

RECORD OF DECISION

**SITE 17, FORMER PESTICIDE SHOP,
BUILDING 95**

**NAVAL AIR STATION BRUNSWICK
BRUNSWICK, MAINE**

**BRAC PMO NORTHEAST
U.S. NAVY**



SEPTEMBER 2011

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ACRONYMS

bgs	below ground surface
BRAC	Base Realignment and Closure
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	chemical of potential concern
CSF	cancer slope factor
CTE	central tendency exposure
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
Eco-SSL	ecological Soil Screening Level
EE/CA	Engineering Evaluation/Cost Analysis
EEQ	Ecological Effects Quotient
EPA	United States Environmental Protection Agency
EPC	exposure point concentration
ERA	ecological risk assessment
ESL	ecological screening level
FFA	Federal Facility Agreement
HHRA	human health risk assessment
HI	Hazard Index
HQ	Hazard Quotient
ILCR	incremental lifetime cancer risk
IR	Installation Restoration
LOAEL	lowest-observed-adverse-effect level
MEDEP	Maine Department of Environmental Protection
mg/kg	milligram per kilogram
msl	mean sea level
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAEL	no-observed-adverse-effect level
NPL	National Priorities List
PCB	polychlorinated biphenyl
PMO	Project Management Office
PRG	preliminary remediation goal

RAB	Restoration Advisory Board
RfD	reference dose
RI	Remedial Investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
SSL	Soil Screening Level
TRC	Technical Review Committee
TRV	toxicity reference value
UCL	upper confidence limit
USC	United States Code

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

Site 17, Former Pesticide Shop, Building 95, at the former Naval Air Station (NAS) Brunswick, Maine, United States Environmental Protection Agency (EPA) ID number ME8170022018.

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the No Further Action decision for soils at Site 17 at the former NAS Brunswick (see Figure 1-1). The decision was made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (USC) § 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) 300 et seq., as amended. The regulatory program performed under the context of these combined laws and regulations is commonly referred to as "Superfund." This decision is based on information contained in the Administrative Record for the site, which is available for review at the Information Repository maintained at the Curtis Memorial Library in Brunswick, Maine. The Navy and EPA have agreed on the No Further Action decision for soils at Site 17, and the Maine Department of Environmental Protection (MEDEP) concurs with the No Further Action decision (see Appendix A for MEDEP concurrence letter).

FIGURE 1-1. SITE 17 LOCATION MAP



1.3 DESCRIPTION OF SELECTED REMEDY

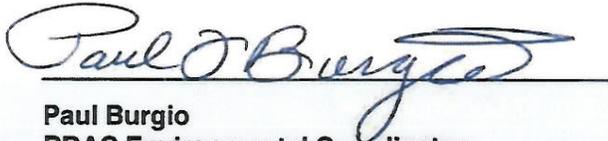
No further CERCLA remedial action for soils is necessary at Site 17. The No Further Action decision for soils is based on the Navy's successful completion of a series of investigations and removal actions at the site. Based on the conclusions of the human health risk assessment (HHRA) and ecological risk assessment (ERA) performed as part of the revised Remedial Investigation (RI) using post-removal actions soil contaminant concentrations, the soils at the site do not pose an unacceptable risk to human health or the environment. Groundwater quality at Site 17 continues to be evaluated by the Navy and will be addressed in a future ROD.

1.4 STATUTORY DETERMINATIONS

No further cleanup actions are necessary for Site 17 soils under CERCLA to ensure protection of human health and the environment. Previous responses at the site have adequately addressed potentially unacceptable human and ecological site risks. Under CERCLA, if no unacceptable risks to human health or the environment are identified, then no further actions, investigations, or monitoring is required. The remedy for site soil does not result in hazardous substances remaining on site in excess of levels that allow for unlimited use and unrestricted exposure; therefore, five-year reviews for soil will not be required.

1.5 AUTHORIZING SIGNATURES

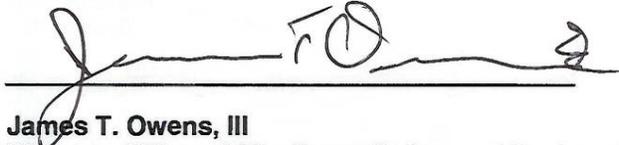
This ROD documents that No Further Action for Site 17 soils at the former NAS Brunswick is necessary to ensure protection of human health and the environment. MEDEP's statement on the selected decision is presented in Appendix A.



Paul Burgio
BRAC Environmental Coordinator
BRAC PMO Northeast

9-15-11

Date



James T. Owens, III
Director, Office of Site Remediation and Restoration
EPA Region 1 – New England

9/26/11

Date

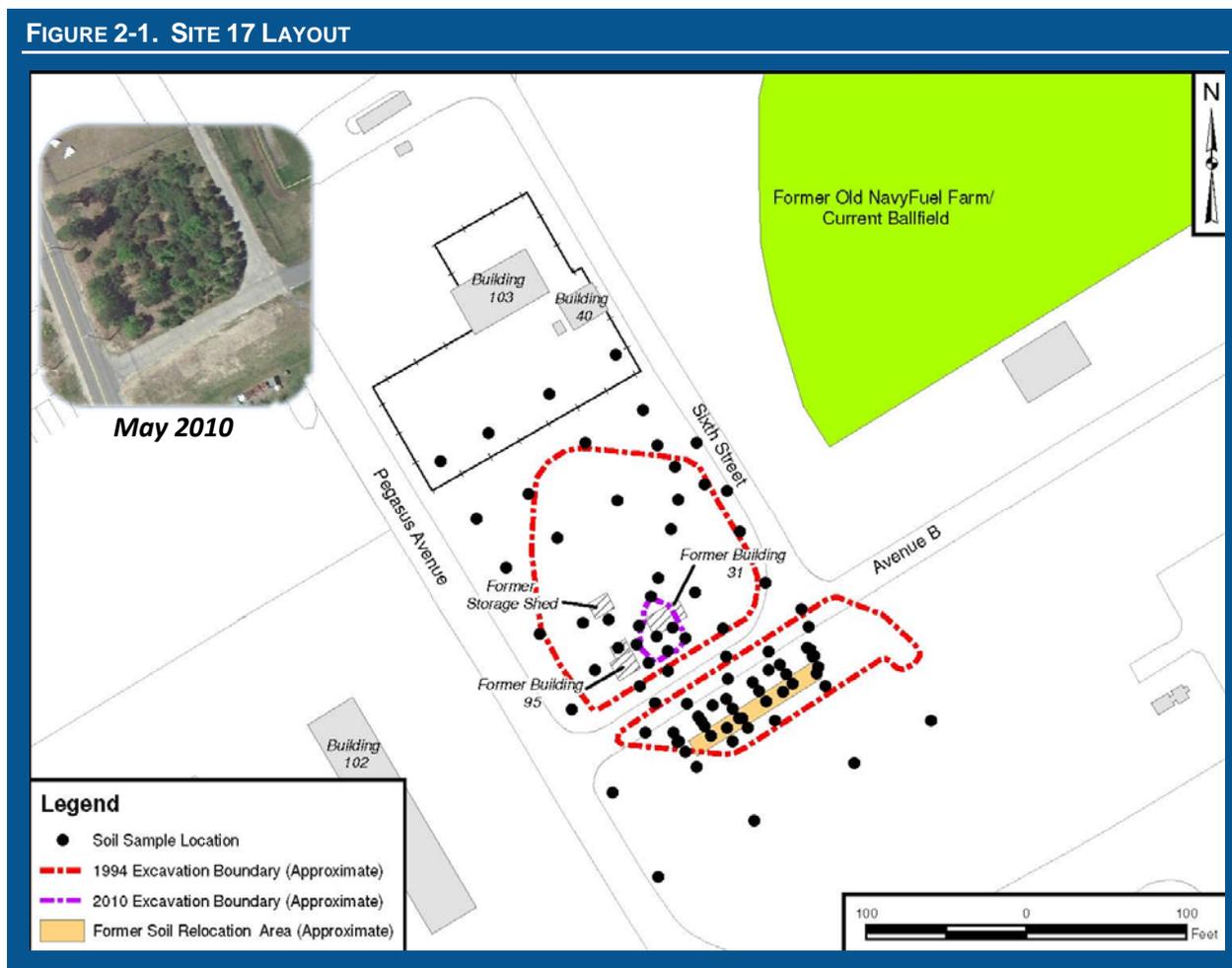
2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

The former NAS Brunswick, EPA ID number ME8170022018, occupied a maximum of approximately 3,000 acres in Brunswick, Cumberland County, Maine. Until the end of its flying mission in January 2010, the base supported the Navy's antisubmarine warfare operations in the Atlantic Ocean with several squadrons of P-3 maritime patrol aircraft. NAS Brunswick was officially designated as a Superfund site in 1987 when EPA added it to the National Priorities List (NPL). NAS Brunswick was selected in 2005 by the Base Realignment and Closure (BRAC) Commission for closure and was deactivated on May 31, 2011. The base population and facility operations decreased significantly in January 2010 with the end of the base's flying mission. Some tenant activities are ongoing at the base, mainly associated with base closure. The former operational area of the base covers approximately 138 acres east of the two parallel runways extending north to south in the northern portion of the facility. The operational area includes numerous office buildings, barracks, recreational facilities, hangars, repair shops, and other facilities that formerly supported NAS Brunswick aircraft, although building demolition associated with base closure has begun.

Forested areas, grasslands, shrubland, marsh, and open water comprise approximately 83 percent of the base, with the remaining 17 percent consisting of paved areas (primary flight ramps and runways) of the operations area. The southern edge of the base borders coves and estuaries of the Gulf of Maine.

FIGURE 2-1. SITE 17 LAYOUT



Site 17 is located in the north-central area of the base, one block north of Fitch Avenue at the corners of Pegasus Avenue and Avenue B. The site (approximately 0.7 acre) is bounded to the northeast by the former Old Navy Fuel Farm, to the north by a former security guard dog kennel, to the southwest and northwest by Pegasus Avenue, and to the southeast by a former railroad bed. Three former buildings (Building 95, Building 31, and a storage shed) were previously located north of Avenue B. These buildings housed Navy pest control operations that included storage, mixing, and disposal of pesticides and herbicides from the 1940s until 1985. Pesticides identified as having been used at NAS Brunswick included malathion, diazinon, Baygon, pyrethrin, cyndgas, Sevin, esmethrin, 4,4'-dichlorodiphenyltrichloroethane (DDT), chlordane, dieldrin, zinc phosphide, arsenic lead, rotanone, and Avitrol. Herbicides identified as being used were Drexel, simazine, monuron trichloroethane, 2,4-dichlorophenoxyacetic acid, 2,4,5-trichlorophenoxyacetic acid, and maleic hydrazide (R.F. Weston, Inc., 1983). Various pesticides and herbicides were mixed with a liquid carrier such as water or kerosene on an as-needed basis when pest control service calls were placed. Prior to 1976, any materials left over after service calls were reportedly dumped behind Building 95. Empty containers were rinsed, crushed, and placed in the trash for disposal.

The former NAS Brunswick is an inactive facility, and environmental investigations and remediation at the base are funded under the BRAC program. The Navy is the lead agency for CERCLA activities at the facility, and EPA and MEDEP are regulatory oversight agencies.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

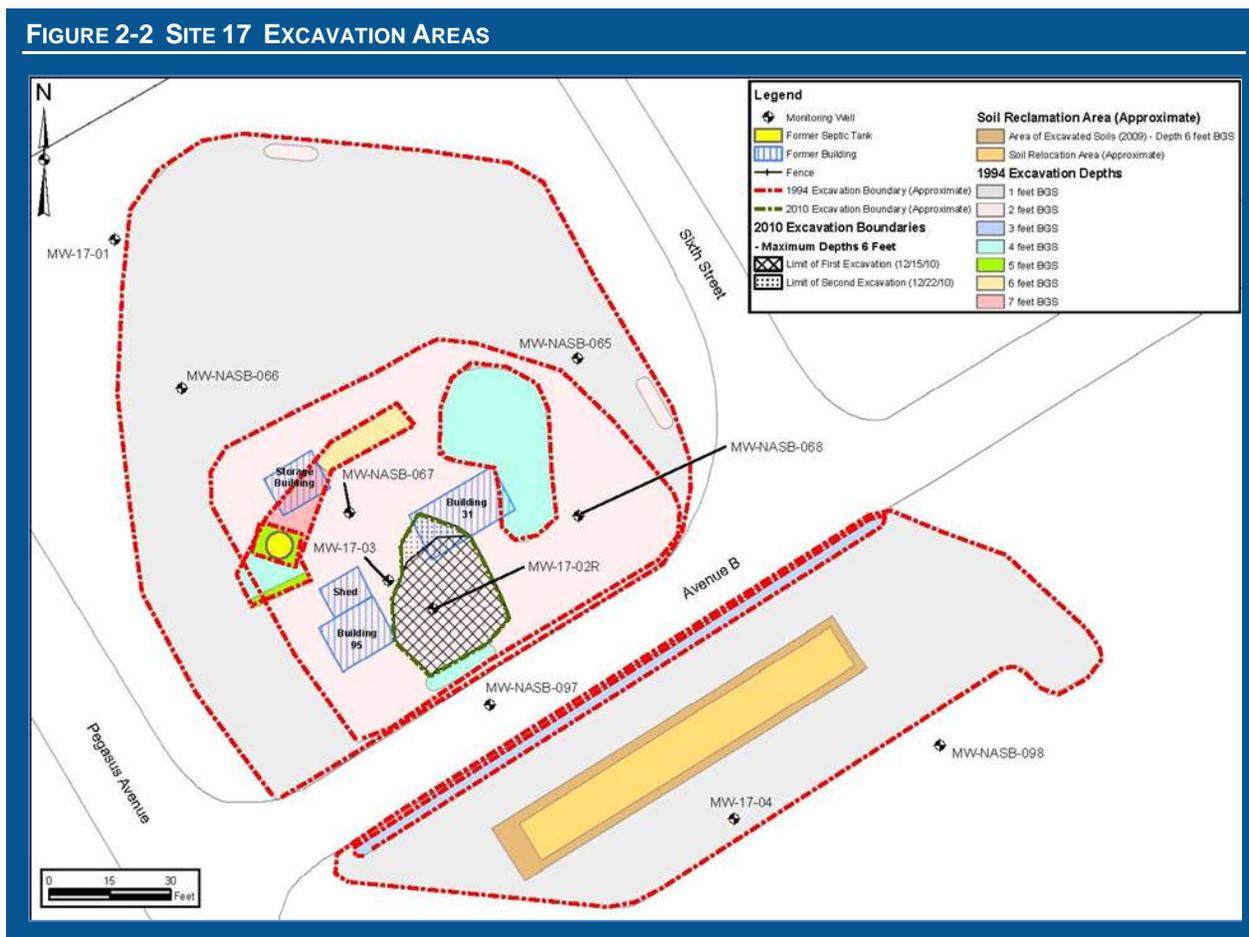
Sources of contamination at Site 17 included activities associated with former pest control operations at the site. Table 2-1 provides brief summaries of previous investigations at Site 17. Results of these investigations indicated elevated concentrations of pesticides in soils at the site. Subsequent removal actions removed pesticide-contaminated soil associated with unacceptable human health risks (see Figure 2-2).

TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION		
INVESTIGATION	DATE	ACTIVITIES
Interim License	1980	Issued by MEDEP for storage of hazardous wastes at NAS Brunswick; included provisions for storage of pesticide wastes at the Building 95 site.
Request for Interim License Termination	1986	NAS Brunswick requested termination of the 1980 Interim License and submitted a Closure Plan for MEDEP review and approval.
Closure Plan	1988	Revised Closure Plan was approved by MEDEP.
Federal Facility Agreement	1990	Established the framework for investigation and remediation of environmental impacts associated with past and present activities at the base.
Initial Sampling	1990	Four surface soil samples were collected in the vicinity of Building 95 and analyzed for Target Compound List pesticides and polychlorinated biphenyls (PCBs). Sampling results indicated that the soils were impacted with DDT and its degradation products, dichlorodiphenyldichloroethane (DDD) and dichlorodiphenyldichloroethylene (DDE). No PCBs were detected. Based on these data and the area of the site (less than 1 acre), the Navy performed an Engineering Evaluation/Cost Analysis (EE/CA) to support a soil removal action.
Site Evaluation Work Plan	1991	Soil and groundwater sampling and analysis to determine the nature and extent of contamination. Chemical analysis of soil indicated the presence of DDT, DDD, DDE, pyrethrins, dieldrin and chlordane.
Transfer from RCRA to CERCLA	1991	Navy requested that removal actions at the site be conducted under CERCLA (May 9, 1991), MEDEP issued a RCRA Closure Order for NAS Brunswick (May 22, 1991), and MEDEP concurred with Navy's request to proceed with site cleanup under CERCLA (May 29, 1991).
EE/CA and Associated Sampling	1992	Results showed DDT, DDE, and DDD at concentrations up to 8,200 mg/kg in soil. Cleanup options for pesticide-contaminated soil were evaluated. Additional sampling was conducted to determine the extent of impacted soil, and risk assessments were completed that concluded that exposure to contaminated soil at the site posed unacceptable risk to human and ecological

TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION		
INVESTIGATION	DATE	ACTIVITIES
		receptors. The greatest risks to humans were associated with exposure to DDT, DDD, and DDE. DDT and pyrethrins were also found to pose the greatest acute and chronic risks to ecological receptors. Maximum concentrations of DDT were detected in shallow surface soil (ABB Environmental Services, Inc., 1992).
Action Memorandum	1993	Outlined the proposed removal of three existing buildings, an abandoned septic tank, and a set of abandoned railroad tracks, in addition to contaminated soils.
Initial Removal Actions	1994 - 1995	Buildings 31 and 95, a storage shed, and railroad lines were demolished and disposed of off base. The septic tank was removed, cleaned, cut into pieces, and disposed of off base. Three soil removal actions were conducted in 1994-1995 in areas that exceeded preliminary remediation goals (PRGs) established for the site, 0.5 mg/kg for DDT in surface soil (0 to 2 feet bgs), 135 mg/kg for DDT in subsurface soil (greater than 2 feet bgs), and 10 mg/kg for total pyrethrins. In February and March 1994, 1,260 cubic yards of soil from north and south of Avenue B were excavated from the site, but confirmatory soil samples collected at the limits of the excavation indicated contaminants at concentrations exceeding PRGs. In October 1994, an additional 45 cubic yards of material were excavated from four areas north of Avenue B based on February 1994 confirmatory soil sample results. Also during 1994 excavation activities, pesticide concentrations in surface soil samples collected immediately south of Avenue B were found to exceed surface soil PRGs but not subsurface soil PRGs. The soil from this area was excavated, relocated to within the previously excavated (and yet to be backfilled) area south of Avenue B (subsequently referred to as the "soil strip"), spread as a 6-inch layer, and covered with geotextile fabric. The geotextile fabric was then covered with 2 feet of common fill during site restoration (to effectively render the material as subsurface soil, for which PRGs were not exceeded) (ABB Environmental Services, Inc., 1993a and 1993b). Based on confirmation sampling in October 1994 and during the removal in December 1994, additional soil was removed and shipped off site in January 1995. A total of 1,310 cubic yards of soil was shipped off site for incineration. As part of site restoration, a geotextile was used to demark native soils from clean fill (Harding Lawson Associates, 1998).
Closure Report	1998	Summarizes the 1994-1995 removal actions.
RI	2008-2009	RI objectives were to determine if there was unacceptable risk to human or ecological receptors, to determine the extent of contaminated soil, to determine whether groundwater was contaminated and if so if it was migrating off site, and to determine the appropriate option for remediating the relocated "soil strip" south of Avenue B. Eighty soil samples were collected from 45 soil borings for lithologic characterization and laboratory analysis. Four monitoring wells were installed and these and four existing wells were sampled. Initial results indicated unacceptable human health risks from soil exposure, and the Navy decided to conduct additional focused soil removals (after submittal of the draft RI Report in July 2009) to address these risks.
Soil Strip Excavation	2009	Removal and off-base disposal of 117 tons of soil previously excavated from the area south of Avenue B and placed (buried and covered with clean soil) south of Avenue B after 1994 removal actions were completed. Contaminated soil was shipped off site for incineration (ECC, 2010).
Post-Draft Remedial Investigation Soil Removal and Associated Sampling	2009-2010	Additional sampling was conducted after the RI to determine the amount of soil to be removed to meet risk-based cleanup levels (Tetra Tech, 2009). The 2010 removal action was based on PRGs of 22 mg/kg for DDD and 15 mg/kg for DDE and DDT. An additional 287 tons of soil were removed and shipped off base for incineration in December 2010 (Charter, 2011).
Revised RI Report	2011	The RI Report was updated to reflect site conditions after the 2009 and 2010 soil removals. Based on these post-removal action results, calculated risks to human health and the environment from site soils were determined to be acceptable for unrestricted land use per CERCLA requirements/guidelines (Tetra Tech, 2011).

