STS 118 Return Samples: Assessment of Air Quality aboard the Shuttle (STS-118) and International Space Station (13A.1)

The toxicological assessments of 2 grab sample canisters (GSCs) and one pair of formaldehyde badges from the Shuttle are reported in Table 1. Analytical methods have not changed from earlier reports. The recoveries of the 3 surrogates (^{13}C-acetone, fluorobenzene, and chlorobenzene) from the 2 GSCs averaged 120, 117, and 122 %, respectively. Three formaldehyde controls averaged 98% recovery. The Shuttle atmosphere was acceptable for human respiration.

Table 1. Analytical Summary of Shuttle Samples

Sample Location	Date of Sample	NMVOCs [a] (mg/m^3)	T Value[b] (units)	Alcohols (mg/m^3)	Formaldehyde (µg/m^3)
Middeck (preflight)	8/08/07	0.4	0.45[c]	1	--
Flight deck	8/18/07	--			38
Middeck (end mission)	8/21/07	4	0.10	0	--

[a] Non-methane volatile organic hydrocarbons.
[b] Calculated excluding CO_2, formaldehyde, and siloxanes.
[c] A trace of propenal contributed 0.42 units of this value

The toxicological assessment of 8 GSCs and 6 pairs of formaldehyde badges from the ISS is shown in Table 2. The recoveries of the 3 standards (as listed above) from the GSCs averaged 99, 99 and 99%, respectively. Three formaldehyde control badges averaged 98% recovery.

Table 2. Analytical Summary of ISS Results

Module/Sample	Approx. Date	NMVOCs[a] (mg/m^3)	T Value[b] (units)	Alcohols (mg/m^3)	Formaldehyde (µg/m^3)
SM	6/11/07	4	0.12	3	24
FGB	6/11/07	6	0.16	3	--
Lab	6/11/07	6	0.14	4	32
SM	7/10/07	5	0.66[c]	3	20
FGB	7/10/07	7	0.13	6	--
Lab	7/10/07	4	0.11	3	30
SM	8/2/07	4	0.14	3	20
Lab	8/2/07	4	0.13	3	25
Guideline		*<25*	*<1.0*	*<5*	*<120*

[a] Non-methane volatile organic hydrocarbons.
[b] Calculated excluding CO_2, formaldehyde, and siloxanes.
[c] A trace of propenal contributed 0.42 T units to this value. Other aliphatic aldehydes were slightly above normal levels.

Based on these limited samples, the ISS atmosphere is acceptable for human respiration. The alcohol levels were well controlled throughout the period of sampling.

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Enclosures

Table 1A: Analytical concentrations of compounds found in the STS-118 GSCs
Table 1B: Analytical concentrations of compounds found in 13A.1 GSCs
Table 2A: T-values of the compounds in table 1A
Table 2B: T-values of the compounds in table 1B

