

Toxicological Assessment of ISS Air Quality: June – September 2013 (Increment 36)



Fourteen mini grab sample containers (mGSCs) were collected on ISS between June and September 2013 and were returned on 34S; however, the ATV-4 first ingress mGSC did not contain sufficient sample to report results (initial sample pressure = 1.2 psia). Of the remaining 13 mGSCs, 12 were collected as routine monthly samples in the Russian Service Module (SM), US Laboratory (Lab), and either the Japanese Pressurized Module (JPM) or the Columbus module (Col), and 1 was collected during HTV-4 first ingress.

A summary of the analytical results from the 13 valid mGSCs is shown in Table 1. Complete data tables of all measured concentrations and corresponding T-values based on 180-day SMACs are enclosed. A data table containing T-values based on both the 7-day and 180-day SMACs is enclosed for the HTV-4 first ingress sample. The detection limit for all target compounds, except m/p-xylenes and hexachloro-1,3-butadiene, was 0.025 mg/m³. The detection limit for m/p-xylenes, hexachloro-1,3-butadiene, and all non-target compounds was 0.05 mg/m³. The average recoveries of the 3 surrogate standards from the mGSCs were as follows: ¹³C-acetone, 122 ± 9%; fluorobenzene-d₅, 117 ± 8%; and chlorobenzene-d₅, 113 ± 14%. Initial measured sample pressures for 12 of the mGSCs were between 13.7 and 14.4 psia, indicating nominal sample collection. The initial measured sample pressure for the mGSC collected in the US Lab on 8/14/2013 was marginally lower, at 11.5 psia, but was sufficient to obtain reliable data. A summary of the analytical results from 6 pairs of passive-diffusion formaldehyde badges collected in the US Lab or Russian Service Module (SM) and returned aboard 35S is also provided in Table 1. Positive control recoveries (1 trip and 2 lab controls) were 109%, 100%, and 80%, respectively. Formaldehyde sampling was cancelled in June to preserve contingency badges due to delayed resupply.

Table 1. Analytical Summary of ISS results

Sample Location	Sample Date	NMVOCs ^a (mg/m ³)	Freon 218 (mg/m ³)	Alcohols ^b (mg/m ³)	T-Value ^c (units)	CO ₂ (mg/m ³)	Formaldehyde (µg/m ³)
JPM	6/24/2013	6.4	7.6	3.1	0.4	6700	--
Lab	6/24/2013	6.3	7.5	3.1	0.4	7000	Cancelled
SM	6/24/2013	5.5	8.5	3.1	0.3	7100	Cancelled
SM	7/18/2013	6.4	7.0	3.4	0.4	6800	18
Lab	7/18/2013	6.3	7.3	3.7	0.4	7000	33
Col	7/18/2013	6.9	7.0	3.6	0.4	7000	--
HTV4	8/10/2013	14	3.7	3.6	2.2 (1.5)	3900	--
Lab	8/14/2013	6.9	5.9	3.4	0.5	7500	42
JPM	8/14/2013	7.1	5.2	3.2	0.5	7700	--
SM	8/14/2013	7.0	6.3	3.6	0.4	7800	37
Lab	9/3/2013	7.2	5.5	3.1	0.5	7600	41
Col	9/3/2013	7.4	5.9	3.2	0.5	7600	--
SM	9/3/2013	6.1	5.2	3.1	0.4	7500	18
<i>Guideline</i>		<25	---	<5	<1	<9300	<160

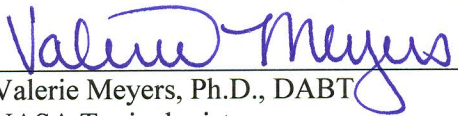
^aNon-methane volatile organic hydrocarbons, excluding Freon 218

^bIncludes acetone

^cSum of the ratios of the measured concentration and the corresponding 180-day SMAC for each compound, excluding CO₂; parentheses indicate value based on 7-day SMACs used for evaluation of first ingress.

