Assessment of Air Quality in the International Space Station (ISS) and Space Shuttle Based on Samples Returned aboard STS-108 (UF1) in December 2001

The toxicological assessment of grab sample canisters (GSCs) returned aboard STS-108 is reported. Analytical methods have not changed from earlier reports, and surrogate standard recoveries from the GSCs were 81-119%. Pressure tracking indicated no leaks in the canisters.

The two general criteria used to assess air quality are the total-non-methane-volatile organic hydrocarbons (NMVOCs) and the total T-value (minus the CO_2 and formaldehyde contributions). Because of the inertness of Freon 218 (octafluoropropane, OFP), its contribution to the NMVOC is subtracted and tabulated separately. Control of atmospheric alcohols is important to the water recovery system engineers, hence total alcohols are also shown for each sample. Because formaldehyde is quantified from sorbent badges, its concentration is listed separately. These five indices of air quality are summarized below:

Sample Location	Date/Type	NMVOCs - OFP (mg/m^3)	OFP (mg/m^3)	T Value[a] (units)	Alcohols (mg/m^3)	Formaldehyde (mg/m^3)
SM (contingency)	9/1/01	10	632	1.08	5.6	ns[b]
FGB	9/13/01	9	332	0.90	5.5	ns
SM	9/13/01	5	334	0.84	3.9	0.030
Lab	9/13/01	8	334	0.86	4.1	0.037
Lab	10/10/01	7	221	0.43	5.5	0.038
FGB	10/10/01	12	212	0.83	7.3	ns
SM	10/10/01	7	195	0.23	5.5	0.025
SM[c]	11/15/01	15	284	0.82	11.1[e]	0.027
Lab	11/15/01	ns	ns	ns	ns	0.045
MPLM2	12/09/01	13	20	1.02	6.4	ns
SM	12/09/01	10	295	1.08	7.3	ns
Lab	12/09/01	13	244	1.46	7.9	ns
Lab	12/15/01	9	245	0.64	6.3	ns
Shuttle Preflight[d]	12/5/01	3	0	0.69	0.7	ns
Shuttle Middeck	12/17/01	11	194	0.54	3.9	ns
Acceptable Health Guideline:		<25	85000	<1	<10	0.050

[a] Formaldehyde and CO2 not included in T calculation.
[b] ns = not sampled
[c] FGB sample was bad and no Lab GSC sample was taken on 11/15/01
[d] This sample was unusually contaminated for a preflight sample. This may be due to interruption of airflow to the vehicle's environmental system for several hours before the sample was acquired. There is no health concern.
[e] Due to an unusually high ethanol of 9.9 mg/m^3

The table shows that the air quality in general was acceptable for crew respiration. There is a trend of decreasing concentrations of OFP. The only T value significantly above 1 was from the Lab on 12/9/01. For health assessment, this value can be divided into toxicological groups with associated T-Values as follows: irritants (0.63), neurotoxicants (0.33), reproductive toxicants (0.20), hepatotoxicants (0.04), cardiotoxicants (0.17), and respiratory system toxicants (0.28). Formaldehyde at times approaches its limit and there is a pattern of slightly higher levels in the Lab compared to the SM. This could be due to differences in air scrubbing and humidity condensing capacity in the modules or to more sources of formaldehyde in the Lab.

Enclosures
1A: Analytical Results of UF1 GSC Samples
1B: T Values of UF1 GSC Samples
2A: Analytical Results of STS-108 GSC Samples
2B: T Values of STS-108 GSC Samples

