

00471

**Submission of the Final Report  
on Decontamination of Building  
Interiors for the  
White Oak Detachment  
Dahlgren Division  
Naval Surface Warfare Center**

30 April 1998

Department of the Navy  
Naval Ordnance Center  
Indian Head, Maryland 20640-5555

**DEPARTMENT OF THE NAVY**

NAVAL SURFACE WARFARE CENTER

DAHLGREN DIVISION

DAHLGREN, VIRGINIA 22448-5000

Section: 13.03  
Site 20903-5640 (White Oak)  
Doc. #: 0007

IN REPLY REFER TO

8020  
Ser 9240J-RAM  
JAN 20 1998

**From:** Commander, Dahlgren Division, Naval Surface Warfare Center  
**To:** Chairman, Department of Defense Explosive Safety Board (DDESB)  
**Via:** Commander, Naval Ordnance Center (Code N71)

**Subj:** DECONTAMINATION OF BUILDING INTERIORS FOR THE WHITE OAK DETACHMENT, DAHLGREN DIVISION, NAVAL SURFACE WARFARE CENTER (NSWCDDWODET), SUBMISSION OF THE FINAL REPORT ON

**Ref:** (a) NSWCDD ltr 8020 Ser CW16 of 1 May 97  
(b) NAVORDCEN ltr Ser N7112/411 of 24 Jun 97  
(c) DDESB ltr DDESB-KO of 16 Sep 97

**Encl:** (1) Final Report On Decontamination Of Explosive Residue From Operating Building Interiors At The Naval Surface Warfare Center Dahlgren Division White Oak Detachment

1. Phase 1 decontamination operations at NSWCDDWODET, designed to clean building interiors of any residual explosive materials, are complete. Those operations were identified by reference (a) and approved by references (b) and (c). All former explosive operating facilities remaining at White Oak were cleaned to Level **XXXXX** in accordance with DoD 5160.65-M. Enclosure (1) provides the final report on this Phase 1 building decontamination.
2. As discussed within the report, three cleaning operations conducted at Building 318 could only achieve Level **XXX** decontamination. Dahlgren Division is in the process of determining how best to achieve the Level **XXXXX** decontamination of this building. Dahlgren Division will document the methods used and results when the decontamination of Building 318 has been completed.
3. The DDESB is requested to concur that; 1) interior cleaning operations accomplished were adequate to remove any residual explosive materials, and 2) these facilities, from an interior standpoint, are now ready for unrestricted reuse. The final report identifies specific exterior features of some facilities which should be addressed during Phase 2 of the White Oak building decontamination.

**Subj: DECONTAMINATION OF BUILDING INTERIORS FOR THE WHITE OAK DETACHMENT, DAHLGREN DIVISION, NAVAL SURFACE WARFARE CENTER (NSWCDDWOJET), SUBMISSION OF THE FINAL REPORT ON**

4. Upon approval of this final report, Mr. Marion's official duties and responsibilities as the Explosive Safety Officer for NSWCDDWOJET are complete.

  
V. E. MAHAFFEY

Copy to:  
NSWC  
IHD NSWC (Codes 04 (Adams, Olup), 90A, 9240J, 9530D)  
NAVFAC EFA Chesapeake (Codes 00, 24)

8020  
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V. E. MAHAFFEY

Copy to:

NSWC

IHD NSWC (Codes 04 (Adams, Olup), 90A, 9240J, 9530D)

NAVFAC EFA Chesapeake (Codes 00, 24)

Blind copy to:

C28 (Goss)

C29 (Call)

**FINAL REPORT  
ON  
DECONTAMINATION OF EXPLOSIVE  
RESIDUES FROM OPERATING BUILDING INTERIORS  
AT THE NAVAL SURFACE WARFARE CENTER  
DAHLGREN DIVISION WHITE OAK DETACHMENT**

**PART OF THE OVERALL  
EXPLOSIVE AND ORDNANCE REMEDIATION OF  
THE NAVAL SURFACE WARFARE CENTER  
DAHLGREN DIVISION, WHITE OAK DETACHMENT  
SILVER SPRING, MD**

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15 January 1998

Enclosure (1)

**FINAL REPORT  
ON  
DECONTAMINATION OF EXPLOSIVE  
RESIDUES FROM OPERATING BUILDING INTERIORS  
AT THE NAVAL SURFACE WARFARE CENTER  
DAHLGREN DIVISION WHITE OAK DETACHMENT**

<u>Section</u>	<u>Page</u>
EXECUTIVE SUMMARY	i
REFERENCES CITED	ii
I. BACKGROUND	1
II. EXPLOSIVE DECONTAMINATION GOALS AND REQUIREMENTS	1
III. DECONTAMINATION WORK DEFINITION AND IDENTIFICATION	2
IV. EXPLOSIVE SAFETY APPROACH	3
V. DECONTAMINATION PROCESS	4
VI. QUALITY ASSURANCE AND INSPECTION	4
VII. DECONTAMINATION RESULTS	5
VIII. DISCUSSION OF EXPLOSIVE CONTAMINATION OBSERVED	6
IX. CONCLUSION	14
 <u>Tables</u>	
1. Structures Decontaminated of Explosive Residue at White Oak	15
2. Summary of Lab. Data	17

## EXECUTIVE SUMMARY

The White Oak Detachment of the Dahlgren Division of the Naval Surface Warfare Center was selected for closure during the BRAC 95 process. The Land and Facilities at White Oak were determined to be excess to Navy needs and were requested to be transferred to the General Services Administration, majority, Air Force and Army, minority, for reuse. For over 50 years White Oak was the site of numerous facets of energetic materials Research and Development. White Oak's lengthy history in explosive and other hazardous material operations has mandated the need for remedial investigation and corrective actions to remove residual hazardous material contaminates.

To address and eliminate building and facilities reuse concerns, related to explosive material contamination, the Naval Surface Warfare Center's (NSWC) Dahlgren and Indian Head Division's developed a program to clean the interiors of former explosive operating buildings. Program documentation was submitted to and subsequently approved by the Naval Ordnance Center and the Department of Defense Explosive Safety Board (DDESB). NSWC Indian Head began explosive decontamination operations of White Oak facilities in January 1997, and completed that work in September 1997. During that period, over 100 facilities were investigated for potential explosive contamination.

During site inspections 91 structures were identified for DECON action. Six of those structures were decontaminated to Level XXX and relocated to Indian Head. Level XXX, per DoD 5160.65-M, is not fully decontaminated but allowable for items being used for the same purpose by knowledgeable personnel. Facility 383, requested by the Army for like use, was also decontaminated to Level XXX. Fifteen minor structures, "Dog Houses" (day storage lockers), sheds and trailers, were also decontaminated on site to Level XXX, but were subsequently destroyed in decontamination at Indian Head. Building 318 was washed three times but could not be fully decontaminated using washing techniques. Building 318 is being investigated by NSWC Dahlgren to determine the specific remedial action to achieve full decontamination. The other 68 White Oak facilities identified for explosive DECON actions, no reuse identified, were fully decontaminated to Level XXXXX through washing and equipment removal.

Decontamination Tags (DoD Form 2271) were prepared and provided with complete decontamination records for each facility. Those documents, prepared in accordance with DoD 5160.65-M, form official records which have been transferred to the Naval Facilities Command, Engineering Field Activity Chesapeake, BRAC Environmental Coordinator (BEC) for White Oak (Ms. Armalia Berry) for retention.

Based upon facility documentation, usage history, and investigations conducted during this effort, significant explosive residue may still remain at White Oak. Issues concerning explosive contamination of septic systems, current sewage lines, building sumps, holding pits, floor and sink drain pipes, drain fields, disposal wells and the like, remain, which will require investigation and remediation if warranted. The investigation, decontamination and remediation of explosive residues beyond the interior features of White Oak facilities is under the purview and direction of the Naval Facilities Command, Engineering Field Activity Chesapeake.

There is no information known which would suggest that any such explosive contamination presents a threat to nearby landowners, the general public, GSA personnel, or to site visitors. Any danger or risk from this contamination would be to remediation investigators or to demolition workers who do not conduct their operations in accord with standard explosive safety practices.

It must be clearly understood that this report, and the decontamination efforts conducted by NSWC Indian Head as well, only address the removal of explosive contaminates. Other contaminates may be present in White Oak facilities whether explosive decontaminated or not.

## REFERENCES CITED

**A. Letter: 8020 Ser C16 RAM dated 19 June 1996**

**From:** Officer in Charge Dahlgren Division, White Oak Detachment, NSWC  
**To:** Chairman, Department of Defense Explosive Safety Board  
**Via:** (1) Commanding Officer, Engineering Field Activity Chesapeake, Naval Facilities Command  
(2) Commander, Naval Ordnance Center

**Subj:** SAFETY PLAN SUBMISSION FOR THE EXPLOSIVE AND ORDNANCE REMEDIATION OF THE NAVAL SURFACE WARFARE CENTER, DAHLGREN DIVISION, WHITE OAK DETACHMENT

**Summary of Contents:** Identifies five areas of concerns as non time critical removal actions, and defines responsibilities for remediation of explosives/ordnance contamination. Proposes generic safety plan for remediation of three concerns, and suggests additional investigation required for the two others. Requests concurrence with transfer of land in advance of remediation completion.