Toxicological Evaluation of ISS Air Quality: Routine monthly sampling provides a very limited set of samples on which to perform an air quality assessment. However, based on these samples, there is no concern for crew health. Formaldehyde levels in the US Lab are consistent with historical levels which are generally between 30-40 $\mu\text{g}/\text{m}^3$. Concentrations in the Russian SM are generally lower than the US, and were notably lower in July and September. The primary contributor to the total T-value across all sampling locations throughout this time period was hexamethylcyclotrisiloxane. This compound was measured well below levels of health concern but may contribute to periodic accumulation of siloxanes in the water recovery system. In contrast to samples collected in the prior 6 months, alcohol values in all mGSCs were below the alcohol guideline of $<5 \text{ mg}/\text{m}^3$, which is intended to protect the water recovery system from risk of overloading. mGSCs provide only a snapshot of conditions and are not ideal for evaluating potential CO_2 exposures. However, reported levels were below 4 mmHg (9300 mg/m^3), as requested for this Increment in Chit 011331.

The CO_2 and Freon 218 levels measured in the HTV4 first ingress sample indicate that some mixing occurred with the ISS atmosphere prior to sample collection. The elevated T-value at HTV-4 first ingress was primarily attributed to trimethylsilanol, hexamethylcyclotrisiloxane, fluorotrimethylsilane, and carbon monoxide. The measured T-value of 1.5 based on 7-day SMACs is lower than the predicted T-value of 2.5 resulting from the off-gas test performed by JAXA; however, the primary contaminants measured at first ingress were consistent with those reported by JAXA as the primary contaminants in the off-gas test, and the lower T-value may be the result of the aforementioned dilution with ISS cabin air.


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Date

Enclosures Table 1: Analytical concentrations of compounds found in the mGSCs returned on 34S
Table 2: T-values corresponding to analytical concentrations in Table 1, based on 180-day SMACs
Table 2A: T-values corresponding to the analytical concentrations in Table 1, based on 180-day and 7-day SMACs for HTV-4 first ingress