There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to the cleanup of Site 17.

FIGURE 2-2 SITE 17 EXCAVATION AREAS



2.3 COMMUNITY PARTICIPATION

The Navy performs public participation activities in accordance with CERCLA and the NCP throughout the site cleanup process at the former NAS Brunswick. The Navy has a comprehensive community relations program for NAS Brunswick, and community relations activities are conducted in accordance with the NAS Brunswick Community Relations Plan (ECC, 2008). These activities include regular technical and Restoration Advisory Board (RAB) meetings with local officials and the establishment of an Information Repository at the local library for dissemination of information to the community.

A Technical Review Committee (TRC) for NAS Brunswick was established in 1988 to provide coordinated direction to the Installation Restoration (IR) Program activities at NAS Brunswick. In 1995, in accordance with CERCLA, the TRC reformed as the RAB, whose members include the Navy, EPA, MEDEP, and various community representatives. The RAB, which reviews and discusses NAS Brunswick environmental issues with local community officials and concerned citizens, has met frequently since its inception and currently meets quarterly. Site 17 investigation activities, results, and associated remedial decisions have been discussed at RAB meetings. The NAS Brunswick Information Repository is located at the Curtis Memorial Library, 23 Pleasant Street, Brunswick, Maine. Documents and other relevant information relied on in the remedy selection process are available for public review at the Information Repository, which includes a copy of the Administrative Record. For access to the Administrative Record or additional information about the IR Program at the former NAS Brunswick, contact: Todd Bober, Remedial Project Manager, Building 679, Naval Business Center, 4911 South Broad Street, Philadelphia, Pennsylvania, 19112-1303, 215-897-4911.

In accordance with Sections 113 and 117 of CERCLA, the Navy provided a public comment period from August 1 to August 31, 2011, for the proposed No Further Action decision described in the Proposed Plan for Site 17 soils. A public meeting to present the Proposed Plan was held on August 17, 2011, at the Parkwood Inn, Brunswick, Maine. Public notice of the meeting and availability of documents were published in the Portland Press-Herald on August 1, 2011, and the Brunswick Times-Record on August 2, 2011. The Proposed Plan and public notices are included in Appendix B.

2.4 SCOPE AND ROLE OF OPERABLE UNIT

The Department of the Navy is the lead agency and EPA is the lead regulatory agency for CERCLA activities at the former NAS Brunswick. MEDEP also provides state regulatory oversight for environmental site activities. The United States Department of Defense is the sole source of cleanup funding for the property under the Navy BRAC program. Site 17 is part of a comprehensive environmental investigation and cleanup program currently being performed at the former NAS Brunswick under CERCLA authority pursuant to the Federal Facility Agreement (FFA) dated October 19, 1990. IR Program cleanup activities are being performed under CERCLA, except at those sites subject to the MEDEP underground oil storage tank program. CERCLA response obligations and Resource Conservation and Recovery Act (RCRA) corrective action obligations at the former NAS Brunswick are being integrated through implementation of the FFA, Section XIX, such that activities covered by the FFA will achieve compliance with CERCLA, applicable sections of RCRA, and all applicable or relevant and appropriate federal and state laws and regulations, to the extent required by Section 121 of CERCLA, 42, United States Code (U.S.C.) Section 9621. Therefore, CERCLA remedial actions selected, implemented and completed under the FFA will be protective of human health and the environment such that further action under RCRA, as amended, will not be required.

Site 17 was originally regulated under MEDEP's RCRA program (Maine Hazardous Waste Management Rules) via an Interim Order, but upon Navy request, MEDEP approved the transfer of the site to the CERCLA program in 1991 (MEDEP, 1991) in accordance with the FFA.

Eighteen IR sites have been identified at NAS Brunswick, and each of these sites is undergoing or has undergone the CERCLA cleanup process independently of each other. No Further Action RODs have been signed for 10 of 18 CERCLA sites at NAS Brunswick, and remedial actions have been implemented at six sites in accordance with their respective RODs. Site 17 groundwater and Site 12, Explosive Ordnance Disposal Area, are still under investigation, and as Site 17 groundwater and Site 12 progress through the cleanup process, separate RODs will be issued for those sites.

The ROD for Site 17 soils is not expected to have an impact on the cleanup of the other sites at the former NAS Brunswick. The signing of this ROD by the Navy and EPA Region 1 indicates the completion of the CERCLA process for Site 17 soils. No additional actions or investigations of soil at Site 17 are required under CERCLA.

2.5 SITE CHARACTERISTICS

Figure 2-1 presents the Site 17 layout showing the locations of former buildings and soil sample locations. Currently, a large portion of the site (north of Avenue B) is covered with grass and low brush. The northern portion of the site was cleared of most trees and scrubs during 2010 soil excavation activities. South of Avenue B, the site is grass covered (maintained) with a few trees. There are no delineated wetlands or water bodies on site. Elevations at the site range from approximately 72 to 76 feet above mean sea level (msl). The southeastern portion of the site is level, and the northwestern portion is relatively level, with small undulations (approximately 4 feet or less) throughout the area. The site surface slopes gently to the east and southeast with no distinct surface water drainage features. The surrounding area is relatively level.

The site is underlain by fill, fine sand (Upper Sand), interbedded fine sand and silt (Transition Unit), and silty clay (Presumpscot Formation). The Upper Sand is present from the ground surface to approximately 13 to 14 feet below ground surface (bgs) and included an interbedded black organic material and clay subunit between 8 and 10 feet bgs at one location south of Avenue B. Depths to groundwater during the

RI ranged from 2 to 5 feet bgs, and the direction of groundwater flow was generally to the south-southeast with some slight seasonal variation. The hydraulic gradient is relatively flat across Site 17.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The Navy's maritime aircraft patrol mission at the former NAS Brunswick ceased on January 31, 2010, and the base was decommissioned on May 31, 2011. Property uses surrounding the former base are primarily suburban and rural residential, with some commercial and light industrial uses along Routes 1, 24, and 123. An elementary school and a college are located within a 1-mile radius of the western base boundary. Site 17 is currently inactive, with no existing buildings or structures. The Reuse Master Plan for the former NAS Brunswick identifies planned future uses of the Site 17 area as community mixed use, which could include various commercial, retail, recreational, and residential uses (Matrix Design Group, 2007).

The majority of potable water used at the base is from the Brunswick/Topsham Water District municipal water supply. Two wells, the Dyer's Gate bedrock well and the base golf course well, supplied water to limited numbers of people when the base was operational. The Dyer's Gate well is located near the southern end of the runways and is screened below a relatively impermeable clay. The golf course well is located within the boundaries of the golf course in the southwestern portion of the base. This well previously supplied water to a former farmhouse in the area acquired by the Navy in the late 1940s or early 1950s and supplied water to visitors to the golf course. Based on the previous and potential future use of groundwater beneath the base, its EPA groundwater classification would be Class II, currently and/or potentially a source for drinking water. The State of Maine classifies all groundwater in the state as Class GW-A (groundwater of such quality that it can be used for public water supplies) unless specific action is taken by the legislature for reclassification to Class GW-B (suitable for all other uses other than public water supplies).

2.7 SUMMARY OF POTENTIAL SITE RISKS

The baseline risk assessment estimates what potential human and ecological risks the site pose if no additional actions were taken. It provides the basis for taking action, if necessary, and identifies the contaminants and exposure pathways that need to be addressed by any remedial action. The HHRA and ERA conducted as part of the 2009 draft RI were updated as presented in the final RI Report (Tetra Tech, 2011) to evaluate risks to human health and the environment, respectively, based on post-excavation soil data from the site.

2.7.1 Summary of Human Health Risk

The quantitative HHRA was conducted using chemical concentrations detected in Site 17 RI and post-excavation soil samples. Key steps in the risk assessment process included identification of chemicals of potential concern (COPCs), exposure assessment, toxicity assessment, and risk characterization. Groundwater was included in the risk assessment conducted as part of the RI, but the results are not included in this ROD, which is for soils only.

Identification of COPCs

Tables C-1 and C-2 in Appendix C present exposure point concentrations (EPCs) for the COPCs identified in Site 17 surface and subsurface soil, respectively. EPCs are the concentrations used in the risk assessment to estimate exposure and risk from each COPC. For each COPC, information in the tables includes arithmetic mean and maximum detected concentrations, EPC, and how the EPC was derived. EPCs for Site 17 COPCs are 95-percent upper confidence limits (UCLs) on the mean calculated using EPA's Pro-UCL Version 4.1 software.

Exposure Assessment

During the exposure assessment, current and potential future exposure pathways through which humans might come into contact with the COPCs identified in the previous step were evaluated. Potential

exposure routes for soil include dermal contact with soil (skin exposure), incidental ingestion of soil (swallowing small amounts of soil), and inhalation of dust emissions from soil. The HHRA considered receptor exposure under non-residential land use (construction and industrial workers and trespassers) and future residential land use. Current and future exposure pathways at Site 17 are summarized in Table 2-2.

TABLE 2-2. RECEPTORS AND EXPOSURE ROUTES EVALUATED IN THE HHRA	
RECEPTOR	EXPOSURE ROUTE
Trespassers (current and future land use)	Soil dermal contact (surface and subsurface ⁽¹⁾) Soil ingestion (surface and subsurface ⁽¹⁾) Inhalation of air/dust emissions from soil (surface and subsurface ⁽¹⁾)
Construction Workers (current and future land use)	Soil dermal contact (surface and subsurface ⁽¹⁾) Soil ingestion (surface and subsurface ⁽¹⁾) Inhalation of air/dust emissions from soil (surface and subsurface ⁽¹⁾)
Industrial Workers (future land use)	Soil dermal contact (surface and subsurface ⁽¹⁾) Soil ingestion (surface and subsurface ⁽¹⁾) Inhalation of air/dust emissions from soil (surface and subsurface ⁽¹⁾)
Residents (future land use)	Soil dermal contact (surface and subsurface ⁽¹⁾) Soil ingestion (surface and subsurface ⁽¹⁾) Inhalation of air/dust emissions from soil (surface and subsurface ⁽¹⁾)

1 It is unlikely that trespassers or industrial workers would be exposed to chemicals in subsurface soil; however, exposure of these receptors to chemicals in subsurface soil was evaluated qualitatively and discussed in the Uncertainty Analysis of the HHRA.

Groundwater exposure routes were evaluated for construction worker and residential receptors as part of the HHRA but are not included in this ROD, which is for soils only.

Toxicity Assessment

The toxicity assessment involves identifying the types of adverse health effects caused by exposure to site COPCs and determining the relationship between the magnitude of exposure and the severity of adverse effects (i.e., dose-response relationship) for each COPC. Based on the quantitative dose-response relationships determined, toxicity values for both cancer (cancer slope factor [CSF]) and non-cancer (reference dose [RfD]) effects were derived and used to estimate the potential for adverse effects. Carcinogenic risk information and non-carcinogenic hazard information relevant to the Site 17 COPCs for oral/dermal and inhalation exposure are presented in Tables C-3 through C-6.

Risk Characterization

During the risk characterization, the outputs of the exposure and toxicity assessments are combined to characterize the baseline risk (cancer risks and non-cancer hazards) at a site if no further action is taken to address the contamination. Potential cancer risks and non-cancer hazards were calculated based on reasonable maximum exposure (RME) and central tendency exposure (CTE) assumptions. The RME scenario assumes the maximum level of human exposure that could reasonably be expected to occur, and the CTE scenario assumes a median or average level of human exposure.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen, expressed as an incremental lifetime cancer risk (ILCR). EPA's generally acceptable risk range for site-related exposures is 1×10^{-4} to 1×10^{-6} (1 in 10,000 to 1 in 1 million). MEDEP's ICLR target is 1×10^{-5} (1 in 100,000). For non-carcinogens, the risk to human health is expressed as a Hazard Index (HI). An HI greater than 1 suggests that adverse health effects are possible. Table C-7 provides RME cancer risk estimates for the significant receptors

and routes of exposure and also provides RME non-cancer HQs for each receptor and route of exposure and total HIS for all routes of exposure.

Arsenic was initially selected as a COPC, but it was subsequently determined based on soil types identified during the RI and completion of a statistical evaluation that elevated arsenic concentrations were not a result of site activities but were related to the fill material used at the site during NAS Brunswick construction and alteration activities that occurred over the course of the approximately 60 years that the base was an active military installation. The statistical evaluation compared elevated arsenic detections in fill material to arsenic concentrations in all other site soils and found that the population of arsenic concentrations in fill material is distinct and greater than arsenic concentrations in all other site soils. Based on this comparison, the elevated arsenic concentrations are attributed to fill material and are not considered to be site related. Therefore, risks from arsenic were not quantified in the risk calculations. Table 2-3 provides a summary of the calculated cancer risks and non-cancer hazards for Site 17 soils.

The ILCRs for all receptors evaluated were less than or within USEPA's target risk range of 1×10^{-4} to 1×10^{-6} and were less than Maine's cumulative cancer risk management criterion of 1×10^{-5} . Total HIs for all receptors and exposure scenarios evaluated were less than or equal to unity, indicating that no adverse health effects are anticipated for any receptor under the defined exposure conditions.

TABLE 2-3. SUMMARY OF CANCER RISKS AND HAZARD INDICES			
RECEPTOR AND EXPOSURE MEDIUM		CANCER RISK	HAZARD INDEX
Construction Workers	Surface soil	7×10^{-9}	0.004
	Subsurface soil	5×10^{-8}	0.02
Industrial Workers	Surface soil	1×10^{-7}	0.002
	Subsurface soil	7×10^{-7}	0.01
Adolescent Trespassers	Surface soil	9×10^{-9}	0.0005
	Subsurface soil	6×10^{-8}	0.002
Adult Trespassers	Surface soil	5×10^{-9}	0.0002
	Subsurface soil	4×10^{-8}	0.001
Child Residents	Surface soil	3×10^{-7}	0.03
	Subsurface soil	2×10^{-6}	0.1
Adolescent Residents	Surface soil	1×10^{-7}	0.01
	Subsurface soil	6×10^{-7}	0.02
Adult Residents	Surface soil	7×10^{-8}	0.003
	Subsurface soil	5×10^{-7}	0.01
Lifelong Trespassers	Surface soil	1×10^{-8}	NA
	Subsurface soil	9×10^{-8}	NA
Lifelong Residents	Surface soil	4×10^{-7}	NA
	Subsurface soil	3×10^{-6}	NA

NA - Non-carcinogenic hazards are not evaluated for lifelong exposure scenarios.

Based on the results of the HHRA, no unacceptable RME or CTE cancer risks or non-cancer hazards were identified that would require a CERCLA remedial action. The previous removal actions removed all soils from the site that might have posed unacceptable risk to human health.

2.7.2 Summary of Ecological Risk

An ecological risk assessment (ERA) consisting of Steps 1, 2 and 3a of the Navy's ERA process was completed at Site 17 in accordance with Navy policy and USEPA guidance. In Step 1 (problem formulation), the environmental setting, chemical fate and transport, ecotoxicity and potential receptors, and complete exposure pathways were considered to develop an ecological conceptual site model and assessment and measurement endpoints. Potentially complete exposure pathways were identified for both lower trophic level and upper trophic level terrestrial receptor populations based on concentrations of chemicals in soil. Because terrestrial receptors are not substantially exposed to subsurface soils, that pathway was not evaluated in the ERA. For the purpose of this ERA, surface soil was defined as soil from 0 to 1 foot bgs where exposure to ecological receptors is expected to be the greatest. Tables summarizing data used in the ERA and associated results are presented in Appendix D.

In Step 2, hazard quotients (HQs) were calculated to characterize the potential for chemicals to pose ecological risk using conservative exposure assumptions. HQs represent a ratio of the exposure level to an ecological effect level, and they are estimates of potential risk. In Step 2, exposure levels for lower trophic level receptors were the maximum detected chemical concentration in an exposure medium. For upper trophic level receptors, exposure levels were the dietary doses estimated using the wildlife exposure model but based on the maximum concentrations. Chemicals with HQs in excess of 1 were identified for each receptor and selected as COPCs. Because COPCs were identified in this step, the ERA proceeded to Step 3a.

In Step 3a, the conservative exposure assumptions employed for Step 2 were refined, and risk estimates were recalculated using the same conceptual site model and assessment and measurement endpoints. Refinement factors that were included in this re-evaluation, as applicable, included the magnitude of criteria exceedances, frequencies of detection and spatial distributions, contaminant bioavailabilities, comparisons to additional benchmarks, results of food-chain modeling, and comparisons to site-specific background concentrations. Based on the refined risk calculation, no chemicals were retained as COPCs for the receptor populations of terrestrial plants, soil invertebrates, mammals, or birds.

Based on consideration of the Step 3a refinement factors, it was determined that none of the COPCs were expected to pose unacceptable risk to ecological receptors populations at Site 17.

2.7.3 Basis for No Further Action Decision

Human health and ecological risks for soils remaining at Site 17 after soil removal activities are less than state and federal action levels. Therefore, the Navy and EPA have concluded, with concurrence from MEDEP, that No Further Action is necessary for soils at Site 17 to protect public health and welfare from actual or threatened releases of these hazardous substances into the environment. Because hazardous substances are not present at the site in excess of levels that allow for unlimited exposure and unrestricted use, five-year reviews for site soils are not required.

2.8 DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires an explanation of significant changes from the selected remedy presented in the Proposed Plan that was published for public comment. Questions and comments from the public meeting held on August 17, 2010, and written comments received from the public during the comment period are summarized in Appendix E, which also includes the transcript from the public meeting. No significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

2.9 STATE ROLE

MEDEP has reviewed the relevant site information and concurs with the selected remedy, No Further Action, for Site 17 soils. MEDEP's concurrence on the decision documented in this ROD is presented in Appendix A.

3.0 RESPONSIVENESS SUMMARY

3.1 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

Participants in the public meeting held on August 17, 2011, included RAB members and representatives of the Navy, EPA, and MEDEP. Questions and concerns raised at the meeting, additional written comments received by the Navy during the public comment period, and Navy responses to all comments are provided in Appendix E along with the transcript of the public meeting. No changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate based on comments received during the public hearing or public comment period.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues associated with the Site17 ROD for soils were identified.

REFERENCES

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ECC, 2010. Final Completion Report, Investigation and Removal of Relocated Soils, Site 17, Naval Air Station Brunswick, Brunswick, Maine. January.

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Tetra Tech, 2009. Technical Memorandum, Site 17 Supplemental Soil Sampling, NAS Brunswick, Maine, August 26.

