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FINAL RESOURCE CONSERVATION AND RECOVERY ACT PARTIAL CLOSURE REPORT
FOR HANGAR 6 WITH TRANSMITTAL LETTER NAS BRUNSWICK ME
8/24/2010
NAS BRUNSWICK

**ENVIRONMENTAL DEPARTMENT
NAVAL AIR STATION
437 HUEY DRIVE
BRUNSWICK, ME 04011**

August 24, 2010

Mr. Edward Vigneault
Maine Department of Environmental Protection
Division of Oil and Hazardous Waste Facilities Registration
17 State House Station
Augusta, ME 04333-0017

Subj: Final RCRA Partial Closure Report for Hangar 6

Dear Mr. Vigneault:

A copy of the Final RCRA Partial Closure Report for Hangar 6 at Naval Air Station Brunswick is provided as Enclosure (1).

If you have any questions, please contact Mr. Mike Fagan at 921-1717 or via e-mail at michael.fagan1@navy.mil.

Sincerely,



FAL LISA M. JOY
Environmental Director

Enclosure: (1) Final RCRA Partial Closure Report for Hangar 6

Copy to:
NAVFAC Mid-Atlantic (B. Abraham)
NAS Brunswick (M. Fagan/D. Smith)
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RCRA PARTIAL CLOSURE REPORT
for
HANGAR 6 – AIRCRAFT MAINTENANCE HANGAR PARCEL
NAVAL AIR STATION BRUNSWICK, MAINE
USEPA IDENTIFICATION NUMBER ME8170022018
AUGUST 2010

1. INTRODUCTION

The purpose of this report is to present the findings and conclusions of the investigation conducted to determine if the Maine Department of Environmental Protection (MEDEP) RCRA or hazardous waste closure requirements have been completed for the Hangar 6 parcel at Naval Air Station Brunswick (NAS Brunswick).

2. PROPERTY DESCRIPTION

The Hangar 6 parcel is located in the northern-central portion of NAS Brunswick (Figure 1). The approximately 56-acre parcel is bordered to the north by Taxiway I (also known as the Old Taxiway) and former helicopter pad area; to the east by Pegasus Street; to the south by the Seahawk Avenue; and to the west by the Runways Area parcel (Figure 2). The parcel contains Hangar 6 (Aircraft Maintenance Hangar) and the associated parking and grass-covered areas to the north, east, and west, and the airfield apron to the south. A liquid-oxygen and nitrogen dispenser is located in the southeast corner of the parcel.

The following buildings are also located within the Hangar 6 parcel, as shown in Figure 2, but have been addressed separately under the NAS Brunswick RCRA closure program:

- Building 433, VPU-1/VP-26 Line Shack (Tetra Tech, May 2010)
- Building 446, ISAR Equipment Maintenance Trailer (Tetra Tech, July 2010)
- Building 601, ASOS Tower (Tetra Tech, July 2010)
- Building 606, LOX Cart Shed (Tetra Tech, March 2010)

Former Hangars 2 and 3 were located in the southwest and southeast portions of the Hangar 6 parcel, respectively, prior to demolition in the 2000s. Both hangars were closed under separate RCRA Partial Closure Reports (Malcolm Pirnie, 2000 and Sebago Technics, 2005). The RCRA Partial Closure Report for Hangar 2 certified closure of the paint booth room only.

Hangar 6, constructed in 2005, consists of a 166,335-square-foot, two-story, steel-truss building on a slab foundation. Hangar 6 was used as an aircraft maintenance hangar for its entire history. Most of the building's interior space consists of the aircraft hangar bays with hangar doors, located on the airfield apron (southern) side. Bordering the hangar bays to the north are workshops for various aircraft maintenance activities. The northernmost portion of Hangar 6, along the parking area side, is comprised of administrative and training areas. A mezzanine level contains the hangar bay heating system (natural gas –fired forced air) and storage space. The office spaces have hot water base board heat supplied by two gas fired boilers located at the west end of the hangar. The second floor, north of the hangar bays, contains administrative offices.

The aircraft hangar bay space is divided into three sections: Hangar 6 West, Hangar 6 East and the transient-line (T-Line) area. Hangar 6 West and East sections are each made up of three aircraft bays and the associated maintenance workshops and administrative and training classroom spaces (Figures 3A and 3B). While in service, Hangar 6 housed three P3 Orion squadrons: Squadron VPU-1 in Hangar 6 East and Squadrons VP-26 and VP-92 in Hangar 6 West. The T-Line area, located at the western end of the hangar, provided flight line and runway support, including operation and maintenance of ground support equipment, arresting gear, and aircraft salvage equipment

The floors of the hangar bays are covered with an epoxy coating system. The hangar bays feature a grated, main floor trench-drain, approximately 1-foot deep and 1-foot wide, running the length of the hangar in line with the edge of the hangar door openings. Three perpendicular, tributary floor-trench-drains are located in both the Hangar 6 West and East sections. The trench-drains serve to collect and remove aircraft wash water and to intercept wind-driven rain that may enter through the hangar doors. In the event of fuel spillage or fire, the trench-drains serve to remove hazardous fuels or fire-suppression system discharges from the hangar floor (see following paragraph). The trench-drain system is connected to two oil-water separators (OWS), located at the north east and north west corners of the hangar, which discharge to the sanitary sewer system (OWS is shown on Figure 2). This sewer system is connected to the Town of Brunswick Sewer District’s municipal wastewater collection system.

The Hangar 6 fire-suppression system features aqueous-film-forming foam (AFFF) dispensed from nozzles located in the floor trenches of the hangar bays. The system is activated by heat sensors located throughout the hangar bays. AFFF is water-based and frequently contains smaller quantities (less than 1 percent) of hydrocarbon-based surfactants, such as sodium alkyl sulfate, fluorosurfactants, ethylene glycol, and urea. AFFF and its constituents are not classified as hazardous waste under RCRA. The 2,500-gallon capacity, aboveground storage tank (AST) containing AFFF is located in the fire protection equipment room (Figure 3A) in the north-central portion of the building.

According to NAS Brunswick personnel, the squadrons carried out aircraft maintenance and minor repairs in Hangar 6, with major repairs performed by the Aircraft Intermediate Maintenance Division (AIMD) in Building 250, which is attached to Hangar 4 (located south of Hangar 6). The table below provides a general description of activities conducted in Hangar 6 that may have generated hazardous waste, and the location associated with each activity as performed in the respective sections of Hangar 6.

Hangar 6 Maintenance Activities

Activity	Description	Hangar 6 Location/Room ⁽¹⁾	
		West	East
Tool Room	Minor grinding/soldering operations	D108 and C111	not applicable
Air Frames	Change parts on the aircraft No major maintenance performed Minor grinding/welding	not applicable	A147
Electrician	Remove and replace parts on aircraft No major repair work performed Minor soldering	B147	A150 and A151
Avionics	Remove and replace parts on aircraft Some soldering performed in the shop	B148	not applicable
Hazardous Materials	Storage of hazardous materials for ready issue Receive hazardous waste for disposal	Alcoves in Hangar 6 West	Alcove in Hangar 6 East
Satellite Accumulation Area	Accumulation of hazardous waste and used oil	On ramp southwest of hangar	On ramp southeast of hangar

⁽¹⁾ Location/room numbers are shown on Figures 3A and 3B.

According to NAS Brunswick Environmental personnel, hazardous materials were signed-out in small quantities (typically less than a week’s supply) from the Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP) building (Building 81), with unused quantities returned to Building 81. Hazardous materials were temporarily stored in lockers in the alcoves of Hangar 6 East and West.

A number of temporary structures are located at the Hangar 6 parcel. These include wooden sheds, concrete sheds, and steel hazardous materials lockers, as listed below and described in the paragraphs that follow:

Hangar 6 Temporary Structures

Satellite Accumulation Area (SAA) - West, located near the southwest corner of Hangar 6:	
Structure BB	Hazardous Waste Storage (wooden shed, 3 feet [ft] by 8 ft by 8 ft)
Structure CC	Hazardous Waste Storage (wooden shed, 3 ft by 8 ft by 8 ft)
SAA - East, located near the southeast corner of Hangar 6:	
Structure Z	Hazardous Waste Storage (wooden shed, 3 ft by 8 ft by 8 ft)
Southwest corner of Hangar 6:	
Structure AA	Smoking area (pre-cast concrete shed, 10 ft by 8 ft by 8 ft)
South-central area of Hangar 6 (former VP-92 SSA):	
Two unnamed flammable materials storage cabinets	
Southern fence line of Hangar 6:	
Structure X	Former Hazardous Waste Storage (pre-cast concrete shed, 10 ft by 8 ft by 8 ft)

Each of the two SAAs contained hazardous waste temporary storage sheds, one assigned to each Hangar 6 tenant squadron. These wooden-construction storage sheds were equipped with a secondary-containment concrete bottom. In addition, a set of double-walled steel ASTs, a 500-gallon waste-oil tank and a 250-gallon, waste mixed-lubricants tank, were positioned at the SAAs for each squadron. VP-26 and VP-92's hazardous waste storage sheds, waste oil and waste lubricant storage tanks were staged at the West SSA while VPU-1's hazardous waste storage shed, waste oil and waste lubricant storage tanks were staged at the East SSA. In addition, a 250-gallon double-walled steel AST for waste oil was located at the 6 West SAA for used by the T-Line area, located in the western portion of Hangar 6.

The sheds at the SSAs were used for temporary storage of accumulated hazardous waste, prior to pick-up by the NAS Brunswick Environmental Department for transport to the Hazardous Waste Building (Building 45). All hazardous waste was then characterized and disposed of at approved off-site facilities. The SAA sheds also typically stored universal waste, including fluorescent light bulbs, spent lithium and nickel-cadmium batteries from the aircraft, paint rags, oily rags, spent sealant, and spent aerosol cans.

A liquid oxygen and nitrogen dispenser station is located in the southeast corner of the Hangar 6 parcel (Figure 2). The dispenser consisted of a 1,000-gallon AST of liquid oxygen, a 1,000-gallon AST of liquid nitrogen, and associated dispenser equipment.

A fire-fighting training area was formerly located to the north of the Hangar 6 parcel parking area. According to the NAS Brunswick Fire Department, a stainless-steel aircraft mock-up contained propane jets that were ignited for fire-fighting training activities. The propane tanks were located north of the Hangar 6 parking lot. The mock aircraft and propane tanks were removed and shipped to another Navy facility. No liquid petroleum fuel was used during fire-fighting training activities. No impact from the fire-fighting training activities occurred at the Hangar 6 parcel.

According to NAS Brunswick personnel, aircraft were fueled by fuel-tanker trucks dispatched from the Old Navy Fuel Farm (ONFF) and later from the Jet Fuel Storage Installation (JFSI) that was constructed in the early 1990s. However, historical drawings indicate that, in the 1940s, underground pipelines conveyed aviation gasoline to fuel-loading pits in the apron near Hangars 2, and 3, as discussed in Section 3.

Photographs taken during the Hangar 6 site visit are provided in an attachment.