TABLE 1A
ANALYTICAL RESULTS OF
ISS UF-1 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)												
	AA03234 S/N 1046 Service Module 9/1/01@ 09:33GMT	AA03223 S/N 1070 FGB 9/13/01@ 18:08 GMT	AA03235 S/N 1080 Service Module 9/13/01@ 18:12GMT	AA03224 S/N 1018 Lab 9/13/01@ 18:15GMT	AA03236 S/N 1071 Lab 10/10/01@ 10:09GMT	AA03237 S/N 1054 FGB 10/10/01@ 10:11GMT	AA03238 S/N 1044 Service Module 10/10/01@ 10:13GMT	AA03239 S/N 1072 FGB 11/15/01@ 09:15GMT	AA03240 S/N 1015 Service Module 11/15/01@ 09:20GMT	AA03241 S/N 1066 MPLM 2 12/09/01@ 01:18GMT	AA03242 S/N 1041 Service Module 12/09/01@ 18:05GMT	AA03243 S/N 1082 Lab 12/09/01@ 18:10GMT	AA03244 S/N 1060 Lab 12/15/01@ 11:51GMT
TARGET COMPOUNDS (TO-14/POLAR)* **													
FREON 12	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	<0.05	TRACE	TRACE	TRACE
CHLOROMETHANE	TRACE	<0.05	<0.05	<0.05	TRACE	TRACE	TRACE	TRACE	<0.05	TRACE	TRACE	TRACE	TRACE
FREON 114	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
METHANOL	0.44	2.05	0.50	0.54	0.50	0.53	0.46	0.41	0.64	0.27	0.58	1.70	0.39
ACETALDEHYDE	0.32	0.17	0.15	0.15	0.12	0.14	0.12	0.17	0.19	0.12	0.16	0.25	0.15
VINYL CHLORIDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BROMOMETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ETHANOL	4.3	2.8	2.71	2.79	4.70	5.67	4.57	3.19	9.90	1.02	6.21	5.32	5.32
CHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ACETONITRILE	TRACE	TRACE	<0.05	TRACE	TRACE	TRACE	<0.05	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
PROPENAL	TRACE_	TRACE_	TRACE_	TRACE_	<0.02	<0.02	<0.02	TRACE_	<0.02	<0.02	TRACE_	TRACE_	<0.02
ACETONE	0.35	0.26	0.26	0.30	0.11	0.16	0.13	0.15	0.22	1.48	0.28	0.38	0.27
PROPANAL	0.05	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	0.13	TRACE	0.05	TRACE
2-PROPANOL	0.23	0.22	0.24	0.25	0.09	0.16	0.24	0.13	0.16	3.06	0.17	0.29	0.18
FREON 11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	TRACE	<0.05	<0.05
FURAN	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ACRYLONITRILE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	<0.05	TRACE	TRACE	TRACE
PENTANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05	<0.05	<0.05
2-METHYL-2-PROPANOL	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
METHYL ACETATE	<0.05	TRACE	<0.05	<0.05	TRACE	TRACE	TRACE	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05
1,1-DICHLOROETHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DICHLOROMETHANE	0.30	0.11	0.11	0.15	0.13	0.14	0.10	0.08	0.09	3.01	0.26	0.37	0.16
3-CHLOROPROPENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
FREON 113	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	TRACE	<0.05	<0.05	<0.05
N-PROPANOL	0.07	0.05	0.06	0.07	TRACE	0.71	TRACE	TRACE	0.06	0.34	TRACE	0.07	TRACE
1,1-DICHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BUTANAL	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
2-BUTANONE	0.06	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	0.06	TRACE	0.55	TRACE	0.06	TRACE
1,2-DICHLOROETHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-METHYLFURAN	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ETHYL ACETATE	TRACE	TRACE	TRACE	TRACE	TRACE	0.05	TRACE	TRACE	TRACE	0.13	0.10	0.08	TRACE
HEXANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05
CHLOROFORM	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05
2-BUTENAL	TRACE	TRACE	<0.05	TRACE	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	TRACE	TRACE	<0.05
1,2-DICHLOROETHANE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	<0.05	<0.05	TRACE	<0.05	TRACE	TRACE	TRACE
1,1,1-TRICHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-BUTANOL	0.16	0.14	0.15	0.15	0.07	0.11	0.08	0.07	0.13	0.22	0.10	0.14	0.09
BENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05
CARBON TETRACHLORIDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-PENTANONE	<0.05	TRACE	<0.05	TRACE	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05	<0.05	<0.05
PENTANAL	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
1,2-DICHLOROPROPANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	TRACE	TRACE	<0.05
1,4-DIOXANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TRICHLOROETHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05
2,5-DIMETHYLFURAN	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4-METHYL-2-PENTANONE	TRACE	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05	TRACE	<0.05	TRACE	TRACE
CIS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-PENTENAL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TRANS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2-TRICHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TOLUENE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	0.35	TRACE	TRACE	TRACE
HEXANAL	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)												
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TARGET COMPOUNDS (TO-14/POLAR)* **													
MESITYL OXIDE	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-DIBROMOETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BUTYL ACETATE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
TETRACHLOROETHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05
CHLOROBENZENE	<0.05	TRACE	TRACE	TRACE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ETHYL BENZENE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	<0.05	<0.05	TRACE	TRACE	TRACE	TRACE	<0.05
M- + P-XYLENES	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
2-HEPTANONE	TRACE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TRACE	<0.05	TRACE	<0.05	TRACE	<0.05
CYCLOHEXANONE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
HEPTANAL	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
STYRENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-TETRACHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
O-XYLENE	0.07	0.08	0.08	0.09	0.07	0.10	0.06	TRACE	0.06	TRACE	0.11	0.07	TRACE
1,3,5-TRIMETHYLBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-TRIMETHYLBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-TRICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HEXACHLORO-1,3-BUTADIENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TARGET COMPOUNDS (TOXIC)													
1,3-BUTADIENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ETHYLENE OXIDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
CARBON DISULFIDE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
2-METHYL-2-PROPENAL	TRACE	TRACE	TRACE	<0.05	<0.05	TRACE	<0.05	TRACE	TRACE	TRACE	<0.05	TRACE	<0.05
3-BUTEN-2-ONE	TRACE	<0.05	<0.05	<0.05	TRACE	TRACE	<0.05	TRACE	<0.05	TRACE	TRACE	TRACE	TRACE
DIMETHYLDISULFIDE	<0.05	<0.05	<0.05	TRACE	<0.05	TRACE	<0.05	<0.05	TRACE	<0.05	TRACE	TRACE	TRACE
2-ETHOXYETHANOL	TRACE	<0.05	TRACE	<0.05	TRACE	TRACE	<0.05	<0.05	TRACE	<0.05	TRACE	TRACE	<0.05
OCTAMETHYLCYCLOTETRASILOXANE	0.68	0.79	0.21	0.54	0.17	1.18	0.11	1.18	0.98	0.56	0.18	1.13	0.28
NON-TARGET COMPOUNDS													
OCTAFLUOROPROPANE***	632	332	334	334	221	212	195	130	284	19.6	295	244	245
CHLOROPENTAFLUOROETHANE	0.07	0.03	0.03	0.04	0.01	0.01	0.01	0.01	0.02	0.002	0.02	0.03	0.03
BROMOTRIFLUOROMETHANE	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	0.12	0.14	0.17
2-METHYLPROPANE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.005	0.005	0.01	0.005
TRIMETHYLSILANOL	0.11	0.11	0.07	0.14	0.10	0.11	0.04	0.07	0.07	0.65	0.08	0.12	0.08
1,3-DIOXOLANE	0.02	0.03	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.06	0.03	0.03	0.02
2-METHYLPROPANENITRILE	0.003	0.003	0.004	0.002	0.005	0.01	0.002	0.002	0.002	0.02	0.01	0.01	0.002
C7 ALKANE	0.04	0.03	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.06	0.05	0.01
HEPTANE	0.02	0.02	0.01	0.02	0.01	0.01	0.004	0.10	0.01	0.01	0.06	0.05	0.01
HEXAMETHYLCYCLOTRISILOXANE	1.60	0.78	0.23	1.05	0.24	2.00	0.19	1.29	2.03	0.95	0.31	1.43	0.51
LIMONENE	0.07	0.06	0.06	0.06	0.05	0.06	0.05	0.03	0.05	0.02	0.01	0.01	0.01
DECAMETHYLCYCLOPENTASILOXANE	0.26	0.19	0.18	0.35	0.13	0.30	0.11	0.15	0.28	0.11	0.21	0.42	0.63
TOTAL ALCOHOLS PLUS ACETONE	**5.6**	**5.5**	**3.9**	**4.1**	**5.5**	**7.3**	**5.5**	**3.9**	**11.1**	**6.4**	**7.3**	**7.9**	**6.3**
TARGET COMPOUNDS (GC)* **													
ETHYLENE	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
CARBON MONOXIDE	TRACE	<1.1	1.7	<1.1	TRACE	<1.1	TRACE	<1.1	TRACE	1.3	1.8	1.6	1.40
METHANE	7.30	20.0	20.0	20.0	2.9	3.10	3.00	2.20	1.10	1.90	9.30	9.30	19.0
HYDROGEN	TRACE	TRACE	2.10	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	3.60	3.70	6.20
CARBON DIOXIDE	6400	5200	5200	5800	7200	6700.00	7000.00	3600.00	8100.00	2300.00	9500.00	8700.00	9000