TABLE 1
ANALYTICAL RESULTS OF
SOYUZ 34S RETURN GSC AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)												
	AA05568	AA05569	AA05570 #	AA05571	AA05572	AA05573	AA05574	AA05575	AA05576	AA05577	AA05578	AA05579	AA05580
	S/N 2029	S/N 2030	S/N 2037	S/N 2036	S/N 2033	S/N 2038	S/N 2034	S/N 2032	S/N 2039	S/N 2035	S/N 2055	S/N 2027	S/N 2031
	JPM	LAB	SM	SM	LAB	COL	HTV4 INGRESS	LAB	JPM	SM	LAB	COL	SM
6/24/13 @ 07:30 GMT	6/24/13 @ 07:34 GMT	6/24/13 @ 07:35 GMT	7/18/13 @ 07:33 GMT	7/18/13 @ 07:37 GMT	7/18/13 @ 07:40 GMT	8/10/13 @ 11:15 GMT	8/14/13 @ 10:54 GMT	8/14/13 @ 10:55 GMT	8/14/13 @ 10:58 GMT	9/3/13 @ 10:27 GMT	9/3/13 @ 10:29 GMT	9/3/13 @ 10:31 GMT	
TARGET COMPOUNDS (TO-14/POLAR)													
FREON12	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CHLOROMETHANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
FREON114	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
METHANOL	0.36	0.37	0.38	0.38	0.39	0.39	0.33	0.36	0.35	0.41	0.34	0.35	0.36
ACETALDEHYDE	0.16	0.18	0.21	0.19	0.17	0.18	0.24	0.17	0.16	0.19	0.15	0.15	0.16
VINYLCHLORIDE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
BROMOMETHANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ETHANOL *	2.2	2.2	2.2	2.5	2.7	2.6	1.4	2.4	2.3	2.5	2.2	2.2	2.1
CHLOROETHANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ACETONITRILE	<0.025	<0.025	TRACE	<0.025	<0.025	<0.025	TRACE	TRACE	TRACE	<0.025	<0.025	<0.025	<0.025
PROPENAL	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ACETONE	0.27	0.26	0.25	0.30	0.32	0.32	0.30	0.35	0.32	0.39	0.36	0.39	0.40
PROPANAL	0.039	0.042	0.062	0.032	0.037	0.038	0.034	0.035	0.039	0.044	0.042	0.041	0.043
ISOPROPANOL	0.21	0.11	0.12	0.14	0.14	0.18	1.5	0.20	0.18	0.18	0.11	0.18	0.13
FREON11	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
FURAN	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ACRYLONITRILE	<0.025	<0.025	<0.050	<0.025	TRACE	<0.025	<0.025	TRACE	TRACE	TRACE	<0.025	TRACE	TRACE
PENTANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-METHYL-2-PROPANOL	<0.025	TRACE	<0.050	<0.025	<0.025	<0.025	0.040	<0.025	TRACE	<0.025	<0.025	<0.025	<0.025
METHYLACETATE	TRACE	TRACE	<0.050	TRACE	TRACE	TRACE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,1-DICHLOROETHENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
DICHLOROMETHANE	<0.025	<0.025	<0.050	<0.025	<0.025	TRACE	0.025	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
3-CHLOROPROPENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
FREON113	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
N-PROPANOL	0.037	0.039	TRACE	0.029	0.033	0.039	TRACE	0.036	0.039	0.035	0.027	0.029	0.026
1,1-DICHLOROETHANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
BUTANAL	<0.025	<0.025	<0.050	TRACE	<0.025	TRACE	TRACE	<0.025	TRACE	<0.025	<0.025	<0.025	<0.025
2-BUTANONE	TRACE	TRACE	<0.050	TRACE	TRACE	0.032	0.053	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
CIS-1,2-DICHLOROETHENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-METHYLFURAN	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ETHYLACETATE	0.027	0.028	TRACE	TRACE	TRACE	TRACE	0.027	0.028	0.031	0.035	TRACE	TRACE	0.028
HEXANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CHLOROFORM	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-BUTENAL	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,2-DICHLOROETHANE	0.025	0.029	<0.050	TRACE	0.029	TRACE	TRACE	0.025	TRACE	0.028	0.026	0.027	0.026
1,1,1-TRICHLOROETHANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
N-BUTANOL	0.061	0.064	0.052	0.061	0.062	0.068	0.061	0.067	0.068	0.074	0.063	0.067	0.063
BENZENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CARBONTETRACHLORIDE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-PENTANONE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-METHYLHEXANE	<0.025	TRACE	<0.050	<0.025	<0.025	<0.025	<0.025	TRACE	TRACE	TRACE	<0.025	<0.025	TRACE
2,3-DIMETHYLPENTANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	TRACE	TRACE	TRACE	<0.025	<0.025	TRACE
PENTANAL	<0.025	<0.025	<0.050	TRACE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
3-METHYLHEXANE	TRACE	TRACE	<0.050	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	0.028	TRACE	TRACE	TRACE
1,2-DICHLOROPROPANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,4-DIOXANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
TRICHLOROETHENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2,5-DIMETHYLFURAN	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
N-HEPTANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	0.175	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
4-METHYL-2-PENTANONE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CIS-1,3-DICHLOROPROPENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-PENTENAL	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
TRANS-1,3-DICHLOROPROPENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,1,2-TRICHLOROETHANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
TOLUENE	TRACE	0.027	TRACE	TRACE	TRACE	0.036	0.13	0.034	0.032	0.039	0.027	0.029	0.028
HEXANAL	<0.025	<0.025	<0.050	0.032	<0.025	<0.025	TRACE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
MESITYLOXIDE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,2-DIBROMOETHANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
BUTYLACETATE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
OCTANE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
TETRACHLOROETHENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CHLOROBENZENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ETHYLBENZENE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
M/P-XYLENES	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-HEPTANONE	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CYCLOHEXANONE	<0.025	<0.025	<0.050	&									

**TABLE 1
ANALYTICAL RESULTS OF
SOYUZ 34S RETURN GSC AIR SAMPLES**

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)												
	AA05568	AA05569	AA05570 #	AA05571	AA05572	AA05573	AA05574	AA05575	AA05576	AA05577	AA05578	AA05579	AA05580
	S/N 2029	S/N 2030	S/N 2037	S/N 2036	S/N 2033	S/N 2038	S/N 2034	S/N 2032	S/N 2039	S/N 2035	S/N 2055	S/N 2027	S/N 2031
	JPM	LAB	SM	SM	LAB	COL	HTV4 INGRESS	LAB	JPM	SM	LAB	COL	SM
	6/24/13 @ 07:30 GMT	6/24/13 @ 07:34 GMT	6/24/13 @ 07:35 GMT	7/18/13 @ 07:33 GMT	7/18/13 @ 07:37 GMT	7/18/13 @ 07:40 GMT	8/10/13 @ 11:15 GMT	8/14/13 @ 10:54 GMT	8/14/13 @ 10:55 GMT	8/14/13 @ 10:58 GMT	9/3/13 @ 10:27 GMT	9/3/13 @ 10:29 GMT	9/3/13 @ 10:31 GMT

