(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment – Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

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Final Report
Environmental Assessment – Hardened Aircraft Shelters
Stronghold Freedom
Karshi-Khanabad Airfield, Uzbekistan
6 June – 20 July 2002

1. (U) References. A list of references is provided in Appendix A.

2. (U) ~~(C//NF)~~ Purpose. To assess and characterize potential health risks from environmental contaminants located in Hardened Aircraft Shelters (HAS) 14 and 17 at Stronghold Freedom, Karshi-Khanabad (K2) Airfield, Uzbekistan and make recommendations to mitigate identified health risks.

3. (U) ~~(S)~~ Authority.

a. (U) DoD Directive 6490.2, dated 30 August 1997.

b. (U) DoD Instruction 6490.3, dated 7 August 1997.

c. (U) Joint Chiefs of Staff Memorandum MCM-0006-02, 1 February 2002, subject: Updated Procedures for Deployment Health Surveillance and Readiness.

d. (U) Headquarters Department of the Army Policy Letter, Force Health Protection (FHP): Occupational and Environmental Health (OEH) Threats, 27 June 2001.

e. (U) ~~(S)~~ Message, 150756Z May 02, COMCFLCC, SURG-MD, subject: Request for USACHPPM Services.

f. (U) Message, 271355Z May 02, USCINCCENT, CCJ3, subject: Request for USACHPPM Services.

4. (U) ~~(S//NF)~~ Scope.

a. (U) ~~(S//NF)~~ Previous Efforts. Reference 1 details an extensive OEH survey performed at Stronghold Freedom in the October-November 2001 timeframe. This survey was performed in response to environmental health threats from jet kerosene contaminated soils uncovered during construction of the Stronghold Freedom tent city area.

b. (U) ~~(S//NF)~~ Scope of Work/Specified Tasks. Commander, Combined Forces Land Component Command (COMCFLCC) requested USACHPPM to perform the following tasks at Stronghold Freedom: assess radiation levels at Site 1 and inside the perimeter berm; be prepared to conduct ambient air monitoring for volatile organic compounds (VOCs); PM10, radiation and suspended asbestos fibers (paragraph 3e). US CENTCOM endorsed this request for action and authorized direct coordination between CFLCC Surgeon, Combined Joint Task Force – Afghanistan (CJTF-AFG), and USACHPPM. On 1 June 2002, responsibility for the execution of these surveys passed from the CFLCC to Combined Joint Task Force (CJTF) 180. During the timeframe of this assessment, CJTF 180 and the local command (Logistics Task Force (LTF) 507 and their successors, LTF 164) requested CHPPM-EUR to assess potential environmental contaminants in HAS 14 and 17.

c. (U) DoD Requirements. The Department of Defense, Joint Staff, Department of Army, and US CENTCOM policies require that deployed forces identify the risks from OEH hazards as part of the overall Force Health Protection efforts. The CHPPM has developed tactics, techniques and procedures to assess these risks using Operational Risk Management (ORM) practices. These practices were used to conduct this assessment.

5. (U) ~~(C//NF)~~ Background.

a. (U) ~~(C//NF)~~ Hardened Aircraft Shelters (HAS)/ Chemical Agent Residual Survey by U.S. Army Technical Escort Unit (TEU). During the same timeframe as this survey, the 507th Logistics Task Force (LTF) requested that TEU perform monitoring and sampling for chemical warfare agents and residuals for HAS and occupied buildings located in the Stronghold Freedom Operations Area, abandoned Uzbek bunkers located south of the runway adjacent to the Uzbek Ammunition Supply Point (ASP), and bunkers within the confines of the present US ASP (also located south of the runway).

b. (U) ~~(C//NF)~~ Field Results. Field results of this survey on 8 June 2002 indicated presumptive positive results for G-Nerve agent in HAS 17 and mustard agent/ blood agent in HAS 14 in the Operations Area. Figure 1 contains a schematic of the results of the TEU field survey. Based on these results, the 507th LTF evacuated Stronghold Freedom personnel from these HAS as a precautionary measure, pending laboratory confirmation. Simultaneously, the TF 261 Medical (installation medical authority) performed a retrospective medical records review and screening of Stronghold Freedom personnel to determine possible clinical exposure effects related to the TEU field results. Over 700 personnel were individually screened by TF 261 MED physicians, using a specific questionnaire developed on SF 600 (Figure 2). Copies of these questionnaires were made for individual medical records and for future biostatistical analysis. TF 261 MED subsequently forwarded all completed questionnaires to the CJTF 180 Surgeon. The CJTF 180 Surgeon subsequently requested HQ, USACHPPM conduct epidemiological analysis and archiving of all questionnaires to determine possible trends as a reach-back capability (reference 23).

c. (U) ~~(C//NF)~~ Field Report and Laboratory Report. The TEU subsequently published a report on 12 June 2002 detailing the results of their field investigation (reference 24). During

the course of the TEU investigation, the following samples were collected and submitted to the US Army Soldier and Biological Command (SBCCOM) laboratory for confirmatory analysis: 10 pairs of solid sorbent sample tubes; 7 functioned Drager sample tubes; 16 swipe samples; 28 soil samples; 3 concrete samples; 4 wood samples; 2 water samples and 7 functioned M256 kits. These samples arrived at the SBCCOM laboratory on 16 June 2002. The initial report published by SBCCOM (reference 25) indicated that no Chemical Warfare Material (CW) was detected in the samples submitted by TEU. Non-CW material from these samples indicated the presence of hydrocarbons and semi-volatile organic compounds (SVOCs).

d. (U) ~~(C//NF)~~ Request for CHPPM-EUR Assessment. After the release of the SBCCOM test results, both 507th LTF, their successor unit (164th LTF), and CJTF 180 requested the CHPPM-EUR survey team perform additional OEH sampling of HAS 14 and 17 to quantify and qualify possible environmental health hazards, and associated countermeasures, prior to any decision regarding future use of these facilities.

6. (U) Methodology and Procedures.

a. (U) Air Sampling.

(1) (U) Purpose and Scope. The purpose of the ambient air sampling was to further evaluate potential health threats associated with the inhalation of volatile organic compounds (VOCs), pesticides, and other environmental contaminants that may have been present in these structures.

(2) (U) Procedures. Air sampling for organic compounds was performed using SKC Airchek Model 52® personal air sampling pumps and US Environmental Protection Agency (EPA) Modified Method TO1 sampling media (Supelco 20370-U® Tenax tube media), Chromosorb tubes for pesticide analysis, charcoal tubes for VOC analysis, and XAD-2 and XAD7 media for industrial hygiene analysis. Industrial hygiene analysis was specified for National Institute of Occupational Safety and Health (NIOSH) Methods 5600/ 5601/ 5602 for XAD-2 media and NIOSH Method 2546 for XAD-7 media. Sampling flow rates were adjusted to compensate for the various methods. Sampling flow rates for the modified TO1 sampling were approximately 0.40 milliliters per minute (mL/min), in accordance with guidelines established for the sample media. Sample volumes were generally bracketed between 18 and 20 liters (total volume) to prevent breakthrough of VOCs through the tube media. The Tenax® tube media were analyzed for VOCs using USEPA Method TO 1. XAD-7 and XAD-2 samples were run at a flow rate of approximately 1 liter per minute (1 L/min) for a period of 4-5 hours (total sample volume of 280-300 liters). Chromosorb samples were run at 0.4 L/min for a period of 4-5 hours (total sample volume of approximately 100 liters). Sample pumps generally used the low-flow controller and were calibrated immediately before and after each sampling event using a Dry-Cal DC-1® flow calibrator. Pre- and post- calibration flow rates varied no more than approximately 5%. The average of the pre- and post- calibration flow rates was used to determine the total sampling volume.

(3) (U) ~~(C//NF)~~ Sampling Locations. Prior to sampling, CHPPM-EUR and TEU personnel jointly entered both HAS 14 and 17 and identified sampling locations where TEU recorded their

field results and collected their suspected CW samples. This was done to ensure that sampling was performed in the proper locations. In HAS 17, a total of 5 air sampling locations were selected to coincide with TEU sampling locations. These were labeled with an alpha-numeric code indicating HAS number and sampling location letters (e.g., 17 A through 17 E). In HAS 14, three air sampling locations were selected using the same labeling scheme (eg, 14 A through C). At each air sampling location, three sample pumps were collocated with Chromosorb, XAD-2, and XAD-7 sample media. A photo-ionization detector (PID) direct read instrument was used in HAS 17 to directly record levels of VOCs. Two locations in HAS 17 (17 A and 17 B) were subsequently selected for additional sampling for VOCs using charcoal tubes based on PID results and qualitative observations.

b. (U) Soil, Wipe and Bulk Material Sampling.

(1) (U) Purpose and Scope. The purpose of soil and bulk material sampling was to determine if there were potential health risks to US personnel resulting from contaminants in soil and bulk material present in these HAS. Wipe sampling was performed to determine if pesticide residues existed in the wooden construction products (plywood) used in the HAS' or if pesticide residual contamination existed on HAS concrete surfaces in living and working areas.