**Endorsements:**

- (1) Letter: dated 18 July 1996, From: Commanding Officer, Engineering Field Activity Chesapeake, forwarded recommending approval.
- (2) Letter: 8020 OPR N7112, Ser N71/5367, dated 12 August 1996, From: Commander, Naval Ordnance Center, forwarded recommending approval subject to provisions stated.

**Approval:** Letter DDESB-KO dated 20 September 1996, From: Chairman, Department of Defense Explosive Safety Board, interim approval granted subject to provisions stated in NOC ltr.

**B. Letter: 8020 Ser CW16 RAM dated 1 May 1997**

**From:** Commander, Dahlgren Division, Naval Surface Warfare Center  
**To:** Chairman, Department of Defense Explosive Safety Board  
**Via:** Commander, Naval Ordnance Center

**Subj:** EXPLOSIVE AND ORDNANCE REMEDIATION OF THE NAVAL SURFACE WARFARE CENTER, DAHLGREN DIVISION, WHITE OAK DETACHMENT

**Summary of Contents:** Forwards supplemental information to original safety submission and requests approval. Provides the program plan and details for building decontamination from explosive residues.

**C. Endorsement to Ref. B: Letter 8020 Ser N7112/411 dated 24 June 1997, From: Commander, Naval Ordnance Center, forwarded recommending approval.**

**D. Approval of Ref. B: Letter DDESB-KO dated 16 September 1997, From: Chairman, Department of Defense Explosive Safety Board, approval granted noting exterior decontamination not complete.**

DECONTAMINATION OF EXPLOSIVE RESIDUES FROM  
OPERATING BUILDING INTERIORS  
AT THE NAVAL SURFACE WARFARE CENTER  
DAHLGREN DIVISION WHITE OAK DETACHMENT

## I. BACKGROUND

Since 1945, a primary mission of the Naval Surface Warfare Center, Dahlgren Division (NSWCDD) White Oak Detachment (NSWCDDWOJET), was to conduct the research and development (R&D) of explosive materials. This effort included various explosive operations involving basic chemistry, mixing, component fabrication, test, evaluation, firing and the like. The 1995 decision to close NSWCDDWOJET and transfer the grounds and facilities to the General Services Administration (GSA) and Army, required remediation planning and action to clean explosive operating areas eliminating hazards to reuse of the base. Reference (a) was generated to identify areas of the base where known or suspect explosive contamination, or debris from ordnance related materials remained which could present a hazard.

Reference (a) identified five explosive safety concerns at White Oak. Three of those concerns identified were defined sufficiently to start remedial action, no additional inputs or approvals were needed. They were; 1) suspect ordnance items and models at two landfills (IR Sites 2 & 3), 2) soil remediation at a former explosive material burn pit (IR Site 7), and 3) clearing the base of ordnance related models. The other two safety concerns identified involved buildings where explosive operations had been conducted and required additional investigation before remedial action could begin. Residual explosive material contaminates internal to building structures, and waste lines, waste holding tanks, leaching fields and chemical disposal wells, external to building structures formed two other explosive safety concerns.

The investigation and decontamination of potential explosive residues from White Oak explosive operating building is being addressed in two phases. Phase 1, conducted for the Naval Sea Systems Command (NAVSEA) by the Naval Surface Warfare Center's Dahlgren and Indian Head Divisions, addresses the removal of explosive residues from building interior features and equipment. Phase 2, to be conducted for the Naval Facilities Engineering Command (NAVFAC) by Engineering Field Activity Chesapeake (EFA CHES), will address exterior features such as drain pipes, sumps, waste holding tanks, leaching wells and drain field systems, and general soil areas around the buildings. Reference (b) was generated to define the technical and safety programs required to complete Phase 1 building decontamination. Phase 1 work was completed in September 1997 and is summarized within this report.

## II. EXPLOSIVE DECONTAMINATION GOALS AND REQUIREMENTS

The goal of this effort was to decontaminate the interiors of former explosive operating facilities from any residual explosive contaminates in a safe and environmentally sound manner. When completed, any potential hazards to facility maintenance workers, any risk to human health or the environment from residual explosive materials would be eliminated, and those facilities could then be released for unrestricted reuse. This decontamination effort did not include the investigation or decontamination of other potential hazardous materials such as chemicals, metals, asbestos or lead paint. In some cases, however; other contaminates were removed since they were intertwined with explosive contaminates. In some areas asbestos abatement was required as a prerequisite to explosive decontamination.

To protect decontamination (DECON) workers and to avoid an accidental release of some unknown residues, duct work and drains in Buildings 30 and 310 (chemical laboratories) were surveyed for other contaminants. Survey results for those buildings indicate significant levels of potentially hazardous metals, and lower levels of semi-volatile compounds are present. Details of those findings have been provided to the GSA Environmental Office at White Oak, and the EFA CHES Base Environmental Coordinator (BEC) for White Oak, Ms. Armalia Berry.

Department of Defense (DoD) agencies such as the Navy, are governed by numerous DoD directives and policies related to land, facility and asset disposal actions. Three specific directions provided guidance for this explosive decontamination effort. DoD Directive 5160.65-M, Chapter 11, Paragraph C, provides policy regarding the disposal of various DoD assets contaminated with explosives, defines decontamination levels and markings, and documentation requirements. DoD 6055.9-STD, Chapter 12, provides specific policy regarding DoD owned real property known to be contaminated with ammunition or explosives. The policy provides that real property, facilities and assets, must be decontaminated to assure protection of the public consistent with their proposed end use. NAVSEA OP 5, Volume 1, Chapter 2-1.13 reiterates DoD policy. These documents require decontamination plans be submitted in advance for review and approval, and require final reports upon completion. Army pamphlet IOC PAM 385-5 (Guidance on Detection and Remediation of Explosive Contamination) was also used.

White Oak Building 362, formerly an explosive storage facility (magazine), is a wall structure having 40 separate compartments. Building 362 was utilized to store serviceable, segregated, and waste explosive materials. As an explosive operating facility, Building 362 required decontamination according to DoD and Navy requirements. Additionally, as a State of Maryland permitted hazardous waste storage facility, Code of Maryland Regulations (COMAR) also governed the closure and decontamination of this facility. COMAR 26.13.05.07 provides the closure requirements for facilities used to store controlled hazardous substances (CHS) waste.

### III. DECONTAMINATION WORK DEFINITION AND IDENTIFICATION

Two levels (DoD 5160.65-M) of decontamination were used during this effort.

- Level XXX- not fully decontaminated. Appropriate for items that have been partially decontaminated, or for items that will be used for the same purpose by "knowledgeable" personnel.
- Level XXXXX- fully decontaminated. Appropriate for items that will be released for general use or scrap.

Inputs from five sources were used to determine which buildings and what specific internal features required decontamination.

- A knowledgeable contractor (Applied Ordnance Technology (AOT)) was tasked to inspect buildings, identify potential explosive contamination and severity, and propose level XXX and XXXXX decontamination procedures.
- Current facility operators provided worksheets identifying the types of explosive operations conducted, Standard Operating Procedures (SOP's) used, state of the explosive materials handled (liquid, powder, sealed component), and utility information (floor drains, vent hoods, exhaust fans/ducts).
- Public Works reports, drawings and files were reviewed.
- Interviews were conducted with current and former employees.
- The above information was disseminated to a team of personnel from the last facility user, DECON operations supervision, public works, environmental, OSH and

explosive safety programs, lead and asbestos programs, base Explosive Safety Officer, and the Operations Site Manager during site visits. Using this information at each site, the team defined specific work requirements, resolved environmental and safety concerns, and developed pre and post requisite work actions.

The following is a general description of the different types of decontamination identified during those site visits.

- Pipe Cleaning and or Removal - Any piping which may have come into contact with explosives.
- Duct work and Air Handlers - Supplying or exhausting air which may contain explosive dust.
- Equipment - Specific to explosive operations.
- Filters - Used for air supply or exhaust systems.
- Window air conditioners.
- Workbench Cleaning and Removal - Used for explosive operations.
- Floors and Flooring - Cement, conductive mats used for explosive operations, or others that are loose, cracked or have gaps.
- Sinks/Sink Drains.
- Floor Drains.
- Rooms - Ceiling, walls, floors and porous covering materials.
- Sumps or Holding Tanks - Accessible.

The above process yielded the building interior explosive decontamination requirements for White Oak and evolved into a Program Plan that was approved by the Commanding Officers of NSWC Dahlgren and Indian Head Divisions. This Program Plan, along with building specific and room work requirements, was forwarded for approval to the Naval Ordnance Center (NAVORDCEN) and the Department of Defense Explosive Safety Board (DDESB) by reference (b). NAVORDCEN and DDESB provided official approval by references (c) and (d) respectively.

#### **IV. EXPLOSIVE SAFETY APPROACH**

Information from the AOT and last user surveys suggested that minimal quantities of explosive residue should be encountered during decontamination efforts. This information was confirmed by the site visit team and discussed as possible rationale for conducting the decontamination as a non-explosive operation. However, it was decided to proceed with decontamination as an explosive operation. This approach was conservative, but the work was completed without incident.