TABLE 1A
ANALYTICAL RESULTS OF
STS-118 GRAB SAMPLE CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)	
	AA04313 Flight Deck SN 1094 08/21/07 @ 10:30 GMT	AA04311 Preflight SN 1083 08/08/07 @ 12:02 EDT
TARGET COMPOUNDS (TO-14/POLAR)* **		
FREON12	TRACE	<0.025
CHLOROMETHANE	TRACE	<0.025
FREON114	<0.025	<0.025
METHANOL	0.12	TRACE
ACETALDEHYDE	0.12	0.12
VINYLCHLORIDE	<0.025	<0.025
BROMOMETHANE	<0.025	<0.025
ETHANOL	0.50	TRACE
CHLOROETHANE	<0.025	<0.025
ACETONITRILE	TRACE	TRACE
PROPENAL	<0.025	TRACE
ACETONE	0.27	0.079
PROPANAL	0.026	0.042
ISOPROPANOL	0.060	TRACE
FREON11	<0.025	<0.025
FURAN	<0.025	<0.025
ACRYLONITRILE	<0.025	<0.025
PENTANE	<0.025	<0.025
2-METHYL-2-PROPANOL	<0.025	<0.025
METHYLACETATE	TRACE	<0.025
1,1-DICHLOROETHENE	<0.025	<0.025
DICHLOROMETHANE	TRACE	<0.025
3-CHLOROPROPENE	<0.025	<0.025
FREON113	<0.025	<0.025
N-PROPANOL	TRACE	<0.025
1,1-DICHLOROETHANE	<0.025	<0.025
BUTANAL	TRACE	TRACE
2-BUTANONE	TRACE	TRACE
CIS-1,2-DICHLOROETHENE	<0.025	<0.025
2-METHYLFURAN	<0.025	<0.025
ETHYLACETATE	<0.025	<0.025
HEXANE	<0.025	<0.025
CHLOROFORM	<0.025	<0.025
2-BUTENAL	<0.025	<0.025
1,2-DICHLOROETHANE	<0.025	<0.025
1,1,1-TRICHLOROETHANE	<0.025	<0.025
N-BUTANOL	<0.025	<0.025
BENZENE	<0.025	<0.025
CARBONTETRACHLORIDE	<0.025	<0.025
2-PENTANONE	TRACE	TRACE
2-METHYLHEXANE	<0.025	<0.025
2,3-DIMETHYLPENTANE	<0.025	<0.025
PENTANAL	TRACE	TRACE
3-METHYLHEXANE	<0.025	<0.025
1,2-DICHLOROPROPANE	<0.025	<0.025
1,4-DIOXANE	<0.025	<0.025
TRICHLOROETHENE	<0.025	<0.025
2,5-DIMETHYLFURAN	<0.025	<0.025
N-HEPTANE	<0.025	<0.025
4-METHYL2-PENTANONE	<0.025	<0.025
CIS-1,3-DICHLOROPROPENE	<0.025	<0.025
2-PENTENAL	<0.025	<0.025
TRANS-1,3-DICHLOROPROPENE	<0.025	<0.025
1,1,2-TRICHLOROETHANE	<0.025	<0.025
TOLUENE	<0.025	<0.025
HEXANAL	TRACE	TRACE
MESITYLOXIDE	<0.025	<0.025
1,2-DIBROMOETHANE	<0.025	<0.025
BUTYLACETATE	<0.025	<0.025
OCTANE	<0.025	<0.025
TETRACHLOROETHENE	<0.025	<0.025
CHLOROBENZENE	<0.025	<0.025
ETHYLBENZENE	<0.025	<0.025
M/P-XYLENES	<0.025	<0.025
2-HEPTANONE	<0.025	<0.025
CYCLOHEXANONE	<0.025	<0.025
HEPTANAL	<0.025	<0.025
STYRENE	<0.025	<0.025
1,1,2,2-TETRACHLOROETHANE	<0.025	<0.025
O-XYLENE	<0.025	<0.025
NONANE	<0.025	<0.025
1,3,5-TRIMETHYLBENZENE	<0.025	<0.025
1,2,4-TRIMETHYLBENZENE	<0.025	<0.025
DECANE	<0.025	<0.025
1,3-DICHLOROBENZENE	<0.025	<0.025
1,4-DICHLOROBENZENE	<0.025	<0.025
1,2-DICHLOROBENZENE	<0.025	<0.025
1,2,4-TRICHLOROBENZENE	<0.025	<0.025
HEXACHLORO-1,3-BUTADIENE	<0.025	<0.025
TARGET COMPOUNDS (TOXIC)		
1,3-BUTADIENE	<0.025	<0.025
ETHYLENE OXIDE	<0.025	<0.025
CARBON DISULFIDE	<0.025	<0.025
2-METHYL-2-PROPENAL	<0.025	<0.025
3-BUTEN-2-ONE	<0.025	<0.025
2-ETHOXYETHANOL	<0.025	<0.025
DIMETHYLDISULFIDE	<0.025	<0.025
OCTAMETHYLCYCLOTETRASILOXANE	*	*
NON-TARGET COMPOUNDS		
BROMOTRIFLUOROMETHANE	2.9	<0.025
HEXAMETHYLCYCLOTRISILOXANE	*	*
DECAMETHYLCYCLOPENTASILOXANE	*	*
TOTAL ALCOHOLS PLUS ACETONE	**0.96**	**0.12**
TARGET COMPOUNDS (GC)* **		
CARBON MONOXIDE	<0.57	<0.57
METHANE	59	TRACE
HYDROGEN	8.6	<0.74
CARBON DIOXIDE	5000	TRACE
TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	**4.1**	**0.37**

