STS 133 Return Samples: Air Quality aboard Shuttle (STS-133) and International Space Station (ULF5)

Space Shuttle: The toxicological assessments of 2 canisters (mini-GSC or GSCs) from the Shuttle are reported in Table 1. Analytical methods have not changed from earlier reports. The percent recoveries of the 3 surrogates (^{13}C-acetone, fluorobenzene, and chlorobenzene) from the 2 Shuttle GSCs averaged 86, 100, and 87, respectively. Based on the end-of-mission sample, the Shuttle atmosphere was acceptable for human respiration.

Table 1. Analytical Summary of Shuttle Samples (GSC in black and mini-GSC in blue)

Sample Location	Date of Sample	NMVOCs [a] (mg/m^3)	Freon 218 (mg/m^3)	T Value[b] (units)	Alcohols (mg/m^3)	Formaldehyde ($\mu g/m^3$)
Preflight	2/24/11	0.4	<0.1	0.04	0.2	No sample
Mid-deck (end of mission)	3/9/11	2.1	23[c]	0.11	1.2	No sample
Guideline		*25*	*none*	*1.0*	*None*[d]	*<120*

[a] Non-methane volatile organic hydrocarbons, excluding Freon 218
[b] Based on 7-day SMACs and calculated excluding CO_2, formaldehyde, and siloxanes.
[c] This is residual from the ISS during docked phase.
[d] There is no guideline value because water is not recovered from humidity condensate on Shuttle as it is on ISS.

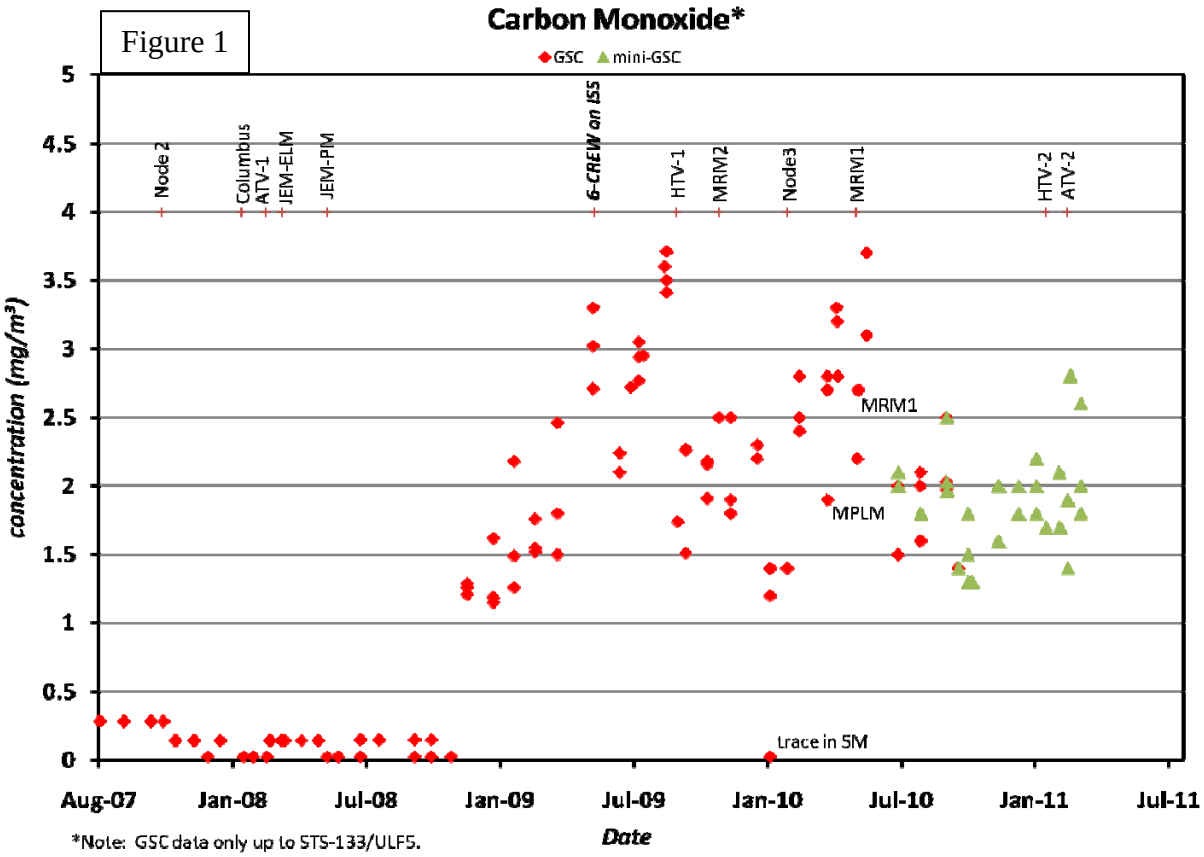
International Space Station: The toxicological assessment of 16 GSCs from the ISS is shown in Table 2. The recoveries of the 3 standards (as listed above) from the GSCs averaged 99, 108 and 97%, respectively.

Table 2. Analytical Summary of ISS Results (GSC in black and mini-GSC in blue)

Module/Sample	Approx. Date of Sample	NMVOCs[a] (mg/m^3)	Freon 218 (mg/m^3)	T Value[b] (units)	Alcohols (mg/m^3)	Formaldehyde[d] ($\mu g/m^3$)
Lab	5/31/10	6.0	70	0.40	4.5	32
Lab	5/31/10	6.3	54	0.41	4.8	--
JEM	5/31/10	6.8	40	**1.41**	4.8	--
SM	5/31/10	6.5	28	0.44	4.8	30
SM	7/12/10	5.3	42	0.32	4.0	29
SM	7/12/10	5.9	42	0.31	4.6	--
Lab	7/12/10	5.2	28	0.34	3.7	31
Col	7/12/10	5.6	22	0.32	4.0	--
Lab	8/11/10	6.2	23	0.37	4.6	60
JEM	8/11/10	5.8	23	0.31	4.3	--
JEM	8/11/10	5.3	28	0.30	4.3	--
JEM	8/11/10	6.4	30	0.31	5.2	--
SM	8/11/10	5.5	26	0.33	4.0	49
WRS-1 Rack[c]	10/1/10	4.5	36	0.26	3.1	--
Lab[c]	10/19/10	7.8	36	0.34	**5.9**	--
PMM (first entry)	03/01/11	22	<1	**2.51**	**9.3**	--
Guideline		*<25*	*none*	*<1.0*	*<5*	*<120*

[a] Non-methane volatile organic hydrocarbons, excluding Freon 218
[b] Based on 180-d SMACs and calculated excluding CO_2, formaldehyde, and siloxanes.
[c] Contingency sample taken due to odors.
[d] Formaldehyde badges returned on 22S.