(2) (U) Procedures. Surface soil samples were collected from accumulated soils that were present in the cracks between concrete pads in HAS 17 only. A total of 2 samples were collected. No soil samples were collected in HAS 14. Bulk material samples were collected of treated plywood being used for construction in HAS 15. Similar construction materials were used in other HAS'. Pesticide wipe samples were collected using 50/50 mixture of reagent grade Hexane and Acetone, cotton swabs, and 40 ml amber vials. The cotton swab was wetted with this mixture and a 10 cm x 10 cm (100 cm^2) area was wiped with the cotton swab. The cotton swab was then placed into a 40ml vial. Sample information was completed for each sample, to include date, time, and sampling location. The swab/ solution was not used on any painted surfaces. All samples were stored and shipped in a cooler with ice packs until analyzed. Surface soil samples were analyzed for VOCs, semi-volatile organic compounds (SVOCs), and pesticides. Bulk material samples were analyzed for pesticides and inorganic contaminants (arsenic). Air sample analysis was performed in accordance with the selected method for VOCs and various pesticides. Pesticide analysis was selected because of similar chemical structures shared with certain CW agents, such as G-series nerve. This is especially true for organo-phosphorous pesticides. Inorganic arsenic analysis was selected for bulk material analysis because of similar chemical composition with CW agents, such as Lewisite, which also contain some arsenic compounds.

k. (U) Laboratory.

(1) (U) All samples were initially submitted to the Department of Laboratory Sciences (DLS), CHPPM-EUR for analysis, except for the radiological samples, which went to the Radiological Inorganic Chemistry lab at HQ, USACHPPM. The Deutscher Akkreditierungs Rat (DAR, German Accreditation Council) recognizes the accreditation by the Deutsches Akkreditierungssystem Prüfwesen GmbH (DAP) for all 15 European countries, by the DLS,

USACHPPM-EUR. The DAP has determined that the DLS is competent under the terms of Deutsche Institut für Normung (DIN) EN 45001 to carry out physical, physical-chemical, and chemical analysis of water, soils, sediments, and other environmental media. The DLS's, DAR registration number is DAP-P-03.000-00-95-02. The DLS has also established the equivalency of U.S. Environmental Protection Agency (EPA) and German methods.

(2) (U) The American Association for Laboratory Accreditation (A2LA) has also accredited the DLS, USACHPPM-EUR according to the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" and additional requirements in the field of environmental media.

(3) (U) The DLS, HQUSACHPPM performed analysis for bulk materials, all air samples, all pesticide wipe samples, and selected soil (SVOC) samples.

7. (U) ~~(C//NF)~~ Findings.

a. (U) ~~(C//NF)~~ Air Sampling. Appendix B provides images of all sampling activities in HAS 14 and 17. All sampling results are provided in Appendix C.

(1) (U) ~~(C//NF)~~ VOCs. VOCs were detected at low levels in 3 air samples collected inside HAS 17. The initial air sample collected inside this HAS was a breathing zone sample collected prior to evacuation. This sample detected low levels of fuel related petroleum hydrocarbons inside the tactical operations center (TOC) structure in the HAS on 7 June 2002. Ironically, this sampling occurred at about the same time and at the same location in the HAS as the TEU CW sampling. Additional air samples collected at locations A and B in HAS 17 (sampling location was inches off the floor and was not a breathing zone sample) detected kerosene at levels of 36 and 66 milligrams per cubic meter (mg/m^3). This area of HAS 17 was obviously impacted by minor amounts of leaking fuel (probably jet kerosene) in the past. There was a stain on the concrete floor in this area and soil sampled between the cracks in the concrete pad smelled of petroleum products. The fuel stain/ odor was extremely limited in size to a specific area toward the rear of the TOC. The plywood flooring was removed in order to access this area and sample. PID readings generally ranged between 15 and 30 parts per million (ppm – as JP8) when soil headspace readings were collected. The NIOSH guideline for kerosene in air is 100 mg/m^3 (8 hour time weighted average). There is no Air-MEG established for kerosene in USACHPPM TG 230.

(2) (U) ~~(C//NF)~~ Pesticides. No pesticides were detected in any of the air samples collected in HAS 14 or HAS 17. There appears to be no health threat from pesticides in air that would pose a health threat to future inhabitants of these structures.

b. (U) ~~(C//NF)~~ Soil, Wipe, and Bulk Material Sampling.

(1) (U) ~~(C//NF)~~ Soil Samples. Results of the soil sampling are provided in Appendix C. VOC analysis of HAS 17 soils indicated fuel related compounds in the low milligram per kilogram (mg/kg) range. Compounds detected include trimethylbenzene, ethylbenzene, napthalene, xylene, and toluene. SVOC analysis detected similar fuel related compounds (i.e.,

napthalene, methyl napthalene); also in the low mg/kg range (e.g., 10-20 mg/kg). This analysis is consistent with the results of the SBCCOM report and indicates fuel-related hydrocarbon contamination of this soil. It should be noted that most of the contaminated soil was actually removed during the sampling process. The fuel contamination in the soils was further identified by the laboratory as "weathered kerosene" (reference 26), which is consistent with the air sampling results in this same area. This is likely the result of a minor fuel spill that occurred in the past. No pesticides were detected in soil samples.

(2) (U) ~~(C//NF)~~ Wipe Samples. No pesticides were detected in any of the wipe samples. This indicates that no pesticide residues were present in the areas sampled.

(3) (U) ~~(C//NF)~~ Bulk Material Samples. Bulk material samples (treated wood and sawdust) contained high levels of arsenic- approximately 4,900 mg/kg. The label on this wood indicated that it had been pressure treated with Chromated Copper Arsenate (CCA). Pesticide wipe samples collected from wood surfaces did not detect any pesticides.

c. (U) ~~(C//NF)~~ Risk Communication. Discussion with previous occupants of these structures and observations of signs posted on the HAS (see Appendix B) indicate that personnel may not have been advised of the negative CW result quoted in the SBCCOM report. Additionally, a frequent question asked of the CHPPM-EUR sampling team was "Why did the agent detectors detect a positive CW sample?" The team explained that the purpose of this assessment was not to answer this question, but rather to determine exactly what the possible contaminants were, assess potential health risks, and advise on countermeasures to minimize exposures to eliminate or reduce health risks. Only personnel that owned, operated, and maintained the field sampling equipment and performed the original CW testing and subsequent CW laboratory analysis (e.g., TEU and SBCCOM) can answer questions regarding the occurrence of the false positive field results. The Stronghold Freedom command group and CJTF 180 should make every effort to have an explanation for the false positive readings and provide this to Stronghold Freedom personnel. Figures B-1 and B-2 illustrate the perceptions held by Stronghold Freedom personnel on this subject.

9. (U) ~~(C//NF)~~ Conclusions.

a. (U) ~~(C//NF)~~ HAS 17. The only environmental contaminants detected in HAS 17 were fuel related hydrocarbons. These were detected in a very specific and relatively small portion of the HAS 17 TOC, in the same area where TEU sampled for CW. Kerosene was identified as one of the predominant compounds in both air and soil, indicating jet fuel (also known as jet kerosene) as the likely contaminant. A breathing zone sample collected in early June (prior to evacuation) detected similar fuel related compounds at low levels. No pesticides were detected in wipe samples or air samples collected in this HAS. The contaminant levels observed in the lone breathing zone sample do not pose an acute health hazard to personnel working in this HAS. However, samples collected at the floor surface near the contamination detected kerosene at levels approaching the NIOSH guideline. Prior to reoccupying this HAS, the fuel stained area should be cleaned thoroughly using soap (Alconox) and hot water and capped with concrete (possibly poured in the headspace between the existing floor supports) to prevent/ minimize

future exposures. The plywood flooring can easily be replaced after cleaning and capping. The facility should then be re-occupied and used for its original purpose or other roles in accordance with the Stronghold Freedom master plan.

b. (U) ~~(C//NF)~~ HAS 14. No pesticide or VOC contaminants were detected in any of the samples collected at HAS 14. This HAS should be cleared for immediate occupation or re-use in accordance with the Stronghold Freedom master plan.

c. (U) ~~(C//NF)~~ Risk Communication. Stronghold Freedom personnel are concerned about the false positive CW agent detection with regards to these structures. Every attempt should be made to determine the cause of the false positive results and communicate this information to Stronghold Freedom personnel. The results of this assessment should also be disseminated widely through the chain of command.

10. (U) ~~(C//NF)~~ Recommendations.

a. (U) ~~(C//NF)~~ Clean the fuel stained area in the HAS 17 TOC using an industrial soap (like Alconox) and warm water mixture. After cleaning and drying, cap this area by pouring concrete in the headspace between the HAS floor and the plywood floor to prevent future exposures/ complaints from personnel working in this area.

b. (U) ~~(C//NF)~~ Communicate these results to Stronghold Freedom personnel, especially units that have occupied or will re-occupy HAS 14 and HAS 17. Coordinate/ consult with SBCCOM and TEU regarding a possible explanation for the false positive CW field results and communicate this information to Stronghold Freedom personnel.

11. (U) Point of Contact. The POC for this action is the undersigned and can be reached by telephone at [redacted]; e-mail: [redacted] or by US mail: Commander, USACHPPM-EUR, CMR 402, APO AE 09180.