The safety system used included a general SOP as the primary controlling document. The SOP defined the proper procedure necessary to complete each type of decontamination, and identified specific safety and environmental procedures associated with each. The SOP also included sections defining mandatory safety gear, approved tools and equipment, responsibilities, limits, emergency response contacts, contingency plans, and provided a hazard control brief. SOP validation was conducted by a team of safety and operations personnel at one of the more complex buildings to be decontaminated. After the SOP was approved by both the Dahlgren and Indian Head organizations, all DECON workers were properly trained, tested, qualified and certified to conduct the operations specified within the SOP.

Supplementing the SOP was a master plan for each building. The master plan identified the specific types of decontamination required, provided specific and detailed Work Review

Forms (WRF's) and/or work permits for each type of decontamination, and identified the proper sequence to safely complete decontamination work.

## V. DECONTAMINATION PROCESS

Actual decontamination work was conducted by personnel from NSWC Indian Head Division (IHD). Again, work did not start until after all work descriptions (WRF's and/or work permits) were issued. Before issue, those documents were reviewed and approved by the team leader of the DECON workers, the DECON program manager, the IHD safety and environmental representatives, and the IHD executive at White Oak. Also as a prerequisite to DECON work, asbestos that interfered with this work was either sealed or abated. Only Building 30 required major asbestos abatement action. One additional action required at some buildings before DECON could start was the completion of a radiation survey. Electrical power was secured at each facility before washing operations.

The first step of DECON was to remove all extraneous items such as furniture, loose equipment, benches, and to sweep, collect, bag and ship the sweepings to IHD for thermal treatment. Items removed that were considered contaminated were washed on site to remove surface contamination, "Red Tagged" (contaminated) and sent to IHD for thermal decontamination or "like" reuse. Items removed that were not contaminated were inspected and "Green Tagged" (safe) for reuse or disposal at IHD.

The next step was to remove exhaust vents, fans, vent hoods, and duct work, followed by the flushing and removal of plumbing lines. Plumbing drains that were accessible and not being removed were wipe sampled prior to flushing, flushed, and resampled if needed. The removal of A/C units and loose flooring followed next. Floor drains were sampled and the room was spot treated or pre-scrubbed with a solvent (NG Killer) or detergent (Bonsai) if needed, and finally hot water pressure washed. All wash water was collected, sampled, and either processed through the filtration system to remove explosives at Building 318, or shipped to IHD for treatment. Floor drains were sampled before room washing, cleaned to a depth of two feet into the drain if accessible, and wipe sampled again. If a second sample indicated explosive contamination was above acceptable levels, cleaning and sampling was repeated until satisfactory.

Openings created in structures during DECON were sealed to keep out the elements. After DECON was completed, the facility was inspected by an IHD safety inspector and the program manager. If additional work was required they would reinspect upon completion. Once ready for turnover to Dahlgren Division (DD), an original DoD Form 2271 was issued and affixed inside the structure, and a copy outside if possible. Original 2271's that could not be placed at a building were included in the decontamination records.

## VI. QUALITY ASSURANCE AND INSPECTION

Quality assurance inspection tools used during this effort included field test kits for the detection of explosive materials, and chemical laboratory analyses of surface wipe samples, liquid or sludge samples, or material samples of suspect items. These tools provided supplemental information to the final inspection team which visual inspected each facility.

Visual inspection is a subjective process that can be ineffective. However, I submit that the inspectors here were conservative in their judgment. As support, consider that the inspectors' signatures are on the DoD Form 2271, certifying the facilities are decontaminated. Furthermore, reviewing Table 2 you will find instances where the inspector required additional cleaning and sampling of facility features even though the previous sample results were satisfactory.

Laboratory samples were collected by personnel who were trained in the proper procedures for collection, experienced with facility operations at White Oak, and were not DECON workers or final inspectors.

Chemical laboratory analysis results were considered acceptable, sufficiently clean, if at or below:

- a. 0.050 milligram/Wipe (mg/Wipe)
- b. 1.0 mg/liter (mg/L) (equivalent to 1 part per million (PPM))
- c. 1.0 mg/kilogram (mg/kg) (1 PPM)
- d. 1 microgram/centimeter<sup>2</sup> ( $\mu\text{g}/\text{cm}^2$ ) (1 PPM)
- e. or the method detection limit (MDL) if greater than the above.

The following list provides the MDL for the respective explosive materials targeted for detection during this effort. The NSWC IHD Chemistry Laboratory can detect much lower levels than shown. However, these were considered the practical limits for achieving accurate quantitation using standard high performance liquid chromatography (HPLC) methods.

<u>Explosive Compound</u>	<u>MDL</u>
NG	0.2 mg/L
PGDN	0.2 mg/L
TEGDN	0.2 mg/L
TMETN	0.2 mg/L
PETN	1.0 mg/L
HMX	1.0 mg/L
RDX	1.0 mg/L
TNT	1.0 mg/L

As the base Explosive Safety Officer (ESO), I inspected the facilities as DECON work was underway and upon completion. At times, I coordinated my inspection with the final inspection team, IHD Safety Inspector and DECON Program Manager, and also after the final inspection had been completed.

## VII. DECONTAMINATION RESULTS

Decontamination of explosive residues from former explosive operating buildings at NSWCWODET was completed in September 1997. A total of 78 major buildings or facilities were decontaminated during this effort. Seven of those facilities were portable structures that were relocated to Indian Head for "like" use, or destroyed to achieve decontamination. All facilities relocated to Indian Head were decontaminated to Level XXX on site and "Red Tagged" prior to being moved. An additional 13 small wooden structures used for day storage of explosives, referred to as "Doghouses," were removed for thermal treatment at IHD. Except for Building 318 and Facility 383, all buildings left on site were decontaminated to the Level XXXXX.

Building 318 and Facility 383 were decontaminated Level XXX. Table 1 provides a list of structures decontaminated.

During this decontamination effort, not all buildings were sampled for the presence of explosive material residue in advance of decontamination. As a rule, any facility that was used for conducting explosive operations was considered contaminated. Sampling was not needed to make this decision. The SOP and WRF prescribed the appropriate methods, tools, materials, specific items or areas that required cleaning. However, if a building or room had sink or floor drains, air handlers, duct work, porous finishing material such as ceiling tile, that could be contaminated, then sampling was conducted. If an initial sample was positive for the presence of explosives, then the contaminated area was either cleaned and resampled as many times as needed, or removed. ALL wash and rinse water generated during cleaning was collected, sampled for contaminants, appropriately processed and disposed.

Facility 383, a 6" Naval gun, modified for use as a Conical Shock Tube, was transferred to the Army Research Laboratory (ARL), Adelphi for "like" use by "knowledgeable" personnel. To assure there would be no confusion regarding the status of the shock tube, a DD Form 2271 (Decontamination Tag) was prepared and forwarded to ARL by letter. The text of the letter also emphasized the Level XXX condition and cautioned that minute hazardous materials could be present. Facility 383 is located on real estate that has been transferred to ARL and is not located on the GSA portion of White Oak.

## VIII. DISCUSSION OF EXPLOSIVE CONTAMINATION OBSERVED

From the 91 structures listed in Table 1, 38 had specific features of concern where sampling was conducted. Of the 38, 17 structures had features where initial sampling results were positive for explosives. Fifteen of those were either floor or sink drains, sumps or holding pits. As stated earlier, sink and floor drains were cleaned to a maximum depth of two feet into the pipe or to an attached physical block, such as a screen, and resampled. Accessible sumps or holding pits were cleared of existing water and sludge, the pit and pipes (within two foot maximum depth) were cleaned and resampled. Table 2 provides a summary of laboratory sampling data.

Provided within the remarks column of Table 2, are specific values of sampling results for locations that tested positive for explosive residue. Those shown from drain or sump locations are highlighted to ease their recognition. Drain and sump contamination suggest the need for additional investigation to answer several major safety concerns.

- Where do those drains and pipes go?
- Do they feed into sewage lines, French drains or drain fields, or to some other below ground feature such as a well?
- Is there explosive contamination beyond the test location within pipes or soil areas?
- If those drains currently feed into the sanitary sewer, was the former septic tank and drain field inspected for explosive residue?
- Were the tank and field decontaminated?

These issues and others are external facility concerns which were beyond the scope of the internal building explosive decontamination, and are to be addressed by NAVFAC EFA CHES during Phase 2.

### BUILDING 30

Building 30 was utilized for a variety of purposes such as office space, chemistry labs, inert material storage, explosive material storage, small scale explosive firing tests, assembly and disassembly of fuzing devices, mixing small quantities of sensitive explosive powders, weighing and loading sensitive powders into components, and an electronics lab. As stated earlier, Building 30 contains contaminants in other serious forms but only three locations sampled showed evidence of explosive contamination.