SPECIAL INTEREST COMPOUNDS **													
1,3-BUTADIENE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ETHYLENE OXIDE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-METHYL-2-PROPENAL	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	TRACE	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
3-BUTEN-2-ONE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-ETHOXYETHANOL	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
DIMETHYL DISULFIDE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
OCTAFLUOROPROPANE &	7.6	7.5	8.5	7.0	7.3	7.0	3.7	5.9	5.2	6.3	5.5	5.9	5.2
PERFLUORO-2-METHYLPENTANE &	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
CARBONYL SULFIDE &	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	TRACE	<0.025	<0.025	TRACE	<0.025	<0.025	<0.025
ISOBUTANE &	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	0.034	<0.025	TRACE	<0.025	<0.025	<0.025	<0.025
2-METHYL-1-PROPENE &	TRACE	TRACE	<0.050	TRACE	TRACE	TRACE	0.037	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
DIMETHYL SULFIDE &	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CARBON DISULFIDE &	<0.025	<0.025	<0.050	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
TRIMETHYLSILANOL &	0.10	0.096	0.070	0.081	0.10	0.12	3.6	0.19	0.26	0.19	0.18	0.19	0.14
OCTAMETHYLCYCLOTETRAILOXANE &	0.080	0.11	<0.10	0.096	<0.050	0.083	0.097	0.081	0.082	0.14	0.33	0.096	<0.050
DECAMETHYLCYCLOPENTASILOXANE &	0.62	0.56	0.50	0.50	0.56	0.61	0.50	0.64	0.67	0.46	0.32	0.88	0.64
HEXAMETHYLCYCLOTRIILOXANE %	1.9	1.9	1.4	1.7	1.5	1.9	3.6	1.9	2.1	1.8	2.7	2.5	1.6

NON-TARGET COMPOUNDS **													
SULFURHEXAFLUORIDE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,1,2-TETRAFLUOROETHANE	TRACE	TRACE	<0.10	<0.050	TRACE	<0.050	TRACE	0.056	0.051	0.062	0.060	0.064	0.066
1,1-DIFLUOROETHANE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
PROPENE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
FLUOROTRIMETHYLSILANE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	0.18	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
CYCLOHEXANE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	0.11	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
HEXAMETHYLDISILOXANE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	0.50	0.092	0.12	0.072	<0.050	<0.050	<0.050
C8-ALKANE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
METHYLCYCLOHEXANE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	0.064	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-ETHYL-1-HEXANOL	0.12	0.092	TRACE	0.079	0.10	0.086	TRACE	0.098	0.11	0.083	0.096	0.12	0.087
NONANAL	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
DODECAMETHYLPENTASILOXANE	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	0.52	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

TOTAL ALCOHOLS PLUS ACETONE	3.1	3.1	3.1	3.4	3.7	3.6	3.6	3.4	3.2	3.6	3.1	3.2	3.1
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TARGET COMPOUNDS (GC)													
CARBON MONOXIDE	0.41	0.41	0.38	0.40	0.39	0.39	4.9	0.59	0.70	0.57	0.43	0.45	0.41
METHANE	9.2	9.3	9.3	9.0	8.9	8.9	4.3	7.6	7.4	8.1	9.0	9.0	9.7
HYDROGEN	5.8	5.7	5.8	5.1	4.9	5.1	2.7	5.4	5.6	5.5	5.1	5.1	5.2
CARBON DIOXIDE	6700	7000	7100	6800	7000	7000	3900	7500	7700	7800	7600	7600	7500

TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	14	14	14	13	14	14	17	13	12	13	13	13	11
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TOTAL CONCENTRATION - OFP (NON-METHANE HYDROCARBONS)	6.4	6.3	5.5	6.4	6.3	6.9	14	6.9	7.1	7.0	7.2	7.4	6.1
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* GC/FID data results are in bold
 ** Quantified using "B" response factor except where noted
 & Quantified using a multi-level calibration
 % Response factor generated from an internal study
 < : Value is less than the laboratory report detection limit.
 TRACE: Amount detected is sufficient for compound identification only.
 OFP - Octafluoropropane
 # Partial sample loss during pressure measurement which required a further dilution