[redacted]
COL, MS
Commanding

Appendices:

A. (U) ~~(S//NF)~~ References
B. (U) ~~(S//NF)~~ HAS Sampling Photographs
C. (U) ~~(C//NF)~~ Tables of Results

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment – Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

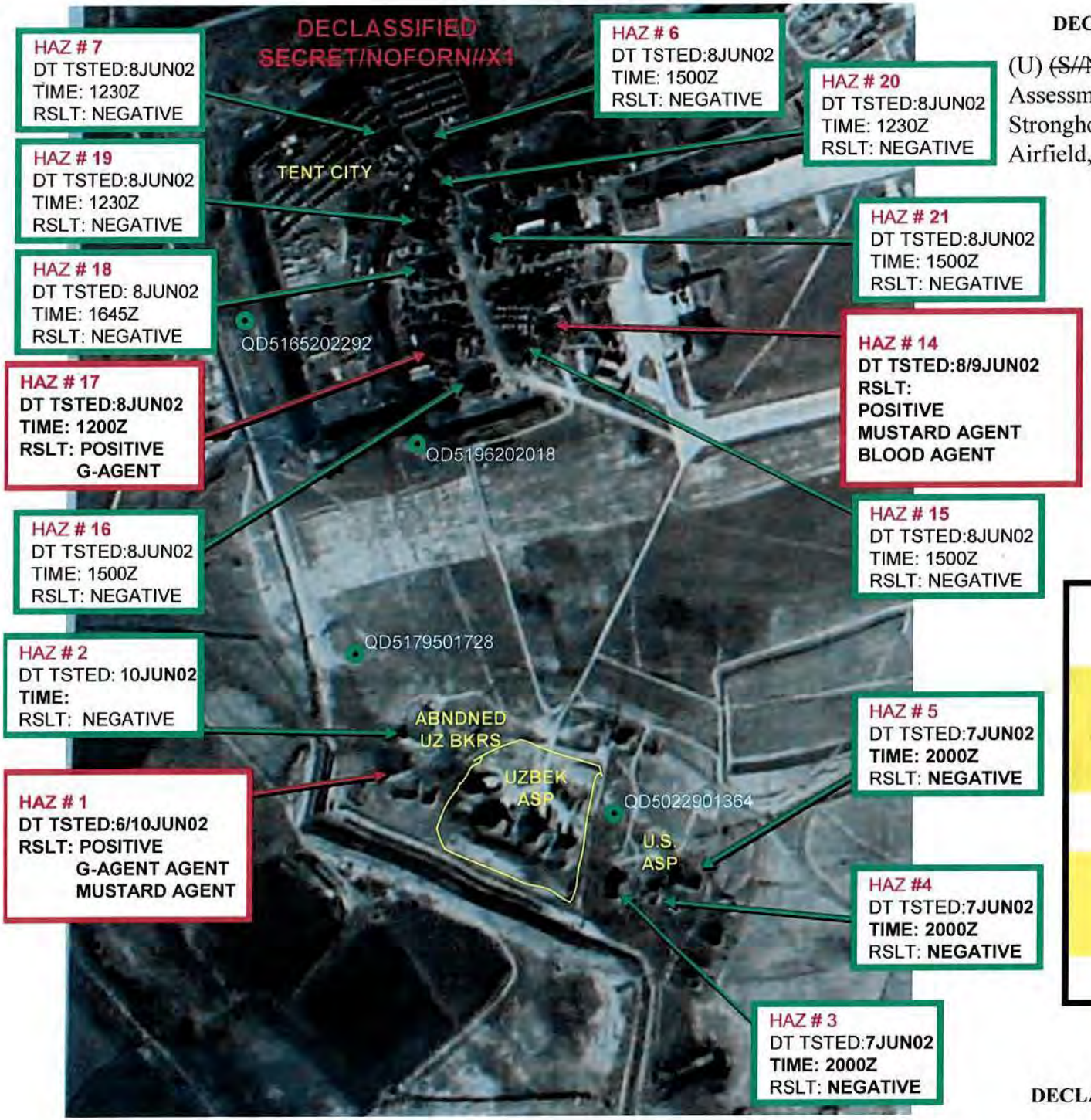
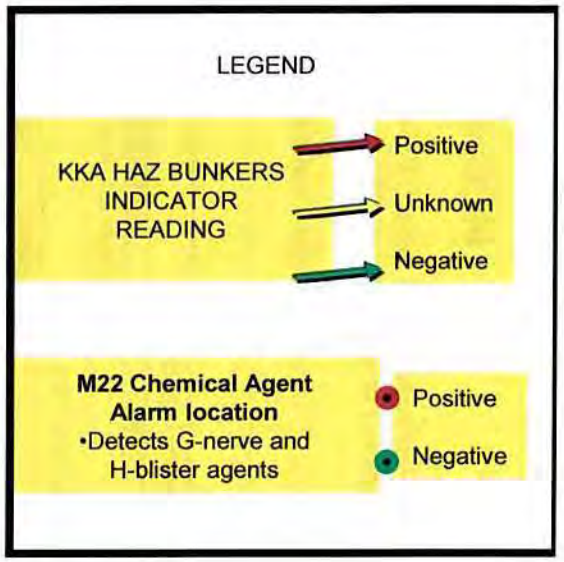


Figure 1. USATEU Field Results By Location at Stronghold Freedom, K2.

Results were later determined to be false positives for CW upon SBCCOM laboratory analysis.

As of : 11 0400Z June 2002



(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment – Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

Figure 2. (U) Questionnaire Used for Potential HAS Exposure.

AUTHORIZED FOR LOCAL REPRODUCTION

MEDICAL RECORD	CHRONOLOGICAL RECORD OF MEDICAL CARE
DATE	SYMPTOMS, DIAGNOSIS, TREATMENT, TREATING ORGANIZATION *(Sign each entry)*
	MEDICAL SURVEILLANCE FOR POTENTIAL EXPOSURE TO CHEMICAL AGENTS
DEMOGRAPHICS	NAME: DOB: AGE: SSN:
	MALE / FEMALE HOME STATION: UNIT:
	M.O.S. K2 DUTY LOCATION: TENT #:
	K2 ARRIVAL DATE: PREVIOUS EMPLOYMENT:
HISTORY	ARE YOU CURRENTLY TAKING PERSCRIBED MEDICATIONS?(List)
	ARE YOU TAKING OVER THE COUNTER MEDICATIONS?(List)
	DO YOU SMOKE? (Packs/day) DO YOU DRINK ALCOHOL? IF YES, HOW MUCH?
	DO YOU HAVE ANY CHRONIC MEDICAL CONDITION(S)? (List)
	DO YOU WORK WITH OR AROUND HAZARDOUS MATERIALS, CHEMICALS OR INSECTICIDES?(List)
	SINCE THIS DEPLOYMENT, HAVE YOU HAD ANY OF THE FOLLOWING SYMPTOMS? (Circle Y OR N)
	a) DIM OR BLURRED VISION Y N b) EXCESSIVE RUNNING OF NOSE Y N
	c) PROLONGED HEADACHE Y N d) EXCESSIVE SALIVATION/DROOLING Y N
	~~e)TIGHTNESS IN CHEST OR DIFFICULTY BREATHING Y N~~
	f) MUSCLE WEAKNESS OR PARALYSIS Y N g) MUSCLE TWITCHING Y N
	h) LOSS OF CONSCIOUSNESS Y N i) SEIZURES Y N
	j) LOSS OF BOWEL OR BLADDER CONTROL Y N
	k) SKIN BLISTERS, RASH OR SORES Y N
	l) NAUSEA, VOMITING, DIARRHEA Y N
	m) DIFFICULTY WITH CONCENTRATION OR MEMORY Y N
	n) PROFUSE OR INCREASED SWEATING Y N

HOSPITAL OR MEDICAL FACILITY	STATUS	DEPART./SERVICE	RECORDS MAINTAINED AT
SPONSOR'S NAME	SSN/ID NO.	RELATIONSHIP TO SPONSOR	
PATIENT'S IDENTIFICATION: *(For typed or written entries, give: Name - last, first, middle; ID No or SSN; Sex; Date of Birth; Rank/Grade.)*		REGISTER NO.	WARD NO.

CHRONOLOGICAL RECORD OF MEDICAL CARE
Medical Record
STANDARD FORM 600 (REV. 6-97)
Prescribed by GSA/ICMR
FIRMR (41 CFR) 201-9.202-1 USAPA V2.00

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment – Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

(U) ~~(S//REL)~~ APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

1. (U) Memorandum, USACHPPM-Europe, MCHB-AE, 15 February 2002, subject: Final Report, Environmental Site Characterization and Operational Health Risk Assessment, Site 1, 27 October – 27 November 2001 (Original Document Classified).

2. (U) REDACTED

3. (U) USACHPM-Europe and USACHPPM-Main Directorate of Laboratory Services, Analytical Methods, 2001.

4. (U) Department of the Army (DA), Risk Management. FM 100-14, 23 April 1998.

5. (U) USACHPPM Technical Guide (TG) 248, Guide for Deployed Preventive Personnel on Health Risk Management. August 2001.

6. (U) USACHPPM TG 230, Chemical Exposure Guidelines for Deployed Military Personnel, January 2002.

7. (U) USEPA Preliminary Remediation Goals. November 2001.

8. (U) DoD Directive 6490.2, Joint Medical Surveillance, 30 August 1997.

9. (U) DoD Instruction 6490.3, Implementation and Application of Joint Medical Surveillance for Deployments, 7 August 1997.

10. (U) Joint Staff Memorandum, MCM-251-98, dated 4 December 1998.

11. (U) Headquarters Department of the Army Policy Letter, Force Health Protection (FHP): Occupational and Environmental Health Threats, 27 June 2001.

12. REDACTED

13. (U) U.S. Army Center for Health Promotion and Preventive Medicine, USACHPPM Technical Guide 251 – A Soldier's Guide to Environmental and Occupational Field Sampling for Military Deployment (Draft), August 2001

14. (U) ~~(S)~~ Interim Environmental Site Characterization and Operational Health Risk Assessment, Stronghold Freedom, Karshi Khanabad Airfield, Uzbekistan, 27 Oct - 27 November 2001.

15. (U) REDACTED

16. (U) Overseas Environmental Baseline Guidance Document, date.

17. (U) USACHPPM Technical Guide (TG) 236A, Basic Radiological Dose Estimation – A Field Guide, August 2001.