***Present, subject to large, random variability, therefore not quantifiable**
< : Value is less than the laboratory report detection limit.
TRACE: Amount detected is sufficient for compound identification only.
*** Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)							
	AA04335 S/N 1010 SM 06/11/07 @ 17:00GMT	AA04336 S/N 1038 FGB 6/11/07 @ 17:03 GMT	AA04337 S/N 1040 LAB 6/11/07 @ 17:06 GMT	AA04338 S/N 1004 LAB 7/10/07 @ 18:35 GMT	AA04339 S/N 1050 FGB 7/10/07 @ 18:36 GMT	AA04340 S/N 1089 SM 7/10/07 @ 18:39 GMT	AA04341 S/N 1031 LAB 8/2/07 @ 18:35 GMT	AA04342 S/N 1048 SM 8/2/07 @ 18:40 GMT
TARGET COMPOUNDS (TO-14/POLAR)* **								
FREON12	TRACE	0.025	TRACE	0.028	TRACE	0.027	TRACE	TRACE
CHLOROMETHANE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
FREON114	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
METHANOL	0.23	0.24	0.20	0.26	0.40	0.27	0.23	0.26
ACETALDEHYDE	0.081	0.084	0.13	0.069	0.060	0.37	0.068	0.071
VINYLCHLORIDE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
BROMOMETHANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ETHANOL *	**2.6**	**2.7**	**2.9**	**2.2**	**3.3**	**2.2**	**2.0**	**2.2**
CHLOROETHANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ACETONITRILE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
PROPENAL	<0.025	<0.025	<0.025	<0.025	<0.025	TRACE	<0.025	<0.025
ACETONE	0.18	0.19	0.22	0.18	0.28	0.33	0.21	0.24
PROPANAL	TRACE	TRACE	0.028	TRACE	TRACE	0.10	TRACE	TRACE
ISOPROPANOL	0.068	0.099	0.18	0.042	0.17	0.043	0.049	0.047
FREON11	<0.025	TRACE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
FURAN	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ACRYLONITRILE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
PENTANE	<0.025	TRACE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-METHYL-2-PROPANOL	TRACE	TRACE	TRACE	<0.025	<0.025	TRACE	<0.025	<0.025
METHYLACETATE	<0.025	TRACE	<0.025	<0.025	TRACE	TRACE	<0.025	TRACE
1,1-DICHLOROETHENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
DICHLOROMETHANE	TRACE	0.027	TRACE	0.032	0.031	0.031	0.029	0.029
3-CHLOROPROPENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
FREON113	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
N-PROPANOL **	0.027	TRACE	TRACE	0.030	**1.5**	0.026	0.11	0.13
1,1-DICHLOROETHANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
BUTANAL	TRACE	TRACE	TRACE	TRACE	<0.025	0.055	TRACE	TRACE
2-BUTANONE	TRACE	TRACE	TRACE	TRACE	TRACE	0.047	TRACE	TRACE
CIS-1,2-DICHLOROETHENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-METHYLFURAN	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ETHYLACETATE	0.049	0.055	0.076	0.043	0.047	0.048	0.036	0.041
HEXANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CHLOROFORM	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-BUTENAL	TRACE	<0.025	<0.025	TRACE	TRACE	TRACE	TRACE	TRACE
1,2-DICHLOROETHANE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
1,1,1-TRICHLOROETHANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
N-BUTANOL	0.072	0.070	0.084	0.075	0.079	0.075	0.085	0.15
BENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CARBONTETRACHLORIDE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-PENTANONE	<0.025	<0.025	<0.025	<0.025	<0.025	TRACE	<0.025	<0.025
2-METHYLHEXANE	TRACE	TRACE	0.032	TRACE	TRACE	TRACE	TRACE	TRACE
2,3-DIMETHYLPENTANE	TRACE	TRACE	0.030	TRACE	TRACE	TRACE	TRACE	TRACE
PENTANAL	<0.025	TRACE	TRACE	<0.025	<0.025	0.030	<0.025	<0.025
3-METHYLHEXANE	TRACE	TRACE	0.050	TRACE	TRACE	TRACE	TRACE	TRACE
1,2-DICHLOROPROPANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,4-DIOXANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
TRICHLOROETHENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2,5-DIMETHYLFURAN	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
N-HEPTANE	<0.025	<0.025	TRACE	<0.025	<0.025	<0.025	<0.025	<0.025
4-METHYL2-PENTANONE	<0.025	<0.025	<0.025	<0.025	TRACE	<0.025	<0.025	<0.025
CIS-1,3-DICHLOROPROPENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
2-PENTENAL	<0.025	<0.025	<0.025	<0.025	<0.025	TRACE	<0.025	<0.025
TRANS-1,3-DICHLOROPROPENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,1,2-TRICHLOROETHANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
TOLUENE	TRACE	TRACE	0.026	TRACE	TRACE	TRACE	TRACE	TRACE
HEXANAL	TRACE	<0.025	TRACE	TRACE	TRACE	TRACE	<0.025	TRACE
MESITYLOXIDE	<0.025	<0.025	<0.025	<0.025	TRACE	TRACE	<0.025	<0.025
1,2-DIBROMOETHANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
BUTYLACETATE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
OCTANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
TETRACHLOROETHENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CHLOROBENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ETHYLBENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
M/P-XYLENES	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
2-HEPTANONE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
CYCLOHEXANONE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
HEPTANAL	<0.025	<0.025	<0.025	<0.025	<0.025	TRACE	<0.025	<0.025
STYRENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,1,2,2-TETRACHLOROETHANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
O-XYLENE	0.041	0.039	0.16	0.033	0.038	0.039	0.035	0.041
NONANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,3,5-TRIMETHYLBENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,2,4-TRIMETHYLBENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
DECANE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,3-DICHLOROBENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,4-DICHLOROBENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,2-DICHLOROBENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,2,4-TRICHLOROBENZENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
HEXACHLORO-1,3-BUTADIENE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025

