Source of Acquisition
NASA Johnson Space Center

Assessment of Air Quality in the Shuttle and International Space Station (ISS) Based on Samples Returned by STS-102 at the Conclusion of 5A.1

The toxicological assessment of air samples returned at the end of the STS-102 (5A.1) flight to the ISS is reported. ISS air samples were taken in late February 2001 from the Service Module, FGB, and U.S. Laboratory using grab sample canisters (GSCs) and/or formaldehyde badges. A "first-entry" sample of the multipurpose logistics module (MPLM) atmosphere was taken with a GSC, and preflight and end-of-mission samples were obtained from *Discovery* using GSCs. Analytical methods have not changed from earlier reports, and all quality control measures were met for the data presented herein.

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 contribution). Control of atmospheric alcohols is important to the water recovery system engineers, hence total alcohols were also assessed in each sample. Formaldehyde is quantified separately. These four indices are summarized below:

Sample Location	Date/Type	NMVOCs (mg/m^3)	T Value (units)	Alcohols (mg/m^3)	Formaldehyde (mg/m^3)
SM	2/28/01	7	0.98	1.5	0.037
FGB	2/28/01	15	0.35[a]	10.5[b]	no sample
U.S. Lab	2/28/01	11	1.08	1.2	0.039
MPLM	first entry	20	1.05[a]	10.0[c]	no sample
Shuttle mid-deck	preflight	0.7	0.02[a]	0.4	no sample
Shuttle mid-deck	EOM	8	0.41[a]	1.1	no sample
Acceptable Guideline>>>		<25	<1	<10	0.05

[a] Formaldehyde not included in measurements
[b] n-propanol and n-butanol were unusually high in this sample
[c] 2-propanol, acetone, and ethanol were the main components of this "first-entry" sample. Relatively high concentrations of pollutants from the ISS suggest that this sample was taken after appreciable mixing of the MPLM atmosphere and the general ISS atmosphere; this was not really a first-entry sample.

Taken as a whole, these data suggest that air pollutants were controlled to acceptable levels to protect crew health. To the extent that these samples were representative of the vehicle atmospheres, *Discovery* contributed little to the alcohol load in the ISS atmosphere, but the MPLM may have made a momentary contribution.

4 Enclosures
1a: Analytical Results of 5A.1 Air Samples
1b: Analytical Results of STS-102 Air Samples
2a: T Values of 5A.1 Air Samples
2b: T Values of STS-102 Air Samples