Figure 1



Carbon Monoxide Accumulation aboard ISS : Beginning in late 2008 the nominal concentrations of CO began increasing gradually (figure 1). The results from samples returned on this flight indicate that the CO concentrations, after dropping in late 2009, have cycled upward and then settled back to concentrations near 2 mg/m^3. In any case, these changes are well below the 180-day SMAC for CO, which is17 mg/m^3. There is no threat to crew health. The source of the additional CO is unknown.

Contingency Samples: Two contingency samples were acquired in the present set. The WRS-1 sample was taken due to a "hot metal smell" in the area and the Lab sample on October 19, 2010 was taken because of a "funky" smell in the area. No compounds in the first sample could be associated with the hot metal smell; however, the second sample contained somewhat high levels of methanol, ethanol, methyl acetate, and ethyl acetate which together may have contributed to the odor.

High T Value Samples: The high T-Value (1.41) in the JEM was due to traces of propenal and furan in the sample. These were not detected in any other sample. The high T-Value (2.51) in the first-entry sample of the PMM was primarily due to trimethylsilanol (0.82) and fluorotrimethylsilane (0.65). This sample also showed an unusually high amount of 2-propanol (6.3 mg/m^3), which elevated the "alcohols" value above 5. The alcohol may have been residue from cleaning.

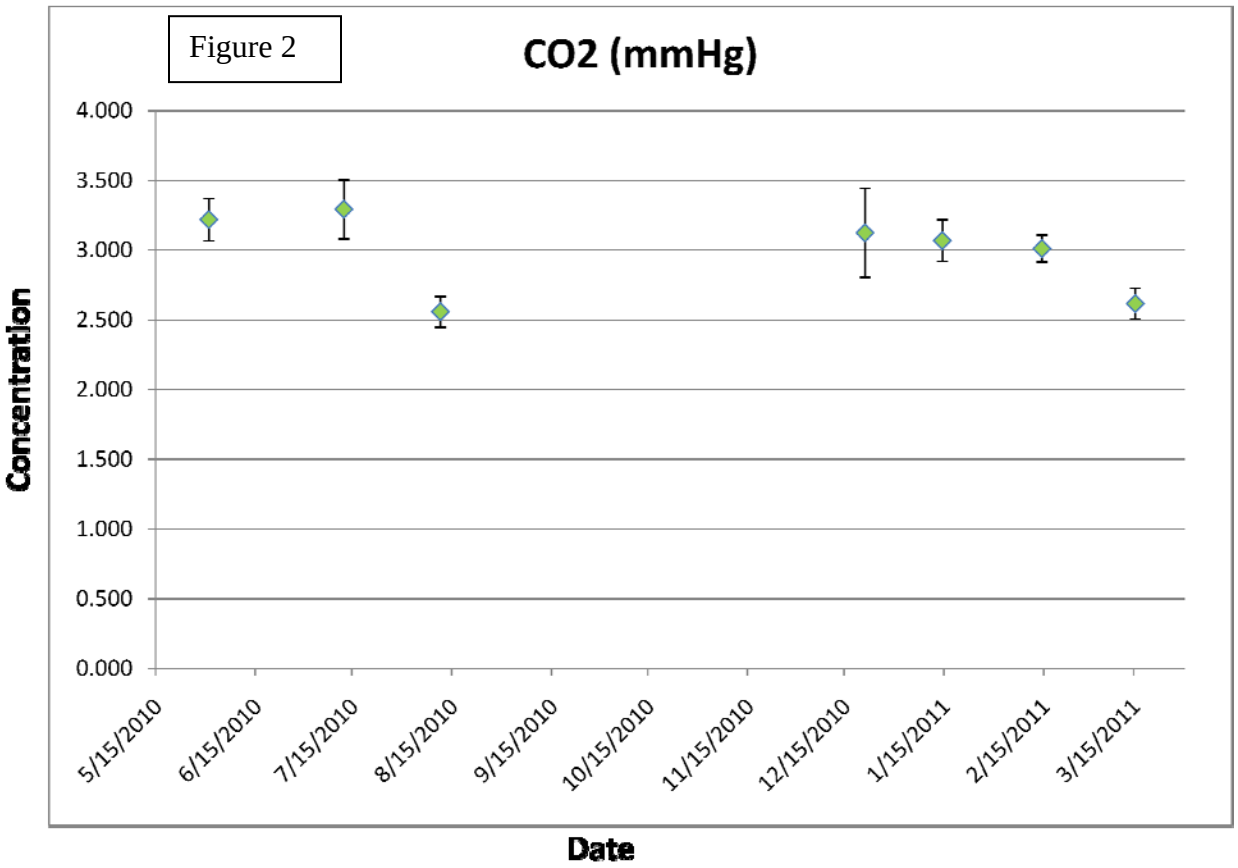
General Observations about ISS Air Quality:

This is a very limited set of samples on which to perform an air quality assessment. However, based on these samples, we have no reason to believe that nominal ISS air is unsafe to breathe. Past observations of sporadic elevations of propenal have recurred once, but at a lower level. We must continue to be vigilant when dealing with nominal atmospheres in ISS. New, unmanned modules, such as the PMM, require special attention when the crew first enters.