CHEMICAL CONTAMINANT	AA04313 Flight Deck SN 1094 08/21/07 @ 10:30 GMT	AA04311 Preflight SN 1083 08/08/07 @ 12:02 EDT
TARGET COMPOUNDS (TO-14/POLAR)		
FREON12	0.00003	ND
CHLOROMETHANE	0.00030	ND
FREON114	ND	ND
METHANOL	0.01368	0.00139
ACETALDEHYDE	0.03071	0.03054
VINYLCHLORIDE	ND	ND
BROMOMETHANE	ND	ND
ETHANOL	0.00025	0.00001
CHLOROETHANE	ND	ND
ACETONITRILE	0.00187	0.00187
PROPENAL	ND	0.41667
ACETONE	0.00517	0.00152
PROPANAL	0.00181	0.00293
ISOPROPANOL	0.00040	0.00008
FREON11	ND	ND
FURAN	ND	ND
ACRYLONITRILE	ND	ND
PENTANE	ND	ND
2-METHYL-2-PROPANOL	ND	ND
METHYLACETATE	0.00010	ND
1,1-DICHLOROETHENE	ND	ND
DICHLOROMETHANE	0.00025	ND
3-CHLOROPROPENE	ND	ND
FREON113	ND	ND
N-PROPANOL	0.00013	ND
1,1-DICHLOROETHANE	ND	ND
BUTANAL	0.00071	0.00071
2-BUTANONE	0.00042	0.00042
CIS-1,2-DICHLOROETHENE	ND	ND
2-METHYLFURAN	ND	ND
ETHYLACETATE	ND	ND
HEXANE	ND	ND
CHLOROFORM	ND	ND
2-BUTENAL	ND	ND
1,2-DICHLOROETHANE	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND
N-BUTANOL	ND	ND
BENZENE	ND	ND
CARBONTETRACHLORIDE	ND	ND
2-PENTANONE	0.00018	0.00018
2-METHYLHEXANE	ND	ND
2,3-DIMETHYLPENTANE	ND	ND
PENTANAL	0.00059	0.00059
3-METHYLHEXANE	ND	ND
1,2-DICHLOROPROPANE	ND	ND
1,4-DIOXANE	ND	ND
TRICHLOROETHENE	ND	ND
2,5-DIMETHYLFURAN	ND	ND
N-HEPTANE	ND	ND
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	ND	ND
HEXANAL	0.00051	0.00051
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	ND	ND
NONANE	ND	ND
1,3,5-TRIMETHYLBENZENE	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND
DECANE	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 2B
ANALYTICAL RESULTS OF
13A.1 RETURN GRAB SAMPLE CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)							
	AA04335 S/N 1010 SM 06/11/07 @ 17:00GMT	AA04336 S/N 1038 FGB 6/11/07 @ 17:03 GMT	AA04337 S/N 1040 LAB 6/11/07 @ 17:06 GMT	AA04338 S/N 1004 LAB 7/10/07 @ 18:35 GMT	AA04339 S/N 1050 FGB 7/10/07 @ 18:36 GMT	AA04340 S/N 1089 SM 7/10/07 @ 18:39 GMT	AA04341 S/N 1031 LAB 8/2/07 @ 18:35 GMT	AA04342 S/N 1048 SM 8/2/07 @ 18:40 GMT
TARGET COMPOUNDS (TO-14/POLAR)								
FREON12	0.00003	0.00005	0.00003	0.00006	0.00003	0.00006	0.00003	0.00003
CHLOROMETHANE	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030
FREON114	ND	ND	ND	ND	ND	ND	ND	ND
METHANOL	0.02552	0.02671	0.02255	0.02903	0.04429	0.02973	0.02537	0.02859
ACETALDEHYDE	0.02023	0.02106	0.03170	0.01714	0.01507	0.09344	0.01698	0.01771
VINYLCHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND	ND	ND	ND
ETHANOL *	**0.00132**	**0.00133**	**0.00147**	**0.00112**	**0.00163**	**0.00110**	**0.00102**	**0.00108**
CHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND
ACETONITRILE	0.00187	0.00187	0.00187	0.00187	0.00187	0.00187	0.00187	0.00187
PROPENAL	ND	ND	ND	ND	ND	0.41667	ND	ND
ACETONE	0.00353	0.00366	0.00416	0.00346	0.00542	0.00631	0.00408	0.00466
PROPANAL	0.00347	0.00347	0.00780	0.00347	0.00347	0.02912	0.00347	0.00347
