
SB10	Sludge Batch 10
SME	Slurry Mix Evaporator
SRAT	Sludge Receipt and Adjustment Tank
SRE	Sodium Reactor Experiment
SRNL	Savannah River National Laboratory
SRNS	Savannah River Nuclear Solutions
SRR	Savannah River Remediation
SWPF	Salt Waste Processing Facility
TSR	Technical Safety Requirement
TTQAP	Task Technical and Quality Assurance Plan
TTR	Technical Task Request
WAPS	Waste Acceptance Product Specifications

1.0 Introduction

H-Canyon plans to discard Sodium Reactor Experiment (SRE) material that is currently stored in Tanks 16.3 and 16.4. Savannah River Remediation (SRR) determined that a portion of the SRE material can be added to Sludge Batch 9 (SB9) in Tank 40, and the remainder will be added to Sludge Batch 10 (SB10) that is currently being prepared in Tank 51.[1] A Defense Waste Processing Facility (DWPF) processing flowsheet for both the nitric-formic acid[2] and the nitric-glycolic acid[3] were previously developed for SB9 sludge-only and coupled operation with the Actinide Removal Process – Modular Caustic Side Solvent Extraction Unit (ARP-MCU). Earlier testing with both flowsheets demonstrated processing with the Salt Waste Processing Facility (SWPF). Due to the compositional change in Tank 40 after the addition of SRE material, it is necessary to determine the influence on the acid stoichiometry operating window and hydrogen production for SB9 processing.[4,5]

A technical report was requested to address the influence of an addition of SRE and DR-3 Fuel from H-Canyon on the chemistry of Tank 40, the defined acid stoichiometry window (with and without SWPF streams) for the nitric-formic and nitric-glycolic acid flowsheets, and the resulting influence of the hydrogen production. Hydrogen production during the Sludge Receipt and Adjustment Tank (SRAT) /Slurry Mix Evaporator (SME) cycles consists of thermolytic, radiolytic, and catalytic hydrogen. Catalytic hydrogen dominates the hydrogen production during DWPF operation mode for the SRAT and SME vessels. This report addresses whether the SRE/DR-3 addition will challenge the Shielded Cells reported values for the catalytic hydrogen for both the nitric-formic and the nitric-glycolic flowsheets compared to the Technical Safety Requirement (TSR) value of 0.15 and 0.024 lb/h respectively.[6] The paper also addresses whether further testing is warranted.

2.0 Background

A potential window for SRE addition from H-Canyon Tank 16.4 to SB9 has been identified spanning roughly May 2020 to October 2020. The DWPF will continue to operate during the planned window until SRE addition commences. This means the sludge volume in Tank 40 (which already contains SRE from Tank 16.4) will continue decreasing over the addition window due to processing in DWPF. Once SRE additions begin, Tank 40 will be locked down for the duration of the additions, and DWPF will not receive sludge from Tank 40 during additions. The scenarios that will be assessed are summarized in Section 2.1. The composition of the SRE liquid in Tank 16.4 is discussed in Section 2.2 and the resulting composition of the slurry in Tank 40 is summarized in Section 2.3. Section 2.4 discusses the Quality Assurance for this analysis.

2.1 Scenarios for Assessment

Two scenarios are being evaluated, similar to the system impact evaluation completed by D. B. Henley.[7]

- Scenario A. Adding Tank 16.4 contents to Tank 40 in May 2020[†].
- Scenario B. Adding Tank 16.4 contents to Tank 40 in October 2020.

Both scenarios involve the transfer of 7,100 gallons from Tank 16.4 to Tank 40. The volumes of Tank 40, Tank 16.4 and the percent of Tank 16.4 in Tank 40 are summarized in Table 2-1.

Note that the analysis does not depend on the date of the transfers but does depend on the amount of slurry in Tank 40 at the time of the transfer and the amount of SRE that is added.

[†] The analysis does not depend on the date of the transfers but does depend on the amount of slurry in Tank 40 at the time of the transfer and the amount of SRE that is added.

Table 2-1. Volume of Tank 40, Tank 16.4, and Volume Percent of Tank 16.4 in Tank 40

Scenario	Tank 40, gallons	Tank 16.4, gallons	Volume % of Tank 16.4 in Tank 40
Scenario A	440,908	7,100	1.61
Scenario B	321,763	7,100	2.20

2.2 Tank 16.4 Compositional Estimates

Savannah River Nuclear Solutions (SRNS) summarized the composition of the SRE liquid stream prior to that would be added to Tank 40.[8] A more extensive list of analytes was documented. Note that sodium hydroxide addition will precipitate insoluble solids in the SRE material prior to transferring the slurry to Tank 40, targeting a final free hydroxide concentration of at least 1.2 M.

The above analysis did not include the precipitation of aluminum, iron, mercury, manganese, and gadolinium due to the addition of sodium hydroxide. A simulation was performed using OLI Studio: Stream Analyzer to predict the insoluble solids that would be produced as a result of the sodium hydroxide addition. Table 2-2 summarizes the predicted chemistry of the slurry that will be added to Tank 40. It should be noted that this stream is high in sodium, potassium, nitrate, and fluoride relative to a washed sludge. And OLI predicted the precipitation of insoluble solids concentration would be 4.18 wt %, consisting of aluminum hydroxide (gibbsite) $Al(OH)_3$, uranyl hydroxide $UO_2(OH)_2$, gadolinium hydroxide $Gd(OH)_3$, mercuric oxide HgO, iron hydroxide $Fe(OH)_2$, and Chromite $FeCr_2O_4$.

Table 2-2. OLI Prediction of Neutralized Tank 16.4 Waste Stream to Sludge Batch 9

Anions	**M**	**mg/L**	**mg/kg**
Nitrate	3.85	239,000	184,000
Nitrite	<0.00717	<330	<254
Free Hydroxide	1.2	20400	15700
Carbonate	4.78E-05	2.87	2.21
Chloride	<0.00931	<330	<254
Fluoride	0.0351	667	513
Sulfate	<0.00344	<330	<254
Phosphate	<0.00347	<330	<254
Oxalate	<0.00375	<330	<254
Cations	**M**	**mg/L**	**mg/kg**
Ag	<0.00002	<1.64	<1.26
Al	0.789	21,300	16,400
As	0.00002	1.81	1.39
Ba	0.00014	19.8	15.2
Cd	<0.00001	<0.667	<0.513
Cr	0.00076	39.3	30.2
Fe	0.00399	223	171
Gd	0.0144	2,270	1,740
Hg	0.00428	859	660
K	0.0366	1,430	1,100
Mn	0.00018	10.1	7.76
Na	5.96	137,000	105,000
Pb	<0.01829	<330	<254
Se	0.00004	2.93	2.25
Si	<0.00018	<5.13	<3.94
U	0.0196	4,667	3,590
Density, Solids and pH		**OLI Predicted Insoluble Solids**	
Slurry Density, g/mL	1.3015	$Al(OH)_3$, mg/L	46,200
Supernate Density, g/mL	1.2728	$UO_2(OH)_2$, mg/L	2,110
Total Solids, wt %	37.32	$Gd(OH)_3$, mg/L	1,640
Insoluble Solids, wt %	4.18	HgO, mg/L	900
Soluble Solids, wt %	33.14	$Fe(OH)_2$, mg/L	315
Calcined Solids, wt %	17.71	$FeCr_2O_4$, mg/L	85
pH	>14		

Because of the 5 mg/L increase in fluoride concentration due to the addition of fluoride with the SRE, a corrosion evaluation was performed by Bruce Wiersma and will be discussed in Section 3.4.

2.3 Tank 40 Compositional Estimates

The amount of SRE material that can be added into SB9 is determined by several factors. SRR intends to accept as much SRE as possible without having to reperform all sludge batch qualification efforts (i.e. Shielded Cells demonstration, Material Acceptability Region assessment, variability study, frit selection, etc.). This assessment is one of several that will be performed to ensure viability prior to making the transfer.

SRR developed four scenarios[9] that were evaluated to generate fissile concentrations in sludge and glass at various waste loadings, fissile enrichment, and poison to fissile ratios. These scenarios span the SRE addition window with two cases including the contribution from monosodium titanate (MST) and two cases not including the contribution from MST. Note the MST stream may also contain sludge solids but is

referred to as MST in this report. The scenarios are listed below and summarized in the memo from S. T. Isom.[9]

1. Scenario A with MST (May 2020 SRE addition)
2. Scenario A without MST (May 2020 SRE addition)
3. Scenario B with MST (October 2020 SRE addition)
4. Scenario B without MST (October 2020 SRE addition)

2.4 Predicted Composition of Tank 40 Before and After Addition of Tank 16.4

Sludge Batch 9 was prepared by transferring 241,769 gallons of sludge from Tank 51 to the sludge heel in Tank 40. Approximately 18,000 gallons of SRE material was added to Tank 51 prior to this transfer. The result is that approximately 15,700 gallons of SRE was present in Tank 40 at the beginning of sludge batch 9.[10] This is an important distinction since SRE material (more will be added to Tank 40 as discussed in section 2.4) is part of the SB9 sludge in Tank 40. The SRE material has been part of the 21 batches that have been completed in the SRAT and SME during SB9 processing.

Although there are many scenarios that could have been evaluated, only Scenario 4 [Scenario B without MST (sludge-only processing of Tank 40 without added SWPF streams) for the October 2020‡ transfer] was evaluated. This selection is because Scenario B without MST has the potential to have the smallest operating window and highest hydrogen generation. If the SRE is added in October, Tank 40 will be at its lowest volume, so Tank 16.4 will be at its the largest volume fraction in Tank 40. Even at this point, the Tank 16.4 addition is only a 2.2% increase in volume. Furthermore, since the solution in Tank 16.4, prior to neutralization with sodium hydroxide, is a very strong nitric acid solution, the main impact in adding Tank 16.4 to Tank 40 is the increased concentration of the soluble sodium, free hydroxide and nitrate, along with the generation of insoluble solids including aluminum hydroxide (gibbsite), uranyl hydroxide, gadolinium hydroxide and iron hydroxide.

Scenario B with MST was not evaluated since the addition of the ARP stream from SWPF is typically low in noble metals compared to sludge. There are several factors that impact the noble metal concentration in this ARP stream. The first is that the noble metals are produced by fission of U-235[11] to Pd (~8 wt%), Ru (~8 wt%), and ~Rh(~4 wt %). As a result, there is expected to be a noble metal distribution like sludge. Since the insoluble solids in the ARP stream are less than half sludge, the noble metals are further diluted by the MST. Lastly, very little sludge has been present in salt batches to date, so ARP was able to operate without an MST addition and still meet the Waste Acceptance Criteria. As a result, the addition of ARP lowers the concentration of noble metals in the sludge fed to the SRAT and SME, leading to less hydrogen generation.

In addition, there is no reason to evaluate the operating window with respect to hydrogen formation for the nitric-glycolic acid flowsheet as the hydrogen generation will be much lower than for comparable processing for the nitric-formic acid flowsheet.[2, 12] An extensive report on hydrogen generation in nitric-glycolic acid flowsheet runs was completed to predict the maximum hydrogen generation rate that DWPF might experience based on SRNL testing.[13]

The predicted composition of Tank 40 before and after the addition from H Canyon Tank 16.4 for Scenario 4 is summarized in Table 2-3, Table 2-4, and Table 2-5.

‡ The analysis does not depend on the date of the transfers but does depend on the amount of slurry in Tank 40 at the time of the transfer and the amount of SRE that is added.

Table 2-3. Properties in Tank 40 Before and After Tank 16.4 Addition Based on Scenario 4

Description	SB9 Before SRE Addition	Tank 16.4 Addition	SB9 After SRE Addition
Initial tank Level (in)	92		94
Slurry volume (gal)	322,800	7,100	329,900
liquid volume (gal)	307,300	6,956	314,300
sludge volume (gal)	15,505	144	15,649
Total Mass (kg)	1,344,000	34,974	1,379,000
Water (kg)	1,155,000	23,385	1,179,000
Total Solids, kg	189,000	11,589	201,000
Insoluble solids (kg)	123,000	1,460	124,000
Calcined Solids (kg)	132,000	6,193	138,000
Soluble Solids (kg)	66,300	11,600	76,400
Total solids (wt %)	14.06	37.32	14.65
Insoluble solids (wt %)	9.13	4.18	9.00
Calcined Solids (wt %)	9.83	17.71	10.03
Soluble Solids (wt %)	4.93	33.14	5.65
Slurry Density (kg/L)	1.1000	1.3015	1.1043
Supernate Density (kg/L)	1.0500	1.2728	1.0549

Notes on the impact of the addition of Tank 16.4 to Tank 40 are:

- 2.20% increase in volume
- Insoluble solids concentrations decrease 1.37% and total solids increase by 4.20% respectively
- Density rises slightly
- 2.0% increase in calcined solids mass

Table 2-4. Tank 40 Metals Before and After Tank 16.4 Was Added, wt % on dried solids basis, 2018 Waste Acceptance Product Specifications (WAPS) Sample

Metal	SB9 Before SRE Addition	Tank 16.4 Addition	SB9 After SRE Addition
Ag	<0.0200	<0.001	<0.019
Al	6.06	4.30	5.98
B	0.0300	Not Reported	0.0286
Ba	0.0700	<0.004	0.0672
Be	0.0200	Not Reported	0.0191
Ca	1.03	Not Reported	0.983
Cd	0.010	Not Reported	0.0096
Ce	0.220	Not Reported	0.210
Co	0.0100	Not Reported	0.0095
Cr	0.0800	0.008	0.0767
Cu	0.0300	Not Reported	0.0286
Fe	15.7	0.045	15.0
Gd	0.080	0.457	0.097
Hg	2.22	0.173	2.13
K	0.080	0.289	0.089
La	0.0400	Not Reported	0.0382
Li	0.040	Not Reported	0.0382
Mg	0.210	Not Reported	0.200
Mn	5.12	0.002	4.89
Mo	0.0100	Not Reported	0.0095
Na	13.9	27.6	14.5
Ni	1.04	Not Reported	0.993
P	0.140	Not Reported	0.134
Pb	0.0400	Not Reported	0.0386
Pd	0.0023	Not Reported	0.0022
Ru	0.0523	Not Reported	0.0499
Rh	0.0115	Not Reported	0.0110
S	0.250	Not Reported	0.239
Sb	0.0200	Not Reported	0.0191
Si	1.24	Note Reported	1.18
Sn	<0.0100	Not Reported	<0.0095
Sr	0.0200	Not Reported	0.0191
Th	0.800	Not Reported	0.764
Ti	0.0200	Not Reported	0.0191
U	2.90	0.936	2.81
V	<0.0100	Not Reported	<0.0095
Zn	0.0300	Not Reported	0.0286
Zr	0.0300	Not Reported	0.0286

Notes on the impact of the addition of Tank 16.4 to Tank 40 are:

- 1.32% decrease in aluminum concentration, 17.4% increase in gadolinium
- 4.24% increase in sodium concentration and 10.4% increase in potassium
- Although As, Ba, Cr, Fe, Gd, Mn, Se, U were above quantitation limits in the Tank 16.4 sample, the concentration of these will decrease in Tank 40 after the Tank 16.4 solution is added.

Table 2-5. Supernate Ion Concentration in Tank 40 Before and After Tank 16.4 Was Added, M

Ion	SB9 Before SRE Addition	Tank 16.4 Addition	SB9 After SRE Addition
Na^+	0.861	5.960	0.974
NO_2^-	0.289	<0.007	0.283
NO_3^-	0.093	3.991	0.179
OH^-	0.250	1.200	0.271
Cl^-	<0.002	<0.009	<0.002
SO_4^{-2}	0.010	<0.003	0.010
F^-	<0.005	0.035	≤0.006
CO_3^{-2}	0.138	0.00005	0.135
AlO_2^-	0.060	0.194	0.063
$C_2O_4^{-2}$	0.028	<0.006	0.027
PO_4^{-3}	<0.001	<0.005	<0.001
K^+	0.001	0.036	0.002

Notes on the impact of adding Tank 16.4 to Tank 40 on the ion concentrations are:

- 13.1% increase in sodium and 71.4% increase in potassium ion concentration
- 92.8% increase in nitrate concentration
- 8.4% increase in free hydroxide concentration
- 4.9% increase in aluminate concentration.
- Although carbonate was above quantitation limits in the Tank 16.4 sample, its concentration will decrease in Tank 40 after the Tank 16.4 solution is added. Carbonate continually increases in waste tanks as CO_2 is absorbed from air. The carbonate will be higher, and the free hydroxide will be lower, but this does not impact the SRAT acid demand.
- 13.3% increase in fluoride, assuming Tank 40 fluoride concentration is at detection limit. This is about a 5 mg/L increase in fluoride

2.5 Quality Assurance

The functional class for this work is Safety Class.[4] Requirements for performing reviews of technical reports and the extent of review are established in manual E7 2.60. SRNL documents the extent and type of review using the SRNL Technical Report Design Checklist contained in WSRC-IM-2002-00011, Rev. 2. All work, data inputs, and documentation complies with these requirements.

3.0 Results and Discussion

SRR requested that SRNL evaluate the influence of planned Tank 16.4 addition on the acid window and hydrogen generation in the DWPF SRAT and SME. The hydrogen generation depends on both noble metal activity and acid stoichiometry. The acid window depends on both hydrogen generation and rheology. Section 3.1 summarizes the SRNL testing to develop the nitric-formic acid flowsheet operating window. Section 3.2 summarizes the hydrogen generation in DWPF during SRAT and SME processing of the nitric-formic acid flowsheet. Section 3.3 summarizes the influence of the Tank 16.4 SRE addition on the required acid needed and the predicted SRAT product nitrate and formate concentration. Section 3.4 summarizes the corrosion evaluation that performed to assess the addition of SRE to Tank 40. Section 3.5 summarizes an evaluation performed to assess the SB9 Antifoam strategy after adding Tank 16.4 to Tank 40.

3.1 Analysis of Hydrogen Data from SRNL SB9 SRAT and SME testing

Eleven experiments with simulant were completed in SRNL to develop the nitric-formic acid processing flowsheet for SB9 with ARP-MCU[2] which included the SB9 sludge together with added noble metals and mercury. The noble metals were added at a concentration that was 125% of what was expected in SB9 (the Rh was actually 137% higher, the Ru was 148% higher and the Pd was 159% in the simulant runs compared to the Tank 40 WAPS[14] samples). The data from most of the 4-L experiments is summarized in Table 3-1. It should be noted that the hydrogen generation rate from these experiments was conservative due to the use of a form of the ruthenium catalyst (Ruthenium(III) nitrosyl nitrate solution) that led to higher hydrogen peaks. A single experiment with the old ruthenium catalyst, $RuCl_3$, reported in the table below at 125% acid stoichiometry, was ~4x lower in hydrogen generation than a duplicate test with the new ruthenium catalyst. As a result, the acid window for SB9 is 109.7-125% Hsu acid stoichiometry.

Two Shielded Cells experiments were completed to demonstrate that the operating window recommended by the simulant tests was conservative. Only the hydrogen peak from the lower acid stoichiometry experiment from (SC-17) is summarized in Table 3-2.[15] Note that the hydrogen peak was high (compared to the 0.15 lb/h TSR limit) in this experiment, leading to a recommendation for DWPF to begin SB9 processing at 110% Hsu acid stoichiometry,[16] instead of the 128% Hsu acid stoichiometry used in the SC-17 experiment, to be conservative.

Table 3-1. Hydrogen Peak Generation Rate in SRNL Simulant Experiments

Hsu Acid Stoichiometry	SRAT H_2 peak, lb/h	SME H_2 peak, lb/h
110%	0.023	0.007
125	0.083	0.023
131	0.432	0.208
136	0.656	0.177
152%	1.142	0.151

Table 3-2. Hydrogen Peak Generation Rate, DWPF Scale, in SRNL Actual Waste Experiments

Hsu Acid Stoichiometry	SRAT H_2 peak, lb/h	SME H_2 peak, lb/h
128%	0.0539	0.095

3.2 Analysis of Hydrogen Data during DWPF SB9 SRAT and SME processing

As of SRAT Batch 794, DWPF has completed 21 SB9 SRAT and SME cycles. Small scale experiments are good for planning for the processing of a future sludge batch, but actual full-scale processing is the best indicator of the average and peak hydrogen generation rates. Experiments with simulants are intended to be conservative so often lead to higher hydrogen generation rates than are achieved in the DWPF CPC.

Thus, a careful analysis of the DWPF CPC data was completed. The data was supplied by Jeremiah Ledbetter from the PI data that had been archived during DWPF processing. The data was screened to eliminate calibration data or data collected just after the calibration. The data was evaluated in the same manner as was used to develop the 0.15 lb/h TSR limit, including not considering the intermittent spike data for the SME column B Gas Chromatograph (GC) data starting with SME Batch 782.[17] Note that the first fifteen batches target a Hsu acid stoichiometry of 110%, while the last six targeted 112%. In addition, the first eight targeted a REDOX of 0.15 while the last seventeen targeted a REDOX of 0.10 (except that 786 targeted 0.14, 787 targeted 0.15 and 792 targeted 0.05). A graph of the hydrogen generation data is included in Figure 3-1.

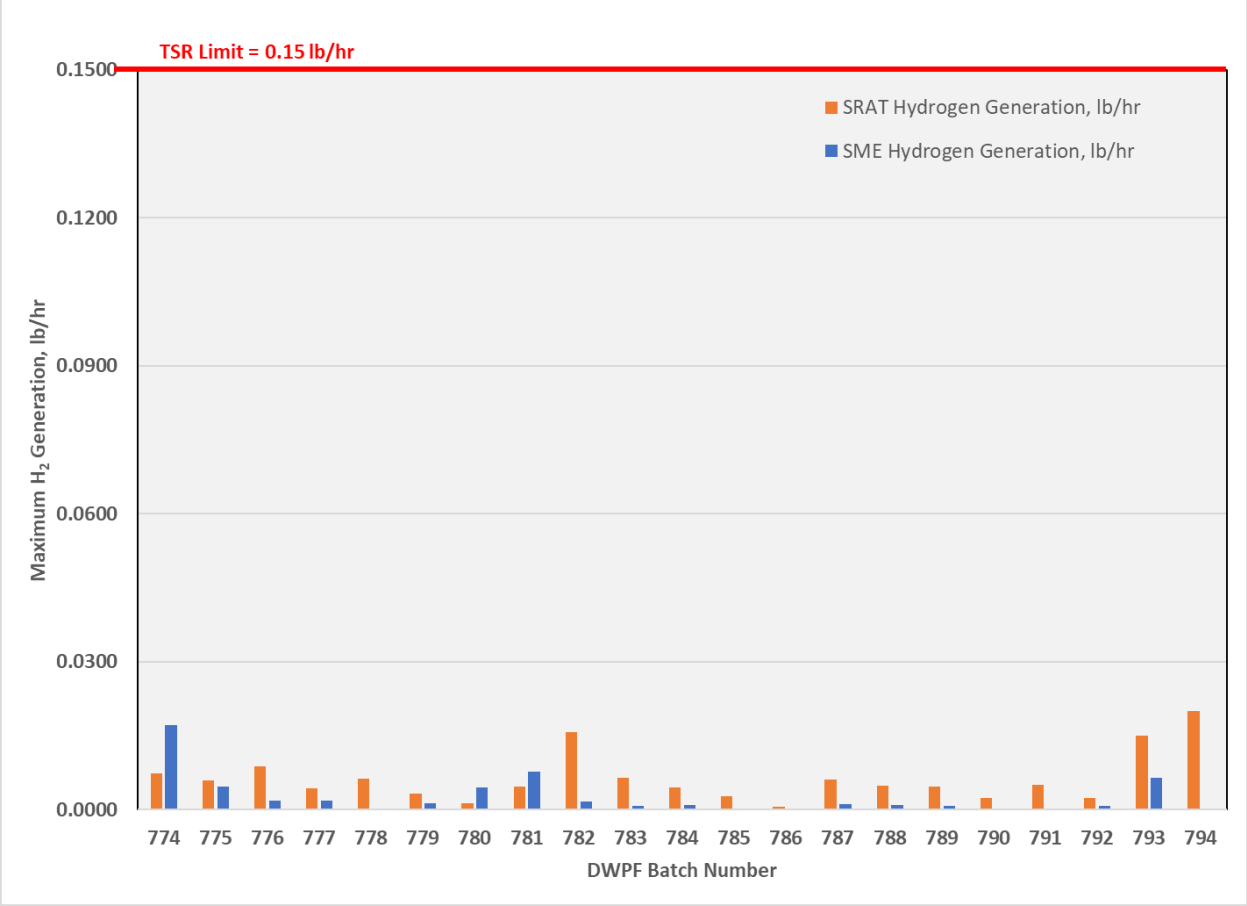

Figure 3-1. SB9 Hydrogen Generation Rate in SRAT and SME Processing, lb/h

The hydrogen data during SB9 SRAT and SME cycles was evaluated to determine the peak hydrogen generation rate. The peak SRAT and SME cycle hydrogen (volume %), lower flammability limit (LFL) data, and hydrogen generation rate, lb/h is summarized in Figure 3-1 and Table 3-3. The peak SRAT cycle hydrogen concentration was 0.029 volume % or 0.020 lb/h and the peak SME cycle hydrogen concentration was 0.064 volume % or 0.017 lb/h. Note that the hydrogen concentration is lower in the SRAT cycle as a

result of the higher air purge. The composite LFL in the SRAT and SME is 3.84%. The % LFL and the lb/h H_2 are calculated as follows:

$$\%LEL = \frac{H_2, volume\ \%}{Composite\ LEL, volume\ \%} \text{x} 100$$

$$SRAT\ H_2, \frac{lb}{hr} = \frac{H_2, volume\ \%}{100} * 222\ scf * 60\ \frac{min}{hr} * \frac{lb-mole}{386.765\ scf} * 2.01588\ \frac{lb}{lb-mole}$$

$$SME\ H_2, \frac{lb}{hr} = \frac{H_2, volume\ \%}{100} * 86\ scf * 60\ \frac{min}{hr} * \frac{lb-mole}{386.765\ scf} * 2.01588\ \frac{lb}{lb-mole}$$

The maximum hydrogen generation during SB9 processing occurred in SRAT batch 774 and SME batch 794. Note the SB9 hydrogen interlock is set at 0.15 lb/h H_2 so the peak hydrogen was less 12% of the DWPF limit. In other words, the SRAT and SME could maintain below the 0.15 lb/h limit even if the hydrogen generation was eight times that measured SB9 processing.