TABLE 1a
ANALYTICAL RESULTS OF
ISS 5A.1 AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)			
	AA03030 S/N 1047 SERVICE MODULE 2/28/01 11:30 GMT	AA03031 S/N 1049 FGB 2/28/01 11:30 GMT	AA03032 S/N 1074 LAB 2/28/01 11:40GMT	AA03034 S/N 1038 MPLM 1 DATE NA TIME NA
TARGET COMPOUNDS (TO-14/POLAR)				
DICHLORODIFLUOROMETHANE	0.07	0.07	0.07	TRACE
CHLOROMETHANE	#TRACE	TRACE	TRACE	TRACE
1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE	*<0.050	<0.050	<0.050	<0.050
ACETALDEHYDE	0.18	0.40	0.18	0.28
METHANOL	0.18	0.25	0.20	0.20
VINYL CHLORIDE	<0.050	<0.050	<0.050	<0.050
BROMOMETHANE	<0.050	<0.050	<0.050	<0.050
ETHANOL	0.97	1.2	0.66	3.9
CHLOROETHANE	<0.050	<0.050	<0.050	<0.050
ACETONITRILE	TRACE	TRACE	TRACE	<0.050
PROPENAL	<0.020	<0.020	<0.020	<0.020
ACETONE	0.19	0.91	0.20	1.9
PROPANAL	TRACE	TRACE	TRACE	0.11
ISOPROPANOL	0.09	0.07	0.08	3.5
TRICHLOROFLUOROMETHANE	<0.050	<0.050	<0.050	<0.050
FURAN	<0.050	<0.050	<0.050	<0.050
ACRYLONITRILE	TRACE	TRACE	TRACE	TRACE
PENTANE	<0.050	<0.050	<0.050	<0.050
2-METHYL-2-PROPANOL	<0.050	<0.050	<0.050	TRACE
METHYL ACETATE	<0.050	TRACE	<0.050	<0.050
1,1-DICHLOROETHENE	<0.050	<0.050	<0.050	<0.050
DICHLOROMETHANE	0.11	0.11	0.11	2.1
3-CHLOROPROPENE	<0.050	<0.050	<0.050	<0.050
1,1,2-TRICHLORO-1,1,2-TRIFLUOROETHANE	<0.050	<0.050	<0.050	TRACE
N-PROPANOL	TRACE	5.6	TRACE	0.09
1,1-DICHLOROETHANE	<0.050	<0.050	<0.050	<0.050
BUTANAL	TRACE	TRACE	TRACE	TRACE
2-BUTANONE	TRACE	TRACE	TRACE	0.62
1,2-DICHLOROETHENE	<0.050	<0.050	<0.050	<0.050
2-METHYLFURAN	<0.050	<0.050	<0.050	<0.050
ETHYL ACETATE	TRACE	TRACE	<0.050	TRACE
HEXANE	<0.050	<0.050	<0.050	TRACE
CHLOROFORM	<0.050	<0.050	<0.050	TRACE
2-BUTENAL	<0.050	<0.050	<0.050	<0.050
1,2-DICHLOROETHANE	<0.050	<0.050	<0.050	TRACE
1,1,1-TRICHLOROETHANE	<0.050	<0.050	<0.050	<0.050
N-BUTANOL	TRACE	2.5	TRACE	0.45
BENZENE	<0.050	<0.050	<0.050	TRACE
CARBON TETRACHLORIDE	<0.050	<0.050	<0.050	<0.050
2-PENTANONE	TRACE	<0.050	TRACE	TRACE
PENTANAL	TRACE	TRACE	TRACE	TRACE
1,2-DICHLOROPROPANE	<0.050	<0.050	<0.050	0.08
1,4-DIOXANE	<0.050	<0.050	<0.050	<0.050
TRICHLOROETHENE	<0.050	<0.050	<0.050	<0.050
2,5-DIMETHYLFURAN	<0.050	<0.050	<0.050	<0.050
4-METHYL-2-PENTANONE	<0.050	TRACE	<0.050	TRACE
CIS-1,3-DICHLOROPROPENE	<0.050	<0.050	<0.050	<0.050
2-PENTENAL	<0.050	<0.050	<0.050	TRACE
TRANS-1,3-DICHLOROPROPENE	<0.050	<0.050	<0.050	<0.050
1,1,2-TRICHLOROETHANE	<0.050	<0.050	<0.050	<0.050
TOLUENE	<0.050	TRACE	TRACE	0.19
HEXANAL	TRACE	TRACE	TRACE	TRACE
MESITYL OXIDE	<0.050	0.06	<0.050	<0.050
1,2-DIBROMOETHANE	<0.050	<0.050	<0.050	<0.050
BUTYL ACETATE	<0.050	TRACE	<0.050	TRACE
TETRACHLOROETHENE	<0.050	<0.050	<0.050	TRACE
CHLOROBENZENE	<0.050	<0.050	<0.050	<0.050
ETHYL BENZENE	<0.050	<0.050	<0.050	TRACE
M- + P-XYLENES	TRACE	TRACE	<0.050	TRACE
2-HEPTANONE	<0.050	<0.050	<0.050	TRACE
CYCLOHEXANONE	TRACE	TRACE	TRACE	TRACE
HEPTANAL	TRACE	TRACE	TRACE	TRACE
STYRENE	<0.050	<0.050	<0.050	<0.050
1,1,2,2-TETRACHLOROETHANE	<0.050	<0.050	<0.050	<0.050
O-XYLENE	TRACE	TRACE	TRACE	TRACE
1,3,5-TRIMETHYLBENZENE	<0.050	<0.050	<0.050	<0.050
1,2,4-TRIMETHYLBENZENE	<0.050	<0.050	<0.050	<0.050
1,3-DICHLOROBENZENE	<0.050	<0.050	<0.050	<0.050
1,4-DICHLOROBENZENE	<0.050	<0.050	<0.050	<0.050
1,2-DICHLOROBENZENE	<0.050	<0.050	<0.050	<0.050
1,2,4-TRICHLOROBENZENE	<0.050	<0.050	<0.050	<0.050
HEXACHLORO-1,3-BUTADIENE	<0.050	<0.050	<0.050	<0.050