3. PROPERTY HISTORY AND RECORDS RESEARCH

The Tetra Tech project team interviewed NAS Brunswick Environmental Department personnel and performed records research at both NAS Brunswick and the MEDEP office in Augusta, Maine to collect available information concerning the Hangar 6 parcel, including past use and operations at that location.

According to NAS Brunswick Environmental Department personnel, since its construction in 2005, the sole use of Hangar 6 has been as an aircraft maintenance hangar. The Environmental Department also reported that hazardous waste generated and stored at Hangar 6 included spent solvents from parts cleaning; waste paint that may have contained lead; lead dust from soldering, welding, and grinding activities; lead-acid batteries; waste oil; and universal waste.

NAS Brunswick has a program in place that tracks hazardous waste to ensure proper handling and disposal. According to NAS Brunswick Hazardous Waste Manager, D. Bruce Smith, hazardous waste generation was tracked by squadron. The Hazardous Waste Department maintains a list of hazardous wastes generated by the squadrons. The list summarizes materials generated by the aircraft maintenance activities conducted in Hangar 6 from 2005 until 2009, when the last squadron left the maintenance space. The table below lists the hazardous waste quantities generated by the VPU-1 and VP-26 squadrons from 2005 to 2009, and the VP-92 squadron from 2005 to 2007, prior to each squadron vacating Hangar 6.

Hangar 6 Hazardous Waste Quantities (2005 through 2009)

Description	Hangar 6 West		Hangar 6 East
	VP-26 (lbs) ⁽¹⁾	VP-92 (lbs) ⁽²⁾	VPU-1(lbs) ⁽³⁾
adhesive	42.60	2.80	18.89
adhesive caulk	-	54.98	1.98
aerosol	206.63	50.88	117.19
aerosol empty	25.27	4.99	20.58
aircraft grease	-	-	1.44
alcohol	-	-	1.08
amyl acetate	-	0.30	-
asbestos (P3 floorboards)	9.96	-	-
ballast PCB	3.70	-	-
battery lithium	85.14	8.79	99.07
battery NI-CAD	15.56	25.62	23.06
battery NI-MH	-	21.72	0.20
cathode ray tubes (CRTs)	-	65.00	721.00
corrosion prevention compound	-	-	3.30
emergency escape breathing devices (EEBD)	59.34	73.00	-
engine wash	2,217.32	1230.00	1604.00
epoxy lab pack	7.46	-	15.02
fuel filters	3.00	-	-
fuel oil spill debris	75.00	-	-
grease	32.36	30.30	17.06
joint compound	0.40	-	-
JP rags	2,920.36	403.00	751.12
lamps, fluorescent	19.92	25.76	41.92
lamps, mercury	-	-	0.36
lead debris (broken monitor from VPU-1)	-	-	710.00
paint	2.12	81.00	3.50
paint, aircraft	71.84	19.47	51.94
paint, latex	83.74	-	1.38
paint rags	166.41	42.62	180.68
paint stripper	-	9.06	4.86
paint, waste	132.14	37.00	144.60
POL rags	170.00	138.00	-
rosin flux	-	-	1.56

Hangar 6 Hazardous Waste Quantities (2005 through 2009) continued

sealant	474.46	27.84	178.46
sem pen ⁽⁴⁾	1.08	1.04	1.10
solvent	0.62	-	4.83
used oil	25,600.00	10800.00	18200.00
wax, floor	3.50	-	-

Notes:

lbs pounds

1 Based on VP-26 Squadron 2005-2009 waste tracking

2 Based on VP-92 Squadron 2005-2007 waste tracking

3 Based on VPU-1 Squadron 2005-2009 waste tracking

4 Paint-pen for aircraft touch-up

According to historic documents, two SAAs were present at the Former Hangars 2 and 3. The SAA at Hangar 2 was located at the northwest exterior, west of former Building 477, and contained a skid-mounted hazardous waste building, a timber shed, and two waste oil ASTs. According to demolition plans, these were removed, and the bollards and curbing were removed and filled with concrete. The SAA at Hangar 3 was located at the southeastern exterior of the hangar. No additional information was available on the Hangar 3 SAA.

According to NAS Brunswick records, the Hangar 6 OWSs, which discharge to the sanitary sewer system, were serviced annually as part of the OWS maintenance program. The servicing of the OWS included removal of accumulated petroleum products and excessive sludge, and proper disposal of all collected petroleum-contaminated water, petroleum products, and sludge. The most recent OWS cleaning event was performed in early June 2010. The waters and sludges removed from the OWSs across the base during the June 2010 cleaning were collectively disposed of as non-hazardous, oil-contaminated liquid and solids (Clean Harbors, 2010).

According to historic documents, OWSs were also present at Former Hangars 2 and 3. Hangar 2 had two 1000-gallon, concrete-chamber OWSs located at the southeastern and western exterior of the hangar; these OWSs discharged to the sanitary sewer system. Hangar 3 had a 315-gallon, concrete-manhole OWS located at the southwestern exterior; a 30-gallon sump was located in the floor, and discharged to the sanitary sewer system. According to NAS Brunswick, the OWS were routinely cleaned and pumped out as described above until the hangars were demolished, Hangar 2 in 2000 and Hangar 3 in 2005. Hangar 2 demolition plans show that its two OWSs were removed and the lines filled with grout. Hangar 3 demolition plans show that its' two OWSs were abandoned in place, filled with sand, and the lines filled with cement. At all OWS locations, manholes were removed and the areas restored to surrounding grade and paved with asphalt.

Records reviewed include: historical aerial photographs; the NAS Brunswick Other Environmental Liabilities (OEL) Database; area-specific reports; facility plans and drawings; and hazardous waste records. Aerial photographs dated 1958, 1978, 1981, 1984, 1989, 1993 and 1997 (Sewall 1958, 1978, 1981, 1984, 1989, 1993 and 1997) were reviewed along with Public Works Department (PWD) site base maps dated 1946, 1952, 1956, 1957, 1975, 1989, 2004, and 2006, to provide historical information (PWD 1946, 1952, 1956, 1957, 1975, 1989, 2004, and 2006).

Based on these records, no buildings were located at the Hangar 6 location prior to the 2006 facility plan. From 1943 until 1989, Hangars 2 and 3 are present within the Hangar 6 parcel, in the southwest and southeast portions, respectively. The concrete airfield apron is shown north of Hangars 2 and 3 and was used for aircraft parking. The 1946 facility plan shows a ball field located between Hangars 2 and 3, in the southern portion of the Hangar 6 parcel. The new runway configuration is first shown in the 1952 facility plan. Both hangars are visible on the 1997 aerial photograph, the latest available.

An engineering drawing dated August 1945 (revision date) shows a gasoline loading system served the former Hangar 2 and Hangar 3 areas and the former Hangar 1 area, as well. The

system consisted of two parallel 4-inch pipelines, reducing to 3-inch diameter, that conveyed 91-octane and 100-octane gasoline from the ONFF along the north side of former Avenue A (now known as Seahawk Avenue) to in-ground fuel pits located east and west of the hangars (PWD, 1943). It is assumed that the fuel pits were used to fill the tanker trucks that fueled aircraft on the parking apron. A second engineering drawing for a Hangar 1 rehabilitation project, dated 1992, shows two abandoned fuel lines in Orion Street (NAVFAC, 1992). No further information regarding the gasoline loading system was found. The date of decommissioning of the system is unknown; it may have occurred in the mid-1960s when the P2 Neptune aircraft, which used aviation gasoline, was replaced by the P3 Orion aircraft, which use jet fuel. No documentation regarding historical releases associated with the system's operation have been found.

The NAS Brunswick Transformer Database lists no electrical transformers for Hangar 6 (PWD, 2010). A transformer is located on the north-central side of Hangar 6, outside of the mechanical room; however, the manufacturer of the unit could not be determined. Since Hangar 6 was constructed in 2005, this transformer is likely to have been recently manufactured, and is therefore unlikely to contain PCBs (as of July 1, 1979, the United States Environmental Protection Agency (EPA) prohibited all manufacturing of new PCB electrical equipment [transformers and capacitors]). Based on these dates and the relatively recent construction of Hangar 6, it is also unlikely that PCB-containing transformers were in service at this Hangar 6 transformer pad at any time in the past (Hangar 6 constructed in 2005).

According to NAS Brunswick records, no USTs were installed at Hangar 6 (Environmental Department, 2009). Also, according to NAS Brunswick records, the following ASTs are present at Hangar 6 (Environmental Department, 2009). Other information relating to these tanks was not found.

Hangar 6 Aboveground Tanks

Serial No.	Capacity and Make	Product	Installation Date	Removal Date
A6.0	125 gallons DWS	Hydraulic Oil (elevator)	2004	Active
A6.1	250 gallons DWS	Waste Oil (VPU-1 east SAA)	2004	Inactive
A6.2	500 gallons DWS	Waste Oil (VPU-1 east SAA)	2004	Inactive
A6.3	500 gallons DWS	Waste Oil (VP-26 west SAA)	2005	Inactive
A6.4	250 gallons DWS	Waste Oil (VP-26 west SAA)	2005	Inactive
A6.5	500 gallons DWS	Waste Oil (VP-92 center SAA)	2005	2009
A6.6	250 gallons DWS	Waste Oil (VP-92 center SAA)	2005	2009
A6.7	250 gallons DWS	Waste Oil (T-Line)	2005	Inactive

DWS double-walled steel

In addition, one 2,500-gallon-capacity AST containing AFFF is located in the mechanical room (Room C122).

According to NAS Brunswick Environmental Department personnel, aircraft maintenance practices performed on the Hangar 6 parking apron area consisted of flushing the aircraft engine gas pathways with a detergent solution to remove carbon deposits, to maintain engine performance. The engine wash operation would be performed at almost any aircraft parking spot on the apron, and reportedly generated between 10 and 20 gallons of wash water per washing operation. Other sources have reported that this maintenance practice for the P3 Orion T56 engine produces cadmium-contaminated wash water, due to leaching from the nickel-cadmium coating on the engine compressor blades. In 1997, NAS Brunswick began the use of catch-carts to contain the wash water; prior to that time, the wash water was allowed to drain to the tarmac.

The Environmental Department reports that collected wash water was transported to Building 45 to be disposed of as hazardous waste, with RCRA code D006 (waste exceeds maximum concentration of cadmium for toxicity characteristic). Available sample results for engine wash water analyzed for toxicity characteristic leaching procedure (TCLP) are provided in the table below. As indicated, the cadmium TCLP limit is exceeded in one of the two samples.

Engine Wash Water Samples - TCLP Analysis Results (mg/L)

Metal	TCLP Limit	6/26/2002	3/9/2007
Arsenic	5.0	<0.2	<0.2
Barium	100	0.14	0.25
Cadmium	1.0	1.9	0.51
Chromium	5.0	<0.05	<0.05
Lead	5.0	<0.05	0.1
Mercury	0.2	<0.05	<0.05
Selenium	1.0	<0.25	<0.25
Silver	5.0	<0.05	<0.05

Notes:

Bold font: exceeds TCLP limit

Source: NAS Brunswick Environmental Department

mg/L milligram per liter

< less than

The table below summarizes estimated total quantities of engine wash water that were collected annually by NAS Brunswick, from 1997 through 2009 (based on NAS Brunswick hazardous waste shipment records). The majority of the NAS Brunswick wash water would have been generated at the Airfield Parking Apron Area; the remainder would have been collected from engine washing conducted at the current Hangar 6 apron area.