1. A wipe sample taken from the floor drain in Room 021, chemistry lab, picked up 0.001mg of RDX. (Room 021 is on the basement floor, back right as you face the main entrance.)
2. A wipe sample taken from the floor drain in Room 104, chemistry lab, picked up 0.01mg of RDX. (Room 104 is on the ground floor, front left corner as you face the main entrance.)
3. A wipe sample taken from the floor drain in Room 123, sensitive explosive powders processing, picked up 0.001mg of RDX. (Room 123 is on the ground floor, back right corner as you face the main entrance.)

**CAUTION:** All three locations had very low levels of explosive contamination present. Even though residual explosive contamination at this location was below the maximum acceptable level, the main sewage line from this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

### BUILDING 305

Building 305 was utilized for conducting various safety tests on explosive materials. One location showed evidence of explosive contamination in an unexplainable location.

1. A somewhat darkened piece of ceiling was removed and found to contain 513 mg/kg of TNT. All of the ceiling tile in Room 100 was removed.

### BUILDING 308

Building 308 was utilized for explosive component assembly and testing. One location showed evidence of explosive contamination.

1. The wipe sample from the floor drain in Room 104 contained 0.016mg of HMX. The floor drain was cleaned and resampled with no explosives detected.

**CAUTION:** Even though residual explosive contamination at this location was below the maximum acceptable level, any pipe work, sumps, or collection areas from the floor drain of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDINGS 310 A&B

Buildings 310 A&B were utilized as explosive material chemistry laboratories conducting small scale synthesis (formulation of new compounds) and developing explosive material analytical techniques. Residual explosive contamination was found in three locations at Building 310A.

1. A wipe sample taken from the inside of duct work located on the roof contained 0.0052 mg of HMX. The contaminated duct work was removed.
2. A wipe sample taken from an air handler located on the roof contained 0.016mg of RDX. The contaminated air handler was removed.
3. A wipe sample taken from the floor drain of Room 6 contained 0.140mg of TNT. The contaminated floor drain was cleaned and resampled with no explosives detected.

**CAUTION:** Any pipe work, sumps, or collection areas from the floor drain of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 311

Building 311 was utilized as a chemistry laboratory where explosive material formulation and mixing was conducted. Residual explosive contamination was found in three locations.

1. A wipe sample taken from duct work from a vent hood in Room 103 contained 0.58mg of PETN. The duct work and vent hood were removed.
2. A sample of sludge removed from a sump in Room 104 contained 0.42mg/l of NG. The sludge was removed, the sump was cleaned and wipe sampled with no explosives detected.
3. A wipe sample taken from the floor drain in Room 107 contained 0.016mg of RDX. The drain was cleaned and resampled with no explosives detected.

**CAUTION:** Any pipe work, sumps, or collection areas from the floor drain of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 312

Building 312 was utilized to determine the physical and safety characteristics of propellants and explosives. Residual explosive contamination was found in one location.

1. A wipe sample taken from the dry sump located in 312A Room 102 contained 0.26mg of RDX. The sump was cleaned and resampled with no explosives detected.

**CAUTION:** Any pipe work leading to or from this sump and collection areas beyond should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 314

Building 314 was utilized as a bombproof chamber to conduct explosive detonation operations. Residual explosive contamination was found in one location.

1. A wipe sample taken from the floor drain in Room 102 contained 0.55mg of HMX. The floor drain was cleaned and resampled with no explosives detected.

**CAUTION:** Any pipe work, sumps, or collection areas from the floor drain of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 318

Building 318, formerly utilized for explosive machining and filtration of explosive contaminated water operations, was only decontaminated to Level XXX. Three attempts were made at cleaning the concrete floor to remove explosive residues. Some attempts also included soaking and pre-scrubbing with a detergent to neutralize explosive residue. Post cleaning sampling indicated that each washing had drawn even larger concentrations of explosive to the concrete's surface. As an example, one area tested positive for HMX at 0.0074 mg/Wipe (surface) after the first washing, after the second 0.042, and 5.62 after the third.

The primary location of this explosive contamination appears to be the trench or trough running the length of the floor in the machining area. The trench was used to collect and direct both wash and cooling waters from machining bays to the water collection area for filtration. Although the trench was covered with a sealant material in the late 1980's, it may have been applied over an already contaminated concrete surface (no record or knowledge of pre-installation decontamination). Former building operators believe the sealant was applied in response to complaints about ground or rain water intrusion. Water seepage into sumps and pits below ground level, and the trench as well, were long standing problems for the building.

Although the focus of decontamination efforts was the trench area, it is recommended, at least initially, that the entire floor slab should be considered contaminated with explosives. Again, what is below the sealant material covering the concrete slab, floor tile as well, is unknown. Explosive contaminants may have been tracked throughout the building by facility operators, or just as likely to have been spread by ground or rain water entering and exiting.

No attempt was made to extract a sample of the concrete for analysis. However, a sample of the sealant material was analyzed and found to contain high levels of several explosive compounds. From the sample, the sealant material contained RDX at 758.0, HMX at 2041.0, TNT at 571.0, PGDN at 1.87, TMETN at 65.0, TEGDN at 26.0 and PETN at 3064.0 all in mg/kg levels. Again, it is unknown if the actual concrete material contains the same concentrations of explosive contaminants. Considering the high cost of hazardous waste disposal, it may be prudent to sample the concrete at several locations before classifying as hazardous waste.

Upon completion of decontamination efforts, NSWIC IHD personnel locked the building entrances, applied seals and affixed a permanent sign to each. The sign prescribed by NAVSEA OP 5, Volume 1, paragraph 2-1.13.5, was worded "CAUTION, CONTAMINATED AREA, CONTAMINATED WITH RDX, HMX, TNT, and PETN". NSWICDD, GSA, EFA CHES and the Restoration Advisory Board (RAB) at White Oak were notified that Building 318 is cleaned to Level XXX. The same was documented on the decontamination tag issued and posted at the building. NSWIC IHD recommends that to achieve full decontamination, Level XXXXX, Building 318 must be demolished and all concrete rubble removed to a permitted hazardous waste treatment facility or disposal site, if so required. Structural components above the concrete floor,

walls, roof materials, duct work, piping and the like, are not contaminated with explosives. It is unknown if those same components are contaminated with other hazardous materials.

NSWC IHD has also recommended to NSWCDD, EFA CHES and the RAB, that explosive contamination may be present in surface ground water and soil at the Building 318 site. Once Building 318 has been removed, investigation of the site for contamination should be a priority action, thereby eliminating post excavation run off concerns. The Building 318 site, which is located approximately 150 feet from the intersection of Brown and Isherwood Roads, may prove to be a major source of soil and ground water contamination within the lower portion of the "300 Area" at White Oak.

#### BUILDING 324

Building 324 was utilized as a bombproof chamber to conduct explosive detonation operations. Residual explosive contamination was found in one location.

1. A wipe sample taken from the floor drain in Room 103 contained 0.007mg of HMX. The floor drain was cleaned and resampled with no explosives detected.

**CAUTION:** Any pipe work, sumps, or collection areas from the floor drain of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

#### BUILDING 325

Building 325 was utilized as a bombproof chamber to conduct explosive detonation operations. Residual explosive contamination was found in one location.

1. A wipe sample taken from the floor drain in Room 101 contained 0.29mg of HMX. The floor drain was cleaned and resampled with no explosives detected.

**CAUTION:** Any pipe work, sumps, or collection areas from the floor drain of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 327

Building 327 was utilized as a bombproof chamber to conduct explosive detonation operations. Residual explosive contamination was found in four locations. Floor drains in Room 106 are labeled below as #1, the closest to the main electrical panel and #2, the second closest proceeding toward the rear of the building.

1. A wipe sample taken from floor drain #1 in Room 106 contained 0.013mg of HMX. The floor drain was cleaned and resampled with no explosives detected.
2. A wipe sample taken from floor drain #2 in Room 106 contained 0.082mg of HMX. The floor drain was cleaned and resampled with no explosives detected.
3. A wipe sample taken from the floor drain in Room 101 contained 0.007mg of HMX. The floor drain was cleaned and resampled with no explosives detected.
4. A wipe sample taken from one section of duct work in Room 101 contained 0.25mg of HMX. This section of duct and one next to it (no explosives detected) were removed.

**CAUTION:** Any pipe work, sumps, or collection areas from the floor drains of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 328

Building 328 was utilized to conduct explosive pressing, explosive train testing and assembly operations. Residual explosive contamination was found in four locations.

1. A wipe sample taken from a floor drain located in the hallway near Room 107 contained 0.078mg of TEGDN. The floor drain was cleaned twice and on the second resampling no explosives were detected.
2. A wipe sample taken from the floor drain in Room 109 contained 0.029mg of HMX. The floor drain was cleaned and resampled with no explosives detected.
3. A wipe sample taken from the sink drain in Room 109 contained 0.011mg of RDX. The sink drain was cleaned and resampled with no explosives detected.
4. A wipe sample taken from the floor drain in Room 110 contained 0.058mg of HMX. The floor drain was cleaned and resampled with no explosives detected.

**CAUTION:** Any pipe work, sumps, or collection areas from the floor drains and sink drains of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 344

Building 344 was utilized to conduct surface evaluation of explosives during initiation. Residual explosive contamination was found in one location.

1. A wipe sample taken from a sink drain contained 0.026mg of RDX. The sink drain was cleaned three times and the third resampling showed explosive contamination present but below the maximum acceptable value.