18. (U) Information Memorandum, 12 June 2002, HQUSACHPPM, subject: Uranium Found at Karshi Khanabad Airbase (Original Document Classified).

19. (U) Memorandum for Record, 764th Ordnance Company, AFOD-DG, 5 June 2002, subject: Radiation Readings.

20. (U) Memorandum, USACHPPM-Europe, MCHB-AE, 10 June 2002, subject: False Positive Alpha Contamination at K2.

21. (U) Federal Guidance Report #11, Limiting Values of Radionuclide Intake and Air Concentration, EPA, 1988.

22. (U) Health and Environmental Consequences of Depleted Uranium Use in the U. S. Army: Technical Report, U. S. Army Environmental Policy Institute, June 1995.

23. (U) REDACTED

24. (U) REDACTED

25. (U) Memorandum, USA SBCCOM, AMSSB-CS, 22 June 02, subject: Samples Received from K2.

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment – Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

(U) ~~(S//NF)~~ APPENDIX B

HAS SAMPLING PHOTOGRAPHS

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment – Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

Figure B-1. (U) ~~(S//NF)~~ HAS 17 Markings – 5 July 02

These photos illustrate the risk communication challenge faced by the command at Stronghold Freedom to explain the false positive readings for Chemical Weapons in these structures.

Figure B-2. (U) ~~(S//NF)~~ HAS 14 Markings – 5 July 02

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment – Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

Figure B-3. (U) ~~(S//NF)~~ Typical TEU box used to "trap chemical vapors" from the concrete pad in the floor headspace in HAS 14. These were in shaded hangars and concrete pad temperature was cool to the touch. Presumptive blister agent detects were possibly a relic from treated wood (chromated copper arsenate) that might have been used in the construction of this box.

Figure B-4. (U) ~~(S//NF)~~ Osmose pressure treated plywood (treated with Chromated Copper Arsenate) that was sampled in HAS 15. Bulk samples of plywood and sawdust were collected from this source. A wipe was also collected from this stack of plywood (on side).

Figure B-5. (U) ~~(S//NF)~~ HAS 17. Petroleum stain on concrete pad in rear of TOC. This is area where original sampling was performed in early June 2002 and false CW positives were generated by TEU. CHPPM-EUR also collected a Tenax air sample from the breathing zone in this general area; detected low levels of fuel related compounds. Dark "stain" in middle right is substance similar to driveway crack sealant (tar compound).

Figure B-6. (U) ~~(S//NF)~~ HAS 17. Location of soil samples and cracks in concrete pad where soil was collected for samples 17-S-1 and 17-S-2. Photo also shows collocated air sampling pumps (locations 17A and 17B) placed at this location to capture air contaminants from this source. Soil was cleaned out of cracks to fill the two sample containers.

(U) ~~(C//NF)~~ APPENDIX C

ANALYTICAL RESULTS

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-1. (U) ~~(C//NF)~~ Soil Analytical Results – VOCs

FIELD ID			17-S-1	17-S-2
LAB ID			1268-022	1268-023
LOCATION DESCRIPTION				
COLLECTION DATE				
PARAMETERS	UNITS	MDL[1]		
VOLATILE ORGANIC COMPOUNDS (VOCs)				
1,1,1,2-Tetrachloroethane	mg/kg	0.01	BDL	BDL
1,1,1-Trichloroethane	mg/kg	0.01	BDL	BDL
1,1,2,2-Tetrachloroethane	mg/kg	0.01	BDL	BDL
1,1,2-Trichloroethane	mg/kg	0.01	BDL	BDL
1,1-Dichloroethane	mg/kg	0.01	BDL	BDL
1,1-Dichloroethene	mg/kg	0.01	BDL	BDL
1,1-Dichloropropene	mg/kg	0.01	BDL	BDL
1,2,3-Trichlorobenzene	mg/kg	0.01	BDL	BDL
1,2,3-Trichloropropane	mg/kg	0.01	BDL	BDL
1,2,4-Trichlorobenzene	mg/kg	0.01	BDL	BDL
1,2,4-Trimethylbenzene	mg/kg	0.01	BDL	BDL
1,2-Dibromo-3-chloropropane	mg/kg	0.01	BDL	BDL
1,2-Dibromoethane	mg/kg	0.01	BDL	BDL
1,2-Dichlorobenzene	mg/kg	0.01	BDL	BDL
1,2-Dichloroethane	mg/kg	0.01	BDL	BDL
1,2-Dichloropropane	mg/kg	0.01	BDL	BDL
1,3,5-Trimethylbenzene	mg/kg	0.01	**1.7**	**0.98**
1,3-Dichlorobenzene	mg/kg	0.01	BDL	BDL
1,3-Dichloropropane	mg/kg	0.01	BDL	BDL
1,4-Dichlorobenzene	mg/kg	0.01	BDL	BDL
2,2-Dichloropropane	mg/kg	0.01	BDL	BDL
2-Chlorotoluene	mg/kg	0.01	BDL	BDL
2-Methoxy-2-methylpropane	mg/kg	0.01	BDL	BDL
4-Chlorotoluene	mg/kg	0.01	BDL	BDL
Benzene	mg/kg	0.01	BDL	BDL
Bromobenzene	mg/kg	0.01	BDL	BDL
Bromochloromethane	mg/kg	0.01	BDL	BDL
Bromodichloromethane	mg/kg	0.01	BDL	BDL
Bromoform	mg/kg	0.01	BDL	BDL
Bromomethane	mg/kg	0.01	BDL	BDL
Carbon tetrachloride	mg/kg	0.01	BDL	BDL
Chlorobenzene	mg/kg	0.01	BDL	BDL
Chloroethane	mg/kg	0.01	BDL	BDL
Chloroform	mg/kg	0.01	BDL	BDL
Chloromethane	mg/kg	0.01	BDL	BDL
Dibromochloromethane	mg/kg	0.01	BDL	BDL
Dibromomethane	mg/kg	0.01	BDL	BDL
Dichlorodifluoromethane	mg/kg	0.01	BDL	BDL
Ethylbenzene	mg/kg	0.01	**0.51**	**0.13**
Hexachlorobutadiene	mg/kg	0.01	BDL	BDL
Isopropylbenzene	mg/kg	0.01	**0.56**	**0.27**
Methylene chloride	mg/kg	0.01	BDL	BDL
Naphthalene	mg/kg	0.01	**5.7**	**4.9**
Styrene	mg/kg	0.01	BDL	BDL
Tetrachloroethene (PCE)	mg/kg	0.01	BDL	BDL
Toluene	mg/kg	0.01	**0.31**	BDL
Trichloroethene (TCE)	mg/kg	0.01	BDL	BDL
Trichlorofluoromethane	mg/kg	0.01	BDL	BDL
Trihalomethanes, total	mg/kg	0.01	BDL	BDL
Vinyl chloride	mg/kg	0.01	BDL	BDL
Xylene, total	mg/kg	0.01	**2.4**	**0.69**
cis-1,2-Dichloroethene	mg/kg	0.01	BDL	BDL
cis-1,3-Dichloropropene	mg/kg	0.01	BDL	BDL
n-Butylbenzene	mg/kg	0.01	BDL	BDL
n-Propylbenzene	mg/kg	0.01	**0.93**	**0.55**
p-Isopropyltoluene	mg/kg	0.01	**1.3**	**0.91**
sec-Butylbenzene	mg/kg	0.01	BDL	BDL
tert-Butylbenzene	mg/kg	0.01	BDL	BDL
trans-1,2-Dichloroethene	mg/kg	0.01	BDL	BDL
trans-1,3-Dichloropropene	mg/kg	0.01	BDL	BDL

[1] Minimum Detection Level

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-2. (U) ~~(C//NF)~~ Soil Analytical Results – SVOCs

FIELD ID			17-S-1	17-S-2
LAB ID			1268-022	1268-023
LOCATION DESCRIPTION				
COLLECTION DATE				
PARAMETERS	UNITS	MDL[1]		
SEMI VOLATILE ORGANIC COMPOUNDS (SVOCs)				
1,2,4-Trichlorobenzene	mg/kg	4.35	BDL[2]	BDL[2]
1,2-Dichlorobenzene	mg/kg	4.35	BDL[2]	BDL[2]
1,3-Dichlorobenzene	mg/kg	4.35	BDL[2]	BDL[2]
1,4-Dichlorobenzene	mg/kg	4.35	BDL[2]	BDL[2]
2,4,5-Trichlorophenol	mg/kg	4.35	BDL[2]	BDL[2]
2,4,6-Trichlorophenol	mg/kg	4.35	BDL[2]	BDL[2]
2,4-Dichlorophenol	mg/kg	4.35	BDL[2]	BDL[2]
2,4-Dimethylphenol	mg/kg	4.35	BDL[2]	BDL[2]
2,4-Dinitrophenol	mg/kg	4.35	BDL[2]	BDL[2]
2,4-Dinitrotoluene	mg/kg	4.35	BDL[2]	BDL[2]
2,6-Dinitrotoluene	mg/kg	4.35	BDL[2]	BDL[2]
2-Chloronaphthalene	mg/kg	4.35	BDL[2]	BDL[2]
2-Chlorophenol	mg/kg	4.35	BDL[2]	BDL[2]
2-Methyl-4,6-dinitrophenol	mg/kg	4.35	BDL[2]	BDL[2]
2-Methylnaphthalene	mg/kg	4.35	10.1	16.2
2-Methylphenol (o-Cresol)	mg/kg	4.35	BDL[2]	BDL[2]
2-Nitroaniline	mg/kg	4.35	BDL[2]	BDL[2]
2-Nitrophenol	mg/kg	4.35	BDL[2]	BDL[2]
3-Nitroaniline	mg/kg	4.35	BDL[2]	BDL[2]
4-Bromophenyl-phenylether	mg/kg	4.35	BDL[2]	BDL[2]
4-Chloro-3-methylphenol	mg/kg	4.35	BDL[2]	BDL[2]
4-Chloroaniline	mg/kg	4.35	BDL[2]	BDL[2]
4-Chlorophenyl-phenylether	mg/kg	4.35	BDL[2]	BDL[2]
4-Methylphenol (p-Cresol)	mg/kg	4.35	BDL[2]	BDL[2]
4-Nitroaniline	mg/kg	4.35	BDL[2]	BDL[2]
4-Nitrophenol	mg/kg	4.35	BDL[2]	BDL[2]
Acenaphthene	mg/kg	4.35	BDL[2]	BDL[2]
Acenaphthylene	mg/kg	4.35	BDL[2]	BDL[2]
Anthracene	mg/kg	4.35	BDL[2]	BDL[2]