NAS Brunswick Engine Wash Water Quantities Collected 1997 through 2009

Year	Estimated Volume (gallons)
1997	1220
1998	1310
1999	970
2000	740
2001	530
2002	560
2003	600
2004	330
2005	390
2006	240
2007	70
2008	60
2009	20

Source: NAS Brunswick Environmental Department

As discussed above, prior to 1997, engine wash water was discharged to the tarmac, resulting in the material being discharged through the airfield stormwater sewer system. Prior to the Hangar 6 construction, the eastern parking apron area drained north to the stormwater sewer system that discharges to the Androscoggin watershed. The western portion drained to the stormwater sewer system that discharges to the Picnic Pond impoundment/retention pond stormwater system located to the east near Building 201.

It is highly unlikely that any residue remains from waste wash water that was discharged to the tarmac during the 1962 to 1997 timeframe. This material would have been carried by precipitation runoff to the stormwater sewer systems, and discharged to the receiving water bodies, which are located outside the Hangar 6 parcel.

A 2002 hydrologic study concluded that the Picnic Pond stormwater treatment pond is capturing contamination within its sediments and providing particulate removal as designed. Also, the

study concluded that while metals concentrations in the sediments are above ecological threshold values, these metals are tightly bound to sediments and are unavailable to aquatic life (Woodard & Curran, 2002).

A review of the MEDEP spill database and the NAS Brunswick spill logbook identified the following reported spill within the Hangar 6 Parcel.

Documented Spills – Hangar 6 Parcel

Location	Date	Material	Quantity (gallons)	MEDEP Notified	Notes
Hangar 3 (Former)	3/15/2003	Potassium Acetate	Unknown	Yes	Material found on runway and cleaned up by NASB personnel

Source: MEDEP Spills Database

No groundwater investigations have been conducted in the vicinity of the Hangar 6 parcel; therefore, groundwater characterization information for the parcel is not available. Information available for known groundwater contamination areas at NAS Brunswick was reviewed to determine if groundwater underlying the Hangar 6 parcel could potentially be impacted by another (off-parcel) source area.

According to available site information, no groundwater investigations have been conducted in at the Hangar 6 parcel; therefore, groundwater characterization information for the parcel is not available. Information for known, nearby groundwater contamination areas was reviewed to determine if groundwater underlying the Hangar 6 parcel could potentially be impacted by another (off-parcel) source area. The only identified groundwater contamination in the vicinity of the Hangar 6 parcel is the dissolved phase hydrocarbon plume associated with the Old Navy Fuel Farm (ONFF) and pesticides and hydrocarbons detected in Site 17 (Former Building 95 Pesticide Storage Facility) groundwater. Recent ONFF groundwater monitoring program results indicate that groundwater flows to the southeast from the ONFF across Fitch Avenue (ESI, 2009) and away from the Hangar 6 parcel. Similarly the investigation at Site 17 indicated that groundwater flow is southeast and away from the Hangar 6 parcel. Based upon the available groundwater monitoring program information, it is unlikely that groundwater at Hangar 6 is impacted by either the ONFF or the Site 17 groundwater impacts.

4. SITE VISIT AND INVESTIGATION

Hangar 6 site visits were conducted on June 30, 2009 and January 22, 2010 by Tetra Tech personnel, Mr. Brandon Smith, P.E. and Mr. James Forrelli, P.E. The purpose of these visits was to verify information gathered during the records search and to collect additional information as necessary to prepare this RCRA Partial Closure Report. Tetra Tech personnel were accompanied by Mr. D. Bruce Smith, the NAS Brunswick Hazardous Waste Manager. The Hangar 6 parcel was visually inspected for signs of hazardous waste generation or storage. Site visit observations, recorded on the attached Building Inspection Form ⁽¹⁾ are summarized below:

- At the time of inspection, Hangar 6 was not occupied and in excellent condition. Office furniture, workbenches, and storage lockers were present in the workshops and administrative/classroom spaces.
- Evidence of potential past hazardous waste generation activities was observed. A summary of potential hazardous waste areas identified during the building inspection is provided in Table A of the attached Building Inspection Form.
- The floor trench-drains were visibly clean; a small amount of solids or sediment was present in the trenches.
- No evidence of hazardous waste residues was observed.
- Petroleum staining and distressed vegetation were observed on the western side of the Hangar 6 SAA-West. Structural modifications that could conceal signs of a past release were not observed.

- Hazardous waste was temporarily stored at the interior hazardous waste accumulation areas located in the alcoves in Hangar 6 East and West. This was temporary storage, prior to the waste being moved to the two exterior SAAs located on the concrete airfield apron at the southeast corner (SAA-East) and southwest corner (SAA-West) of Hangar 6. The SAAs each included hazardous waste storage lockers and two waste oil ASTs. The SAAs are used as accumulation points for hazardous waste prior to its being transported to Building 45 for off-site disposal at an approved facility.
- No visual staining, cracking, spalling, or discoloration of the concrete was noted at the SAAs. The expansion joints appeared in good condition. The vegetation adjacent to the Hangar 6 SAA-West showed signs of distress on the western side of the SAA concrete pad. Vegetated areas north of the Hangar 6 SAA-East did not show signs of distress.

The available information regarding the historical activities that occurred at the parcel and the location of known NAS Brunswick groundwater contamination areas indicate that there is no evidence to suggest that groundwater underlying the Hangar 6 parcel has been adversely impacted by a release, either from within the parcel or from another (off-parcel) source area.

Based on the records research and site visit observations, specific areas within the Hangar 6 parcel were identified for investigation to determine if hazardous waste residues are present. Samples were collected in two sampling events, summarized below, and discussed in the following text.

Hangar 6 Sampling Events

Date	Description	Analytes
February 22 and 24, 2010	Work Area Wipe Sampling: 22 wipe samples collected from six areas in Hangar 6 East, and six areas in Hangar 6 West	RCRA 8 metals SVOCs (select locations)
	Trench-Drainage System - Solids Sampling – Event 1: Six solids (sediment) samples collected from Hangar 6 East and West trench-drainage systems	RCRA 8 metals
	West SAA Soil Sampling – Event 1: Six soil samples collected from 3 locations at West SAA	RCRA 8 Metals SVOCs
May 5, 2010	Trench-Drainage System - Solids Sampling – Event 2: Two six-point composite solids (sediment) samples collected: one from Hangar 6 East and one from Hangar 6 West trench-drainage systems	TCLP
	East SAA Soil Sampling: Four soil samples collected from two locations at East SAA West SAA Soil Sampling – Event 2: Ten soil samples collected from 5 locations at West SAA	TAL Metals SVOCs VOCs (surficial soil samples, 0- to 2-foot depth interval)

Notes:
 SVOCs –Semi-volatile organic compounds
 VOCs – Volatile organic compounds
 TAL – Target Analyte List
 SAA – Satellite Accumulation Area

All samples were submitted for analysis by Tetra Tech’s subcontracted analytical laboratory, Analytics Environmental Laboratory (Analytics), Portsmouth, New Hampshire. The resulting analytical data underwent limited data validation, consisting of field duplicate evaluation, blank contamination evaluation, and completeness evaluation.

Work Area Wipe Sampling

Twelve areas where hazardous waste may have been generated or stored were targeted for sample collection: six areas in Hangar 6 West; and six areas in Hangar 6 East. These areas included the airframes and avionic electronics (AE) shops; the hazardous material storage areas (in event of a spill); and the floor trenches. On February 22 and 24, 2010, wipe, sediment, and

soil samples were collected at the targeted areas, as shown on Figures 3A and 3B. Hangar 6 sampling activities consisted of collecting wipe samples from specific work rooms and areas. Fourteen wipe samples were collected from the western bay (rooms D108, C111, B147, B144, B148, and two hazardous material storage alcoves) for RCRA 8 Metals analysis, while eight wipe samples were collected from the eastern bay (rooms A147, A150, A151, and one hazardous material storage alcove) for RCRA 8 Metals analysis. Samples from selected locations were also analyzed for SVOCs. Hangar 6 wipe sample analytical results are presented in Table 1.

The wipe sample lead results were compared to the following MEDEP criteria for lead-contaminated settled dust, applicable for RCRA closures:

Floors: 40 micrograms per square foot ($\mu\text{g}/\text{ft}^2$)
 Walls and other flat surfaces up to a height of 8 feet: 250 $\mu\text{g}/\text{ft}^2$
 Surfaces above 8 feet: visibly clean (dust-free)

There are no Maine criteria for the other seven RCRA metals. For informational purposes, wipe sample results for the other seven metals were compared with available World Trade Center Settled Dust Screening Values (WTC, 2003).

Lead levels in floor wipe samples were found to exceed the MEDEP criterion ($40 \mu\text{g}/\text{ft}^2$) at the following locations:

Hangar 6 West

Hazardous materials storage area, in front of Room C110 (floor)	The lead level in one of two samples, $46 \mu\text{g}/\text{ft}^2$ in sample B6W-WP05, exceeds the criterion
Hazardous materials storage area, in front of Room B140 (floor)	The lead level in one of two samples, $44 \mu\text{g}/\text{ft}^2$ in sample B6W-WP09, exceeds the criterion

Based on these analytical results, it was concluded that floor-cleaning at the hazardous materials storage areas in front of Rooms C110 and B140 was required to remove surface residue with lead at levels exceeding the MEDEP floor criterion ($40 \mu\text{g}/\text{ft}^2$). In addition, as shown in Table 1, cadmium and chromium levels in wipe samples collected from the surface of a work bench in Room D108 exceed the World Trade Center Settled Dust Screening Values, indicating cleaning or removal and disposal of the bench is required for closure.

Trench-Drainage System - Solids Sampling

Event 1: On February 24, 2010, six solids (sediment) samples were collected from the Hangar 6 interior trench-drainage system, for RCRA 8 metals analysis. Sample results were compared to twenty times the TCLP limits to determine if the residual sediment in the trench is potentially a RCRA hazardous waste, based on toxicity characteristics. As shown in Table 2, analytical results for these solids samples collected from both Hangar 6 East and Hangar 6 West trenches exceed twenty times the TCLP limits for barium, cadmium, and lead. Since some results exceeded the twenty times TCLP limits, additional samples were collected for actual TCLP analysis, as follows.

Event 2: On May 5, 2010, two six-point composite solids (sediment) samples were collected for TCLP metals analysis: one sample from the Hangar 6 East trench-drainage system and one from the Hangar 6 West trench-drainage system. As shown in Table 2, metals levels in the leachate from each sample are below TCLP limits.

SAA Soil Sampling

Soil samples were collected from the unpaved, grass-covered areas adjacent to both SAAs (east and west). Analytical results for the soil samples were compared to the MEDEP 2010 Outdoor Commercial Worker Remedial Action Guidelines (RAGs), as the Hangar 6 parcel is an industrial

area and will remain so in the future. Analytical results are summarized in Table 3. The sampling and results are discussed below.