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)												
	AA03234 S/N 1046 Service Module 9/1/01@ 09:33GMT	AA03223 S/N 1070 FGB 9/13/01@ 18:08 GMT	AA03235 S/N 1080 Service Module 9/13/01@ 18:12GMT	AA03224 S/N 1018 Lab 9/13/01@ 18:15GMT	AA03236 S/N 1071 Lab 10/10/01@ 10:09GMT	AA03237 S/N 1054 FGB 10/10/01@ 10:11GMT	AA03238 S/N 1044 Service Module 10/10/01@ 10:13GMT	AA03239 S/N 1072 FGB 11/15/01@ 09:15GMT	AA03240 S/N 1015 Service Module 11/15/01@ 09:20GMT	AA03241 S/N 1066 MPLM 2 12/09/01@ 01:18GMT	AA03242 S/N 1041 Service Module 12/09/01@ 18:05GMT	AA03243 S/N 1082 Lab 12/09/01@ 18:10GMT	AA03244 S/N 1060 Lab 12/15/01@ 11:51GMT
TARGET COMPOUNDS (TO-14/POLAR)* **													
TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	**642**	**341**	**339**	**342**	**228**	**224**	**202**	**138**	**299**	**33**	**305**	**257**	**254**

< : Value is less than the laboratory report detection limit.

TRACE: Amount detected is sufficient for compound identification only. Calculations are based on one-half of the laboratory report detection limit (1.1 mg/m3 for CO; 0.2 mg/m3 for CH4; 1.6 mg/m3 for H2; 0.05 mg/m3 for VOCs; and 0.02 mg/m3 for propenal.)

BL: Area below the search routine limit (<20% of the fluorobenzene peak area).

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

NOTE: High levels (above 1.5ppm) of Methanol, Ethanol, Acetone, Isopropanol and 2-Butanone are routinely reported based on calibrated GC-FID measurements.