Table 3-3. SB9 SRAT and SME Cycle Peak Hydrogen Concentration[§]

Run	Max concentration SRAT			Max concentration SME		
Hydrogen	**Volume %**	**%LFL**	**lb/h**	**Volume %**	**%LFL**	**lb/h**
Minimum	**0.0007**	**0.02**	**0.0005**	**0.0006**	**0.02**	**0.0002**
Average	**0.0090**	**0.25**	**0.0063**	**0.0098**	**0.27**	**0.0026**
Maximum	**0.0287**	**0.79**	**0.0200**	**0.0637**	**1.75**	**0.0171**
774	0.011	0.29	0.0074	0.064	1.75	0.0171
775	0.009	0.24	0.0060	0.017	0.469	0.0046
776	0.013	0.35	0.0088	0.007	0.181	0.0018
777	0.006	0.17	0.0043	0.007	0.184	0.0018
778	0.009	0.25	0.0063	0.001	0.017	0.0002
779	0.005	0.13	0.0033	0.005	0.127	0.0012
780	0.002	0.05	0.0013	0.017	0.461	0.0045
781	0.007	0.19	0.0047	0.029	0.785	0.0077
782	0.023	0.62	0.0157	0.006	0.174	0.0017
783	0.009	0.25	0.0064	0.003	0.079	0.0008
784	0.006	0.17	0.0044	0.003	0.093	0.0009
785	0.004	0.11	0.0027	0.001	0.017	0.0002
786	0.001	0.02	0.0005	0.001	0.017	0.0002
787	0.009	0.24	0.0061	0.004	0.103	0.0010
788	0.007	0.19	0.0048	0.003	0.087	0.0009
789	0.007	0.19	0.0047	0.003	0.077	0.0008
790	0.003	0.09	0.0023	0.001	0.017	0.0002
791	0.007	0.19	0.0049	0.001	0.022	0.0002
792	0.003	0.10	0.0024	0.003	0.082	0.0008
793	0.022	0.59	0.0150	0.024	0.655	0.0064
794	0.029	0.79	0.0200	Incomplete		

Note that the SRAT and SME are automatically cooled down if the hydrogen generation exceeds 0.15 lb/h.

[§] The TSR limit of 0.15 lb/h for the nitric-formic acid flowsheet and 0.024 lb/h for the nitric-glycolic acid addition uses a composite LFL which includes, hydrogen generation, isopar vapor, and antifoam degradation products.

3.3 Impact of Addition of Tank 16.4 to Tank 40 on DWPF Acid Calculation

An assessment was performed to determine the impact of the SRE addition on CPC processing. The DWPF Acid Calculation Spreadsheet (SRAT Acid SB9.xlsx, revised 12/26/18, new batch 795) was used to calculate the nitric acid and formic acid needed for processing along with the resulting nitrate and formate concentration in the SRAT product. The data from Table 2-3 to Table 2-5 were used as inputs to the acid calculation. The information for completing the acid calculation is summarized in Table 3-4.

Note that this calculation does not include a SRAT heel of approximately 1,500 gallons as it is conservative from a hydrogen generation standpoint. Fresh sludge added to the SRAT is very reactive in generating hydrogen and typically relatively inert by the end of the SRAT cycle. This is one of the reasons why almost all SRNL experiments exclude a heel as an additional conservative measure to ensure the hydrogen generated rate in DWPF is less than what is measured in SRNL experiments.

Table 3-4. SRAT Inputs and Outputs from DWPF Acid Calc

Inputs	**Tank 40 Before Tank 16.4 Addition**	**Tank 40 After Tank 16.4 Addition**
Hsu Acid Stoichiometry	112%	112%
Reduction/Oxidation (REDOX) target	0.1	0.1
Volume [gal]	7,895	7,895
SpG	1.100	1.104
wt % solids	14.06	14.65
Hydroxide [eq/L]	0.250	0.271
Nitrite [mg/kg]	13,900	13,500
Mercury [mg/kg]	2,180	2,140
Manganese [wt % solids]	3.58	3.35
Total Inorganic Carbon [mg/kg]	1,280	1,250
Formate [mg/kg]	0	0
Nitrate [mg/kg]	6,040	11,400
Oxalate [mg/kg]	2,580	2,500
Carbon [mg/kg solids]	240	240
Outputs	**Before**	**After**
Nitric Acid Addition, mols	5,806	3,655
Formic Acid Addition, mols	23,224	25,645
50% Nitric Acid Addition, gal	148	93
90% Formic Acid Addition, gal	260	288
SRAT Product Total Solids, wt %	20.0	20.0
SME Product REDOX	0.10	0.10
SRAT product formate, mg/kg	30,190	32,700
SRAT product nitrate, mg/kg	24,410	25,800

Calculations were performed using the DWPF Acid Calc spreadsheet to estimate the nitric and formic acid demand for the nitric-formic acid flowsheet using both the predicted composition of Tank 40 before and after the SRE addition. The Reduction/Oxidation (REDOX) target was 0.10 and the Hsu Acid Stoichiometry target was 112%, the same targets that have been used for recent SB9 SRAT batches (110%

was used for the first fifteen SB9 SRAT batches). A SRAT product total solids target of 20% was used for both calculations.

The result from this analysis is that the SRAT cycles performed after the addition of SRE to Tank 40 will be similar to the SRAT products that have been produced in SRAT cycles before the addition of SRE to Tank 40. Because the nitrate concentration in the SB9 increases from 6,040 to 11,400 mg/kg, the acid calculation corrects the SRAT product by adding less nitric acid and more formic acid. So, although the nitrate in the SRAT feed increases by 88%, the final nitrate in the SRAT product only increases by 5.7%. Because the nitrate increases, the formate in the SRAT product also increases 8.3% to achieve the REDOX target of 0.1. In comparing the results for processing before and after the SRE addition, the acid demand increases by 0.9% due to the increase in free hydroxide. The same nitrate and formate concentration can be achieved in processing the Tank 40 sludge with SRE addition by lowering the acid stoichiometry to 100%. Processing using the nitric-formic acid flowsheet at acid stoichiometries as low as 100% isn't recommended, however, as it isn't within the SB9 window and might lead to incomplete nitrite conversion, high pH SME products, and thick rheology.

For the *nitric-formic acid flowsheet*, after adding the SRE to Tank 40, the hydrogen generation in SRAT and SME processing is expected to be similar or lower than the hydrogen generation in completed SB9 processing. If DWPF continues processing at the low end of the acid stoichiometry window, there is a margin of 8X against exceeding the 0.15 lbs/hr TSR limit. It is also expected that the Hsu acid stoichiometry operating window would be approximately 110-125%, although it is recommended to use a Hsu acid stoichiometry target of 112% for future SB9 SRAT processing after the SRE has been added to Tank 40 to be consistent with recent processing.

For the *nitric-glycolic acid flowsheet*, after adding the SRE to Tank 40, the hydrogen generation in SRAT and SME processing is expected to be similar to the hydrogen generation prior to adding the SRE to Tank 40. Thus, it is expected that the hydrogen will not exceed the 0.024 lb/hr TSR limit. It is also expected that the Hsu acid stoichiometry operating window would be approximately 77-133%, although it is recommended to use a low Hsu acid stoichiometry target to minimize hydrogen generation. Note also that the hydrogen generation rate is very flat even over this wide acid stoichiometry range. The small addition of insoluble solids due to the SRE addition is not expected to impact physical properties such as foaming or rheology.

3.4 Corrosion Evaluation

A corrosion assessment was completed to evaluate any impacts the SRE addition may have on Tank 40 corrosion. Given that the nitrate and hydroxide concentrations are less than 1 M the following criteria must be met to comply with SRS corrosion chemistry requirements shown in Table 7 of the Corrosion Control Program Description Document (PDD).[18]

- Temperature < 40 °C
- pH > 10.3
- Nitrite/Nitrate ratio greater than 1.66

The current PDD does not specifically address the fluoride levels because typically they are less than detectable values in the SRS tanks. An evaluation on the effect of the fluoride concentration was performed utilizing pitting data from testing that was performed for the Hanford waste tank facility[19]. The chemical composition tested for the Hanford waste simulants bounds the composition for Tank 40 after SRE. The criteria for pitting prevention in this case is:

- Temperature < 50 °C
- Hydroxide > 0.01 M
- Nitrite > 0.2 M
- Pitting Factor (PF) > 1.2 Note: fluoride concentration is accounted for in the PF ratio calculation

The results of both assessments are summarized in Table 3-5.

Table 3-5. Corrosion Evaluation Results

Criteria	Tk 40 Before SRE	Tk 40 After SRE
Nitrite/Nitrate	3.11	1.59
Pitting Factor (PF)	15.90	10.68

Tank 40 meets the SRS corrosion chemistry requirements and the Hanford requirements before the SRE addition. The pitting factor (PF) remains well above 1.2 after the SRE addition suggests that the fluoride does not impact the corrosivity of the waste significantly. The PF decreases primarily because of the nitrate concentration increase. The nitrite/nitrate ratio is slightly below the 1.66 required ratio per the SRS corrosion chemistry requirement for pitting. The facility would need to make a small nitrite addition per the current requirements if the SRE is added when the Tank 40 volume is lowest (October 2020[**]). Note that this sodium nitrite addition would not significantly impact the chemistry discussion in the previous sections.

3.5 Antifoam Evaluation

The addition of SRE to Tank 40 adds 1,463 kg of insoluble solids and decreases the insolubles solids concentration by 1.37 wt %. The foaming in DWPF is caused by the insoluble solids present in Tank 40, especially the fine solids. Typically, the more dilute the insoluble solids, the less persistent the foam will be.[20] As a result, the antifoam strategy that has been used in SB9 should be adequate for controlling foaming during processing of Tank 40 sludge after SRE is added.

[**] The analysis does not depend on the date of the transfers but does depend on the amount of slurry in Tank 40 at the time of the transfer and the amount of SRE that is added. So, this analysis applies to transfers of SRE volume to Tank 40

4.0 Conclusions

An assessment was completed to address the influence of an addition of SRE and DR-3 Fuel from H-Canyon on the chemistry of Tank 40, the defined acid stoichiometry window (with and without SWPF streams) for the nitric-formic and nitric-glycolic acid flowsheets, and the resulting influence of the hydrogen production. Hydrogen production during the SRAT/SME cycles consists of thermolytic, radiolytic, and catalytic hydrogen. For the nitric-formic acid flowsheet, catalytic hydrogen dominates the hydrogen production during DWPF operation mode for the SRAT and SME vessels. This report was written to summarize that assessment.

The justification for this is summarized below:

- Approximately 15,700 gallons of SRE has already been added in the preparation of Sludge Batch 9 (SB9). The addition of 7,100 gallons of SRE will increase the SRE volume in the remaining portion of SB9 about 48-65%, depending on when it is added.
- As of SRAT batch 794, there have been 21 SB9 SRAT and 20 SME Cycles completed in the DWPF). SRAT processing has been completed at a Hsu acid stoichiometry of 110-112% and a Reduction/Oxidation (REDOX) target of 0.05-0.15. The peak hydrogen concentration from these batches was 0.029 volume % in the SRAT and 0.064 volume % in the SME. The peak hydrogen generation was 0.020 lb/h in the SRAT and 0.017 lb/h in the SME during all SB9 processing. Because of the low hydrogen generation during SB9 processing in the CPC, there is a larger margin for any unexpected increase in hydrogen due to processing variability.
- The most significant factor in hydrogen generation is the concentration of active noble metals catalysts. The SRE addition is only 2.2% by volume even if it is added in October 2020[††]. The noble metals concentration will decrease slightly with the addition of SRE. As SRE is already present in Tank 40, it is unlikely the SRE noble metals are more reactive than the noble metals already in Tank 40.
- Adding SRE to SB9 in Tank 40 will not require the addition of depleted uranium and manganese to protect the slurry from a criticality. If the SRE is later added to Tank 51 during SB10 sludge preparation, the addition of depleted uranium and manganese may be needed to protect the slurry from a criticality. This has the potential to alter the rheology of the SB10 slurry along with adding additional Mn and U that would be incorporated into the final glass waste form.
- SB9 SRAT processing started at 110% Hsu acid stoichiometry and was later increased to 112% Hsu acid stoichiometry. No increase in hydrogen was noted with this increase in acid. This is consistent with a low noble metal concentration and/or a low concentration of active noble metals.
- The most significant process influencing as a result of the SRE addition is an increase in free hydroxide. To account for the increase in hydroxide, additional acid will need to be added to neutralize the free hydroxide. Since DWPF is using a REDOX target of 0.1 and the SRE increases the nitrate, more formic acid and less nitric acid will be added during each SRAT cycle, to offset the nitrate increase as a result of SRE addition, so that the resulting SRAT product would be 8.3% higher in formate and 5.7% higher in nitrate.
- Based on a corrosion evaluation of Tank 40 after the SRE addition, which was performed due to the large increase in nitrate and fluoride, no significant increase in stress corrosion cracking or pitting is expected.
- For the nitric-formic acid process, it is expected that the hydrogen generation in SRAT and SME processing will be similar or lower than the hydrogen generation in completed SB9 processing. Thus, it is expected that the hydrogen generation will not exceed the TSR limit during similar processing. It is also expected that the Hsu acid stoichiometry operating window would be approximately 110-125%.

[††] The analysis does not depend on the date of the transfers but does depend on the amount of slurry in Tank 40 at the time of the transfer and the amount of SRE that is added. So, this analysis applies to transfers of SRE volume to Tank 40

- For the nitric-glycolic acid process, it is expected that the hydrogen generation in SRAT and SME processing will be similar to SRNL laboratory testing. Thus, it is expected that the hydrogen generation will not exceed the TSR limit during similar processing.
- The antifoam strategy that has been used in SB9 should be adequate for controlling foaming during processing of Tank 40 sludge after SRE is added.

5.0 Recommendations

No SRNL testing is needed prior to adding an additional 7,100 gallons of SRE and DR-3 Fuel from H-Canyon to Tank 40. Also, the addition of SRE will not exceed the Shielded Cells reported values for catalytic hydrogen for either the nitric-formic acid flowsheet (TSR limit of 0.15 lb/h) or the nitric-glycolic acid flowsheet Technical Safety Requirement (TSR limit of 0.024 lb/h). The addition of ARP from SWPF and the use of the nitric-glycolic acid flowsheet are both expected to decrease hydrogen generation, leading to a larger safety margin in the CPC.

It is recommended to use a Hsu acid stoichiometry target of 112% for future SB9 nitric-formic acid flowsheet SRAT processing after the SRE has been added to Tank 40 to be consistent with recent processing. It is also recommended to use a Hsu acid stoichiometry operating window of 77-133% for future SB9 nitric-glycolic acid flowsheet SRAT processing after the SRE has been added to Tank 40.

Because of the large nitrate addition, a small addition of sodium nitrite will likely be required to meet SRS corrosion chemistry requirements if the SRE is added when the Tank 40 volume is lowest (October 2020[‡‡]).

[‡‡] The analysis does not depend on the date of the transfers but does depend on the amount of slurry in Tank 40 at the time of the transfer and the amount of SRE that is added. So, this analysis applies to transfers of SRE volume to Tank 40

6.0 References

1. Carraway, A. C.; Bunlap, R. E.; Giddings, B. J.; Baynham, B. A.; Bennett, W. M.; Tice, T. L.; Clinton, B. A. *Path Forward: Sodium Reactor Experiment (SRE) Discard Proposal*; X-EPF-H-00029, Revision 2; Savannah River Nuclear Solutions, Aiken, SC, 2020.

2. Smith, T. E.; Newell, J. D.; Woodham, W. H. *Defense Waste Processing Facility Simulant Chemical Processing Cell Studies for Sludge Batch 9*; SRNL-STI-2016-00281, Revision 0; Savannah River National Laboratory, Aiken, SC, 2016.

3. Lambert, D. P.; Williams, M. S.; Brandenberg, C. H.; Luther, M. C.; Newell, J. D.; Woodham, W. H., Sludge Batch 9 Simulant Runs Using the Nitric-Glycolic Acid Flowsheet. Savannah River National Laboratory, Aiken, SC: 2016.

4. Fellinger, T. L. *Sludge Batch 9 Simulant Runs Using the Nitric-Glycolic Flowsheet*; X-TTR-S-00037, Revision 1; Savannah River National Laboratory, Aiken, SC, 2020.

5. Lambert, D. P.; Martino, C. J. *Task Technical and Quality Assurance Plan for Sludge Batch 9 Simulant Flowsheet Studies*; SRNL-RP-2014-01059, Revision 2; Savannah River National Laboratory, Aiken, SC, 2020.

6. Chen, G. *Add Title*; DWPF-I-PC-0046, Revision 0; Savannah River Remediation LLC, Aiken, SC, 2019.

7. Henley, D. B. *System Impact Evaluation for Sodium Reactor Experiment (SRE) Addition to Sludge Batch 9*; X-ESR-H-01022, Revision 0; Savannah River Remediation LLC, Aiken, SC, 2020.

8. Bennett, W. M. *Waste Characterization Report for High Aluminum-Low Uranium and SRE Solutions In Tank 16.4 for Disposal to Sludge Batch 9 (SB9)*; SRNS-E1120-2020-00006, Revision 0; Savannah River Nuclear Solutions, Aiken, SC, 2020.

9. Isom, S. T. *Projection of Sludge Batch 9 (SB9) Composition with Additional Sodium Reactor Experiment (SRE) into Tank 40*; SRR-LWP-2020-00005 Rev. 0; Savannah River National Laboratory, Aiken, SC, 2020.

10. Shafer, A. R.; Gillam, J. M. *Projected Blend Compositions and Summary of Sludge Batch 9, After Tank 51 to 40 Transfer*; X-ESR-H-00858, Revision 1; Savannah River Remediation LLC, Aiken, SC, 2016.

11. Bibler, N. E. *Measuring and Predicting Fission Product Noble Metals in Savannah River Site High Level Waste Sludges*; WSRC-TR-2005-00098, Revision 0; Savannah River National Laboratory, Aiken, SC, 2005.

12. Lambert, D. P. SB9 Nitric-Glycolic Acid Flowsheet Development, eNotebook Experiment ID o7787-00055-19, Savannah River National Laboratory, Aiken, SC, 2016.

13. Martino, C. J.; Newell, J. D.; Williams, M. *Nitric-Glycolic Flowsheet Testing for Maximum Hydrogen Generation Rate*; SRNL-STI-2015-00130, Revision 0; Savannah River National Laboratory, Aiken, SC, 2016.

14. Trivelpiece, C. L.; Kubuilius, W. P.; Pareizs, J. M.; Edwards, T. B. *Tank 40 Sludge Batch 9 Waste Acceptance Product Specifications (WAPS) Solids and Chemical Analyses*; SRNL-STI-2018-00318, Revision 0; Savannah River National Laboratory, Aiken, SC, 2018.

15. Pareizs, J. M.; Newell, J. D.; Martino, C. J.; Crawford, C. L.; Johnson, F. C. *Sludge Washing and Demonstration of the DWPF Nitric/Formic Flowsheet in the SRNL Shielded Cells for Sludge Batch 9 Qualification*; SRNL--STI-2016-00355, Revision 0; Savannah River National Laboratory, Aiken, SC, 2016.

16. Pareizs, J. M.; Smith, T. E. *Recommendations for Sludge Batch 9 Processing in the Defense Waste Processing Facility Chemical Process Cell*; SRNL-L3100-2016-00144, Revision 0; Savannah River National Laboratory, Aiken, SC, 2016.

17. Clark, M. C. *SRAT and SME Gas Chromatograph Hydrogen Data for Sludge Batch 9*; U-ESR-S-00023, Revision 0; Savannah River Remediation LLC, Aiken, SC, 2019.

18. Martin, K. *CSTF Corrosion Control Program*; WSRC-TR-2002-00327, Revision 9; Savannah River Remediation LLC, Aiken, SC, 2015.

19. Wiersma, B. J.; Fuentes, R. E.; Stock, L. M. *Chemistry Envelope for Pitting and Stress Corrosion Cracking Mitigation*; SRNL-STI-2019-00217, Revision 0; Savannah River National Laboratory, Aiken, SC, 2019.

20. Bindal, S. K.; Nikolov, A. D.; Wasan, D. T.; Lambert, D. P.; Koopman, D. C., Foaming in Simulated Radioactive Waste. *Environ. Sci. Technol.* **2001,** *35* (19), 3941-3947.

Appendix A DWPF SB9 Hydrogen Data from PI

Jeremiah Ledbetter supplied DWPF PI data from the SB9 SRAT and SME cycles. He screened the data by eliminating the calibration data and runs immediately after this that are high in hydrogen (since it is not related to process generated hydrogen).

The following PI Tags were involved in compiling the spreadsheet. The spreadsheet tables are included on the following pages in Table B-1 for the SRAT cycle and Table B-2 for the SME cycle.

SRAT GC#1 %H2, PI Tag, DAI8795A
SRAT GC#2 %H2, PI Tag, DAI8796A
SRAT GC#1 %O2, PI Tag, DAI8795C
SRAT GC#2 %O2, PI Tag, DAI8796C
SRAT GC#1 %N2, PI Tag, DAI8795B
SRAT GC#2 %N2, PI Tag, DAI8796B
SRAT Batch Number, PI Tag, DSRAT_Batch
SME GC#1 %H2, PI Tag, DAI8797A
SME GC#2 %H2, PI Tag, DAI8798A
SME GC#1 %O2, PI Tag, DAI8797C
SME GC#2 %O2, PI Tag, DAI8798C
SME GC#1 %N2, PI Tag, DAI8797B
SME GC#2 %N2, PI Tag, DAI8798B
SME Batch Number, PI Tag, DSME_Batch

Note also that the SME data from batch 782-793 is incorrect. As stated in ESR-00023, one of the SME GCs was outside calibration standards from 782 onward. As a result, SME GC 2 data is used for peak hydrogen in these batches.

Standard conditions are 70 °F and 1 atm. SME target purge: >86 SCFM. SRAT target purge: >222 SCFM.

Table B-1. DWPF SB9 GC Maximum, Minimum and Average Offgas Data, volume %

Summary	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	
Minimum	0.0000	0.0000	0.0003	0.00	49.21	
Average	0.0024	0.0025	0.0048	20.06	76.31	
Maximum	0.0367	0.0439	0.0439	22.86	84.42	

Table B-2. DWPF SB9 GC Hydrogen Data, volume %

Date	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	SRAT Batch
09-Nov-16 19:06:16	0.0000	0.0005	0.001	20.33	76.64	774
09-Nov-16 19:19:31	0.0055	0.0000	0.005	20.46	76.72	774
09-Nov-16 22:57:16	0.0000	0.0106	0.011	21.21	78.38	774
10-Nov-16 03:12:16	0.0038	0.0000	0.004	20.69	75.82	774
10-Nov-16 03:18:41	0.0000	0.0005	0.001	21.01	77.34	774
10-Nov-16 11:04:56	0.0003	0.0000	0.000	20.36	74.74	774
10-Nov-16 11:11:31	0.0000	0.0005	0.001	21.34	78.48	774
10-Nov-16 18:57:41	0.0019	0.0000	0.002	21.07	77.07	774
10-Nov-16 19:03:51	0.0000	0.0006	0.001	20.77	76.55	774
17-Nov-16 08:39:26	0.0054	0.0000	0.005	20.62	76.37	775
17-Nov-16 09:08:26	0.0000	0.0086	0.009	19.54	72.65	775
17-Nov-16 16:31:26	0.0004	0.0000	0.000	20.64	76.04	775
17-Nov-16 17:01:11	0.0000	0.0039	0.004	19.32	71.27	775
17-Nov-16 17:22:26	0.0004	0.0000	0.000	20.54	75.62	775
17-Nov-16 17:22:26	0.0000	0.0037	0.004	19.59	72.02	775
17-Nov-16 17:32:26	0.0004	0.0000	0.000	20.17	74.06	775
17-Nov-16 17:32:26	0.0000	0.0041	0.004	19.51	72.42	775
17-Nov-16 17:52:41	0.0003	0.0000	0.000	20.84	76.33	775
17-Nov-16 17:52:41	0.0000	0.0036	0.004	19.65	72.09	775
22-Nov-16 08:04:51	0.0004	0.0000	0.000	19.01	75.53	776
22-Nov-16 08:14:56	0.0000	0.0006	0.001	19.21	75.51	776
22-Nov-16 15:57:46	0.0042	0.0000	0.004	20.43	76.07	776
22-Nov-16 16:07:46	0.0000	0.0006	0.001	20.61	76.39	776
22-Nov-16 23:50:11	0.0020	0.0000	0.002	20.51	75.92	776
23-Nov-16 00:00:16	0.0000	0.0005	0.001	20.29	75.40	776
23-Nov-16 01:40:36	0.0000	0.0126	0.013	20.63	75.52	776
23-Nov-16 01:50:36	0.0000	0.0006	0.001	20.31	75.57	776
23-Nov-16 07:42:41	0.0013	0.0000	0.001	20.32	75.46	776
23-Nov-16 09:43:21	0.0000	0.0040	0.004	19.88	74.32	776
26-Nov-16 12:13:41	0.0035	0.0000	0.003	19.07	71.95	777
26-Nov-16 12:26:41	0.0000	0.0057	0.006	20.00	75.03	777
27-Nov-16 03:59:01	0.0051	0.0000	0.005	20.23	75.26	777

Table B-2. DWPF SB9 GC Hydrogen Data, volume %

Date	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	SRAT Batch
27-Nov-16 04:12:06	0.0000	0.0061	0.006	20.39	76.84	777
27-Nov-16 11:51:51	0.0020	0.0000	0.002	19.52	72.38	777
27-Nov-16 12:04:31	0.0000	0.0036	0.004	20.36	76.17	777
27-Nov-16 19:44:01	0.0004	0.0000	0.000	20.04	74.21	777
27-Nov-16 19:56:56	0.0000	0.0036	0.004	20.59	76.47	777
28-Nov-16 03:36:41	0.0020	0.0000	0.002	19.71	73.13	777
28-Nov-16 03:50:01	0.0000	0.0005	0.001	20.44	75.25	777
03-Dec-16 04:48:16	0.0012	0.0000	0.001	20.45	78.36	778
03-Dec-16 04:48:16	0.0000	0.0028	0.003	21.38	82.55	778
03-Dec-16 12:41:06	0.0062	0.0000	0.006	21.32	78.94	778
03-Dec-16 12:41:06	0.0000	0.0090	0.009	22.68	84.42	778
03-Dec-16 20:33:26	0.0031	0.0000	0.003	20.68	76.51	778
03-Dec-16 20:33:26	0.0000	0.0066	0.007	22.86	83.92	778
04-Dec-16 04:26:01	0.0019	0.0000	0.002	21.27	78.72	778
04-Dec-16 04:26:01	0.0000	0.0006	0.001	22.23	82.37	778
21-Dec-16 14:17:16	0.0029	0.0000	0.003	19.21	71.80	779
21-Dec-16 16:28:11	0.0040	0.0000	0.004	19.52	72.88	779
21-Dec-16 16:28:11	0.0000	0.0017	0.002	18.65	69.64	779
21-Dec-16 16:39:41	0.0047	0.0000	0.005	19.07	71.27	779
21-Dec-16 16:39:41	0.0000	0.0017	0.002	19.28	72.00	779
21-Dec-16 17:10:26	0.0042	0.0000	0.004	19.15	71.63	779
21-Dec-16 17:10:26	0.0000	0.0017	0.002	19.30	72.16	779
22-Dec-16 09:02:26	0.0004	0.0000	0.000	19.76	74.01	779
22-Dec-16 09:02:26	0.0000	0.0005	0.001	19.50	72.87	779
22-Dec-16 16:55:01	0.0006	0.0000	0.001	19.51	73.05	779
22-Dec-16 16:55:01	0.0000	0.0006	0.001	19.28	71.88	779
23-Dec-16 00:47:41	0.0009	0.0000	0.001	19.58	73.43	779
23-Dec-16 00:47:41	0.0000	0.0006	0.001	18.74	69.52	779
23-Dec-16 08:40:21	0.0012	0.0000	0.001	19.03	71.41	779
23-Dec-16 08:40:21	0.0000	0.0006	0.001	19.35	72.13	779
23-Dec-16 16:32:41	0.0010	0.0000	0.001	19.54	73.11	779
23-Dec-16 16:32:41	0.0000	0.0006	0.001	19.32	72.08	779
31-Dec-16 22:44:21	0.0004	0.0000	0.000	20.45	76.94	780
31-Dec-16 22:58:36	0.0000	0.0019	0.002	20.69	77.31	780
01-Jan-17 06:37:16	0.0004	0.0000	0.000	20.40	76.48	780
01-Jan-17 06:51:06	0.0000	0.0006	0.001	20.26	76.00	780
01-Jan-17 14:29:46	0.0003	0.0000	0.000	20.01	74.89	780
01-Jan-17 14:43:41	0.0000	0.0006	0.001	20.36	76.20	780
05-Jan-17 18:19:06	0.0005	0.0000	0.001	19.65	75.42	781