East SAA - Soil Samples and Results

On May 5, 2010, a total of four soil samples were collected from two locations at the Hangar 6 East SAA. Two samples (and a field duplicate) were collected from 0- to 2-feet bgs and submitted for VOCs, SVOCs, and TAL metals analysis. Two soil samples were collected from 2- to 6-feet bgs and submitted for SVOCs and TAL metals analysis. VOCs were not detected in any of these soil samples, and all detected metals were at levels below the MEDEP Outdoor Commercial Worker RAGs. The polycyclic aromatic hydrocarbon (PAH), benzo(a)pyrene, was detected at 7,850 µg/kg in one of the duplicate soil samples collected at location B6E-SB02-0024, exceeding the Outdoor Commercial Worker RAG of 3,500 µg/kg. The benzo(a)pyrene concentration reported in the paired sample of this duplicate is 232 µg/kg. The average benzo(a)pyrene concentration in surficial soil (0 to 2 feet bgs) samples at the Hangar 6 East SAA is 3,097 µg/kg which is below the Outdoor Commercial Worker RAG.

PAHs in surficial soils are not unexpected, based on the long-term previous use of this area: the concrete airfield apron to the south of Hangar 6 was used to park aircraft and to perform aircraft engine checks and testing for the P3 Orion aircraft. The apron area has been part of the airfield operations since NAS Brunswick opened in 1946. PAHs are the byproduct of incomplete combustion, including the incomplete combustion of fuel. Due to the aircraft engine operations on the apron area through 2009, the presence of PAHs in the surficial soils surrounding the SAAs is likely due to the deposition of dry, airborne particulates containing PAHs, resulting from the engine exhaust.

According to the EPA, PAH formation in a jet turbine engine occurs in the primary and secondary combustion zones. In the primary combustion zone, incompletely combusted fuel droplets lead to the formation of particulate matter which consists primarily of carbon particles. At the exit of the combustion chamber in the engine, particles remain in the turbine exhaust. PAH compounds are bound to these particles (EPA, 1998).

The University of Massachusetts - Lowell conducted a study of atmospheric deposition of PAHs near New England coastal waters at two sites in Nahant, Massachusetts and Wolf Neck, Maine (Golomb, 2001). The study concluded that the largest contribution of dry PAH deposition at both sites appears to be due to jet exhaust. Logan International Airport, the seventh busiest airport in the United States, is 12 kilometers from Nahant, along the prevailing southwesterly winds. Wolf Neck is 28 kilometers northeast of Portland International Airport and 15 kilometers from NAS Brunswick. The study concluded that between 32 and 35 percent of dry PAH particle deposition at the two sites was due to jet exhaust (Golomb, 2001).

West SAA - Soil Samples and Results

On February 24, 2010, six soil samples (and a field duplicate) were collected from three locations around the hazardous waste SAA located west of the hangar. At each location, samples were collected from 0- to 6-inches bgs and from 6- to 12-inches bgs. (Soil borings could not be advanced below 12 inches due to frozen ground conditions.) Samples were analyzed for RCRA 8 Metals and SVOCs. A petroleum odor was noted at locations SB01 and SB02.

Based on the results of the February 2010 soil samples and based on discussions with MEDEP, additional samples were collected. On May 5, 2010, ten soil samples (and a field duplicate) were collected from five additional locations at the Hangar 6 West SAA. At each location, samples were collected from 0- to 2-feet bgs and from 2- to 6-feet bgs. Samples were submitted for analysis of VOCs (0- to 2-feet bgs interval only), SVOCs, and metals.

VOCs were not detected in any of the soil samples and all detected SVOCs were below the MEDEP Outdoor Commercial Worker RAGs.

In three of the samples collected from the Hangar 6 West SAA (SB01-0612, SB04-0024, and SB08-0024), arsenic was detected at concentrations ranging from 27 to 34 mg/kg, exceeding the MEDEP Background Soil RAG for arsenic of 9 mg/kg. In nine of the soil samples, arsenic exceeded the MEDEP Outdoor Commercial Worker RAG of 4.2 mg/kg, this criterion equaling nearly one-half the MEDEP background concentration for arsenic. According to the Maine RAGs for Soil Contaminated with Hazardous Substances, if arsenic is identified in on-site soil at levels above the RAG, a determination is to be made as to whether the arsenic was released by site-related activities or whether it is naturally-occurring, or both. Arsenic introduced through site-related activities must be reduced to the greater of the RAG or background concentration, which would be the background concentration of 9 mg/kg arsenic (MEDEP, 2010). The exceedances of the MEDEP background concentration for arsenic are attributed to anthropogenic sources resulting from the Navy's past use of arsenical herbicides, pesticides, and rodenticides. Therefore, no further action is recommended for either the Hangar 6 East or Hangar 6 West SAAs.

5. HAZARDOUS WASTE GENERATION AND STORAGE

The records research, site visit observations, NAS Brunswick Environmental Department personnel interviews, and investigation results document that hazardous waste was generated and stored at the Hangar 6 parcel while the hangar was in service. As discussed in Section 3.0, NAS Brunswick tracks hazardous waste to ensure proper handling and disposal. According to NAS Brunswick personnel, hazardous waste stored or generated at Hangar 6 included solvents from parts cleaning; waste paint that may have contained lead; lead dust from soldering, welding, and grinding activities; lead-acid batteries; waste oil; and universal waste. In addition, hazardous waste was generated on the parking apron by aircraft engine washing activities.

6. CLOSURE ACTIONS

Based on the investigation results, closure remedial actions were undertaken at Hangar 6 to remove waste residues as required to achieve MEDEP hazardous waste closure requirements. Closure actions consisted of the cleaning of floors in two areas:

Hangar 6 West

- Hazardous materials storage area (in front of Room B140)
- Hazardous materials storage area (in front of Room C110)

Prior to implementing the waste residue removal actions, a series of housekeeping actions was performed to prepare the buildings for layaway. This phase of work also included cleaning the floor trenches as well as removal of trash and debris. Based on wipe sample exceedances of cadmium and chromium, the work bench in Room D108 was removed and disposed of by NAS Brunswick prior to cleaning activities.

Tetra Tech's cleaning subcontractor, Global Remediation Services (Global), performed floor-cleaning activities in the Hangar 6 hazardous materials storage areas on July 21, 2010. Prior to cleaning, floor openings were covered and sealed with polyethylene sheeting. The floor was then manually swept and then vacuumed with a HEPA vacuum. After sweeping and vacuuming, floors were sprayed with a 2-percent, lead-specific detergent solution, scrubbed, and pressure-washed using a 5,000-pounds-per-square-inch (psi) steam-cleaner. All cleaning wastewater was containerized using a wet-vacuum, placed in 55-gallon drums, and transferred to the NAS Brunswick hazardous waste department for disposal. Upon completion, the Tetra Tech field representative performed a visual inspection of the cleaned area.

After the work areas were allowed to dry, four post-cleaning confirmatory wipe samples were collected for lead analysis (Figure 4). As presented in Table 4, the analytical results indicate lead was not detected in any of the post-cleaning wipe samples at concentrations exceeding 40 µg/ft², the MEDEP criterion for lead-contaminated settled dust on floors.

7. OTHER ENVIRONMENTAL CONSIDERATIONS

USTs or ASTs known to be associated with Hangar 6 are discussed in Sections 3 and 4. No other tanks were observed in the immediate vicinity of Hangar 6, other than those discussed in Sections 3 and 4.

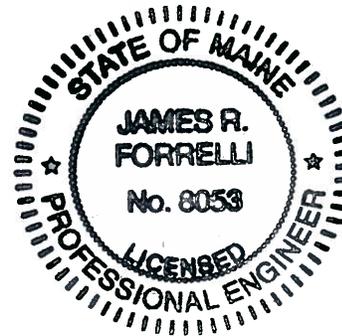
8. LIMITATIONS

This investigation of the hazardous waste closure requirement applies to the Hangar 6 parcel (as shown on Figure 2) only.

8. CERTIFICATION

Historical operations resulted in the generation, accumulation, and storage of hazardous waste at the Hangar 6 parcel, NAS Brunswick, Maine. Based on the findings of the investigation as presented in this Partial Closure Report, the hazardous waste closure of the Hangar 6 parcel was completed in accordance with the provisions of MEDEP Regulations Chapter 851, Standards for Generators of Hazardous Waste, Section 11.


James Forrelli, P.E.
Senior Project Engineer
Tetra Tech NUS, Inc.



⁽¹⁾ The Building Inspection Form provides preliminary information collected during the building inspection, including information from visual observations, Navy personnel interviews, and from documents reviewed during file reviews. It does not reflect any additional information provided at a later date that further clarifies or corrects preliminary information collected during the building inspection and file reviews.

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**TABLE 1
INVESTIGATION WIPE SAMPLE RESULTS
RCRA PARTIAL CLOSURE REPORT
HANGAR 6 – AIRCRAFT MAINTENANCE HANGAR PARCEL
NAVAL AIR STATION BRUNSWICK, MAINE**

SAMPLE ID ⁽¹⁾				B6E-WP01	B6E-WP02	B6E-WP03	B6E-WP04	B6E-WP05	B6E-WP06	B6E-WP07	B6E-WP08	B6W-WP01	B6W-WP02	B6W-WP03	B6W-WP04	B6W-WP05	B6W-WP06	B6W-WP07	B6W-WP08	B6W-WP09	B6W-WP10	B6W-WP11	B6W-WP12	B6W-WP13	B6W-WP14		
DATE				02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10		
LOCATION				Hangar 6 East Hazmat Storage Area (Room A141) - Floor		Room A147-Fume Hood	Room A147-Floor	Room A150-Floor	Room A150-Wall	Room A151 - Floor			Room D108 - Floor	Room D108-Bench	Room C111 - Floor		Hangar 6 West Hazmat Storage Area (Room C110) - Floor		Room 147 - Floor		Hangar 6 East Hazmat Storage Area (Room B140) - Floor		Room B144 - Floor		Room B148 - Floor		
METALS (µg/ft ²)	CRITERIA																										
	WTC	MEDEP wall	MEDEP floor																								
arsenic	36	--	--	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	6.4	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
barium	10000	--	--	38	33	44	130	26	9.3 U	24	17	190	270	50	31	140	75	44	19	600	84	13	190	44	27		
cadmium	140	--	--	4.5 J	3.4 J	3.7 J	24 J	5.6 J	4.7 J	2.3 J	2.8 J	120 J	360 J	6.9 J	6.3 J	69 J	14 J	30 J	2.6 J	42 J	10 J	2.9 J	88 J	11 J	6.7 J		
chromium	440	--	--	9.3 UJ	9.3 UJ	62 J	42 J	9.3 UJ	9.3 UJ	9.3 UJ	9.3 UJ	17 J	1300 J	9.3 UJ	10 J	220 J	19 J	10 J	9.3 UJ	44 J	28 J	9.3 UJ	44 J	9.3 J	9.3 UJ		
lead	--	250	40	5.8	4.3	3.7 U	6.4	6.7	3.7 U	5.3	7.3	19	140	14	8.9	46	18	7	3.7 U	44	19	3.7 U	37	13	4.2		
mercury	15	--	--	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.58	0.093 U	0.093 U	0.093 U	0.093 U	
selenium	--	--	--	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	22	19	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U		
silver	730	--	--	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	4.8	1.9 U	1.9 U	
SEMIVOLATILES (µg/ft ²)																											
bis(2-ethylhexyl)phthalate	--	--	--	46 U	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30	54	27	32	88	23	NA	NA	300	120	
butyl benzyl phthalate	--	--	--	2700	47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	28	51	20	50	120	32	NA	NA	180	64	
di-n-butyl phthalate	--	--	--	46 U	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21	37	9.3 U	9.3 U	9.3 U	9.3 U	NA	NA	9.3 U	9.3 U	
di-n-octyl phthalate	--	--	--	46 U	9.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	9.3 U	NA	NA	33	9.3 U	