**CAUTION:** Any pipe work from the sink drains of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 362

Building 362, a wall with 40 separate storage cells, was utilized to store explosives categorized as hazardous waste (MDE Permitted CHS storage), segregated and serviceable. Building 362 was not sampled before decontamination efforts. The first phase of decontamination was to spray with NG-Killer and let dry, rinse with water, wipe down with rags and let dry, conduct field testing, rinse positive cells, wipe down with rags, field retest positive cells. Each cell was wipe sampled and residual explosive contamination was found in 22 of the 40 cells.

1. Wipe samples taken from Cells A1-14, B2, C4, C6, C8-10, D2 and D8 contained various types of explosive materials ranging from 0.005mg to 5.15mg in quantity. ALL 40 cells were sprayed with Bonsai (high pH detergent) and brush scrubbed, rinsed with hot water and let dry. Resampling found explosive residue at an acceptable level ( $< 2.0\mu\text{g}/\text{cm}^2$ ). Confirmation wipe sampling conducted by an independent laboratory, supporting EFA CHES on the Maryland CHS permit closure, found all cells consistent with IHD results and meeting COMAR requirements.

## BUILDING 613

Building 613 was utilized to conduct small scale explosive mixing and milling. Residual explosive contamination was found in seven locations. In the 1980's, an above ground storage tank (AST) was installed to hold wash water from the mixers and milling operations. Prior to the AST installation, how the wash water was handled is unknown. There may be an underground sump and drain field at this location used for explosive contaminated waste water.

1. A wipe sample taken from the floor drain in the hallway between control rooms and bays contained 0.011mg of HMX. The floor drain was cleaned three times and the third resampling showed explosive contamination present but below the maximum acceptable value.
2. A wipe sample taken from the floor drain in the hallway between control rooms and bays contained 0.16mg of HMX. The floor drain was cleaned three times and the third resampling showed no explosive contamination.
3. A wipe sample taken from the floor drain in Room 101 contained 1.31mg of HMX. The floor drain was cleaned three times and the third resampling showed no explosive contamination.
4. A wipe sample taken from the floor drain in Room 103 contained 0.15mg of HMX. The floor drain was cleaned twice and the second resampling showed no explosive contamination.
5. A wipe sample taken from the floor drain in Room 107 contained 0.48mg of HMX. The floor drain was cleaned three times and the third resampling showed no explosive contamination.
6. A wipe sample taken from a pipe protruding from the floor in Room 107 contained 0.010mg of HMX. The pipe was cleaned. No resample was taken since the first sample was below the maximum acceptable level.
7. A wipe sample taken from a pipe protruding from the floor in Room 109 contained 0.009mg of HMX. The pipe was cleaned. No resample was taken since the first sample was below the maximum acceptable level.

**CAUTION:** Any pipe work, sumps, or collection areas from the floor drains of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING 620

Building 620 was utilized for scale up of explosive mixing and explosive packaging. Residual explosive contamination was found in six locations. Explosive contaminated waste water went into at least three sumps and drain fields at this location.

1. A wipe sample taken from the trench in the floor of Room 103 contained 0.26mg of HMX. The trench was cleaned and resampled with explosive contamination present but below the maximum acceptable level.
2. A wipe sample taken from the floor in Room 103 contained 0.38mg of HMX. The floor was cleaned and resampled with explosive contamination present but below the maximum acceptable level. A sample of the sealant covering the floor was analyzed between the two samples taken above and found to contain several explosives with the largest being 157 mg/kg of HMX.
3. A wipe sample taken from a covered drain pipe behind the building contained 0.067mg of HMX. The drain pipe was cleaned twice and the second resampling showed no explosive contamination.
4. A wipe sample was taken from the inflow side of the pit on the left side of the building contained 0.055mg of HMX. The pit was cleaned twice and the second resample showed no explosive contamination.
5. A wipe sample was taken from the inflow side of the pit on the right side of the building contained 5.7mg of HMX. A sample of water from the overflow side of this pit contained 1.3mg/L of HMX. The water was removed and the pit was cleaned twice and the second resample showed explosive contamination present but below the maximum acceptable level. Between cleanings, the pipe which goes from the pit to a drain field, presumed, was plugged to prevent contaminated water from back flowing.

**CAUTION:** Any pipe work, sumps, collection areas or drain fields from the external pits and drains sampled above should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## BUILDING T35

Building T35 was utilized to receive, weigh, package and ship explosives. Residual explosive contamination was found in three locations.

1. A wipe sample taken from the floor drain in Room 1 contained 0.16mg of RDX. The floor drain was cleaned twice and the second resample showed no explosive contamination.
2. A wipe sample taken from the sink drain in Room 1 contained 0.16mg of RDX. The sink drain was cleaned twice and the second resample showed no explosive contamination.
3. A wipe sample taken from the floor drain in Room 2 contained 0.16mg of HMX. The floor drain was cleaned twice and the second resample showed no explosive contamination.

**CAUTION:** Any pipe work, sumps or collection areas from the floor drains of this building should be considered contaminated with explosives. Future servicing or removal actions should be conducted as explosive operations until tested to demonstrate otherwise.

## **IX. CONCLUSION**

The interiors of buildings and facilities utilized to conduct explosive operations at the former NSWCDDWODET have been decontaminated of explosive material residues. It is recommended that the Naval Ordnance Center and Department of Defense Explosive Safety Board release these facilities for Unrestricted reuse. However, any action related to the maintenance or demolition of facility features, either on or below the soil or floor surface, MUST be conducted with **CAUTION!** Section VIII of this report provides guidance pertinent to specific facilities and features that should remain as safety concerns until such time as NAVFAC EFA CHES completes Phase 2 of the building decontamination.

Again, there is no information known which would suggest that any such explosive contamination presents a threat to nearby landowners, the general public, GSA personnel, or to site visitors. Any danger or risk from this contamination would be to remediation investigators or to demolition workers who do not conduct their operations in accordance with standard explosive safety practices.

Table 1. Structures Decontaminated of Explosive Residue at White Oak

Facility Number	DECON Level	Disposition	Remarks
20- Room 057	XXXXX	Remains at WO	
30 All Floors	XXXXX	Remains at WO	Other Contaminants
301	XXXXX	Remains at WO	
302	XXXXX	Remains at WO	
303	XXXXX	Remains at WO	
304	XXXXX	Remains at WO	
305	XXXXX	Remains at WO	
305-2	XXX	Removed to IHD	For Like Use
306 & 306A	XXXXX	Remains at WO	
308	XXXXX	Remains at WO	
310A & 310B	XXXXX	Remains at WO	Other Contaminants
311	XXXXX	Remains at WO	
312	XXXXX	Remains at WO	
312-4 & 312-6	XXX	Removed to IHD	For Like Use
314	XXXXX	Remains at WO	
314-3	XXX	Removed to IHD	For Like Use
315-1	XXX	Removed to IHD	For Like Use
316	XXXXX	Remains at WO	
317	XXXXX	Remains at WO	
318	XXX DEMO REQ'D	Remains at WO	Posted Contaminated
318-1	XXX	Removed to IHD	For Like Use
324	XXXXX	Remains at WO	
325	XXXXX	Remains at WO	
326	XXXXX	Remains at WO	
327	XXXXX	Remains at WO	
328 & 328-3	XXXXX	Remains at WO	
331	XXXXX	Remains at WO	
332	XXXXX	Remains at WO	
333	XXXXX	Remains at WO	
334	XXXXX	Remains at WO	
335-1, 335-2 & 335-3	XXXXX	Remains at WO	
338	XXXXX	Remains at WO	
339	XXXXX	Remains at WO	
340	XXXXX	Remains at WO	
343	XXXXX	Remains at WO	
344	XXXXX	Remains at WO	
348	XXXXX	Remains at WO	
351	XXXXX	Remains at WO	
352	XXXXX	Remains at WO	
353	XXXXX	Remains at WO	
354	XXXXX	Remains at WO	
356	XXXXX	Remains at WO	
357	XXXXX	Remains at WO	
358	XXXXX	Remains at WO	
359	XXXXX	Remains at WO	
360	XXXXX	Remains at WO	
362	XXXXX	Remains at WO	MDE Closure Req'd
363	XXXXX	Remains at WO	
364	XXXXX	Remains at WO	

Table 1. Cont. Structures Decontaminated of Explosive Residue at White Oak

Facility Number	DECON Level	Disposition	Remarks
366	XXXXX	Remains at WO	
369, 369-1 & 369-4	XXXXX	Remains at WO	
371	XXXXX	X-ferred to Carderock	
372	XXXXX	Remains at WO	
375 & 375-1	XXXXX	Remains at WO	
383	XXX	X-ferred to ARL	For Like Use
386	XXXXX	Remains at WO	
390	XXXXX	Remains at WO	
392	XXXXX	Remains at WO	
405 Room 1299A	XXXXX	Remains at WO	Air Force Use
613 & 613-5	XXXXX	Remains at WO	
613-6	XXX	Removed to IHD	Destroyed In DECON
615	XXXXX	Remains at WO	
620	XXXXX	Remains at WO	
630	XXXXX	Remains at WO	
H7	XXX	Removed to IHD	Destroyed In DECON
T28	XXXXX	Remains at WO	
T35	XXXXX	Remains at WO	
19Y1	XXXXX	Remains at WO	
All "Dog Houses"	XXX	Removed to IHD	Destroyed In DECON
1-Near T-5			
2-Near 305			
2-Near 308			
2-Near 324			
1-Near 333			
1-Near 339			
1-Near 348			
1-Near 375			
1-Near 409			
1-Monroe Loop South			