Carbon Dioxide: This anthropogenic compound has drawn much attention recently because of the possibility that it could contirbute to the effects of intracranial hypertension experienced because of spaceflight-induced fluid shifts. From now on we will maintain a plot (Figure 2) of carbon dioxide concentrations (±SD) by averaging the values found in the 3-5 samples taken each month in diverse locations of the ISS. This will enable us to estimate the average exposure of crewmembers to carbon dioxide during their stay aboard the ISS. In general, concentrations are being maintained below 3.5 mmHg.

Contaminated Samples: GSC samples taken in the Lab on 5/31/10 and from the SM on 7/12/10 were invalid because of internal contamination. The source of contamination has been isolated to a specific series of GSC numbers, although the precise origin of the contamination is uncertain.

Figure 2



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Enclosures

Table 1A: Analytical concentrations of compounds found in the STS-133 GSCs
Table 1B: Analytical concentrations of compounds found in ULF5 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-133 GRAB SAMPLE CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)	
	AA05070 MIDDECK SN 2036 03/19/11 @ 11:17 GMT	AA05068 PREFLIGHT SN 1094 02/24/11 @16:10 EST
TARGET COMPOUNDS (TO-14/POLAR)* **		
FREON12	<0.050	<0.025
CHLOROMETHANE	TRACE	<0.025
FREON114	<0.050	<0.025
METHANOL	0.32	TRACE
ACETALDEHYDE	0.094	0.14
VINYLCHLORIDE	<0.050	<0.025
BROMOMETHANE	<0.050	<0.025
ETHANOL	0.51	TRACE
CHLOROETHANE	<0.050	<0.025
ACETONITRILE	<0.050	<0.025
PROPENAL	<0.050	<0.025
ACETONE	0.24	0.12
PROPANAL	<0.050	<0.025
ISOPROPANOL	0.14	TRACE
FREON11	<0.050	<0.025
FURAN	<0.050	<0.025
ACRYLONITRILE	<0.050	<0.025
PENTANE	<0.050	<0.025
2-METHYL-2-PROPANOL	<0.050	<0.025
METHYLACETATE	<0.050	<0.025
1,1-DICHLOROETHENE	<0.050	<0.025
DICHLOROMETHANE	<0.050	<0.025
3-CHLOROPROPENE	<0.050	<0.025
FREON113	<0.050	<0.025
N-PROPANOL	<0.050	<0.025
1,1-DICHLOROETHANE	<0.050	<0.025
BUTANAL	<0.050	TRACE
2-BUTANONE	<0.050	TRACE
CIS-1,2-DICHLOROETHENE	<0.050	<0.025
2-METHYLFURAN	<0.050	<0.025
ETHYLACETATE	<0.050	<0.025
HEXANE	<0.050	<0.025
CHLOROFORM	<0.050	<0.025
2-BUTENAL	<0.050	<0.025
1,2-DICHLOROETHANE	<0.050	<0.025
1,1,1-TRICHLOROETHANE	<0.050	<0.025
N-BUTANOL	<0.050	<0.025
BENZENE	<0.050	<0.025
CARBONTETRACHLORIDE	<0.050	<0.025
2-PENTANONE	<0.050	<0.025
2-METHYLHEXANE	<0.050	<0.025
2,3-DIMETHYLPENTANE	<0.050	<0.025
PENTANAL	<0.050	TRACE

3-METHYLHEXANE	<0.050	<0.025
1,2-DICHLOROPROPANE	<0.050	<0.025
1,4-DIOXANE	<0.050	<0.025
TRICHLOROETHENE	<0.050	<0.025
2,5-DIMETHYLFURAN	<0.050	<0.025
N-HEPTANE	<0.050	<0.025
4-METHYL2-PENTANONE	<0.050	<0.025
CIS-1,3-DICHLOROPROPENE	<0.050	<0.025
2-PENTENAL	<0.050	<0.025
TRANS-1,3-DICHLOROPROPENE	<0.050	<0.025
1,1,2-TRICHLOROETHANE	<0.050	<0.025
TOLUENE	<0.050	<0.025
HEXANAL	<0.050	TRACE
MESITYLOXIDE	<0.050	<0.025
1,2-DIBROMOETHANE	<0.050	<0.025
BUTYLACETATE	<0.050	<0.025
OCTANE	<0.050	<0.025
TETRACHLOROETHENE	<0.050	<0.025
CHLOROBENZENE	<0.050	<0.025
ETHYLBENZENE	<0.050	<0.025
M/P-XYLENES	<0.050	<0.025
2-HEPTANONE	<0.050	<0.025
CYCLOHEXANONE	<0.050	<0.025
HEPTANAL	<0.050	TRACE
STYRENE	<0.050	<0.025
1,1,2,2-TETRACHLOROETHANE	<0.050	<0.025
O-XYLENE	<0.050	<0.025
NONANE	<0.050	<0.025
1,3,5-TRIMETHYLBENZENE	<0.050	<0.025
1,2,4-TRIMETHYLBENZENE	<0.050	<0.025
1,3-DICHLOROBENZENE	<0.050	<0.025
1,4-DICHLOROBENZENE	<0.050	<0.025
1,2-DICHLOROBENZENE	<0.050	<0.025
1,2,4-TRICHLOROBENZENE	<0.050	<0.025
HEXACHLORO-1,3-BUTADIENE	<0.050	<0.025

TARGET COMPOUNDS (TOXIC)+		
1,3-BUTADIENE	<0.050	<0.025
ETHYLENE OXIDE	<0.050	<0.025
CARBON DISULFIDE	<0.050	<0.025
2-METHYL-2-PROPENAL	<0.050	<0.025
3-BUTEN-2-ONE	<0.050	<0.025
2-ETHOXYETHANOL	<0.050	<0.025
DIMETHYLDISULFIDE	<0.050	<0.025
OCTAMETHYLCYCLOTETRASILOXANE	*	*

NON-TARGET COMPOUNDS+		
OCTAFLUOROPROPANE**	23	0.077
SULFURHEXAFLUORIDE	0.079	<0.025
BROMOTRIFLUOROMETHANE	0.64	<0.025
HEXAMETHYLCYCLOTRISILOXANE	*	*
DECAMETHYLCYCLOPENTASILOXANE	*	*