TABLE 1B
ANALYTICAL RESULTS OF
ISS UF-1 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)												
	AA03234 S/N 1046 Service Module 9/1/01@ 09:33GMT	AA03223 S/N 1070 FGB 9/13/01@ 18:08 GMT	AA03235 S/N 1080 Service Module 9/13/01@ 18:12GMT	AA03224 S/N 1018 Lab 9/13/01@ 18:15GMT	AA03236 S/N 1071 Lab 10/10/01@ 10:09GMT	AA03237 S/N 1054 FGB 10/10/01@ 10:11GMT	AA03238 S/N 1044 Service Module 10/10/01@ 10:13GMT	AA03239 S/N 1072 FGB 11/15/01@ 09:15GMT	AA03240 S/N 1015 Service Module 11/15/01@ 09:20GMT	AA03241 S/N 1066 MPLM 2 12/09/01@ 01:18GMT	AA03242 S/N 1041 Service Module 12/09/01@ 18:05GMT	AA03243 S/N 1082 Lab 12/09/01@ 18:10GMT	AA03244 S/N 1060 Lab 12/15/01@ 11:51GMT
TARGET COMPOUNDS (TO-14/POLAR)* **													
FREON 12	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	ND	0.00005	0.00005	0.00005
CHLOROMETHANE	0.00061	ND	ND	ND	0.00061	0.00061	0.00061	0.00061	ND	0.00061	0.00061	0.00061	0.00061
FREON 114	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHANOL	0.04920	0.22737	0.05604	0.06012	0.05575	0.05925	0.05066	0.04542	0.07060	0.03028	0.06478	0.18938	0.04367
ACETALDEHYDE	0.07995	0.04199	0.03762	0.03697	0.03005	0.03555	0.03016	0.04179	0.04783	0.03101	0.04053	0.06370	0.03650
VINYL CHLORIDE	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	0.00216	0.00140	0.00136	0.00140	0.00235	0.00284	0.00228	0.00159	0.00495	0.00051	0.00310	0.00266	0.00266
CHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACETONITRILE	0.00373	0.00373	ND	0.00373	0.00373	0.00373	ND	0.00373	0.00373	0.00373	0.00373	0.00373	0.00373
PROPENAL	0.33333	0.33333	0.33333	0.33333	ND	ND	ND	0.33333	ND	ND	0.33333	0.33333	ND
ACETONE	0.00676	0.00493	0.00504	0.00573	0.00212	0.00317	0.00243	0.00279	0.00424	0.02851	0.00544	0.00729	0.00524
PROPANAL	0.01521	0.00694	0.00694	0.00694	0.00694	0.00694	0.00694	0.00694	0.00694	0.03492	0.00694	0.01461	0.00694
2-PROPANOL	0.00155	0.00148	0.00160	0.00169	0.00057	0.00105	0.00159	0.00087	0.00109	0.02041	0.00117	0.00190	0.00122
FREON 11	ND	ND	ND	ND	ND	ND	ND	ND	0.00003	ND	0.00003	ND	ND
FURAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACRYLONITRILE	0.00893	0.00893	0.00893	0.00893	0.00893	0.00893	0.00893	0.00893	0.00893	ND	0.00893	0.00893	0.00893
PENTANE	ND	ND	ND	ND	ND	ND	ND	0.00004	ND	ND	ND	ND	ND
2-METHYL-2-PROPANOL	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021	0.00021
METHYL ACETATE	ND	0.00021	ND	ND	0.00021	0.00021	0.00021	ND	ND	ND	ND	0.00021	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DICHLOROMETHANE	0.03040	0.01108	0.01121	0.01462	0.01282	0.01385	0.01024	0.00788	0.00886	0.30144	0.02554	0.03716	0.01648
3-CHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FREON 113	ND	ND	ND	ND	ND	ND	ND	0.00006	ND	0.00006	ND	ND	ND
N-PROPANOL	0.00071	0.00054	0.00059	0.00076	0.00026	0.00721	0.00026	0.00026	0.00063	0.00352	0.00026	0.00076	0.00026
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BUTANAL	0.00568	0.00568	0.00568	0.00568	0.00568	0.00568	0.00568	0.00568	0.00568	0.00568	0.00568	0.00568	0.00568
2-BUTANONE	0.00190	0.00083	0.00083	0.00083	0.00083	0.00083	0.00083	0.00196	0.00083	0.01820	0.00083	0.00199	0.00083
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
ETHYL ACETATE	0.00014	0.00014	0.00014	0.00014	0.00014	0.00030	0.00014	0.00014	0.00014	0.00074	0.00057	0.00044	0.00014
HEXANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00014	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00500	ND	ND	ND
2-BUTENAL	0.01471	0.01471	ND	0.01471	ND	ND	ND	0.01471	ND	ND	0.01471	0.01471	ND
1,2-DICHLOROETHANE	0.02500	0.02500	0.02500	0.02500	0.02500	0.02500	ND	ND	0.02500	ND	0.02500	0.02500	0.02500
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-BUTANOL	0.00402	0.00346	0.00375	0.00375	0.00180	0.00263	0.00206	0.00166	0.00325	0.00555	0.00240	0.00350	0.00215
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12500	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-PENTANONE	ND	0.00036	ND	0.00036	ND	ND	ND	0.00036	ND	ND	ND	ND	ND
PENTANAL	0.00472	0.00472	0.00472	0.00472	0.00472	0.00472	0.00472	0.00472	0.00472	0.00472	0.00472	0.00472	0.00472
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00196	0.00060	0.00060	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	0.00250	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-METHYL-2-PENTANONE	0.00018	ND	ND	ND	ND	0.00018	ND	ND	ND	0.00018	ND	0.00018	0.00018