TABLE 2
T-VALUES for SOYUZ 345 RETURN GSC AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)												
	AA05568	AA05569	AA05570	AA05571	AA05572	AA05573	AA05574	AA05575	AA05576	AA05577	AA05578	AA05579	AA05580
	S/N 2029	S/N 2030	S/N 2037	S/N 2036	S/N 2033	S/N 2038	S/N 2034	S/N 2032	S/N 2039	S/N 2035	S/N 2055	S/N 2027	S/N 2031
	JPM	LAB	SM	SM	LAB	COL	HTV4 INGRESS	LAB	JPM	SM	LAB	COL	SM
	6/24/13 @ 07:30 GMT	6/24/13 @ 07:34 GMT	6/24/13 @ 07:35 GMT	7/18/13 @ 07:33 GMT	7/18/13 @ 07:37 GMT	7/18/13 @ 07:40 GMT	8/10/13 @ 11:15 GMT	8/14/13 @ 10:54 GMT	8/14/13 @ 10:55 GMT	8/14/13 @ 10:58 GMT	9/3/13 @ 10:27 GMT	9/3/13 @ 10:29 GMT	9/3/13 @ 10:31 GMT
TARGET COMPOUNDS (TO-14/POLAR)													
FREON12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FREON114	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHANOL	0.00399	0.00416	0.00428	0.00423	0.00438	0.00434	0.00365	0.00397	0.00393	0.00450	0.00379	0.00393	0.00403
ACETALDEHYDE	0.00380	0.04410	0.05259	0.04849	0.04327	0.04428	0.05902	0.04145	0.04109	0.04661	0.03707	0.03694	0.04063
VINYLCHEMORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHANOL	0.00110	0.00112	0.00112	0.00127	0.00136	0.00130	0.00069	0.00118	0.00113	0.00126	0.00110	0.00109	0.00107
CHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACETONITRILE	ND	ND	0.00373	ND	ND	ND	0.00187	0.00187	0.00187	ND	ND	ND	ND
PROPENAL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACETONE	0.00518	0.00492	0.00482	0.00578	0.00610	0.00616	0.00568	0.00676	0.00614	0.00747	0.00700	0.00749	0.00766
PROPANAL	0.00351	0.00378	0.00560	0.00292	0.00336	0.00342	0.00309	0.00322	0.00352	0.00402	0.00384	0.00369	0.00395
ISOPROPANOL	0.00143	0.00071	0.00083	0.00090	0.00091	0.00119	0.00090	0.00135	0.00122	0.00122	0.00075	0.00118	0.00087
FREON11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FURAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACRYLONITRILE	ND	ND	ND	ND	0.00446	ND	ND	0.00446	0.00446	0.00446	ND	0.00446	0.00446
PENTANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-METHYL-2-PROPANOL	ND	0.00010	ND	ND	ND	ND	0.00033	ND	0.00010	ND	ND	ND	ND
METHYLACETATE	0.00010	0.00010	ND	0.00010	0.00010	0.00010	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DICHLOROMETHANE	ND	ND	ND	ND	ND	0.00125	0.00255	0.00125	0.00125	0.00125	0.00125	0.00125	0.00125
3-CHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FREON113	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-PROPANOL	0.00037	0.00040	0.00026	0.00029	0.00034	0.00040	0.00013	0.00036	0.00039	0.00036	0.00027	0.00029	0.00027
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BUTANAL	ND	ND	ND	0.00096	ND	0.00096	0.00096	ND	0.00096	ND	ND	ND	ND
2-BUTANONE	0.00042	0.00042	ND	0.00042	0.00042	0.00107	0.00177	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042
CIS-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-METHYLFURAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLACETATE	0.00015	0.00016	0.00014	0.00007	0.00007	0.00007	0.00015	0.00016	0.00017	0.00019	0.00007	0.00007	0.00015
HEXANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-BUTENAL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	0.01583	0.01803	ND	0.00781	0.01793	0.00781	0.00781	0.01591	0.00781	0.01737	0.01629	0.01687	0.01629
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-BUTANOL	0.00154	0.00161	0.00130	0.00152	0.00155	0.00170	0.00151	0.00168	0.00170	0.00185	0.00158	0.00168	0.00158
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-PENTANONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-METHYLHEXANE	ND	0.00104	ND	ND	ND	ND	ND	0.00104	0.00104	0.00104	ND	ND	0.00104
2,3-DIMETHYLPENTANE	ND	ND	ND	ND	ND	ND	ND	0.00104	ND	0.00104	ND	ND	0.00104
PENTANAL	ND	ND	ND	0.00078	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-METHYLHEXANE	0.00104	0.00104	ND	0.00104	0.00104	0.00104	0.00104	0.00104	0.00104	0.00232	0.00104	0.00104	0.00104
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-DIOXANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-HEPTANE	ND	ND	ND	ND	ND	ND	0.01460	ND	ND	ND	ND	ND	ND
4-METHYL-2-PENTANONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-PENTENAL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	0.00083	0.00178	0.00167	0.00083	0.00083	0.00239	0.00884	0.00225	0.00215	0.00261	0.00178	0.00192	0.00185
HEXANAL	ND	ND	ND	0.00176	ND	ND	0.00069	ND	ND	ND	ND	ND	ND
MESTYLOXIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BUTYLACETATE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OCTANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M/P-XYLENES	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-HEPTANONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00021	ND	ND	ND
CYCLOHEXANONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HEPTANAL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
STYRENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	0.00187	0.00191	0.00171	0.00182	0.00171	0.00156	0.00135	0.00219	0.00214	0.00266	0.00174	0.00183	0.00197
NONANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-TRIMETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HEXACHLORO-1,3-BUTADIENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2
T-VALUES for SOYUZ 34S RETURN GSC AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)												
	AA05568 S/N 2029	AA05569 S/N 2030	AA05570# S/N 2037	AA05571 S/N 2036	AA05572 S/N 2033	AA05573 S/N 2038	AA05574 S/N 2034 HTV4 INGRESS	AA05575 S/N 2032	AA05576 S/N 2039	AA05577 S/N 2035	AA05578 S/N 2055	AA05579 S/N 2027	AA05580 S/N 2031
	JPM 6/24/13 @ 07:30 GMT	LAB 6/24/13 @ 07:34 GMT	SM 6/24/13 @ 07:35 GMT	SM 7/18/13 @ 07:33 GMT	LAB 7/18/13 @ 07:37 GMT	COL 7/18/13 @ 07:40 GMT	LAB 8/10/13 @ 11:15 GMT	LAB 8/14/13 @ 10:54 GMT	JPM 8/14/13 @ 10:55 GMT	SM 8/14/13 @ 10:58 GMT	LAB 9/3/13 @ 10:27 GMT	COL 9/3/13 @ 10:29 GMT	SM 9/3/13 @ 10:31 GMT
SPECIAL INTEREST COMPOUNDS													
1,3-BUTADIENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLENE OXIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-METHYL-2-PROPENAL	ND	ND	ND	ND	ND	ND	0.01471	ND	ND	ND	ND	ND	ND
3-BUTEN-2-ONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-ETHOXYETHANOL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIMETHYL DISULFIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OCTAFLUOROPROPANE	0.00009	0.00009	0.00010	0.00008	0.00009	0.00008	0.00004	0.00007	0.00006	0.00007	0.00007	0.00007	0.00006
PERFLUORO-2-METHYLPENTANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CARBONYL SULFIDE	ND	ND	ND	ND	ND	ND	0.00104	ND	ND	0.00104	ND	ND	ND
ISOBUTANE	ND	ND	ND	ND	ND	ND	0.00014	ND	0.00005	ND	ND	ND	ND
2-METHYL-1-PROPENE	0.00001	0.00001	ND	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
DIMETHYL SULFIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005
CARBON DISULFIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRIMETHYLSILANOL	0.02583	0.02401	0.01742	0.02032	0.02546	0.02973	0.90580	0.04866	0.06438	0.04714	0.04606	0.04754	0.03438
OCTAMETHYLCYCLOTETRAILOXANE	0.00665	0.00889	ND	0.00801	ND	0.00692	0.00806	0.00671	0.00681	0.01182	0.02716	0.00800	ND
DECAMETHYLCYCLOPENTASILOXANE	0.04127	0.03711	0.03332	0.03327	0.03705	0.04038	0.03341	0.04295	0.04472	0.03035	0.02153	0.05878	0.04260
HEXAMETHYLCYCLOTRIILOXANE	0.21451	0.21329	0.15560	0.19304	0.16690	0.21524	0.39992	0.20801	0.22911	0.19892	0.30513	0.27485	0.17846
NON-TARGET COMPOUNDS													
SULFURHEXAFLUORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1,2-TETRAFLUOROETHANE	0.00024	0.00024	ND	ND	0.00024	ND	0.00024	0.00054	0.00049	0.00060	0.00058	0.00061	0.00064
1,1-DIFLUOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FLUOROTRIMETHYLSILANE	ND	ND	ND	ND	ND	ND	0.35518	ND	ND	ND	ND	ND	ND
CYCLOHEXANE	ND	ND	ND	ND	ND	ND	0.00054	ND	ND	ND	ND	ND	ND
HEXAMETHYLDISILOXANE	ND	ND	ND	ND	ND	ND	0.00502	0.00092	0.00118	0.00072	ND	ND	ND
C8-ALKANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLCYCLOHEXANE	ND	ND	ND	ND	ND	ND	0.00107	ND	ND	ND	ND	ND	ND
2-ETHYL-1-HEXANOL	0.00217	0.00174	0.00094	0.00150	0.00189	0.00161	0.00047	0.00185	0.00207	0.00156	0.00181	0.00228	0.00165
NONANAL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DODECAMETHYLPENTASILOXANE	ND	ND	ND	ND	ND	ND	0.00260	ND	ND	ND	ND	ND	ND
TARGET COMPOUNDS (GC)													
CARBON MONOXIDE	0.02437	0.02410	0.02241	0.02378	0.02309	0.02315	0.29046	0.03459	0.04101	0.03363	0.02533	0.02624	0.02438
METHANE	0.00262	0.00264	0.00265	0.00258	0.00255	0.00255	0.00123	0.00218	0.00210	0.00230	0.00256	0.00258	0.00276
HYDROGEN	0.01690	0.01683	0.01714	0.01500	0.01444	0.01498	0.00784	0.01576	0.01653	0.01629	0.01506	0.01505	0.01530
CARBON DIOXIDE	0.51711	0.53817	0.54544	0.52042	0.53982	0.53994	0.30274	0.57379	0.59099	0.59816	0.58089	0.58540	0.57610
TOTAL T-VALUE	0.92805	0.95250	0.87307	0.89903	0.89937	0.95364	2.45618	1.02765	1.08207	1.04347	1.10417	1.10557	0.97091
TOTAL T-VALUE - CO2	0.41094	0.41433	0.32763	0.37861	0.35955	0.41370	2.15344	0.45386	0.49108	0.44531	0.52328	0.52017	0.39481