Notes:
 (1) Sample prefix "NASB" is not shown.
 Wipe sample surface area: 10 cm by 10 cm
 WTC Source: Table A-3 Settled Dust Screening Values and Supporting Toxicity Criteria from World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks, May 2003
 µg/ft² micrograms per square foot
 -- no criteria available
 J estimated
 NA not applicable
 U not detected (with associated detection limit)
 shading indicates criteria exceeded

**TABLE 2
INVESTIGATION TRENCH SEDIMENT SAMPLE RESULTS
RCRA PARTIAL CLOSURE REPORT
HANGAR 6 – AIRCRAFT MAINTENANCE HANGAR PARCEL
NAVAL AIR STATION BRUNSWICK, MAINE**

TOTAL METALS ANALYSIS

SAMPLE ID ⁽¹⁾			B6E-SD01	B6E-SD02	B6E-SD03	SD-DUP01-022210	B6W-SD01	B6W-SD02	B6W-SD03
DATE			02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10	02/22/10
LOCATION			Hangar 6 East Bay 3	Hangar 6 East Bay 2	Hangar 6 East Bay 1	Hangar 6 East Bay 1	Hangar 6 West Bay 6	Hangar 6 West Bay 5	Hangar 6 West Bay 4
MATRIX			Floor Trench Solids						
	CRITERIA								
METALS (mg/kg)	TCLP Limit (mg/L)	20x TCLP Limit (mg/kg)							
arsenic	5	100	2.8	4.4	3.5	4.2	6.2	4.7	6.2
barium	100	2000	15000 J	7600 J	4600 J	5500 J	920 J	240 J	530 J
cadmium	1	20	110 J	30 J	20 J	140 J	32 J	55 J	45 J
chromium	5	100	73	110	62	100	170	130	65
lead	5	100	170 J	88 J	120 J	49 J	80 J	47 J	61 J
mercury	0.2	4	0.026	0.018	0.018 J	0.043	0.081	0.075	0.10
selenium	1	20	0.49 U	0.47 U	0.50 U	0.45 U	0.50 U	0.66 U	0.72 U
silver	5	100	15 J	3.5 J	0.55 J	2.3 J	1.1 J	4.5 J	4.7 J

TCLP ANALYSIS

SAMPLE ID ⁽¹⁾		B6E-SD04	B6W-SD04
DATE		05/05/10	05/05/10
LOCATION		Hangar 6 East	Hangar 6 West
MATRIX		Floor Trench Solids Composite	Floor Trench Solids Composite
METALS (mg/L)	CRITERIA TCLP Limit (mg/L)		
arsenic	5	0.2 U	0.2 U
barium	100	1 U	1 U
cadmium	1	0.48	0.39
chromium	5	0.2 U	0.2 U
lead	5	0.2 U	0.2 U
mercury	0.2	0.02 U	0.02 U
selenium	1	0.5 U	0.5 U
silver	5	0.1 U	0.1 U

Notes:
 (1) Sample prefix "NASB" is not shown.
 mg/kg milligram per kilogram
 mg/L milligram per liter
 J estimated
 U not detected (with associated detection limit)
 shading indicates criteria exceeded

**TABLE 3
INVESTIGATION SATELLITE ACCUMULATION AREA SOIL SAMPLE RESULTS
RCRA PARTIAL CLOSURE REPORT
HANGAR 6 – AIRCRAFT MAINTENANCE HANGAR PARCEL
NAVAL AIR STATION BRUNSWICK, MAINE
PAGE 1 OF 2**

SAMPLE ID ⁽¹⁾	B6E-SB01-0024	B6E-SB01-2472	B6E-SB02-0024	DUP02	B6E-SB02-2472	B6W-SB01-0006	DUP01	B6W-SB01-0612	B6W-SB02-0006	B6W-SB02-0612	B6W-SB03-0006	B6W-SB03-0612	B6W-SB04-0024	B6W-SB04-2472	B6W-SB05-0024	B6W-SB05-2472	B6W-SB06-0024	B6W-SB06-2472	B6W-SB07-0024	DUP01		
DATE	05/05/10	05/05/10	05/05/10	05/05/10	05/05/10	02/24/10	02/24/10	02/24/10	02/24/10	02/24/10	02/24/10	02/24/10	05/05/10	05/05/10	05/05/10	05/05/10	05/05/10	05/05/10	05/05/10	05/05/10		
LOCATION	Soil	Soil	Soil - DUP	Soil - DUP	Soil	Soil - DUP	Soil - DUP	Soil	Soil - DUP	Soil - DUP												
INTERVAL (feet bgs)	0-2	2-6	0-2	0-2	2-6	0-0.5	0-0.5	0.5-1.0	0-0.5	0.5-1.0	0-0.5	0.5-1.0	0-2	2-6	0-2	2-6	0-2	2-6	0-2	0-2		
METALS (MG/KG)	Criteria		East SAA								West SAA											
	MEDEP 2010 RAGs (Appendix 3) ¹	MEDEP Outdoor Commercial Worker ²																				
arsenic	9	4.2	3.8	2	3	1.9	1.8	4.3	4.8	33	6.2	5.9	6.5	3.1	27	3.5	2.6	2.7	3.3	2.3	6	5.7
barium	6800	340000	26	27	580	57	13	30	32	210	130	54	42	24	190	14	17	15	13	13	43	29
cadmium	2.1	94	0.29	0.071 J	0.6	0.3	0.052 J	0.13 U	0.11 UJ	0.09 UJ	0.081 UJ	0.084 UJ	0.12 U	0.088 UJ	0.064 J	0.033 J	0.094 J	0.063 J	0.056 J	0.065 J	0.12	0.099 J
chromium	100	5100	14	12	19	14	8.7	39	47	180	43	36	26	88	63	9.3	10	11	9.5	10	29	19
lead	170	1100	23	7.8	19	11	8.7	8.4	9.3	5.1	6.2	4.8	20	5.8	3.8	4.4	8.4	5.3	4.2	4.4	11	9.5
mercury	--		0.0073 U	0.015 J	0.0082 U	0.017 J	0.042	0.03 J	0.037	0.022	0.023	0.019 J	0.034	0.027	0.0081 J	0.011 J	0.015 J	0.012 J	0.0077 U	0.016 J	0.018 J	0.02 J
selenium	68	3400	0.53 U	0.55 U	0.52 U	0.51 U	0.6 U	0.62 U	0.58 U	0.54 U	0.53 U	0.50 U	0.48 U	0.53 U	0.48 U	0.53 U	0.52 U	0.55 U	0.54 U	0.55 U	0.52 U	0.53 U
silver	170	8500	0.11 U	0.11 U	0.13 J	0.1 U	0.12 U	0.12 U	0.12 U	0.11 U	0.11 U	0.10 U	0.11 J	0.11 U	0.097 U	0.11 U	0.1 U	0.11 U	0.11 U	0.11 U	0.1 U	0.11 U
VOLATILES (µg/kg)																						
			ND	NS	ND	ND	NS	NS	NS	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	NS	ND	ND
SEMIVOLATILES (µg/kg)																						
benzo(a)anthracene	260	35000	853	296 U	179 J	7340	309 U	267 U	267 U	267 U	270 J	1940	1560	1690	278 U	284 U	309	288 U	279 U	309 U	632	3180
benzo(a)pyrene	26	3500	1210	296 U	232 J	7850	309 U	163 J	267 U	267 U	312	1800	1610	1540	278 U	284 U	595	149 J	160 J	309 U	685	2860
benzo(b)fluoranthene	260	35000	2280	296 U	376	12000	309 U	244	355	267 U	392	2430	2460	2120	184 J	153 J	753	201 J	238 J	309 U	1110	4140
dibenzo(a,h)anthracene	26	3500	279 U	296 U	273 U	1210	309 U	267 U	267 U	267 U	267 U	206 J	267 U	164 J	278 U	284 U	284 U	288 U	279 U	309 U	274 U	215 J

Notes:
(1) Sample prefix "NASB" is not shown.
mg/kg milligram per kilogram
mg/L milligram per liter
J estimated
U not detected (with associated detection limit)
bgs below ground surface
NS not sampled
ND not detected
shading indicates criteria exceeded

**TABLE 3
INVESTIGATION SATELLITE ACCUMULATION AREA SOIL SAMPLE RESULTS
RCRA PARTIAL CLOSURE REPORT
HANGAR 6 – AIRCRAFT MAINTENANCE HANGAR PARCEL
NAVAL AIR STATION BRUNSWICK, MAINE
PAGE 2 OF 2**

SAMPLE ID ⁽¹⁾			B6W-SB07-2472	B6W-SB08-0024	B6W-SB08-2472
DATE			05/05/10	05/05/10	05/05/10
LOCATION			Soil	Soil	Soil
INTERVAL (feet bgs)			2-6	0-2	2-6
Criteria					
METALS (MG/KG)	MEDEP 2010 RAGs (Appendix 3) (mg/kg) ¹	MEDEP Outdoor Commercial Worker (mg/kg) ²			
arsenic	9	4.2	2.8	34	4.4
barium	6800	340000	17	98	25
cadmium	2.1	94	0.044 J	0.039 J	0.049 J
chromium	100	5100	15	87	21
lead	170	1100	5.7	4.3	4.1
mercury	--		0.02	0.0087 U	0.013 J
selenium	68	3400	0.54 U	0.51 U	0.54 U
silver	170	8500	0.11 U	0.1 U	0.11 U
VOLATILES (µg/kg)					
			NS	ND	NS
SEMIVOLATILES (µg/kg)					
benzo(a)anthracene	260	35000	289 U	264 U	270 J
benzo(a)pyrene	26	3500	289 U	264 U	269 J
benzo(b)fluoranthene	260	35000	289 U	264 U	435
dibenzo(a,h)anthracene	26	3500	289 U	264 U	291 U

Notes:
 (1) Sample prefix "NASB" is not shown.
 mg/kg milligram per kilogram
 mg/L milligram per liter
 J estimated
 U not detected (with associated detection limit)
 bgs below ground surface
 NS not sampled
 ND not detected

**TABLE 4
POST-CLEANING FLOOR WIPE SAMPLE RESULTS
RCRA PARTIAL CLOSURE REPORT
HANGAR 5 – AIRCRAFT MAINTENANCE HANGAR PARCEL
NAVAL AIR STATION BRUNSWICK, MAINE**