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Tetra Tech, 2011. Remedial Investigation Report for Site 17, Former Building 95, Naval Air Station Brunswick, Maine, Revision 2, July.

United States Department of the Navy and United States Environmental Protection Agency, 1990. Federal Facility Agreement Under CERCLA Section 120 as Amended, October 19.

Appendix A

MEDEP Concurrence Letter



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
ACTING COMMISSIONER

September 21, 2011

Mr. Todd Bober
BRAC PMO NE
Building 679-Naval Business Center
4911 South Broad Street
Philadelphia, PA 19112-1303

Re: Record of Decision for Site 17 - Soils
Former Naval Air Station, Brunswick, Maine

Dear Mr. Bober:

The Maine Department of Environmental Protection (MEDEP) has reviewed the Record of Decision - Site 17, Former Pesticide Shop, Building 95, Naval Air Station Brunswick, Maine, dated September 2011. The Record of Decision (ROD) summarizes the results from the Remedial Investigation, the results of the soil removal actions that were conducted to address unacceptable risks to human health and the environment, and documents Navy's rationale for selecting a No Further Action decision for the soils at Site 17. MEDEP concurs with the selected decision for site soils of No Further Action.

The State's concurrence of the selected decision, as described above, should not be construed as the State's concurrence with any conclusion of law or finding of fact, which may be set forth in the ROD or supporting documents for the site listed above. The State reserves any and all rights to challenge any such finding of fact or conclusion of law in any other context.

This concurrence is based on the State's understanding that MEDEP will continue to participate in the Federal Facilities Agreement and in the review and concurrence with the Finding of Suitability to Transfer as allowed under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

MEDEP looks forward to working the Department of the Navy and the Environmental Protection Agency to resolve the remaining environmental issues remaining at the former Naval Air Station. If you have any questions or comments, please contact Claudia Sait at claudia.b.sait@maine.gov or 207 287-7713.

Best regards,

Patricia W. Aho
Acting Commissioner

pc: Claudia Sait - MEDEP
Jeff Orient - TINUS
Mike Daly - EPA

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Appendix B Proposed Plan



Proposed Plan Site 17 - Former Pesticide Shop, Building 95 Former Naval Air Station Brunswick, Maine

THE NO FURTHER ACTION PROPOSAL

This Proposed Plan has been prepared in accordance with federal laws to present the Navy's proposal that **no further action** is required for soil at Site 17 – Former Pesticide Shop, Building 95, Naval Air Station (NAS) Brunswick. Groundwater at Site 17 is still under investigation and will be addressed in a separate Proposed Plan.

This plan provides information on the results of soil investigations and removal actions used to make the **no further action** determination, the public comment period, a public information session and public hearing, and how the final remedy for Site 17 will be selected.

Federal and state environmental laws govern cleanup activities at federal facilities. A federal law called the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, better known as Superfund, provides procedures for investigation and cleanup of environmental problems. Under this law, the Navy is investigating and pursuing cleanup, as necessary, of sites at former NAS Brunswick to return the property to a condition that is protective of the community, workers, and the environment. The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**.

Introduction

This Proposed Plan provides information to the public on the preferred approach for Site 17 – Former Building 95 at the former NAS Brunswick and provides the rationale for this preference. This document is issued by the Navy, as the lead agency for all investigation and cleanup programs ongoing at the former NAS Brunswick, and the United States Environmental Protection Agency (EPA), with concurrence from the Maine Department of Environmental Protection

LET US KNOW WHAT YOU THINK

Mark Your Calendar!

PUBLIC COMMENT PERIOD
AUGUST 1, 2011, TO AUGUST 31, 2011



The Navy will accept written comments on the Proposed Plan for Site 17 during this comment period. Comments can also be sent by mail, e-mail, or fax. You can also offer oral or written comments at the formal public hearing (see page 6 for details).

INFORMATIONAL OPEN HOUSE AND PUBLIC MEETING **AUGUST 17, 2011**

The Navy invites you to attend an informational open house from 5:30 pm to 7:00 pm to learn about the Site 17 proposal. The informational session will include posters describing the Proposed Plan and an informal question-and-answer session. A formal public hearing will follow during which the Navy will receive comments on the Proposed Plan from the public. It is at this formal hearing that an official transcript of the comments will be recorded. The above activities will be held in at the Parkwood Inn, 71 Gurnet Road, Brunswick, Maine.

FOR MORE INFORMATION, VISIT THE
INFORMATION REPOSITORY AT THE LOCATION
PROVIDED ON PAGE 6 OF THIS PROPOSED PLAN.

(MEDEP). The Navy and EPA, with the concurrence of MEDEP, will select a final remedy for Site 17 after reviewing and considering all information submitted during the 30-day public comment period. The Navy and EPA, with the concurrence of MEDEP, may modify the **no further action** proposal or select another response action based on new information or public comments. Therefore, the public is encouraged to review and comment on this Proposed Plan.

This Proposed Plan summarizes information that can be found in greater detail in the **Remedial Investigation (RI)** Report and other documents included in the NAS Brunswick Information Repository, which is located in the Curtis Memorial Library at 23 Pleasant Street, Brunswick, Maine.

BOLDED TERMS THROUGHOUT THIS PROPOSED PLAN ARE EXPLAINED IN THE GLOSSARY OF TERMS ON PAGE 7.

The Navy and EPA encourage the public to review these documents to gain a more comprehensive understanding of the site and associated environmental activities.

The purpose of this Proposed Plan is to:

- Provide the public with basic background information about the former NAS Brunswick, including Site 17, which is known as Former Building 95. This information includes a description of the site that was developed by reviewing past documents about the site, investigating soil at the site, and evaluating potential human and ecological impacts.
- Describe the information used as the basis for the Navy's determination that **no further action** is required for soil at the site.
- Provide the public information on how they can be involved in the remedy selection process.
- Solicit and encourage public review of the Proposed Plan.

After the public has had the opportunity to review and comment on this Proposed Plan, the Navy will summarize and respond to all comments received during the comment period and formal public hearing in a document called the **Responsiveness Summary**. The Navy will carefully consider all comments received and could even select a remedial action different from that proposed. Ultimately, the selected remedy for Site 17 will be documented in a **Record of Decision (ROD)** for the site. The **Responsiveness Summary** will be issued with the **ROD**.

SITE BACKGROUND

The former NAS Brunswick occupies approximately 3,094 acres in Brunswick, Cumberland County, Maine. The base supported the Navy's antisubmarine warfare operations in the Atlantic Ocean with several squadrons of P-3 maritime patrol aircraft. NAS Brunswick was officially designated as a Superfund site in 1987 when EPA added it to the National Priorities List (NPL). NAS Brunswick was selected in 2005 by the Base Realignment and Closure (BRAC) Commission for closure and was deactivated on May 31, 2011. The base population and facility operations decreased significantly in January 2010 with the end of the base's flying mission. Some tenant activities are ongoing at the base, mainly associated with base closure. The former operational area of the base covers approximately 138 acres east of the two parallel runways extending north to south in the northern portion of the facility. The operational area includes numerous office buildings, barracks, recreational facilities, hangars, repair shops, and other facilities that formerly supported NAS Brunswick aircraft, although building demolition associated with base closure has begun.



Forested areas, grasslands, shrubland, marsh, and open water comprise approximately 83 percent of the base, with the remaining 17 percent consisting of paved areas (primary flight ramps and runways) of the operations area. The southern edge of the base borders coves and estuaries of the Gulf of Maine.

Where is Site 17 within the base?

Site 17 is located in the north-central area of the base, one block north of Fitch Avenue at the corners of Pegasus Avenue and Avenue B, and is bounded to the northeast by the former Old Navy Fuel Farm, to the southeast by the former railroad bed south of Avenue B, and to the southwest to northwest by Fifth Street (see Figure 1).

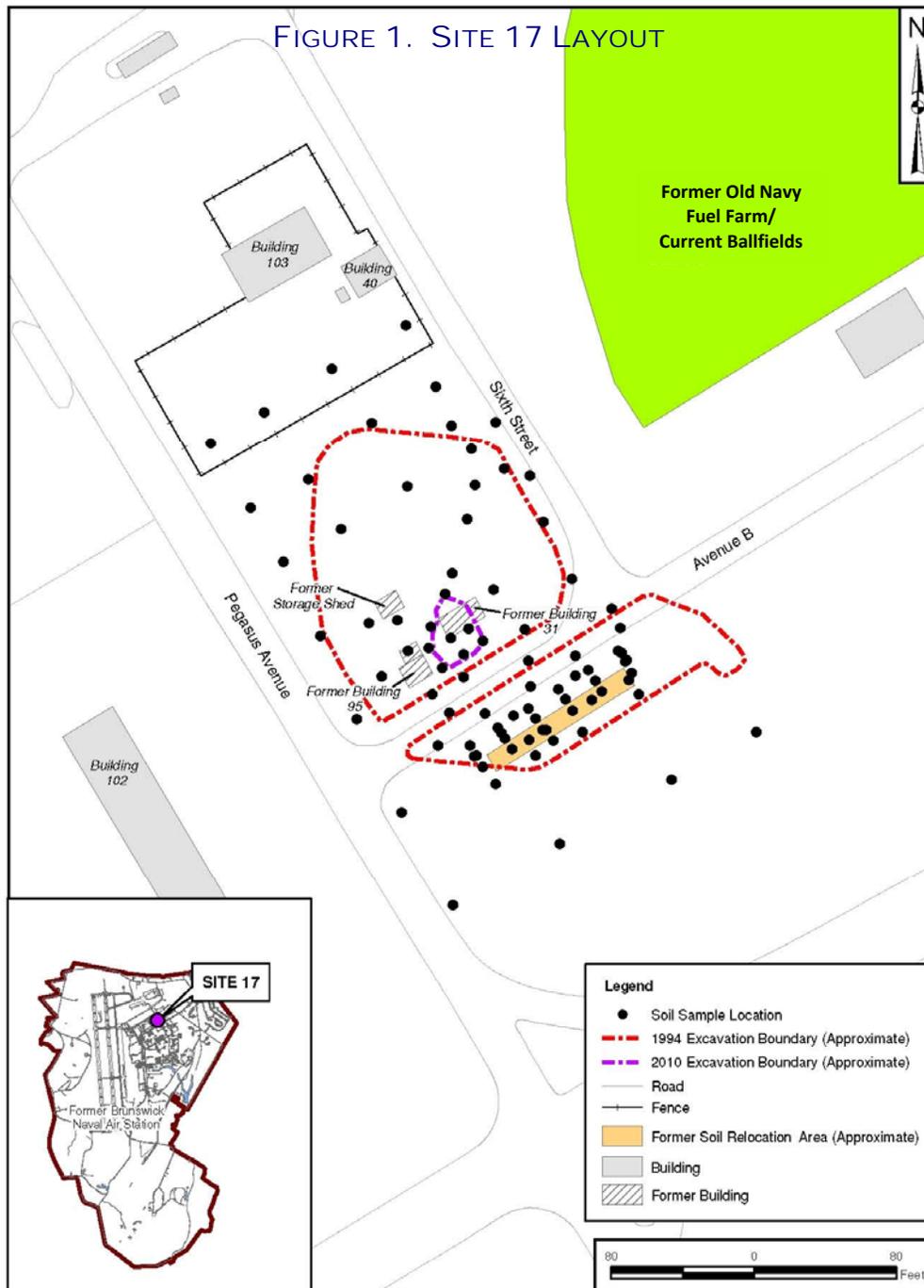
For what was Site 17 used?

Site 17 buildings north of Avenue B housed Navy pest control operations that included storage, mixing, and disposal of pesticides and herbicides from the 1940s until 1985.

Various pesticides and herbicides were mixed with a liquid carrier such as water or kerosene on an as-needed basis when pest control service calls were placed. Prior to 1976, any materials left over after service calls were reportedly dumped behind Building 95. Empty containers were rinsed, crushed, and placed in the trash for disposal.

What is the current and future land use at the site?

Site 17 is currently inactive, with no buildings or structures. The Reuse Master Plan for the former NAS Brunswick identifies planned future uses of the Site 17 area as community mixed use, which could include various commercial, retail, recreational, and residential uses. However, based on the site's proximity to the airfield, it is unlikely to be used for residential purposes in the future.



SITE CHARACTERISTICS

Site 17 is approximately 0.7 acre, and currently, a large portion of the site north of Avenue B is covered with grass and low brush. South of Avenue B, the site is grass covered (maintained) with a few trees.

How much and what types of chemicals are present?

The primary contaminants that have been the target of Navy studies and cleanup efforts include the pesticides **DDT, DDD, and DDE**. After extensive activities at the site to remove soil with elevated concentrations of these

pesticides that are associated with potential risks to humans and the environment, only residual low levels of these contaminants remain in soil across the site. Arsenic, which is a naturally occurring substance found in soil and groundwater, was also detected at concentrations greater than unrestricted land use concentrations, but it was determined that the arsenic was not a result of site activities but was related to the fill material used at the site during NAS Brunswick construction and alteration activities that occurred over the course of the approximately 60 years that the base was an active military installation.

History of Soil-Related Investigations and Removal Actions at Site 17

1990 Soil Sampling: Results of soil samples from the Building 95 vicinity indicated impacts from the pesticide **DDT** and its degradation products **DDD** and **DDE**.

1992 Engineering Evaluation/Cost Analysis (EE/CA) and Associated Sampling: An EE/CA was completed to evaluate cleanup options for pesticide-contaminated soil. Additional sampling was conducted to determine the extent of impacted soil, and **risk assessments** were completed that concluded that exposure to contaminated soil at the site posed unacceptable risk to human and ecological **receptors**.

1994 Removal Actions: Removal actions in 1994 resulted in the excavation and off-base disposal of about 1,350 cubic yards of contaminated soil and debris.

Draft Remedial Investigation: Determined the extent of contaminated soil, if **groundwater** was contaminated and if so if it was migrating off site, and estimated associated human health and ecological risks. Initial results indicated unacceptable human health risks from soil exposure, and the Navy decided to conduct additional focused soil removals to address these risks.

July 2009: Removal and off-base disposal of 117 tons of soil that were excavated from the area north of Avenue B and placed (buried and covered with clean soil) south of Avenue B after the 1994 removal actions were completed.

2009-2010 Post-Draft Remedial Investigation Soil Removal and Associated Sampling: Additional sampling was conducted after the **Remedial Investigation** to determine the amount of soil to be removed to meet risk-based **cleanup levels**. An additional 287 tons of soil were removed and disposed of off base in December 2010.

2011 Revised Remedial Investigation: Updated to reflect site conditions after recent soil removals. Based on these post-removal action results, estimated risks to human health and the environment from site soil were determined to be acceptable for unrestricted land use per CERCLA requirements/guidelines.

SCOPE AND ROLE OF THE SITE 17 RESPONSE ACTION

Site 17 is one of several sites identified at NAS Brunswick for assessment and cleanup under Superfund/CERCLA. Each of these sites is undergoing the Superfund/CERCLA cleanup process independently of each other. **No further action Records of Decision** have been signed for 10 of 18 Superfund/CERCLA sites at NAS Brunswick, and remedial

actions have been implemented at six sites in accordance with **Records of Decision**. Site 12, Explosive Ordnance Disposal Area, is still under investigation. This Proposed Plan and ROD document what is expected to be the final remedy for soil at Site 17; a separate Proposed Plan and **Record of Decision** will be issued for Site 17 **groundwater**.

The Proposed Plan for Site 17 is not expected to have an impact on the cleanup for the other sites at the former NAS Brunswick. As Site 17 **groundwater** and Site 12 progress through the cleanup process, Proposed Plans will be issued for those sites.

SUMMARY OF SITE 17 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT RESULTS

As part of site investigation activities, the Navy completed human health and ecological **risk assessments** to evaluate potential current and future effects of the chemicals detected at the site on human health and the environment. The **risk assessments** were conducted using data collected after recent site soil removal actions. The results of the **risk assessments** are described below.

Human Health Risks

The human health **risk assessment** estimates the baseline risk, which is the likelihood of health problems occurring if cleanup actions were not taken at the site. To estimate the baseline risk for humans, a four-step process was used.

Step 1 – Identify Chemicals of Potential Concern

Chemicals of potential concern (COPCs) are chemicals found at the site at concentrations greater than current federal and state risk-based screening levels. These chemicals are evaluated further in Steps 2 through 4 of the **risk assessment**.

Step 2 – Conduct an Exposure Assessment

In this step, ways that humans could come into contact with soil at Site 17 were evaluated. Both current and reasonably foreseeable future exposure scenarios were identified.

Human **receptors** evaluated at Site 17 included industrial workers, construction workers, trespassers/recreational users, and future residents. The assumed exposure routes for all **receptors** included ingestion, skin contact, and inhalation.

Step 3 – Complete a Toxicity Assessment

At this step, possible harmful effects from exposure to the individual **chemicals of potential concern** are evaluated. Generally, these chemicals are separated into two groups, **carcinogens**, chemicals that may cause cancer, and **non-carcinogens**, chemicals that may cause adverse effects other than cancer.

Expressing Estimated Human Health Risks

Human Health Risk Assessment: When evaluating the risk to humans, the risk estimates for **carcinogens** (chemicals that may cause cancer) and **non-carcinogens** (chemicals that may cause adverse effects other than cancer) are expressed differently.

Carcinogens: For cancer-causing chemicals, risk estimates are expressed in terms of probability. For example, exposure to a particular carcinogenic chemical may present a 1 in 10,000 chance of causing cancer over an estimated lifetime of 70 years. This can also be expressed as 1×10^{-4} . The EPA risk range for **carcinogens** is 1×10^{-6} (a 1 in 1 million chance) to 1×10^{-4} (a 1 in 10,000 chance). In general, calculated risks higher than this range would require consideration of the development and implementation of cleanup alternatives. MEDEP's target risk level is 1×10^{-5} (a 1 in 100,000 chance).

Non-Carcinogens: For non-cancer causing chemicals, exposures are first estimated and then compared to a reference dose (RfD). The reference dose is developed by EPA scientists to estimate the amount of a chemical a person (including the most sensitive person) could be exposed to over a lifetime without developing adverse (non-cancer) health effects. This measure is known as a hazard index. A hazard index greater than 1 suggests that adverse effects are possible.

Step 4 – Characterize the Risk

The results of Steps 2 and 3 were combined to estimate the overall potential risk from exposure to the Site 17 **contaminants of potential concern**. The terms used to define the estimated risk are explained in the text box, *Expressing Estimated Human Health Risks*, below.

The results of the **risk assessment** for humans potentially exposed to soil at Site 17 indicated the following:

- Estimated risks from cancer-causing **chemicals of potential concern** were within EPA's target risk range of 1 in 10,000 to 1 in 1 million (1×10^{-4} to 1×10^{-6}) and less than MEDEP's target risk level of 1 in 100,000 (1×10^{-5}) for all potential land use scenarios evaluated, including future residential use of the site.
- Estimated non-cancer hazards were less than or equal to 1.0 (the EPA and MEDEP target hazard) for all potential land use scenarios evaluated, including future residential use of the site.

Ecological Risks:

The primary objective of the ecological **risk assessment** is to

evaluate whether ecological **receptors** are potentially at risk when exposed to chemicals at Site 17. The ecological **risk assessment** is completed in three steps, as discussed below.

Step 1 – Problem Formulation

The goal of the ecological **risk assessment** at Site 17 was to evaluate the potential for adverse ecological impacts from site-related contamination (i.e., whether ecological **receptors** are able to exist and grow in similar ways to the surrounding area).

Actual or potential exposures of ecological **receptors** are determined by identifying the most likely pathways of contaminant release and transport. A complete exposure pathway has three components: (1) a source of chemicals that can be released to the environment, (2) a route of contaminant transport through the environment, and (3) an exposure or contact point for an ecological **receptor**. The complete exposure pathways and routes of entry to plants and animals at Site 17 consist of:

- Direct contact with surface soil by invertebrates, plants, mammals, and birds.
- Ingestion of surface soil by invertebrates, mammals, and birds.