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)												
	AA03234 S/N 1046 Service Module 9/1/01@ 09:33GMT	AA03223 S/N 1070 FGB 9/13/01@ 18:08 GMT	AA03235 S/N 1080 Service Module 9/13/01@ 18:12GMT	AA03224 S/N 1018 Lab 9/13/01@ 18:15GMT	AA03236 S/N 1071 Lab 10/10/01@ 10:09GMT	AA03237 S/N 1054 FGB 10/10/01@ 10:11GMT	AA03238 S/N 1044 Service Module 10/10/01@ 10:13GMT	AA03239 S/N 1072 FGB 11/15/01@ 09:15GMT	AA03240 S/N 1015 Service Module 11/15/01@ 09:20GMT	AA03241 S/N 1066 MPLM 2 12/09/01@ 01:18GMT	AA03242 S/N 1041 Service Module 12/09/01@ 18:05GMT	AA03243 S/N 1082 Lab 12/09/01@ 18:10GMT	AA03244 S/N 1060 Lab 12/15/01@ 11:51GMT
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	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00584	0.00042	0.00042	0.00042
HEXANAL	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410
MESITYL OXIDE	ND	ND	ND	ND	ND	0.00063	ND	ND	ND	ND	ND	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BUTYL ACETATE	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00074	ND	ND	ND
CHLOROBENZENE	ND	0.00054	0.00054	0.00054	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYL BENZENE	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	ND	ND	0.00050	0.00050	0.00050	0.00050	ND
M- + P-XYLENES	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011
2-HEPTANONE	0.00109	ND	ND	ND	ND	ND	ND	0.00109	ND	0.00109	ND	0.00109	ND
CYCLOHEXANONE	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042
HEPTANAL	0.00357	0.00357	0.00357	0.00357	0.00357	0.00357	0.00357	0.00357	0.00357	0.00357	0.00357	0.00357	0.00357
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	0.00031	0.00035	0.00038	0.00040	0.00033	0.00043	0.00029	0.00011	0.00026	0.00011	0.00050	0.00031	0.00011
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
TARGET COMPOUNDS (TOXIC)													
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
CARBON DISULFIDE	0.00156	0.00156	0.00156	0.00156	0.00156	0.00156	0.00156	0.00156	0.00156	0.00156	0.00156	0.00156	0.00156
2-METHYL-2-PROPENAL	0.01471	0.01471	0.01471	ND	ND	0.01471	ND	0.01471	0.01471	0.01471	ND	0.01471	ND
3-BUTEN-2-ONE	0.05814	ND	ND	ND	0.05814	0.05814	ND	0.05814	ND	0.05814	0.05814	0.05814	0.05814
DIMETHYLDISULFIDE	ND	ND	ND	0.12500	ND	0.12500	ND	ND	0.12500	ND	0.12500	0.12500	0.12500
2-ETHOXYETHANOL	0.08333	ND	0.08333	ND	0.08333	0.08333	ND	ND	0.08333	ND	0.08333	0.08333	ND
OCTAMETHYLCYCLOTETRASILOXANE	0.05658	0.06587	0.01723	0.04483	0.01393	0.09824	0.00904	0.09825	0.08145	0.04705	0.01507	0.09444	0.02339
NON-TARGET COMPOUNDS													
OCTAFLUOROPROPANE***	0.00744	0.00391	0.00393	0.00393	0.00260	0.00250	0.00230	0.00153	0.00334	0.00023	0.00347	0.00287	0.00288
CHLOROPENTAFLUOROETHANE	0.00011	0.00005	0.00004	0.00006	0.00002	0.00002	0.00002	0.00002	0.00004	0.00000	0.00003	0.00004	0.00004
BROMOTRIFLUOROMETHANE	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	0.00001	0.00001	0.00002
2-METHYLPROPANE	0.00006	0.00003	0.00003	0.00004	0.00003	0.00003	0.00003	0.00003	0.00004	0.00002	0.00002	0.00003	0.00002
TRIMETHYLSILANOL	0.00288	0.00284	0.00189	0.00369	0.00257	0.00305	0.00121	0.00196	0.00196	0.01755	0.00208	0.00320	0.00204
1,3-DIOXOLANE	0.00063	0.00087	0.00098	0.00109	0.00100	0.00076	0.00064	0.00056	0.00057	0.00178	0.00094	0.00096	0.00059
2-METHYLPROPANENITRILE	0.00042	0.00038	0.00049	0.00029	0.00063	0.00072	0.00027	0.00033	0.00024	0.00247	0.00204	0.00160	0.00034
C7 ALKANE	0.00021	0.00014	0.00012	0.00017	0.00005	0.00005	0.00003	0.00005	0.00005	0.00010	0.00028	0.00024	0.00006
HEPTANE	0.00012	0.00008	0.00007	0.00010	0.00003	0.00003	0.00002	0.00049	0.00003	0.00005	0.00029	0.00024	0.00005
HEXAMETHYLCYCLOTRISILOXANE	0.17759	0.08658	0.02526	0.11699	0.02613	0.22185	0.02158	0.14387	0.22554	0.10556	0.03479	0.15862	0.05694
LIMONENE	0.00012	0.00010	0.00010	0.00011	0.00009	0.00011	0.00009	0.00005	0.00010	0.00004	0.00002	0.00002	0.00001
DECAMETHYLCYCLOPENTASILOXANE	0.01704	0.01277	0.01219	0.02304	0.00844	0.01979	0.00755	0.00971	0.01879	0.00753	0.01412	0.02775	0.04203

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)												
	AA03234 S/N 1046 Service Module 9/1/01@ 09:33GMT	AA03223 S/N 1070 FGB 9/13/01@ 18:08 GMT	AA03235 S/N 1080 Service Module 9/13/01@ 18:12GMT	AA03224 S/N 1018 Lab 9/13/01@ 18:15GMT	AA03236 S/N 1071 Lab 10/10/01@ 10:09GMT	AA03237 S/N 1054 FGB 10/10/01@ 10:11GMT	AA03238 S/N 1044 Service Module 10/10/01@ 10:13GMT	AA03239 S/N 1072 FGB 11/15/01@ 09:15GMT	AA03240 S/N 1015 Service Module 11/15/01@ 09:20GMT	AA03241 S/N 1066 MPLM 2 12/09/01@ 01:18GMT	AA03242 S/N 1041 Service Module 12/09/01@ 18:05GMT	AA03243 S/N 1082 Lab 12/09/01@ 18:10GMT	AA03244 S/N 1060 Lab 12/15/01@ 11:51GMT
TARGET COMPOUNDS (GC)* **													
ETHYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CARBON MONOXIDE	0.05000	ND	0.15455	ND	0.05000	ND	0.05000	ND	0.05000	0.11818	0.16364	0.14545	0.12727
METHANE	0.00192	0.00526	0.00526	0.00526	0.00076	0.00082	0.00079	0.000058	0.00029	0.00050	0.00245	0.00245	0.00500
HYDROGEN	0.00235	0.00235	0.00618	0.00235	0.00235	0.00235	0.00235	0.00235	0.00235	0.00235	0.01059	0.01088	0.01824
CARBON DIOXIDE	0.49231	0.40000	0.40000	0.44615	0.55385	0.51538	0.53846	0.27692	0.62308	0.17692	0.73077	0.66923	0.69231
TOTAL T-VALUE	**1.56732**	**1.30473**	**1.24115**	**1.31451**	**0.97788**	**1.34168**	**0.77299**	**1.10429**	**1.43968**	**1.19624**	**1.80755**	**2.13276**	**1.32999**