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-2. (U) ~~(C//NF)~~ Soil Analytical Results – SVOCs – Cont'd

FIELD ID			17-S-1	17-S-2
LAB ID			1268-022	1268-023
LOCATION DESCRIPTION				
COLLECTION DATE				
PARAMETERS	UNITS	MDL[1]		
SEMI VOLATILE ORGANIC COMPOUNDS (SVOCs)				
Benzo(a)anthracene	mg/kg	4.35	BDL[2]	BDL[2]
Benzo(a)pyrene	mg/kg	4.35	BDL[2]	BDL[2]
Benzo(b)fluoroanthene	mg/kg	4.35	BDL[2]	BDL[2]
Benzo(g,h,i)perylene	mg/kg	4.35	BDL[2]	BDL[2]
Benzo(k)fluoroanthene	mg/kg	4.35	BDL[2]	BDL[2]
Benzyl alcohol	mg/kg	4.35	BDL[2]	BDL[2]
bis(2-Chloroethoxy)methane	mg/kg	4.35	BDL[2]	BDL[2]
bis(2-Chloroethyl)ether	mg/kg	4.35	BDL[2]	BDL[2]
bis(2-Chloroisopropyl)ether	mg/kg	4.35	BDL[2]	BDL[2]
bis(2-ethylhexyl)phthalate	mg/kg	4.35	76.9	129
Butylbenzylphthalate	mg/kg	4.35	BDL[2]	BDL[2]
Chrysene	mg/kg	4.35	BDL[2]	BDL[2]
Dibenz(a,h)anthracene	mg/kg	4.35	BDL[2]	BDL[2]
Dibenzofuran	mg/kg	4.35	BDL[2]	BDL[2]
Diethylphthalate	mg/kg	4.35	BDL[2]	BDL[2]
Dimethylphthalate	mg/kg	4.35	BDL[2]	BDL[2]
Di-n-butylphthalate	mg/kg	4.35	19.5	11.1
Di-n-octylphthalate	mg/kg	4.35	BDL[2]	BDL[2]
Fluoranthene	mg/kg	4.35	BDL[2]	BDL[2]
Fluorene	mg/kg	4.35	BDL[2]	BDL[2]
Hexachlorobenzene	mg/kg	4.35	BDL[2]	BDL[2]
Hexachlorobutadiene	mg/kg	4.35	BDL[2]	BDL[2]
Hexachlorocyclopentadiene	mg/kg	4.35	BDL[2]	BDL[2]
Hexachloroethane	mg/kg	4.35	BDL[2]	BDL[2]
Indeno(1,2,3-cd)pyrene	mg/kg	4.35	BDL[2]	BDL[2]
Isophorone	mg/kg	4.35	BDL[2]	BDL[2]
Naphthalene	mg/kg	4.35	12.7	11.9
Nitrobenzene	mg/kg	4.35	BDL[2]	BDL[2]
N-Nitrosodimethylamine	mg/kg	4.35	BDL[2]	BDL[2]
N-Nitrosodiphenylamine	mg/kg	4.35	BDL[2]	BDL[2]
N-Nitrosodipropylamine	mg/kg	4.35	BDL[2]	BDL[2]
Pentachlorophenol	mg/kg	4.35	BDL[2]	BDL[2]
Phenanthrene	mg/kg	4.35	11.5	8.68
Phenol	mg/kg	4.35	BDL[2]	BDL[2]
Pyrene	mg/kg	4.35	BDL[2]	BDL[2]

[1] Minimum Detection Level
[2] Below Detection Level

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-3. (U) ~~(C//NF)~~ Soil Analytical Results – Pesticides

FIELD ID			17-S-1	17-S-2
LAB ID			1268-022	1268-023
LOCATION DESCRIPTION				
COLLECTION DATE				
PARAMETERS	UNITS	MDL[1]		
Aldrin	mg/kg	0.01	<0.02	<0.02
alpha HCH	mg/kg	0.02	<0.02	<0.02
Atrazine	mg/kg	0.02	<0.02	<0.02
Azinphosethyl	mg/kg	0.01	<0.01	<0.01
beta HCH	mg/kg	0.02	<0.02	<0.02
Chlorfenvinphos	mg/kg	0.01	<0.01	<0.01
delta HCH	mg/kg	0.02	<0.02	<0.02
Dieldrin	mg/kg	0.02	<0.02	<0.02
Dimethoat	mg/kg	0.01	<0.01	<0.01
gamma HCH (Lindane)	mg/kg	0.02	<0.02	<0.02
Heptachlor	mg/kg	0.02	<0.02	<0.02
Heptachlor Epoxide	mg/kg	0.02	<0.02	<0.02
Hexachlorobenzene (HCB)	mg/kg	0.02	<0.02	<0.02
Methoxychlor	mg/kg	0.05	<0.05	<0.05
o,p'-DDD	mg/kg	0.05	<0.05	<0.05
o,p'DDE	mg/kg	0.05	<0.05	<0.05
o,p'DDT	mg/kg	0.05	<0.05	<0.05
p,p'-DDD	mg/kg	0.05	<0.05	<0.05
p,p'-DDE	mg/kg	0.05	<0.05	<0.05
p,p'-DDT	mg/kg	0.05	<0.05	<0.05
Parathionethyl	mg/kg	0.01	<0.01	<0.01
Parathionmethyl	mg/kg	0.01	<0.01	<0.01
Simazine	mg/kg	0.02	<0.01	<0.01

[1] Minimum Detection Level

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-4. (U) ~~(C//NF)~~ Bulk Analytical Results.

FIELD ID			15-W-1 (1271-080)
LAB ID			2002-05346
COLLECTION DATE			
PARAMETERS	UNITS	MDL	
PESTICIDES			
Aldrin	mg/kg	0.01	< 0.01
alpha HCH	mg/kg	0.02	< 0.01
Atrazine	mg/kg	0.02	< 0.01
Azinphosethyl	mg/kg	0.01	< 0.01
beta HCH	mg/kg	0.02	< 0.01
Chlorfenvinphos	mg/kg	0.01	< 0.01
delta HCH	mg/kg	0.02	< 0.01
Dieldrin	mg/kg	0.02	< 0.01
Dimethoat	mg/kg	0.01	< 0.01
gamma HCH (Lindane)	mg/kg	0.02	< 0.01
Heptachlor	mg/kg	0.02	< 0.01
Heptachlor Epoxide	mg/kg	0.02	< 0.01
Hexachlorobenzene (HCB)	mg/kg	0.02	< 0.01
Methoxychlor	mg/kg	0.05	< 0.01
o,p'-DDD	mg/kg	0.05	< 0.01
o,p'DDE	mg/kg	0.05	< 0.01
o,p'DDT	mg/kg	0.05	< 0.01
p,p'-DDD	mg/kg	0.05	< 0.01
p,p'-DDE	mg/kg	0.05	< 0.01
p,p'-DDT	mg/kg	0.05	< 0.01
Parathionethyl	mg/kg	0.01	< 0.01
Parathionmethyl	mg/kg	0.01	< 0.01
Simazine	mg/kg	0.02	< 0.01
HEAVY METALS			
Arsenic	mg/kg	39.8	4910

[1] Minimum Detection Level
[2] Below Detection Level

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-5. (U) ~~(C//NF)~~ Swipe Analytical Results - Pesticides (All Samples were Below Detection Limit (BDL); MDLs shown below)