Table B-2. DWPF SB9 GC Hydrogen Data, volume %

Date	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	SRAT Batch
05-Jan-17 19:11:36	0.0000	0.0006	0.001	21.21	80.53	781
06-Jan-17 02:11:16	0.0042	0.0000	0.004	20.36	75.91	781
06-Jan-17 03:04:11	0.0000	0.0068	0.007	21.38	80.12	781
06-Jan-17 10:03:36	0.0024	0.0000	0.002	19.93	74.61	781
06-Jan-17 10:56:41	0.0000	0.0006	0.001	20.94	78.59	781
06-Jan-17 17:56:06	0.0014	0.0000	0.001	20.49	76.58	781
06-Jan-17 18:49:21	0.0000	0.0006	0.001	21.60	80.97	781
11-Jul-17 17:34:55	0.0004	0.0000	0.000	20.56	76.88	782
11-Jul-17 18:01:35	0.0000	0.0006	0.001	19.96	74.17	782
12-Jul-17 01:27:55	0.0005	0.0000	0.001	20.39	76.33	782
12-Jul-17 01:53:45	0.0000	0.0006	0.001	20.16	74.40	782
12-Jul-17 17:13:25	0.0005	0.0000	0.001	20.31	75.99	782
12-Jul-17 17:39:05	0.0000	0.0006	0.001	20.17	74.83	782
13-Jul-17 01:05:40	0.0006	0.0000	0.001	20.33	76.12	782
13-Jul-17 01:31:45	0.0000	0.0006	0.001	19.94	73.95	782
13-Jul-17 16:50:45	0.0005	0.0000	0.001	20.23	75.71	782
13-Jul-17 17:17:10	0.0000	0.0006	0.001	20.19	74.94	782
14-Jul-17 00:43:30	0.0005	0.0000	0.001	19.86	74.42	782
14-Jul-17 01:09:35	0.0000	0.0006	0.001	20.22	74.31	782
26-Nov-17 21:09:44	0.0000	0.0006	0.001	21.69	81.56	782
27-Nov-17 01:59:39	0.0005	0.0000	0.001	21.65	81.49	782
27-Nov-17 05:02:19	0.0000	0.0006	0.001	21.67	81.30	782
27-Nov-17 09:52:14	0.0005	0.0000	0.001	21.73	81.67	782
01-Dec-17 18:23:34	0.0000	0.0118	0.012	18.42	72.94	782
01-Dec-17 18:33:39	0.0116	0.0000	0.012	19.11	73.99	782
01-Dec-17 22:15:14	0.0004	0.0000	0.000	20.23	75.73	782
01-Dec-17 22:45:19	0.0000	0.0006	0.001	20.24	76.10	782
01-Dec-17 22:55:19	0.0000	0.0106	0.011	19.94	74.92	782
02-Dec-17 00:15:49	0.0106	0.0000	0.011	20.64	77.19	782
02-Dec-17 03:06:54	0.0209	0.0000	0.021	20.51	75.62	782
02-Dec-17 05:37:39	0.0003	0.0000	0.000	20.72	76.54	782
02-Dec-17 05:47:39	0.0139	0.0000	0.014	20.63	76.99	782
02-Dec-17 06:47:59	0.0000	0.0126	0.013	20.21	75.96	782
02-Dec-17 09:48:59	0.0000	0.0226	0.023	20.08	75.29	782
02-Dec-17 13:40:24	0.0191	0.0000	0.019	20.19	75.90	782
02-Dec-17 17:41:44	0.0000	0.0216	0.022	20.38	75.64	782
11-May-18 07:53:10	0.0000	0.0007	0.001	20.59	77.70	783
11-May-18 10:33:50	0.0006	0.0000	0.001	20.78	76.82	783
11-May-18 15:45:25	0.0000	0.0006	0.001	20.96	78.08	783

Table B-2. DWPF SB9 GC Hydrogen Data, volume %

Date	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	SRAT Batch
11-May-18 18:26:20	0.0006	0.0000	0.001	20.55	75.99	783
12-May-18 07:30:35	0.0000	0.0007	0.001	20.48	76.72	783
12-May-18 10:11:25	0.0006	0.0000	0.001	20.94	77.94	783
17-May-18 04:11:41	0.0080	0.0000	0.008	19.58	74.56	783
17-May-18 04:11:41	0.0000	0.0027	0.003	19.96	76.08	783
17-May-18 12:04:11	0.0069	0.0000	0.007	20.57	77.23	783
17-May-18 12:04:11	0.0000	0.0013	0.001	20.47	76.40	783
17-May-18 17:30:26	0.0046	0.0000	0.005	19.93	74.80	783
17-May-18 17:30:26	0.0000	0.0007	0.001	20.51	76.89	783
18-May-18 01:29:26	0.0059	0.0000	0.006	20.12	75.55	783
18-May-18 01:29:26	0.0000	0.0007	0.001	20.68	77.54	783
18-May-18 09:22:16	0.0073	0.0000	0.007	19.37	72.93	783
18-May-18 09:22:16	0.0000	0.0006	0.001	20.61	77.28	783
18-May-18 17:14:51	0.0078	0.0000	0.008	20.66	77.01	783
18-May-18 17:14:51	0.0000	0.0092	0.009	20.15	75.67	783
13-Jun-18 21:38:11	0.0000	0.0007	0.001	21.67	81.37	784
13-Jun-18 21:40:41	0.0006	0.0000	0.001	21.10	79.44	784
14-Jun-18 05:30:46	0.0000	0.0007	0.001	21.08	79.53	784
14-Jun-18 05:33:11	0.0007	0.0000	0.001	20.66	77.08	784
14-Jun-18 13:23:11	0.0000	0.0007	0.001	21.69	81.57	784
14-Jun-18 13:25:31	0.0006	0.0000	0.001	21.13	78.89	784
02-Jul-18 09:54:11	0.0032	0.0000	0.003	20.34	77.17	784
02-Jul-18 10:14:16	0.0000	0.0008	0.001	19.92	74.84	784
02-Jul-18 17:46:31	0.0063	0.0000	0.006	19.68	74.25	784
02-Jul-18 18:06:36	0.0000	0.0007	0.001	20.43	76.37	784
03-Jul-18 01:39:26	0.0006	0.0000	0.001	19.52	73.56	784
03-Jul-18 01:59:36	0.0000	0.0007	0.001	20.37	76.06	784
03-Jul-18 17:44:36	0.0000	0.0007	0.001	20.35	76.30	784
01-Aug-18 01:58:46	0.0000	0.0007	0.001	21.66	81.59	785
04-Aug-18 10:52:21	0.0023	0.0000	0.002	19.45	73.62	785
12-Aug-18 23:15:11	0.0038	0.0000	0.004	20.86	77.74	785
13-Aug-18 00:07:21	0.0000	0.0012	0.001	21.21	79.54	785
13-Aug-18 07:07:36	0.0039	0.0000	0.004	20.87	77.89	785
13-Aug-18 08:00:06	0.0000	0.0006	0.001	21.37	79.99	785
13-Aug-18 22:52:46	0.0010	0.0000	0.001	20.23	75.46	785
13-Aug-18 23:45:11	0.0000	0.0007	0.001	20.80	78.57	785
14-Aug-18 06:45:36	0.0006	0.0000	0.001	21.02	78.34	785
14-Aug-18 07:37:36	0.0000	0.0007	0.001	21.11	79.03	785
14-Aug-18 14:37:56	0.0016	0.0000	0.002	20.50	76.34	785

Table B-2. DWPF SB9 GC Hydrogen Data, volume %

Date	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	SRAT Batch
14-Aug-18 15:29:21	0.0000	0.0007	0.001	21.20	79.63	785
14-Aug-18 22:30:31	0.0006	0.0000	0.001	20.64	76.92	785
14-Aug-18 23:21:21	0.0000	0.0007	0.001	21.16	79.20	785
15-Aug-18 06:22:51	0.0006	0.0000	0.001	20.35	75.86	785
15-Aug-18 07:14:06	0.0000	0.0006	0.001	21.29	79.14	785
04-Oct-18 05:24:31	0.0007	0.0000	0.001	20.48	77.58	786
04-Oct-18 05:57:31	0.0000	0.0006	0.001	20.38	77.04	786
19-Oct-18 08:45:16	0.0006	0.0000	0.001	20.75	78.26	786
19-Oct-18 09:42:51	0.0000	0.0007	0.001	20.70	77.37	786
19-Oct-18 16:37:46	0.0006	0.0000	0.001	20.39	76.97	786
19-Oct-18 17:35:11	0.0000	0.0006	0.001	20.80	77.28	786
20-Oct-18 00:30:06	0.0006	0.0000	0.001	20.06	75.56	786
20-Oct-18 01:27:26	0.0000	0.0007	0.001	20.43	75.65	786
20-Oct-18 08:22:01	0.0006	0.0000	0.001	19.80	75.99	786
20-Oct-18 09:20:01	0.0000	0.0007	0.001	20.41	75.70	786
20-Oct-18 16:14:46	0.0007	0.0000	0.001	20.13	76.23	786
23-Nov-18 07:07:06	0.0006	0.0000	0.001	20.10	75.89	786
23-Nov-18 14:59:21	0.0005	0.0000	0.001	20.25	76.56	786
16-Dec-18 09:09:46	0.0006	0.0000	0.001	10.14	76.07	786
16-Dec-18 09:44:21	0.0000	0.0006	0.001	21.53	79.49	786
16-Dec-18 17:02:06	0.0006	0.0000	0.001	9.62	73.60	786
16-Dec-18 17:37:01	0.0000	0.0006	0.001	21.36	78.41	786
21-Dec-18 13:53:26	0.0006	0.0000	0.001	20.42	75.86	787
21-Dec-18 21:46:01	0.0006	0.0000	0.001	20.69	77.68	787
21-Dec-18 23:01:01	0.0000	0.0006	0.001	20.80	77.96	787
22-Dec-18 05:38:11	0.0006	0.0000	0.001	20.56	77.01	787
22-Dec-18 06:53:31	0.0000	0.0006	0.001	21.22	79.51	787
22-Dec-18 13:31:06	0.0006	0.0000	0.001	20.61	77.20	787
22-Dec-18 14:46:06	0.0000	0.0007	0.001	20.75	77.92	787
22-Dec-18 21:23:56	0.0006	0.0000	0.001	20.51	77.46	787
22-Dec-18 22:38:26	0.0000	0.0006	0.001	20.61	77.27	787
22-Jan-19 18:35:41	0.0026	0.0000	0.003	20.76	78.71	787
23-Jan-19 02:28:01	0.0011	0.0000	0.001	20.85	78.78	787
23-Jan-19 02:53:56	0.0000	0.0006	0.001	20.76	78.14	787
23-Jan-19 10:20:41	0.0026	0.0000	0.003	19.87	75.24	787
23-Jan-19 10:46:16	0.0000	0.0065	0.007	19.98	75.24	787
23-Jan-19 18:13:11	0.0088	0.0000	0.009	20.26	75.95	787
23-Jan-19 18:38:31	0.0000	0.0058	0.006	20.43	76.99	787
17-Feb-19 05:38:33	0.0006	0.0000	0.001	19.94	75.36	787

Table B-2. DWPF SB9 GC Hydrogen Data, volume %

Date	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	SRAT Batch
17-Feb-19 08:26:03	0.0000	0.0006	0.001	21.04	78.63	787
17-Feb-19 13:31:03	0.0012	0.0000	0.001	19.62	74.16	787
17-Feb-19 16:18:28	0.0000	0.0006	0.001	20.71	77.47	787
20-Feb-19 12:22:33	0.0069	0.0000	0.007	20.22	76.63	788
20-Feb-19 15:11:08	0.0000	0.0006	0.001	20.81	78.03	788
20-Feb-19 20:15:13	0.0041	0.0000	0.004	19.50	74.05	788
20-Feb-19 23:03:33	0.0000	0.0006	0.001	20.59	77.44	788
21-Feb-19 04:07:33	0.0016	0.0000	0.002	19.94	75.60	788
21-Feb-19 06:56:03	0.0000	0.0006	0.001	19.88	74.93	788
23-Feb-19 11:14:18	0.0007	0.0000	0.001	19.42	73.47	788
23-Feb-19 11:27:03	0.0000	0.0006	0.001	21.41	80.34	788
23-Feb-19 19:06:53	0.0010	0.0000	0.001	20.09	75.81	788
23-Feb-19 19:19:33	0.0000	0.0006	0.001	21.32	80.11	788
24-Feb-19 02:59:08	0.0006	0.0000	0.001	19.60	73.57	788
24-Feb-19 03:11:53	0.0000	0.0006	0.001	21.20	79.56	788
16-Mar-19 17:58:38	0.0006	0.0000	0.001	20.59	76.67	788
16-Mar-19 18:19:08	0.0000	0.0006	0.001	20.90	78.45	788
17-Mar-19 02:11:48	0.0000	0.0006	0.001	20.56	78.41	788
24-Mar-19 04:47:08	0.0068	0.0000	0.007	18.58	68.29	789
24-Mar-19 05:31:28	0.0000	0.0006	0.001	18.53	69.41	789
24-Mar-19 12:39:33	0.0045	0.0000	0.005	18.03	67.68	789
24-Mar-19 13:23:43	0.0000	0.0006	0.001	18.73	70.15	789
24-Mar-19 20:32:08	0.0005	0.0000	0.001	17.57	66.02	789
24-Mar-19 21:15:48	0.0000	0.0006	0.001	18.94	70.76	789
25-Mar-19 04:25:03	0.0036	0.0000	0.004	18.31	68.71	789
01-Apr-19 19:56:58	0.0000	0.0007	0.001	20.38	76.28	789
02-Apr-19 03:13:18	0.0005	0.0000	0.001	20.92	78.54	789
02-Apr-19 03:49:33	0.0000	0.0006	0.001	20.88	78.12	789
02-Apr-19 11:05:53	0.0006	0.0000	0.001	20.81	78.25	789
02-Apr-19 11:42:03	0.0000	0.0006	0.001	20.86	78.09	789
14-Apr-19 13:51:18	0.0034	0.0000	0.003	21.20	79.99	790
14-Apr-19 14:23:43	0.0000	0.0006	0.001	21.27	79.69	790
15-Apr-19 05:36:33	0.0010	0.0000	0.001	21.13	79.49	790
15-Apr-19 06:07:58	0.0000	0.0006	0.001	22.22	83.03	790
15-Apr-19 13:28:28	0.0026	0.0000	0.003	21.93	82.31	790
15-Apr-19 14:00:43	0.0000	0.0006	0.001	22.30	83.06	790
25-Apr-19 06:27:38	0.0000	0.0006	0.001	21.50	80.26	790
25-Apr-19 06:29:58	0.0006	0.0000	0.001	16.55	64.17	790
25-Apr-19 14:20:03	0.0000	0.0006	0.001	20.79	77.60	790

Table B-2. DWPF SB9 GC Hydrogen Data, volume %

Date	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	SRAT Batch
25-Apr-19 14:22:28	0.0010	0.0000	0.001	16.61	64.58	790
25-Apr-19 22:12:33	0.0000	0.0006	0.001	20.69	76.43	790
25-Apr-19 22:15:13	0.0014	0.0000	0.001	3.87	49.21	790
21-May-19 18:29:53	0.0006	0.0000	0.001	19.85	76.22	791
21-May-19 18:29:53	0.0000	0.0006	0.001	19.83	75.45	791
21-May-19 21:15:08	0.0016	0.0000	0.002	20.16	76.28	791
21-May-19 21:15:08	0.0000	0.0061	0.006	21.09	78.82	791
21-May-19 23:14:08	0.0017	0.0000	0.002	20.29	76.43	791
21-May-19 23:14:08	0.0000	0.0071	0.007	20.48	76.10	791
23-May-19 13:53:03	0.0018	0.0000	0.002	19.98	75.76	791
23-May-19 13:53:03	0.0000	0.0018	0.002	20.93	77.59	791
24-May-19 04:08:43	0.0000	0.0006	0.001	21.00	78.07	791
24-May-19 09:43:18	0.0006	0.0000	0.001	19.84	75.25	791
24-May-19 12:01:28	0.0000	0.0008	0.001	21.03	78.02	791
26-May-19 20:10:28	0.0006	0.0000	0.001	19.74	74.04	791
26-May-19 20:10:28	0.0000	0.0008	0.001	18.81	70.59	791
27-May-19 04:03:18	0.0006	0.0000	0.001	19.34	72.57	791
27-May-19 04:03:18	0.0000	0.0026	0.003	19.16	71.75	791
27-May-19 11:55:43	0.0006	0.0000	0.001	19.81	74.32	791
27-May-19 11:55:43	0.0000	0.0025	0.003	19.66	73.26	791
15-Jun-19 20:17:28	0.0006	0.0000	0.001	19.40	72.35	792
15-Jun-19 20:30:13	0.0000	0.0007	0.001	20.75	77.49	792
16-Jun-19 12:02:33	0.0006	0.0000	0.001	19.00	71.38	792
16-Jun-19 12:14:58	0.0000	0.0006	0.001	20.51	76.41	792
16-Jun-19 19:55:28	0.0006	0.0000	0.001	19.02	71.29	792
16-Jun-19 20:07:28	0.0000	0.0006	0.001	20.12	74.81	792
17-Jun-19 11:40:53	0.0006	0.0000	0.001	19.93	74.63	792
17-Jun-19 11:52:43	0.0000	0.0007	0.001	20.51	75.53	792
17-Jun-19 19:33:23	0.0006	0.0000	0.001	19.47	72.35	792
17-Jun-19 19:45:08	0.0000	0.0007	0.001	21.27	78.38	792
28-Jun-19 21:32:28	0.0000	0.0015	0.001	19.15	73.05	792
30-Jun-19 18:24:08	0.0013	0.0000	0.001	20.53	77.16	792
30-Jun-19 18:35:53	0.0000	0.0035	0.003	20.55	77.66	792
01-Jul-19 02:16:33	0.0014	0.0000	0.001	19.96	74.82	792
01-Jul-19 02:28:33	0.0000	0.0032	0.003	20.55	77.42	792
01-Jul-19 10:08:43	0.0011	0.0000	0.001	20.43	76.75	792
01-Jul-19 10:21:03	0.0000	0.0007	0.001	0.00	77.03	792
01-Jul-19 18:01:08	0.0014	0.0000	0.001	19.94	73.73	792
01-Jul-19 18:13:08	0.0000	0.0007	0.001	20.15	75.21	792

Table B-2. DWPF SB9 GC Hydrogen Data, volume %

Date	SRAT GC1 H2	SRAT GC2 H2	Max SRAT H2	SRAT O2	SRAT N2	SRAT Batch
07-Jul-19 01:18:53	0.0000	0.0007	0.001	20.50	76.16	793
07-Jul-19 02:18:48	0.0006	0.0000	0.001	19.40	72.75	793
07-Jul-19 09:11:48	0.0000	0.0006	0.001	21.01	77.92	793
07-Jul-19 10:11:13	0.0006	0.0000	0.001	19.62	73.69	793
07-Jul-19 17:03:58	0.0000	0.0007	0.001	20.24	74.77	793
07-Jul-19 18:03:48	0.0006	0.0000	0.001	20.07	75.28	793
10-Jul-19 23:49:03	0.0000	0.0018	0.002	0.00	74.80	793
11-Jul-19 00:49:28	0.0020	0.0000	0.002	19.68	73.76	793
11-Jul-19 07:41:13	0.0000	0.0074	0.007	0.00	76.66	793
11-Jul-19 08:41:38	0.0066	0.0000	0.007	19.58	73.50	793
11-Jul-19 15:34:13	0.0000	0.0086	0.009	0.00	75.89	793
11-Jul-19 16:34:28	0.0115	0.0000	0.011	19.43	73.08	793
11-Jul-19 21:56:38	0.0000	0.0187	0.019	0.01	76.53	793
11-Jul-19 22:57:03	0.0216	0.0000	0.022	19.46	73.08	793
16-Jul-19 20:20:03	0.0006	0.0000	0.001	20.32	76.20	794
16-Jul-19 20:30:08	0.0000	0.0007	0.001	20.75	76.49	794
01-Jan-20 09:01:50	0.0000	0.0013	0.001	21.02	78.22	794
01-Jan-20 16:16:55	0.0040	0.0000	0.004	20.41	76.36	794
01-Jan-20 16:52:02	0.0000	0.0061	0.006	20.78	77.23	794
02-Jan-20 00:07:11	0.0082	0.0000	0.008	19.92	74.57	794
02-Jan-20 00:42:18	0.0000	0.0100	0.010	20.65	76.72	794
02-Jan-20 05:42:17	0.0000	0.0206	0.021	21.55	79.99	794
02-Jan-20 05:47:10	0.0186	0.0000	0.019	20.25	75.85	794
02-Jan-20 12:47:26	0.0287	0.0000	0.029	19.83	74.33	794
02-Jan-20 13:32:38	0.0000	0.0253	0.025	21.64	80.13	794

Table B-3. DWPF SB9 SME GC Maximum, Minimum and Average Hydrogen Data, Volume %

Summary	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2
Minimum	0.000	0.000	0.000	0.0	0.0
Average	0.028	0.005	0.033	20.4	76.3
Maximum	0.103	0.095	0.103	24.8	93.2

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
11-Nov-16 21:22:01	0.000	0.010	0.010	20.2	75.3	3.74	774
11-Nov-16 21:28:21	0.012	0.000	0.012	20.6	76.8	3.73	774
13-Nov-16 01:31:16	0.000	0.017	0.017	20.0	75.0	3.75	774
13-Nov-16 01:37:21	0.022	0.000	0.022	20.6	77.1	3.74	774
13-Nov-16 01:41:21	0.000	0.034	0.034	20.6	77.0	3.74	774
13-Nov-16 01:47:21	0.040	0.000	0.040	20.6	77.1	3.74	774
13-Nov-16 01:51:26	0.000	0.020	0.020	20.1	75.0	3.73	774
13-Nov-16 01:57:26	0.016	0.000	0.016	20.1	75.1	3.74	774
13-Nov-16 04:52:16	0.000	0.007	0.007	20.6	76.9	3.74	774
13-Nov-16 05:02:21	0.000	0.026	0.026	20.1	75.5	3.75	774
13-Nov-16 05:18:46	0.005	0.000	0.005	21.0	78.3	3.73	774
13-Nov-16 05:28:51	0.021	0.000	0.021	20.5	76.6	3.74	774
13-Nov-16 08:53:21	0.000	0.015	0.015	20.6	77.1	3.74	774
13-Nov-16 11:20:36	0.004	0.000	0.004	20.2	75.5	3.73	774
13-Nov-16 11:30:41	0.034	0.000	0.034	20.5	76.7	3.74	774
13-Nov-16 11:40:46	0.012	0.000	0.012	20.2	75.8	3.74	774
13-Nov-16 11:44:26	0.000	0.004	0.004	20.7	77.4	3.74	774
13-Nov-16 11:54:31	0.000	0.022	0.022	20.4	77.4	3.79	774
13-Nov-16 12:00:51	0.030	0.000	0.030	20.0	75.0	3.74	774
13-Nov-16 12:04:36	0.000	0.006	0.006	20.7	77.5	3.74	774
13-Nov-16 12:10:51	0.006	0.000	0.006	20.9	78.1	3.73	774
13-Nov-16 12:14:41	0.000	0.017	0.017	20.3	75.4	3.71	774
13-Nov-16 12:20:51	0.028	0.000	0.028	20.5	76.8	3.76	774
13-Nov-16 17:26:21	0.000	0.028	0.028	20.1	75.0	3.74	774
13-Nov-16 20:13:31	0.035	0.000	0.035	20.8	77.7	3.73	774
13-Nov-16 20:53:36	0.009	0.000	0.009	20.2	75.4	3.73	774
13-Nov-16 20:57:21	0.000	0.054	0.054	20.5	75.3	3.67	774
13-Nov-16 21:03:36	0.036	0.000	0.036	20.5	76.5	3.74	774
13-Nov-16 21:07:26	0.000	0.035	0.035	20.5	76.8	3.74	774
13-Nov-16 21:23:46	0.009	0.000	0.009	20.2	75.8	3.74	774
13-Nov-16 21:33:51	0.042	0.000	0.042	20.0	75.0	3.74	774

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
13-Nov-16 21:43:56	0.030	0.000	0.030	20.8	77.8	3.73	774
13-Nov-16 21:47:41	0.000	0.007	0.007	20.1	75.8	3.76	774
13-Nov-16 21:53:26	0.000	0.055	0.055	20.1	75.5	3.76	774
13-Nov-16 21:53:56	0.047	0.000	0.047	20.3	75.8	3.74	774
13-Nov-16 22:03:31	0.000	0.034	0.034	20.3	75.8	3.74	774
13-Nov-16 22:04:01	0.036	0.000	0.036	20.6	77.9	3.78	774
13-Nov-16 22:13:31	0.000	0.016	0.016	20.6	77.0	3.74	774
13-Nov-16 22:14:06	0.010	0.000	0.010	20.2	75.4	3.74	774
13-Nov-16 22:23:36	0.000	0.029	0.029	20.1	75.4	3.75	774
13-Nov-16 22:24:11	0.032	0.000	0.032	20.5	76.6	3.74	774
14-Nov-16 00:14:11	0.000	0.039	0.039	20.5	77.0	3.75	774
14-Nov-16 01:25:01	0.043	0.000	0.043	20.2	75.5	3.74	774
14-Nov-16 01:54:41	0.000	0.025	0.025	20.6	77.1	3.75	774
14-Nov-16 01:55:06	0.026	0.000	0.026	20.8	77.6	3.74	774
14-Nov-16 02:14:51	0.000	0.052	0.052	20.3	76.0	3.74	774
14-Nov-16 02:15:11	0.045	0.000	0.045	20.6	77.3	3.74	774
14-Nov-16 02:34:56	0.000	0.041	0.041	20.1	75.0	3.73	774
14-Nov-16 04:45:31	0.000	0.054	0.054	20.1	75.1	3.74	774
14-Nov-16 04:46:11	0.055	0.000	0.055	20.3	76.3	3.77	774
14-Nov-16 07:26:16	0.000	0.064	0.064	20.5	76.8	3.75	774
14-Nov-16 07:57:11	0.067	0.000	0.067	20.5	76.7	3.73	774
19-Nov-16 09:22:11	0.009	0.000	0.009	20.4	77.2	3.78	775
19-Nov-16 09:22:11	0.000	0.009	0.009	20.5	76.9	3.74	775
19-Nov-16 17:14:16	0.008	0.000	0.008	20.0	74.6	3.74	775
19-Nov-16 17:14:16	0.000	0.007	0.007	20.1	74.8	3.73	775
20-Nov-16 01:06:51	0.006	0.000	0.006	20.0	75.0	3.74	775
20-Nov-16 01:06:51	0.000	0.005	0.005	20.1	75.2	3.74	775
20-Nov-16 08:59:01	0.006	0.000	0.006	20.1	75.1	3.74	775
20-Nov-16 08:59:01	0.000	0.005	0.005	20.3	75.8	3.74	775
21-Nov-16 00:44:21	0.000	0.007	0.007	20.4	76.1	3.73	775
21-Nov-16 04:35:46	0.007	0.000	0.007	20.4	76.7	3.77	775
21-Nov-16 06:36:16	0.021	0.000	0.021	19.9	74.0	3.72	775
21-Nov-16 06:36:16	0.000	0.017	0.017	20.1	75.2	3.74	775
21-Nov-16 06:46:16	0.008	0.000	0.008	20.3	77.0	3.80	775
21-Nov-16 07:06:21	0.000	0.007	0.007	20.4	76.1	3.74	775
25-Nov-16 13:52:06	0.003	0.000	0.003	20.6	76.1	3.70	776
25-Nov-16 21:34:36	0.000	0.001	0.001	20.0	74.6	3.74	776