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)			
	AA03030 S/N 1047 SERVICE MODULE 2/28/01 11:30 GMT	AA03031 S/N 1049 FGB 2/28/01 11:30 GMT	AA03032 S/N 1074 LAB 2/28/01 11:40GMT	AA03034 S/N 1038 MPLM 1 DATE NA TIME NA
TARGET COMPOUNDS (TOXIC)				
1,3-BUTADIENE	<0.050	<0.050	<0.050	<0.050
ETHYLENE OXIDE	<0.050	<0.050	<0.050	<0.050
CARBON DISULFIDE	TRACE	TRACE	TRACE	TRACE
2-METHYL-2-PROPENAL	<0.050	<0.050	TRACE	TRACE
3-BUTEN-2-ONE	<0.050	<0.050	<0.050	<0.050
DIMETHYLDISULFIDE	<0.050	<0.050	<0.050	<0.050
2-ETHOXYETHANOL	<0.050	TRACE	<0.050	<0.050
OCTAMETHYLCYCLOTETRASILOXANE ***	*0.35*	*0.12*	*0.24*	*0.79*
NON-TARGET COMPOUNDS				
OCTAFLUOROPROPANE	3.4	2.6	7.8	2.7
BROMOTRIFLUOROMETHANE	0.06	0.06	0.06	0.02
TRIMETHYLSILANOL	0.15	0.01	0.03	0.62
1,3-DIOXOLANE	0.09	0.01	0.01	0.47
1,2-DIMETHOXYETHANE	0.01	0.01	0.00	0.08
CYCLOHEXANE	& BL	BL	BL	0.09
HEXAMETHYLCYCLOTRISILOXANE ***	*0.74*	*0.24*	*0.45*	*1.2*
TARGET COMPOUNDS (GC)				
ETHYLENE	ND	ND	ND	ND
CARBON MONOXIDE	ND	ND	TRACE	1.6
METHANE	11	11	11	2.8
HYDROGEN	*1.16*	*1.20*	*1.30*	*0.91*
CARBON DIOXIDE	7104	8215	7183	2223
TOTAL ALCOHOL	1.5	10.5	1.2	10
TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	7.0	15	11	20

* <: 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; 0.65 mg/m3 for CH4; 0.41 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).