ISOPROPANOL	0.00045	0.00066	0.00119	0.00028	0.00113	0.00028	0.00033	0.00032
FREON11	ND	0.00002	ND	ND	ND	ND	ND	ND
FURAN	ND	ND	ND	ND	ND	ND	ND	ND
ACRYLONITRILE	0.00446	0.00446	0.00446	0.00446	0.00446	0.00446	0.00446	0.00446
PENTANE	ND	0.00002	ND	ND	ND	ND	ND	ND
2-METHYL-2-PROPANOL	0.00010	0.00010	0.00010	ND	ND	0.00010	ND	ND
METHYLACETATE	ND	0.00010	ND	ND	0.00010	0.00010	ND	0.00010
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND
DICHLOROMETHANE	0.00125	0.00271	0.00125	0.00324	0.00308	0.00307	0.00291	0.00291
3-CHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND
FREON113	ND	ND	ND	ND	ND	ND	ND	ND
N-PROPANOL	0.00027	0.00013	0.00013	0.00030	0.01518	0.00027	0.00116	0.00131
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND
BUTANAL	0.00284	0.00284	0.00284	0.00284	ND	0.01246	0.00284	0.00284
2-BUTANONE	0.00042	0.00042	0.00042	0.00042	0.00042	0.00157	0.00042	0.00042
CIS-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND
2-METHYLFURAN	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLACETATE	0.00027	0.00031	0.00042	0.00024	0.00026	0.00027	0.00020	0.00023
HEXANE	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND
2-BUTENAL	0.00735	ND	ND	0.00735	0.00735	0.00735	0.00735	0.00735
1,2-DICHLOROETHANE	0.01250	0.01250	0.01250	0.01250	0.01250	0.01250	0.01250	0.01250
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND
N-BUTANOL	0.00181	0.00176	0.00210	0.00187	0.00197	0.00187	0.00213	0.00372
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND
CARBONTETRACHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND
2-PENTANONE	ND	ND	ND	ND	ND	0.00018	ND	ND
2-METHYLHEXANE	0.00043	0.00043	0.00110	0.00043	0.00043	0.00043	0.00043	0.00043
2,3-DIMETHYLPENTANE	0.00006	0.00006	0.00014	0.00006	0.00006	0.00006	0.00006	0.00006
PENTANAL	ND	0.00236	0.00236	ND	ND	0.00558	ND	ND
3-METHYLHEXANE	0.00043	0.00043	0.00171	0.00043	0.00043	0.00043	0.00043	0.00043
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND
1,4-DIOXANE	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND	ND	ND	ND	ND	ND
N-HEPTANE	ND	ND	0.00006	ND	ND	ND	ND	ND
4-METHYL2-PENTANONE	ND	ND	ND	ND	0.00009	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND
2-PENTENAL	ND	ND	ND	ND	ND	0.00595	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	0.00021	0.00021	0.00044	0.00021	0.00021	0.00021	0.00021	0.00021
HEXANAL	0.00205	ND	0.00205	0.00205	0.00205	0.00205	ND	0.00205
MESITYLOXIDE	ND	ND	ND	ND	0.00031	0.00031	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND	ND	ND	ND	ND	ND
BUTYLACETATE	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
OCTANE	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND
M/P-XYLENES	0.00006	0.00006	0.00006	0.00006	0.00006	0.00006	0.00006	0.00006
2-HEPTANONE	ND	ND	ND	ND	ND	ND	ND	ND
CYCLOHEXANONE	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021
HEPTANAL	ND	ND	ND	ND	ND	0.00179	ND	ND