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 30 Basement Level (Firing Train Testing)</b>								
30-003	Flr Drain	FD72	No	RFD72	No	None	N/A	
30-007	Snk Drain	SD126	No	None	N/A			
	Flr Drain	RSD126	No	None	N/A			
30-007A	Flr Drain	FD71	No	RFD71	No	None	N/A	
30-011	Flr Drain	FD88	No	None	N/A			
	Flr Drain	FD89	No	RFD89	No	None	N/A	
30-013	Snk Drain	SD135	No	RSD135	No	None	N/A	
	Snk Drain	SD136	No	RDS136	No	None	N/A	
30-014	Snk Drain	SD134	No	RSD134	No	None	N/A	
	Ceiling Dr	REF116	No	None	N/A			
30-015	Snk Drain	SD133	No	RSD133	No	None	N/A	
30-018	Snk Drain	SD132	No	RSD132	No	None	N/A	
	Flr Drain	FD70	No	RFD70	No	None	N/A	
30-019	Flr Drain	FD67	No	RFD67	No	None	N/A	
	Flr Drain	FD68	No	RFD68	No	None	N/A	
	Flr Drain	FD69	No	RFD69	No	None	N/A	
30-021	Flr Drain	FD65	No	RFD65	No	None	N/A	
	Flr Drain	FD66	Yes	RFD66	No	None	N/A	0.001mg/Wipe RDX
30-022	Sump	REF141	No	REF143	No	None	N/A	
30-025	Flr Drain	FD64	No	RFD64	No	None	N/A	
<b>Building 30 First Floor Level (Chemistry, Small Device Loading, Mixing)</b>								
30-104	Flr Drain	FD73	Yes	Pipe Removed No Retest				0.01 mg/Wipe RDX
30-106	Flr Drain	FD74	No	RFD74	No	None	N/A	
30-109	Flr Drain	FD91	No	None	N/A			
30-110	Flr Drain	FD75	No	RFD75	No	None	N/A	
30-115	Snk Drain	SD131	No	RSD131	No	None	N/A	
	Air Hndler	REF064	No	None	N/A			
30-115A	Snk Drain	SD130	No	RSD130	No	None	N/A	
30-115B	Snk Drain	SD129	No	RSD129	No	None	N/A	
	Air Hndler	REF065	No	None	N/A			
30-123	Snk Drain	SD137	No	None	N/A			Removed
	Flr Drain	FD62	Yes	None	N/A		Removed	0.001 mg/Wipe RDX
30-126	Flr Drain	FD63	No	RFD63	No	None	N/A	
<b>Building 30 Second Floor Level (Chemistry)</b>								
30-205A	Snk Drain	SD128	No	RSD128	No	None	N/A	
30-209	Flr Drain	FD90	No	None	N/A			
30-213A	Air Hndler	REF062	No	None	N/A			
30-216	Flr Drain	FD94	No	RFD94	No	None	N/A	
30-218	Air Hndler	REF063	No	None	N/A			
	Flr Drain	FD76	No	RFD76	No	None	N/A	
30-221	Air Hndler	REF061	No	None	N/A			
30-223	Air Hndler	REF060	No	None	N/A			
30-224	Air Hndler	REF059	No	None	N/A			
30-226	Air Hndler	REF058	No	None	N/A			

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 30 Third Floor Level (Offices)</b>								
30-309	Air Hndler	REF055	No	None	N/A			Removed
	Air Hndler	REF056	No	None	N/A			Removed
<b>Building 30 General</b>								
1st Flr Hall	Flr Drain	FD103	No	None				Removed
	Flr Drain	FD104	No	None				Removed
2nd Flr Hall	Flr Drain	FD92	No	RFD92	No	None	N/A	
	Flr Drain	FD93	No	RFD93	No	None	N/A	
3rd Flr Hall	Flr Drain	FD101	No	RFD101	No	None	N/A	
	Air Hndler	REF057	No	None	N/A			
	Flr Drain	FD102	No	RFD102	No	None	N/A	
<b>Building 301(Component Handling Testing)</b>								
301-100	Flr Drain	FD22	No	RFD22	No	None	N/A	
301-101	Sump	REF016	No	None	N/A			
301-102	Flr Drain	FD23	No	RFD23	No	None	N/A	
301-103	Flr Drain	FD-24	No	None	N/A	Water In Drain Tested		
	Flr Drain	FD24	No	RFD24	No	None	N/A	
<b>Building 302 (Component Storage Testing)</b>								
Right Sink	Snk Drain	SD104	No	RSD104	No	None	N/A	
Left Sink	Snk Drain	SD105	No	RSD105	No	None	N/A	
<b>Building 303 (Component Storage Testing)</b>								
Bay 1	Flr Drain	FD26	No	RFD26	No	None	N/A	
Bay 2	Flr Drain	FD27	No	RFD27	No	None	N/A	
Bay 3	Flr Drain	FD28	No	RFD28	No	None	N/A	
Bay 4	Flr Drain	FD29	No	RFD29	No	None	N/A	
Bay 5	Flr Drain	FD30	No	RFD30	No	None	N/A	
Bay 6	Flr Drain	FD31	No	RFD31	No	None	N/A	
Bay 7	Flr Drain	FD32	No	RFD32	No	None	N/A	
Bay 8	Flr Drain	FD33	No	RFD33	No	None	N/A	
<b>Building 304(Explosive Properties Evaluation)</b>								
Bay 2	Ceill'g Tile	REF007	No	None	N/A			
	Flr Drain	FD40	No	RFD40	No	None	N/A	
	Flr Drain	FD41	No	RFD41	No	None	N/A	
	Flr Drain	FD42	No	RFD42	No	None	N/A	
	Flr Drain	FD43	No	RFD43	No	None	N/A	
Bay 3	Flr Drain	FD44	No	RFD44	No	None	N/A	
	Flr Drain	FD45	No	RFD45	No	None	N/A	
<b>Building 305 (Explosive Properties Evaluation)</b>								
305-100	Ceill'g Tile	REF005	Yes	Ceiling Tile Removed No Retest				513mg/kg TNT
	Snk Drain	SD118	No	RSD118	No	None	N/A	
<b>Building 306 (Component Handling Testing)</b>								
306-100	Flr Drain	FD34	No	RFD34	No	None	N/A	

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 306A (Component Handling Testing)</b>								
	Sump	REF011	No	None	N/A	Sampled After Cleaning		
	Snk Drain	SD122	No	RSD122	No	None	N/A	
<b>Building 308 (Component Assembly &amp; Testing)</b>								
308-100	Snk Drain	SD109	No	RSD109	No	None	N/A	
	Flr Drain	FD80	No	RFD80	No	None	N/A	
308-101	Flr Drain	FD36	No	RFD36	No	None	N/A	
308-104	Flr Drain	FD37	Yes	RFD37	No	None	N/A	0.016mg/Wipe HMX
308-106	Flr Drain	FD57	No	RFD57	No	None	N/A	
<b>Building 310A &amp; B (Chemistry&amp;Synthesis)</b>								
310A-Roof	Duct	REF050	No	None	N/A			
	Duct	REF086	Yes	None	N/A	Removed		0.0052mg/Wipe HMX
	Air Hndler	REF087	Yes	None	N/A	Removed		0.016mg/Wipe RDX
310A-Hall	Snk Drain	SD171	No	None	N/A			
	Snk Drain	SD172	No	None	N/A			
	Snk Drain	SD175	No	None	N/A			
310A-3	Flr Drain	FD97	No	RFD97	No	None	N/A	
	Flr Drain	FD81	No	RFD81	No	None	N/A	
310A-3A	Snk Drain	SD169	No	None	N/A			
	Snk Drain	SD170	No	None	N/A			
310A-4	Flr Drain	FD82	No	RFD82	No	None	N/A	
	Snk Drain	SD140	No	None	N/A			
	Snk Drain	SD141	No	None	N/A			
	Snk Drain	SD138	No	None	N/A			
	Snk Drain	SD139	No	None	N/A			
310A-5	Flr Drain	FD83	No	RFD83	No	None	N/A	
	Snk Drain	SD142	No	None	N/A			
	Snk Drain	SD143	No	None	N/A			
	Snk Drain	SD144	No	None	N/A			
	Snk Drain	SD145	No	None	N/A			
310A-6	Flr Drain	FD84	Yes	RFD84	Yes	REF111	No	0.140mg/Wipe TNT
	Snk Drain	SD146	No	None	N/A			
	Snk Drain	SD147	No	None	N/A			
	Snk Drain	SD148	No	None	N/A			
310A-7	Flr Drain	FD85	No	RFD85	No	None	N/A	
	Snk Drain	SD149	No	None	N/A			
	Snk Drain	SD150	No	None	N/A			
	Snk Drain	SD151	No	None	N/A			
310A-8	Flr Drain	FD86	No	RFD86	No	None	N/A	
	Snk Drain	SD152	No	None	N/A			
	Snk Drain	SD153	No	None	N/A			
	Snk Drain	SD154	No	None	N/A			
	Snk Drain	SD155	No	None	N/A			
310A-9	Flr Drain	FD87	No	RFD87	No	None	N/A	
	Snk Drain	SD156	No	None	N/A			
	Snk Drain	SD157	No	None	N/A			