ND : Value is less than the laboratory report detection limit.
 Note: Number of decimal places in T-Values do not represent significant figures of measurements.
 # Partial sample loss during pressure measurement which required a further dilution

TABLE 2A
T-VALUES for HTV4 INGRESS GSC AIR SAMPLE

CHEMICAL CONTAMINANT	T-VALUE (7-d SMAC)	T-VALUE (180-d SMAC)
	AA05574 S/N 2034 HTV4 INGRESS 8/10/13 @ 11:15 GMT	AA05574 S/N 2034 HTV4 INGRESS 8/10/13 @ 11:15 GMT
TARGET COMPOUNDS (TO-14/POLAR)		
FREON12	ND	ND
CHLOROMETHANE	ND	ND
FREON114	ND	ND
METHANOL	0.00365	0.00365
ACETALDEHYDE	0.05902	0.05902
VINYLCHLORIDE	ND	ND
BROMOMETHANE	ND	ND
ETHANOL	0.00069	0.00069
CHLOROETHANE	ND	ND
ACETONITRILE	0.00187	0.00187
PROPENAL	ND	ND
ACETONE	0.00568	0.00568
PROPANAL	0.00309	0.00309
ISOPROPANOL	0.00990	0.00990
FREON11	ND	ND
FURAN	ND	ND
ACRYLONITRILE	ND	ND
PENTANE	ND	ND
2-METHYL-2-PROPANOL	0.00026	0.00033
METHYLACETATE	ND	ND
1,1-DICHLOROETHENE	ND	ND
DICHLOROMETHANE	0.00052	0.00255
3-CHLOROPROPENE	ND	ND
FREON113	ND	ND
N-PROPANOL	0.00013	0.00013
1,1-DICHLOROETHANE	ND	ND
BUTANAL	0.00096	0.00096
2-BUTANONE	0.00177	0.00177
CIS-1,2-DICHLOROETHENE	ND	ND
2-METHYLFURAN	ND	ND
ETHYLACETATE	0.00015	0.00015
HEXANE	ND	ND
CHLOROFORM	ND	ND
2-BUTENAL	ND	ND
1,2-DICHLOROETHANE	0.00781	0.00781
N-BUTANOL	0.00076	0.00151
BENZENE	ND	ND
CARBONTETRACHLORIDE	ND	ND
2-PENTANONE	ND	ND
2-METHYLHEXANE	ND	ND
2,3-DIMETHYLPENTANE	ND	ND
PENTANAL	ND	ND
3-METHYLHEXANE	0.00005	0.00104
1,2-DICHLOROPROPANE	ND	ND
1,4-DIOXANE	ND	ND
TRICHLOROETHENE	ND	ND
2,5-DIMETHYLFURAN	ND	ND
N-HEPTANE	0.00070	0.01460
4-METHYL2-PENTANONE	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND
2-PENTENAL	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND
TOLUENE	0.00884	0.00884
HEXANAL	0.00069	0.00069
MESITYLOXIDE	ND	ND
1,2-DIBROMOETHANE	ND	ND
BUTYLACETATE	ND	ND
OCTANE	ND	ND
TETRACHLOROETHENE	ND	ND
CHLOROBENZENE	ND	ND
ETHYLBENZENE	ND	ND
M/P-XYLENES	ND	ND
2-HEPTANONE	ND	ND
CYCLOHEXANONE	ND	ND
HEPTANAL	ND	ND
STYRENE	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND
O-XYLENE	0.00068	0.00135
NONANE	ND	ND
1,3,5-TRIMETHYLBENZENE	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND
1,3-DICHLOROBENZENE	ND	ND
1,4-DICHLOROBENZENE	ND	ND
1,2-DICHLOROBENZENE	ND	ND
1,2,4-TRICHLOROBENZENE	ND	ND
HEXACHLORO-1,3-BUTADIENE	ND	ND