STYRENE	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	0.00019	0.00018	0.00073	0.00015	0.00017	0.00018	0.00016	0.00019
NONANE	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-TRIMETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND
DECANE	ND	ND	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND
HEXACHLORO-1,3-BUTADIENE	ND	ND	ND	ND	ND	ND	ND	ND
TARGET COMPOUNDS (TOXIC)								
1,3-BUTADIENE	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLENE OXIDE	ND	ND	ND	ND	ND	ND	ND	ND
CARBON DISULFIDE	ND	ND	ND	0.00078	0.00078	0.00078	ND	ND
2-METHYL-2-PROPENAL	ND	ND	ND	ND	ND	ND	0.00735	ND
3-BUTEN-2-ONE	ND	ND	ND	ND	ND	ND	ND	ND
2-ETHOXYETHANOL	ND	ND	ND	ND	ND	ND	ND	ND
DIMETHYLDISULFIDE	ND	ND	ND	ND	ND	ND	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE	##	##	##	##	##	##	##	##
NON-TARGET COMPOUNDS								
OCTAFLUOROPROPANE	#	#	#	#	#	#	#	#
SULFURHEXAFLUORIDE	0.00017	0.00015	0.00015	0.00014	0.00018	0.00013	0.00014	0.00013
BROMOTRIFLUOROMETHANE	0.00001	0.00002	0.00001	ND	ND	ND	ND	ND
C5-ALKANE	ND	0.00009	0.00148	ND	ND	ND	ND	ND
2-METHYL-1,3-BUTADIENE	0.00417	0.00417	0.00417	0.00417	0.00417	0.00902	0.01512	0.01853
TRIMETHYLSILANOL	0.00255	0.00320	0.00545	0.00328	0.00328	0.00305	0.00343	0.00345
C5-ALKENE	ND	ND	0.00029	ND	ND	ND	ND	ND
1,3-DIOXOLANE	0.00144	0.05155	0.00558	0.00219	0.00195	0.00180	0.00220	0.00242
1,2-DIMETHOXYETHANE	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003
C7-ALKENE	0.00006	0.00006	0.00006	ND	0.00006	0.00006	0.00006	0.00006
C7-ALKANE	0.00006	0.00006	0.00022	0.00006	0.00006	0.00006	0.00006	0.00006
2-PROPENOICACID,2-METHYLMETHYLESTER	0.00012	0.00012	0.00012	0.00012	0.00012	0.00012	0.00012	0.00012
C7-ALKANE	ND	ND	0.00006	ND	ND	ND	ND	ND
HEXAMETHYLCYCLOTRISILOXANE	##	##	##	##	##	##	##	##
BENZALDEHYDE	0.00007	0.00007	0.00007	0.00007	0.00007	0.00042	0.00007	0.00007
2-ETHYL-1-HEXANOL	0.00062	0.00052	0.00024	0.00063	0.00081	0.00024	0.00065	0.00084
C11-ALKANE	ND	ND	0.00026	ND	ND	ND	ND	ND
LIMONENE	0.00014	0.00018	0.00010	0.00057	0.00055	0.00037	0.00034	0.00039
C11-ALKANE	ND	ND	0.00059	ND	ND	ND	ND	ND
C11-ALKANE	ND	ND	0.00091	ND	ND	ND	ND	ND
DECAMETHYLCYCLOPENTASILOXANE	##	##	##	##	##	##	##	##
C12-ALKANE	ND	ND	0.00009	ND	ND	ND	ND	ND
C12-ALKANE	0.00009	0.00009	0.00009	0.00009	0.00009	0.00009	0.00009	0.00009
TARGET COMPOUNDS (GC)								
CARBON MONOXIDE	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
METHANE	0.00249	0.00251	0.00211	0.00203	0.00197	0.00202	0.00347	0.00354
HYDROGEN	0.01412	0.00674	0.01183	0.00109	0.00000	0.00109	0.00831	0.00921
CARBON DIOXIDE	0.26435	0.41683	0.26323	0.60396	0.60565	0.66445	0.37977	0.43373
TOTAL T-VALUE	**0.38220**	**0.57488**	**0.40135**	**0.71284**	**0.74241**	**1.32415**	**0.51028**	**0.57027**

*** FROM GC/FID RESULTS**
 # Present, but not calculated
Present, but not included in total T-Value
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.