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
25-Nov-16 21:44:41	0.008	0.000	0.008	19.8	74.0	3.74	776
26-Nov-16 05:27:26	0.000	0.004	0.004	19.9	74.6	3.74	776
26-Nov-16 05:37:31	0.008	0.000	0.008	20.3	75.9	3.74	776
26-Nov-16 13:19:56	0.000	0.006	0.006	20.0	74.7	3.74	776
26-Nov-16 13:30:01	0.003	0.000	0.003	20.4	76.2	3.73	776
26-Nov-16 21:12:51	0.000	0.005	0.005	20.0	74.6	3.73	776
26-Nov-16 21:22:51	0.005	0.000	0.005	19.8	74.2	3.74	776
27-Nov-16 05:05:16	0.000	0.006	0.006	20.0	74.8	3.73	776
27-Nov-16 05:15:21	0.006	0.000	0.006	20.0	74.8	3.75	776
27-Nov-16 12:58:01	0.000	0.005	0.005	20.6	76.8	3.73	776
27-Nov-16 13:08:06	0.006	0.000	0.006	20.2	74.3	3.69	776
27-Nov-16 20:50:41	0.000	0.007	0.007	20.4	76.1	3.72	776
27-Nov-16 21:00:46	0.006	0.000	0.006	20.1	75.3	3.74	776
01-Dec-16 02:40:36	0.003	0.000	0.003	19.9	74.4	3.73	777
01-Dec-16 02:48:01	0.000	0.003	0.003	20.0	74.7	3.74	777
02-Dec-16 02:18:36	0.006	0.000	0.006	20.6	77.0	3.74	777
02-Dec-16 02:26:16	0.000	0.006	0.006	20.0	75.0	3.75	777
02-Dec-16 18:03:31	0.008	0.000	0.008	20.5	76.7	3.73	777
02-Dec-16 18:10:46	0.000	0.006	0.006	19.8	73.8	3.72	777
03-Dec-16 01:55:51	0.007	0.000	0.007	19.8	74.0	3.75	777
03-Dec-16 02:03:16	0.000	0.007	0.007	20.1	75.1	3.74	777
23-Dec-16 07:41:36	0.001	0.000	0.001	20.3	75.9	3.73	778
23-Dec-16 18:09:16	0.001	0.000	0.001	0.0	0.0	5.25	778
23-Dec-16 20:27:31	0.000	0.001	0.001	21.0	78.1	3.73	778
24-Dec-16 02:01:41	0.001	0.000	0.001	0.0	0.0	5.82	778
24-Dec-16 09:54:21	0.001	0.000	0.001	0.0	0.0	4.74	778
29-Dec-16 19:15:46	0.002	0.000	0.002	20.7	77.2	3.73	779
29-Dec-16 20:59:21	0.000	0.001	0.001	20.2	75.9	3.75	779
30-Dec-16 03:08:26	0.003	0.000	0.003	19.8	74.0	3.73	779
30-Dec-16 04:52:06	0.000	0.005	0.005	20.3	75.8	3.74	779
30-Dec-16 12:44:51	0.000	0.004	0.004	20.7	77.3	3.74	779
30-Dec-16 18:53:31	0.003	0.000	0.003	20.8	77.6	3.73	779
31-Dec-16 02:46:16	0.003	0.000	0.003	19.9	74.7	3.75	779
31-Dec-16 04:29:46	0.000	0.004	0.004	20.3	76.0	3.74	779
31-Dec-16 12:22:16	0.000	0.003	0.003	20.3	75.9	3.74	779
31-Dec-16 12:39:21	0.013	0.000	0.013	20.0	74.8	3.73	779
31-Dec-16 13:29:31	0.002	0.000	0.002	20.9	78.1	3.73	779

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
31-Dec-16 20:14:31	0.000	0.004	0.004	20.5	76.3	3.73	779
31-Dec-16 21:22:11	0.005	0.000	0.005	20.1	75.1	3.73	779
03-Jan-17 22:31:46	0.003	0.000	0.003	20.5	76.7	3.73	780
03-Jan-17 22:50:01	0.000	0.002	0.002	20.9	78.0	3.74	780
04-Jan-17 06:24:11	0.002	0.000	0.002	21.6	79.8	3.70	780
04-Jan-17 06:42:36	0.000	0.001	0.001	20.7	77.9	3.75	780
05-Jan-17 06:01:16	0.003	0.000	0.003	20.7	77.6	3.74	780
05-Jan-17 06:20:26	0.000	0.002	0.002	21.2	79.0	3.74	780
05-Jan-17 16:14:51	0.013	0.000	0.013	21.3	79.8	3.74	780
05-Jan-17 16:35:01	0.003	0.000	0.003	21.1	78.9	3.73	780
05-Jan-17 22:06:16	0.000	0.003	0.003	20.5	76.4	3.73	780
06-Jan-17 00:28:01	0.004	0.000	0.004	20.9	78.3	3.74	780
06-Jan-17 05:58:41	0.000	0.003	0.003	21.0	78.5	3.73	780
06-Jan-17 08:20:36	0.006	0.000	0.006	21.9	81.8	3.74	780
06-Jan-17 13:51:21	0.000	0.004	0.004	20.5	77.0	3.75	780
06-Jan-17 15:51:46	0.000	0.017	0.017	21.0	78.6	3.75	780
06-Jan-17 15:53:11	0.017	0.000	0.017	20.8	77.8	3.75	780
06-Jan-17 16:01:51	0.000	0.005	0.005	20.5	77.5	3.79	780
06-Jan-17 16:13:21	0.007	0.000	0.007	21.8	81.4	3.74	780
06-Jan-17 23:54:26	0.000	0.006	0.006	20.5	76.6	3.74	780
07-Jan-17 00:06:01	0.009	0.000	0.009	20.8	77.9	3.74	780
08-Jan-17 17:09:56	0.001	0.000	0.001	20.4	76.2	3.73	781
08-Jan-17 17:11:41	0.000	0.001	0.001	19.8	75.0	3.78	781
09-Jan-17 01:02:21	0.004	0.000	0.004	20.6	76.3	3.71	781
09-Jan-17 01:04:21	0.000	0.006	0.006	20.3	75.5	3.72	781
09-Jan-17 08:54:31	0.004	0.000	0.004	20.3	75.4	3.72	781
09-Jan-17 08:57:06	0.000	0.006	0.006	19.8	73.8	3.72	781
09-Jan-17 16:47:06	0.007	0.000	0.007	20.5	76.5	3.73	781
09-Jan-17 16:49:16	0.000	0.009	0.009	20.1	74.9	3.73	781
10-Jan-17 00:39:46	0.002	0.000	0.002	20.4	76.0	3.72	781
10-Jan-17 00:42:11	0.000	0.004	0.004	19.7	73.2	3.72	781
10-Jan-17 08:32:36	0.006	0.000	0.006	20.6	76.8	3.72	781
10-Jan-17 08:34:56	0.000	0.004	0.004	19.6	73.0	3.72	781
10-Jan-17 16:25:01	0.004	0.000	0.004	20.1	75.1	3.73	781
10-Jan-17 16:27:16	0.000	0.002	0.002	19.7	73.2	3.71	781
11-Jan-17 00:17:31	0.009	0.000	0.009	19.8	73.5	3.72	781
11-Jan-17 00:20:11	0.000	0.007	0.007	19.8	73.5	3.71	781

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
11-Jan-17 07:19:46	0.029	0.000	0.029	20.5	76.4	3.72	781
11-Jan-17 07:22:06	0.000	0.029	0.029	20.1	74.5	3.71	781
11-Jan-17 07:39:56	0.013	0.000	0.013	19.6	72.9	3.72	781
11-Jan-17 07:42:06	0.000	0.010	0.010	19.6	72.7	3.72	781
05-Dec-17 03:43:04	0.001	0.000	0.001	19.9	74.8	3.76	782
05-Dec-17 05:32:44	0.076	0.000	0.076	20.7	77.8	3.76	782
05-Dec-17 05:33:59	0.001	0.000	0.001	20.3	76.3	3.76	782
05-Dec-17 05:38:49	0.075	0.000	0.075	20.5	77.0	3.76	782
05-Dec-17 05:40:09	0.001	0.000	0.001	20.0	75.0	3.76	782
05-Dec-17 05:44:54	0.074	0.000	0.074	20.2	75.0	3.71	782
05-Dec-17 05:46:14	0.001	0.000	0.001	19.7	74.0	3.75	782
05-Dec-17 05:46:59	0.000	0.005	0.005	20.0	75.1	3.76	782
05-Dec-17 06:04:29	0.078	0.000	0.078	20.7	77.6	3.75	782
05-Dec-17 06:05:34	0.002	0.000	0.002	20.3	76.3	3.75	782
05-Dec-17 06:11:44	0.078	0.000	0.078	20.3	76.4	3.76	782
05-Dec-17 06:14:09	0.001	0.000	0.001	19.7	74.1	3.76	782
05-Dec-17 06:19:04	0.078	0.000	0.078	20.5	77.1	3.76	782
05-Dec-17 06:22:44	0.001	0.000	0.001	19.7	74.2	3.76	782
05-Dec-17 06:26:24	0.074	0.000	0.074	19.7	74.2	3.76	782
05-Dec-17 06:28:49	0.001	0.000	0.001	20.2	75.8	3.76	782
05-Dec-17 06:30:04	0.076	0.000	0.076	20.2	75.8	3.76	782
05-Dec-17 06:34:59	0.001	0.000	0.001	19.9	74.8	3.76	782
05-Dec-17 06:36:09	0.074	0.000	0.074	19.9	74.8	3.76	782
05-Dec-17 06:43:24	0.001	0.000	0.001	19.8	74.2	3.75	782
05-Dec-17 06:44:39	0.079	0.000	0.079	20.7	77.9	3.76	782
05-Dec-17 06:55:34	0.001	0.000	0.001	20.6	77.5	3.76	782
05-Dec-17 06:56:44	0.076	0.000	0.076	19.8	74.3	3.76	782
05-Dec-17 07:10:09	0.001	0.000	0.001	19.7	74.8	3.80	782
05-Dec-17 07:11:19	0.076	0.000	0.076	19.7	74.8	3.80	782
05-Dec-17 07:15:04	0.001	0.000	0.001	20.0	75.2	3.76	782
05-Dec-17 07:16:09	0.081	0.000	0.081	20.7	77.7	3.76	782
05-Dec-17 07:33:14	0.001	0.000	0.001	19.7	74.2	3.76	782
05-Dec-17 07:34:29	0.078	0.000	0.078	20.4	76.7	3.76	782
05-Dec-17 07:40:29	0.001	0.000	0.001	19.7	74.2	3.76	782
05-Dec-17 07:41:49	0.073	0.000	0.073	19.7	74.2	3.76	782
05-Dec-17 07:44:09	0.001	0.000	0.001	20.5	76.9	3.76	782
05-Dec-17 07:46:34	0.075	0.000	0.075	20.5	76.9	3.76	782

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
05-Dec-17 07:47:54	0.001	0.000	0.001	20.0	75.0	3.76	782
05-Dec-17 07:48:59	0.075	0.000	0.075	19.7	73.9	3.76	782
05-Dec-17 07:51:29	0.001	0.000	0.001	19.9	74.6	3.75	782
05-Dec-17 07:52:39	0.077	0.000	0.077	20.6	77.3	3.76	782
05-Dec-17 07:53:54	0.001	0.000	0.001	20.0	75.2	3.75	782
05-Dec-17 07:56:24	0.080	0.000	0.080	20.6	77.6	3.76	782
05-Dec-17 07:59:59	0.001	0.000	0.001	20.5	77.1	3.76	782
05-Dec-17 08:01:14	0.073	0.000	0.073	19.9	74.9	3.76	782
05-Dec-17 08:02:29	0.001	0.000	0.001	20.2	76.0	3.76	782
05-Dec-17 08:03:39	0.078	0.000	0.078	20.2	76.0	3.76	782
05-Dec-17 08:04:49	0.046	0.000	0.046	19.7	74.1	3.76	782
05-Dec-17 08:04:54	0.001	0.000	0.001	19.7	74.1	3.76	782
05-Dec-17 08:08:34	0.076	0.000	0.076	20.5	76.8	3.75	782
05-Dec-17 08:09:44	0.001	0.000	0.001	19.9	74.6	3.76	782
05-Dec-17 08:12:09	0.079	0.000	0.079	20.6	77.2	3.75	782
05-Dec-17 08:13:24	0.001	0.000	0.001	19.7	73.9	3.76	782
05-Dec-17 08:14:34	0.079	0.000	0.079	20.5	77.0	3.76	782
05-Dec-17 08:17:04	0.001	0.000	0.001	19.7	74.0	3.76	782
05-Dec-17 08:19:29	0.078	0.000	0.078	20.5	77.6	3.78	782
05-Dec-17 08:25:34	0.001	0.000	0.001	19.7	74.1	3.76	782
05-Dec-17 08:30:24	0.076	0.000	0.076	20.0	75.3	3.76	782
05-Dec-17 08:31:39	0.001	0.000	0.001	20.0	75.3	3.76	782
05-Dec-17 08:32:54	0.076	0.000	0.076	20.4	76.8	3.76	782
05-Dec-17 08:35:19	0.001	0.000	0.001	20.4	76.8	3.76	782
05-Dec-17 08:36:34	0.075	0.000	0.075	20.4	76.8	3.76	782
05-Dec-17 08:38:59	0.001	0.000	0.001	19.7	74.1	3.76	782
05-Dec-17 08:41:24	0.079	0.000	0.079	20.5	77.2	3.76	782
05-Dec-17 08:45:04	0.001	0.000	0.001	19.6	73.7	3.76	782
05-Dec-17 08:46:19	0.077	0.000	0.077	20.6	77.3	3.76	782
05-Dec-17 08:48:44	0.001	0.000	0.001	20.6	77.3	3.76	782
05-Dec-17 08:53:34	0.079	0.000	0.079	20.6	77.2	3.75	782
05-Dec-17 08:54:49	0.001	0.000	0.001	19.6	73.9	3.76	782
05-Dec-17 09:06:59	0.074	0.000	0.074	20.5	77.1	3.76	782
05-Dec-17 09:08:14	0.001	0.000	0.001	19.5	73.4	3.75	782
05-Dec-17 09:15:29	0.075	0.000	0.075	20.5	76.9	3.76	782
05-Dec-17 09:16:44	0.001	0.000	0.001	19.5	73.2	3.75	782
05-Dec-17 09:22:49	0.073	0.000	0.073	19.7	74.1	3.76	782

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
05-Dec-17 09:23:59	0.005	0.000	0.005	19.8	74.5	3.76	782
05-Dec-17 09:34:59	0.073	0.000	0.073	20.4	76.7	3.76	782
05-Dec-17 09:36:14	0.001	0.000	0.001	20.4	76.7	3.76	782
05-Dec-17 09:42:19	0.077	0.000	0.077	20.5	76.9	3.76	782
05-Dec-17 09:44:44	0.001	0.000	0.001	19.7	73.9	3.76	782
05-Dec-17 09:49:39	0.075	0.000	0.075	20.4	76.6	3.76	782
05-Dec-17 09:50:49	0.001	0.000	0.001	19.6	73.7	3.76	782
05-Dec-17 09:53:19	0.075	0.000	0.075	20.1	76.1	3.79	782
05-Dec-17 09:54:34	0.001	0.000	0.001	19.5	73.4	3.76	782
05-Dec-17 09:55:44	0.077	0.000	0.077	20.4	76.9	3.76	782
05-Dec-17 09:56:54	0.001	0.000	0.001	20.0	75.1	3.76	782
05-Dec-17 13:39:54	0.000	0.006	0.006	19.9	75.2	3.77	782
05-Dec-17 17:49:19	0.001	0.000	0.001	19.5	74.4	3.81	782
05-Dec-17 21:32:49	0.000	0.001	0.001	19.8	74.8	3.77	782
06-Dec-17 01:41:49	0.001	0.000	0.001	18.6	69.9	3.76	782
06-Dec-17 09:34:04	0.001	0.000	0.001	20.2	75.9	3.76	782
27-May-18 23:57:21	0.000	0.001	0.001	20.1	75.6	3.76	783
28-May-18 01:46:41	0.001	0.000	0.001	19.8	74.4	3.75	783
28-May-18 13:36:46	0.001	0.000	0.001	19.4	72.8	3.75	783
28-May-18 15:42:21	0.000	0.003	0.003	20.4	76.6	3.75	783
28-May-18 16:19:06	0.082	0.000	0.082	19.7	73.7	3.74	783
28-May-18 17:08:51	0.020	0.000	0.020	20.5	72.7	3.55	783
28-May-18 17:10:06	0.001	0.000	0.001	19.4	72.7	3.75	783
28-May-18 17:10:11	0.079	0.000	0.079	20.5	76.6	3.74	783
28-May-18 17:34:36	0.001	0.000	0.001	19.4	72.5	3.75	783
28-May-18 17:37:01	0.074	0.000	0.074	20.0	74.9	3.75	783
28-May-18 17:41:56	0.001	0.000	0.001	19.3	72.4	3.75	783
28-May-18 17:43:11	0.072	0.000	0.072	19.6	73.5	3.74	783
28-May-18 17:57:41	0.001	0.000	0.001	20.3	76.1	3.74	783
28-May-18 17:58:56	0.076	0.000	0.076	20.3	76.1	3.74	783
28-May-18 18:00:16	0.001	0.000	0.001	20.3	76.1	3.74	783
28-May-18 18:01:21	0.076	0.000	0.076	20.3	76.1	3.74	783
28-May-18 18:06:16	0.001	0.000	0.001	19.9	74.6	3.75	783
28-May-18 18:09:56	0.072	0.000	0.072	19.9	74.6	3.75	783
28-May-18 18:11:06	0.001	0.000	0.001	19.5	73.0	3.75	783
28-May-18 18:12:26	0.072	0.000	0.072	19.5	73.0	3.75	783
28-May-18 18:13:36	0.001	0.000	0.001	20.2	76.1	3.76	783

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
28-May-18 18:48:51	0.074	0.000	0.074	20.5	76.6	3.74	783
28-May-18 18:50:01	0.005	0.000	0.005	20.5	76.6	3.74	783
28-May-18 19:47:21	0.073	0.000	0.073	20.4	76.3	3.75	783
28-May-18 19:48:31	0.001	0.000	0.001	20.0	74.9	3.74	783
28-May-18 19:53:25	0.070	0.000	0.070	19.6	73.5	3.75	783
28-May-18 19:54:36	0.001	0.000	0.001	19.6	73.5	3.75	783
28-May-18 19:58:11	0.076	0.000	0.076	20.4	76.4	3.74	783
28-May-18 20:00:41	0.001	0.000	0.001	19.6	73.4	3.74	783
28-May-18 20:03:06	0.074	0.000	0.074	20.0	74.8	3.74	783
28-May-18 20:04:16	0.001	0.000	0.001	19.5	73.0	3.75	783
28-May-18 20:09:11	0.078	0.000	0.078	20.2	75.6	3.74	783
28-May-18 20:10:26	0.001	0.000	0.001	20.3	76.1	3.74	783
28-May-18 20:11:36	0.077	0.000	0.077	20.5	76.7	3.75	783
28-May-18 20:38:21	0.001	0.000	0.001	19.2	71.9	3.75	783
05-Jul-18 07:55:01	0.000	0.001	0.001	20.1	75.8	3.77	784
05-Jul-18 08:43:01	0.001	0.000	0.001	21.3	80.0	3.75	784
06-Jul-18 23:18:06	0.000	0.001	0.001	20.6	77.3	3.76	784
07-Jul-18 00:51:26	0.001	0.000	0.001	21.2	79.9	3.76	784
07-Jul-18 07:10:21	0.000	0.003	0.003	20.8	78.2	3.76	784
07-Jul-18 08:43:56	0.001	0.000	0.001	21.3	80.2	3.76	784
17-Jul-18 09:21:56	0.000	0.001	0.001	21.1	78.9	3.75	784
17-Jul-18 09:37:56	0.001	0.000	0.001	23.0	86.4	3.75	784
17-Jul-18 13:02:51	0.095	0.000	0.095	24.8	93.2	3.75	784
17-Jul-18 14:13:01	0.077	0.000	0.077	20.6	77.6	3.76	784
17-Jul-18 14:14:46	0.001	0.000	0.001	20.8	78.4	3.76	784
17-Jul-18 14:16:01	0.083	0.000	0.083	21.4	79.5	3.71	784
17-Jul-18 14:37:56	0.001	0.000	0.001	19.9	75.2	3.77	784
17-Jul-18 16:16:31	0.079	0.000	0.079	20.2	75.9	3.76	784
17-Jul-18 16:39:41	0.001	0.000	0.001	20.3	77.2	3.80	784
17-Jul-18 16:43:21	0.078	0.000	0.078	21.2	79.5	3.76	784
17-Jul-18 16:45:46	0.001	0.000	0.001	20.4	76.8	3.76	784
17-Jul-18 16:47:01	0.078	0.000	0.078	21.3	80.0	3.76	784
17-Jul-18 16:48:16	0.001	0.000	0.001	21.3	80.0	3.76	784
17-Jul-18 17:14:16	0.000	0.002	0.002	20.0	75.0	3.75	784
17-Jul-18 21:05:26	0.075	0.000	0.075	20.5	77.0	3.76	784
17-Jul-18 21:06:36	0.001	0.000	0.001	21.0	79.1	3.76	784
17-Jul-18 21:07:51	0.080	0.000	0.080	21.0	79.1	3.76	784

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
17-Jul-18 21:24:56	0.001	0.000	0.001	20.4	76.9	3.76	784
18-Jul-18 01:06:51	0.000	0.002	0.002	20.7	77.7	3.75	784
18-Jul-18 05:17:01	0.001	0.000	0.001	21.2	80.2	3.79	784
18-Jul-18 08:59:41	0.000	0.001	0.001	21.2	79.5	3.75	784
18-Jul-18 13:09:36	0.001	0.000	0.001	21.3	79.3	3.72	784
18-Jul-18 16:21:01	0.080	0.000	0.080	20.3	76.6	3.76	784
19-Jul-18 02:50:46	0.083	0.000	0.083	21.1	79.3	3.77	784
19-Jul-18 02:52:06	0.001	0.000	0.001	20.5	77.3	3.77	784
19-Jul-18 02:53:11	0.081	0.000	0.081	21.0	79.1	3.76	784
19-Jul-18 02:56:51	0.001	0.000	0.001	21.2	79.9	3.76	784
19-Jul-18 02:58:06	0.080	0.000	0.080	20.6	76.4	3.72	784
19-Jul-18 03:00:36	0.001	0.000	0.001	21.1	79.6	3.78	784
19-Jul-18 03:01:46	0.080	0.000	0.080	20.2	76.1	3.77	784
19-Jul-18 03:04:11	0.001	0.000	0.001	20.2	76.1	3.77	784
19-Jul-18 08:37:01	0.000	0.002	0.002	20.7	77.5	3.75	784
19-Jul-18 10:56:56	0.001	0.000	0.001	20.7	78.2	3.77	784
19-Jul-18 16:29:56	0.000	0.001	0.001	21.0	78.6	3.75	784
19-Jul-18 17:30:41	0.001	0.000	0.001	20.1	75.8	3.77	784
20-Jul-18 00:22:26	0.000	0.002	0.002	21.2	79.4	3.74	784
20-Jul-18 01:21:11	0.001	0.000	0.001	21.1	79.8	3.78	784
20-Jul-18 08:15:06	0.000	0.001	0.001	20.8	78.1	3.75	784
20-Jul-18 09:13:41	0.001	0.000	0.001	21.4	80.9	3.78	784
20-Jul-18 16:07:46	0.000	0.003	0.003	21.1	79.2	3.75	784
20-Jul-18 17:06:06	0.001	0.000	0.001	20.7	78.1	3.78	784
21-Jul-18 00:00:16	0.000	0.002	0.002	20.6	77.1	3.75	784
21-Jul-18 00:58:01	0.001	0.000	0.001	20.5	77.4	3.77	784
22-Jul-18 12:07:21	0.000	0.001	0.001	20.4	76.6	3.75	784
22-Jul-18 16:01:11	0.001	0.000	0.001	20.3	76.1	3.75	784
22-Jul-18 19:59:41	0.000	0.001	0.001	20.6	76.8	3.72	784
22-Jul-18 23:53:46	0.001	0.000	0.001	20.5	75.9	3.70	784
23-Jul-18 03:52:36	0.000	0.001	0.001	20.5	76.8	3.75	784
23-Jul-18 07:46:06	0.001	0.000	0.001	20.1	75.3	3.75	784
23-Jul-18 11:45:06	0.000	0.001	0.001	20.4	76.4	3.74	784
23-Jul-18 15:38:36	0.001	0.000	0.001	19.7	73.8	3.75	784
23-Jul-18 16:04:01	0.074	0.000	0.074	19.5	73.5	3.76	784
23-Jul-18 16:10:06	0.001	0.000	0.001	19.3	72.6	3.76	784
23-Jul-18 16:11:21	0.077	0.000	0.077	19.8	74.1	3.75	784