TABLE 2A
T-VALUES for HTV4 INGRESS GSC AIR SAMPLE

CHEMICAL CONTAMINANT	T-VALUE (7-d SMAC)	T-VALUE (180-d SMAC)
	AA05574 S/N 2034 HTV4 INGRESS 8/10/13 @ 11:15 GMT	AA05574 S/N 2034 HTV4 INGRESS 8/10/13 @ 11:15 GMT

SPECIAL INTEREST COMPOUNDS		
1,3-BUTADIENE	ND	ND
ETHYLENE OXIDE	ND	ND
2-METHYL-2-PROPENAL	0.01471	0.01471
3-BUTEN-2-ONE	ND	ND
2-ETHOXYETHANOL	ND	ND
DIMETHYL DISULFIDE	ND	ND
OCTAFLUOROPROPANE	0.00004	0.00004
PERFLUORO-2-METHYLPENTANE	ND	ND
CARBONYL SULFIDE	0.00104	0.00104
ISOBUTANE	0.00014	0.00014
2-METHYL-1-PROPENE	0.00003	0.00003
DIMETHYL SULFIDE	ND	ND
CARBON DISULFIDE	ND	ND
TRIMETHYLSILANOL	0.90580	0.90580
OCTAMETHYLCYCLOTETRASILOXANE	0.00035	0.00806
DECAMETHYLCYCLOPENTASILOXANE	0.00501	0.03341
HEXAMETHYLCYCLOTRESILOXANE	0.03999	0.39992

NON-TARGET COMPOUNDS		
SULFURHEXAFLUORIDE	ND	ND
1,1,1,2-TETRAFLUOROETHANE	0.00024	0.00024
1,1-DIFLUOROETHANE	ND	ND
PROPENE	ND	ND
FLUOROTRIMETHYLSILANE	0.35518	0.35518
CYCLOHEXANE	0.00054	0.00054
HEXAMETHYLDISILOXANE	0.00502	0.00502
C8-ALKANE	ND	ND
METHYLCYCLOHEXANE	0.00107	0.00107
2-ETHYL-1-HEXANOL	0.00047	0.00047
NONANAL	ND	ND
DODECAMETHYLPENTASILOXANE	0.00260	0.00260

TARGET COMPOUNDS (GC)		
CARBON MONOXIDE	0.07838	0.29046
METHANE	0.00123	0.00123
HYDROGEN	0.00784	0.00784
CARBON DIOXIDE	0.30274	0.30274

TOTAL T-VALUE	1.82966	2.45618
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TOTAL T-VALUE - CO2	1.52692	2.15344
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ND : Value is less than the laboratory report detection limit.
Note: Number of decimal places in T-Values do not represent significant figures of measurements.