TOTAL ALCOHOLS PLUS ACETONE	**1.2**	0.16

TARGET COMPOUNDS (GC)* **		
CARBON MONOXIDE	3.3	<0.57
METHANE	32	<1.6
HYDROGEN	8.7	<0.41
CARBON DIOXIDE	4200	TRACE

TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	**25**	**0.44**

TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS) MINUS OCTAFLUOROPROPANE	**2.1**	**0.36**

***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 quantitated by one-point calibration

*** Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.

+ Book B-values are used for quantitation. B-values are referenced in the book "Compilation of Mass Spectral Data" by A. Cornu and R. Massot, 1966

TABLE 1B
ANALYTICAL RESULTS OF
STS-133 GRAB SAMPLE CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (7-d SMAC)	
	AA05070 MIDDECK SN 2036 03/19/11 @ 11:17 GMT	AA05068 PREFLIGHT SN 1094 02/24/11 @16:10 EST
TARGET COMPOUNDS (TO-14/POLAR)		
FREON12	ND	ND
CHLOROMETHANE	0.00061	ND
FREON114	ND	ND
METHANOL	0.00353	0.00014
ACETALDEHYDE	0.02348	0.03460
VINYLCHLORIDE	ND	ND
BROMOMETHANE	ND	ND
ETHANOL	0.00026	0.00001
CHLOROETHANE	ND	ND
ACETONITRILE	ND	ND
PROPENAL	ND	ND
ACETONE	0.00469	0.00240
PROPANAL	ND	ND
ISOPROPANOL	0.00091	0.00008
FREON11	ND	ND
FURAN	ND	ND
ACRYLONITRILE	ND	ND
PENTANE	ND	ND
2-METHYL-2-PROPANOL	ND	ND
METHYLACETATE	ND	ND
1,1-DICHLOROETHENE	ND	ND
DICHLOROMETHANE	ND	ND
3-CHLOROPROPENE	ND	ND
FREON113	ND	ND
N-PROPANOL	ND	ND
1,1-DICHLOROETHANE	ND	ND
BUTANAL	ND	0.00096
2-BUTANONE	ND	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	ND	ND
2-METHYLHEXANE	ND	ND
2,3-DIMETHYLPENTANE	ND	ND
PENTANAL	ND	0.00078

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	ND	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	0.00060
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
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

TARGET COMPOUNDS (TOXIC)		
1,3-BUTADIENE	ND	ND
ETHYLENE OXIDE	ND	ND
CARBON DISULFIDE	ND	ND
2-METHYL-2-PROPENAL	ND	ND
3-BUTEN-2-ONE	ND	ND
2-ETHOXYETHANOL	ND	ND
DIMETHYLDISULFIDE	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE	*	*

NON-TARGET COMPOUNDS		
OCTAFLUOROPROPANE	0.00027	0.00000
SULFURHEXAFLUORIDE	0.00007	ND
BROMOTRIFLUOROMETHANE	0.00006	ND
HEXAMETHYLCYCLOTRISILOXANE	*	*
DECAMETHYLCYCLOPENTASILOXANE	*	*

TARGET COMPOUNDS (GC)		
CARBON MONOXIDE	0.05241	0.00000

METHANE	0.00925	0.00000
HYDROGEN	0.02560	0.00000
CARBON DIOXIDE	0.32516	0.01538
TOTAL T-VALUE	**0.44630**	**0.05606**
TOTAL T-VALUE MINUS OCTAFLUOROPROPANE	**0.44603**	**0.05606**