Step 2 – Risk Analysis

In this step, possible harmful effects from being exposed to the individual chemicals are evaluated. This step includes estimating or measuring the amount of each chemical in soil, aquatic environments such as surface water, or plant or animal tissue and then evaluating ecological **receptor** exposure to these chemical concentrations.

Step 3 – Risk Characterization

In this step, the results of the risk analysis are analyzed to determine the likelihood of harmful effects to ecological **receptors** at Site 17. Based on the risk characterization, the overall level of ecological risk associated with the detected contaminants was considered to be minimal; therefore, no action is required at Site 17 to protect ecological **receptors**.



Risk Summary - Why is action not needed at the site?

Human health and ecological risks for soil remaining at Site 17 after soil removal activities were less than state and federal action levels. Therefore, it is the current judgment of the Navy and EPA, and with concurrence from MEDEP, that **no further action** is necessary for soil at Site 17 to protect public health and welfare from actual or threatened releases of these hazardous substances into the environment.

Because hazardous substances are not present at the site in excess of levels that allow for unlimited exposure and unrestricted use, review of the site every 5 years after initiation is not required.

NEXT STEPS

The Navy will accept public comments during a 30-day formal comment period. The Navy considers and uses these comments to improve its cleanup approach.

During the formal comment period, the Navy will accept written comments via mail, e-mail, and fax. Additionally, verbal comments may be made during the formal Public Hearing on August 17, 2011, during which a stenographer will record all offered comments.

The Navy will not respond to your comments during the formal Public Hearing. The Navy will hold a brief informational meeting prior to the start of the formal Public Hearing on August 17, 2011.

The Navy will review the transcript of all the comments received during the hearing and all written comments received during the comment period before making a final cleanup decision.

The Navy will then prepare a written response to all the formal written and oral comments received. Your formal comment will become part of the official public record. The transcript of comments and the Navy's written responses will be issued in a document called a **Responsiveness Summary** when the Navy releases the Record of Decision. The **Responsiveness Summary** and **Record of Decision** will be made available to the public on-line and at the Curtis Memorial Library (see address to the right).

The Navy will announce the final decision on the cleanup plan through the local media and via the NAS Brunswick Environmental Restoration Program website, <http://nasbrunswick.navy-env.com/>.

You may send comments by U.S. mail, fax or e-mail. A tear-off mailer is provided for your convenience.

WHAT DO YOU THINK?

The Navy, as the lead agency, is accepting formal public comments on this Proposed Plan from August 1 to August 31, 2011. You don't have to be a technical expert to comment. If you have a comment, the Navy wants to hear it before the final decision about Site 17 is made.

Send Written Comments

Provide the Navy with your written comments about the Proposed Plan for Site 17. Please email (todd.bober@navy.mil), fax (215)-897-4902, or mail comments, postmarked no later than August 31, 2011, to:

Mr. Todd Bober
BRAC PMO Northeast
Building 679, Naval Business Center
4911 South Broad Street
Philadelphia, Pennsylvania 19112-1303

For More Detailed Information You May Go to the Public Information Repository or Visit Our Website

The Proposed Plan was prepared to help the public understand and comment on the **no further action** proposal for this site and provides a summary of a number of reports and studies. The technical and public information documents used by the Navy to prepare the Proposed Plan are available at the following Information Repository:

Curtis Memorial Library
23 Pleasant Street
Brunswick, Maine 04011-2261

Relevant documents can also be accessed via the NAS Brunswick Environmental Restoration Program website, nasbrunswick.navy-env.com and Department of the Navy BRAC Program Management Office website, www.bracpmo.navy.mil/.

GLOSSARY OF TERMS

This glossary defines the bolded terms used in this Proposed Plan. The definitions in this glossary apply specifically to this Proposed Plan and may have other meanings when used in different circumstances.

Carcinogens: Chemicals that cause cancer.

Chemical of Concern (COC): A substance detected at a level and/or in a location where it could have an adverse effect on human health and the environment. No **chemicals of concern** were identified at Site 17 because no adverse effects were identified.

Chemical of potential concern (COPC): Chemicals found at concentrations greater than federal and state risk-based screening levels.

Cleanup Level: A numerical concentration agreed upon by the Navy and EPA, in consultation with MEDEP, as having to be reached for a certain **chemical of concern** to meet one or more of the remedial action objectives. A **cleanup level** may be a regulatory-based criterion, a risk-based concentration, or even a background value.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law also known as "Superfund." This law was passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

DDT, DDD, and DDE: **DDT** is a synthetic pesticide and persistent contaminant with the chemical name dichlorodiphenyltrichloroethane that was banned in the US in 1972 based on adverse impacts to human health and the environment. Dichlorodiphenyldichloroethylene (**DDE**) and dichlorodiphenyldichloroethane (**DDD**) were present in minor amounts in commercial **DDT** mixtures and are also breakdown products of **DDT**.

Groundwater: Water found beneath the earth's surface that fills pores between such materials as sand, soil, gravel, or rock.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): More commonly called the **National Contingency Plan**, it is the federal government's blueprint for responding to both oil spills and hazardous substance releases. Following the passage of Superfund (**CERCLA**) legislation in 1980, the **National Contingency Plan**

was broadened to cover releases at hazardous waste sites requiring emergency removal actions. A key provision involves authorizing the lead agency to initiate appropriate removal action in the event of a hazardous substance release.

Non-carcinogens: Chemicals that may cause adverse effects other than cancer.

No Further Action: A recommendation made for a site when no unacceptable risk to human health and the environment is found.

Receptor: An individual, either a human, plant, or animal, that may be exposed to a chemical present at the site.

Record of Decision (ROD): An official document that describes the selected action for a specific site. The **Record of Decision** documents the remedy selection process and is issued by the Navy following the public comment period.

Remedial Investigation (RI): An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site.

Responsiveness Summary: A section of the **Record of Decision** that includes a listing of the written and oral formal comments received during the public comment period and public meeting on the Proposed Plan and Navy's responses to the comments.

Risk Assessment: Evaluation and estimation of the current and future potential for adverse human health and/or ecological effects from exposure to contaminants. A human health **risk assessment** is an evaluation of current and future potential for adverse human health effects from exposure to site contaminants. An ecological **risk assessment** is a study that evaluates the potential risk to ecological receptors (various types of plants and animals) from contaminants at a site.

Superfund: Another name for the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** (see above).

Place
Stamp
Here

MR. TODD BOBER
REMEDIAL PROJECT MANAGER
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PHILADELPHIA, PA 19112-1303

Fold on line, staple, stamp, and mail

NATION

Bush to attend 9/11 anniversary event

President Obama and U.S. leaders during the 2001 attacks will be on hand, without giving speeches.

The Associated Press
NEW YORK — The ceremony at the World Trade Center site marking the 10th anniversary of the terrorist attacks will be a solemn but stately event that will include former President George W. Bush and a chance for victims' families to view the names of loved ones etched into the memorial, Mayor Michael Bloomberg said.

President Obama and Bloomberg will be joined by the leaders in charge during the 2001 attacks, including Bush, former Mayor Rudolph Giuliani and former New York Gov. George Pataki. Current New York Gov. Andrew Cuomo and New Jersey Gov. Chris Christie will also be there, he said.

Speaking on his weekly radio show Friday, Bloomberg said the lawmakers will read short poems or quotes. No speeches will be given.

"This cannot be political," he said. "So that's why there's a poem or a quote or something that each of the readers will read. No speeches whatsoever. That's not an appropriate thing."

The mayor also revealed a few more details for the ceremony on Sunday, Sept. 11. It will be held on the highway to the west of the site, and only relatives will be allowed inside the memorial to look for the names of their loved ones, etched into the railings at two huge waterfalls built in the footprint of the World Trade Center.

The names of the nearly 3,000 victims — including those who died at the Pentagon and aboard United Flight 93 that went down in Shanksville, Pa. — will be read



The Associated Press
Work continues on the National September 11 Memorial at the World Trade Center site. The memorial will be dedicated on Sept. 11 this year, the 10th anniversary of the terrorist attacks.

aloud for the first time.

The public will be allowed into the space, still a major construction site, the day after the ceremony but only with tickets. Bloomberg said limiting the number of people is a safety precaution as the work continues on 1 World Trade Center, the PATH station and museum.

He said there have been a couple of hundred thousand reservations already, and a few days are already booked solid. He estimated that a million people annually will visit the site.

The museum is still under construction and is scheduled to open next year. Artifacts from the terrorist attacks are slowly being accumulated for the space, including a steel T-beam shaped like a cross that was discovered by a construc-

tion worker in the smoldering rubble. A national atheist group sued over the inclusion of the cross in the museum. It says all beliefs should be included, or none.

Bloomberg said on his radio show that the group had a right to sue, but the cross had a right to be there.

"This clearly influenced people," he said. "It gave them strength. In a museum you want to show things that impacted people's behavior back then, even if you don't think it was right. It's history. Museums are for history."

Bloomberg said other religious relics would be in the museum — a star of David cut from World Trade Center steel, a Bible found during the recovery effort and a Jewish prayer shawl.

Rapid, cheap HIV test works in field

A 'lab on a chip' accurately detects the virus among Rwandan patients within 20 minutes, a study finds.

The Washington Post
WASHINGTON — The first field trial for a "lab on a chip" accurately detected both HIV and syphilis among a Rwandan population, researchers reported Sunday.

Blood samples injected into the clear plastic device produced results within 20 minutes. This kind of test could offer a faster, cheaper and easier way to detect infectious diseases that afflict developing countries, according to the report published online by Nature Medicine.

"This is a big step," said Doris Rouse, a vice president at RTI International in North Carolina, who specializes in global health technologies and was not involved with the study. "What's especially exciting about this

device is that it's rugged, easy to use and doesn't require a lot of infrastructure or training."

Cheap HIV tests that provide results within 30 minutes have been available for years, but many rely on a decades-old method called lateral flow. A sample of blood or oral fluid is placed on a strip of paper, and like a pregnancy test, a colored band appears and can be interpreted to indicate infection.

Few lateral flow tests, however, have proven reliable across multiple settings and types of infection. Many people in developing countries instead rely on expensive, time-consuming lab analysis, "but this new test can be done outside the lab with all the same advantages and sensitivity for detection," said Rosanna Peeling, a diagnostics researcher at the London School of Hygiene & Tropical Medicine, who was not part of the study.

The lab on a chip trial shows 100 percent detection of HIV-

positive cases, with only one false positive out of 70 total samples, according to the report.

When a dual test of HIV and syphilis was performed, the chip had similar accuracy for HIV; 94 percent of syphilis cases were detected, though four of 67 total samples were false positives.

Overall, the test proved successful in a difficult environment with little infrastructure, said Samuel Sia, one of the study's authors and a biomedical engineer at Columbia University.

Sia tested the device in Rwanda, where about 3 percent of the adult population is infected with HIV, according to the WHO. Currently, patients in the city of Kigali must provide blood at the local hospital, which then sends samples to a national lab for analysis.

Turnaround time for results could be weeks, but the chip, which can be used at the hospital itself, detected both HIV and syphilis within 20 minutes.



NOTICE OF AVAILABILITY AND PUBLIC COMMENT PERIOD

Proposed Plan

Installation Restoration Site 17

Former Naval Air Station Brunswick, Maine



The Department of the Navy announces the availability for public comment of the Proposed Plan for soils at Site 17 at the former Naval Air Station Brunswick, Maine. This plan was prepared as required by the Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund). Site 17 is located in the north-central area of the base at the corner of Pegasus Avenue and Avenue B. Soil contamination at Site 17 occurred as a result of pest control operations that included storage, mixing, and disposal of pesticides and herbicides from the 1940s until 1985. Soils impacted by these activities were excavated and disposed of at an off-base location as part of multiple removal actions conducted in 1994, 2009, and 2010. With the removal of contaminated soils from Site 17, potentially unacceptable risks from exposure to soil were eliminated. Further action for soils is not required to protect human health and the environment at Site 17.

PUBLIC COMMENT PERIOD

The Proposed Plan is available for public review, and the Navy will accept comments from August 1 to August 31, 2011. Public comments submitted in writing must be postmarked or e-mailed no later than August 31, 2011. If you have any questions or wish to comment, please contact Mr. Todd Bober, Remedial Project Manager, BRAC PMO NE, Building 679, Naval Business Center, 4911 South Broad Street, Philadelphia, PA 19112-1303; todd.bober@navy.mil; phone: 215-897-4911; fax: 215-897-4902.

PUBLIC MEETING

On August 17, 2011, the Navy will hold a public meeting at the Parkwood Inn in Brunswick, Maine, consisting of an informational session from 5:30 to 7:00 pm and a public meeting at 7:00 pm where the Navy will accept oral and written comments from the public.

FOR MORE INFORMATION

Community input is integral to the remedy selection process. The Proposed Plan for Site 17 soils is available on the NAS Brunswick Environmental Restoration website, http://nasbrunswick.navy-env.com, or Department of the Navy BRAC Program Management Office website, www.bracpmo.navy.mil, and at the Information Repository during normal hours of operation at:

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**NOTICE OF AVAILABILITY AND
PUBLIC COMMENT PERIOD
Proposed Plan
Installation Restoration Site 17
Former Naval Air Station Brunswick, Maine**

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Appendix C Human Health Risk Assessment Summary Tables and Conceptual Site Model

**TABLE C-1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, BRUNSWICK, MAINE**

Scenario Timeframe: Current/Future Medium: Surface Soil Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration ⁽¹⁾			
						Value	Units	Statistic	Rationale
Site 17	ARSENIC	mg/kg	6.55	8.03 (G)	18.2	8	mg/kg	95% Approximate Gamma UCL	ProUCL Version 4.1
	HEPTACHLOR EPOXIDE	mg/kg	0.0087	0.024 (NP)	0.13 (J)	0.02	mg/kg	95% RM (Percentile Bootstrap) UCL	ProUCL Version 4.1

For non-detects, the sample quantitation limit was used as an input for the 95% UCL calculation; one-half the detection limit was used as the proxy concentration for non-detects in the arithmetic mean calculation.

For duplicate sample results, the average value was used in the calculation.

1. Exposure point concentration is the value recommended by USEPA's ProUCL. The maximum detected concentration is selected as the exposure point concentration if the recommended

calculated UCL is greater than the maximum or if the dataset contains less than 10 samples.

G = Gamma

J = Estimated value

NP = Non-parametric

UCL = Upper Confidence Limit

**TABLE C-2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
NAS BRUNSWICK
BRUNSWICK, MAINE**

Scenario Timeframe: Current/Future Medium: Subsurface Soil Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration ⁽¹⁾			
						Value	Units	Statistic	Rationale
Site 17	ARSENIC	mg/kg	3.08	4.36 (NP)	8.7 (J)	4.4	mg/kg	95% KM (Chebyshev) UCL	ProUCL Version 4.1
	MONURON	mg/kg	0.032	0.05 (NP)	0.55 (J)	0.05	mg/kg	95% KM (t) UCL	ProUCL Version 4.1
	4,4'-DDT	mg/kg	0.85	2.3 (NP)	15.2 (J)	2.3	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL Version 4.1
	ALPHA-CHLORDANE	mg/kg	0.12	0.41 (NP)	3.1 (J)	0.4	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL Version 4.1
	DIELDRIN	mg/kg	0.002	0.003 (NP)	0.043	0.003	mg/kg	95% KM (t) UCL	ProUCL Version 4.1
	GAMMA-CHLORDANE	mg/kg	0.12	0.37 (NP)	2.7	0.4	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL Version 4.1
	HEPTACHLOR	mg/kg	0.02	0.03 (NP)	0.39 (J)	0.03	mg/kg	95% KM (t) UCL	ProUCL Version 4.1
	HEPTACHLOR EPOXIDE	mg/kg	0.02	0.03 (NP)	0.58 J	0.03	mg/kg	95% KM (t) UCL	ProUCL Version 4.1

For non-detects, the sample quantitation limit was used as an input for the 95% UCL calculation; one-half the detection limit was used as the proxy concentration for non-detects in the arithmetic mean calculation.

For duplicate sample results, the average value was used in the calculation.

1. Exposure point concentration is the value recommended by USEPA's ProUCL. The maximum detected concentration is selected as the exposure point concentration if the recommended

calculated UCL is greater than the maximum or if the dataset contains less than 10 samples.

J = Estimated value

N = Normal

NP = Non-parametric

UCL = Upper Confidence Limit

**TABLE C-3
CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, BRUNSWICK, MAINE**

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal ⁽¹⁾	Absorbed Cancer Slope Factor for Dermal ⁽²⁾		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Pesticides/PCBs								
4,4'-DDT	3.4E-01	(mg/kg/day) ⁻¹	1	3.4E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
4,4'-DDD	2.4E-01	(mg/kg/day) ⁻¹	1	2.4E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Alpha-Chlordane ⁽³⁾	3.5E-01	(mg/kg/day) ⁻¹	1	3.5E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Dieldrin	1.6E+01	(mg/kg/day) ⁻¹	1	1.6E+01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Gamma-Chlordane ⁽³⁾	3.5E-01	(mg/kg/day) ⁻¹	1	3.5E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Heptachlor	4.5E+00	(mg/kg/day) ⁻¹	1	4.5E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Heptachlor Epoxide	9.1E+00	(mg/kg/day) ⁻¹	1	9.1E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Inorganics								
Arsenic	1.5E+00	(mg/kg/day) ⁻¹	1	1.5E+00	(mg/kg/day) ⁻¹	A (Human Carcinogen)	IRIS	3/08/2010

Notes:

1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance

2 or Dermal Risk Assessment Interim EPA 540/R/99/005.

3 - Values are for chlordane.
Oral cancer slope factor / Oral Absorption Efficiency for Dermal.

Acronyms:

IRIS = Integrated Risk Information System.

NA = Not Available.

**TABLE C-4
CANCER TOXICITY DATA -- INHALATION
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, BRUNSWICK, MAINE**

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor ⁽¹⁾		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Pesticides/PCBs							
4,4'-DDT	9.7E-05	(ug/m3) ⁻¹	3.4E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
4,4'-DDD	6.9E-05	(ug/m3) ⁻¹	2.4E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/8/2010
Alpha-Chlordane ⁽²⁾	1.0E-04	(ug/m3) ⁻¹	3.6E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Dieldrin	4.6E-03	(ug/m3) ⁻¹	1.6E+01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Gamma-Chlordane ⁽²⁾	1.0E-04	(ug/m3) ⁻¹	3.6E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Heptachlor	1.3E-03	(ug/m3) ⁻¹	4.6E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Heptachlor Epoxide	2.6E-03	(ug/m3) ⁻¹	9.1E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	3/08/2010
Inorganics							
Arsenic	4.3E-03	(ug/m ³) ⁻¹	1.5E+01	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	3/08/2010

Notes:

1 - Inhalation CSF = Unit Risk * 70 kg / 20m³/day.

2 - Values are for chlordane.

Definitions:

IRIS = Integrated Risk Information System.

NA = Not Available.

**TABLE C-5
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, BRUNSWICK, MAINE**

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal ⁽¹⁾	Absorbed RfD for Dermal ⁽²⁾		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Pesticides/PCBs										
4,4'-DDT	Chronic	5.0E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	100/1	IRIS	3/08/2010
4,4'-DDD	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-chlordane ⁽³⁾	Chronic	5.0E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	3/08/2010
Dieldrin	Chronic	5.0E-05	mg/kg/day	1	5.00E-05	mg/kg/day	Liver	100/1	IRIS	3/08/2010
Gamma Chlordane ⁽³⁾	Chronic	5.0E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	3/08/2010
Heptachlor	Chronic	5.0E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	3/08/2010
Heptachlor Epoxide	Chronic	1.3E-05	mg/kg/day	1	1.30E-05	mg/kg/day	Liver	1000/1	IRIS	3/08/2010
Extractable Petroleum Hydrocarbons										
Inorganics										
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	3/08/2010

Notes:

1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for

2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.