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
23-Jul-18 17:17:11	0.001	0.000	0.001	19.5	72.9	3.75	784
23-Jul-18 17:18:21	0.076	0.000	0.076	19.5	76.8	3.95	784
23-Jul-18 17:26:56	0.001	0.000	0.001	19.5	73.1	3.75	784
23-Jul-18 17:28:16	0.073	0.000	0.073	19.9	74.4	3.75	784
23-Jul-18 17:37:56	0.001	0.000	0.001	20.1	75.2	3.75	784
23-Jul-18 17:39:06	0.072	0.000	0.072	19.5	73.2	3.74	784
23-Jul-18 17:56:06	0.001	0.000	0.001	20.3	76.9	3.79	784
23-Jul-18 19:37:36	0.000	0.001	0.001	19.7	73.6	3.75	784
24-Jul-18 01:48:36	0.001	0.000	0.001	19.4	72.8	3.75	784
24-Jul-18 03:30:11	0.000	0.001	0.001	19.5	73.2	3.75	784
24-Jul-18 09:41:01	0.001	0.000	0.001	20.0	75.1	3.76	784
24-Jul-18 11:22:51	0.000	0.001	0.001	19.4	72.7	3.75	784
24-Jul-18 17:33:41	0.001	0.000	0.001	19.7	73.7	3.75	784
25-Jul-18 01:26:21	0.001	0.000	0.001	19.3	72.5	3.76	784
25-Jul-18 03:08:11	0.000	0.001	0.001	19.3	72.3	3.75	784
25-Jul-18 09:19:06	0.001	0.000	0.001	19.4	72.9	3.75	784
25-Jul-18 11:00:36	0.000	0.001	0.001	20.3	76.0	3.74	784
25-Jul-18 13:32:06	0.078	0.000	0.078	19.5	73.1	3.75	784
25-Jul-18 13:33:16	0.001	0.000	0.001	19.5	73.1	3.75	784
25-Jul-18 13:34:31	0.080	0.000	0.080	20.2	75.8	3.75	784
25-Jul-18 13:35:41	0.001	0.000	0.001	19.6	73.6	3.75	784
25-Jul-18 13:38:06	0.080	0.000	0.080	20.4	76.5	3.75	784
25-Jul-18 13:40:36	0.001	0.000	0.001	19.6	73.6	3.75	784
25-Jul-18 18:53:26	0.000	0.001	0.001	19.8	74.4	3.75	784
25-Jul-18 21:33:11	0.001	0.000	0.001	19.5	73.1	3.75	784
26-Jul-18 02:46:06	0.000	0.001	0.001	19.6	73.4	3.74	784
26-Jul-18 05:25:51	0.001	0.000	0.001	19.1	72.0	3.77	784
26-Jul-18 10:38:21	0.000	0.001	0.001	19.5	73.2	3.75	784
26-Jul-18 13:18:21	0.001	0.000	0.001	20.1	75.6	3.75	784
26-Jul-18 18:31:06	0.000	0.002	0.002	20.1	75.4	3.74	784
28-Jul-18 11:42:41	0.000	0.001	0.001	20.6	77.2	3.74	784
28-Jul-18 14:07:41	0.002	0.000	0.002	20.0	74.8	3.74	784
28-Jul-18 19:34:56	0.000	0.001	0.001	19.5	73.9	3.79	784
28-Jul-18 22:00:01	0.002	0.000	0.002	20.7	77.2	3.74	784
29-Jul-18 03:27:16	0.000	0.001	0.001	20.3	76.0	3.75	784
29-Jul-18 05:52:36	0.002	0.000	0.002	20.7	77.7	3.75	784
29-Jul-18 11:19:46	0.000	0.001	0.001	19.6	73.3	3.74	784

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
29-Jul-18 13:45:11	0.001	0.000	0.001	20.3	76.0	3.74	784
29-Jul-18 19:12:01	0.000	0.001	0.001	19.3	72.3	3.74	784
29-Jul-18 21:37:56	0.002	0.000	0.002	20.6	77.1	3.75	784
30-Jul-18 03:04:26	0.000	0.001	0.001	20.4	76.1	3.74	784
30-Jul-18 05:30:26	0.003	0.000	0.003	20.6	77.1	3.75	784
30-Jul-18 10:56:51	0.000	0.001	0.001	20.4	76.5	3.74	784
30-Jul-18 13:23:11	0.002	0.000	0.002	20.1	75.4	3.75	784
30-Jul-18 16:54:26	0.080	0.000	0.080	20.4	76.4	3.74	784
30-Jul-18 18:12:21	0.001	0.000	0.001	20.3	75.9	3.75	784
30-Jul-18 18:49:16	0.000	0.002	0.002	20.4	76.3	3.74	784
05-Oct-18 01:14:11	0.081	0.000	0.081	21.5	80.5	3.74	785
05-Oct-18 01:15:21	0.002	0.000	0.002	20.9	78.0	3.74	785
05-Oct-18 01:16:36	0.084	0.000	0.084	21.5	80.6	3.74	785
05-Oct-18 01:28:51	0.003	0.000	0.003	20.6	77.0	3.75	785
05-Oct-18 01:29:56	0.080	0.000	0.080	20.6	77.0	3.75	785
05-Oct-18 06:15:06	0.000	0.001	0.001	21.0	78.5	3.75	785
05-Oct-18 09:55:11	0.001	0.000	0.001	21.3	79.6	3.74	785
05-Oct-18 14:07:01	0.000	0.001	0.001	21.1	78.9	3.74	785
06-Oct-18 13:44:36	0.000	0.001	0.001	21.2	79.2	3.74	785
06-Oct-18 16:55:01	0.093	0.000	0.093	21.6	80.8	3.74	785
06-Oct-18 16:56:11	0.001	0.000	0.001	21.3	79.8	3.74	785
06-Oct-18 17:04:51	0.092	0.000	0.092	21.4	76.1	3.56	785
06-Oct-18 17:08:21	0.001	0.000	0.001	20.1	75.5	3.76	785
06-Oct-18 17:09:41	0.089	0.000	0.089	20.9	78.2	3.75	785
06-Oct-18 18:03:11	0.001	0.000	0.001	21.1	79.0	3.74	785
06-Oct-18 18:04:21	0.092	0.000	0.092	21.6	80.6	3.74	785
06-Oct-18 18:06:46	0.001	0.000	0.001	20.8	78.0	3.75	785
06-Oct-18 18:08:01	0.090	0.000	0.090	21.4	80.2	3.74	785
06-Oct-18 18:09:06	0.001	0.000	0.001	21.4	78.4	3.65	785
06-Oct-18 18:10:21	0.093	0.000	0.093	21.6	80.8	3.74	785
06-Oct-18 18:11:41	0.001	0.000	0.001	21.2	79.1	3.74	785
06-Oct-18 21:36:51	0.000	0.001	0.001	21.3	79.5	3.74	785
07-Oct-18 02:03:56	0.001	0.000	0.001	21.4	80.1	3.75	785
07-Oct-18 17:49:01	0.001	0.000	0.001	21.2	79.6	3.75	785
07-Oct-18 21:14:16	0.000	0.001	0.001	20.4	76.3	3.75	785
07-Oct-18 23:21:01	0.080	0.000	0.080	20.3	75.9	3.74	785
07-Oct-18 23:22:16	0.001	0.000	0.001	20.5	77.1	3.75	785

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
07-Oct-18 23:23:26	0.086	0.000	0.086	20.5	77.1	3.75	785
07-Oct-18 23:24:41	0.001	0.000	0.001	21.2	79.1	3.74	785
07-Oct-18 23:25:56	0.087	0.000	0.087	20.8	77.6	3.73	785
07-Oct-18 23:52:41	0.009	0.000	0.009	21.4	80.0	3.74	785
07-Oct-18 23:53:56	0.085	0.000	0.085	20.8	77.9	3.74	785
08-Oct-18 00:03:41	0.002	0.000	0.002	20.6	77.2	3.74	785
08-Oct-18 00:06:06	0.087	0.000	0.087	21.4	79.9	3.74	785
08-Oct-18 00:11:01	0.002	0.000	0.002	20.1	75.4	3.75	785
08-Oct-18 00:12:11	0.084	0.000	0.084	21.4	79.9	3.74	785
08-Oct-18 00:15:51	0.003	0.000	0.003	20.8	77.9	3.74	785
08-Oct-18 00:19:31	0.085	0.000	0.085	20.8	78.0	3.74	785
08-Oct-18 00:22:01	0.002	0.000	0.002	20.2	75.4	3.74	785
08-Oct-18 00:23:11	0.081	0.000	0.081	20.2	75.4	3.74	785
08-Oct-18 00:24:26	0.001	0.000	0.001	20.2	75.4	3.74	785
08-Oct-18 00:29:21	0.080	0.000	0.080	20.2	75.4	3.74	785
08-Oct-18 00:34:11	0.002	0.000	0.002	21.2	79.3	3.74	785
08-Oct-18 00:35:26	0.081	0.000	0.081	20.3	76.1	3.74	785
08-Oct-18 00:39:06	0.002	0.000	0.002	20.7	77.4	3.74	785
08-Oct-18 00:42:46	0.080	0.000	0.080	20.3	76.0	3.75	785
08-Oct-18 00:43:56	0.003	0.000	0.003	20.7	77.4	3.74	785
08-Oct-18 00:46:26	0.085	0.000	0.085	21.2	79.2	3.74	785
08-Oct-18 00:48:51	0.002	0.000	0.002	20.2	75.5	3.75	785
08-Oct-18 00:50:06	0.087	0.000	0.087	21.4	80.0	3.74	785
08-Oct-18 00:53:46	0.002	0.000	0.002	20.5	76.9	3.74	785
08-Oct-18 00:55:01	0.084	0.000	0.084	20.2	75.8	3.75	785
08-Oct-18 01:04:46	0.001	0.000	0.001	20.2	75.4	3.74	785
08-Oct-18 01:05:56	0.091	0.000	0.091	21.2	79.4	3.74	785
08-Oct-18 01:07:11	0.001	0.000	0.001	19.9	74.7	3.75	785
08-Oct-18 05:06:31	0.000	0.001	0.001	20.3	76.0	3.75	785
02-Nov-18 02:28:51	0.041	0.000	0.041	20.5	76.9	3.75	785
02-Nov-18 02:28:56	0.001	0.000	0.001	20.5	76.9	3.75	785
02-Nov-18 02:30:11	0.085	0.000	0.085	20.5	76.9	3.75	785
02-Nov-18 02:33:51	0.001	0.000	0.001	20.2	75.5	3.75	785
02-Nov-18 02:35:01	0.083	0.000	0.083	21.0	78.5	3.75	785
02-Nov-18 02:36:16	0.001	0.000	0.001	21.0	78.5	3.75	785
02-Nov-18 02:37:26	0.089	0.000	0.089	21.0	78.5	3.75	785
02-Nov-18 02:43:31	0.001	0.000	0.001	19.9	74.9	3.76	785

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
02-Nov-18 02:44:46	0.090	0.000	0.090	21.3	79.6	3.74	785
02-Nov-18 02:52:06	0.001	0.000	0.001	21.2	79.4	3.75	785
02-Nov-18 02:56:56	0.086	0.000	0.086	20.3	75.9	3.75	785
02-Nov-18 02:58:06	0.001	0.000	0.001	20.3	75.9	3.75	785
02-Nov-18 02:59:26	0.090	0.000	0.090	21.4	80.1	3.74	785
02-Nov-18 03:01:51	0.001	0.000	0.001	19.9	74.8	3.75	785
02-Nov-18 03:04:11	0.088	0.000	0.088	20.7	77.5	3.75	785
02-Nov-18 03:05:31	0.001	0.000	0.001	20.7	77.5	3.75	785
02-Nov-18 03:06:41	0.084	0.000	0.084	20.4	76.2	3.74	785
02-Nov-18 03:07:56	0.001	0.000	0.001	21.0	78.5	3.75	785
02-Nov-18 03:10:16	0.089	0.000	0.089	20.9	78.2	3.75	785
02-Nov-18 03:13:56	0.001	0.000	0.001	20.4	76.3	3.75	785
02-Nov-18 03:26:11	0.088	0.000	0.088	21.1	79.2	3.75	785
02-Nov-18 03:27:21	0.001	0.000	0.001	20.5	76.7	3.74	785
02-Nov-18 03:28:36	0.086	0.000	0.086	20.5	76.7	3.74	785
02-Nov-18 03:29:46	0.001	0.000	0.001	20.5	76.7	3.74	785
02-Nov-18 03:33:26	0.084	0.000	0.084	20.3	76.3	3.75	785
02-Nov-18 03:34:41	0.001	0.000	0.001	19.9	74.5	3.74	785
02-Nov-18 03:35:56	0.089	0.000	0.089	20.9	78.3	3.75	785
02-Nov-18 03:37:01	0.001	0.000	0.001	20.9	78.3	3.75	785
02-Nov-18 03:39:31	0.084	0.000	0.084	20.0	75.9	3.79	785
02-Nov-18 03:42:01	0.001	0.000	0.001	21.3	79.9	3.75	785
02-Nov-18 03:44:26	0.088	0.000	0.088	21.3	79.9	3.74	785
02-Nov-18 04:27:01	0.001	0.000	0.001	20.8	77.9	3.75	785
02-Nov-18 04:28:16	0.087	0.000	0.087	21.1	79.0	3.75	785
02-Nov-18 05:20:31	0.001	0.000	0.001	20.4	76.7	3.75	785
02-Nov-18 05:21:51	0.085	0.000	0.085	20.4	76.7	3.75	785
02-Nov-18 05:26:36	0.001	0.000	0.001	19.9	74.7	3.75	785
02-Nov-18 05:29:06	0.090	0.000	0.090	21.1	79.1	3.75	785
02-Nov-18 05:30:21	0.001	0.000	0.001	21.1	79.1	3.75	785
02-Nov-18 05:35:16	0.090	0.000	0.090	21.1	79.1	3.75	785
02-Nov-18 05:37:36	0.001	0.000	0.001	20.0	74.7	3.74	785
02-Nov-18 05:40:06	0.083	0.000	0.083	20.2	75.6	3.75	785
02-Nov-18 06:03:16	0.001	0.000	0.001	21.1	79.1	3.75	785
02-Nov-18 06:04:21	0.088	0.000	0.088	21.1	79.1	3.75	785
02-Nov-18 09:25:06	0.077	0.000	0.077	20.2	75.7	3.75	785
02-Nov-18 09:27:16	0.000	0.001	0.001	20.3	74.8	3.69	785

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
02-Nov-18 10:34:56	0.001	0.000	0.001	20.1	75.3	3.75	785
02-Nov-18 10:36:11	0.078	0.000	0.078	20.5	76.9	3.75	785
02-Nov-18 10:41:01	0.002	0.000	0.002	20.9	78.5	3.75	785
02-Nov-18 10:45:56	0.077	0.000	0.077	20.7	77.5	3.75	785
02-Nov-18 10:56:56	0.001	0.000	0.001	20.2	75.6	3.75	785
02-Nov-18 10:59:16	0.078	0.000	0.078	20.6	77.2	3.75	785
02-Nov-18 11:01:46	0.001	0.000	0.001	21.0	78.4	3.74	785
02-Nov-18 11:06:41	0.077	0.000	0.077	21.2	79.7	3.75	785
02-Nov-18 11:07:51	0.001	0.000	0.001	20.2	75.5	3.75	785
02-Nov-18 11:11:31	0.078	0.000	0.078	21.1	79.3	3.75	785
02-Nov-18 11:12:46	0.001	0.000	0.001	20.6	77.0	3.75	785
02-Nov-18 12:04:01	0.076	0.000	0.076	21.3	79.7	3.75	785
02-Nov-18 12:05:11	0.001	0.000	0.001	20.2	75.6	3.75	785
02-Nov-18 12:06:26	0.072	0.000	0.072	20.2	75.6	3.75	785
02-Nov-18 12:10:06	0.001	0.000	0.001	20.6	77.4	3.75	785
02-Nov-18 12:15:01	0.078	0.000	0.078	21.1	78.9	3.75	785
02-Nov-18 12:16:06	0.001	0.000	0.001	20.2	75.7	3.74	785
02-Nov-18 12:17:26	0.077	0.000	0.077	20.9	78.2	3.75	785
02-Nov-18 12:18:41	0.001	0.000	0.001	20.1	75.4	3.75	785
02-Nov-18 12:22:16	0.077	0.000	0.077	21.2	79.4	3.75	785
02-Nov-18 12:24:46	0.001	0.000	0.001	20.1	75.1	3.74	785
02-Nov-18 12:27:11	0.078	0.000	0.078	21.2	79.5	3.74	785
02-Nov-18 12:28:16	0.001	0.000	0.001	20.1	75.4	3.75	785
02-Nov-18 12:29:36	0.077	0.000	0.077	20.8	77.9	3.75	785
02-Nov-18 12:30:46	0.001	0.000	0.001	20.8	77.9	3.75	785
02-Nov-18 12:38:06	0.080	0.000	0.080	21.0	78.5	3.74	785
02-Nov-18 12:39:21	0.001	0.000	0.001	20.1	75.4	3.75	785
02-Nov-18 12:42:56	0.078	0.000	0.078	21.2	79.5	3.74	785
02-Nov-18 12:44:11	0.001	0.000	0.001	21.2	79.5	3.74	785
02-Nov-18 12:49:06	0.079	0.000	0.079	21.2	79.5	3.74	785
02-Nov-18 12:50:16	0.002	0.000	0.002	21.2	79.5	3.74	785
02-Nov-18 12:55:11	0.077	0.000	0.077	21.2	79.6	3.75	785
02-Nov-18 12:56:26	0.001	0.000	0.001	20.7	77.7	3.75	785
02-Nov-18 13:04:56	0.077	0.000	0.077	20.9	78.2	3.75	785
02-Nov-18 13:06:06	0.001	0.000	0.001	20.9	78.2	3.75	785
02-Nov-18 13:14:41	0.075	0.000	0.075	21.2	79.4	3.75	785
02-Nov-18 13:15:56	0.001	0.000	0.001	20.1	75.3	3.75	785

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
02-Nov-18 13:22:01	0.078	0.000	0.078	21.2	79.3	3.75	785
02-Nov-18 13:23:16	0.001	0.000	0.001	20.3	76.1	3.75	785
02-Nov-18 17:19:51	0.000	0.001	0.001	20.0	74.8	3.75	785
02-Nov-18 17:41:26	0.078	0.000	0.078	21.2	79.5	3.74	785
02-Nov-18 17:42:41	0.001	0.000	0.001	21.2	79.5	3.74	785
02-Nov-18 18:00:51	0.077	0.000	0.077	21.3	79.5	3.74	785
02-Nov-18 18:02:06	0.001	0.000	0.001	20.3	76.2	3.75	785
02-Nov-18 18:03:21	0.075	0.000	0.075	20.7	77.6	3.74	785
02-Nov-18 18:05:41	0.001	0.000	0.001	20.3	75.9	3.75	785
02-Nov-18 18:06:56	0.076	0.000	0.076	20.3	75.9	3.75	785
02-Nov-18 18:08:06	0.001	0.000	0.001	20.4	76.6	3.75	785
02-Nov-18 18:16:36	0.078	0.000	0.078	21.0	78.8	3.74	785
02-Nov-18 18:17:51	0.001	0.000	0.001	20.1	75.6	3.75	785
02-Nov-18 18:24:01	0.078	0.000	0.078	21.1	79.0	3.75	785
02-Nov-18 18:25:16	0.001	0.000	0.001	20.2	75.9	3.75	785
02-Nov-18 18:27:41	0.078	0.000	0.078	21.0	78.8	3.74	785
02-Nov-18 18:32:36	0.001	0.000	0.001	20.5	76.7	3.74	785
02-Nov-18 18:33:46	0.077	0.000	0.077	20.5	76.7	3.74	785
02-Nov-18 18:35:01	0.001	0.000	0.001	20.7	77.7	3.75	785
02-Nov-18 18:36:16	0.076	0.000	0.076	20.5	77.7	3.80	785
02-Nov-18 18:38:41	0.001	0.000	0.001	20.0	75.0	3.75	785
02-Nov-18 18:39:56	0.079	0.000	0.079	21.1	79.0	3.75	785
02-Nov-18 18:41:11	0.001	0.000	0.001	20.4	76.4	3.75	785
02-Nov-18 18:42:21	0.076	0.000	0.076	20.4	76.4	3.75	785
02-Nov-18 18:43:36	0.001	0.000	0.001	20.8	78.1	3.75	785
02-Nov-18 18:44:51	0.077	0.000	0.077	20.4	78.1	3.83	785
02-Nov-18 18:47:16	0.001	0.000	0.001	20.0	75.1	3.75	785
02-Nov-18 18:48:21	0.079	0.000	0.079	20.9	78.3	3.75	785
02-Nov-18 18:53:21	0.001	0.000	0.001	20.2	75.5	3.74	785
02-Nov-18 18:54:31	0.076	0.000	0.076	20.2	75.5	3.74	785
02-Nov-18 18:55:46	0.001	0.000	0.001	20.2	75.5	3.74	785
02-Nov-18 18:57:01	0.075	0.000	0.075	20.2	75.5	3.74	785
02-Nov-18 19:15:16	0.001	0.000	0.001	20.3	76.0	3.75	785
02-Nov-18 19:16:26	0.081	0.000	0.081	21.0	78.8	3.75	785
02-Nov-18 21:02:21	0.001	0.000	0.001	20.1	75.4	3.75	785
02-Nov-18 21:09:41	0.091	0.000	0.091	21.0	79.5	3.79	785
02-Nov-18 21:10:51	0.001	0.000	0.001	20.2	76.1	3.76	785

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
02-Nov-18 21:25:31	0.087	0.000	0.087	20.4	76.6	3.76	785
02-Nov-18 21:26:41	0.001	0.000	0.001	20.4	76.6	3.76	785
05-Nov-18 08:27:26	0.000	0.001	0.001	19.9	74.7	3.75	785
05-Nov-18 09:42:26	0.001	0.000	0.001	20.2	75.7	3.75	785
05-Nov-18 10:27:41	0.086	0.000	0.086	20.4	76.3	3.75	785
05-Nov-18 10:28:56	0.001	0.000	0.001	20.7	77.8	3.76	785
05-Nov-18 10:35:01	0.088	0.000	0.088	20.7	77.8	3.76	785
05-Nov-18 10:38:36	0.001	0.000	0.001	19.6	73.6	3.76	785
05-Nov-18 10:39:46	0.081	0.000	0.081	20.0	74.9	3.75	785
05-Nov-18 10:43:31	0.017	0.000	0.017	19.8	74.3	3.75	785
05-Nov-18 10:44:36	0.001	0.000	0.001	19.8	74.3	3.75	785
05-Nov-18 10:44:41	0.085	0.000	0.085	20.3	76.2	3.75	785
05-Nov-18 10:55:46	0.001	0.000	0.001	20.6	77.2	3.75	785
05-Nov-18 10:56:51	0.083	0.000	0.083	19.9	74.8	3.75	785
05-Nov-18 13:12:06	0.003	0.000	0.003	20.2	75.7	3.75	785
05-Nov-18 13:13:21	0.076	0.000	0.076	20.2	75.7	3.75	785
05-Nov-18 13:32:51	0.001	0.000	0.001	19.8	74.4	3.75	785
05-Nov-18 13:34:06	0.071	0.000	0.071	20.8	78.0	3.75	785
05-Nov-18 13:45:01	0.001	0.000	0.001	20.9	78.2	3.74	785
05-Nov-18 13:47:26	0.079	0.000	0.079	20.9	78.4	3.75	785
05-Nov-18 13:51:06	0.001	0.000	0.001	20.0	74.9	3.75	785
05-Nov-18 13:53:31	0.070	0.000	0.070	19.7	73.9	3.75	785
05-Nov-18 13:54:51	0.001	0.000	0.001	20.2	75.7	3.75	785
05-Nov-18 13:57:11	0.078	0.000	0.078	20.9	78.4	3.75	785
05-Nov-18 13:58:31	0.001	0.000	0.001	20.0	74.9	3.75	785
05-Nov-18 14:02:06	0.076	0.000	0.076	20.4	76.7	3.75	785
05-Nov-18 14:07:01	0.001	0.000	0.001	19.9	74.7	3.75	785
05-Nov-18 14:09:31	0.076	0.000	0.076	20.5	77.6	3.78	785
05-Nov-18 14:10:36	0.001	0.000	0.001	20.8	77.6	3.73	785
05-Nov-18 14:15:36	0.075	0.000	0.075	20.9	78.3	3.75	785
05-Nov-18 14:16:46	0.001	0.000	0.001	20.6	78.3	3.80	785
05-Nov-18 14:17:56	0.073	0.000	0.073	20.6	77.3	3.75	785
05-Nov-18 14:19:16	0.001	0.000	0.001	20.0	74.9	3.75	785
05-Nov-18 14:27:46	0.077	0.000	0.077	20.8	78.1	3.75	785
05-Nov-18 14:30:11	0.024	0.000	0.024	20.8	78.1	3.74	785
05-Nov-18 14:32:31	0.001	0.000	0.001	19.9	74.5	3.75	785
05-Nov-18 14:32:36	0.076	0.000	0.076	20.5	76.9	3.75	785

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
05-Nov-18 14:33:51	0.002	0.000	0.002	20.1	75.5	3.75	785
05-Nov-18 14:50:56	0.073	0.000	0.073	20.8	78.0	3.75	785
05-Nov-18 14:52:01	0.003	0.000	0.003	20.5	76.9	3.75	785
05-Nov-18 15:10:21	0.075	0.000	0.075	20.8	78.0	3.75	785
05-Nov-18 15:11:41	0.001	0.000	0.001	19.8	74.3	3.75	785
05-Nov-18 15:17:41	0.073	0.000	0.073	20.5	76.8	3.75	785
05-Nov-18 15:18:51	0.001	0.000	0.001	19.7	74.0	3.75	785
05-Nov-18 15:21:16	0.074	0.000	0.074	20.4	76.5	3.75	785
05-Nov-18 15:22:31	0.001	0.000	0.001	20.0	75.2	3.75	785
05-Nov-18 15:29:51	0.076	0.000	0.076	20.8	78.0	3.75	785
05-Nov-18 15:31:01	0.001	0.000	0.001	20.8	78.0	3.75	785
05-Nov-18 16:20:01	0.000	0.001	0.001	20.5	76.7	3.74	785
06-Nov-18 16:56:46	0.001	0.000	0.001	20.7	77.4	3.75	785
06-Nov-18 23:50:41	0.000	0.001	0.001	19.6	73.5	3.75	785
07-Nov-18 00:49:11	0.001	0.000	0.001	20.8	78.0	3.75	785
07-Nov-18 07:43:16	0.000	0.001	0.001	20.4	76.4	3.75	785
07-Nov-18 08:41:36	0.001	0.000	0.001	20.5	76.8	3.75	785
07-Nov-18 15:35:46	0.000	0.001	0.001	19.8	74.1	3.74	785
07-Nov-18 16:34:21	0.001	0.000	0.001	19.5	73.4	3.76	785
08-Nov-18 07:20:06	0.000	0.001	0.001	20.3	76.0	3.75	785
08-Nov-18 08:19:01	0.001	0.000	0.001	20.4	76.4	3.75	785
08-Nov-18 15:12:51	0.000	0.001	0.001	20.1	75.5	3.75	785
08-Nov-18 16:11:16	0.001	0.000	0.001	19.9	75.0	3.77	785
25-Dec-18 12:31:26	0.086	0.000	0.086	20.3	76.0	3.75	786
25-Dec-18 12:32:41	0.001	0.000	0.001	21.2	79.0	3.73	786
25-Dec-18 12:36:21	0.085	0.000	0.085	20.3	75.3	3.71	786
25-Dec-18 12:37:31	0.001	0.000	0.001	20.3	75.3	3.71	786
25-Dec-18 12:38:51	0.091	0.000	0.091	21.4	80.0	3.75	786
25-Dec-18 13:19:01	0.080	0.000	0.080	20.8	77.8	3.75	786
25-Dec-18 14:11:26	0.001	0.000	0.001	20.2	75.7	3.75	786
25-Dec-18 14:12:36	0.077	0.000	0.077	20.2	75.7	3.75	786
25-Dec-18 14:34:36	0.001	0.000	0.001	21.1	79.0	3.74	786
25-Dec-18 14:35:46	0.076	0.000	0.076	20.2	75.8	3.75	786
25-Dec-18 14:47:56	0.001	0.000	0.001	21.0	78.8	3.75	786
25-Dec-18 14:49:11	0.062	0.000	0.062	20.3	76.1	3.75	786
25-Dec-18 14:50:16	0.078	0.000	0.078	20.3	76.1	3.75	786
25-Dec-18 14:50:21	0.001	0.000	0.001	20.3	76.1	3.75	786