***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.

TABLE 2A
ANALYTICAL RESULTS OF
ULF5 RETURN GRAB SAMPLE CONTAINER & MINI-GRAB SAMPLE CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)															
	AA050351 S/N 2015 LAB 05/31/10 @ 8:21 GMT	**AA050361 S/N 2016 LAB 05/31/10 @ 8:21 GMT**	**AA050372 S/N 1035 JEM 05/31/10 @ 8:27 GMT**	**AA050382 S/N 1037 SM 05/31/10 @ 8:29 GMT**	**AA050401 S/N 2017 SM 07/12/10 @ 16:14 GMT**	**AA050411 S/N 2019 SM 07/12/10 @ 16:14 GMT**	**AA050422 S/N 1042 LAB 07/12/10 @ 16:17 GMT**	**AA050432 S/N 1078 COL 07/12/10 @ 16:20 GMT**	**AA050442 S/N 1073 LAB 08/11/10 @ 14:50 GMT**	**AA050452 S/N 1020 JEM 08/11/10 @ 14:55 GMT**	**AA050461 S/N 2018 JEM 08/11/10 @ 14:55 GMT**	**AA050471 S/N 2020 JEM 08/11/10 @ 14:55 GMT**	**AA050482 S/N 1079 SM 08/11/10 @ 15:00 GMT**	**AA050492 S/N 1052 WRS-1 RACK 10/01/10 @ 8:36 GMT**	**AA050501 S/N 2028 LAB 10/19/10 @ 19:42 GMT**	**AA050511 S/N 2038 PMM 03/01/11 @ 03:15 GMT**
TARGET COMPOUNDS (TO-14/POLAR)+++																
FREON12	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
CHLOROMETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
FREON114	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
METHANOL **	0.48	0.53	0.30	0.30	0.40	0.41	0.32	0.36	***0.44***	0.38	0.53	0.59	0.32	0.27	0.49	0.93
ACETALDEHYDE	0.22	0.19	0.16	0.16	0.20	0.16	0.20	0.19	0.19	0.17	0.33	0.27	0.20	0.16	0.19	0.24
VINYLCHLORIDE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
BROMOMETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
ETHANOL *	**3.3**	**3.4**	**3.7**	**3.7**	**3.1**	**2.9**	**2.8**	**3.1**	**3.5**	**3.3**	**2.9**	**3.1**	**3.1**	**2.4**	**4.7**	0.64
CHLOROETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
ACETONITRILE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
PROPENAL	<0.050	<0.050	TRACE	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
ACETONE	0.37	0.38	0.49	0.44	0.29	0.30	0.32	0.33	0.36	0.32	0.29	0.28	0.33	0.24	0.33	0.81
PROPANAL	TRACE	TRACE	TRACE	0.037	TRACE	TRACE	0.026	TRACE	0.042	0.039	TRACE	TRACE	0.048	0.034	TRACE	TRACE
ISOPROPANOL *	0.23	0.29	0.15	0.13	0.18	0.72	0.10	0.12	0.14	0.13	0.18	0.86	0.11	0.13	0.29	**6.3**
FREON11	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
FURAN	<0.050	<0.050	TRACE	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
ACRYLONITRILE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
PENTANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2-METHYL-2-PROPANOL	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.19
METHYLACETATE	0.058	0.062	0.066	0.053	<0.050	<0.050	TRACE	TRACE	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	0.064	<0.050
1,1-DICHLOROETHENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
DICHLOROMETHANE	<0.050	<0.050	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	<0.050	TRACE
3-CHLOROPROPENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
FREON113	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
N-PROPANOL	<0.050	<0.050	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	TRACE	TRACE	TRACE	<0.050	TRACE	TRACE	<0.050	0.15
1,1-DICHLOROETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
BUTANAL	<0.050	<0.050	<0.025	TRACE	<0.050	<0.050	TRACE	TRACE	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	<0.050	<0.050
2-BUTANONE	TRACE	TRACE	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	<0.050	1.3
CIS-1,2-DICHLOROETHENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2-METHYLFURAN	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
ETHYLACETATE	0.10	0.11	0.14	0.11	<0.050	TRACE	0.048	0.047	0.052	0.047	TRACE	TRACE	0.050	0.039	0.11	0.075
HEXANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
CHLOROFORM	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2-BUTENAL	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,2-DICHLOROETHANE	TRACE	0.058	0.065	0.058	0.053	0.052	0.047	0.049	0.054	0.044	TRACE	TRACE	0.048	0.052	TRACE	TRACE
1,1,1-TRICHLOROETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
N-BUTANOL	0.12	0.13	0.13	0.13	0.11	0.24	0.12	0.13	0.16	0.15	0.36	0.29	0.14	0.12	0.13	0.53
BENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	TRACE
CARBONTETRACHLORIDE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2-PENTANONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2-METHYLHEXANE	<0.050	<0.050	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	TRACE	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.68
2,3-DIMETHYLPENTANE	TRACE	TRACE	0.028	0.026	TRACE	<0.050	TRACE	TRACE	TRACE	<0.025	<0.050	<0.050	TRACE	<0.025	<0.050	0.89
PENTANAL	<0.050	<0.050	<0.025	TRACE	<0.050	<0.050	TRACE	TRACE	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	<0.050	<0.050
3-METHYLHEXANE	TRACE	TRACE	0.041	0.038	TRACE	TRACE	0.028	0.030	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	TRACE	1.4
1,2-DICHLOROPROPANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,4-DIOXANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
TRICHLOROETHENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2,5-DIMETHYLFURAN	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
N-HEPTANE	<0.050	<0.050	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.38
4-METHYL2-PENTANONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.051
CIS-1,3-DICHLOROPROPENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2-PENTENAL	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
TRANS-1,3-DICHLOROPROPENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,1,2-TRICHLOROETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
TOLUENE	TRACE	0.055	0.063	0.048	0.062	0.059	0.057	0.063	0.047	0.042	TRACE	TRACE	0.041	0.034	TRACE	1.6
HEXANAL	<0.050	<0.050	<0.025	TRACE	<0.050	<0.050	TRACE	TRACE	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	<0.050	<0.050
MESITYLOXIDE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,2-DIBROMOETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
BUTYLACETATE	TRACE	TRACE	0.040	0.038	TRACE	TRACE	0.032	0.032	0.028	0.026	TRACE	<0.050	0.028	TRACE	<0.050	0.11
OCTANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
TETRACHLOROETHENE	<0.050	<0.050	0.048	TRACE	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
CHLOROBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
ETHYLBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
M/P-XYLENES	<0.050	<0.050	0.026	TRACE	<0.050	<0.050	0.027	0.027	TRACE	TRACE	<0.050	<0.050	TRACE	TRACE	<0.050	TRACE
2-HEPTANONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
CYCLOHEXANONE	TRACE	TRACE	0.061	0.048	TRACE	TRACE	0.044	0.050	0.047	0.049	TRACE	TRACE	0.040	0.039	TRACE	TRACE
HEPTANAL	<0.050	<0.050	<0.025	TRACE	<0.050	<0.050	TRACE	<0.025	<0.025	TRACE	<0.050	<0.050	TRACE	TRACE	<0.050	<0.050
STYRENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,1,2,2-TETRACHLOROETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
O-XYLENE	0.25	0.26	0.31	0.28	0.16	0.17	0.17	0.17	0.10	0.096	0.071	0.069	0.10	0.094	0.13	<0.050
NONANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,3,5-TRIMETHYLBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,2,4-TRIMETHYLBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,3-DICHLOROBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,4-DICHLOROBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
1,2-DICHLOROBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050