3 - Values are for chlordane.

Definitions:

CNS = Central Nervous System

CVS = Cardiovascular system

GS = Gastrointestinal

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

MADEP = Massachusetts Department of Environmental Protection

NA = Not Available.

PPRTV = Provisional Peer Reviewed Toxicity Values

RIC = Reference concentration

RfD = Reference Dose

**TABLE C-6
NON-CANCER TOXICITY DATA -- INHALATION
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, BRUNSWICK, MAINE**

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD ⁽¹⁾		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Pesticides/PCBs									
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-Chlordane ⁽²⁾	Chronic	7.0E-04	mg/m ³	2.0E-04	(mg/kg/day)	Liver	1000/1	IRIS	3/08/2010
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma-Chlordane ⁽²⁾	Chronic	7.0E-04	mg/m ³	2.0E-04	(mg/kg/day)	Liver	1000/1	IRIS	3/08/2010
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics									
Arsenic	Chronic	1.50E-05	mg/m ³	4.3E-06	(mg/kg/day)	NA	NA	Cal EPA	12/2009

Notes:

- 1 - Extrapolated RfD = RfC *20m³/day / 70 kg
- 2 - Values are for chlordane.

Definitions:

- Cal EPA = California EPA
- CNS = Central Nervous System
- HEAST= Health Effects Assessment Summary Tables
- IRIS = Integrated Risk Information System
- MADEP = Massachusetts Department of Environmental Protection
- NA = Not Applicable
- PPRTV = Provisional Peer Reviewed Toxicity Values

- RfC = Reference concentration
- RfD = Reference Dose

TABLE C-7
SUMMARY OF SITE-SPECIFIC CANCER RISKS AND HAZARD INDICES
REASONABLE MAXIMUM EXPOSURES
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, MAINE
PAGE 1 OF 4

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index (HI)	Chemicals Contributing to an HI > 1 ⁽¹⁾
Construction Worker (Current/Future)	Surface Soil	Incidental Ingestion	5E-09	--	--	--	0.003	--
		Dermal Contact	2E-09	--	--	--	0.001	--
		Inhalation	6E-11	--	--	--	--	--
		Total	7E-09	--	--	--	0.004	--
Construction Worker (Current/Future)	Subsurface Soil	Incidental Ingestion	4E-08	--	--	--	0.02	--
		Dermal Contact	7E-09	--	--	--	0.003	--
		Inhalation	5E-10	--	--	--	0.0001	--
		Total	5E-08	--	--	--	0.02	--
Construction Worker (Current/Future)	Groundwater	Incidental Ingestion	1E-10	--	--	--	0.00004	--
		Dermal Contact	--	--	--	--	--	--
		Inhalation	--	--	--	--	--	--
		Total	1E-10	--	--	--	--	--
Construction Worker Surface Soil + Groundwater Total			7E-09				0.004	
Construction Worker Subsurface Soil + Groundwater Total			5E-08				0.02	
Typical Industrial Worker (Future)	Surface Soil	Incidental Ingestion	6E-08	--	--	--	0.002	--
		Dermal Contact	4E-08	--	--	--	0.001	--
		Inhalation	5E-13	--	--	--	--	--
		Total	1E-07	--	--	--	0.002	--
Typical Industrial Worker (Future)	Subsurface Soil	Incidental Ingestion	5E-07	--	--	--	0.01	--
		Dermal Contact	2E-07	--	--	--	0.003	--
		Inhalation	4E-12	--	--	--	--	--
		Total	7E-07	--	--	--	0.01	--
Adolescent Trespasser (Current/Future)	Surface Soil	Incidental Ingestion	4E-09	--	--	--	0.0003	--
		Dermal Contact	5E-09	--	--	--	0.0003	--
		Inhalation	9E-15	--	--	--	--	--
		Total	9E-09	--	--	--	0.0005	--
Adolescent Trespasser (Current/Future)	Subsurface Soil	Incidental Ingestion	4E-08	--	--	--	0.001	--
		Dermal Contact	2E-08	--	--	--	0.001	--
		Inhalation	8E-14	--	--	--	--	--
		Total	6E-08	--	--	--	0.002	--

TABLE C-7
SUMMARY OF SITE-SPECIFIC CANCER RISKS AND HAZARD INDICES
REASONABLE MAXIMUM EXPOSURES
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, MAINE
PAGE 2 OF 4

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index (HI)	Chemicals Contributing to an HI > 1 ⁽¹⁾
Adult Trespasser (Current/Future)	Surface Soil	Incidental Ingestion	4E-09	--	--	--	0.0002	--
		Dermal Contact	1E-09	--	--	--	0.0001	--
		Inhalation	1E-14	--	--	--	--	--
		Total	5E-09	--	--	--	0.0002	--
Adult Trespasser (Current/Future)	Subsurface Soil	Incidental Ingestion	3E-08	--	--	--	0.001	--
		Dermal Contact	7E-09	--	--	--	0.0002	--
		Inhalation	1E-13	--	--	--	--	--
		Total	4E-08	--	--	--	0.001	--
Child Resident (Future)	Surface Soil	Incidental Ingestion	2E-07	--	--	--	0.02	--
		Dermal Contact	6E-08	--	--	--	0.01	--
		Inhalation	5E-13	--	--	--	--	--
		Total	3E-07	--	--	--	0.03	--
Child Resident (Future)	Subsurface Soil	Incidental Ingestion	2E-06	--	--	--	0.1	--
		Dermal Contact	3E-07	--	--	--	0.02	--
		Inhalation	4E-12	--	--	--	--	--
		Total	2E-06	--	--	--	0.1	--
Child Resident (Future)	Groundwater	Incidental Ingestion	5E-06	--	--	--	0.2	--
		Dermal Contact	--	--	--	--	--	--
		Inhalation	--	--	--	--	--	--
		Total	5E-06	--	--	--	0.2	--
Child Resident Surface Soil + Groundwater Total			5E-06			0.2		
Child Resident Subsurface Soil + Groundwater Total			7E-06			0.4		
Adolescent Resident (Future)	Surface Soil	Incidental Ingestion	5E-08	--	--	--	0.003	--
		Dermal Contact	5E-08	--	--	--	0.003	--
		Inhalation	8E-13	--	--	--	--	--
		Total	1E-07	--	--	--	0.01	--
Adolescent Resident (Future)	Subsurface Soil	Incidental Ingestion	4E-07	--	--	--	0.02	--
		Dermal Contact	2E-07	--	--	--	0.01	--
		Inhalation	6E-12	--	--	--	--	--
		Total	6E-07	--	--	--	0.02	--

TABLE C-7
SUMMARY OF SITE-SPECIFIC CANCER RISKS AND HAZARD INDICES
REASONABLE MAXIMUM EXPOSURES
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, MAINE
PAGE 3 OF 4

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index (HI)	Chemicals Contributing to an HI > 1 ⁽¹⁾
Adolescent Resident (Future)	Groundwater	Incidental Ingestion	4E-06	--	--	--	0.1	--
		Dermal Contact	--	--	--	--	--	--
		Inhalation	--	--	--	--	--	--
		Total	4E-06	--	--	--	0.1	--
Adolescent Resident Surface Soil + Groundwater Total			4E-06			0.1		
Adolescent Resident Subsurface Soil + Groundwater Total			5E-06			0.1		
Adult Resident (Future)	Surface Soil	Incidental Ingestion	5E-08	--	--	--	0.002	--
		Dermal Contact	2E-08	--	--	--	0.001	--
		Inhalation	1E-12	--	--	--	--	--
		Total	7E-08	--	--	--	0.003	--
Adult Resident (Future)	Subsurface Soil	Incidental Ingestion	4E-07	--	--	--	0.01	--
		Dermal Contact	9E-08	--	--	--	0.002	--
		Inhalation	9E-12	--	--	--	--	--
		Total	5E-07	--	--	--	0.01	--
Adult Resident (Future)	Groundwater	Incidental Ingestion	5E-06	--	--	--	0.09	--
		Dermal Contact	--	--	--	--	--	--
		Inhalation	--	--	--	--	--	--
		Total	5E-06	--	--	--	0.09	--
Adult Resident Surface Soil + Groundwater Total			5E-06			0.09		
Adult Resident Subsurface Soil + Groundwater Total			5E-06			0.1		
Lifelong Trespasser (Current/Future)	Surface Soil	Incidental Ingestion	8E-09	--	--	--	NA	--
		Dermal Contact	6E-09	--	--	--	NA	--
		Inhalation	2E-14	--	--	--	NA	--
		Total	1E-08	--	--	--	NA	--
Lifelong Trespasser (Current/Future)	Subsurface Soil	Incidental Ingestion	7E-08	--	--	--	NA	--
		Dermal Contact	3E-08	--	--	--	NA	--
		Inhalation	2E-13	--	--	--	NA	--
		Total	9E-08	--	--	--	NA	--

TABLE C-7
SUMMARY OF SITE-SPECIFIC CANCER RISKS AND HAZARD INDICES
REASONABLE MAXIMUM EXPOSURES
SITE 17 REMEDIAL INVESTIGATION
NAS BRUNSWICK, MAINE
PAGE 4 OF 4

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index (HI)	Chemicals Contributing to an HI > 1 ⁽¹⁾
Lifelong Resident (Future)	Surface Soil	Incidental Ingestion	3E-07	--	--	--	NA	--
		Dermal Contact	1E-07	--	--	--	NA	--
		Inhalation	2E-12	--	--	--	NA	--
		Total	4E-07	--	--	--	NA	--
Lifelong Resident (Future)	Subsurface Soil	Incidental Ingestion	3E-06	--	--	--	NA	--
		Dermal Contact	6E-07	--	--	--	NA	--
		Inhalation	2E-11	--	--	--	NA	--
		Total	3E-06	--	--	--	NA	--
Lifelong Resident (Future)	Groundwater	Incidental Ingestion	1E-05	--	--	--	NA	--
		Dermal Contact	--	--	--	--	NA	--
		Inhalation	--	--	--	--	NA	--
		Total	1E-05	--	--	--	NA	--
Lifelong Resident Surface Soil + Groundwater Total			1E-05			NA		
Lifelong Resident Subsurface Soil + Groundwater Total			2E-05			NA		

TABLE 7.1.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE
 PAGE 1 OF 2

Scenario Timeframe: Future
 Receptor Population: Construction Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 17	Ingestion	Heptachlor Epoxide	0.020	mg/kg	5.5E-10	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	5.0E-09	3.9E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.003
			Exp. Route Total								5.0E-09					0.003
			Dermal	Heptachlor Epoxide	0.020	mg/kg	1.7E-10	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	1.5E-09	1.2E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0009
			Exp. Route Total								1.5E-09					0.0009
	Exposure Point Total										6.5E-09				0.004	
	Exposure Medium Total										6.5E-09				0.004	
	Air	Site 17	Inhalation	Heptachlor Epoxide	1.2E-8	mg/m ³	2.4E-11	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	6.3E-11	1.7E-09	(mg/m ³)	NA	(mg/m ³)	--
			Exp. Route Total								6.3E-11				--	
			Exposure Point Total									6.3E-11				--
	Exposure Medium Total										6.3E-11				--	
Medium Total										6.6E-09				0.004		
Subsurface Soil	Subsurface Soil	Site 17	Ingestion	MONURON	0.050	mg/kg	1.4E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	2.30	mg/kg	6.4E-08	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	2.2E-08	4.5E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.009
				ALPHA-CHLORDANE	0.400	mg/kg	1.1E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	3.9E-09	7.7E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.002
				DIELDRIN	0.003	mg/kg	8.3E-11	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.3E-09	5.8E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0001
				GAMMA-CHLORDANE	0.400	mg/kg	1.1E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	3.9E-09	7.7E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.002
				HEPTACHLOR	0.030	mg/kg	8.3E-10	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	3.7E-09	5.8E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0001
				HEPTACHLOR EPOXIDE	0.030	mg/kg	8.3E-10	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	7.6E-09	5.8E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.004
			Exp. Route Total								4.2E-08					0.02
			Dermal	MONURON	0.050	mg/kg	4.2E-10	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	2.30	mg/kg	5.7E-09	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	1.9E-09	4.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0008
	ALPHA-CHLORDANE	0.400		mg/kg	1.3E-09	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	4.6E-10	9.3E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002		
	DIELDRIN	0.003		mg/kg	2.5E-11	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	4.0E-10	1.7E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00003		
	GAMMA-CHLORDANE	0.400	mg/kg	1.3E-09	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	4.6E-10	9.3E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002			
	HEPTACHLOR	0.030	mg/kg	2.5E-10	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	1.1E-09	1.7E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00003			
	HEPTACHLOR EPOXIDE	0.030	mg/kg	2.5E-10	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	2.3E-09	1.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.001			
	Exp. Route Total								6.7E-09					0.003		
	Exposure Point Total										4.9E-08				0.02	
Exposure Medium Total										4.9E-08				0.02		
Air	Site 17	Inhalation	MONURON	3.1E-8	mg/m ³	6.0E-11	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.2E-09	(mg/m ³)	NA	(mg/m ³)	--	
			4,4'-DDT	1.4E-6	mg/m ³	2.8E-09	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	2.7E-10	1.9E-07	(mg/m ³)	NA	(mg/m ³)	--	
			ALPHA-CHLORDANE	2.5E-7	mg/m ³	4.8E-10	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	4.8E-11	3.4E-08	(mg/m ³)	7.0E-04	(mg/m ³)	0.00005	
			DIELDRIN	1.9E-9	mg/m ³	3.6E-12	(mg/m ³)	4.6E-03	(ug/m ³) ⁻¹	1.7E-11	2.5E-10	(mg/m ³)	NA	(mg/m ³)	--	
			GAMMA-CHLORDANE	2.5E-7	mg/m ³	4.8E-10	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	4.8E-11	3.4E-08	(mg/m ³)	7.0E-04	(mg/m ³)	0.00005	
			HEPTACHLOR	1.9E-8	mg/m ³	3.6E-11	(mg/m ³)	1.3E-03	(ug/m ³) ⁻¹	4.7E-11	2.5E-09	(mg/m ³)	NA	(mg/m ³)	--	
			HEPTACHLOR EPOXIDE	1.9E-8	mg/m ³	3.6E-11	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	9.4E-11	2.5E-09	(mg/m ³)	NA	(mg/m ³)	--	
			Exp. Route Total								5.2E-10					0.00010
Exposure Point Total									5.2E-10					0.00010		
Exposure Medium Total									5.2E-10					0.00010		
Medium Total										4.9E-08				0.02		

TABLE 7.1.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE
 PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 17	Ingestion	4,4'-DDD	1.200	ug/L	2.0E-10	(mg/kg/day)	2.4E-01	(mg/kg/day) ⁻¹	4.8E-11	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	1.6	ug/L	2.7E-10	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	9.1E-11	1.9E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00004
			Exp. Route Total								1.4E-10					0.00004
			Dermal	4,4'-DDD	1.200	ug/L	0.0E+00	(mg/kg/day)	2.4E-01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	1.6	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
			Exp. Route Total								--					--
	Exposure Point Total								1.4E-10					0.00004		
	Exposure Medium Total								1.4E-10					0.00004		
	Air	Site 17	Inhalation	4,4'-DDD	0.0E+0	mg/m ³	0.0E+00	(mg/m ³)	6.9E-05	(ug/m ³) ⁻¹	--	0.0E+00	(mg/m ³)	NA	(mg/m ³)	--
				4,4'-DDT	0.0E+0	mg/m ³	0.0E+00	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	--	0.0E+00	(mg/m ³)	NA	(mg/m ³)	--
			Exp. Route Total								--					--
			Exposure Point Total								--					--
	Exposure Medium Total								--					--		
	Medium Total								1.4E-10					0.00004		

TABLE 7.2.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE

Scenario Timeframe: Current/Future
 Receptor Population: Industrial Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Site 17	Ingestion	Heptachlor Epoxide	0.020	mg/kg	7.0E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	6.4E-08	2.0E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.002	
			Exp. Route Total								6.4E-08					0.002	
			Dermal	Heptachlor Epoxide	0.020	mg/kg	4.6E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	4.2E-08	1.3E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.001	
			Exp. Route Total								4.2E-08					0.001	
			Exposure Point Total								1.1E-07					0.002	
	Exposure Medium Total								1.1E-07						0.002		
	Air	Site 17	Inhalation	Heptachlor Epoxide	2.1E-12	mg/m ³	1.7E-13	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	4.5E-13	4.9E-13	(mg/m ³)	NA	(mg/m ³)	--	
				Exp. Route Total							4.5E-13					0.00	
				Exposure Point Total							4.5E-13					--	
				Exposure Medium Total							4.5E-13					--	
Medium Total										1.1E-07				0.002			
Subsurface Soil	Subsurface Soil	Site 17	Ingestion	MONURON	0.050	mg/kg	1.7E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				4,4'-DDT	2.30	mg/kg	8.0E-07	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	2.7E-07	2.3E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.005	
				ALPHA-CHLORDANE	0.400	mg/kg	1.4E-07	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	4.9E-08	3.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0008	
				DIELDRIN	0.003	mg/kg	1.0E-09	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.7E-08	2.9E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00006	
				GAMMA-CHLORDANE	0.400	mg/kg	1.4E-07	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	4.9E-08	3.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0008	
				HEPTACHLOR	0.030	mg/kg	1.0E-08	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	4.7E-08	2.9E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00006	
				HEPTACHLOR EPOXIDE	0.030	mg/kg	1.0E-08	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	9.5E-08	2.9E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.002	
				Exp. Route Total							5.3E-07						0.01
				Dermal	MONURON	0.050	mg/kg	1.2E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
					4,4'-DDT	2.30	mg/kg	1.6E-07	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	5.4E-08	4.5E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0009
					ALPHA-CHLORDANE	0.400	mg/kg	3.7E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.3E-08	1.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002
					DIELDRIN	0.003	mg/kg	6.9E-10	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.1E-08	1.9E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00004
	GAMMA-CHLORDANE	0.400	mg/kg		3.7E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.3E-08	1.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002			
	HEPTACHLOR	0.030	mg/kg		6.9E-09	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	3.1E-08	1.9E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00004			
	HEPTACHLOR EPOXIDE	0.030	mg/kg	6.9E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	6.3E-08	1.9E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.001				
	Exp. Route Total							1.9E-07						0.003			
	Exposure Point Total								7.2E-07						0.01		
	Exposure Medium Total								7.2E-07						0.01		
	Air	Site 17	Inhalation	MONURON	5.3E-12	mg/m ³	4.4E-13	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.2E-12	(mg/m ³)	NA	(mg/m ³)	--	
				4,4'-DDT	2.5E-10	mg/m ³	2.0E-11	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	1.9E-12	5.6E-11	(mg/m ³)	NA	(mg/m ³)	--	
				ALPHA-CHLORDANE	4.3E-11	mg/m ³	3.5E-12	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	3.5E-13	9.7E-12	(mg/m ³)	7.0E-04	(mg/m ³)	0.00000001	
				DIELDRIN	3.2E-13	mg/m ³	2.6E-14	(mg/m ³)	4.6E-03	(ug/m ³) ⁻¹	1.2E-13	7.3E-14	(mg/m ³)	NA	(mg/m ³)	--	
				GAMMA-CHLORDANE	4.3E-11	mg/m ³	3.5E-12	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	3.5E-13	9.7E-12	(mg/m ³)	7.0E-04	(mg/m ³)	0.00000001	
HEPTACHLOR				3.2E-12	mg/m ³	2.6E-13	(mg/m ³)	1.3E-03	(ug/m ³) ⁻¹	3.4E-13	7.3E-13	(mg/m ³)	NA	(mg/m ³)	--		
HEPTACHLOR EPOXIDE				3.2E-12	mg/m ³	2.6E-13	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	6.8E-13	7.3E-13	(mg/m ³)	NA	(mg/m ³)	--		
Exp. Route Total										3.8E-12						0.00000003	
Exposure Point Total								3.8E-12						0.00000003			
Exposure Medium Total								3.8E-12						0.00000003			
Medium Total										7.2E-07				0.01			