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 310A &amp; B Cont.</b>								
A-9 Cont	Snk Drain	SD158	No	None	N/A			
	Snk Drain	SD159	No	None	N/A			
	Snk Drain	SD160	No	None	N/A			
	Snk Drain	SD167	No	None	N/A			
	Snk Drain	SD168	No	None	N/A			
310B-Side	Flr Drain	FD109	No	RFD109	No	None	N/A	
310B-Front	Flr Drain	FD110	No	None	N/A			
	Snk Drain	SD161	No	RSD161	No	None	N/A	
Back Room	Snk Drain	SD173	No	None	N/A			
	Snk Drain	SD174	No	None	N/A			
<b>Building 311 (Formulation&amp;Mixing Laboratory)</b>								
Hall	Duct	REF026	No	None	N/A			
311-102	Flr Drain	FD100	No	RFD100	No	None	N/A	
311-103	Duct	REF123	No	None	N/A			
	Duct	REF025	No	None	N/A			
	Duct	REF024	No	None	N/A			
	Duct	REF085	Yes	None	N/A	Duct Removed		0.58mg/Wipe PETN
	Snk Drain	SD114	No	RSD114	No	None	N/A	
	Flr Drain	FD9	No	RFD9	No	None	N/A	
311-104	Sump	REF013	Yes	REF067	No	Sludge Removed		0.42mg/L NG
	Snk Drain	SD113	No	RSD113	No	None	N/A	
	Flr Drain	FD8	No	RFD8	No	None	N/A	
311-105	Snk Drain	SD112	No	RSD112	No	None	N/A	
	Flr Drain	FD7	No	RFD7	No	None	N/A	
311-106	Flr Drain	FD10	No	RFD10	No	None	N/A	
311-107	Flr Drain	FD11	Yes	RFD11	No	None	N/A	0.016mg/Wipe RDX
<b>Building 312 (Propellant Properties Laboratory)</b>								
312A-102	Sump	REF040	Yes	REF068	No	None	N/A	0.26mg/Wipe RDX
312-103	Snk Drain	SD106	No	RSD106	No	None	N/A	
312-107	Snk Drain	SD107	No	RSD107	No	None	N/A	
<b>Building 314 (Bombproof Chamber)</b>								
314-102	Wood	314Wood	No	None	N/A			
314-102	Flr Drain	FD1	Yes	RFD1	Yes	REF048	No	0.55mg/Wipe HMX
<b>Building 316 (Charge Assembly)</b>								
	Snk Drain	SD115	No	RSD115	No	None	N/A	
<b>Building 317 (Bombproof Chamber)</b>								
	Snk Drain	SD121	No	RSD121	No	None	N/A	
<b>Building 318 (Explosive Machining&amp;Water Filtration)</b>								
Hall	Snk Drain	SD163	No	None	N/A			
Ceiling	Tile	REF110	Yes	None	N/A	Tile Removed		171mg/kg TNT

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 318 Cont.</b>								
318-104	Sump	REF142	No	None	N/A			
	Sump	REF053	No	None	N/A			
318-108	Duct	REF033	No	None	N/A			
	Duct	REF032	No	None	N/A			
	Flr Trench	REF129	Yes	REF153	Yes	REF165	Yes	Higher w/each samp
318-110	Duct	REF031	No	None	N/A			
	Flr Trench	REF128	Yes	REF152	Yes	REF164	Yes	Higher w/each samp
-110/114	Sump	REF130	Yes	REF166	Yes	None	N/A	Higher w/each samp
	Smp/Pipe	REF132	Yes	REF154	Yes	REF167	Yes	Acceptable Level
318-111	Floor	REF131A	Yes	REF155	Yes	None	N/A	Acceptable Level
	Pipe	REF131B	Yes	REF156	Yes	None	N/A	Acceptable Level
318-114	Duct	REF030	No	None	N/A			
	Flr Trench	REF163	Yes	None	N/A			10.13mg/Wipe PETN
	Sump	REF127	Yes	REF151	Yes	None	N/A	
318-116	Duct	REF029	No	None	N/A			
	Flr Trench	REF126	Yes	REF150	Yes	REF162	Yes	Higher w/each samp
	Liner Mat	LINER	Yes	Numerous expls. present in liner material				3064mg/kg PETN
318-120	Duct	REF028	No	None	N/A			
	Flr Trench	REF125	Yes	REF149	Yes	REF161	Yes	Higher w/each samp
318-122	Duct	REF027	No	None	N/A			
	Flr Trench	REF124	Yes	REF148	Yes	REF160	Yes	Higher w/each samp
<b>Building 324 (Bombproof Chamber)</b>								
324-103	Flr Drain	FD12	Yes	RFD12	No	None	N/A	0.007mg/Wipe HMX
	Exterior Pit Fr Flr Drain	REF017	No	None	N/A			
	Pipe Fr Pit to Sewer	REF049	No	None	N/A			
<b>Building 325 (Bombproof Chamber)</b>								
325-101	Flr Drain	FD13	Yes	RFD13	No	None	N/A	0.29mg/Wipe HMX
<b>Building 326 (Charge Assembly)</b>								
	Duct	REF020	No	None	N/A			
	Duct	REF021	No	None	N/A			
	Duct	REF022	No	None	N/A			
	Duct	REF023	No	None	N/A			
	Flr Drain	FD14	No	RFD14	No	None	N/A	
<b>Building 327 (Bombproof Chamber)</b>								
327-106	Flr Drain	FD15	Yes	RFD15	No	None	N/A	0.013mg/Wipe HMX
	Flr Drain	FD16	Yes	RFD16	No	None	N/A	0.082mg/Wipe HMX
	Flr Drain	FD17	No	RFD17	No	None	N/A	
	Flr Drain	FD18	No	RFD18	No	None	N/A	
327-101	Flr Drain	FD106	No	RFD106	Yes	REF135	No	0.007mg/Wipe HMX
	Duct	REF018	Yes	None	N/A	Removed		0.25mg/Wipe HMX
	Duct	REF019	No	None	N/A	Removed		
	Air Hndler	REF136	No	None	N/A	Removed		
	Air Hndler	REF137	No	None	N/A	Removed		

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 328 (Load, Assemble, Test Firing Trains)</b>								
Hall nr 107	Flr Drain	FD79	Yes	RFD79	Yes	REF117	No	0.078mg/Wipe TEGDN
	Ceiling	Tile	REF#12	No	None	N/A		
328-107	Duct	REF118	No	None	N/A			
328-109	Flr Drain	FD78	Yes	RFD78	No	None	N/A	0.029mg/Wipe HMX
	Snk Drain	SD110	No	RSD110	No	None	N/A	
	Snk Drain	SD111	Yes	RSD111	No	None	N/A	0.011mg/Wipe RDX
328-110	Flr Drain	FD77	Yes	RFD77	No	None	N/A	0.058mg/Wipe HMX
	Duct	REF119	No	None	N/A			
<b>Building 333 (Chemistry Laboratory)</b>								
	Ceiling	Tile	B333	No	None	N/A		
		Flr Drain	FD2	No	RFD2	No	None	N/A
		Flr Drain	FD3	No	RFD3	No	None	N/A
<b>Building 334 (Underwater Test Facility)</b>								
		Snk Drain	SD108	No	RSD108	No	None	N/A
		Test Tank	REF044	No	None	N/A		
<b>Building 335-1 (Explosive Processing)</b>								
Bay 1	Duct	REF034	No	None	N/A			
Bay 2	Duct	REF035	No	None	N/A			
Bay 3	Duct	REF036	No	None	N/A			
Bay 4	Duct	REF037	No	None	N/A			
Bay 5	Duct	REF038	No	None	N/A			
Mach. Rm.	Flr Drain	FD19	No	RFD19	No	None	N/A	
<b>Building 339 (Explosive Properties Laboratory)</b>								
339-105	Flr Drain	FD21	No	RFD21	No	None	N/A	
339-106	Flr Drain	FD20	No	RFD20	No	None	N/A	
		Snk Drain	SD116	No	RSD116	No	None	N/A
<b>Building 340 (Explosive Properties Laboratory)</b>								
		Snk Drain	SD117	No	RSD117	No	None	N/A
<b>Building 343 (Synthesis Laboratory)</b>								
Ext. Pit	Pit Water	FD58	No	None	N/A			
Mach. Rm.	Vac Pump	REF009	No	None	N/A			
Attic	Duct	Memo	No	None	Wipes taken before/after filter in ten air handlers			
343-101	Snk Drain	SD102	No	RSD102	No	None	N/A	
343-102	Snk Drain	SD101	No	RSD101	No	None	N/A	
343-103	Flr Drain	FD95	No	RFD95	No	None	N/A	
343-109	Snk Drain	SD103	No	RSD103	No	None	N/A	
343-114	Flr Drain	FD98	No	RFD98	No	None	N/A	