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
25-Dec-18 14:51:41	0.082	0.000	0.082	20.3	76.1	3.75	786
25-Dec-18 15:02:36	0.001	0.000	0.001	21.1	78.9	3.74	786
25-Dec-18 15:05:01	0.081	0.000	0.081	21.3	79.9	3.75	786
25-Dec-18 15:11:06	0.001	0.000	0.001	20.5	77.1	3.75	786
25-Dec-18 15:12:26	0.083	0.000	0.083	21.3	79.9	3.75	786
25-Dec-18 15:14:46	0.001	0.000	0.001	20.6	77.3	3.75	786
25-Dec-18 15:16:01	0.075	0.000	0.075	20.6	77.3	3.75	786
25-Dec-18 15:29:26	0.000	0.001	0.001	19.9	74.7	3.75	786
25-Dec-18 15:33:06	0.001	0.000	0.001	20.2	75.7	3.75	786
25-Dec-18 15:34:16	0.080	0.000	0.080	21.0	78.6	3.75	786
25-Dec-18 15:53:46	0.001	0.000	0.001	20.3	75.9	3.75	786
25-Dec-18 15:55:01	0.079	0.000	0.079	20.7	77.4	3.75	786
25-Dec-18 16:09:41	0.001	0.000	0.001	20.2	75.7	3.74	786
25-Dec-18 16:10:51	0.081	0.000	0.081	21.1	78.8	3.74	786
25-Dec-18 16:13:16	0.001	0.000	0.001	20.3	75.9	3.75	786
25-Dec-18 16:14:36	0.080	0.000	0.080	21.4	80.0	3.75	786
25-Dec-18 16:26:46	0.001	0.000	0.001	20.6	77.0	3.74	786
25-Dec-18 16:27:56	0.076	0.000	0.076	20.6	77.0	3.74	786
25-Dec-18 16:30:26	0.001	0.000	0.001	20.7	77.0	3.71	786
25-Dec-18 16:32:56	0.076	0.000	0.076	20.7	77.0	3.71	786
25-Dec-18 16:35:21	0.001	0.000	0.001	20.3	76.2	3.75	786
25-Dec-18 16:36:31	0.081	0.000	0.081	21.3	79.9	3.75	786
25-Dec-18 16:40:06	0.001	0.000	0.001	20.2	75.8	3.75	786
25-Dec-18 16:42:31	0.081	0.000	0.081	20.9	78.2	3.75	786
25-Dec-18 16:47:31	0.001	0.000	0.001	20.2	75.9	3.75	786
25-Dec-18 16:48:36	0.074	0.000	0.074	20.2	75.9	3.75	786
25-Dec-18 16:52:16	0.001	0.000	0.001	21.0	78.9	3.75	786
25-Dec-18 16:53:31	0.077	0.000	0.077	20.4	76.3	3.75	786
25-Dec-18 16:57:11	0.001	0.000	0.001	21.0	78.6	3.75	786
25-Dec-18 16:58:21	0.079	0.000	0.079	21.0	78.6	3.75	786
25-Dec-18 17:09:16	0.001	0.000	0.001	20.6	77.3	3.75	786
25-Dec-18 17:11:46	0.079	0.000	0.079	21.3	79.7	3.75	786
25-Dec-18 17:21:26	0.001	0.000	0.001	20.3	76.1	3.75	786
25-Dec-18 17:22:46	0.076	0.000	0.076	20.3	76.1	3.75	786
25-Dec-18 17:25:06	0.001	0.000	0.001	20.2	75.8	3.75	786
25-Dec-18 17:26:26	0.077	0.000	0.077	20.7	77.5	3.75	786
25-Dec-18 17:29:56	0.001	0.000	0.001	20.4	76.4	3.75	786

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
25-Dec-18 17:32:26	0.082	0.000	0.082	21.4	80.1	3.75	786
25-Dec-18 17:51:56	0.001	0.000	0.001	21.1	79.2	3.75	786
25-Dec-18 17:53:11	0.079	0.000	0.079	21.1	79.2	3.75	786
25-Dec-18 18:22:21	0.001	0.000	0.001	20.5	76.9	3.75	786
25-Dec-18 18:23:31	0.080	0.000	0.080	20.5	76.9	3.75	786
25-Dec-18 19:44:06	0.091	0.000	0.091	21.5	80.4	3.74	786
25-Dec-18 20:14:26	0.035	0.000	0.035	20.1	75.1	3.74	786
25-Dec-18 20:15:36	0.001	0.000	0.001	20.1	75.1	3.74	786
25-Dec-18 20:15:41	0.088	0.000	0.088	21.0	78.7	3.75	786
25-Dec-18 20:18:06	0.001	0.000	0.001	20.9	78.2	3.75	786
25-Dec-18 20:20:36	0.087	0.000	0.087	20.4	76.4	3.75	786
25-Dec-18 20:21:41	0.001	0.000	0.001	20.4	76.4	3.75	786
25-Dec-18 20:24:11	0.043	0.000	0.043	20.2	76.0	3.75	786
25-Dec-18 20:24:16	0.085	0.000	0.085	20.2	76.0	3.75	786
25-Dec-18 20:25:21	0.001	0.000	0.001	20.2	76.0	3.75	786
25-Dec-18 23:21:51	0.000	0.001	0.001	20.9	78.3	3.75	786
26-Dec-18 04:17:36	0.001	0.000	0.001	20.3	76.1	3.75	786
26-Dec-18 07:14:26	0.000	0.001	0.001	20.1	75.5	3.75	786
26-Dec-18 08:31:31	0.091	0.000	0.091	21.3	79.7	3.75	786
26-Dec-18 08:32:51	0.001	0.000	0.001	21.3	79.7	3.75	786
26-Dec-18 08:38:56	0.092	0.000	0.092	21.1	78.9	3.75	786
26-Dec-18 08:40:01	0.011	0.000	0.011	21.1	78.9	3.75	786
26-Dec-18 09:10:11	0.001	0.000	0.001	20.1	75.4	3.75	786
26-Dec-18 12:56:01	0.088	0.000	0.088	20.7	77.6	3.75	786
26-Dec-18 14:26:26	0.077	0.000	0.077	20.0	75.0	3.75	786
26-Dec-18 14:38:26	0.001	0.000	0.001	19.9	74.7	3.75	786
26-Dec-18 14:39:41	0.084	0.000	0.084	20.9	78.4	3.74	786
26-Dec-18 14:49:21	0.001	0.000	0.001	20.1	75.4	3.75	786
26-Dec-18 14:51:46	0.083	0.000	0.083	21.0	78.7	3.75	786
26-Dec-18 14:55:21	0.004	0.000	0.004	20.9	78.4	3.75	786
26-Dec-18 14:56:41	0.077	0.000	0.077	19.9	74.5	3.75	786
26-Dec-18 15:05:11	0.001	0.000	0.001	20.3	76.3	3.75	786
26-Dec-18 15:06:21	0.077	0.000	0.077	20.3	76.3	3.75	786
26-Dec-18 15:06:46	0.000	0.001	0.001	20.7	77.5	3.74	786
26-Dec-18 15:07:41	0.001	0.000	0.001	20.7	77.4	3.73	786
26-Dec-18 15:08:51	0.075	0.000	0.075	19.9	74.6	3.75	786
26-Dec-18 15:10:01	0.001	0.000	0.001	20.4	76.4	3.75	786

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
26-Dec-18 15:11:21	0.082	0.000	0.082	21.0	78.4	3.74	786
26-Dec-18 15:22:16	0.001	0.000	0.001	20.0	74.9	3.75	786
26-Dec-18 15:24:41	0.079	0.000	0.079	20.3	76.0	3.75	786
26-Dec-18 15:39:16	0.001	0.000	0.001	20.5	77.0	3.75	786
26-Dec-18 15:40:36	0.081	0.000	0.081	20.5	77.0	3.75	786
26-Dec-18 15:45:21	0.001	0.000	0.001	21.0	78.8	3.75	786
26-Dec-18 15:46:41	0.080	0.000	0.080	20.7	77.6	3.74	786
26-Dec-18 15:47:51	0.001	0.000	0.001	20.7	77.6	3.74	786
26-Dec-18 15:49:06	0.081	0.000	0.081	20.7	77.6	3.74	786
26-Dec-18 15:50:16	0.001	0.000	0.001	20.7	77.6	3.74	786
26-Dec-18 15:51:26	0.079	0.000	0.079	21.0	78.8	3.75	786
26-Dec-18 15:53:51	0.001	0.000	0.001	19.9	74.5	3.75	786
26-Dec-18 15:56:21	0.076	0.000	0.076	19.9	74.5	3.75	786
26-Dec-18 15:57:36	0.001	0.000	0.001	19.9	74.5	3.75	786
26-Dec-18 15:58:51	0.076	0.000	0.076	19.9	74.5	3.75	786
26-Dec-18 16:01:16	0.001	0.000	0.001	20.3	76.1	3.74	786
26-Dec-18 16:02:26	0.078	0.000	0.078	20.3	76.1	3.74	786
26-Dec-18 16:06:01	0.001	0.000	0.001	20.6	77.2	3.75	786
26-Dec-18 16:08:31	0.077	0.000	0.077	19.9	75.6	3.79	786
26-Dec-18 16:11:01	0.001	0.000	0.001	20.3	76.2	3.74	786
26-Dec-18 16:13:26	0.078	0.000	0.078	20.8	78.0	3.75	786
26-Dec-18 16:19:31	0.001	0.000	0.001	21.0	78.6	3.74	786
26-Dec-18 16:21:56	0.079	0.000	0.079	19.9	74.6	3.75	786
26-Dec-18 16:23:06	0.001	0.000	0.001	21.1	78.8	3.74	786
26-Dec-18 16:24:26	0.081	0.000	0.081	21.0	78.8	3.75	786
26-Dec-18 16:29:11	0.001	0.000	0.001	21.0	78.5	3.74	786
26-Dec-18 16:31:46	0.080	0.000	0.080	20.9	78.2	3.74	786
26-Dec-18 16:34:11	0.001	0.000	0.001	19.9	74.7	3.75	786
26-Dec-18 16:35:16	0.080	0.000	0.080	21.0	78.6	3.75	786
26-Dec-18 16:52:26	0.001	0.000	0.001	20.4	75.6	3.71	786
26-Dec-18 16:53:31	0.075	0.000	0.075	20.0	75.6	3.78	786
26-Dec-18 16:59:46	0.001	0.000	0.001	19.9	74.6	3.75	786
26-Dec-18 17:00:51	0.080	0.000	0.080	21.0	78.5	3.74	786
26-Dec-18 17:10:36	0.001	0.000	0.001	20.4	76.3	3.75	786
26-Dec-18 17:13:06	0.080	0.000	0.080	20.6	77.1	3.75	786
26-Dec-18 17:15:36	0.001	0.000	0.001	20.1	78.4	3.90	786
26-Dec-18 17:16:41	0.077	0.000	0.077	20.7	77.6	3.75	786

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
26-Dec-18 17:18:01	0.001	0.000	0.001	20.7	77.6	3.75	786
26-Dec-18 17:19:11	0.076	0.000	0.076	20.1	75.4	3.75	786
26-Dec-18 17:30:11	0.001	0.000	0.001	20.4	76.4	3.75	786
26-Dec-18 17:31:21	0.079	0.000	0.079	20.4	76.4	3.75	786
26-Dec-18 17:32:36	0.001	0.000	0.001	20.8	78.0	3.75	786
26-Dec-18 17:33:51	0.082	0.000	0.082	20.8	78.0	3.75	786
26-Dec-18 17:55:46	0.001	0.000	0.001	20.4	76.3	3.75	786
26-Dec-18 17:57:01	0.082	0.000	0.082	20.8	78.1	3.76	786
26-Dec-18 19:50:16	0.001	0.000	0.001	21.0	78.7	3.74	786
26-Dec-18 19:51:26	0.092	0.000	0.092	21.3	80.0	3.75	786
26-Dec-18 19:55:06	0.001	0.000	0.001	20.5	77.9	3.80	786
26-Dec-18 19:56:16	0.089	0.000	0.089	21.0	77.9	3.70	786
26-Dec-18 19:58:46	0.001	0.000	0.001	20.0	74.9	3.75	786
26-Dec-18 20:10:51	0.093	0.000	0.093	20.8	78.1	3.75	786
26-Dec-18 20:21:51	0.001	0.000	0.001	21.1	79.0	3.75	786
26-Dec-18 22:59:16	0.000	0.001	0.001	19.9	74.7	3.75	786
27-Dec-18 04:14:16	0.001	0.000	0.001	21.3	79.8	3.74	786
27-Dec-18 06:51:31	0.000	0.001	0.001	20.0	75.2	3.75	786
27-Dec-18 09:17:06	0.093	0.000	0.093	21.5	80.5	3.75	786
27-Dec-18 09:18:11	0.001	0.000	0.001	21.5	80.5	3.75	786
27-Dec-18 09:32:56	0.092	0.000	0.092	21.4	80.3	3.75	786
27-Dec-18 09:34:06	0.001	0.000	0.001	20.3	76.0	3.75	786
27-Dec-18 09:36:31	0.088	0.000	0.088	20.8	77.9	3.75	786
27-Dec-18 09:39:01	0.001	0.000	0.001	20.5	76.7	3.75	786
27-Dec-18 09:41:31	0.088	0.000	0.088	20.4	76.7	3.75	786
27-Dec-18 09:43:56	0.001	0.000	0.001	20.2	75.6	3.75	786
27-Dec-18 09:48:46	0.011	0.000	0.011	21.3	80.5	3.78	786
27-Dec-18 09:48:51	0.092	0.000	0.092	21.3	80.5	3.78	786
27-Dec-18 09:53:41	0.001	0.000	0.001	20.4	76.3	3.74	786
27-Dec-18 09:54:56	0.087	0.000	0.087	20.4	76.3	3.74	786
27-Dec-18 09:56:06	0.001	0.000	0.001	21.2	79.4	3.75	786
27-Dec-18 09:57:21	0.093	0.000	0.093	21.5	79.4	3.70	786
27-Dec-18 11:17:46	0.082	0.000	0.082	21.0	78.5	3.74	786
27-Dec-18 12:39:21	0.001	0.000	0.001	20.5	76.9	3.75	786
27-Dec-18 12:40:36	0.083	0.000	0.083	21.4	80.3	3.75	786
27-Dec-18 12:49:01	0.001	0.000	0.001	21.0	78.7	3.74	786
27-Dec-18 12:50:21	0.083	0.000	0.083	21.0	78.7	3.74	786

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
27-Dec-18 12:55:11	0.001	0.000	0.001	21.2	79.9	3.77	786
27-Dec-18 12:56:26	0.083	0.000	0.083	21.5	79.9	3.73	786
27-Dec-18 12:57:31	0.001	0.000	0.001	20.9	78.2	3.75	786
27-Dec-18 12:58:51	0.077	0.000	0.077	20.2	75.9	3.75	786
27-Dec-18 13:01:16	0.001	0.000	0.001	20.2	75.8	3.75	786
27-Dec-18 13:02:31	0.081	0.000	0.081	21.4	80.1	3.75	786
27-Dec-18 13:03:36	0.001	0.000	0.001	21.0	78.9	3.75	786
27-Dec-18 13:07:21	0.081	0.000	0.081	21.3	79.0	3.70	786
27-Dec-18 13:08:36	0.001	0.000	0.001	20.5	76.9	3.75	786
27-Dec-18 13:13:26	0.080	0.000	0.080	21.2	79.5	3.74	786
27-Dec-18 13:14:41	0.001	0.000	0.001	20.2	75.7	3.74	786
27-Dec-18 13:15:56	0.081	0.000	0.081	21.4	80.3	3.75	786
27-Dec-18 13:17:06	0.011	0.000	0.011	21.4	80.3	3.75	786
27-Dec-18 13:19:31	0.001	0.000	0.001	20.9	78.2	3.75	786
27-Dec-18 13:19:36	0.078	0.000	0.078	20.9	78.2	3.75	786
27-Dec-18 13:20:46	0.001	0.000	0.001	20.3	76.1	3.75	786
27-Dec-18 13:26:51	0.075	0.000	0.075	20.4	76.3	3.75	786
27-Dec-18 13:28:06	0.001	0.000	0.001	20.4	76.3	3.75	786
27-Dec-18 14:43:36	0.000	0.001	0.001	20.1	75.2	3.74	786
28-Dec-18 22:13:56	0.000	0.001	0.001	20.7	77.4	3.74	786
28-Dec-18 22:45:36	0.001	0.000	0.001	20.0	75.1	3.75	786
29-Dec-18 06:06:26	0.000	0.001	0.001	20.7	77.4	3.73	786
29-Dec-18 06:38:31	0.001	0.000	0.001	20.0	75.1	3.75	786
30-Dec-18 13:36:56	0.000	0.001	0.001	19.7	73.7	3.73	786
30-Dec-18 14:08:11	0.001	0.000	0.001	20.9	77.8	3.72	786
30-Dec-18 21:29:06	0.000	0.001	0.001	20.8	78.1	3.75	786
30-Dec-18 22:00:46	0.001	0.000	0.001	21.0	78.7	3.74	786
10-Mar-19 03:29:43	0.001	0.000	0.001	20.4	76.8	3.76	787
10-Mar-19 10:36:28	0.000	0.001	0.001	20.4	76.4	3.75	787
10-Mar-19 11:22:03	0.001	0.000	0.001	20.0	74.8	3.75	787
10-Mar-19 11:42:48	0.088	0.000	0.088	20.4	76.5	3.76	787
10-Mar-19 12:53:03	0.078	0.000	0.078	19.7	74.0	3.75	787
10-Mar-19 13:32:28	0.003	0.000	0.003	19.6	73.7	3.76	787
10-Mar-19 13:33:38	0.072	0.000	0.072	19.6	73.7	3.76	787
10-Mar-19 13:34:58	0.003	0.000	0.003	19.6	73.7	3.76	787
10-Mar-19 13:43:28	0.073	0.000	0.073	19.6	73.6	3.75	787
10-Mar-19 13:44:38	0.002	0.000	0.002	19.6	73.6	3.75	787

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
10-Mar-19 18:29:08	0.000	0.001	0.001	20.4	76.5	3.74	787
10-Mar-19 21:30:18	0.002	0.000	0.002	19.8	74.4	3.75	787
10-Mar-19 23:38:08	0.087	0.000	0.087	20.4	76.3	3.75	787
10-Mar-19 23:58:43	0.002	0.000	0.002	20.1	75.3	3.75	787
10-Mar-19 23:59:58	0.082	0.000	0.082	19.5	73.2	3.75	787
11-Mar-19 00:09:48	0.001	0.000	0.001	19.8	74.2	3.75	787
11-Mar-19 02:21:38	0.000	0.004	0.004	20.2	75.7	3.75	787
11-Mar-19 08:02:28	0.003	0.000	0.003	19.3	72.5	3.76	787
30-Mar-19 03:02:23	0.001	0.000	0.001	20.5	77.2	3.76	788
30-Mar-19 03:32:38	0.000	0.001	0.001	20.3	76.2	3.75	788
30-Mar-19 04:11:23	0.076	0.000	0.076	20.7	77.7	3.75	788
30-Mar-19 04:13:48	0.089	0.000	0.089	20.7	77.7	3.75	788
30-Mar-19 04:13:53	0.001	0.000	0.001	20.0	75.2	3.76	788
30-Mar-19 05:09:57	0.091	0.000	0.091	20.7	77.6	3.75	788
30-Mar-19 05:13:43	0.001	0.000	0.001	20.7	77.6	3.75	788
30-Mar-19 05:14:58	0.084	0.000	0.084	20.4	76.5	3.75	788
30-Mar-19 05:17:23	0.001	0.000	0.001	19.5	73.1	3.75	788
30-Mar-19 05:18:33	0.084	0.000	0.084	20.6	77.2	3.75	788
30-Mar-19 05:19:48	0.009	0.000	0.009	19.9	74.7	3.75	788
30-Mar-19 05:24:38	0.082	0.000	0.082	20.5	76.9	3.75	788
30-Mar-19 05:25:53	0.001	0.000	0.001	20.1	75.2	3.75	788
30-Mar-19 05:28:13	0.078	0.000	0.078	20.4	76.5	3.75	788
30-Mar-19 05:29:33	0.001	0.000	0.001	19.8	74.4	3.75	788
30-Mar-19 10:17:08	0.085	0.000	0.085	19.6	73.5	3.74	788
30-Mar-19 10:18:13	0.001	0.000	0.001	19.2	72.1	3.74	788
30-Mar-19 10:19:33	0.088	0.000	0.088	20.1	75.3	3.74	788
30-Mar-19 10:43:53	0.002	0.000	0.002	20.2	75.5	3.74	788
30-Mar-19 10:45:13	0.084	0.000	0.084	20.2	75.5	3.74	788
30-Mar-19 10:49:58	0.002	0.000	0.002	19.4	72.0	3.70	788
30-Mar-19 10:51:18	0.078	0.000	0.078	19.4	72.0	3.70	788
30-Mar-19 10:52:33	0.002	0.000	0.002	20.3	76.1	3.74	788
30-Mar-19 10:54:58	0.078	0.000	0.078	19.5	73.0	3.74	788
30-Mar-19 10:59:43	0.002	0.000	0.002	19.9	74.5	3.74	788
30-Mar-19 11:01:03	0.074	0.000	0.074	19.3	72.1	3.74	788
30-Mar-19 11:02:13	0.002	0.000	0.002	19.5	72.1	3.69	788
30-Mar-19 11:03:28	0.078	0.000	0.078	19.5	73.5	3.76	788
30-Mar-19 11:04:38	0.002	0.000	0.002	19.5	73.5	3.76	788

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
30-Mar-19 11:05:53	0.076	0.000	0.076	19.5	73.5	3.76	788
30-Mar-19 11:09:33	0.002	0.000	0.002	20.1	75.3	3.74	788
30-Mar-19 11:10:43	0.077	0.000	0.077	20.1	75.3	3.74	788
30-Mar-19 11:16:48	0.002	0.000	0.002	19.9	74.4	3.74	788
30-Mar-19 11:18:08	0.075	0.000	0.075	19.2	74.3	3.86	788
30-Mar-19 11:24:13	0.002	0.000	0.002	19.8	74.0	3.74	788
30-Mar-19 11:25:08	0.000	0.001	0.001	19.7	73.4	3.73	788
30-Mar-19 11:31:23	0.076	0.000	0.076	20.1	74.1	3.69	788
30-Mar-19 11:32:43	0.002	0.000	0.002	19.2	72.0	3.75	788
31-Mar-19 03:09:43	0.000	0.001	0.001	20.2	75.9	3.75	788
31-Mar-19 04:15:48	0.002	0.000	0.002	20.7	77.8	3.76	788
31-Mar-19 11:01:58	0.000	0.003	0.003	20.0	74.9	3.75	788
31-Mar-19 12:07:58	0.002	0.000	0.002	20.3	76.1	3.75	788
31-Mar-19 18:54:43	0.000	0.003	0.003	20.0	75.2	3.75	788
31-Mar-19 20:00:13	0.003	0.000	0.003	20.8	78.1	3.76	788
20-Apr-19 03:38:23	0.000	0.001	0.001	20.8	78.1	3.75	789
20-Apr-19 04:10:43	0.001	0.000	0.001	19.8	74.3	3.75	789
20-Apr-19 11:30:43	0.000	0.002	0.002	20.5	77.0	3.75	789
20-Apr-19 12:03:23	0.002	0.000	0.002	20.8	78.1	3.76	789
20-Apr-19 19:23:08	0.000	0.003	0.003	20.5	76.7	3.75	789
20-Apr-19 19:55:58	0.002	0.000	0.002	20.5	77.1	3.76	789
21-Apr-19 03:15:38	0.000	0.001	0.001	20.7	77.7	3.76	789
21-Apr-19 03:48:33	0.002	0.000	0.002	20.8	77.9	3.75	789
21-Apr-19 11:08:08	0.000	0.001	0.001	20.6	77.1	3.75	789
21-Apr-19 11:40:53	0.001	0.000	0.001	20.3	76.0	3.75	789
21-Apr-19 19:00:38	0.000	0.001	0.001	20.0	74.9	3.75	789
21-Apr-19 19:33:18	0.001	0.000	0.001	20.5	77.1	3.75	789
22-Apr-19 02:53:13	0.000	0.001	0.001	20.6	77.3	3.75	789
22-Apr-19 03:25:28	0.001	0.000	0.001	19.9	74.9	3.76	789
23-Apr-19 10:23:08	0.000	0.001	0.001	19.9	74.6	3.76	789
23-Apr-19 12:30:08	0.001	0.000	0.001	20.0	75.1	3.76	789
23-Apr-19 18:15:33	0.000	0.001	0.001	20.3	76.2	3.75	789
23-Apr-19 20:22:33	0.001	0.000	0.001	19.4	73.2	3.77	789
14-May-19 01:36:33	0.001	0.000	0.001	20.4	76.4	3.75	789
14-May-19 02:46:33	0.001	0.000	0.001	20.8	77.8	3.75	789
14-May-19 02:48:58	0.077	0.000	0.077	20.5	76.8	3.75	789
14-May-19 02:50:18	0.001	0.000	0.001	20.5	76.8	3.75	789