***Siloxane compounds are common contaminates and measurements are not under statistical control.

TABLE 1b
ANALYTICAL RESULTS OF
STS-102 AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)	
	AA03019 S/N1007 PREFLIGHT 3/21/01 @ 00:45 EST	AA03029 S/N1016 FLIGHT DECK MET 12\14:23 (3/21/01 @ 01:55 GMT)
TARGET COMPOUNDS (TO-14/POLAR)		
DICHLORODIFLUOROMETHANE	*<0.050	TRACE
CHLOROMETHANE	<0.050	TRACE
1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE	<0.050	<0.050
ACETALDEHYDE	#TRACE	0.08
METHANOL	TRACE	0.09
VINYL CHLORIDE	<0.050	<0.050
BROMOMETHANE	<0.050	<0.050
ETHANOL	TRACE	0.64
CHLOROETHANE	<0.050	<0.050
ACETONITRILE	<0.050	TRACE
PROPENAL	<0.020	<0.020
ACETONE	TRACE	0.18
PROPANAL	TRACE	TRACE
ISOPROPANOL	0.18	0.22
TRICHLOROFLUOROMETHANE	<0.050	<0.050
FURAN	<0.050	<0.050
ACRYLONITRILE	<0.050	<0.050
PENTANE	<0.050	<0.050
2-METHYL-2-PROPANOL	<0.050	TRACE
METHYL ACETATE	<0.050	<0.050
1,1-DICHLOROETHENE	<0.050	<0.050
DICHLOROMETHANE	<0.050	0.21
3-CHLOROPROPENE	<0.050	<0.050
1,1,2-TRICHLORO-1,1,2-TRIFLUOROETHANE	<0.050	<0.050
N-PROPANOL	<0.050	<0.050
1,1-DICHLOROETHANE	<0.050	<0.050
BUTANAL	TRACE	TRACE
2-BUTANONE	TRACE	TRACE
1,2-DICHLOROETHENE	<0.050	<0.050
2-METHYLFURAN	<0.050	<0.050
ETHYL ACETATE	<0.050	<0.050
HEXANE	<0.050	<0.050
CHLOROFORM	<0.050	<0.050
2-BUTENAL	<0.050	<0.050
1,2-DICHLOROETHANE	<0.050	<0.050
1,1,1-TRICHLOROETHANE	<0.050	<0.050
N-BUTANOL	TRACE	TRACE
BENZENE	<0.050	<0.050
CARBON TETRACHLORIDE	<0.050	<0.050
2-PENTANONE	<0.050	TRACE
PENTANAL	TRACE	TRACE
1,2-DICHLOROPROPANE	<0.050	<0.050
1,4-DIOXANE	<0.050	<0.050
TRICHLOROETHENE	<0.050	<0.050
2,5-DIMETHYLFURAN	<0.050	<0.050
4-METHYL-2-PENTANONE	<0.050	TRACE
CIS-1,3-DICHLOROPROPENE	<0.050	<0.050
2-PENTENAL	<0.050	<0.050
TRANS-1,3-DICHLOROPROPENE	<0.050	<0.050
1,1,2-TRICHLOROETHANE	<0.050	<0.050
TOLUENE	<0.050	TRACE
HEXANAL	TRACE	TRACE
MESITYL OXIDE	<0.050	<0.050
1,2-DIBROMOETHANE	<0.050	<0.050
BUTYL ACETATE	<0.050	<0.050
TETRACHLOROETHENE	<0.050	<0.050
CHLOROBENZENE	<0.050	<0.050
ETHYL BENZENE	<0.050	TRACE
M- + P-XYLENES	<0.050	TRACE
2-HEPTANONE	<0.050	<0.050
CYCLOHEXANONE	<0.050	<0.050
HEPTANAL	TRACE	TRACE
STYRENE	<0.050	<0.050
1,1,2,2-TETRACHLOROETHANE	<0.050	<0.050
O-XYLENE	<0.050	TRACE
1,3,5-TRIMETHYLBENZENE	<0.050	<0.050
1,2,4-TRIMETHYLBENZENE	<0.050	<0.050
1,3-DICHLOROBENZENE	<0.050	<0.050
1,4-DICHLOROBENZENE	<0.050	<0.050
1,2-DICHLOROBENZENE	<0.050	<0.050
1,2,4-TRICHLOROBENZENE	<0.050	<0.050
HEXACHLORO-1,3-BUTADIENE	<0.050	<0.050