FIELD ID		14A	14B	14C	14D	14E	14F	15-P-1	15-L-1	15-P-2	15-K-1	15-F-1
LAB ID		1270-074	1270-075	1270-076	1270-077	1270-078	1270-079	1270-059	1270-060	1270-061	1270-062	1270-063
COLLECTION DATE												
PARAMETERS	UNITS											
Alachlor	ug/wipe	< 1	< 1	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aldrin	ug/wipe	< 0.3	< 0.3	< 0.15	< 0.3	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
alpha-BHC	ug/wipe	0.2	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
alpha-Chlordane	ug/wipe	< 0.3	< 0.3	< 0.15	< 0.3	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Aroclor-1016	ug/wipe	< 3.2	< 3.2	< 1.6	< 3.2	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Aroclor-1221	ug/wipe	< 3.2	< 3.2	< 1.6	< 3.2	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Aroclor-1232	ug/wipe	< 3.2	< 3.2	< 1.6	< 3.2	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Aroclor-1242	ug/wipe	< 3.2	< 3.2	< 1.6	< 3.2	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Aroclor-1248	ug/wipe	< 3.2	< 3.2	< 1.6	< 3.2	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Aroclor-1254	ug/wipe	< 3.2	< 3.2	< 1.6	< 3.2	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Aroclor-1260	ug/wipe	< 3.2	< 3.2	< 1.6	< 3.2	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Aspon	ug/wipe	< 4	< 4	< 2	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Atrazine	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Azinophos methyl	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Azinophos, Ethyl	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Benefin	ug/wipe	< 1	< 1	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
beta-BHC	ug/wipe	< 0.3	< 0.3	< 0.15	< 0.3	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Bolstar	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Bromacil	ug/wipe	< 2	< 2	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbophenothion	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Chlordane, Technical	ug/wipe	< 0.6	< 0.6	< 0.3	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chlorfenvinphos	ug/wipe	< 4	< 4	< 2	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chlorpyrifos	ug/wipe	< 4	< 4	< 2	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chlorpyrifos, Methyl	ug/wipe	< 4	< 4	< 2	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Coumaphos	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Crotoxyphos	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
DCPA (Dacthal)	ug/wipe	< 2	< 2	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
delta-BHC	ug/wipe	< 0.3	< 0.3	< 0.15	< 0.3	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Demeton (Mixed Isomers)	ug/wipe	< 10	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Diazinon	ug/wipe	< 4	< 4	< 2	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dichlofenthion	ug/wipe	< 4	< 4	< 2	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dichlorvos	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Dieldrin	ug/wipe	< 0.3	< 0.3	< 0.15	< 0.3	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Dimethoate	ug/wipe	< 10	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Disulfoton	ug/wipe	< 6	< 6	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Endosulfan I	ug/wipe	< 0.3	< 0.3	< 0.15	< 0.3	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Endosulfan II	ug/wipe	< 0.6	< 0.6	< 0.3	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Endosulfan sulfate	ug/wipe	< 0.6	< 0.6	< 0.3	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Endrin	ug/wipe	< 0.6	< 0.6	< 0.3	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
EPN	ug/wipe	< 4	< 4	< 2	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-5. (U) ~~(C//NF)~~ Swipe Analytical Results - Pesticides (All Samples were Below Detection Limit (BDL); MDLs shown below) - Cont'd

FIELD ID		14A	14B	14C	14D	14E	14F	15-P-1	15-L-1	15-P-2	15-K-1	15-F-1
LAB ID		1270-074	1270-075	1270-076	1270-077	1270-078	1270-079	1270-059	1270-060	1270-061	1270-062	1270-063
COLLECTION DATE												
PARAMETERS	UNITS											
Ethion	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Ethoprop	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Famphur	ug/wipe	<6	<6	<3	<6	<3	<3	<3	<3	<3	<3	<3
Fenitrothion	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Fensulfothion	ug/wipe	<20	<20	<10	<20	<10	<10	<10	<10	<10	<10	<10
Fenthion	ug/wipe	<6	<6	<3	<6	<3	<3	<3	<3	<3	<3	<3
Fonofos	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
gamma-BHC (Lindane)	ug/wipe	<1	<1	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
gamma-Chlordane	ug/wipe	<0.3	<0.3	<0.15	<0.3	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Heptachlor	ug/wipe	<0.3	<0.3	<0.15	<0.3	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Heptachlor epoxide	ug/wipe	<0.3	<0.3	<0.15	<0.3	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Isazophos	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Isofenphos	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Leptophos	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Malathion	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Merphos	ug/wipe	<10	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5
Methoxychlor	ug/wipe	<3	<3	<1.5	<3	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Methyl Parathion	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Mevinphos	ug/wipe	<10	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5
Mirex	ug/wipe	<0.6	<0.6	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Monocrotophos	ug/wipe	<10	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5
o,p'-DDD	ug/wipe	<0.6	<0.6	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
o,p'-DDE	ug/wipe	<0.3	<0.3	<0.15	<0.3	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
o,p'-DDT	ug/wipe	<0.6	<0.6	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Oxadiazon	ug/wipe	<0.6	<0.6	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Oxychlordane	ug/wipe	<0.6	<0.6	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p,p'-DDD	ug/wipe	<0.6	<0.6	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p,p'-DDE	ug/wipe	<0.3	<0.3	<0.15	<0.3	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
p,p'-DDT	ug/wipe	<0.6	<0.6	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Parathion	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Permethrin, cis-	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Permethrin, trans-	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Phorate	ug/wipe	<10	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5
Phosmet	ug/wipe	<6	<6	<3	<6	<3	<3	<3	<3	<3	<3	<3
Phosphamidon	ug/wipe	<100	<100	<50	<100	<50	<50	<50	<50	<50	<50	<50
Propazine	ug/wipe	<6	<6	<3	<6	<3	<3	<3	<3	<3	<3	<3
Propetamphos	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Prototthiophos	ug/wipe	<6	<6	<3	<6	<3	<3	<3	<3	<3	<3	<3
Ronnel	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Simazine	ug/wipe	<6	<6	<3	<6	<3	<3	<3	<3	<3	<3	<3
Sulfotep	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Terbufos	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2
Tetrachlorvinphos	ug/wipe	<6	<6	<3	<6	<3	<3	<3	<3	<3	<3	<3
Toxaphene	ug/wipe	<12	<12	<6	<12	<6	<6	<6	<6	<6	<6	<6
Trichlorfon	ug/wipe	<10	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5
Trichloronate	ug/wipe	<6	<6	<3	<6	<3	<3	<3	<3	<3	<3	<3
Trifluralin	ug/wipe	<1	<1	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zinophos	ug/wipe	<4	<4	<2	<4	<2	<2	<2	<2	<2	<2	<2

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-6. (U) ~~(C//NF)~~ Swipe Analytical Results - Pesticides (All Samples were Below Detection Limit (BDL); MDLs shown below)

FIELD ID		17A	17B	17C	17D	17E	17F	17G	17H	17I	17J
LAB ID		1270-064	1270-065	1270-066	1270-067	1270-068	1270-069	1270-070	1270-071	1270-072	1270-073
COLLECTION DATE											
PARAMETERS	UNITS										
Alachlor	ug/wipe	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aldrin	ug/wipe	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
alpha-BHC	ug/wipe	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-Chlordane	ug/wipe	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Aroclor-1016	ug/wipe	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Aroclor-1221	ug/wipe	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Aroclor-1232	ug/wipe	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Aroclor-1242	ug/wipe	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Aroclor-1248	ug/wipe	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Aroclor-1254	ug/wipe	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Aroclor-1260	ug/wipe	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Aspon	ug/wipe	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Atrazine	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Azinophos methyl	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Azinophos, Ethyl	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Benefin	ug/wipe	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
beta-BHC	ug/wipe	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Bolstar	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Bromacil	ug/wipe	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbophenothion	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Chlordane, Technical	ug/wipe	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chlorfenvinphos	ug/wipe	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chlorpyrifos	ug/wipe	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chlorpyrifos, Methyl	ug/wipe	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Coumaphos	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Crotoxyphos	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
DCPA (Dacthal)	ug/wipe	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
delta-BHC	ug/wipe	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Demeton (Mixed Isomers)	ug/wipe	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Diazinon	ug/wipe	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Dichlofenthion	ug/wipe	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Dichlorvos	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Dieldrin	ug/wipe	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Dimethoate	ug/wipe	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Disulfoton	ug/wipe	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Endosulfan I	ug/wipe	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Endosulfan II	ug/wipe	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Endosulfan sulfate	ug/wipe	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Endrin	ug/wipe	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
EPN	ug/wipe	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-6. (U) ~~(C//NF)~~ Swipe Analytical Results - Pesticides (All Samples were Below Detection Limit (BDL); MDLs shown below) – Cont'd

FIELD ID		17A	17B	17C	17D	17E	17F	17G	17H	17I	17J
LAB ID		1270-064	1270-065	1270-066	1270-067	1270-068	1270-069	1270-070	1270-071	1270-072	1270-073
COLLECTION DATE											
PARAMETERS	UNITS										
Ethion	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Ethoprop	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Famphur	ug/wipe	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Fenitrothion	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Fensulfothion	ug/wipe	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Fenthion	ug/wipe	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Fonofos	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
gamma-BHC (Lindane)	ug/wipe	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
gamma-Chlordane	ug/wipe	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Heptachlor	ug/wipe	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Heptachlor epoxide	ug/wipe	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Isazophos	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Isofenphos	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Leptophos	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Malathion	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Merphos	ug/wipe	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methoxychlor	ug/wipe	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Methyl Parathion	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Mevinphos	ug/wipe	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Mirex	ug/wipe	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Monocrotophos	ug/wipe	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
o,p'-DDD	ug/wipe	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
o,p'-DDE	ug/wipe	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
o,p'-DDT	ug/wipe	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Oxadiazon	ug/wipe	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Oxychlordane	ug/wipe	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
p,p'-DDD	ug/wipe	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
p,p'-DDE	ug/wipe	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
p,p'-DDT	ug/wipe	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Parathion	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Permethrin, cis-	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Permethrin, trans-	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Phorate	ug/wipe	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Phosmet	ug/wipe	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Phosphamidon	ug/wipe	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Propazine	ug/wipe	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Propetamphos	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Protothiophos	ug/wipe	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Ronnel	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Simazine	ug/wipe	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Sulfotep	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Terbufos	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Tetrachlorvinphos	ug/wipe	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Toxaphene	ug/wipe	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Trichlorfon	ug/wipe	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloronate	ug/wipe	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Trifluralin	ug/wipe	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinophos	ug/wipe	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

Table C-7. (U) ~~(C//NF)~~ Ambient Air Analytical Results - Pesticides (NIOSH 5600/5601/5602; XAD-2 Quartz Filter)