ND : Value is less than the laboratory report detection limit.

BL: Area below the search routine limit (< 20% of the fluorobenzene peak area).

Note: Number of decimal places in T-Values do not represent significant figures of measurements.

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

TABLE 2A
ANALYTICAL RESULTS OF
STS-108 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)		
	AA03232 S/N 1004 Preflight Scrub 12/4/01@ 12:20EST	AA03231 S/N 1015 Preflight 12/5/01@ 12:10EST	AA03245 S/N 1007 Middeck 12/17/01@ 11:28GMT
TARGET COMPOUNDS (TO-14/POLAR)* **			
FREON 12	<0.05	<0.05	TRACE
CHLOROMETHANE	<0.05	<0.05	TRACE
FREON 114	<0.05	<0.05	<0.05
METHANOL	TRACE	TRACE	0.20
ACETALDEHYDE	TRACE	0.34	0.17
VINYL CHLORIDE	<0.05	<0.05	<0.05
BROMOMETHANE	<0.05	<0.05	<0.05
ETHANOL	TRACE	0.07	3.45
CHLOROETHANE	<0.05	<0.05	<0.05
ACETONITRILE	<0.05	<0.05	TRACE
PROPENAL	<0.02	TRACE_	<0.02
ACETONE	TRACE	0.56	0.17
PROPANAL	TRACE	0.16	TRACE
2-PROPANOL	0.08	0.05	0.09
FREON 11	<0.05	<0.05	<0.05
FURAN	<0.05	<0.05	<0.05
ACRYLONITRILE	<0.05	<0.05	<0.05
PENTANE	<0.05	TRACE	<0.05
2-METHYL-2-PROPANOL	<0.05	<0.05	TRACE
METHYL ACETATE	<0.05	<0.05	<0.05
1,1-DICHLOROETHENE	<0.05	<0.05	<0.05
DICHLOROMETHANE	<0.05	<0.05	0.18
3-CHLOROPROPENE	<0.05	<0.05	<0.05
FREON 113	<0.05	<0.05	<0.05
N-PROPANOL	<0.05	TRACE	TRACE
1,1-DICHLOROETHANE	<0.05	<0.05	<0.05
BUTANAL	<0.05	0.10	TRACE
2-BUTANONE	<0.05	0.22	TRACE
1,2-DICHLOROETHENE	<0.05	<0.05	<0.05
2-METHYLFURAN	<0.05	<0.05	<0.05
ETHYL ACETATE	<0.05	<0.05	TRACE
HEXANE	TRACE	<0.05	<0.05
CHLOROFORM	<0.05	<0.05	<0.05
2-BUTENAL	<0.05	TRACE	<0.05
1,2-DICHLOROETHANE	<0.05	<0.05	<0.05
1,1,1-TRICHLOROETHANE	<0.05	<0.05	<0.05
N-BUTANOL	<0.05	TRACE	TRACE
BENZENE	<0.05	<0.05	<0.05
CARBON TETRACHLORIDE	<0.05	<0.05	<0.05
2-PENTANONE	<0.05	0.13	<0.05
PENTANAL	<0.05	0.09	TRACE
1,2-DICHLOROPROPANE	<0.05	<0.05	<0.05
1,4-DIOXANE	<0.05	<0.05	<0.05
TRICHLOROETHENE	<0.05	<0.05	<0.05
2,5-DIMETHYLFURAN	<0.05	<0.05	<0.05
4-METHYL-2-PENTANONE	<0.05	TRACE	TRACE
CIS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05
2-PENTENAL	<0.05	<0.05	<0.05
TRANS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)		
	AA03232 S/N 1004 Preflight Scrub 12/4/01@ 12:20EST	AA03231 S/N 1015 Preflight 12/5/01@ 12:10EST	AA03245 S/N 1007 Middeck 12/17/01@ 11:28GMT
1,1,2-TRICHLOROETHANE	<0.05	<0.05	<0.05
TOLUENE	0.07	TRACE	TRACE
HEXANAL	<0.05	0.08	TRACE
MESITYL OXIDE	<0.05	<0.05	<0.05
1,2-DIBROMOETHANE	<0.05	<0.05	<0.05
BUTYL ACETATE	<0.05	<0.05	<0.05
TETRACHLOROETHENE	<0.05	<0.05	<0.05
CHLOROBENZENE	<0.05	<0.05	<0.05
ETHYL BENZENE	<0.05	<0.05	<0.05
M- + P-XYLENES	<0.05	<0.05	<0.05
2-HEPTANONE	<0.05	0.08	<0.05
CYCLOHEXANONE	<0.05	TRACE	<0.05
HEPTANAL	<0.05	0.07	TRACE
STYRENE	<0.05	<0.05	<0.05
1,1,2,2-TETRACHLOROETHANE	<0.05	<0.05	<0.05
O-XYLENE	<0.05	<0.05	<0.05
1,3,5-TRIMETHYLBENZENE	<0.05	<0.05	<0.05
1,2,4-TRIMETHYLBENZENE	<0.05	<0.05	<0.05
1,3-DICHLOROBENZENE	<0.05	<0.05	<0.05
1,4-DICHLOROBENZENE	<0.05	<0.05	<0.05
1,2-DICHLOROBENZENE	<0.05	<0.05	<0.05
1,2,4-TRICHLOROBENZENE	<0.05	<0.05	<0.05
HEXACHLORO-1,3-BUTADIENE	<0.05	<0.05	<0.05
TARGET COMPOUNDS (TOXIC)			
1,3-BUTADIENE	<0.05	<0.05	<0.05
ETHYLENE OXIDE	<0.05	<0.05	<0.05
CARBON DISULFIDE	<0.05	<0.05	TRACE
2-METHYL-2-PROPENAL	<0.05	TRACE	<0.05
3-BUTEN-2-ONE	<0.05	TRACE	<0.05
DIMETHYLDISULFIDE	<0.05	<0.05	<0.05
2-ETHOXYETHANOL	<0.05	<0.05	<0.05
OCTAMETHYLCYCLOTETRASILOXANE	TRACE	TRACE	0.86
NON-TARGET COMPOUNDS			
OCTAFLUOROPROPANE	BL	BL	194
CHLOROPENTAFLUOROETHANE	BL	BL	0.018
BROMOTRIFLUOROMETHANE	BL	BL	0.95
1-PROPENE	BL	0.050	0.011
PROPANE	0.002	0.005	0.001
CARBONYL SULFIDE	0.000	0.002	0.001
2-METHYLPROPANE	BL	BL	BL
TRIMETHYLSILANOL	BL	BL	0.009
1,3-DIOXOLANE	BL	BL	0.007
2-METHYLPROPANENITRILE	BL	BL	BL
C7 ALKANE	0.001	BL	BL
HEPTANE	BL	0.004	BL
C5-ALCOHOL	BL	0.050	BL
C5-ALCOHOL	BL	0.087	BL
C6-ALDEHYDE	BL	0.038	BL
2-HEXANONE	BL	0.091	BL
HEXAMETHYLCYCLOTRISILOXANE	0.032	0.019	1.74
C8-KETONE	BL	0.40	BL