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)	
	AA03019 S/N1007 PREFLIGHT 3/21/01 @ 00:45 EST	AA03029 S/N1016 FLIGHT DECK MET 12\14:23 (3/21/01 @ 01:55 GMT)
TARGET COMPOUNDS (TOXIC)		
1,3-BUTADIENE	<0.050	<0.050
ETHYLENE OXIDE	<0.050	<0.050
CARBON DISULFIDE	<0.050	TRACE
2-METHYL-2-PROPENAL	<0.050	TRACE
3-BUTEN-2-ONE	<0.050	<0.050
DIMETHYLDISULFIDE	<0.050	<0.050
2-ETHOXYETHANOL	<0.050	<0.050
OCTAMETHYLCYCLOTETRASILOXANE ***	*TRACE*	*0.71*
NON-TARGET COMPOUNDS		
OCTAFLUOROPROPANE	& BL	2.9
BROMOTRIFLUOROMETHANE	BL	0.37
HEXAMETHYLCYCLOTRISILOXANE ***	*0.20*	*1.2*
DECAMETHYLCYCLOPENTASILOXANE ***	*0.02*	*0.75*
TARGET COMPOUNDS (GC)		
ETHYLENE	ND	ND
CARBON MONOXIDE	ND	3.3
METHANE	TRACE	48
HYDROGEN	ND	8.1
CARBON DIOXIDE	1400	6960
TOTAL ALCOHOL	0.28	1.2
TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	0.69	7.9

* < : 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; 0.65 mg/m3 for CH4; 0.41 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).

*** Siloxane compounds are common contaminates and measurements are not under statistical control.

TABLE 2a
T-VALUES OF
ISS 5A.1 AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMACs)			
	AA03030 S/N 1047 SERVICE MODULE 2/28/01 11:30 GMT	AA03031 S/N 1049 FGB 2/28/01 11:30 GMT	AA03032 S/N 1074 LAB 2/28/01 11:40GMT	AA03034 S/N 1038 MPLM 1 DATE NA TIME NA
TARGET COMPOUNDS (TO-14/POLAR)				
DICHLORODIFLUOROMETHANE	0.00014	0.00014	0.00015	0.00005
CHLOROMETHANE	0.00061	0.00061	0.00061	0.00061
1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE	* ND	ND	ND	ND
ACETALDEHYDE	0.01994	0.04425	0.02052	0.03101
METHANOL	0.04399	0.06259	0.04988	0.04908
VINYL CHLORIDE	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND
ETHANOL	*0.00048*	*0.00061*	*0.00033*	*0.00195*
CHLOROETHANE	ND	ND	ND	ND
ACETONITRILE	0.00373	0.00373	0.00373	ND
PROPENAL	ND	ND	ND	ND
ACETONE	0.00388	0.01829	0.00399	0.03795
PROPANAL	0.00694	0.00694	0.00694	0.03181
ISOPROPANOL	0.00060	0.00049	0.00053	0.02366
TRICHLOROFLUOROMETHANE	ND	ND	ND	ND
FURAN	ND	ND	ND	ND
ACRYLONITRILE	0.00893	0.00893	0.00893	0.00893
PENTANE	ND	ND	ND	ND
2-METHYL-2-PROPANOL	ND	ND	ND	0.00021
METHYL ACETATE	ND	0.00021	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND
DICHLOROMETHANE	0.01097	0.01077	0.01110	0.20663
3-CHLOROPROPENE	ND	ND	ND	ND
1,1,2-TRICHLORO-1,1,2-TRIFLUOROETHANE	ND	ND	ND	0.00006
N-PROPANOL	0.00026	0.05755	0.00026	0.00088
1,1-DICHLOROETHANE	ND	ND	ND	ND
BUTANAL	0.00568	0.00568	0.00568	0.00568
2-BUTANONE	0.00083	0.00083	0.00083	0.02063
1,2-DICHLOROETHENE	ND	ND	ND	ND
2-METHYLFURAN	ND	ND	ND	ND
ETHYL ACETATE	0.00014	0.00014	ND	0.00014
HEXANE	ND	ND	ND	0.00014
CHLOROFORM	ND	ND	ND	0.00510
2-BUTENAL	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	0.02500
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND
N-BUTANOL	0.00063	0.06372	0.00063	0.01129
BENZENE	ND	ND	ND	0.12500
CARBON TETRACHLORIDE	ND	ND	ND	ND
2-PENTANONE	0.00036	ND	0.00036	0.00036
PENTANAL	0.00472	0.00472	0.00472	0.00472
1,2-DICHLOROPROPANE	ND	ND	ND	0.00196
1,4-DIOXANE	ND	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND	ND
4-METHYL-2-PENTANONE	ND	0.00018	ND	0.00018
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND
2-PENTENAL	ND	ND	ND	0.01190
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND
TOLUENE	ND	0.00042	0.00042	0.00323
HEXANAL	0.00410	0.00410	0.00410	0.00410
MESITYL OXIDE	ND	0.00139	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND	ND
BUTYL ACETATE	ND	0.00013	ND	0.00013
TETRACHLOROETHENE	ND	ND	ND	0.00074
CHLOROBENZENE	ND	ND	ND	ND
ETHYL BENZENE	ND	ND	ND	0.00019
M- + P-XYLENES	0.00011	0.00011	ND	0.00011
2-HEPTANONE	ND	ND	ND	0.00109
CYCLOHEXANONE	0.00042	0.00042	0.00042	0.00042
HEPTANAL	0.00357	0.00357	0.00357	0.00357
STYRENE	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND
O-XYLENE	0.00011	0.00011	0.00011	0.00011
1,3,5-TRIMETHYLBENZENE	ND	ND	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND
1,2-DICHLOROBENZENE	*ND*	*ND*	*ND*	*ND*
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND
HEXACHLORO-1,3-BUTADIENE	ND	ND	ND	ND