TABLE 7.3.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE

Scenario Timeframe: Current/Future
 Receptor Population: Trespasser
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Site 17	Ingestion	Heptachlor Epoxide	0.020	mg/kg	4.8E-10	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	4.4E-09	3.4E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0003	
			Exp. Route Total								4.4E-09					0.0003	
			Dermal	Heptachlor Epoxide	0.020	mg/kg	5.1E-10	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	4.7E-09	3.6E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0003	
			Exp. Route Total								4.7E-09					0.0003	
			Exposure Point Total								9.1E-09					0.001	
	Exposure Medium Total								9.1E-09						0.001		
	Air	Site 17	Inhalation	Heptachlor Epoxide	2.1E-12	mg/m ³	3.6E-15	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	9.4E-15	2.5E-14	(mg/m ³)	NA	(mg/m ³)	--	
				Exp. Route Total								9.4E-15				--	
				Exposure Point Total								9.4E-15				--	
				Exposure Medium Total								9.4E-15				--	
Medium Total									9.1E-09					0.001			
Subsurface Soil	Subsurface Soil	Site 17	Ingestion	MONURON	0.050	mg/kg	1.2E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.5E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				4,4'-DDT	2.30	mg/kg	5.6E-08	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	1.9E-08	3.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0008	
				ALPHA-CHLORDANE	0.400	mg/kg	9.7E-09	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	3.4E-09	6.8E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0001	
				DIELDRIN	0.003	mg/kg	7.3E-11	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.2E-09	5.1E-10	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00001	
				GAMMA-CHLORDANE	0.400	mg/kg	9.7E-09	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	3.4E-09	6.8E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0001	
				HEPTACHLOR	0.030	mg/kg	7.3E-10	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	3.3E-09	5.1E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00001	
				HEPTACHLOR EPOXIDE	0.030	mg/kg	7.3E-10	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	6.6E-09	5.1E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0004	
				Exp. Route Total								3.7E-08					0.001
				Dermal	MONURON	0.050	mg/kg	1.3E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.0E-09	(mg/kg/day)	NA	(mg/kg/day)	--
					4,4'-DDT	2.30	mg/kg	1.8E-08	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	6.0E-09	1.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002
					ALPHA-CHLORDANE	0.400	mg/kg	4.1E-09	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.4E-09	2.9E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00006
	DIELDRIN	0.003	mg/kg		7.7E-11	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.2E-09	5.4E-10	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00001			
	GAMMA-CHLORDANE	0.400	mg/kg		4.1E-09	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.4E-09	2.9E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00006			
	HEPTACHLOR	0.030	mg/kg	7.7E-10	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	3.5E-09	5.4E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00001				
	HEPTACHLOR EPOXIDE	0.030	mg/kg	7.7E-10	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	7.0E-09	5.4E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0004				
	Exp. Route Total								2.1E-08					0.001			
	Exposure Point Total								5.7E-08					0.002			
	Exposure Medium Total								5.7E-08					0.002			
	Air	Site 17	Inhalation	MONURON	5.3E-12	mg/m ³	9.1E-15	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.3E-14	(mg/m ³)	NA	(mg/m ³)	--	
				4,4'-DDT	2.5E-10	mg/m ³	4.2E-13	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	4.0E-14	2.9E-12	(mg/m ³)	NA	(mg/m ³)	--	
				ALPHA-CHLORDANE	4.3E-11	mg/m ³	7.2E-14	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	7.2E-15	5.1E-13	(mg/m ³)	7.0E-04	(mg/m ³)	--	
				DIELDRIN	3.2E-13	mg/m ³	5.4E-16	(mg/m ³)	4.6E-03	(ug/m ³) ⁻¹	2.5E-15	3.8E-15	(mg/m ³)	NA	(mg/m ³)	--	
GAMMA-CHLORDANE				4.3E-11	mg/m ³	7.2E-14	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	7.2E-15	5.1E-13	(mg/m ³)	7.0E-04	(mg/m ³)	--		
HEPTACHLOR				3.2E-12	mg/m ³	5.4E-15	(mg/m ³)	1.3E-03	(ug/m ³) ⁻¹	7.1E-15	3.8E-14	(mg/m ³)	NA	(mg/m ³)	--		
HEPTACHLOR EPOXIDE				3.2E-12	mg/m ³	5.4E-15	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	1.4E-14	3.8E-14	(mg/m ³)	NA	(mg/m ³)	--		
Exp. Route Total											7.9E-14					--	
Exposure Point Total								7.9E-14					--				
Exposure Medium Total								7.9E-14					--				
Medium Total								5.7E-08					0.002				

TABLE 7.4.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE

Scenario Timeframe: Current/Future
 Receptor Population: Trespasser
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Site 17	Ingestion	Heptachlor Epoxide	0.020	mg/kg	4.1E-10	(mg/kg/day)	9.1E+00	(mg/kg/day)-1	3.7E-09	2.0E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0002	
			Exp. Route Total								3.7E-09					0.0002	
			Dermal	Heptachlor Epoxide	0.020	mg/kg	1.6E-10	(mg/kg/day)	9.1E+00	(mg/kg/day)-1	1.5E-09	8.1E-10	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00006	
			Exp. Route Total								1.5E-09					0.0001	
			Exposure Point Total								5.2E-09					0.0002	
	Exposure Medium Total								5.2E-09						0.0002		
	Air	Site 17	Inhalation	Heptachlor Epoxide	2.1E-12	mg/m3	5.1E-15	(mg/m3)	2.6E-03	(ug/m3)-1	1.3E-14	2.5E-14	(mg/m3)	NA	(mg/m3)	--	
			Exp. Route Total								1.3E-14					--	
			Exposure Point Total								1.3E-14					--	
	Exposure Medium Total									1.3E-14					--		
Medium Total									5.2E-09					0.0002			
Subsurface Soil	Subsurface Soil	Site 17	Ingestion	MONURON	0.050	mg/kg	1.0E-09	(mg/kg/day)	NA	(mg/kg/day)-1	--	5.1E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				4,4'-DDT	2.30	mg/kg	4.7E-08	(mg/kg/day)	3.4E-01	(mg/kg/day)-1	1.6E-08	2.3E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0005	
				ALPHA-CHLORDANE	0.400	mg/kg	8.1E-09	(mg/kg/day)	3.5E-01	(mg/kg/day)-1	2.8E-09	4.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00008	
				DIELDRIN	0.003	mg/kg	6.1E-11	(mg/kg/day)	1.6E+01	(mg/kg/day)-1	9.8E-10	3.1E-10	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.000006	
				GAMMA-CHLORDANE	0.400	mg/kg	8.1E-09	(mg/kg/day)	3.5E-01	(mg/kg/day)-1	2.8E-09	4.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00008	
				HEPTACHLOR	0.030	mg/kg	6.1E-10	(mg/kg/day)	4.5E+00	(mg/kg/day)-1	2.7E-09	3.1E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000006	
				HEPTACHLOR EPOXIDE	0.030	mg/kg	6.1E-10	(mg/kg/day)	9.1E+00	(mg/kg/day)-1	5.6E-09	3.1E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0002	
				Exp. Route Total								3.1E-08					0.001
				Dermal	MONURON	0.050	mg/kg	4.1E-10	(mg/kg/day)	NA	(mg/kg/day)-1	--	2.0E-09	(mg/kg/day)	NA	(mg/kg/day)	--
					4,4'-DDT	2.30	mg/kg	5.6E-09	(mg/kg/day)	3.4E-01	(mg/kg/day)-1	1.9E-09	2.8E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00006
	ALPHA-CHLORDANE	0.400	mg/kg		1.3E-09	(mg/kg/day)	3.5E-01	(mg/kg/day)-1	4.5E-10	6.5E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00001			
	DIELDRIN	0.003	mg/kg		2.4E-11	(mg/kg/day)	1.6E+01	(mg/kg/day)-1	3.9E-10	1.2E-10	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.000002			
	GAMMA-CHLORDANE	0.400	mg/kg		1.3E-09	(mg/kg/day)	3.5E-01	(mg/kg/day)-1	4.5E-10	6.5E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00001			
	HEPTACHLOR	0.030	mg/kg		2.4E-10	(mg/kg/day)	4.5E+00	(mg/kg/day)-1	1.1E-09	1.2E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000002			
	HEPTACHLOR EPOXIDE	0.030	mg/kg	2.4E-10	(mg/kg/day)	9.1E+00	(mg/kg/day)-1	2.2E-09	1.2E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00009				
	Exp. Route Total								6.5E-09					0.0002			
	Exposure Point Total								3.7E-08					0.001			
	Exposure Medium Total								3.7E-08					0.001			
	Air	Site 17	Inhalation	MONURON	5.3E-12	mg/m3	1.3E-14	(mg/m3)	NA	(ug/m3)-1	--	6.3E-14	(mg/m3)	NA	(mg/m3)	--	
				4,4'-DDT	2.5E-10	mg/m3	5.8E-13	(mg/m3)	9.7E-05	(ug/m3)-1	5.7E-14	2.9E-12	(mg/m3)	NA	(mg/m3)	--	
ALPHA-CHLORDANE				4.3E-11	mg/m3	1.0E-13	(mg/m3)	1.0E-04	(ug/m3)-1	1.0E-14	5.1E-13	(mg/m3)	7.0E-04	(mg/m3)	--		
DIELDRIN				3.2E-13	mg/m3	7.6E-16	(mg/m3)	4.6E-03	(ug/m3)-1	3.5E-15	3.8E-15	(mg/m3)	NA	(mg/m3)	--		
GAMMA-CHLORDANE				4.3E-11	mg/m3	1.0E-13	(mg/m3)	1.0E-04	(ug/m3)-1	1.0E-14	5.1E-13	(mg/m3)	7.0E-04	(mg/m3)	--		
HEPTACHLOR				3.2E-12	mg/m3	7.6E-15	(mg/m3)	1.3E-03	(ug/m3)-1	9.9E-15	3.8E-14	(mg/m3)	NA	(mg/m3)	--		
HEPTACHLOR EPOXIDE				3.2E-12	mg/m3	7.6E-15	(mg/m3)	2.6E-03	(ug/m3)-1	2.0E-14	3.8E-14	(mg/m3)	NA	(mg/m3)	--		
Exp. Route Total											1.1E-13					--	
Exposure Point Total											1.1E-13					--	
Exposure Medium Total											1.1E-13					--	
Medium Total								3.7E-08					0.001				

TABLE 7.5.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE
 PAGE 1 OF 2

Scenario Timeframe: Future
 Receptor Population: Residents
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 17	Ingestion	Heptachlor Epoxide	0.020	mg/kg	2.3E-08	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	2.1E-07	2.7E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.02
			Exp. Route Total								2.1E-07					0.02
			Dermal	Heptachlor Epoxide	0.020	mg/kg	6.6E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	6.0E-08	7.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.006
			Exp. Route Total								6.0E-08					0.006
	Exposure Point Total										2.7E-07				0.03	
	Exposure Medium Total										2.7E-07				0.03	
	Air	Site 17	Inhalation	Heptachlor Epoxide	2.1E-12	mg/m ³	1.8E-13	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	4.6E-13	2.0E-12	(mg/m ³)	NA	(mg/m ³)	--
			Exp. Route Total								4.6E-13				--	
			Exposure Point Total									4.6E-13				--
	Exposure Medium Total									4.6E-13					--	
Medium Total										2.7E-07				0.03		
Subsurface Soil	Subsurface Soil	Site 17	Ingestion	MONURON	0.050	mg/kg	5.9E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	2.30	mg/kg	2.7E-06	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	9.2E-07	3.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.06
				ALPHA-CHLORDANE	0.400	mg/kg	4.7E-07	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.6E-07	5.5E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.01
				DIELDRIN	0.003	mg/kg	3.5E-09	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	5.6E-08	4.1E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0008
				GAMMA-CHLORDANE	0.400	mg/kg	4.7E-07	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.6E-07	5.5E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.01
				HEPTACHLOR	0.030	mg/kg	3.5E-08	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	1.6E-07	4.1E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0008
				HEPTACHLOR EPOXIDE	0.030	mg/kg	3.5E-08	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	3.2E-07	4.1E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.03
				Exp. Route Total								1.8E-06				
			Dermal	MONURON	0.050	mg/kg	1.6E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	2.30	mg/kg	2.3E-07	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	7.7E-08	2.6E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.005
	ALPHA-CHLORDANE	0.400		mg/kg	5.3E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.8E-08	6.1E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001		
	DIELDRIN	0.003		mg/kg	9.9E-10	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.6E-08	1.2E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0002		
	GAMMA-CHLORDANE	0.400	mg/kg	5.3E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.8E-08	6.1E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001			
	HEPTACHLOR	0.030	mg/kg	9.9E-09	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	4.4E-08	1.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002			
	HEPTACHLOR EPOXIDE	0.030	mg/kg	9.9E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	9.0E-08	1.2E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.009			
	Exp. Route Total								2.6E-07					0.02		
	Exposure Point Total									2.0E-06					0.1	
Exposure Medium Total									2.0E-06					0.1		
Air	Site 17	Inhalation	MONURON	5.3E-12	mg/m ³	4.4E-13	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.1E-12	(mg/m ³)	NA	(mg/m ³)	--	
			4,4'-DDT	2.5E-10	mg/m ³	2.0E-11	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	2.0E-12	2.4E-10	(mg/m ³)	NA	(mg/m ³)	--	
			ALPHA-CHLORDANE	4.3E-11	mg/m ³	3.5E-12	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	3.5E-13	4.1E-11	(mg/m ³)	7.0E-04	(mg/m ³)	0.0000006	
			DIELDRIN	3.2E-13	mg/m ³	2.6E-14	(mg/m ³)	4.6E-03	(ug/m ³) ⁻¹	1.2E-13	3.1E-13	(mg/m ³)	NA	(mg/m ³)	--	
			GAMMA-CHLORDANE	4.3E-11	mg/m ³	3.5E-12	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	3.5E-13	4.1E-11	(mg/m ³)	7.0E-04	(mg/m ³)	0.0000006	
			HEPTACHLOR	3.2E-12	mg/m ³	2.6E-13	(mg/m ³)	1.3E-03	(ug/m ³) ⁻¹	3.4E-13	3.1E-12	(mg/m ³)	NA	(mg/m ³)	--	
			HEPTACHLOR EPOXIDE	3.2E-12	mg/m ³	2.6E-13	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	6.8E-13	3.1E-12	(mg/m ³)	NA	(mg/m ³)	--	
			Exp. Route Total								3.8E-12					0.0000001
Exposure Point Total									3.8E-12					0.0000001		
Exposure Medium Total									3.8E-12					0.0000001		
Medium Total										2.0E-06				0.1		
Groundwater	Groundwater	Site 17	Ingestion	4,4'-DDD	1.200	ug/L	7.0E-06	(mg/kg/day)	2.4E-01	(mg/kg/day) ⁻¹	1.7E-06	8.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	1.6	ug/L	9.4E-06	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	3.2E-06	1.1E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.2
			Exp. Route Total								4.9E-06					0.2
			Dermal	4,4'-DDD	1.200	ug/L	0.0E+00	(mg/kg/day)	2.4E-01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	1.6	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
Exp. Route Total								--					--			

TABLE 7.5.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE
 PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations							
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient			
							Value	Units	Value	Units		Value	Units	Value	Units				
Groundwater	Groundwater	Exposure Point Total																	
		Exposure Medium Total																	0.2
	Air	Site 17	Inhalation	4,4'-DDD	0.0E+0	mg/m ³	0.0E+00	(mg/m ³)	6.9E-05	(ug/m ³) ⁻¹	--	0.0E+00	(mg/m ³)	NA	(mg/m ³)	--		--	
				4,4'-DDT	0.0E+0	mg/m ³	0.0E+00	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	--	0.0E+00	(mg/m ³)	NA	(mg/m ³)	--		--	
			Exp. Route Total									--							--
			Exposure Point Total									--							--
	Exposure Medium Total										--							--	
Medium Total											4.9E-06							0.2	

Notes:
 1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE
 PAGE 1 OF 2

Scenario Timeframe: Future
 Receptor Population: Residents
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Site 17	Ingestion	Heptachlor Epoxide	0.020	mg/kg	5.3E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	4.8E-08	3.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.003	
			Exp. Route Total								4.8E-08					0.003	
			Dermal	Heptachlor Epoxide	0.020	mg/kg	5.6E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	5.1E-08	3.9E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.003	
			Exp. Route Total								5.1E-08					0.003	
			Exposure Point Total								9.9E-08					0.006	
	Exposure Medium Total								9.9E-08					0.006			
	Air	Site 17	Inhalation	Heptachlor Epoxide	2.1E-12	mg/m ³	2.9E-13	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	7.6E-13	2.0E-12	(mg/m ³)	NA	(mg/m ³)	--	
			Exp. Route Total								7.6E-13				--		
			Exposure Point Total								7.6E-13				--		
			Exposure Medium Total								7.6E-13				--		
Medium Total											9.9E-08				0.006		
Subsurface Soil	Subsurface Soil	Site 17	Ingestion	MONURON	0.050	mg/kg	1.3E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				4,4'-DDT	2.30	mg/kg	6.1E-07	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	2.1E-07	4.2E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.008	
				ALPHA-CHLORDANE	0.400	mg/kg	1.1E-07	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	3.7E-08	7.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001	
				DIELDRIN	0.003	mg/kg	7.9E-10	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.3E-08	5.5E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0001	
				GAMMA-CHLORDANE	0.400	mg/kg	1.1E-07	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	3.7E-08	7.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001	
				HEPTACHLOR	0.030	mg/kg	7.9E-09	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	3.6E-08	5.5E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0001	
				HEPTACHLOR EPOXIDE	0.030	mg/kg	7.9E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	7.2E-08	5.5E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.004	
				Exp. Route Total								4.0E-07					0.02
				Dermal	MONURON	0.050	mg/kg	1.4E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
					4,4'-DDT	2.30	mg/kg	1.9E-07	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	6.6E-08	1.3E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.003
	ALPHA-CHLORDANE	0.400	mg/kg		4.5E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.6E-08	3.1E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0006			
	DIELDRIN	0.003	mg/kg		8.4E-10	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.3E-08	5.9E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0001			
	GAMMA-CHLORDANE	0.400	mg/kg		4.5E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	1.6E-08	3.1E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0006			
	HEPTACHLOR	0.030	mg/kg		8.4E-09	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	3.8E-08	5.9E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0001			
	HEPTACHLOR EPOXIDE	0.030	mg/kg	8.4E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	7.6E-08	5.9E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.005				
	Exp. Route Total								2.2E-07					0.009			
	Exposure Point Total								6.2E-07					0.02			
	Exposure Medium Total								6.2E-07					0.02			
	Air	Site 17	Inhalation	MONURON	5.3E-12	mg/m ³	7.3E-13	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.1E-12	(mg/m ³)	NA	(mg/m ³)	--	
				4,4'-DDT	2.5E-10	mg/m ³	3.4E-11	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	3.3E-12	2.4E-10	(mg/m ³)	NA	(mg/m ³)	--	
ALPHA-CHLORDANE				4.3E-11	mg/m ³	5.8E-12	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	5.8E-13	4.1E-11	(mg/m ³)	7.0E-04	(mg/m ³)	0.0000006		
DIELDRIN				3.2E-13	mg/m ³	4.4E-14	(mg/m ³)	4.6E-03	(ug/m ³) ⁻¹	2.0E-13	3.1E-13	(mg/m ³)	NA	(mg/m ³)	--		
GAMMA-CHLORDANE				4.3E-11	mg/m ³	5.8E-12	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	5.8E-13	4.1E-11	(mg/m ³)	7.0E-04	(mg/m ³)	0.0000006		
HEPTACHLOR				3.2E-12	mg/m ³	4.4E-13	(mg/m ³)	1.3E-03	(ug/m ³) ⁻¹	5.7E-13	3.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
HEPTACHLOR EPOXIDE				3.2E-12	mg/m ³	4.4E-13	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	1.1E-12	3.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
Exp. Route Total											6.3E-12					0.0000001	
Exposure Point Total											6.3E-12					0.0000001	
Exposure Medium Total											6.3E-12					0.0000001	
Medium Total											6.2E-07				0.02		
Groundwater	Groundwater	Site 17	Ingestion	4,4'-DDD	1.200	ug/L	6.3E-06	(mg/kg/day)	2.4E-01	(mg/kg/day) ⁻¹	1.5E-06	4.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				4,4'-DDT	1.6	ug/L	8.4E-06	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	2.9E-06	5.9E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.1	
				Exp. Route Total								4.4E-06				0.1	
				Dermal	4,4'-DDD	1.200	ug/L	0.0E+00	(mg/kg/day)	2.4E-01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDT	1.6	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
Exp. Route Total								--					--				