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)		
	AA03232 S/N 1004 Preflight Scrub 12/4/01@ 12:20EST	**AA03231 S/N 1015 Preflight 12/5/01@ 12:10EST**	**AA03245 S/N 1007 Middeck 12/17/01@ 11:28GMT**
C8-KETONE	BL	0.025	BL
C8-ALKENE	BL	0.036	BL
BENZALDEHYDE	0.001	0.015	0.002
LIMONENE	BL	BL	0.004
C9-KETONE	BL	0.089	BL
DECAMETHYLCYCLOPENTASILOXANE	BL	BL	2.66
TOTAL ALCOHOLS PLUS ACETONE	**0.1**	**0.7**	**3.9**
TARGET COMPOUNDS (GC)* **			
ETHYLENE	<0.6	<0.6	<0.6
CARBON MONOXIDE	<1.1	1.1	4.0
METHANE	1.4	1.5	27
HYDROGEN	<1.6	<1.6	11
CARBON DIOXIDE	663	630	3700
TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	**0.37**	**3.2**	**205**

< : Value is less than the laboratory report detection limit.

TRACE: Amount detected is sufficient for compound identification only. Calculations are based on one-half of the laboratory report detection limit (1.1 mg/m3 for CO; 0.2 mg/m3 for CH4; 1.6 mg/m3 for H2; 0.05 mg/m3 for VOCs; and 0.02 mg/m3 for propenal.)

BL: Area below the search routine limit (<20% of the fluorobenzene peak area).

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

NOTE: High levels (above 1.5ppm) of Methanol, Ethanol, Acetone, Isopropanol and 2-Butanone are routinely reported based on calibrated GC-FID measurements.