CHEMICAL CONTAMINANT	T-VALUE (180-d SMACs)			
	AA03030 S/N 1047 SERVICE MODULE 2/28/01 11:30 GMT	**AA03031 S/N 1049 FGB 2/28/01 11:30 GMT**	**AA03032 S/N 1074 LAB 2/28/01 11:40GMT**	**AA03034 S/N 1038 MPLM 1 DATE NA TIME NA**
TARGET COMPOUNDS (TOXIC)				
1,3-BUTADIENE	ND	ND	ND	ND
ETHYLENE OXIDE	ND	ND	ND	ND
CARBON DISULFIDE	0.00156	0.00156	0.00156	0.00156
2-METHYL-2-PROPENAL	ND	ND	0.01471	0.01471
3-BUTEN-2-ONE	ND	ND	ND	ND
DIMETHYLDISULFIDE	ND	ND	ND	ND
2-ETHOXYETHANOL	*ND*	*0.00833*	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE ***	*0.02876*	*0.01031*	*0.02021*	*0.06555*
NON-TARGET COMPOUNDS				
OCTAFLUOROPROPANE	0.00004	0.00003	0.00009	0.00003
BROMOTRIFLUOROMETHANE	0.00001	0.00001	0.00001	0.00000
TRIMETHYLSILANOL	0.00375	0.00035	0.00063	0.01550
1,3-DIOXOLANE	0.00760	0.00061	0.00079	0.03900
1,2-DIMETHOXYETHANE	0.00002	0.00002	0.00001	0.00022
CYCLOHEXANE	& BL	BL	BL	0.00045
HEXAMETHYLCYCLOTRISILOXANE ***	*0.08243*	*0.02654*	*0.05020*	*0.13278*
TARGET COMPOUNDS (GC)				
ETHYLENE	ND	ND	ND	ND
CARBON MONOXIDE	ND	ND	0.05500	0.16000
METHANE	0.00289	0.00289	0.00289	0.00074
HYDROGEN	0.00341	0.00359	0.00379	0.00268
CARBON DIOXIDE	0.54646	0.63192	0.55254	0.17100
TOTAL T-VALUE	0.79808	0.98680	0.83022	1.22283