1,2,4-TRICHLOROBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
HEXACHLORO-1,3-BUTADIENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
TARGET COMPOUNDS (TOXIC)++++																
1,3-BUTADIENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
ETHYLENE OXIDE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
CARBON DISULFIDE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	TRACE
2-METHYL-2-PROPENAL	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	TRACE	<0.050	<0.025	<0.025	<0.050	TRACE
3-BUTEN-2-ONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	TRACE
2-ETHOXYETHANOL	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
DIMETHYLDISULFIDE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
OCTAMETHYLCYCLOTETRASILOXANE	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
NON-TARGET COMPOUNDS++++																
OCTAFLUOROPROPANE++	70	54	40	28	42	42	28	22	23	23	28	30	26	36	36	0.69
SULFURHEXAFLUORIDE	0.071	0.12	<0.025	<0.025	0.10	0.11	<0.025	<0.025	<0.025	<0.025	0.081	0.13	<0.025	0.048	0.12	<0.050
1,1,1,2-TETRAFLUOROETHANE	0.064	0.079	0.078	0.071	0.076	0.076	0.066	0.072	0.085	0.072	0.089	0.086	0.065	0.092	0.12	0.44
PROPENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	TRACE
CHLORODIFLUOROMETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.24
CARBONYLSULFIDE	<0.050	TRACE	<0.025	<0.025	TRACE	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.13
1-BUTENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.47
2-FLUORO-2-METHYLPROPANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	TRACE
FLUOROTRIMETHYLSILANE	<0.050	<0.050	0.029	<0.025	<0.050	<0.050	<0.025	<0.025	TRACE	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.32
1,1-DICHLORO-1-FLUOROETHANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2-METHYL-1,3-BUTADIENE(ISOPRENE)	0.11	0.11	0.14	0.12	0.057	0.079	0.074	0.079	0.079	0.068	TRACE	0.052	0.069	0.040	0.060	<0.050
TRIMETHYLSILANOL	0.25	0.24	0.37	0.30	0.18	0.19	0.23	0.28	0.28	0.27	0.14	0.22	0.22	0.22	0.56	3.3
1,3-DIOXOLANE	<0.050	TRACE	0.066	0.027	TRACE	TRACE	0.046	0.048	0.061	0.045	TRACE	TRACE	0.040	0.045	TRACE	<0.050
TRIMETHYLETHOXYSILANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
C7-ALKANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.28
C7-ALKANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.29
C2-SUBSTITUTEDCYCLOPENTANE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.12
C5-KETONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	0.14
C6-ALDEHYDE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
C6-KETONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
HEXAMETHYLCYCLOTRISILOXANE	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
C8-KETONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
BENZALDEHYDE	<0.050	<0.050	<0.025	0.040	<0.050	<0.050	TRACE	TRACE	0.029	0.038	<0.050	<0.050	0.062	0.029	<0.050	<0.050
C8-KETONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
OCTANAL	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
2-ETHYLHEXANOL	0.052	TRACE	0.095	0.051	0.051	0.060	0.054	0.065	0.079	0.081	TRACE	0.070	0.032	0.062	0.084	0.13
C4-SUBSTITUTEDBENZENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	TRACE	TRACE	0.029	TRACE	<0.050	<0.050	TRACE	0.038	<0.050	<0.050
LIMONENE	0.075	0.074	0.11	0.11	0.14	0.23	0.20	0.19	0.32	0.28	0.090	0.17	0.34	0.23	0.26	<0.050
C9-KETONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
C9-KETONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
DECAMETHYLCYCLOPENTASILOXANE	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
C10-ALKENE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
C10-KETONE	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.050	<0.050
DODECAMETHYLCYCLOHEXASILOXANE	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
TOTAL ALCOHOLS PLUS ACETONE	**4.5**	**4.8**	**4.8**	**4.8**	**4.0**	**4.6**	**3.7**	**4.0**	**4.6**	**4.3**	**4.3**	**5.2**	**4.0**	**3.1**	**5.9**	**9.3**
TARGET COMPOUNDS (GC)+++																
CARBON MONOXIDE	3.0	2.8	3.7	3.1	2.1	2.0	2.0	1.5	2.0	1.6	1.8	1.8	2.1	1.4	1.3	2.8
METHANE	23	23	23	23	8.5	8.5	8.5	8.4	8.9	9.1	8.1	8.7	9.0	TRACE	TRACE	TRACE
HYDROGEN	4.2	4.1	3.6	3.6	3.2	2.9	2.6	2.5	2.2	2.1	2.8	2.6	2.2	1.8	2.4	< 0.41
CARBON DIOXIDE	7700	7100	7800	7900	8000	8400	7300	7500	6200	6200	5600	6100	6200	4000	5200	TRACE
TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	**76**	**60**	**47**	**34**	**47**	**48**	**34**	**27**	**29**	**29**	**33**	**36**	**32**	**41**	**44**	**23**
TOTAL CONCENTRATION - OFP (NON-METHANE HYDROCARBONS)	**6.0**	**6.3**	**6.8**	**6.5**	**5.3**	**5.9**	**5.2**	**5.6**	**6.2**	**5.8**	**5.3**	**6.4**	**5.5**	**4.5**	**7.8**	**22**

1 mini-grab sample container

2 grab sample container

*** FROM GC RESULTS**

*****FROM GC RESULTS; MeOH Conc.=GC MeOH Conc.-(2* GC/MS ACETALDEHYDE Conc.)***

++ Measurements are quantified by single-point calibration.

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

++++ Book B-values are used for quantitation. B-values are referenced in the book "Compilation of Mass Spectral Data" by A. Cornu and R. Massot, 1966