TABLE 2B
ANALYTICAL RESULTS OF
STS-108 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (7-d SMAC)		
	AA03232 S/N 1004 Preflight Scrub 12/4/01@ 12:20EST	AA03231 S/N 1015 Preflight 12/5/01@ 12:10EST	AA03245 S/N 1007 Middeck 12/17/01@ 11:28GMT
TARGET COMPOUNDS (TO-14/POLAR)* **			
FREON 12	ND	ND	0.00005
CHLOROMETHANE	ND	ND	0.00061
FREON 114	ND	ND	ND
METHANOL	0.00278	0.00278	0.02242
ACETALDEHYDE	0.00625	0.08540	0.04280
VINYL CHLORIDE	ND	ND	ND
BROMOMETHANE	ND	ND	ND
ETHANOL	0.00001	0.00004	0.00173
CHLOROETHANE	ND	ND	ND
ACETONITRILE	ND	ND	0.00373
PROPENAL	ND	0.33333	ND
ACETONE	0.00048	0.01080	0.00329
PROPANAL	0.00175	0.01132	0.00175
2-PROPANOL	0.00056	0.00034	0.00057
FREON 11	ND	ND	ND
FURAN	ND	ND	ND
ACRYLONITRILE	ND	ND	ND
PENTANE	ND	0.00004	ND
2-METHYL-2-PROPANOL	ND	ND	0.00017
METHYL ACETATE	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND
DICHLOROMETHANE	ND	ND	0.00368
3-CHLOROPROPENE	ND	ND	ND
FREON 113	ND	ND	ND
N-PROPANOL	ND	0.00026	0.00026
1,1-DICHLOROETHANE	ND	ND	ND
BUTANAL	ND	0.00566	0.00141
2-BUTANONE	ND	0.00730	0.00083
1,2-DICHLOROETHENE	ND	ND	ND
2-METHYLFURAN	ND	ND	ND
ETHYL ACETATE	ND	ND	0.00014
HEXANE	0.00014	ND	ND
CHLOROFORM	ND	ND	ND
2-BUTENAL	ND	0.01471	ND
1,2-DICHLOROETHANE	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND
N-BUTANOL	ND	0.00031	0.00031
BENZENE	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND
2-PENTANONE	ND	0.00192	ND
PENTANAL	ND	0.00450	0.00118
1,2-DICHLOROPROPANE	ND	ND	ND
1,4-DIOXANE	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND
4-METHYL-2-PENTANONE	ND	0.00018	0.00018
CIS-1,3-DICHLOROPROPENE	ND	ND	ND
2-PENTENAL	ND	ND	ND

CHEMICAL CONTAMINANT	T-VALUE (7-d SMAC)		
	AA03232 S/N 1004 Preflight Scrub 12/4/01@ 12:20EST	AA03231 S/N 1015 Preflight 12/5/01@ 12:10EST	AA03245 S/N 1007 Middeck 12/17/01@ 11:28GMT
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND
TOLUENE	0.00123	0.00042	0.00042
HEXANAL	ND	0.00332	0.00101
MESITYL OXIDE	ND	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND
BUTYL ACETATE	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND
CHLOROBENZENE	ND	ND	ND
ETHYL BENZENE	ND	ND	ND
M- + P-XYLENES	ND	ND	ND
2-HEPTANONE	ND	0.00343	ND
CYCLOHEXANONE	ND	0.00042	ND
HEPTANAL	ND	0.00250	0.00089
STYRENE	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND
O-XYLENE	ND	ND	ND
1,3,5-TRIMETHYLBENZENE	ND	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND	ND	ND
HEXACHLORO-1,3-BUTADIENE	ND	ND	ND

TARGET COMPOUNDS (TOXIC)			
1,3-BUTADIENE	ND	ND	ND
ETHYLENE OXIDE	ND	ND	ND
CARBON DISULFIDE	ND	ND	0.00156
2-METHYL-2-PROPENAL	ND	0.01471	ND
3-BUTEN-2-ONE	ND	0.05814	ND
DIMETHYLDISULFIDE	ND	ND	ND
2-ETHOXYETHANOL	ND	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE	0.00009	0.00009	0.00306

NON-TARGET COMPOUNDS			
OCTAFLUOROPROPANE	BL	BL	0.00228
CHLOROPENTAFLUOROETHANE	BL	BL	0.00003
BROMOTRIFLUOROMETHANE	BL	BL	0.00009
1-PROPENE	BL	0.00006	0.00001
PROPANE	BL	0.00001	0.00000
CARBONYL SULFIDE	0.00003	0.00013	0.00006
2-METHYLPROPANE	BL	BL	BL
TRIMETHYLSILANOL	BL	BL	0.00025
1,3-DIOXOLANE	BL	BL	0.00018
2-METHYLPROPANENITRILE	BL	BL	BL
C7 ALKANE	0.00001	BL	BL
HEPTANE	BL	0.00002	BL
C5-ALCOHOL	BL	0.00069	BL
C5-ALCOHOL	BL	0.00121	BL
C6-ALDEHYDE	BL	0.00948	BL
2-HEXANONE	BL	0.00223	BL
HEXAMETHYLCYCLOTRISILOXANE	0.00036	0.00021	0.01932

CHEMICAL CONTAMINANT	T-VALUE (7-d SMAC)		
	AA03232 S/N 1004 Preflight Scrub 12/4/01@ 12:20EST	**AA03231 S/N 1015 Preflight 12/5/01@ 12:10EST**	**AA03245 S/N 1007 Middeck 12/17/01@ 11:28GMT**
C8-KETONE	BL	0.01533	BL
C8-KETONE	BL	0.00097	BL
C8-ALKENE	BL	0.00016	BL
BENZALDEHYDE	0.00001	0.00009	0.00001
LIMONENE	BL	BL	0.00001
C9-KETONE	BL	0.00305	BL
DECAMETHYLCYCLOPENTASILOXANE	BL	BL	0.02656

TARGET COMPOUNDS (GC)* **			
ETHYLENE	ND	ND	ND
CARBON MONOXIDE	ND	0.10000	0.36364
METHANE	0.00037	0.00039	0.00711
HYDROGEN	ND	ND	0.03235
CARBON DIOXIDE	0.05077	0.04846	0.28462

TOTAL T-VALUE	**0.06483**	**0.74438**	**0.82858**

ND : Value is less than the laboratory report detection limit.
BL: Area below the search routine limit (< 20% of the fluorobenzene peak area).
Note: Number of decimal places in T-Values do not represent significant figures of measurements.
***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.