Location	Sample ID ⁽¹⁾	Sample Date	Lead ($\mu\text{g}/\text{ft}^2$)
<u>Hangar 6 West</u>			
Hangar hazardous materials storage area (in front of Room B140)	B6W-WP15	7/21/10	1.8 J
	B6W-WP16	7/21/10	2.9 J
Hangar hazardous materials storage area (in front of Room C110)	B6W-WP17	7/22/10	4.0 J
	B6W-WP18	7/22/10	4.8

Notes:

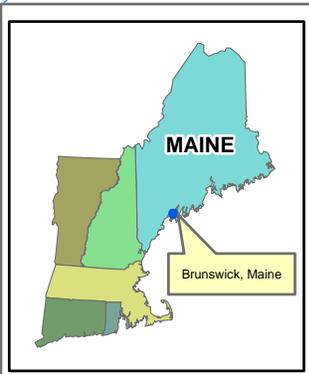
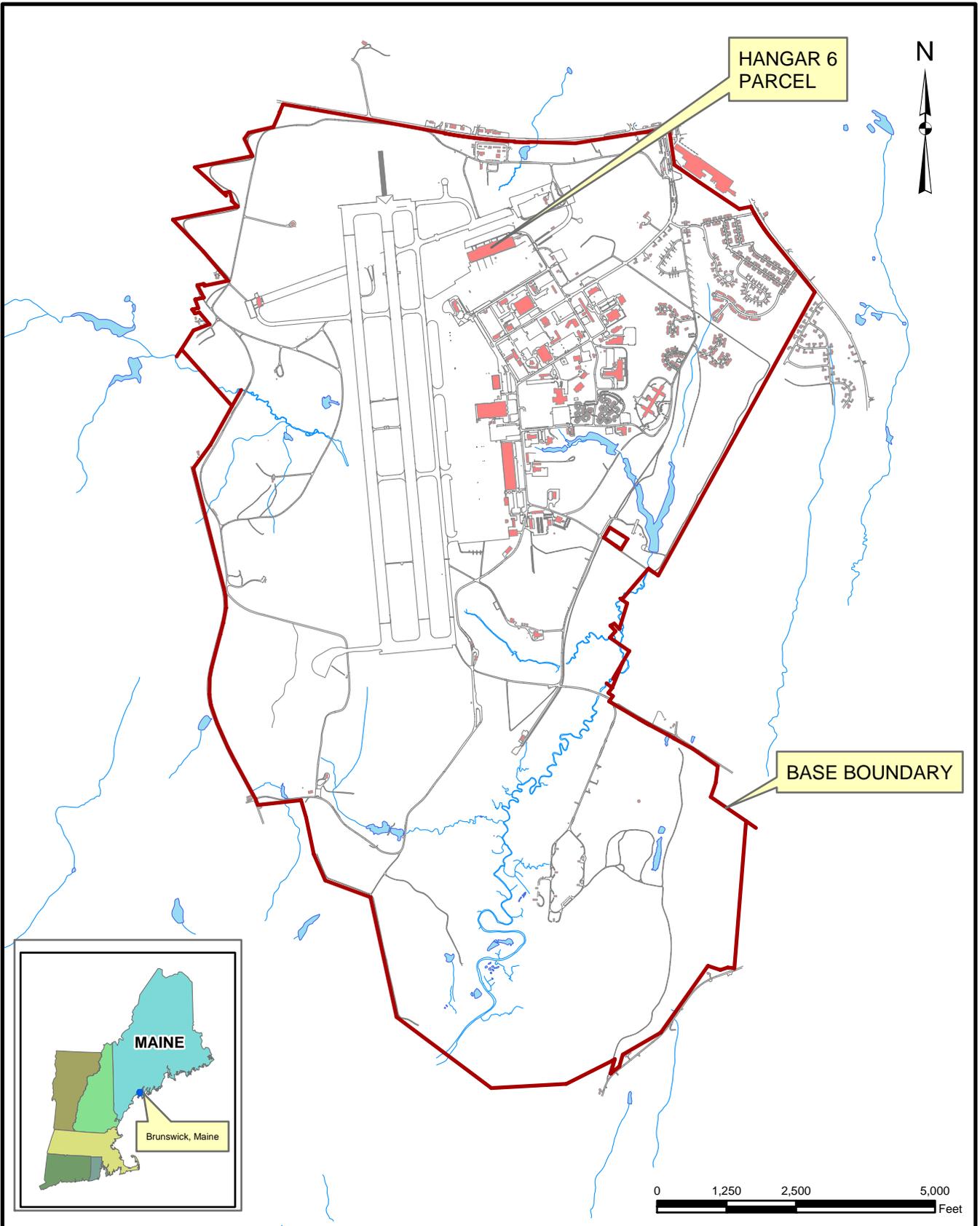
⁽¹⁾ Sample prefix "NASB" is not shown.

Wipe sample surface area: 10 cm by 10 cm

MEDEP criterion for lead-contaminated settled dust on floors applicable for RCRA closures is 40 $\mu\text{g}/\text{ft}^2$

J estimated result

$\mu\text{g}/\text{ft}^2$ micrograms per square foot



Tetra Tech NUS, Inc.

SITE LOCATION MAP
HANGAR 6 PARCEL
RCRA PARTIAL CLOSURE REPORT
NAS BRUNSWICK, MAINE

SCALE
AS NOTED

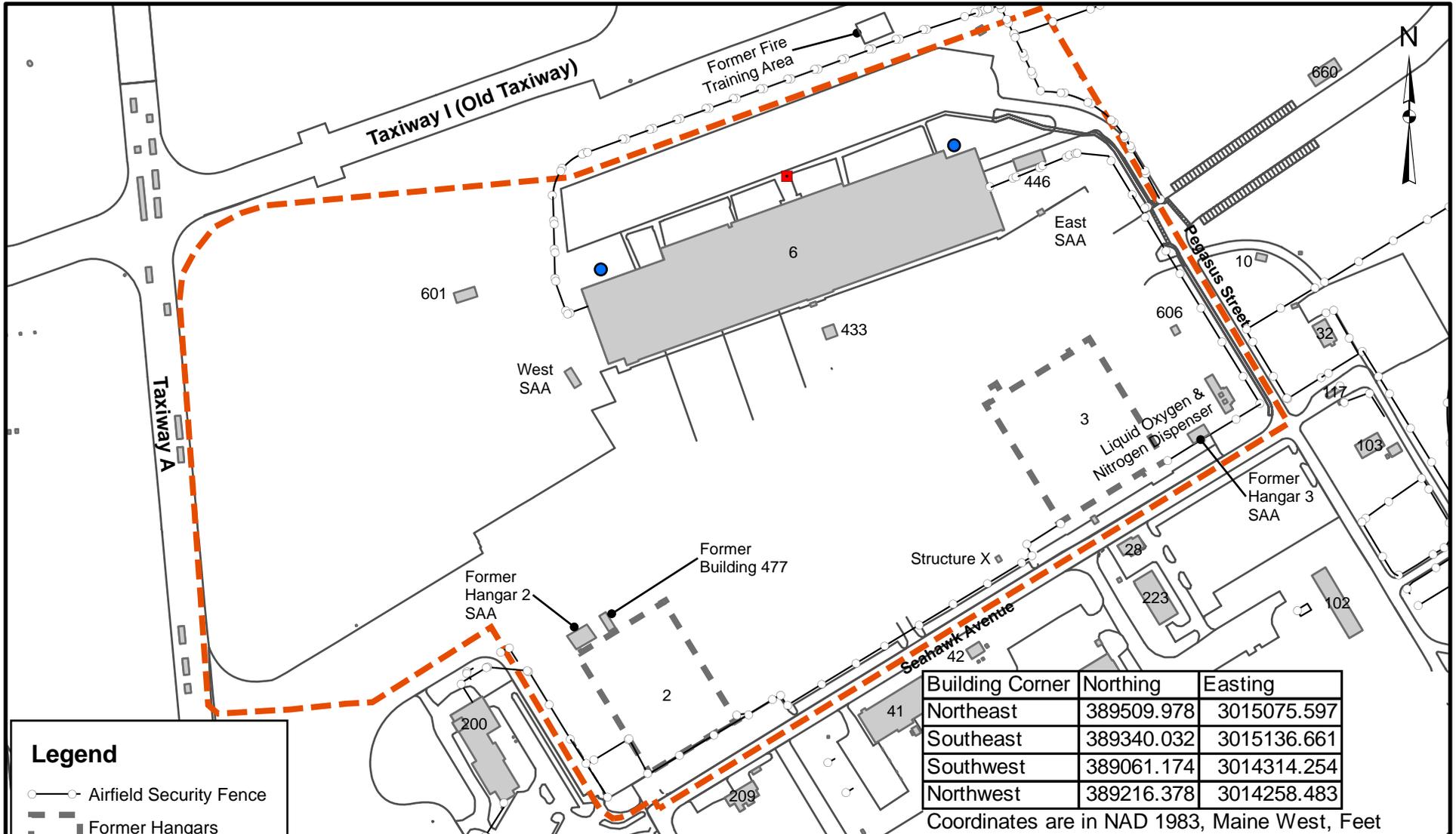
FILE

I:_NASB_H6_LOCUS.MXD

REV	DATE
0	07/16/10

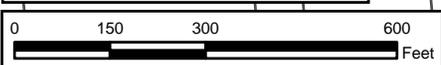
FIGURE NUMBER

1



Legend

- Airfield Security Fence
- Former Hangars
- Parcel Boundary
- Transformer
- Oil-Water Separator