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
14-May-19 02:51:28	0.076	0.000	0.076	20.8	78.2	3.75	789
14-May-19 02:52:38	0.001	0.000	0.001	20.0	75.1	3.75	789
14-May-19 02:58:43	0.077	0.000	0.077	20.8	77.7	3.75	789
14-May-19 03:14:33	0.001	0.000	0.001	20.1	75.4	3.75	789
14-May-19 03:16:58	0.080	0.000	0.080	21.1	79.1	3.75	789
14-May-19 03:21:48	0.001	0.000	0.001	20.3	76.3	3.75	789
14-May-19 03:23:08	0.079	0.000	0.079	20.9	78.5	3.75	789
14-May-19 03:25:28	0.001	0.000	0.001	20.7	77.6	3.75	789
14-May-19 03:26:43	0.075	0.000	0.075	20.2	75.6	3.75	789
14-May-19 03:30:18	0.001	0.000	0.001	20.6	77.5	3.75	789
14-May-19 03:31:33	0.077	0.000	0.077	20.2	75.9	3.75	789
14-May-19 03:32:48	0.001	0.000	0.001	21.1	79.0	3.75	789
14-May-19 03:33:58	0.078	0.000	0.078	20.2	75.9	3.75	789
14-May-19 04:15:28	0.001	0.000	0.001	20.4	76.6	3.75	789
14-May-19 04:17:48	0.082	0.000	0.082	21.4	80.0	3.75	789
14-May-19 04:40:58	0.001	0.000	0.001	21.4	80.1	3.75	789
14-May-19 04:42:18	0.084	0.000	0.084	21.4	80.1	3.75	789
14-May-19 05:12:43	0.001	0.000	0.001	21.0	78.9	3.75	789
14-May-19 05:13:53	0.081	0.000	0.081	20.5	77.0	3.75	789
14-May-19 08:08:13	0.001	0.000	0.001	20.3	76.3	3.75	789
14-May-19 08:09:28	0.089	0.000	0.089	21.0	78.9	3.75	789
14-May-19 08:10:43	0.001	0.000	0.001	20.6	77.3	3.76	789
14-May-19 08:11:48	0.089	0.000	0.089	20.9	78.3	3.75	789
14-May-19 08:28:08	0.000	0.001	0.001	20.6	77.1	3.75	789
14-May-19 11:32:43	0.077	0.000	0.077	20.6	77.2	3.75	789
14-May-19 11:35:08	0.003	0.000	0.003	20.6	77.2	3.75	789
14-May-19 11:36:28	0.083	0.000	0.083	21.1	79.1	3.75	789
14-May-19 11:38:58	0.002	0.000	0.002	20.7	77.6	3.75	789
14-May-19 11:40:08	0.081	0.000	0.081	21.3	79.8	3.75	789
14-May-19 11:48:43	0.002	0.000	0.002	21.1	78.9	3.75	789
14-May-19 11:53:28	0.082	0.000	0.082	21.4	80.2	3.75	789
14-May-19 11:55:58	0.002	0.000	0.002	20.5	76.8	3.75	789
14-May-19 11:59:43	0.080	0.000	0.080	21.1	79.0	3.75	789
14-May-19 12:02:03	0.002	0.000	0.002	20.7	77.6	3.75	789
14-May-19 12:11:53	0.078	0.000	0.078	21.2	79.3	3.75	789
14-May-19 12:14:13	0.002	0.000	0.002	21.4	80.3	3.75	789
14-May-19 16:20:23	0.000	0.001	0.001	20.7	77.8	3.75	789

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
14-May-19 20:06:43	0.001	0.000	0.001	20.9	78.6	3.75	789
15-May-19 09:02:58	0.092	0.000	0.092	20.6	77.2	3.76	789
15-May-19 09:04:18	0.001	0.000	0.001	20.6	77.2	3.76	789
15-May-19 09:29:43	0.090	0.000	0.090	21.2	79.4	3.75	789
15-May-19 10:49:13	0.000	0.001	0.001	20.1	75.3	3.75	789
15-May-19 12:00:53	0.002	0.000	0.002	20.9	78.5	3.75	789
15-May-19 12:02:08	0.083	0.000	0.083	20.5	77.0	3.75	789
15-May-19 12:38:38	0.002	0.000	0.002	21.2	79.5	3.75	789
15-May-19 12:39:53	0.081	0.000	0.081	20.6	77.3	3.75	789
15-May-19 12:43:33	0.002	0.000	0.002	20.4	76.7	3.75	789
15-May-19 12:44:43	0.081	0.000	0.081	20.8	78.0	3.76	789
15-May-19 12:53:18	0.002	0.000	0.002	20.6	77.4	3.76	789
15-May-19 12:55:43	0.079	0.000	0.079	20.6	77.4	3.76	789
15-May-19 12:56:53	0.002	0.000	0.002	20.6	77.4	3.76	789
15-May-19 12:58:08	0.079	0.000	0.079	20.6	77.4	3.76	789
15-May-19 13:03:03	0.002	0.000	0.002	21.2	79.8	3.75	789
15-May-19 13:04:13	0.079	0.000	0.079	20.5	76.9	3.75	789
15-May-19 13:05:23	0.002	0.000	0.002	20.9	78.6	3.75	789
15-May-19 18:41:43	0.000	0.001	0.001	20.6	77.3	3.76	789
29-May-19 16:11:23	0.001	0.000	0.001	19.7	73.8	3.75	790
29-May-19 16:11:53	0.000	0.001	0.001	20.0	75.0	3.75	790
30-May-19 00:03:48	0.001	0.000	0.001	20.4	76.6	3.75	790
30-May-19 00:04:18	0.000	0.001	0.001	20.4	76.8	3.76	790
02-Jun-19 09:30:03	0.001	0.000	0.001	20.2	75.4	3.74	790
02-Jun-19 09:31:18	0.072	0.000	0.072	19.9	75.4	3.78	790
02-Jun-19 09:34:58	0.001	0.000	0.001	20.5	76.5	3.73	790
02-Jun-19 09:36:13	0.072	0.000	0.072	19.9	74.3	3.74	790
02-Jun-19 09:40:58	0.002	0.000	0.002	20.6	76.8	3.74	790
02-Jun-19 09:42:18	0.073	0.000	0.073	20.0	74.7	3.74	790
02-Jun-19 09:48:23	0.001	0.000	0.001	19.8	74.1	3.74	790
02-Jun-19 09:50:48	0.073	0.000	0.073	20.5	76.7	3.74	790
02-Jun-19 09:51:58	0.001	0.000	0.001	20.5	76.7	3.74	790
02-Jun-19 09:58:08	0.073	0.000	0.073	20.7	77.3	3.74	790
02-Jun-19 09:59:18	0.001	0.000	0.001	20.2	75.5	3.73	790
02-Jun-19 10:01:43	0.074	0.000	0.074	20.9	78.0	3.73	790
02-Jun-19 10:02:58	0.001	0.000	0.001	20.9	78.0	3.73	790
02-Jun-19 11:43:38	0.000	0.001	0.001	20.6	77.0	3.74	790

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
06-Jun-19 10:12:58	0.000	0.001	0.001	20.5	76.7	3.74	790
06-Jun-19 13:03:33	0.001	0.000	0.001	20.5	76.7	3.74	790
06-Jun-19 18:05:13	0.000	0.001	0.001	20.5	76.6	3.74	790
06-Jun-19 22:16:58	0.083	0.000	0.083	20.1	75.2	3.74	790
06-Jun-19 22:18:08	0.001	0.000	0.001	20.1	75.2	3.74	790
06-Jun-19 22:54:43	0.083	0.000	0.083	20.2	76.1	3.76	790
06-Jun-19 22:59:28	0.001	0.000	0.001	20.6	77.2	3.74	790
07-Jun-19 01:57:33	0.000	0.001	0.001	21.3	79.7	3.74	790
07-Jun-19 06:51:53	0.001	0.000	0.001	20.3	76.1	3.75	790
07-Jun-19 09:49:43	0.000	0.001	0.001	21.0	78.3	3.74	790
09-Jun-19 10:36:58	0.000	0.001	0.001	20.8	78.5	3.77	791
09-Jun-19 11:48:58	0.001	0.000	0.001	20.1	76.5	3.80	791
10-Jun-19 00:49:38	0.001	0.000	0.001	21.0	78.7	3.76	791
10-Jun-19 02:21:48	0.000	0.001	0.001	20.8	78.0	3.74	791
11-Jun-19 01:59:18	0.000	0.001	0.001	20.3	76.1	3.75	791
12-Jun-19 01:36:33	0.000	0.001	0.001	20.1	75.0	3.73	791
12-Jun-19 07:34:18	0.001	0.000	0.001	20.0	75.4	3.77	791
12-Jun-19 09:29:33	0.000	0.001	0.001	20.6	77.4	3.75	791
12-Jun-19 23:18:33	0.001	0.000	0.001	21.0	79.3	3.77	791
13-Jun-19 01:14:18	0.000	0.001	0.001	20.6	76.9	3.74	791
13-Jun-19 07:10:48	0.001	0.000	0.001	20.4	76.9	3.76	791
13-Jun-19 09:06:28	0.000	0.001	0.001	20.7	77.5	3.75	791
14-Jun-19 00:52:23	0.000	0.001	0.001	20.1	75.3	3.75	791
18-Jun-19 15:31:23	0.079	0.000	0.079	20.5	76.6	3.74	791
18-Jun-19 15:33:53	0.001	0.000	0.001	20.0	75.0	3.74	791
18-Jun-19 15:36:18	0.064	0.000	0.064	20.0	75.0	3.74	791
18-Jun-19 15:37:23	0.076	0.000	0.076	20.0	75.0	3.74	791
18-Jun-19 15:37:28	0.001	0.000	0.001	20.0	75.0	3.74	791
18-Jun-19 15:39:53	0.079	0.000	0.079	19.8	74.1	3.75	791
18-Jun-19 15:41:08	0.001	0.000	0.001	20.0	74.8	3.75	791
18-Jun-19 15:42:28	0.080	0.000	0.080	20.8	77.9	3.74	791
18-Jun-19 15:43:33	0.001	0.000	0.001	20.8	77.9	3.74	791
18-Jun-19 15:45:58	0.079	0.000	0.079	20.7	77.3	3.74	791
18-Jun-19 15:47:18	0.001	0.000	0.001	20.3	76.1	3.75	791
18-Jun-19 15:53:23	0.080	0.000	0.080	20.8	77.7	3.74	791
18-Jun-19 15:57:03	0.001	0.000	0.001	20.7	77.5	3.74	791
18-Jun-19 15:59:28	0.078	0.000	0.078	20.3	75.8	3.74	791

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
18-Jun-19 16:00:43	0.001	0.000	0.001	20.6	77.0	3.74	791
18-Jun-19 16:01:48	0.078	0.000	0.078	20.6	77.0	3.74	791
18-Jun-19 16:04:13	0.024	0.000	0.024	20.3	75.1	3.69	791
18-Jun-19 16:05:28	0.001	0.000	0.001	20.3	75.1	3.69	791
18-Jun-19 16:05:33	0.075	0.000	0.075	19.8	75.1	3.79	791
18-Jun-19 16:06:43	0.001	0.000	0.001	19.8	75.1	3.79	791
18-Jun-19 16:09:13	0.080	0.000	0.080	20.4	76.4	3.74	791
18-Jun-19 16:11:38	0.001	0.000	0.001	20.0	74.8	3.74	791
18-Jun-19 16:12:48	0.078	0.000	0.078	20.0	74.8	3.74	791
18-Jun-19 16:21:23	0.001	0.000	0.001	20.5	76.6	3.74	791
18-Jun-19 16:22:33	0.076	0.000	0.076	19.8	73.9	3.74	791
18-Jun-19 16:27:28	0.001	0.000	0.001	20.8	77.7	3.74	791
18-Jun-19 16:29:58	0.078	0.000	0.078	20.5	76.8	3.74	791
18-Jun-19 16:34:48	0.001	0.000	0.001	19.9	74.4	3.75	791
18-Jun-19 16:36:03	0.080	0.000	0.080	20.3	76.2	3.74	791
18-Jun-19 16:42:03	0.001	0.000	0.001	19.8	74.2	3.74	791
18-Jun-19 16:43:13	0.082	0.000	0.082	19.8	74.0	3.74	791
18-Jun-19 16:57:48	0.001	0.000	0.001	20.4	76.2	3.74	791
18-Jun-19 16:59:08	0.077	0.000	0.077	20.4	76.2	3.74	791
18-Jun-19 17:07:38	0.005	0.000	0.005	19.9	74.4	3.75	791
18-Jun-19 17:08:48	0.081	0.000	0.081	20.5	76.6	3.75	791
18-Jun-19 17:16:13	0.001	0.000	0.001	20.1	75.5	3.75	791
18-Jun-19 17:17:23	0.079	0.000	0.079	19.8	74.2	3.75	791
18-Jun-19 17:36:53	0.001	0.000	0.001	20.6	77.1	3.74	791
18-Jun-19 17:38:08	0.079	0.000	0.079	19.9	74.7	3.74	791
18-Jun-19 18:03:43	0.001	0.000	0.001	20.3	76.2	3.75	791
18-Jun-19 18:04:53	0.080	0.000	0.080	20.3	76.2	3.75	791
18-Jun-19 18:08:23	0.001	0.000	0.001	20.2	75.8	3.75	791
18-Jun-19 18:09:43	0.083	0.000	0.083	20.5	76.9	3.74	791
18-Jun-19 18:23:08	0.001	0.000	0.001	20.3	76.2	3.74	791
18-Jun-19 18:24:23	0.081	0.000	0.081	20.8	77.7	3.74	791
18-Jun-19 18:32:58	0.001	0.000	0.001	19.9	74.6	3.75	791
18-Jun-19 18:34:13	0.081	0.000	0.081	20.7	77.6	3.75	791
18-Jun-19 18:41:23	0.002	0.000	0.002	19.8	74.2	3.75	791
18-Jun-19 18:42:43	0.080	0.000	0.080	20.3	75.9	3.74	791
18-Jun-19 18:43:53	0.001	0.000	0.001	20.3	75.9	3.74	791
18-Jun-19 18:46:18	0.075	0.000	0.075	20.5	75.9	3.70	791

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
18-Jun-19 18:53:43	0.001	0.000	0.001	19.8	74.3	3.75	791
18-Jun-19 18:56:08	0.080	0.000	0.080	20.7	77.6	3.74	791
18-Jun-19 19:04:38	0.001	0.000	0.001	20.1	75.2	3.75	791
18-Jun-19 19:05:53	0.080	0.000	0.080	20.7	77.6	3.74	791
18-Jun-19 19:12:03	0.001	0.000	0.001	20.4	76.4	3.74	791
18-Jun-19 19:13:08	0.076	0.000	0.076	20.0	75.1	3.75	791
18-Jun-19 19:14:28	0.001	0.000	0.001	20.0	75.1	3.75	791
18-Jun-19 19:16:48	0.079	0.000	0.079	20.6	77.3	3.74	791
18-Jun-19 19:18:08	0.001	0.000	0.001	20.6	77.3	3.74	791
18-Jun-19 19:19:18	0.081	0.000	0.081	20.6	77.3	3.74	791
18-Jun-19 19:22:53	0.001	0.000	0.001	20.2	75.6	3.74	791
18-Jun-19 19:25:23	0.079	0.000	0.079	20.6	77.2	3.74	791
18-Jun-19 19:26:38	0.008	0.000	0.008	19.8	74.3	3.75	791
18-Jun-19 19:30:18	0.077	0.000	0.077	20.2	75.6	3.74	791
18-Jun-19 19:32:43	0.008	0.000	0.008	19.9	74.5	3.75	791
18-Jun-19 19:33:53	0.076	0.000	0.076	19.9	74.5	3.75	791
18-Jun-19 19:37:33	0.001	0.000	0.001	19.8	74.3	3.74	791
18-Jun-19 19:41:18	0.080	0.000	0.080	20.6	77.2	3.75	791
18-Jun-19 19:42:28	0.001	0.000	0.001	20.6	77.2	3.75	791
18-Jun-19 19:46:03	0.074	0.000	0.074	20.5	76.7	3.75	791
18-Jun-19 19:49:43	0.001	0.000	0.001	20.5	76.7	3.75	791
18-Jun-19 19:51:03	0.079	0.000	0.079	20.5	76.7	3.75	791
18-Jun-19 19:52:13	0.001	0.000	0.001	20.1	75.4	3.75	791
18-Jun-19 19:54:38	0.078	0.000	0.078	20.7	77.5	3.74	791
18-Jun-19 19:57:08	0.001	0.000	0.001	20.4	76.4	3.74	791
18-Jun-19 19:58:18	0.077	0.000	0.077	20.4	76.4	3.74	791
18-Jun-19 19:59:38	0.001	0.000	0.001	20.7	77.6	3.75	791
18-Jun-19 20:02:03	0.075	0.000	0.075	20.1	75.3	3.75	791
18-Jun-19 20:03:13	0.001	0.000	0.001	20.1	75.3	3.75	791
18-Jun-19 20:08:23	0.000	0.001	0.001	20.5	76.9	3.75	791
18-Jun-19 20:10:23	0.078	0.000	0.078	20.1	76.4	3.80	791
18-Jun-19 20:11:43	0.001	0.000	0.001	20.1	76.4	3.80	791
18-Jun-19 20:12:53	0.080	0.000	0.080	20.7	77.4	3.74	791
18-Jun-19 20:14:08	0.001	0.000	0.001	20.7	77.4	3.74	791
18-Jun-19 20:18:58	0.073	0.000	0.073	19.9	74.5	3.74	791
18-Jun-19 20:20:18	0.001	0.000	0.001	20.6	77.2	3.74	791
19-Jun-19 01:31:58	0.079	0.000	0.079	20.5	76.8	3.75	791

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
19-Jun-19 01:33:13	0.001	0.000	0.001	19.6	73.5	3.75	791
19-Jun-19 01:34:28	0.078	0.000	0.078	20.5	76.9	3.74	791
19-Jun-19 01:35:38	0.001	0.000	0.001	19.7	73.7	3.75	791
19-Jun-19 01:39:18	0.079	0.000	0.079	20.4	76.3	3.75	791
19-Jun-19 01:41:43	0.001	0.000	0.001	20.4	77.0	3.77	791
19-Jun-19 01:42:58	0.076	0.000	0.076	20.6	77.0	3.74	791
19-Jun-19 01:44:08	0.001	0.000	0.001	20.6	77.0	3.74	791
19-Jun-19 01:45:23	0.081	0.000	0.081	20.6	77.0	3.74	791
19-Jun-19 01:46:33	0.001	0.000	0.001	20.3	75.9	3.74	791
19-Jun-19 01:47:48	0.050	0.000	0.050	19.7	73.9	3.74	791
19-Jun-19 01:47:53	0.078	0.000	0.078	19.7	73.9	3.74	791
19-Jun-19 01:55:03	0.001	0.000	0.001	19.8	74.0	3.74	791
19-Jun-19 01:56:23	0.085	0.000	0.085	20.6	77.3	3.74	791
19-Jun-19 02:14:38	0.001	0.000	0.001	20.4	76.6	3.75	791
19-Jun-19 02:15:48	0.087	0.000	0.087	20.4	76.6	3.75	791
19-Jun-19 02:18:18	0.001	0.000	0.001	19.5	73.2	3.75	791
22-Jun-19 06:53:23	0.000	0.001	0.001	20.4	76.4	3.75	791
22-Jun-19 22:37:58	0.000	0.001	0.001	20.4	76.8	3.76	791
22-Jun-19 23:22:13	0.001	0.000	0.001	19.7	73.9	3.75	791
25-Jun-19 21:35:23	0.000	0.001	0.001	20.4	76.4	3.74	791
25-Jun-19 21:42:43	0.075	0.000	0.075	20.2	75.8	3.74	791
25-Jun-19 21:43:58	0.001	0.000	0.001	20.7	77.7	3.74	791
25-Jun-19 21:45:13	0.075	0.000	0.075	20.5	76.6	3.74	791
25-Jun-19 21:54:53	0.001	0.000	0.001	20.1	75.2	3.74	791
25-Jun-19 21:56:13	0.075	0.000	0.075	20.1	75.2	3.74	791
25-Jun-19 22:56:18	0.087	0.000	0.087	21.0	78.8	3.75	791
25-Jun-19 23:05:33	0.001	0.000	0.001	21.0	78.5	3.74	791
25-Jun-19 23:06:53	0.090	0.000	0.090	21.0	78.5	3.74	791
25-Jun-19 23:10:33	0.001	0.000	0.001	20.7	77.3	3.73	791
26-Jun-19 03:49:23	0.086	0.000	0.086	20.8	78.0	3.74	791
26-Jun-19 03:59:08	0.001	0.000	0.001	19.9	74.7	3.76	791
26-Jun-19 04:00:18	0.083	0.000	0.083	20.2	74.7	3.71	791
26-Jun-19 05:27:53	0.000	0.001	0.001	20.1	75.4	3.75	791
26-Jun-19 06:17:48	0.001	0.000	0.001	20.5	76.7	3.75	791
26-Jun-19 10:43:43	0.090	0.000	0.090	21.1	79.0	3.75	791
26-Jun-19 10:44:58	0.001	0.000	0.001	20.4	76.4	3.75	791
26-Jun-19 10:48:33	0.089	0.000	0.089	20.9	78.0	3.73	791

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
26-Jun-19 10:49:48	0.001	0.000	0.001	20.9	78.0	3.73	791
26-Jun-19 10:57:08	0.084	0.000	0.084	20.3	75.8	3.74	791
26-Jun-19 11:01:58	0.015	0.000	0.015	20.4	76.2	3.74	791
26-Jun-19 11:03:08	0.001	0.000	0.001	20.4	76.2	3.74	791
26-Jun-19 11:03:13	0.086	0.000	0.086	20.4	76.2	3.74	791
26-Jun-19 11:04:28	0.001	0.000	0.001	20.0	74.9	3.75	791
26-Jun-19 11:32:28	0.092	0.000	0.092	20.5	76.9	3.74	791
26-Jun-19 11:33:43	0.001	0.000	0.001	20.1	75.4	3.75	791
04-Jul-19 13:36:38	0.080	0.000	0.080	21.3	79.7	3.75	792
04-Jul-19 13:37:58	0.001	0.000	0.001	21.3	79.7	3.75	792
04-Jul-19 13:40:23	0.082	0.000	0.082	21.2	79.5	3.75	792
04-Jul-19 13:41:28	0.001	0.000	0.001	20.4	76.3	3.75	792
04-Jul-19 13:44:03	0.078	0.000	0.078	20.4	76.3	3.75	792
04-Jul-19 13:45:08	0.001	0.000	0.001	20.4	76.3	3.75	792
04-Jul-19 13:46:28	0.084	0.000	0.084	21.3	79.7	3.75	792
04-Jul-19 13:52:33	0.001	0.000	0.001	20.9	78.3	3.75	792
04-Jul-19 19:15:18	0.000	0.003	0.003	21.3	79.6	3.74	792
04-Jul-19 21:45:18	0.003	0.000	0.003	21.3	79.5	3.74	792
05-Jul-19 01:26:43	0.081	0.000	0.081	21.3	79.8	3.75	792
05-Jul-19 01:27:48	0.004	0.000	0.004	21.3	79.8	3.75	792
05-Jul-19 01:41:18	0.078	0.000	0.078	20.9	78.3	3.74	792
05-Jul-19 01:42:28	0.004	0.000	0.004	21.3	79.7	3.75	792
05-Jul-19 03:08:13	0.000	0.003	0.003	21.2	79.5	3.75	792
05-Jul-19 08:13:38	0.081	0.000	0.081	21.3	79.6	3.74	792
05-Jul-19 08:14:58	0.004	0.000	0.004	21.0	78.5	3.75	792
05-Jul-19 08:28:23	0.079	0.000	0.079	20.8	77.8	3.75	792
05-Jul-19 08:33:13	0.004	0.000	0.004	20.4	76.5	3.75	792
05-Jul-19 08:36:53	0.080	0.000	0.080	21.3	79.8	3.75	792
05-Jul-19 08:40:28	0.004	0.000	0.004	20.7	77.5	3.74	792
05-Jul-19 08:46:33	0.084	0.000	0.084	21.1	79.2	3.75	792
05-Jul-19 08:47:53	0.004	0.000	0.004	21.1	79.2	3.75	792
05-Jul-19 08:57:38	0.078	0.000	0.078	20.6	77.3	3.75	792
05-Jul-19 08:58:48	0.004	0.000	0.004	20.6	77.3	3.75	792
05-Jul-19 09:27:58	0.079	0.000	0.079	21.3	80.0	3.75	792
05-Jul-19 09:29:18	0.004	0.000	0.004	21.3	80.0	3.75	792
05-Jul-19 11:01:03	0.000	0.002	0.002	20.8	78.2	3.75	792
05-Jul-19 17:21:48	0.002	0.000	0.002	20.7	77.5	3.75	792

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
05-Jul-19 18:53:38	0.000	0.003	0.003	20.4	76.6	3.75	792
06-Jul-19 09:06:33	0.002	0.000	0.002	20.2	75.7	3.75	792
06-Jul-19 10:38:28	0.000	0.001	0.001	20.1	75.4	3.75	792
09-Jul-19 03:41:18	0.001	0.000	0.001	19.8	74.1	3.74	792
09-Jul-19 10:17:58	0.000	0.001	0.001	20.1	75.1	3.74	792
09-Jul-19 11:34:13	0.002	0.000	0.002	19.8	74.1	3.75	792
11-Jul-19 19:26:08	0.001	0.000	0.001	19.5	73.3	3.75	792
11-Jul-19 19:28:38	0.085	0.000	0.085	20.5	76.9	3.75	792
11-Jul-19 19:29:53	0.001	0.000	0.001	20.2	75.8	3.74	792
11-Jul-19 19:33:33	0.081	0.000	0.081	19.8	74.1	3.74	792
11-Jul-19 19:34:43	0.001	0.000	0.001	19.8	74.1	3.74	792
11-Jul-19 19:40:48	0.082	0.000	0.082	19.8	74.3	3.75	792
11-Jul-19 19:42:03	0.001	0.000	0.001	19.5	73.0	3.75	792
12-Jul-19 15:56:33	0.074	0.000	0.074	20.3	76.0	3.75	792
12-Jul-19 15:57:48	0.002	0.000	0.002	20.3	76.0	3.75	792
12-Jul-19 16:11:13	0.079	0.000	0.079	20.8	77.8	3.75	792
12-Jul-19 16:16:03	0.003	0.000	0.003	20.2	75.8	3.75	792
12-Jul-19 16:18:28	0.080	0.000	0.080	20.7	77.8	3.75	792
12-Jul-19 16:20:53	0.003	0.000	0.003	19.9	74.6	3.75	792
12-Jul-19 16:22:08	0.079	0.000	0.079	20.5	76.8	3.74	792
12-Jul-19 16:25:48	0.003	0.000	0.003	19.9	74.5	3.75	792
12-Jul-19 16:28:13	0.076	0.000	0.076	19.9	74.5	3.75	792
12-Jul-19 16:29:28	0.003	0.000	0.003	19.9	74.5	3.75	792
12-Jul-19 16:30:38	0.079	0.000	0.079	20.7	77.7	3.75	792
12-Jul-19 16:31:53	0.003	0.000	0.003	20.2	75.7	3.75	792
12-Jul-19 16:34:18	0.078	0.000	0.078	20.5	76.9	3.75	792
12-Jul-19 16:36:43	0.003	0.000	0.003	20.2	75.6	3.75	792
12-Jul-19 16:39:08	0.077	0.000	0.077	20.5	75.6	3.70	792
12-Jul-19 16:42:48	0.003	0.000	0.003	19.9	74.6	3.75	792
12-Jul-19 16:46:28	0.076	0.000	0.076	20.6	77.1	3.75	792
12-Jul-19 16:47:43	0.003	0.000	0.003	20.3	77.1	3.80	792
12-Jul-19 17:03:28	0.000	0.001	0.001	20.1	75.6	3.75	792
12-Jul-19 21:39:48	0.078	0.000	0.078	20.7	77.6	3.75	792
12-Jul-19 21:41:03	0.003	0.000	0.003	19.9	74.7	3.75	792
12-Jul-19 21:44:43	0.081	0.000	0.081	20.9	78.2	3.75	792
12-Jul-19 21:45:53	0.003	0.000	0.003	20.9	78.2	3.75	792
12-Jul-19 21:48:23	0.075	0.000	0.075	20.0	74.9	3.75	792