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 344 (Explosive Evaluation Laboratory)</b>								
Ext. Pit	Dry Pit	FD39	No	None	N/A			
	Drains	Memo	No	None	N/A			
	Snk Drain	SD123	Yes	RSD123	Yes	REF071	Yes	0.026mg/Wipe RDX
				4th test of above		REF105	Yes	Acceptable Level
	Snk Drain	SD127	No	None	N/A			
		SD162	No	None	N/A			
	Flr Drain	FD99	No	RFD99	No	None	N/A	
<b>Building 348 (Chemistry)</b>								
348-101	Snk Drain	SD119	No	RSD119	No	None	N/A	
348-110	Snk Drain	SD120	No	RSD120	No	None	N/A	
<b>Building 362 (Explosive Storage, CHS Waste in Cells A1-14 &amp; B1-6)</b>								
A1	Cell	A1	Yes	RA1	Yes	None	N/A	Acceptable Level
A2	Cell	A2	Yes	RA2	No	None	N/A	
A3	Cell	A3	Yes	RA3	Yes	None	N/A	Acceptable Level
A4	Cell	A4	Yes	RA4	Yes	None	N/A	Acceptable Level
A5	Cell	A5	Yes	RA5	Yes	None	N/A	Acceptable Level
A6	Cell	A6	Yes	RA6	No	None	N/A	
A7	Cell	A7	Yes	RA7	Yes	None	N/A	Acceptable Level
A8	Cell	A8	Yes	RA8	Yes	None	N/A	Acceptable Level
A9	Cell	A9	Yes	RA9	No	None	N/A	
A10	Cell	A10	Yes	RA10	No	None	N/A	
A11	Cell	A11	Yes	RA11	No	None	N/A	
A12	Cell	A12	Yes	RA12	No	None	N/A	
A13	Cell	A13	Yes	RA13	No	None	N/A	
A14	Cell	A14	Yes	RA14	No	None	N/A	
B1	Cell	B1	No	RB1	No	None	N/A	
B2	Cell	B2	Yes	RB2	No	None	N/A	
B3	Cell	B3	No	RB3	No	None	N/A	
B4	Cell	B4	No	RB4	No	None	N/A	
B5	Cell	B5	No	RB5	No	None	N/A	
B6	Cell	B6	No	RB6	No	None	N/A	
C1	Cell	C1	No	RC1	No	None	N/A	
C2	Cell	C2	No	RC2	No	None	N/A	
C3	Cell	C3	No	RC3	No	None	N/A	
C4	Cell	C4	Yes	RC4	No	None	N/A	
C5	Cell	C5	No	RC5	Yes	RRC5	Yes	Acceptable Level
C6	Cell	C6	Yes	RC6	No	None	N/A	
C7	Cell	C7	No	RC7	No	None	N/A	
C8	Cell	C8	Yes	RC8	No	None	N/A	
C9	Cell	C9	Yes	RC9	No	None	N/A	
C10	Cell	C10	Yes	RC10	No	None	N/A	
D1	Cell	D1	No	RD1	No	None	N/A	
D2	Cell	D2	Yes	RD2	No	None	N/A	
D3	Cell	D3	No	RD3	No	None	N/A	
D4	Cell	D4	No	RD4	No	None	N/A	

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 362 Cont.</b>								
D5	Cell	D5	No	RD5	No	None	N/A	
D6	Cell	D6	No	RD6	No	None	N/A	
D7	Cell	D7	No	RD7	No	None	N/A	
D8	Cell	D8	Yes	RD8	No	None	N/A	
D9	Cell	D9	No	RD9	No	None	N/A	
D10	Cell	D10	No	RD10	No	None	N/A	
<b>Building 366 (Explosive Storage)</b>								
	Flr Trench	FD46	No	RFD46	No	None	N/A	
<b>Building 369 (Storage Testing)</b>								
Bay 3	Flr Drain	FD59	No	RFD59	No	None	N/A	
Bay 3	Flr Drain	FD60	No	RFD60	No	None	N/A	
Bay 2	Flr Drain	FD61	No	RFD61	No	None	N/A	
<b>Building 375 (Test Chamber)</b>								
	Vac Drain	REF051	No	None	N/A			
<b>Building 405 (Test Chamber)</b>								
405-1299A	Flr Drain	FD105	No	None	N/A			
	Snk Drain	SD124	No	None	N/A			
	Exh Duct	REF008	No	None	N/A			
<b>Building 613 (Explosive Mixing)</b>								
Ext. AST	In-Pipe	REF084	No	None	N/A	Water Holding Tank		Pipe&Tank Removed
	Water	REF079	No	None	N/A			Removed
Hall	Flr Drain	FD47	No	RFD47	No	None	N/A	
	Flr Drain	FD48	Yes	RFD48	Yes	REF074	Yes	0.011mg/Wipe HMX
				4th Test of Above		REF106	Yes	Acceptable Level
	Flr Drain	FD49	Yes	RFD49	Yes	REF075	Yes	0.16mg/Wipe HMX
				4th Test of Above		REF107	No	
613-101	Flr Drain	FD54	Yes	RFD54	Yes	REF078	Yes	1.31mg/Wipe HMX
				4th Test of Above		REF109	No	
613-103	Flr Drain	FD53	Yes	RFD53	Yes	REF077	No	0.15mg/Wipe HMX
613-105	Steam Pip	SD165	No	None	N/A			
613-107	Flr Drain	FD51	Yes	RFD51	Yes	REF076	Yes	0.48mg/Wipe HMX
				4th Test of Above		REF108	No	
	Pipe	SD164	Yes	None	N/A			0.010mg/Wipe HMX
	Drain-AST	REF081	No	None	N/A			
613-109	Pipe	SD166	Yes	None	N/A			0.009mg/Wipe HMX
<b>Building T35 (Explosive Recieving)</b>								
T35-1	Flr Drain	Memo	No	RFD107	Yes	REF121	No	0.16mg/Wipe RDX
	Snk Drain	SD125	No	RSD125	Yes	REF120	No	0.16mg/Wipe RDX
T35-2	Flr Drain	Memo	Yes	RFD108	Yes	REF122	No	0.16mg/Wipe HMX
	Outside Drain Pipe	FD96	No	None	N/A			

Table 2. Summary of Lab. Data

Building-Room No.	Sample Location	Sample Number	Explosive Detected	ReSample Number	Explosive Detected	ReSample Number	Explosive Detected	Remarks
<b>Building 620 (Explosive Mixing)</b>								
	Duct Inter.	REF045	No	None	N/A			
	Duct Roof	REF046	No	None	N/A			
	Duct Wall	REF047	No	None	N/A			
620-103	Flr Trench	REF072	Yes	REF094	Yes	None	N/A	Acceptable Level
	Floor	REF073	Yes	REF095	Yes	None	N/A	Acceptable Level
Floor Material Sample Tested After REF073, REF080 Yes, and Before REF095								
	Outside Rear Drain	REF052	Yes	REF070	Yes	REF139	No	0.067mg/Wipe HMX
<b>Left Side Of Building External Pits From Floor Trenches</b>								
	Inflow Holding Pit	FD5	Yes	RFD5	Yes	REF138	No	0.055mg/Wipe HMX
	Overflow Pit Water	FD55	No	None	N/A			Water Removed
	Overflow Pit Wipe	RFD55	No	None	N/A			
<b>Right Side Of Building External Pits From Floor Trenches</b>								
	Inflow Holding Pit	FD4	Yes	RFD4	Yes	REF140	Yes	5.7mg/Wipe HMX
	Overflow Pit Water	FD56	Yes	None	N/A			Water Removed
	Overflow Pit Wipe	RFD56	No	None	N/A			1.3mg/Liter HMX

## Notes:

1. Except for Building 30, all drain sampling was done both before and after general decontamination cleaning. Some drains in Building 30 were only sampled after general decontamination cleaning.
2. Specific values shown in the remarks column are the largest observed for that location during sampling. In some cases the value was observed in the first sample, for others it was the second, third or fourth sample.
3. Data highlighted within the remarks column identifies specific areas that require additional investigation. Values shown that are within acceptable limits should not be misconstrued as meaning no further action needed. Any indication that explosive material was or is present must be understood as a **CAUTION** that further investigation is required into drain pipes, sumps or holding tanks, and leaching fields beyond that point. All investigation and remediation activities must be conducted with utmost concern for explosive safety.
4. Chemical Laboratory data sheets for the above are attached to the building decontamination records that were transferred to Naval Facilities Command, Engineering Field Activity Chesapeake BRAC Environmental Coordinator for White Oak, Ms. Armalia Berry.
5. Pursuant to RCRA CHS waste storage permit closure with Maryland Department of Environment, Building 362 required additional laboratory sampling by an EPA registered laboratory. Data from this sampling indicates no explosives detected above maximum acceptable limits.