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

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

***Siloxane compounds are common contaminates and measurements are not under statistical control.

TABLE 2b
T-VALUES OF
STS-102 AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (7-d SMACs)	
	AA03019 *S/N1007* PREFLIGHT 3/21/01 @ 00:45 EST	AA03029 *S/N1016* FLIGHT DECK MET 12\14:23 (3/21/01 @ 01:55 GMT)
TARGET COMPOUNDS (TO-14/POLAR)		
DICHLORODIFLUOROMETHANE	*ND	0.00005
CHLOROMETHANE	ND	0.00061
1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE	ND	ND
ACETALDEHYDE	0.00278	0.00844
METHANOL	0.00625	0.02179
VINYL CHLORIDE	ND	ND
BROMOMETHANE	ND	ND
ETHANOL	0.00001	0.00032
CHLOROETHANE	ND	ND
ACETONITRILE	ND	0.00373
PROPENAL	ND	ND
ACETONE	0.00050	0.00352
PROPANAL	0.00175	0.00175
ISOPROPANOL	0.00117	0.00146
TRICHLOROFLUOROMETHANE	ND	ND
FURAN	ND	ND
ACRYLONITRILE	ND	ND
PENTANE	ND	ND
2-METHYL-2-PROPANOL	ND	0.00021
METHYL ACETATE	ND	ND
1,1-DICHLOROETHENE	ND	ND
DICHLOROMETHANE	ND	0.00421
3-CHLOROPROPENE	ND	ND
1,1,2-TRICHLORO-1,1,2-TRIFLUOROETHANE	ND	ND
N-PROPANOL	ND	ND
1,1-DICHLOROETHANE	ND	ND
BUTANAL	0.00141	0.00141
2-BUTANONE	0.00083	0.00083
1,2-DICHLOROETHENE	ND	ND
2-METHYLFURAN	ND	ND
ETHYL ACETATE	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	0.00031	0.00031
BENZENE	ND	ND
CARBON TETRACHLORIDE	ND	ND
2-PENTANONE	ND	0.00036
PENTANAL	0.00118	0.00118
1,2-DICHLOROPROPANE	ND	ND
1,4-DIOXANE	ND	ND
TRICHLOROETHENE	ND	ND
2,5-DIMETHYLFURAN	ND	ND
4-METHYL-2-PENTANONE	ND	0.00018
CIS-1,3-DICHLOROPROPENE	ND	ND
2-PENTENAL	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND
TOLUENE	ND	0.00042
HEXANAL	0.00102	0.00102
MESITYL OXIDE	ND	ND
1,2-DIBROMOETHANE	ND	ND
BUTYL ACETATE	ND	ND
TETRACHLOROETHENE	ND	ND
CHLOROBENZENE	ND	ND
ETHYL BENZENE	ND	0.00019
M- + P-XYLENES	ND	0.00011
2-HEPTANONE	ND	ND
CYCLOHEXANONE	ND	ND
HEPTANAL	0.00089	0.00089
STYRENE	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND
O-XYLENE	ND	0.00011
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

CHEMICAL CONTAMINANT	T-VALUE (7-d SMACs)	
	AA03019 S/N1007 PREFLIGHT 3/21/01@00:45EST	**AA03029 S/N1016 FLIGHT DECK MET 12\14:23 (3/21/01@01:55GMT)**
TARGET COMPOUNDS (TOXIC)		
1,3-BUTADIENE	ND	ND
ETHYLENE OXIDE	ND	ND
CARBON DISULFIDE	ND	0.00156
2-METHYL-2-PROPENAL	ND	0.01471
3-BUTEN-2-ONE	ND	ND
DIMETHYLDISULFIDE	ND	ND
2-ETHOXYETHANOL	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE ***	0.00009	0.00255
NON-TARGET COMPOUNDS		
OCTAFLUOROPROPANE	& BL	0.00003
BROMOTRIFLUOROMETHANE	BL	0.00003
HEXAMETHYLCYCLOTRISILOXANE ***	0.00218	0.01379
DECAMETHYLCYCLOPENTASILOXANE ***	0.00011	0.00501
TARGET COMPOUNDS (GC)		
ETHYLENE	NA	NA
CARBON MONOXIDE	ND	0.28941
METHANE	0.00094	0.01269
HYDROGEN	ND	0.02355
CARBON DIOXIDE	0.10946	0.53542
TOTAL T-VALUE	0.13089	0.95187

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

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

*** Siloxane compounds are common contaminates and measurements are not under statistical control.

NA: Not applicable