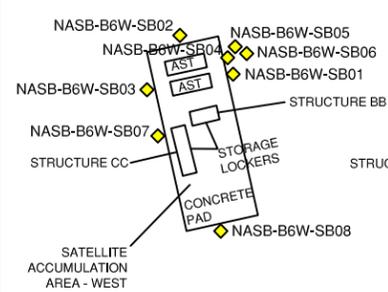
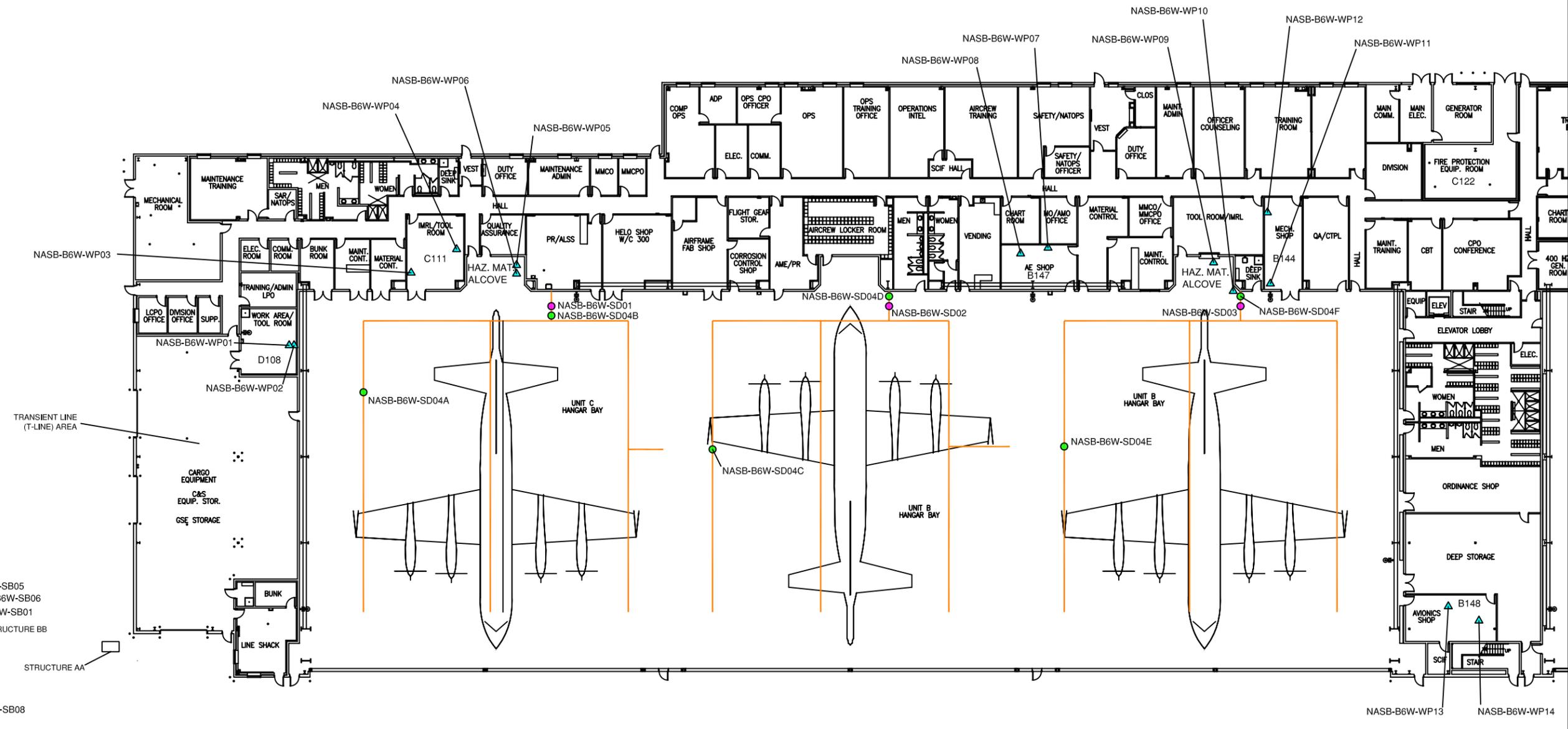
Building Corner	Northing	Easting
Northeast	389509.978	3015075.597
Southeast	389340.032	3015136.661
Southwest	389061.174	3014314.254
Northwest	389216.378	3014258.483

Coordinates are in NAD 1983, Maine West, Feet

Tetra Tech NUS, Inc.

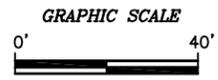
SITE LOCATION MAP
HANGAR 6 PARCEL
RCRA PARTIAL CLOSURE REPORT
NAVAL AIR STATION BRUNSWICK, MAINE

SCALE AS NOTED	
FILE	
\\.\NASB_H6_SITE_MAP.MXD	
REV	DATE
0	08/12/10
FIGURE NUMBER	
2	



LEGEND

- WP10 ▲ FLOOR WIPE SAMPLES
- SD01 ● TRENCH SEDIMENT SAMPLES
- SD04B ● TRENCH SEDIMENT SUBSAMPLES
- SB01 ◆ SOIL BORING SAMPLE LOCATION
- FLOOR TRENCH

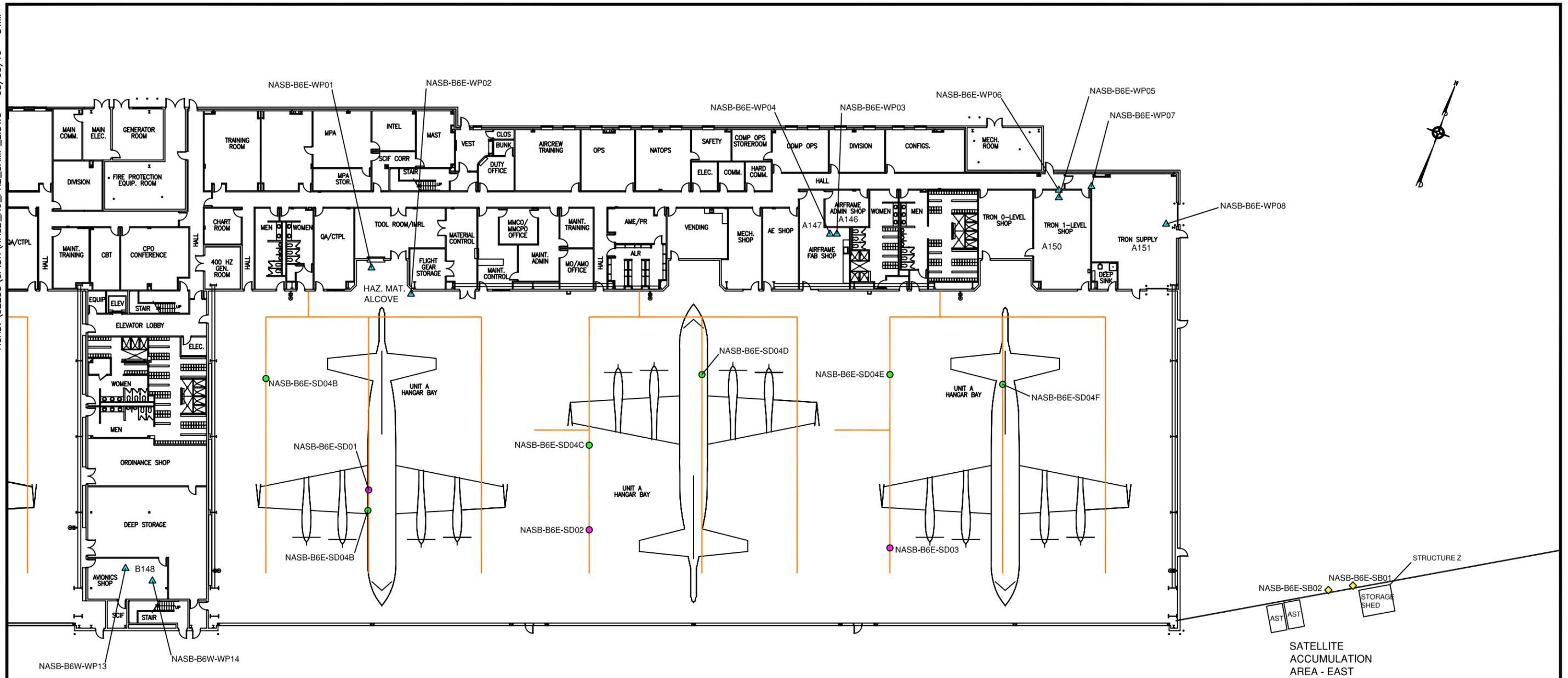


NOTE:
SUBSAMPLES (SD04A--SD04F) WERE COMPOSITED INTO ONE SAMPLE FOR TCLP METALS ANALYSES.



**PRE-CLEANING WIPE SAMPLE LOCATION MAP
HANGAR 6 - WEST
RCRA PARTIAL CLOSURE REPORT
NAVAL AIR STATION BRUNSWICK, MAINE**

FILE \\.\NASB_H6_PRE_SAMP_W.DWG	SCALE AS NOTED
FIGURE NUMBER 3A	REV DATE 0 08/05/10



LEGEND

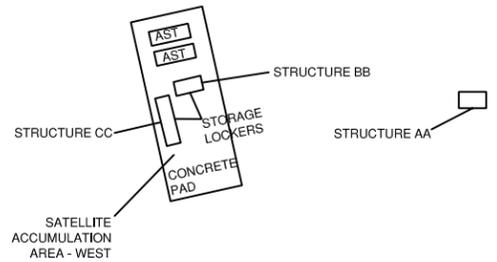
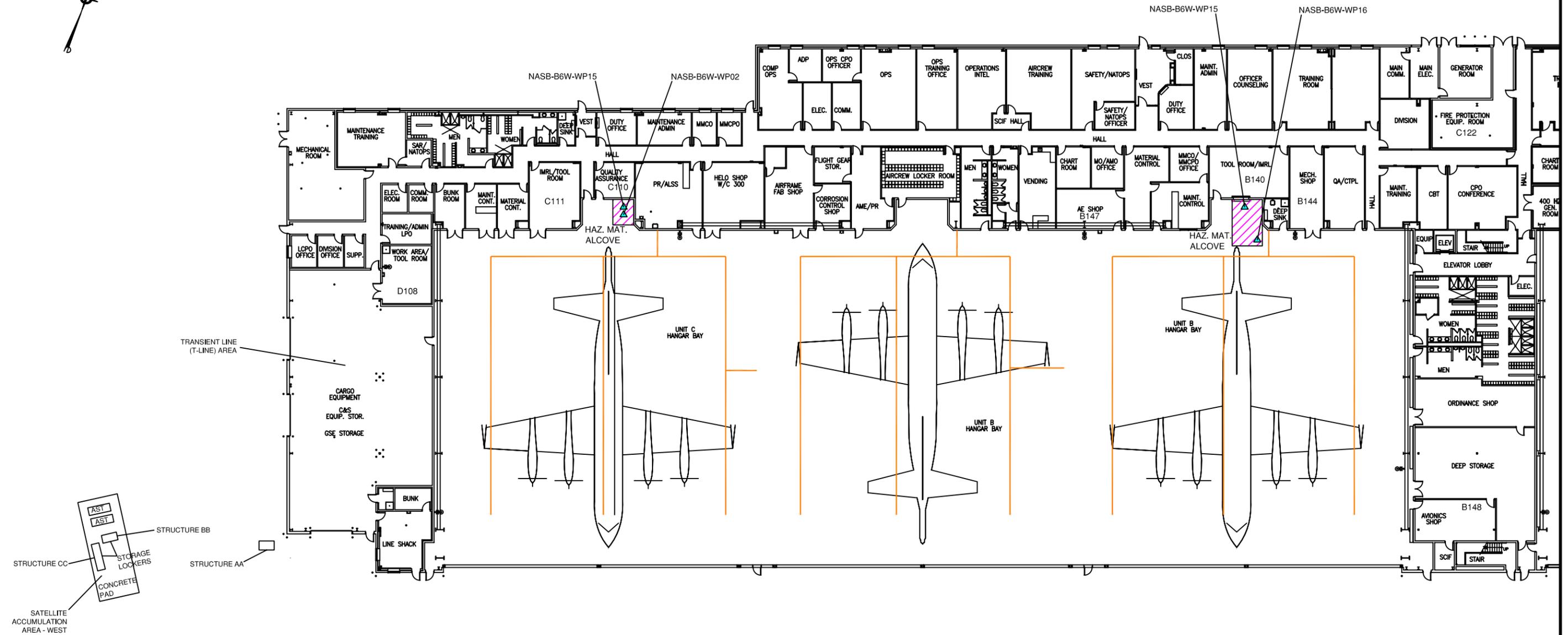
- WP10 ▲ FLOOR WIPE SAMPLES
- SD01 ● TRENCH SEDIMENT SAMPLES
- SD04B ● TRENCH SEDIMENT SUBSAMPLES
- SB01 ◆ SOIL BORING SAMPLE LOCATION
- FLOOR TRENCH

NOTE:
SUBSAMPLES (SD04A-SD04F) WERE COMPOSITED INTO ONE SAMPLE FOR TCLP METALS ANALYSES.