TABLE 7.6.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE
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Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Groundwater	Groundwater	Exposure Point Total																
	Exposure Medium Total																	
	Air	Site 17	Inhalation	4,4'-DDD	0.0E+0	mg/m ³	0.0E+00	(mg/m ³)	6.9E-05	(ug/m ³) ⁻¹	--	0.0E+00	(mg/m ³)	NA	(mg/m ³)	--		
				4,4'-DDT	0.000	mg/m ³	0.0E+00	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	--	0.0E+00	(mg/m ³)	NA	(mg/m ³)	--		
				Exp. Route Total														
	Exposure Point Total																	
Exposure Medium Total																		
Medium Total																		

Notes:
 1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE
 PAGE 1 OF 2

Scenario Timeframe: Future
 Receptor Population: Residents
 Receptor Age: Adult

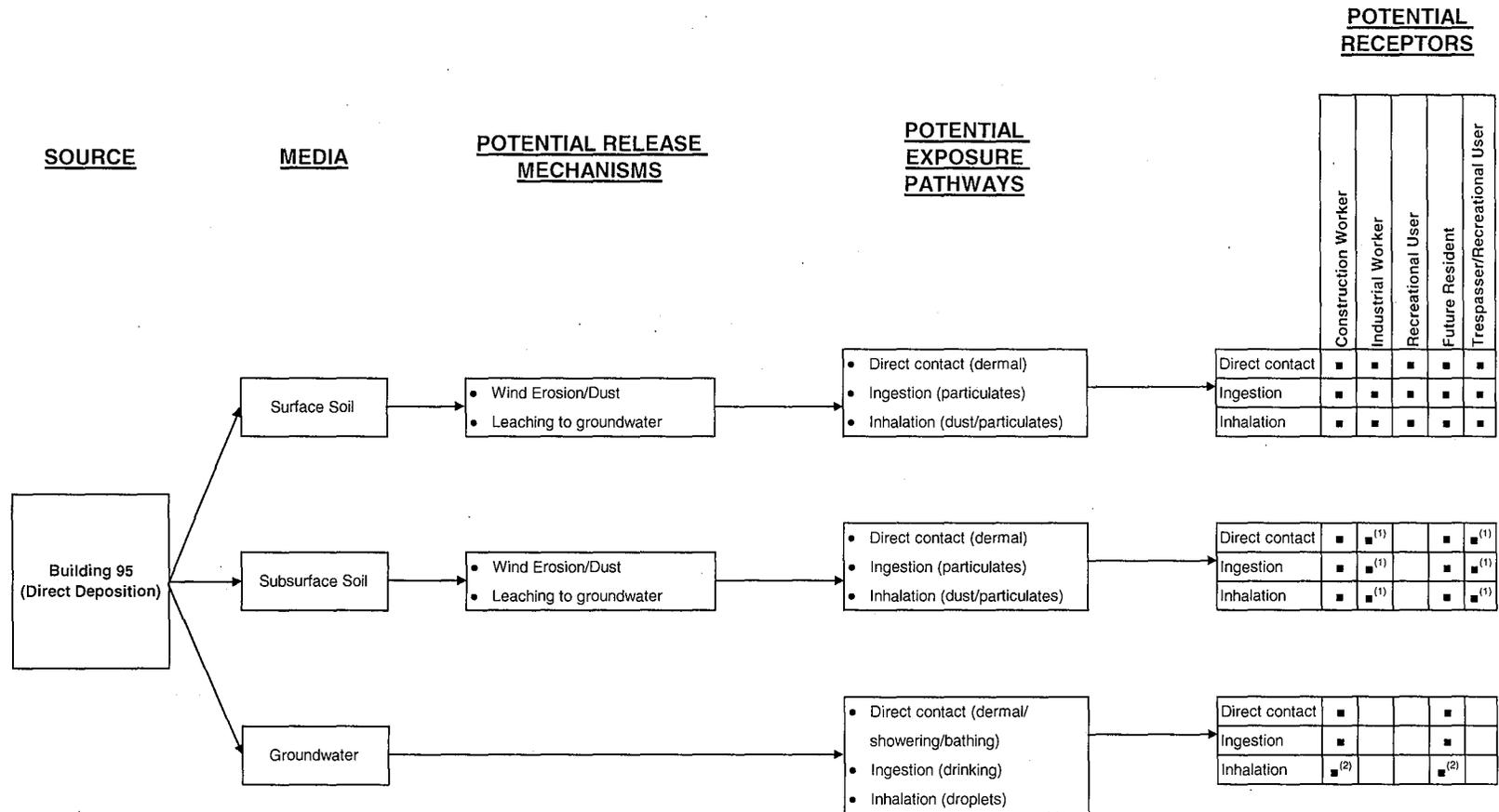
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Site 17	Ingestion	Heptachlor Epoxide	0.020	mg/kg	5.5E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	5.0E-08	2.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.002	
			Exp. Route Total								5.0E-08					0.002	
			Dermal	Heptachlor Epoxide	0.020	mg/kg	2.2E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	2.0E-08	1.1E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0008	
			Exp. Route Total								2.0E-08					0.0008	
	Exposure Point Total										7.0E-08				0.003		
	Exposure Medium Total										7.0E-08				0.003		
	Air	Site 17	Inhalation	Heptachlor Epoxide	2.1E-12	mg/m ³	4.1E-13	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	1.1E-12	2.0E-12	(mg/m ³)	NA	(mg/m ³)	--	
			Exp. Route Total								1.1E-12				--		
			Exposure Point Total									1.1E-12				--	
			Exposure Medium Total									1.1E-12				--	
Medium Total										7.0E-08				0.003			
Subsurface Soil	Subsurface Soil	Site 17	Ingestion	MONURON	0.050	mg/kg	1.4E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				4,4'-DDT	2.30	mg/kg	6.3E-07	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	2.1E-07	3.2E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.006	
				ALPHA-CHLORDANE	0.400	mg/kg	1.1E-07	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	3.8E-08	5.5E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001	
				DIELDRIN	0.003	mg/kg	8.2E-10	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	1.3E-08	4.1E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00008	
				GAMMA-CHLORDANE	0.400	mg/kg	1.1E-07	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	3.8E-08	5.5E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001	
				HEPTACHLOR	0.030	mg/kg	8.2E-09	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	3.7E-08	4.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00008	
				HEPTACHLOR EPOXIDE	0.030	mg/kg	8.2E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	7.5E-08	4.1E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.003	
				Exp. Route Total								4.2E-07					0.01
				Dermal	MONURON	0.050	mg/kg	5.5E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
					4,4'-DDT	2.30	mg/kg	7.5E-08	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	2.6E-08	3.8E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0008
	ALPHA-CHLORDANE	0.400	mg/kg		1.7E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	6.1E-09	8.7E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002			
	DIELDRIN	0.003	mg/kg		3.3E-10	(mg/kg/day)	1.6E+01	(mg/kg/day) ⁻¹	5.2E-09	1.6E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00003			
	GAMMA-CHLORDANE	0.400	mg/kg		1.7E-08	(mg/kg/day)	3.5E-01	(mg/kg/day) ⁻¹	6.1E-09	8.7E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002			
	HEPTACHLOR	0.030	mg/kg		3.3E-09	(mg/kg/day)	4.5E+00	(mg/kg/day) ⁻¹	1.5E-08	1.6E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00003			
	HEPTACHLOR EPOXIDE	0.030	mg/kg	3.3E-09	(mg/kg/day)	9.1E+00	(mg/kg/day) ⁻¹	3.0E-08	1.6E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.001				
	Exp. Route Total								8.8E-08					0.002			
	Exposure Point Total									5.0E-07					0.01		
	Exposure Medium Total									5.0E-07					0.01		
Air	Site 17	Inhalation	MONURON	5.3E-12	mg/m ³	1.0E-12	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
			4,4'-DDT	2.5E-10	mg/m ³	4.7E-11	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	4.6E-12	2.4E-10	(mg/m ³)	NA	(mg/m ³)	--		
			ALPHA-CHLORDANE	4.3E-11	mg/m ³	8.2E-12	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	8.2E-13	4.1E-11	(mg/m ³)	7.0E-04	(mg/m ³)	0.0000006		
			DIELDRIN	3.2E-13	mg/m ³	6.1E-14	(mg/m ³)	4.6E-03	(ug/m ³) ⁻¹	2.8E-13	3.1E-13	(mg/m ³)	NA	(mg/m ³)	--		
			GAMMA-CHLORDANE	4.3E-11	mg/m ³	8.2E-12	(mg/m ³)	1.0E-04	(ug/m ³) ⁻¹	8.2E-13	4.1E-11	(mg/m ³)	7.0E-04	(mg/m ³)	0.0000006		
			HEPTACHLOR	3.2E-12	mg/m ³	6.1E-13	(mg/m ³)	1.3E-03	(ug/m ³) ⁻¹	8.0E-13	3.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
			HEPTACHLOR EPOXIDE	3.2E-12	mg/m ³	6.1E-13	(mg/m ³)	2.6E-03	(ug/m ³) ⁻¹	1.6E-12	3.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Exp. Route Total								8.9E-12					0.0000001	
			Exposure Point Total									8.9E-12					0.0000001
			Exposure Medium Total									8.9E-12					0.0000001
Medium Total									5.0E-07					0.01			
Groundwater	Groundwater	Site 17	Ingestion	4,4'-DDD	1.200	ug/L	6.6E-06	(mg/kg/day)	2.4E-01	(mg/kg/day) ⁻¹	1.6E-06	3.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				4,4'-DDT	1.6	ug/L	8.8E-06	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	3.0E-06	4.4E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.09	
				Exp. Route Total								4.6E-06				0.09	
				Dermal	4,4'-DDD	1.200	ug/L	0.0E+00	(mg/kg/day)	2.4E-01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
					4,4'-DDT	1.6	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
Exp. Route Total								--					--				

TABLE 7.7.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 SITE 17 REMEDIAL INVESTIGATION, NAS BRUNSWICK, BRUNSWICK, MAINE
 PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations									
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient					
							Value	Units	Value	Units		Value	Units	Value	Units						
		Exposure Point Total																			
		Exposure Medium Total																			
	Air	Site 17	Inhalation	4,4'-DDD	0.0E+0	mg/m ³	0.0E+00	(mg/m ³)	6.9E-05	(ug/m ³) ⁻¹	--	0.0E+00	(mg/m ³)	NA	(mg/m ³)	--			--		
					4,4'-DDT	0.000	mg/m ³	0.0E+00	(mg/m ³)	9.7E-05	(ug/m ³) ⁻¹	--	0.0E+00	(mg/m ³)	NA	(mg/m ³)	--			--	
			Exp. Route Total								--								--		
		Exposure Point Total										--							--		
		Exposure Medium Total										--							--		
Medium Total																				4.6E-06	0.09

**ATTACHMENT C-1.6
SITE 17 HUMAN HEALTH CONCEPTUAL SITE MODEL
NAS BRUNSWICK
BRUNSWICK, MAINE**



1 - Exposure to subsurface soil is unlikely for this receptor, and therefore risk estimates for this receptor via the subsurface soil exposure pathway are presented in the Uncertainty Section.

2 - No volatile chemicals were detected in groundwater; therefore, inhalation of chemicals in groundwater was not evaluated quantitatively.

Appendix D Ecological Risk Assessment Summary Tables and Conceptual Site Model

TABLE C-2.1

**ASSESSMENT ENDPOINTS AND MEASUREMENT ENDPOINTS
SITE 17 ECOLOGICAL RISK ASSESSMENT
NAS BRUNSWICK
BRUNSWICK, MAINE**

Assessment Endpoint	Measurement Endpoints
Adverse effects on the survival, reproduction, and/or growth of soil invertebrates	<ul style="list-style-type: none"> Survival, growth, and/or reproduction of soil invertebrates were evaluated by comparing the measured concentrations of chemicals in the surface soil to invertebrate soil screening levels.
Adverse effects on the survival, reproduction, and/or growth of terrestrial plants	<ul style="list-style-type: none"> Survival, growth, and/or reproduction of terrestrial plants were evaluated by comparing the measured concentrations of chemicals in the surface soil to plant soil screening levels.
Adverse effects on the survival, reproduction, and/or increase in development effects of insectivorous birds	<ul style="list-style-type: none"> Survival, reproduction, and/or increase in development effects of birds were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and earthworms to No Observed Adverse Effects Levels (NOAELs) and Lowest Observed Adverse Effects Levels (LOAELs) for surrogate wildlife species.
Adverse effects on the survival, reproduction, and/or increase in development effects of insectivorous mammals	<ul style="list-style-type: none"> Survival, reproduction, and/or increase in development effects of mammals were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and earthworms to NOAELs and LOAELs for surrogate wildlife species.
Adverse effects on the survival, reproduction, and/or increase in development effects of herbivorous birds	<ul style="list-style-type: none"> Survival, reproduction, and/or increase in development effects of birds were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and plants to NOAELs and LOAELs for surrogate wildlife species.
Adverse effects on the survival, reproduction, and/or increase in development effects of herbivorous mammals	<ul style="list-style-type: none"> Survival, reproduction, and/or increase in development effects of mammals were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and plants to NOAELs and LOAELs for surrogate wildlife species.

TABLE C-2.2

SOIL SCREENING VALUES
SITE 17 ECOLOGICAL RISK ASSESSMENT
NAS BRUNSWICK
BRUNSWICK, MAINE

Parameter	Ecological Screening Level							
	Plants		Invertebrates		Avian		Mammals	
	Value	Source	Value	Source	Value	Source	Value	Source
PESTICIDES/PCBS (UG/KG)								
4,4'-DDD	12000	CCME	12000	CCME	93	EcoSSL	21	EcoSSL
4,4'-DDE	12000	CCME	12000	CCME	93	EcoSSL	21	EcoSSL
4,4'-DDT	12000	CCME	12000	CCME	93	EcoSSL	21	EcoSSL
ALPHA-CHLORDANE	224	Reg 5	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	5	Reg 5	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	224	Reg 5	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA	5.98	Reg 5
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	152	Reg 5
TOTAL DDT	12000	CCME	12000	CCME	93	EcoSSL	21	EcoSSL
METALS (MG/KG)								
ARSENIC	18	EcoSSL	17	CCME	43	EcoSSL	46	EcoSSL
CYANIDE	0.9	CCME	0.9	CCME	NA	NA	NA	NA
LEAD	120	EcoSSL	1,700	EcoSSL	11	EcoSSL	56	EcoSSL
ZINC	160	EcoSSL	120	EcoSSL	46	EcoSSL	79	EcoSSL

NA - Not Available

Screening Level Sources in the Order of Preference:

EcoSSL - EPA Ecological Soil Screening Levels (U.S. EPA, 2005, 2007, 2008)

CCME - Canadian Council of Ministers of the Environment (CCME, 1999, 2001)

ORNL - Oak Ridge National Laboratory Toxicological Benchmarks for plants and invertebrates (Efroymson et al., 1997a and 1997b)

Reg 5 - U.S. EPA Region 5 Ecological Screening Levels (U.S. EPA, 2003)

TABLE C-2.3

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
 SITE 17 ECOLOGICAL RISK ASSESSMENT
 NAS BRUNSWICK
 BRUNSWICK, MAINE

Species/Exposure Inputs	Tier 1 Inputs		Tier 2, Step 3A Inputs	
	Values	Units	Values	Units
<i>Meadow Vole</i>				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
<i>Bobwhite Quail</i>				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	1.628E-02	kg/day	1.361E-02	kg/day
Soil Ingestion Rate = Is	2.263E-03	kg/day	8.302E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
<i>Short-Tailed Shrew</i>				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
<i>American Robin</i>				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Soil Ingestion Rate - Is	2.05E-03	kg/day	7.60E-04	kg/day
Home Range = HR	Assume 100% on site		6.10E-01	acres

Notes:

The soil ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil ingestion rates:

	Conservative	50th Percentile	Source
Meadow Vole	3.2%	1.2%	1
Bobwhite quail	13.9%	6.1%	1, 2
Short-tailed Shrew	3%	0.90%	1
American Robin	16.40%	6.40%	1, 3

1 - U.S. EPA (U.S. Environmental Protection Agency), 2007. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.

2 - Based on the mourning dove.

3 - Based on the American woodcock.

TABLE C-2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SITE 17 ECOLOGICAL RISK ASSESSMENT
NAS BRUNSWICK
BRUNSWICK, MAINE

Chemical	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results ⁽¹⁾	Overall Average ⁽²⁾	EEQs				COPC (yes/no)?	Rationale for COPC Selection	Further Evaluated in Terrestrial Food Chain Modeling (yes/no)? ⁽³⁾
									Plants	Invertebrates	Avian	Mammals			
PESTICIDES/PCBS (UG/KG)															
4,4'-DDD	12/26	3.2 J	100	SB-17-112-0001	3.5	4.1	23.6	11.9	0.008	0.008	1.1	4.8	YES	ASL	NO ⁽⁴⁾
4,4'-DDE	23/26	0.7 J	250	SB-17-125-0001	3.7	4.1	31.8	28.4	0.02	0.02	2.7	11.9	YES	ASL	NO ⁽⁴⁾
4,4'-DDT	17/26	8.2 J	1200 J	SB-17-112-0001, SB-17-125-0001	3.5	31	295	195	0.10	0.10	12.9	57.1	YES	ASL	NO ⁽⁴⁾
ALPHA-CHLORDANE	11/26	0.8 J	840 J	SB-17-206-0001	1.8	2.1	114	49.0	3.8	NA	NA	NA	YES	ASL/NSL	YES
GAMMA-BHC (LINDANE)	1/26	1.5 J	1.5 J	SB-17-133-0001	0.17	9.6	1.50	0.948	0.30	NA	NA	NA	YES	NSL	YES
GAMMA-CHLORDANE	10/26	1 J	760 J	SB-17-206-0001	1.8	2.1	113	44.0	3.4	NA	NA	NA	YES	ASL/NSL	YES
HEPTACHLOR	6/26	0.25 J	69 J	SB-17-206-0001	1.8	9.6	16.5	4.70	NA	NA	NA	11.5	YES	ASL/NSL	YES
HEPTACHLOR EPOXIDE	5/26	1.5 J	130 J	SB-17-206-0001	1.8	9.6	40.4	8.68	NA	NA	NA	0.86	YES	NSL	YES
TOTAL DDT ⁽⁵⁾	24/26	0.7	1503	SB-17-125-0001	0	0	252	232	0.13	0.13	16.2	71.6	YES	ASL	YES
METALS (MG/KG)															
ARSENIC	26/26	1.4	18.2	SB-17-103-0001	-	-	6.55	6.55	1.0	1.1	0.42	0.40	YES	ASL	NO
CYANIDE	1/26	0.34 J	0.34 J	SB-17-125-0001	0.4	0.6	0.340	0.262	0.38	0.38	NA	NA	YES	NSL	YES
LEAD	26/26	4.7	37.5	SB-17-131-0001	-	-	12.8	12.8	0.31	0.02	3.4	0.67	YES	ASL	YES
ZINC	26/26	10.9	47.7	SB-17-131-0001	-	-	27.6	27.6	0.30	0.40	1.0	0.60	YES	ASL	YES

Shaded cells indicate that the EEQ exceeds 1 or no screening level is available.