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
12-Jul-19 22:08:23	0.086	0.000	0.086	20.9	78.3	3.75	792
12-Jul-19 22:12:43	0.001	0.000	0.001	20.0	75.0	3.75	792
12-Jul-19 22:14:03	0.083	0.000	0.083	20.0	75.0	3.75	792
12-Jul-19 22:15:08	0.001	0.000	0.001	20.0	75.0	3.75	792
13-Jul-19 00:55:48	0.000	0.002	0.002	21.2	79.4	3.75	792
13-Jul-19 06:07:43	0.004	0.000	0.004	21.0	78.6	3.75	792
13-Jul-19 08:48:13	0.000	0.001	0.001	21.0	78.9	3.75	792
13-Jul-19 14:00:28	0.002	0.000	0.002	20.7	77.7	3.75	792
13-Jul-19 16:40:28	0.000	0.002	0.002	21.3	79.7	3.75	792
16-Jul-19 20:12:03	0.000	0.001	0.001	19.5	73.2	3.76	793
16-Jul-19 20:34:33	0.082	0.000	0.082	20.1	75.0	3.74	793
16-Jul-19 20:35:53	0.001	0.000	0.001	19.7	73.9	3.74	793
16-Jul-19 20:37:03	0.079	0.000	0.079	19.7	73.9	3.74	793
16-Jul-19 21:03:48	0.006	0.000	0.006	20.1	75.4	3.74	793
16-Jul-19 21:06:18	0.076	0.000	0.076	21.0	78.5	3.74	793
16-Jul-19 21:07:33	0.006	0.000	0.006	20.0	75.0	3.74	793
16-Jul-19 21:08:43	0.075	0.000	0.075	21.0	78.6	3.74	793
16-Jul-19 21:25:48	0.008	0.000	0.008	20.2	75.5	3.74	793
16-Jul-19 21:26:58	0.073	0.000	0.073	21.0	78.5	3.74	793
16-Jul-19 21:28:13	0.008	0.000	0.008	20.3	76.1	3.74	793
16-Jul-19 22:02:23	0.000	0.011	0.011	20.2	75.7	3.74	793
17-Jul-19 20:55:53	0.018	0.000	0.018	20.8	77.9	3.75	793
19-Jul-19 08:10:38	0.019	0.000	0.019	20.7	77.8	3.75	793
19-Jul-19 08:20:38	0.000	0.024	0.024	20.5	76.8	3.75	793
19-Jul-19 09:11:03	0.007	0.000	0.007	20.4	76.7	3.75	793
19-Jul-19 09:11:03	0.000	0.003	0.003	20.1	75.4	3.76	793
19-Jul-19 09:18:08	0.076	0.000	0.076	20.3	76.2	3.76	793
19-Jul-19 09:19:18	0.020	0.000	0.020	20.3	76.2	3.76	793
19-Jul-19 09:20:38	0.082	0.000	0.082	21.2	79.5	3.75	793
19-Jul-19 09:21:03	0.000	0.019	0.019	19.8	74.5	3.76	793
19-Jul-19 09:21:43	0.030	0.000	0.030	20.8	78.0	3.76	793
19-Jul-19 09:24:13	0.080	0.000	0.080	20.9	78.3	3.76	793
19-Jul-19 09:38:48	0.022	0.000	0.022	20.3	76.1	3.75	793
19-Jul-19 09:39:58	0.078	0.000	0.078	20.3	76.1	3.75	793
19-Jul-19 09:43:38	0.021	0.000	0.021	20.3	76.1	3.75	793
19-Jul-19 09:44:53	0.079	0.000	0.079	20.6	77.4	3.75	793
19-Jul-19 09:46:03	0.022	0.000	0.022	20.6	77.4	3.75	793

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
19-Jul-19 09:47:23	0.079	0.000	0.079	20.6	77.4	3.75	793
19-Jul-19 09:49:48	0.022	0.000	0.022	20.3	76.4	3.76	793
19-Jul-19 09:52:08	0.083	0.000	0.083	21.2	79.6	3.75	793
19-Jul-19 09:58:13	0.022	0.000	0.022	20.5	77.1	3.76	793
19-Jul-19 10:00:38	0.080	0.000	0.080	20.2	76.0	3.75	793
19-Jul-19 10:04:18	0.022	0.000	0.022	20.7	77.6	3.75	793
19-Jul-19 10:05:33	0.083	0.000	0.083	21.2	79.4	3.75	793
19-Jul-19 10:21:23	0.000	0.004	0.004	20.0	75.1	3.76	793
19-Jul-19 10:27:23	0.015	0.000	0.015	20.3	76.7	3.77	793
19-Jul-19 10:29:48	0.082	0.000	0.082	20.3	76.2	3.76	793
19-Jul-19 10:31:28	0.000	0.022	0.022	19.8	74.4	3.76	793
19-Jul-19 10:32:18	0.029	0.000	0.029	20.3	76.3	3.76	793
19-Jul-19 10:39:33	0.078	0.000	0.078	21.0	76.8	3.65	793
19-Jul-19 10:40:53	0.009	0.000	0.009	20.6	77.4	3.76	793
19-Jul-19 10:41:33	0.000	0.004	0.004	20.6	77.4	3.76	793
19-Jul-19 10:42:03	0.083	0.000	0.083	21.2	79.6	3.76	793
19-Jul-19 10:44:28	0.010	0.000	0.010	20.9	78.5	3.75	793
19-Jul-19 10:45:43	0.085	0.000	0.085	21.3	80.0	3.76	793
19-Jul-19 10:48:08	0.017	0.000	0.017	21.3	79.8	3.75	793
19-Jul-19 10:49:28	0.082	0.000	0.082	20.9	78.4	3.76	793
19-Jul-19 10:51:33	0.000	0.020	0.020	20.7	76.8	3.71	793
19-Jul-19 10:54:13	0.026	0.000	0.026	20.3	76.4	3.75	793
19-Jul-19 10:55:33	0.084	0.000	0.084	21.3	79.9	3.75	793
19-Jul-19 10:57:58	0.023	0.000	0.023	20.4	76.5	3.75	793
19-Jul-19 10:59:08	0.082	0.000	0.082	21.0	78.7	3.75	793
19-Jul-19 11:00:18	0.021	0.000	0.021	20.3	76.3	3.75	793
19-Jul-19 11:01:38	0.077	0.000	0.077	20.3	76.3	3.75	793
19-Jul-19 11:06:23	0.018	0.000	0.018	20.4	76.5	3.76	793
19-Jul-19 11:07:43	0.077	0.000	0.077	20.4	76.5	3.76	793
19-Jul-19 11:11:18	0.007	0.000	0.007	20.8	78.0	3.75	793
19-Jul-19 11:11:38	0.000	0.003	0.003	20.3	76.2	3.76	793
19-Jul-19 11:12:38	0.076	0.000	0.076	20.3	76.1	3.76	793
19-Jul-19 11:14:58	0.013	0.000	0.013	21.3	79.8	3.75	793
19-Jul-19 11:16:13	0.081	0.000	0.081	21.3	79.8	3.75	793
19-Jul-19 11:17:23	0.017	0.000	0.017	20.6	77.3	3.76	793
19-Jul-19 11:18:43	0.078	0.000	0.078	20.3	76.3	3.76	793
19-Jul-19 11:21:43	0.000	0.017	0.017	19.8	74.5	3.77	793

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
19-Jul-19 11:22:23	0.023	0.000	0.023	20.5	76.9	3.76	793
19-Jul-19 11:31:58	0.082	0.000	0.082	21.3	79.8	3.75	793
19-Jul-19 11:33:13	0.020	0.000	0.020	20.5	76.8	3.75	793
19-Jul-19 11:38:03	0.075	0.000	0.075	20.5	76.9	3.76	793
19-Jul-19 11:39:23	0.021	0.000	0.021	21.2	79.6	3.75	793
19-Jul-19 11:43:03	0.076	0.000	0.076	20.4	76.3	3.75	793
19-Jul-19 11:44:13	0.019	0.000	0.019	20.4	76.3	3.75	793
19-Jul-19 11:50:18	0.082	0.000	0.082	21.2	79.5	3.75	793
19-Jul-19 11:51:38	0.021	0.000	0.021	21.2	79.5	3.75	793
19-Jul-19 14:32:23	0.020	0.000	0.020	20.3	76.0	3.75	793
19-Jul-19 14:32:23	0.000	0.015	0.015	20.0	75.1	3.75	793
19-Jul-19 21:50:58	0.082	0.000	0.082	20.6	77.2	3.76	793
19-Jul-19 21:52:13	0.028	0.000	0.028	20.3	76.2	3.75	793
19-Jul-19 21:57:03	0.083	0.000	0.083	21.3	79.7	3.75	793
19-Jul-19 21:58:18	0.029	0.000	0.029	21.3	79.7	3.75	793
19-Jul-19 21:59:33	0.074	0.000	0.074	20.8	78.0	3.75	793
19-Jul-19 22:00:43	0.027	0.000	0.027	20.3	76.0	3.75	793
19-Jul-19 22:02:03	0.080	0.000	0.080	21.0	78.9	3.75	793
19-Jul-19 22:03:08	0.029	0.000	0.029	21.3	78.9	3.70	793
19-Jul-19 22:04:28	0.080	0.000	0.080	20.3	76.4	3.75	793
19-Jul-19 22:05:38	0.028	0.000	0.028	20.3	76.4	3.75	793
19-Jul-19 22:08:08	0.080	0.000	0.080	20.9	78.3	3.75	793
19-Jul-19 22:10:33	0.029	0.000	0.029	20.7	77.8	3.75	793
19-Jul-19 22:12:53	0.079	0.000	0.079	20.4	76.6	3.75	793
19-Jul-19 22:14:13	0.029	0.000	0.029	20.7	77.8	3.75	793
19-Jul-19 22:15:18	0.082	0.000	0.082	21.1	79.3	3.75	793
24-Dec-19 12:56:26	0.001	0.000	0.001	20.5	77.1	3.76	793
24-Dec-19 12:57:36	0.084	0.000	0.084	20.5	77.1	3.76	793
24-Dec-19 12:58:51	0.001	0.000	0.001	20.5	77.1	3.76	793
24-Dec-19 13:00:06	0.082	0.000	0.082	20.1	76.6	3.82	793
24-Dec-19 13:02:31	0.001	0.000	0.001	20.2	78.7	3.90	793
24-Dec-19 13:04:56	0.083	0.000	0.083	20.2	76.0	3.76	793
24-Dec-19 13:09:46	0.001	0.000	0.001	21.0	78.9	3.76	793
24-Dec-19 13:11:01	0.084	0.000	0.084	20.5	75.8	3.69	793
24-Dec-19 13:19:31	0.001	0.000	0.001	20.6	75.4	3.66	793
24-Dec-19 13:20:46	0.082	0.000	0.082	20.6	77.6	3.76	793
24-Dec-19 13:24:26	0.001	0.000	0.001	20.8	77.2	3.71	793

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
24-Dec-19 13:26:51	0.083	0.000	0.083	20.0	75.3	3.76	793
24-Dec-19 13:30:26	0.003	0.000	0.003	19.8	74.5	3.76	793
24-Dec-19 13:32:56	0.083	0.000	0.083	19.7	74.0	3.76	793
24-Dec-19 13:37:46	0.001	0.000	0.001	20.4	76.6	3.76	793
24-Dec-19 13:39:01	0.081	0.000	0.081	20.4	76.6	3.76	793
24-Dec-19 13:40:16	0.001	0.000	0.001	19.7	74.0	3.76	793
24-Dec-19 13:41:25	0.079	0.000	0.079	19.7	74.0	3.76	793
24-Dec-19 13:43:50	0.052	0.000	0.052	19.9	74.8	3.76	793
24-Dec-19 13:43:55	0.001	0.000	0.001	20.1	75.4	3.76	793
24-Dec-19 13:46:20	0.079	0.000	0.079	20.6	77.2	3.76	793
24-Dec-19 13:47:35	0.001	0.000	0.001	20.0	75.1	3.76	793
24-Dec-19 13:50:00	0.082	0.000	0.082	20.2	76.5	3.79	793
24-Dec-19 13:52:25	0.001	0.000	0.001	20.3	76.4	3.76	793
24-Dec-19 13:53:35	0.081	0.000	0.081	20.4	76.9	3.76	Error
24-Dec-19 13:54:50	0.001	0.000	0.001	20.1	75.7	3.76	Error
24-Dec-19 14:03:20	0.082	0.000	0.082	19.7	74.0	3.76	793
24-Dec-19 14:04:35	0.001	0.000	0.001	20.4	76.6	3.76	Error
24-Dec-19 14:08:10	0.082	0.000	0.082	20.5	75.2	3.66	793
24-Dec-19 14:10:35	0.001	0.000	0.001	20.2	75.8	3.76	793
24-Dec-19 14:14:15	0.072	0.000	0.072	19.7	74.2	3.76	793
24-Dec-19 14:15:25	0.082	0.000	0.082	20.5	77.0	3.76	793
24-Dec-19 14:15:30	0.001	0.000	0.001	20.5	77.0	3.76	793
24-Dec-19 14:16:45	0.084	0.000	0.084	19.6	73.8	3.76	793
24-Dec-19 14:25:15	0.001	0.000	0.001	19.7	74.0	3.76	793
24-Dec-19 14:31:20	0.085	0.000	0.085	19.5	73.6	3.77	793
24-Dec-19 14:35:00	0.001	0.000	0.001	20.4	74.3	3.64	793
24-Dec-19 14:37:25	0.083	0.000	0.083	20.0	74.9	3.75	793
24-Dec-19 14:53:15	0.002	0.000	0.002	20.4	76.5	3.76	793
24-Dec-19 14:54:30	0.087	0.000	0.087	19.7	74.4	3.77	793
24-Dec-19 15:05:30	0.001	0.000	0.001	20.6	77.5	3.76	793
24-Dec-19 15:06:40	0.086	0.000	0.086	19.8	74.3	3.76	793
24-Dec-19 15:26:10	0.001	0.000	0.001	20.1	75.5	3.76	793
24-Dec-19 15:27:25	0.083	0.000	0.083	20.1	75.5	3.76	793
24-Dec-19 15:28:35	0.045	0.000	0.045	20.1	75.5	3.76	793
24-Dec-19 15:28:40	0.001	0.000	0.001	20.1	75.5	3.76	793
24-Dec-19 15:29:50	0.084	0.000	0.084	20.0	75.5	3.78	793
24-Dec-19 15:31:05	0.001	0.000	0.001	19.8	75.5	3.81	793

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
24-Dec-19 15:32:15	0.085	0.000	0.085	19.9	74.8	3.76	793
24-Dec-19 15:50:30	0.001	0.000	0.001	20.3	76.5	3.76	793
24-Dec-19 15:51:45	0.083	0.000	0.083	19.7	74.2	3.76	793
24-Dec-19 16:00:15	0.001	0.000	0.001	19.9	74.8	3.76	793
24-Dec-19 16:01:25	0.081	0.000	0.081	20.4	76.6	3.76	793
24-Dec-19 16:06:20	0.001	0.000	0.001	20.2	75.9	3.76	793
24-Dec-19 16:07:30	0.084	0.000	0.084	20.5	77.1	3.76	793
24-Dec-19 16:12:20	0.001	0.000	0.001	20.1	75.4	3.76	793
24-Dec-19 16:18:25	0.084	0.000	0.084	19.8	74.4	3.76	793
24-Dec-19 16:19:40	0.001	0.000	0.001	20.4	76.7	3.76	793
24-Dec-19 16:22:05	0.085	0.000	0.085	20.0	75.2	3.76	793
24-Dec-19 16:23:15	0.001	0.000	0.001	20.5	77.1	3.76	793
24-Dec-19 16:24:30	0.081	0.000	0.081	19.5	73.4	3.76	793
24-Dec-19 16:25:45	0.001	0.000	0.001	19.7	76.5	3.88	793
24-Dec-19 16:26:55	0.081	0.000	0.081	19.7	73.9	3.76	793
24-Dec-19 16:29:25	0.001	0.000	0.001	20.2	76.4	3.79	793
24-Dec-19 16:30:35	0.079	0.000	0.079	20.0	75.4	3.76	793
24-Dec-19 16:33:00	0.001	0.000	0.001	19.8	74.4	3.76	793
24-Dec-19 16:37:50	0.083	0.000	0.083	19.7	74.2	3.76	793
24-Dec-19 16:40:20	0.001	0.000	0.001	19.7	74.1	3.76	793
24-Dec-19 16:42:45	0.079	0.000	0.079	19.6	73.8	3.76	793
24-Dec-19 16:43:55	0.001	0.000	0.001	20.0	75.1	3.76	793
24-Dec-19 16:45:10	0.080	0.000	0.080	20.0	75.1	3.76	793
24-Dec-19 16:47:35	0.001	0.000	0.001	20.3	76.4	3.76	793
24-Dec-19 16:53:40	0.083	0.000	0.083	19.9	74.9	3.76	793
24-Dec-19 16:54:55	0.001	0.000	0.001	20.3	76.4	3.76	793
24-Dec-19 17:02:15	0.082	0.000	0.082	20.0	75.3	3.76	793
24-Dec-19 17:03:25	0.001	0.000	0.001	20.4	76.6	3.76	793
24-Dec-19 17:13:15	0.083	0.000	0.083	20.6	77.2	3.76	793
24-Dec-19 17:14:25	0.052	0.000	0.052	20.6	77.2	3.76	793
24-Dec-19 17:14:30	0.001	0.000	0.001	19.7	74.2	3.77	793
24-Dec-19 18:06:29	0.000	0.001	0.001	20.1	75.4	3.75	793
24-Dec-19 18:21:25	0.080	0.000	0.080	20.3	76.5	3.76	793
24-Dec-19 18:22:44	0.002	0.000	0.002	19.9	74.5	3.75	793
24-Dec-19 18:28:49	0.080	0.000	0.080	19.7	74.3	3.76	793
24-Dec-19 18:29:59	0.002	0.000	0.002	20.4	76.7	3.76	793
24-Dec-19 18:31:14	0.085	0.000	0.085	20.4	76.7	3.76	793

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
24-Dec-19 18:32:24	0.002	0.000	0.002	20.4	76.7	3.76	793
24-Dec-19 18:42:09	0.085	0.000	0.085	20.6	77.4	3.76	793
24-Dec-19 18:43:24	0.003	0.000	0.003	20.6	77.4	3.76	793
24-Dec-19 18:44:34	0.084	0.000	0.084	20.6	77.4	3.76	793
24-Dec-19 18:47:04	0.003	0.000	0.003	19.7	74.2	3.76	793
24-Dec-19 18:48:14	0.084	0.000	0.084	20.6	77.4	3.76	793
24-Dec-19 18:49:29	0.004	0.000	0.004	19.8	74.6	3.76	793
24-Dec-19 18:50:44	0.081	0.000	0.081	20.2	76.1	3.76	793
24-Dec-19 18:53:09	0.003	0.000	0.003	19.8	74.6	3.76	793
24-Dec-19 18:54:24	0.085	0.000	0.085	20.6	77.7	3.76	793
24-Dec-19 18:56:49	0.003	0.000	0.003	19.7	74.1	3.76	793
24-Dec-19 18:57:59	0.085	0.000	0.085	20.6	77.3	3.76	793
24-Dec-19 19:01:39	0.004	0.000	0.004	19.9	74.7	3.76	793
24-Dec-19 19:04:04	0.081	0.000	0.081	19.9	74.9	3.76	793
24-Dec-19 19:13:49	0.004	0.000	0.004	19.8	74.4	3.76	793
24-Dec-19 19:15:04	0.085	0.000	0.085	20.1	75.7	3.76	793
24-Dec-19 19:17:29	0.004	0.000	0.004	20.1	75.7	3.76	793
24-Dec-19 19:18:44	0.085	0.000	0.085	20.5	77.0	3.76	793
24-Dec-19 19:49:14	0.004	0.000	0.004	20.3	76.3	3.76	793
24-Dec-19 19:50:24	0.086	0.000	0.086	20.0	76.3	3.81	793
24-Dec-19 19:54:04	0.015	0.000	0.015	20.3	76.3	3.75	793
24-Dec-19 19:55:14	0.001	0.000	0.001	20.2	76.2	3.77	793
24-Dec-19 19:55:19	0.085	0.000	0.085	19.8	74.4	3.76	793
24-Dec-19 19:58:59	0.001	0.000	0.001	20.0	75.3	3.76	793
24-Dec-19 20:00:09	0.083	0.000	0.083	20.0	75.3	3.76	793
24-Dec-19 20:06:19	0.001	0.000	0.001	20.2	76.0	3.76	793
24-Dec-19 20:07:29	0.087	0.000	0.087	20.5	77.2	3.76	793
24-Dec-19 20:09:59	0.001	0.000	0.001	20.1	75.7	3.77	793
24-Dec-19 20:11:08	0.088	0.000	0.088	20.4	76.8	3.76	793
24-Dec-19 20:13:38	0.001	0.000	0.001	19.6	74.6	3.81	793
24-Dec-19 20:16:03	0.083	0.000	0.083	19.6	74.5	3.81	793
24-Dec-19 20:20:53	0.001	0.000	0.001	20.4	76.8	3.76	793
24-Dec-19 20:23:23	0.086	0.000	0.086	20.1	75.6	3.76	793
24-Dec-19 20:24:33	0.001	0.000	0.001	19.5	73.5	3.77	793
25-Dec-19 01:56:45	0.000	0.001	0.001	20.0	75.4	3.77	793
25-Dec-19 04:14:45	0.001	0.000	0.001	20.3	76.6	3.77	793
25-Dec-19 12:05:01	0.001	0.000	0.001	20.8	78.2	3.77	793

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
25-Dec-19 17:25:00	0.013	0.000	0.013	19.5	73.7	3.77	793
25-Dec-19 17:35:00	0.001	0.000	0.001	19.6	73.9	3.77	793
25-Dec-19 17:37:09	0.000	0.001	0.001	20.0	76.0	3.81	793
25-Dec-19 18:32:14	0.086	0.000	0.086	19.9	74.8	3.76	793
25-Dec-19 18:33:24	0.001	0.000	0.001	20.1	75.9	3.77	793
25-Dec-19 18:34:39	0.091	0.000	0.091	20.7	77.9	3.76	793
26-Dec-19 09:17:37	0.000	0.001	0.001	19.8	74.5	3.76	793
26-Dec-19 11:02:37	0.001	0.000	0.001	20.2	76.0	3.77	793
26-Dec-19 12:52:01	0.092	0.000	0.092	20.6	77.6	3.77	793
26-Dec-19 12:53:16	0.003	0.000	0.003	20.6	77.6	3.77	793
28-Dec-19 07:19:03	0.000	0.001	0.001	21.0	79.0	3.76	793
28-Dec-19 07:55:49	0.001	0.000	0.001	19.9	75.9	3.81	793
28-Dec-19 15:09:19	0.000	0.001	0.001	20.5	77.0	3.75	793
28-Dec-19 15:46:05	0.001	0.000	0.001	19.8	74.6	3.76	793
28-Dec-19 22:59:31	0.000	0.001	0.001	20.9	78.4	3.75	793
28-Dec-19 23:36:17	0.001	0.000	0.001	19.6	73.8	3.77	793
29-Dec-19 06:49:43	0.000	0.001	0.001	20.1	75.4	3.76	793
29-Dec-19 07:26:29	0.001	0.000	0.001	19.5	73.4	3.76	793
29-Dec-19 10:30:17	0.085	0.000	0.085	20.2	76.2	3.77	793
29-Dec-19 10:31:32	0.001	0.000	0.001	20.2	76.2	3.77	793
29-Dec-19 10:35:12	0.083	0.000	0.083	19.8	75.6	3.81	793
29-Dec-19 10:37:37	0.001	0.000	0.001	19.8	74.4	3.76	793
29-Dec-19 10:41:17	0.086	0.000	0.086	20.4	76.8	3.76	793
29-Dec-19 11:17:52	0.003	0.000	0.003	19.7	74.3	3.76	793
29-Dec-19 11:19:02	0.083	0.000	0.083	20.5	74.5	3.64	793
29-Dec-19 11:30:02	0.003	0.000	0.003	20.2	75.9	3.76	793
29-Dec-19 11:31:12	0.077	0.000	0.077	19.7	75.8	3.85	793
29-Dec-19 11:36:07	0.003	0.000	0.003	20.3	74.9	3.70	793
29-Dec-19 11:37:17	0.077	0.000	0.077	19.8	76.2	3.86	793
29-Dec-19 11:40:57	0.003	0.000	0.003	20.5	76.9	3.76	793
29-Dec-19 11:43:22	0.079	0.000	0.079	20.2	76.0	3.76	793
29-Dec-19 11:44:37	0.003	0.000	0.003	20.2	75.2	3.72	793
29-Dec-19 11:47:01	0.082	0.000	0.082	20.6	74.4	3.62	793
29-Dec-19 11:54:21	0.003	0.000	0.003	20.0	75.2	3.76	793
29-Dec-19 11:55:31	0.079	0.000	0.079	20.3	75.3	3.70	793
29-Dec-19 11:56:46	0.003	0.000	0.003	20.3	76.5	3.76	793
29-Dec-19 11:58:01	0.080	0.000	0.080	20.3	76.5	3.76	793

Table B-4. DWPF SB9 SME GC Hydrogen Data, volume %

Date/Time	SME GC1 H2	SME GC2 H2	Max SME H2	SME O2	SME N2	N2/O2 ratio	SME Batch
29-Dec-19 11:59:11	0.003	0.000	0.003	20.3	76.5	3.76	793
29-Dec-19 12:01:36	0.077	0.000	0.077	19.8	74.5	3.76	793
29-Dec-19 12:02:51	0.003	0.000	0.003	19.8	74.5	3.76	793
29-Dec-19 12:08:56	0.078	0.000	0.078	20.5	76.9	3.76	793
29-Dec-19 12:10:11	0.003	0.000	0.003	20.5	76.9	3.76	793
29-Dec-19 12:16:16	0.077	0.000	0.077	20.5	74.1	3.61	793
29-Dec-19 12:17:26	0.003	0.000	0.003	20.2	75.9	3.76	793
29-Dec-19 14:39:59	0.000	0.001	0.001	20.5	77.1	3.75	793
29-Dec-19 20:07:34	0.002	0.000	0.002	19.4	73.2	3.76	793
29-Dec-19 22:30:11	0.000	0.002	0.002	19.9	74.7	3.75	793

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