FIELD ID			HAZ 17-A	HAZ 17-B	HAZ 17-C	HAZ 17-D	HAZ 17-E	Field Blank	HAS 14A XAD-2A	HAS 14A XAD-2B	HAS 14A XAD-2C
LAB ID			1270-076	1270-077	1270-078	1270-079	1270-080	1270-081	1270-082	1270-083	1270-084
LOCATION DESCRIPTION											
COLLECTION DATE			5 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02	6 Jul 02	6 Jul 02	6 Jul 02
PARAMETERS	UNITS	MDL[1]									
Fenamiphos	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Ronnel	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Phosmet	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Phorate	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Parathion	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Monocrotophos	mg/m3	0.013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Mevinphos	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Terbufos	mg/m3	0.0013	BDL	BDL	BDL	< 0.0000013	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Malathion	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Methamidophos	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Ethoprop	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Ethion	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Disulfoton	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Diazinon	mg/m3	0.0013	BDL	BDL	BDL	BDL	< 0.0000013	< 0.0004 mg/sample	BDL	BDL	BDL
Chlorpyrifos	mg/m3	0.0013	BDL	BDL	BDL	BDL	< 0.0000013	< 0.0004 mg/sample	BDL	BDL	BDL
Azinophos methyl	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Methyl Parathion	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.0004 mg/sample	BDL	BDL	BDL
Fonofos	mg/m3	0.0013	BDL	BDL	BDL	BDL	BDL	< 0.004 mg/sample	BDL	BDL	BDL

Table C-8. (U) ~~(C//NF)~~ Ambient Air Analytical Results - Pesticides (NIOSH 2546 / OSHA 110)

FIELD ID		HAS 14AXAD7A	HAS 14BXAD-7B	HAS 14CXAD-7C	HAS17-A	HAS17-B	HAS17-C	HAS17-D	Field Blank
LAB ID		1270-068	1270-069	1270-070	1270-071	1270-072	1270-073	1270-074	1270-075
LOCATION DESCRIPTION									
COLLECTION DATE		6 Jul 02	6 Jul 02	6 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02
PARAMETERS	UNITS								
4-Methylphenol (p-Cresol)	mg/m^3	< 0.21	< 0.21	< 0.21	< 0.17	< 0.18	< 0.18	< 0.18	< 0.0082 mg/sample
3- & 4-Methylphenol	mg/m^3	< 0.21	< 0.21	< 0.21	< 0.17	< 0.18	< 0.18	< 0.18	< 0.091 mg/sample
Phenol	mg/m^3	< 0.034	< 0.034	< 0.034	< 0.028	< 0.029	< 0.029	< 0.03	< 0.052 mg/sample
2-Methylphenol (o-Cresol)	mg/m^3	< 0.38	< 0.38	< 0.38	< 0.31	< 0.32	< 0.33	< 0.33	< 0.051 mg/sample

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

Table C-9. (U) ~~(C//NF)~~ Ambient Air Analytical Results - Pesticides (Chromosorb Tubes)

FIELD ID		HAS 17-A	HAS 17-B	HAS 17-C	HAS 17-D	HAS 17-E	Field Blank	HAS 14ACHR-A	HAS 14ACHR-B	HAS 14CCHR-C
LOCATION DESCRIPTION		1270-059	1270-060	1270-061	1270-062	1270-063	1270-064	1270-065	1270-066	1270-067
SAMPLE TYPE										
COLLECTION DATE		5 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02	5 Jul 02	6 Jul 02	6 Jul 02	6 Jul 02
PARAMETERS	UNITS									
Hexachlorobenzene	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Oxychlordane	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Heptachlor epoxide	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
gamma-Chlordane	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Chlordane, Technical	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
alpha-Chlordane	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
p,p'-DDE	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Methoxychlor	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Endrin	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Dieldrin	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Aldrin	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
gamma-BHC (Lindane)	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
p,p'-DDD	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
p,p'-DDT	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Heptachlor	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
o,p'-DDT	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
Toxaphene	mg/m3	< 0.0208	< 0.0219	< 0.0223	< 0.0227	< 0.0232	< 0.5 mg/sample	< 0.0261	< 0.0261	< 0.0261
o,p'-DDE	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
beta-BHC	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
alpha-BHC	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521
o,p'-DDD	mg/m3	< 0.00417	< 0.00439	< 0.00447	< 0.00455	< 0.00463	< 0.5 mg/sample	< 0.00521	< 0.00521	< 0.00521

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002

Table C-10. (U) ~~(C//NF)~~ Ambient Air Analytical Results - Volatile Organic Compounds (VOCs)

FIELD ID	HAS17VOC-A	HAS17VOC-B	Field Blank	Unopened Field Blank
LAB ID	1269-104	1269-105		
LOCATION DESCRIPTION				
COLLECTION DATE	6 Jul 02	6 Jul 02		
PARAMETERS				
Benzene	< 0.019 mg/m^3	< 0.019 mg/m^3	< 0.0048 mg/sample	< 0.0048 mg/sample
Ethylbenzene	< 0.038 mg/m^3	< 0.038 mg/m^3	< 0.0094 mg/sample	< 0.0094 mg/sample
Kerosene	**36 mg/m^3**	**66 mg/m^3**	< 0.097 mg/sample	< 0.097 mg/sample
Toluene	< 0.02 mg/m^3	< 0.02 mg/m^3	< 0.0049 mg/sample	< 0.0049 mg/sample
Xylenes	< 0.077 mg/m^3	< 0.077 mg/m^3	< 0.019 mg/sample	< 0.019 mg/sample

Table C-11. (U) ~~(C//NF)~~ Ambient Air Analytical Results - Volatile Organic Compounds (VOCs)

FIELD ID			2158-EV6
LOCATION DESCRIPTION			HAS
VOC TUBE NUMBER			C3480
COLLECTION DATE			7 Jun 02
PARAMETERS	UNITS	MDL[1]	
1,1,1,2-Tetrachloroethane	ug/m^3	0.50	BDL
1,1,2,2-Tetrachloroethane	ug/m^3	0.50	BDL
1,1,2-Trichloroethane	ug/m^3	0.50	BDL
1,1-Dichloroethane	ug/m^3	0.50	BDL
1,1-Dichloroethene	ug/m^3	0.50	BDL
1,1-Dichloropropene	ug/m^3	0.50	BDL
1,2,3-Trichlorobenzene	ug/m^3	0.50	BDL
1,2,3-Trichloropropane	ug/m^3	0.50	BDL
1,2,4-Trichlorobenzene	ug/m^3	0.50	BDL
1,2,4-Trimethylbenzene	ug/m^3	0.50	BDL
1,2-Dibromo-3-chloropropane	ug/m^3	0.50	BDL
1,2-Dibromoethane	ug/m^3	0.50	BDL
1,2-Dichlorobenzene	ug/m^3	0.50	BDL
1,2-Dichloroethane	ug/m^3	0.50	BDL
1,2-Dichloropropane	ug/m^3	0.50	BDL
1,3,5-Trimethyl Benzene	ug/m^3	0.50	BDL
1,3-Dichlorobenzene	ug/m^3	0.50	BDL
1,3-Dichloropropane	ug/m^3	0.50	BDL
1,4-Dichlorobenzene	ug/m^3	0.50	**2.45**
2,2-Dichloropropane	ug/m^3	0.50	BDL
2-Chlorotoluene	ug/m^3	0.50	BDL
4-Chlorotoluene	ug/m^3	0.50	BDL
4-Isopropyltoluene	ug/m^3	0.50	**12.81**

(U) ~~(S//NF)~~ Field Final Report, Environmental Assessment, Hardened Aircraft Shelters, Stronghold Freedom, Karshi-Khanabad Airfield, Uzbekistan, 6 June – 20 July 2002
Table C-11. (U) ~~(C//NF)~~ Ambient Air Analytical Results - Volatile Organic Compounds (VOCs) – Cont'd

FIELD ID			2158-EV6
LOCATION DESCRIPTION			HAS
VOC TUBE NUMBER			C3480
COLLECTION DATE			7 Jun 02
PARAMETERS	UNITS	MDL[1]	
Benzene	ug/m^3	0.50	**1.45**
Bromobenzene	ug/m^3	0.50	BDL
Bromochloromethane	ug/m^3	0.50	BDL
Bromodichloromethane	ug/m^3	0.50	BDL
Bromoform	ug/m^3	0.50	BDL
Carbon Tetrachloride	ug/m^3	0.50	BDL
Chlorobenzene	ug/m^3	0.50	BDL
Chloroform	ug/m^3	0.50	BDL
cis-1,2-Dichloroethene	ug/m^3	0.50	BDL
cis-1,3-Dichloropropene	ug/m^3	0.50	BDL
Cyclohexane	ug/m^3	0.50	**0.81**
Cyclopentane	ug/m^3	0.50	BDL
Decane	ug/m^3	0.50	**58.75**
Dibromochloromethane	ug/m^3	0.50	BDL
Dibromomethane	ug/m^3	0.50	BDL
Ethylbenzene	ug/m^3	0.50	**2.17**
Hexachlorobutadiene	ug/m^3	0.50	BDL
Hexane	ug/m^3	0.50	**1.40**
Isooctane	ug/m^3	0.50	BDL
Isopropylbenzene	ug/m^3	0.50	BDL
m/p-Xylene	ug/m^3	0.50	**5.77**
Methyl Chloroform	ug/m^3	0.50	BDL
Methylcyclopentane	ug/m^3	0.50	**0.64**
Methylene Chloride	ug/m^3	0.50	FB > 25% of Sample
n-Butylbenzene	ug/m^3	0.50	BDL
n-Propylbenzene	ug/m^3	0.50	**2.17**
o-Xylene	ug/m^3	0.50	**3.33**
sec-Butylbenzene	ug/m^3	0.50	**1.84**
Styrene	ug/m^3	0.50	**0.71**
tert-Butylbenzene	ug/m^3	0.50	BDL
Tetrachloroethylene	ug/m^3	0.50	BDL
Toluene	ug/m^3	0.50	**5.52**
trans-1,2-Dichloroethene	ug/m^3	0.50	**0.51**
trans-1,3-Dichloropropene	ug/m^3	0.50	BDL
Trichloroethene	ug/m^3	0.50	BDL

[1] Minimum Detection Level

Summary

Two drums were delivered to the Edgewood Chemical Biological Center (ECBC) Chemical Transfer Facility (CTF) on Sunday, June 16, 2002, at 2020 hours.