TABLE 2B
ANALYTICAL RESULTS OF
ULF5 RETURN GRAB SAMPLE CONTAINER & MINI-GRAB SAMPLE CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)															
	AA050351 S/N 2015 LAB 05/31/10 @ 8:21 GMT	**AA050361 S/N 2016 LAB 05/31/10 @ 8:21 GMT**	**AA050372 S/N 1035 JEM 05/31/10 @ 8:27 GMT**	**AA050382 S/N 1037 SM 05/31/10 @ 8:29 GMT**	**AA050401 S/N 2017 SM 07/12/10 @ 16:14 GMT**	**AA050411 S/N 2019 SM 07/12/10 @ 16:14 GMT**	**AA050422 S/N 1042 LAB 07/12/10 @ 16:17 GMT**	**AA050432 S/N 1078 COL 07/12/10 @ 16:20 GMT**	**AA050442 S/N 1073 LAB 08/11/10 @ 14:50 GMT**	**AA050452 S/N 1020 JEM 08/11/10 @ 14:55 GMT**	**AA050461 S/N 2018 JEM 08/11/10 @ 14:55 GMT**	**AA050471 S/N 2020 JEM 08/11/10 @ 14:55 GMT**	**AA050482 S/N 1079 SM 08/11/10 @ 15:00 GMT**	**AA050492 S/N 1052 WRS-1 RACK 10/01/10 @ 8:36 GMT**	**AA050501 S/N 2028 LAB 10/19/10 @ 19:42 GMT**	**AA050511 S/N 2038 PMM 03/01/11 @ 03:15 GMT**
TARGET COMPOUNDS (TO-14/POLAR)																
FREON12	ND	ND	ND	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	ND	ND	ND
FREON114	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHANOL**	0.00529	0.00585	0.00334	0.00336	0.00450	0.00457	0.00352	0.00405	***0.00487***	0.00419	0.00591	0.00657	0.00357	0.00302	0.00549	0.01035
ACETALDEHYDE	0.05417	0.04824	0.03968	0.04030	0.05108	0.04010	0.05121	0.04822	0.04630	0.04364	0.08184	0.06730	0.04916	0.03945	0.04733	0.06071
VINYLCHLORIDE	ND	ND	ND	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	ND	ND	ND
ETHANOL *	**0.00166**	**0.00171**	**0.00185**	**0.00186**	**0.00153**	**0.00147**	**0.00140**	**0.00154**	**0.00173**	**0.00166**	**0.00144**	**0.00156**	**0.00154**	0.00118	**0.00234**	0.00032
CHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACETONITRILE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PROPENAL	ND	ND	0.66131	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACETONE	0.00720	0.00732	0.00946	0.00848	0.00565	0.00585	0.00621	0.00640	0.00686	0.00607	0.00552	0.00546	0.00631	0.00458	0.00640	0.01566
PROPANAL	0.00227	0.00227	0.00114	0.00340	0.00227	0.00227	0.00232	0.00114	0.00385	0.00355	0.00227	0.00227	0.00438	0.00305	0.00227	0.00227
ISOPROPANOL *	0.00151	0.00194	0.00101	0.00087	0.00118	0.00480	0.00069	0.00080	0.00092	0.00087	0.00120	0.00576	0.00076	0.00085	0.00192	**0.04178**
FREON11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FURAN	ND	ND	0.17857	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACRYLONITRILE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENTANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-METHYL-2-PROPANOL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00158
METHYLACETATE	0.00049	0.00052	0.00055	0.00044	ND	ND	0.00010	0.00010	0.00010	0.00010	ND	ND	0.00010	0.00010	0.00053	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DICHLOROMETHANE	ND	ND	0.00125	0.00125	ND	ND	0.00125	0.00125	0.00125	0.00125	ND	ND	0.00125	0.00125	ND	0.00250
3-CHLOROPROPENE	ND	ND	ND	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	ND	ND	ND
N-PROPANOL	ND	ND	0.00013	0.00013	ND	ND	0.00013	0.00013	0.00013	0.00013	0.00026	ND	0.00013	0.00013	ND	0.00150
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BUTANAL	ND	ND	ND	0.00096	ND	ND	0.00096	0.00096	0.00096	0.00096	ND	ND	0.00096	0.00096	ND	ND
2-BUTANONE	0.00083	0.00083	0.00042	0.00042	ND	ND	0.00042	0.00042	0.00042	0.00042	ND	ND	0.00042	0.00042	ND	0.04276
CIS-1,2-DICHLOROETHENE	ND	ND	ND	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	ND	ND	ND
ETHYLACETATE	0.00057	0.00059	0.00077	0.00064	ND	0.00014	0.00027	0.00026	0.00029	0.00026	0.00014	0.00014	0.00028	0.00022	0.00059	0.00042
HEXANE	ND	ND	ND	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	ND	ND	ND
2-BUTENAL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	0.01563	0.03609	0.04039	0.03596	0.03288	0.03250	0.02936	0.03070	0.03366	0.02774	0.01563	0.01563	0.02997	0.03257	0.01563	0.01563
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-BUTANOL	0.00290	0.00315	0.00334	0.00336	0.00280	0.00593	0.00308	0.00333	0.00399	0.00374	0.00899	0.00720	0.00341	0.00312	0.00337	0.01326
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12500
CARBONTETRACHLORIDE	ND	ND	ND	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	ND	ND	ND
2-METHYLHEXANE	ND	ND	0.00104	0.00104	ND	ND	0.00104	0.00104	0.00104	ND	ND	ND	ND	ND	ND	0.05655
2,3-DIMETHYLPENTANE	0.00208	0.00208	0.00231	0.00213	0.00208	ND	0.00104	0.00104	0.00104	ND	ND	ND	0.00104	ND	ND	0.07431
PENTANAL	ND	ND	ND	0.00078	ND	ND	0.00078	0.00078	0.00078	0.00078	ND	ND	0.00078	0.00078	ND	ND
3-METHYLHEXANE	0.00208	0.00208	0.00345	0.00320	0.00208	0.00208	0.00231	0.00247	0.00104	0.00104	ND	ND	0.00104	0.00104	0.00208	0.11944
1,2-DICHLOROPROPANE	ND	ND	ND	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	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND	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	ND	ND	ND
N-HEPTANE	ND	ND	0.00104	0.00104	ND	ND	0.00104	0.00104	ND	ND	ND	ND	ND	ND	ND	0.03194
4-METHYL2-PENTANONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00036
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	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	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	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	ND	ND	ND
TOLUENE	0.00167	0.00365	0.00418	0.00321	0.00413	0.00394	0.00380	0.00420	0.00316	0.00282	0.00167	0.00167	0.00272	0.00226	0.00167	0.10650
HEXANAL	ND	ND	ND	0.00069	ND	ND	0.00069	0.00069	0.00069	0.00069	ND	ND	0.00069	0.00069	ND	ND
MESITYLOXIDE	ND	ND	ND	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	ND	ND	ND
BUTYLACETATE	0.00013	0.00013	0.00021	0.00020	0.00013	0.00013	0.00017	0.00017	0.00015	0.00014	0.00013	ND	0.00015	0.00007	ND	0.00059
OCTANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	ND	ND	0.00142	0.00037	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	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M/P-XYLENES	ND	ND	0.00069	0.00034	ND	ND	0.00072	0.00074	0.00034	0.00034	ND	ND	0.00034	ND	ND	0.00068
2-HEPTANONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00034	ND	ND
CYCLOHEXANONE	0.00042	0.00042	0.00102	0.00081	0.00042	0.00042	0.00073	0.00084	0.00078	0.00081	0.00042	0.00042	0.00067	ND	0.00042	0.00042
HEPTANAL	ND	ND	ND	0.00060	ND	ND	0.00060	ND	ND	0.00060	ND	ND	0.00060	0.00065	ND	ND
STYRENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00060	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	0.00677	0.00705	0.00837	0.00747	0.00436	0.00455	0.00447	0.00465	0.00277	0.00259	0.00193	0.00187	0.00277	ND	0.00341	ND
NONANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00254	ND	ND
1,3,5-TRIMETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00254	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	ND	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	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	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	ND	ND	ND