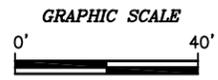
**PRE-CLEANING WIPE SAMPLE LOCATION MAP
HANGAR 6 - EAST
RCRA PARTIAL CLOSURE REPORT
NAVAL AIR STATION BRUNSWICK, MAINE**

FILE \\.\NASB_H6_PRE_SAMP_E.DWG	SCALE AS NOTED
FIGURE NUMBER 3B	REV DATE 0 08/05/10



TRANSIENT LINE (T-LINE) AREA

- LEGEND**
- WP15▲ FLOOR WIPE SAMPLES
 - DECONTAMINATION WORK AREA
 - FLOOR TRENCH



POST-CLEANING WIPE SAMPLE LOCATION MAP
HANGAR 6 - WEST
RCRA PARTIAL CLOSURE REPORT
NAVAL AIR STATION BRUNSWICK, MAINE

FILE \\.\NASB_H6_POST_SAMP_W.DWG	SCALE AS NOTED
FIGURE NUMBER 4	REV DATE 0 08/05/10

**BUILDING INSPECTION FORM
RCRA PARTIAL CLOSURE PROGRAM
NAS BRUNSWICK
BRUNSWICK, MAINE
CTO WE22**

Inspection Date: 6/30/2009 & 01/22/10

Personnel: Brandon Smith, P.E. / James Forrelli, P.E.

Weather: Overcast, 60s

GENERAL BUILDING INFORMATION / USES

Building Name: Hangar 6
Function: Aircraft Maintenance Hangar
Size: 166,335 SF
Year of Construction: 2005

Hangar 6 is located north of Seahawk Avenue, west of Pegasus Avenue and south and east of the airfield at NAS Brunswick. It was constructed in 2005 and served an aircraft maintenance hangar for P3 Orion squadrons for its entire history. Hangar 6 consists of a 166,335 square-foot two-story steel truss building on a slab foundation with a mezzanine level with the heating system. The second floor contains administrative offices.

Hangar 6 was used as an aircraft maintenance hangar for its entire history. Hangar 6 contains 3 sections (Hangar 6 East and West and the T-Line room). The northern portion of each section contains administrative and classroom/training space. The southern portions contain workshops and the hangar bays with the hangar doors on the south side of the building. At the time of closure, Hangar 6 East, which includes 3 hangar bays, maintenance shops, and administrative and training classroom space housed the VPU-1 squadron. Hangar 6 West, which housed the VP-26 squadron at the time of closure, was constructed as a mirror image of Hangar 6 East and includes 3 hangar bays. VP-92 shared Hangar 6 East with VP-26 until it was disestablished in 2007. Hangar 6 is heated by a natural gas boiler system.

BUILDING INSPECTION / CONDITION

Hazardous waste was temporarily stored at the interior hazardous waste accumulation areas located in the Hazardous Materials alcoves in Hangar 6 East and West prior to being moved to the exterior satellite accumulation areas (SAAs) located on the southwest and southeast corners of Hangar 6. The SAAs included HW storage lockers and 2 waste oil ASTs each. VP-92 previously had an SAA located in the center of H6 on the apron south of H6. HW was transported to Building 45 for offsite disposal.

The building was unoccupied at the time of the site visits and appeared in good condition. Office furniture and storage lockers, etc were present in the workshops and administrative/classroom space.

Potential evidence of past hazardous waste generation activities was observed. See the attached Table A for a summary of potential hazardous waste areas identified during the building inspection.

No evidence of hazardous waste residues was observed.

No signs of a past release (staining, unusual odors, stressed vegetation, etc.) were observed. No modifications to the structure, which may conceal signs of a past release, were observed.

Hazardous waste storage areas and hazardous waste accumulation areas were observed as described above.

HAZARDOUS WASTE STORED / GENERATED

Hazardous waste stored or generated at Hangar 6 included solvents from parts cleaning, waste paint that may have contained lead, lead dust from soldering, welding, and grinding activities, lead-acid batteries, waste oil, and universal waste, according to NASB personnel.

POTENTIAL PCB-CONTAINING TRANSFORMERS

The NASB transformer database lists no transformers associated with Hangar 6.

A pad-mounted transformer was observed on the north side of Hangar 6 outside of the electrical and generator rooms during inspection. The serial number is 0028YA65W12A according to NASB personnel.

Due to the age of the building (constructed in 2005) not suspected to be PCB-containing.

APPLICABLE REPORTS / DOCUMENTS

Available historical plans and aerial photos were reviewed for past property uses:
 1943 plan - Hangar 6 area not shown, Hangars 2 and 3 to the south.
 1946 plan - Original runway and taxiways shown. Taxiway/apron at Hangar 6 area. Softball field and Hangars 2 and 3 to the south.
 1952 plan - New runways and taxiways shown. No buildings shown at Hangar 6 location.
 1956 plan - Same as 1952 plan
 1958 aerial - Apron area with aircraft parked. No structures, Hangars 2 and 3 to the south.
 1978 aerial - Same as 1958 aerial.
 1981 aerial - Same as 1978 aerial.
 1975 plan - Labeled as Aircraft Parking Apron, north of Hangars 2 and 3.
 1984 aerial - Same as 1981 aerial.
 1989 plan - same as 1983 plan.
 1989 aerial - same as 1984 aerial
 1993 aerial - same as 1989 aerial
 1997 aerial - Same as 1993 aerial.
 2006 plan - Building identified at current location. Hangars 2 and 3 demolished to the south.

According to NASB records, no USTs were present at Hangar 6.

According to NASB records, the following ASTs were present at Hangar 6:

- A6.0 - 125 gallon, hydraulic oil for elevator (installed 2004, active)
- A6.1 - 250 gallon, waste oil (installed 2004, inactive (VPU-1 east SAA))
- A6.2 - 500 gallon, waste oil (installed 2004, inactive (VPU-1 east SAA))
- A6.3 - 500 gallon, waste oil (installed 2005, inactive (VP-26 west SAA))
- A6.4 - 250 gallon, waste oil (installed 2005, inactive (VP-26 west SAA))
- A6.5 - 500 gallon, waste oil (installed 2005, removed 2009 (VP-92 center SAA))
- A6.6 - 250 gallon, waste oil (installed 2005, removed 2009 (VP-92 center SAA))
- A6.7 - 250 gallon, waste oil (installed 2005, inactive (T-Line waste oil))

HAZARDOUS WASTE STORAGE RECORDS

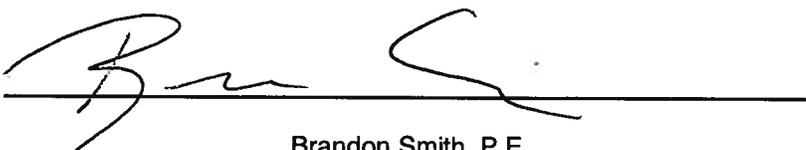
Hazardous waste was historically stored at Hangar 6. According to NAS Brunswick Hazardous Waste Manager, D. Bruce Smith, hazardous waste generation was tracked by squadron and not by building. Until recently, squadrons rotated out of hangar spaces while on deployment overseas and no single aircraft squadron was consistently in each hangar space over the life of the building. As a result, specific records of hazardous waste qualities and types generated in Hangar 5 are not available. However, the Hazardous Waste department maintains a list of hazardous waste generated by the squadrons that shows what would typically be generated by aircraft maintenance activities conducted in the NASB hangars.

MISCELLANEOUS NOTES

Tetra Tech personnel were accompanied on the inspection by D. Bruce Smith, NAS Brunswick Hazardous Waste Manager.

(SEE ATTACHED PHOTOGRAPHS)

INSPECTOR SIGNATURE:



Brandon Smith, P.E.

Table A
Potential Hazardous Waste Areas - Hangar 6
RCRA Partial Closure
NAS Brunswick, Maine

Building Location	Room / Area	Potential Hazardous Waste Issues
Hangar 6 (West)	Hazardous Waste Satellite Accumulation Area - Exterior	Spills from hazardous waste storage
	Room D108 - Tool Room	Lead dust from grinding/soldering
	Room C111 - Tool Room	Lead dust from grinding/soldering
	Room B147 - Aviation Electronics Shop	Lead dust from soldering
	Room B144 - Mechanical Shop	Lead dust from grinding/soldering
	Room B148 - Avionics Shop	Lead dust from soldering
	Hazardous Materials Storage Area - In front of Quality Assurance	Spills from hazardous materials storage
	Floor Trenches	Spills from hazardous materials
Hangar 6 (East)	Hazardous Materials Storage Area - In front of tool room	Spills from hazardous materials / painting
	Hazardous Waste Satellite Accumulation Area - Exterior	Spills from hazardous waste storage
	Room A147 - Airframe Fabrication Shop	Lead dust from grinding/soldering
	Room A150 - Aviation Electronics Shop	Lead dust from soldering
	Room A151 - Aviation Electronics Shop	Lead dust from soldering
	Floor Trenches	Spills from hazardous materials
	Hazardous Materials Storage Area - In front of tool room	Spills from hazardous materials / painting

PHOTOGRAPHS



No. 1 Hangar 6 – NAS Brunswick
Northwest elevation

May 12, 2010



No. 2 Hangar 6 – NAS Brunswick
Southeast elevation

May 12, 2010

PHOTOGRAPHS



No. 3 Hangar 6 – NAS Brunswick
Southwest elevation (from Building 200 control tower)

January 22, 2010



No. 4 Hangar 6 – NAS Brunswick
Western elevation (T-Line area on western end of Hangar)

April 28, 2010

PHOTOGRAPHS



No. 5
Hangar 6 East bays

Hangar 6 – NAS Brunswick

January 22, 2010



No. 6
Hangar 6 East Hazardous materials storage alcove

Hangar 6 – NAS Brunswick

January 22, 2010

PHOTOGRAPHS



No. 7
Hangar 6 West bays

Hangar 6 – NAS Brunswick

January 22, 2010



No. 8
Hangar 6 West bays (from mezzanine level)

January 22, 2010

PHOTOGRAPHS



No. 9 Hangar 6 – NAS Brunswick
Hangar 6 West Hazardous Materials Storage alcove

January 22, 2010



No. 10 Hangar 6 – NAS Brunswick
Hangar 6 West Hazardous Materials Storage alcove

January 22, 2010

PHOTOGRAPHS



No. 11 Hangar 6 – NAS Brunswick
Southeast elevation (SAA in foreground)

May 12, 2010



No. 12 Hangar 6 – NAS Brunswick
Hangar 6 East SAA (Building 446 in background)

May 12, 2010

PHOTOGRAPHS



No. 13
Hangar 6 West SAA

Hangar 6 – NAS Brunswick

May 12, 2010



No. 14
Liquid Oxygen and Nitrogen Dispenser

Hangar 6 – NAS Brunswick

May 12, 2010