The drums were unpacked in the CTF on Wednesday afternoon, June 19, 2002. Based on the chain of custody documents, the drums contained the following items: 10 pairs of solid sorbent sample tubes; 7 functioned Drager sample tubes; 16 swipe samples; 28 soil samples; 3 concrete samples; 4 wood samples; 2 water samples and 7 functioned M256 kits. Photographs of many of the items are available by request.

Upon examination of the items and in consideration of the need for immediate evaluation, a decision was made to concentrate analysis on the solid (soil, wood, concrete) and solid sorbent tubes. To that end, the ten sets of solid sorbent tubes were delivered to the Monitoring Branch Laboratory on Wednesday afternoon, June 19, 2002 at 1605 hours. At the same time, technicians prepared those samples listed as soil, wood and concrete for low-level monitoring as well.

Four out of the ten pairs of tubes contained only Tenax packing (samples 001AA, 003AC, 005AC, and 009AA). These tubes were analyzed for nerve agents Tabun (GA), Sarin (GB), Soman (GD), Cyclohexyl methylphosphonofluoridate (GF), vesicant Bis-(2-chloroethyl)sulfide or Distilled Mustard (HD) and the Mustard breakdown product 1,4-Dithiane.

Analyses of GA, GB, GD, GF, HD, and 1,4-Dithiane were performed utilizing a gas chromatogram equipped with a mass spectrometer (GC/MS) in the Selected Ion Monitoring (SIM) mode. These analyses were performed according to the Monitoring Branch Quality Control Plan for Chemical Agent Standard Reference Material (CASARM), Revision 6, June 2000. **There were no detections of any of the aforementioned compounds on these sample tubes** (results are reported in Table 1).

In order to provide possible identification of some of the non-CW materials detected, two samples were chosen to analyze by GC/MS Full Scan (003AC and 005AC). Sample 003AC contains mostly hydrocarbons, the largest peak being Toluene (5.6% of the total peak area). Other tentatively identified compounds (TICs) include phthalates or plasticizers (6.8%), Benzaldehyde (3.6%), Acetophenone (1.6%),Benzophenone (0.6%), Methyl salicylate (0.5%), Styrene (1.1%), Pyridine (1.9%), and Azulene (0.9%). Sample 005AC contains mostly hydrocarbons, the largest peak being Toluene (4.5% of the total peak area). Other TICs include Cellosolve (1%), Benzaldehyde (3.2%), Acetophenone (5.2%), Azulene (.3%), Methyl salicylate (0.4%), Benzothiazole (0.6%) and Benzophenone (0.5%).

Three pairs of tubes contained Carbonex multi-bed packing (samples 005AA, 008AA, and 013AC). As of this writing, one sample (sample 005AA) was analyzed by GC/MS Full Scan. Sample 005AA contains mostly hydrocarbons. TICs include Methyl cellosolve (2.6%), Cellosolve (7.5%), Butyl cellosolve (0.8%), Benzaldehyde (1.6%), Acetophenone (2.1%),

Methyl salicylate (0.4%), Benzoic acid (0.89%) and Benzophenone 0.5%). The remaining tubes will be analysed and reported in a subsequent final report.

Three sets of the tubes contained HayeSep packing (samples 004AC, 006AA, and 012AC). As of this writing, one sample, 012AC was analyzed by GC/MS Full Scan in order to identify possible industrial compounds on the tube. However, sample 012AC did not chromatograph well. There appeared to be no sample on the tube. No Full Scan results can be reported. The remaining tubes will be analysed and reported in a subsequent final report.

In order to obtain rapid results from the solid samples, they were each placed in a separate sealed bag and heated in order to volatilize contaminates. Upon completion of the heating cycle, the air contained within the bags was collected on a Tenax sorbent tube. This process is known as "headspacing" and was performed in accordance with the Monitoring Branch Quality Control plan. The sorbent tubes were
analyzed for GB, GD, HD, GF, and Lewisite (L) by GC/MS and for Ethyl-S-dimethylaminoethyl methylphosphonothiolate(VX) by GC/FPD. **There were no detections for these CW compounds.** Results are reported in Table 1.

As a means to identify possible non-CW contaminants in the solid samples, several samples were also analyzed by GC/MS Full Scan with the following results:

Sample Number 0206190622-M01 (2090- Wood): Largely hydrocarbons, Azulene (1.5%), Butylated Hydroxytoluene –BHT (0.9%).

Sample Number 0206190641-M01 (004AA(ISAF)-Wood): Largely hydrocarbons, Benzaldehyde (2%), Acetophenone (1.4%), Azulene (1%), Butylated Hydroxytoluene – BHT (1%)

In summary, there was <u>no evidence of CW material detected</u> in either the solid sorbent tubes collected in-situ or those collected as a function of headspacing samples of wood, soil or concrete. However, there was evidence of multiple non-CW compounds detected.

Table 1
Analyses results 6/20-21/2002
(ND = Not Detected NA = Not Analyzed)

ITEM ID as received	Matrix	GA	GB	GD	HD	1,4 Dithiane	L	VX as G-Analog	GF
Detection limits as Nanograms per tube		**0.5**	**0.6**	**0.2**	**1.0**	**1.0**	**1.0**	**0.6**	**0.7**
001AA	Tenax Tube	ND	ND	ND	ND	ND	NA	NA	ND
003AC	Tenax Tube	ND	ND	ND	ND	ND	NA	NA	ND
005AC	Tenax Tube	ND	ND	ND	ND	ND	NA	NA	ND
009AA	Tenax Tube	ND	ND	ND	ND	ND	NA	NA	ND
609	Gauze Pad (Listed as soil)	NA	ND	ND	ND	NA	ND	ND	ND

ITEM ID as received	Matrix	GA	GB	GD	HD	1,4 Dithiane	L	VX as G-Analog	GF
Detection limits as Nanograms per tube		**0.5**	**0.6**	**0.2**	**1.0**	**1.0**	**1.0**	**0.6**	**0.7**
1836	Granular soil	NA	ND	ND	ND	NA	ND	ND	ND
2104	Soil	NA	ND	ND	ND	NA	ND	ND	ND
2359	Soil and broken concrete	NA	ND	ND	ND	NA	ND	ND	ND
3033	Soil and clay	NA	ND	ND	ND	NA	ND	ND	ND
4560	Soil	NA	ND	ND	ND	NA	ND	ND	ND
003AA	Soil	NA	ND	ND	ND	NA	ND	ND	ND
004AA	Soil Wood	NA	ND ND	ND ND	ND ND	NA	ND ND	ND ND	ND ND
007AA	Concrete	NA	ND	ND	ND	NA	ND	ND	ND
2090	Wood	NA	ND	ND	ND	NA	ND	ND	ND
2219	Soil	NA	ND	ND	ND	NA	ND	ND	ND
2312	Soil	NA	ND	ND	ND	NA	ND	ND	ND
006AA	Soil	NA	ND	ND	ND	NA	ND	ND	ND
2071	Soil and concrete	NA	ND	ND	ND	NA	ND	ND	ND
4516	Gauze Pad	NA	ND	ND	ND	NA	ND	ND	ND
3572	Soil with brown chunks	NA	ND	ND	ND	NA	ND	ND	ND
2443	Soil	NA	ND	ND	ND	NA	ND	ND	ND
001AA	Soil	NA	ND	ND	ND	NA	ND	ND	ND
002AA	Soil & gray granular powder	NA	ND	ND	ND	NA	ND	ND	ND
003AA(ISAF)	Dry brown powder	NA	ND	ND	ND	NA	ND	ND	ND
004AA(ISAF)	Soil Wood	NA	ND ND	ND ND	ND ND	NA	ND ND	ND ND	ND ND
1816	Gray powder with chunks	NA	ND	ND	ND	NA	ND	ND	ND
3620	Soil and concrete	NA	ND	ND	ND	NA	ND	ND	ND
3565	Soil-granular	NA	ND	ND	ND	NA	ND	ND	ND
2029	Gauze (listed as soil)	NA	ND	ND	ND	NA	ND	ND	ND
3575	Brown powder	NA	ND	ND	ND	NA	ND	ND	ND
1859	Concrete	NA	ND	ND	ND	NA	ND	ND	ND
3108	Brown powder	NA	ND	ND	ND	NA	ND	ND	ND
007AA(ISAF)	Concrete	NA	ND	ND	ND	NA	ND	ND	ND
2376	Wood	NA	ND	ND	ND	NA	ND	ND	ND
2402	Wet soil	NA	ND	ND	ND	NA	ND	ND	ND
2707	Fine soil	NA	ND	ND	ND	NA	ND	ND	ND
3049	Soil with wood shavings	NA	ND	ND	ND	NA	ND	ND	ND