1,2,4-TRICHLOROBENZENE	ND	ND	ND	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	ND	ND	ND
TARGET COMPOUNDS (TOXIC)																
1,3-BUTADIENE	ND	ND	ND	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	ND	ND	ND
CARBON DISULFIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00156
2-METHYL-2-PROPENAL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01471	ND	ND	ND	ND	0.01471
3-BUTEN-2-ONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05814
2-ETHOXYETHANOL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIMETHYLDISULFIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
NON-TARGET COMPOUNDS																
OCTAFLUOROPROPANE++	0.00081	0.00063	0.00047	0.00033	0.00050	0.00049	0.00033	0.00026	0.00027	0.00027	0.00033	0.00035	0.00031	0.00042	0.00042	0.00001
SULFURHEXAFLUORIDE	0.00006	0.00010	ND	ND	0.00009	0.00009	ND	ND	ND	ND	0.00007	0.00011	ND	0.00004	0.00010	ND
1,1,1,2-TETRAFLUOROETHANE	0.00062	0.00076	0.00075	0.00068	0.00073	0.00073	0.00063	0.00069	0.00082	0.00069	0.00085	0.00083	0.00063	0.00088	0.00116	0.00428
PROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00003
CHLORODIFLUOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00007
CARBONYLSULFIDE	ND	0.00208	ND	ND	0.00208	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01114
1-BUTENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00101
2-FLUORO-2-METHYLPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00010
FLUOROTRIMETHYLSILANE	ND	ND	0.05889	ND	ND	ND	ND	ND	0.02500	ND	ND	ND	ND	ND	ND	0.64889
1,1-DICHLORO-1-FLUOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-METHYL-1,3-BUTADIENE(ISOPRENE)	0.03730	0.03818	0.04755	0.03939	0.01905	0.02649	0.02470	0.02626	0.02641	0.02253	0.00833	0.01732	0.02304	0.01323	0.02012	ND
TRIMETHYLSILANOL	0.06248	0.06111	0.09244	0.07511	0.04423	0.04652	0.05697	0.06928	0.07049	0.06782	0.03617	0.05412	0.05385	0.05577	0.14111	0.81784
1,3-DIOXOLANE	ND	0.00069	0.00184	0.00074	0.00069	0.00069	0.00127	0.00132	0.00170	0.00124	0.00069	0.00069	0.00110	0.00124	0.00069	ND
TRIMETHYLETHOXYSILANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C7-ALKANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02374
C7-ALKANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02432
C2-SUBSTITUTEDCYCLOPENTANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00387
C5-KETONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00782
C6-ALDEHYDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6-KETONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HEXAMETHYLCYCLOTRISILOXANE	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
C8-KETONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZALDEHYDE	ND	ND	ND	0.00023	ND	ND	0.00007	0.00007	0.00017	0.00022	ND	ND	0.00036	0.00017	ND	ND
C8-KETONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OCTANAL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-ETHYLHEXANOL	0.00099	0.00047	0.00180	0.00096	0.00096	0.00114	0.00102	0.00123	0.00149	0.00152	0.00047	0.00131	0.00061	0.00118	0.00159	0.00243
C4-SUBSTITUTEDBENZENE	ND	ND	ND	ND	ND	ND	0.00089	0.00089	0.00204	0.00089	ND	ND	0.00089	0.00273	ND	ND
LIMONENE	0.00065	0.00065	0.00095	0.00096	0.00119	0.00203	0.00173	0.00166	0.00276	0.00240	0.00078	0.00144	0.00294	0.00198	0.00230	ND
C9-KETONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C9-KETONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DECAMETHYLCYCLOPENTASILOXANE	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
C10-ALKENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C10-KETONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DODECAMETHYLCYCLOHEXASILOXANE	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
TARGET COMPOUNDS (GC)																
CARBON MONOXIDE	0.17693	0.16354	0.21889	0.18123	0.12312	0.11506	0.11714	0.08605	0.11649	0.09579	0.10291	0.10356	0.12338	0.07914	0.07469	0.16373
METHANE	0.00650	0.00653	0.00656	0.00660	0.00242	0.00244	0.00242	0.00239	0.00255	0.00259	0.00233	0.00249	0.00257	0.00023	0.00023	0.00023
HYDROGEN	0.01248	0.01216	0.01068	0.01056	0.00927	0.00845	0.00758	0.00732	0.00632	0.00606	0.00826	0.00753	0.00658	0.00541	0.00702	0.00000
CARBON DIOXIDE	0.59503	0.54958	0.59720	0.60560	0.61503	0.64689	0.56463	0.57317	0.47675	0.47935	0.43395	0.47250	0.48011	0.30991	0.40234	0.01538
TOTAL T-VALUE	**0.99950**	**0.96041**	**2.00498**	**1.04571**	**0.93445**	**0.95978**	**0.89772**	**0.88753**	**0.85037**	**0.78578**	**0.73718**	**0.77810**	**0.80940**	**0.57476**	**0.74522**	**2.52383**
TOTAL T-VALUE - OFP	**0.99868**	**0.95978**	**2.00451**	**1.04538**	**0.93396**	**0.95929**	**0.89738**	**0.88728**	**0.85010**	**0.78551**	**0.73685**	**0.77775**	**0.80909**	**0.57434**	**0.74480**	**2.52382**

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.