EEQs are calculated by dividing the chemical concentration by its screening level presented in Table 5-2.

1 - Average of detected concentrations only.

2 - Average of all analytical results including one-half of the detection limit for non-detects.

3 - Chemicals with EEQs for birds or mammals greater than 1.0 or chemicals without bird or mammal screening values are retained for food chain modeling.

4 - Sum of DDD, DDE, and DDT evaluated in Food Chain Model.

5 - Detection limit of DDT result used when all results were non-detects.

Abbreviations:

COPC = Chemical of Potential Concern

EEQ = Ecological Effects Quotient

NA = Not available or not applicable

Rationale Codes for COPC Selection:

ASL = Above COPC Screening Level

NSL = No Screening Level Available

TABLE C-2.5

TERRESTRIAL FOOD CHAIN MODEL - TIER 1 SCENARIO
 INSECTIVOROUS AND HERBIVOROUS RECEPTORS
 SITE 17 ECOLOGICAL RISK ASSESSMENT
 NAS BRUNSWICK
 BRUNSWICK, MAINE

Chemical	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PESTICIDES/PCBS								
ALPHA-CHLORDANE	6.2E-03	1.2E-03	8.8E-04	4.4E-04	1.1E+00	2.3E-01	3.5E-01	1.7E-01
GAMMA-BHC (LINDANE)	3.2E-05	3.2E-06	6.2E-06	6.2E-07	1.2E-03	1.2E-04	2.0E-04	2.0E-05
GAMMA-CHLORDANE	5.6E-03	1.1E-03	7.6E-04	3.8E-04	1.0E+00	2.1E-01	3.2E-01	1.6E-01
HEPTACHLOR	1.2E-03	1.2E-04	3.3E-03	3.3E-04	1.2E-01	1.2E-02	7.4E-01	7.4E-02
HEPTACHLOR EPOXIDE	2.8E-03	2.8E-04	1.2E-02	1.2E-03	7.2E-02	7.2E-03	4.2E-01	4.2E-02
TOTAL DDT	1.5E-01	1.2E-02	1.2E-01	3.1E-03	1.2E+01	1.0E+00	1.2E+01	3.2E-01
METALS								
CYANIDE	NV	NV	5.6E-04	5.6E-05	NV	NV	5.4E-04	5.4E-05
LEAD	4.7E-01	1.7E-02	7.6E-02	1.9E-03	2.1E+00	7.6E-02	3.7E-01	9.2E-03
ZINC	7.6E-02	2.9E-02	6.2E-02	1.6E-02	7.6E-01	2.9E-01	4.3E-01	1.1E-01

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level

LOAEL - Lowest Observed Adverse Effects Level

EEQ - Ecological Effects Quotient

NV - No value determined

TABLE C-2.6

**TERRESTRIAL FOOD CHAIN MODEL - TIER 2, STEP 3A SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS
SITE 17 ECOLOGICAL RISK ASSESSMENT
NAS BRUNSWICK
BRUNSWICK, MAINE**

Chemical	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PESTICIDES/PCBS								
ALPHA-CHLORDANE	2.9E-04	5.8E-05	2.7E-05	1.4E-05	1.4E-01	2.7E-02	3.8E-02	1.9E-02
GAMMA-CHLORDANE	2.5E-04	5.0E-05	2.2E-05	1.1E-05	1.2E-01	2.4E-02	3.4E-02	1.7E-02
TOTAL DDT	3.1E-02	2.6E-03	2.0E-02	5.4E-04	4.3E+00	3.6E-01	4.0E+00	1.0E-01
METALS								
LEAD	1.0E-01	3.8E-03	1.5E-02	3.7E-04	7.6E-01	2.8E-02	1.4E-01	3.6E-03

Cells are shaded if the value is greater than 1.0

Only includes chemicals with EEQs greater than 1 in the conservative food chain model.

NOAEL - No Observed Adverse Effects Level

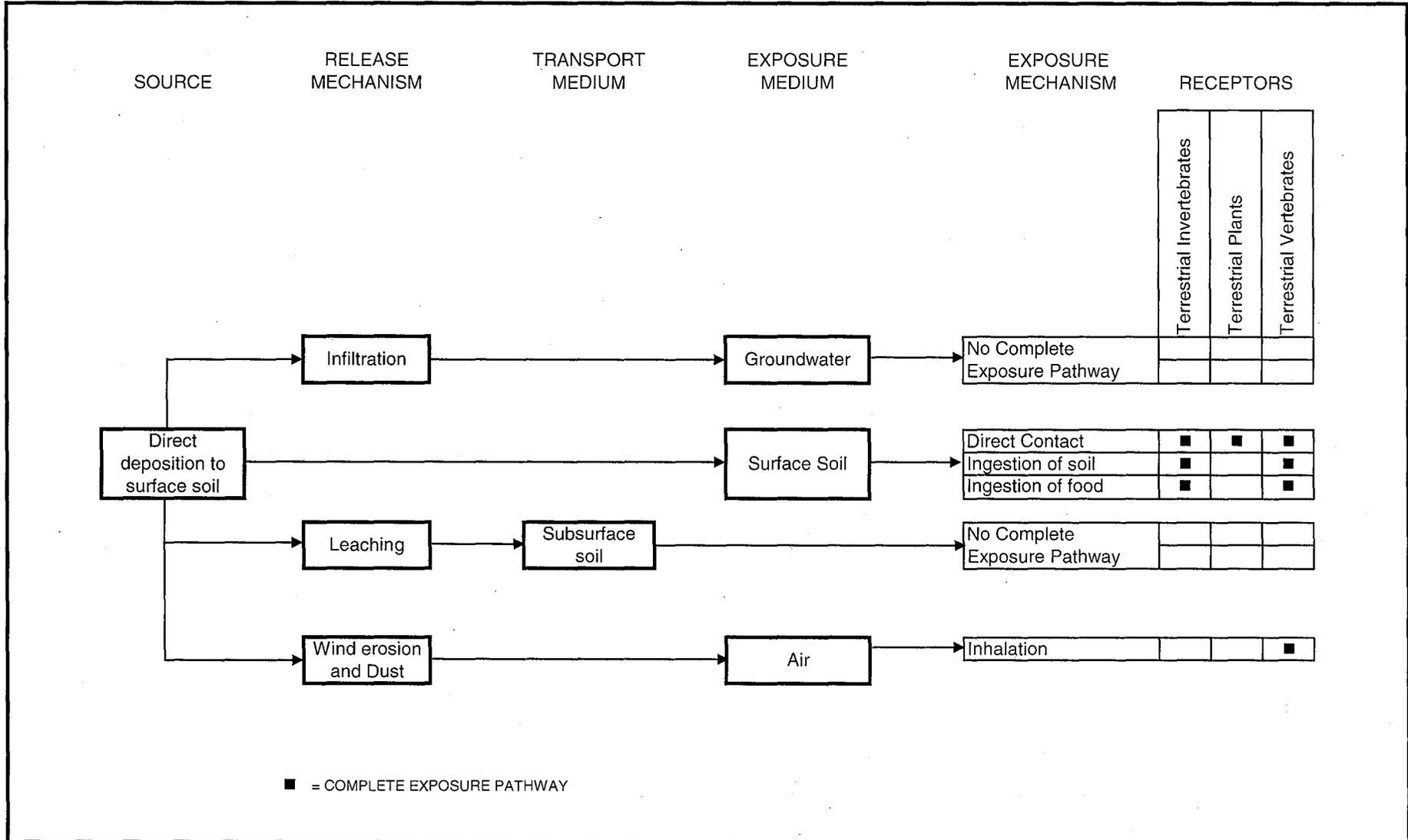
LOAEL - Lowest Observed Adverse Effects Level

EEQ - Ecological Effects Quotient

NV - No value determined

FIGURE 1

ECOLOGICAL CONCEPTUAL SITE MODEL
 SITE 17 ECOLOGICAL RISK ASSESSMENT
 NAS BRUNSWICK
 BRUNSWICK, MAINE



Appendix E
Transcript of the Public Hearing
on the Proposed Plan for Site 17
and Responses to Comments

PUBLIC HEARING

Re:

Environmental Restoration Work at Site 17

Brunswick Naval Air Station

Brunswick, Maine

Held at:

Parkwood Inn

71 Gurnet Road

Brunswick, Maine

On:

Wednesday, August 17, 2011

7:00 p.m.

Before:

Karen D. Pomeroy, RDR, CRR

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www.jensenreporting.com



1 MR. BOBER: By my watch it's 7:00 o'clock.
2 Anybody want to second that, that it's
3 7:00 o'clock?

4 The reason we're here is we had a poster
5 session to provide general information on Site 17
6 soils operable unit. Based on the posters,
7 everybody's kind of seen kind of the history of
8 the site, the cleanups we've done, the summary of
9 our -- our investigations and our risk
10 assessments and things like that; and so at this
11 time the Navy is proposing no further action for
12 soils.

13 As part of the public process and as stated
14 in the proposed plan that we sent out on the 1st
15 of August, I believe, this is -- we'd like -- and
16 the reason we're here is that besides -- besides
17 putting in the -- in the newspaper and other
18 media that we would like, you know, input or
19 comments on our proposed action, this is an
20 opportunity today for anybody from the public to
21 actually speak and give us an opinion or to ask
22 questions on the proposed plan itself.

23 Again, right now the Navy is proposing no
24 further action for soils; and the comments are

1 due in on this particular -- this particular
2 proposed plan by the 31st of this month, that's
3 when the 30-day comment period ends. They need
4 to be postmarked by then.

5 There are forms on the table where you could
6 actually put your comments in and then actually I
7 guess you could just fold it up and put a stamp
8 on it. That's one way of doing it.

9 Another way is you can e-mail me; and there's
10 a sheet up there that gives my e-mail address,
11 but it's todd.bober@navy.mil. That's another way
12 you can do that.

13 So either way, e-mail or a written -- and,
14 actually, you don't have to use this form, you
15 can just type something up and you can send it to
16 the address as well.

17 But at this time I would like to open it up
18 to the floor if anybody has any official comments
19 that they would like to put in the public record
20 relating to this proposed plan which is no
21 further action for soils at Site 17.

22 Yes.

23 MS. WARREN: Todd, could you clarify what the
24 proposal is for groundwater at Site 17.

1 MR. BOBER: Groundwater -- we're going to do
2 a few more rounds of groundwater sampling to --
3 and then, based on those few rounds of sampling,
4 we're going to determine whether or not there are
5 any issues.

6 So this particular meeting is strictly for
7 the soils. The groundwater -- right now we're
8 planning on taking three more rounds of
9 groundwater sampling.

10 MR. DALY: Could I just interject?

11 Mike Daly, EPA. The plan is for at least three
12 rounds. No groundwater decision has been made as
13 of yet.

14 And it's also to allow for, you know, further
15 evaluation of groundwater after we've done the
16 final removal, the final hot spot, to see if
17 things get back to normal in the area of
18 groundwater and to watch the trends post-removal.

19 MS. WARREN: Okay.

20 MR. DALY: And we think that was prudent to
21 do.

22 There was consideration to consider
23 groundwater as part of this decision -- this
24 proposed plan. We thought it was prudent not to

1 include the groundwater at this time.

2 MS. WARREN: Okay. Well, I would like to
3 comment. My name is Carol Warren.

4 My view is that as long as the soils remain
5 contaminated, there could be continuing leaching
6 into the groundwater so that making a
7 determination that it's not necessary to take any
8 action with particularly the subsurface soils is
9 also making a determination that the continued
10 leaching is acceptable.

11 So I am concerned that making the two
12 decisions separately sort of begs the question on
13 whether it would be necessary to take further
14 action with the soils in order to protect the
15 groundwater.

16 So I am -- I have concerns about the effect
17 of the contaminated soil on groundwater.

18 MR. BOBER: Okay. Yes.

19 MS. JOHNSON: I have comments to offer.

20 MR. BOBER: By the way, any specific
21 questions you have will be addressed in the
22 public record.

23 MS. JOHNSON: My name is Suzanne Johnson.
24 I'm a resident of Brunswick.

1 I'm here tonight speaking on behalf of an
2 organization called the Brunswick Area Citizens
3 for a Safe Environment who is a participatory
4 agent of the RAB, resident advisory board.

5 BACSE appreciates the opportunity to comment
6 on the August 2011 proposed plan for Site 17,
7 which is the former pesticide shop at Building
8 95.

9 BACSE is also intending to submit written
10 comments and will have those in before the
11 comment period ends on August 31st.

12 BACSE understands that the proposed plan that
13 is the subject of tonight's public meeting and
14 the resulting record of decision addresses only
15 the soil at Site 17.

16 We understand that groundwater will be
17 addressed in a separate proposed plan and record
18 of decision after the Navy collects and evaluates
19 a minimum of what I think is at least three
20 rounds of monitoring the groundwater. BACSE
21 looks forward to reviewing that proposed plan for
22 Site 17 groundwater at a future date.

23 In the proposed plan that's before us
24 tonight, the Navy states that no further action

1 is needed for soils at Site 17.

2 A no-further-action decision means that
3 there'll be no restrictions in the future on how
4 the soil at the site is used. The soil can be
5 dug up, spread around, and even used elsewhere as
6 clean fill by the future owners or occupants of
7 the site.

8 BACSE states that a no-further-action
9 decision is unacceptable. The Navy's risk
10 assessment focused primarily on the top foot of
11 soil, the surface soil, and concluded that this
12 one-foot-thick layer of soil did not pose
13 unacceptable risk to ecological receptors.

14 As illustrated by the problem formulation
15 section on page 5 of the proposed plan, only
16 risks associated with current surface soil
17 exposures were considered.

18 However, as the data in the July 2011
19 remedial investigation report for Site 17
20 demonstrates, contamination of subsurface soils
21 does present risks to insects, burrowing animals,
22 and other creatures that live in the soil, as
23 well as to the birds and animals that feed on
24 them.

1 Furthermore, potential future uses of the
2 site in which the soils are disturbed by
3 excavation and other activities was not assessed.
4 The comments and responses submitted by the Maine
5 DEP's risk assessment consultant that are
6 included in Appendix F in the proposed plan speak
7 very clearly to the risk associated with deeper
8 soil at the site.

9 BACSE does not disagree with the Navy that
10 the top foot of soil, the surface soil, at
11 Site 17 does not pose an unacceptable risk to
12 ecological receptors.

13 BACSE objects, however, to the lack of future
14 controls on the subsurface soils that would
15 prevent them from being dug up and used as
16 surface soil or clean fill either at Site 17 or
17 elsewhere in our community.

18 Furthermore, it is BACSE's understanding that
19 with a no-further-action decision, any cleanup
20 costs that might arise when subsurface soil is
21 excavated and used would be at the expense of the
22 owner and occupant and not the Navy.

23 BACSE cannot support the Navy's preferred
24 remedial alternative of no further action for

1 soil at Site 17 and recommends institutional
2 controls to manage the risk posed by the
3 subsurface soils at Site 17.

4 Institutional controls are necessary to
5 prevent the unrestricted disturbance or
6 excavation and relocation of the contaminated
7 soil that remains beneath the ground surface at
8 Site 17.

9 Thank you.

10 MR. BOBER: Okay.

11 Any other comments, questions, concerns on
12 Site 17 proposed plan?

13 Yes.

14 MS. WARREN: Carol Warren again. I was also
15 concerned with the lack of institutional
16 controls.

17 It seems to me that, because the subsurface
18 soils do remain contaminated, there could be a
19 restrict -- a risk to construction and so there
20 should be some sort of institutional controls to
21 require a health and safety plan or some sort of
22 management plan so that construction workers
23 would be aware of the risks of dealing with
24 DDT-contaminated soils, the arsenic in the soil

1 and such things, so it seems to me that even if
2 the site undisturbed poses no risk, the fact that
3 the subsurface soils are contaminated could pose
4 a risk in the event of construction or even
5 landscaping. Someone putting in a bush or a tree
6 might dig 3 feet down, so there -- and there is
7 substantial contamination in the subsurface
8 soils, so some sort of restriction should be
9 placed for construction and landscaping work.

10 MR. BOBER: Okay. Other comments? Anybody
11 else?

12 (No response.)

13 MR. BOBER: Again, there's still an
14 opportunity to provide written comments as well.
15 This is just an opportunity for people who wanted
16 to come here and express them verbally.

17 I guess at this time then, this will conclude
18 the public hearing, unless anybody else has a
19 question or comment.

20 (No response.)

21 MR. BOBER: Okay. Well, then thank everybody
22 for coming.

23 (Conclusion of proceedings at 7:11 p.m. this date.)

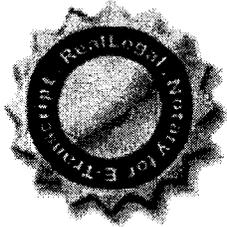
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CERTIFICATE

I, Karen D. Pomeroy, Registered Diplomate Reporter, do hereby certify that the within transcription is a true and accurate record, to the best of my knowledge, skills and ability, of the proceedings.

I further certify that I am not related to any of the parties in this matter by blood or marriage and that I am in no way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office this 23rd day of August, 2011.



Karen D. Pomeroy

Karen D. Pomeroy, RDR, CRR

RESPONSES TO COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD ON THE PROPOSED PLAN FOR SITE 17, FORMER NAVAL AIR STATION BRUNSWICK, MAINE

Oral comments during the August 17, 2011, public hearing were received from Ms. Carol Warren and Ms. Suzanne Johnson for Brunswick Area Citizens for a Safe Environment (BACSE) on the August 2011 Proposed Plan for Site 17. Written comments dated August 26 and August 31, 2011, were also received from Ms. Warren and BACSE, respectively. No changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate based on comments received during the public comment period. A summary of the comments received at the public hearing and the Navy's responses to these comments are provided in the table below. Responses to comments received during the public comment period are provided after the table.

Summary of Questions/Comments Received During the Public Meeting	
Question/Comment	Navy Response
Ms. Warren asked for clarification of the proposal for groundwater at Site 17.	The Navy plans to conduct at least three more rounds of groundwater sampling, and based on those results, the Navy will propose an appropriate course of action for groundwater at this site.
Ms. Warren expressed concerns about the effect of contaminated soil on groundwater, i.e., leaching of soil contaminants to groundwater and the potential need for further action for soil to be protective of groundwater.	<p>The no further action determination related to potential leaching of soil contaminants to groundwater was based on 12 years of groundwater monitoring data collected in accordance with an regulator-approved monitoring program from 1995 (after the 1994 soil removals) through 2007. The results of this monitoring indicated that, even before the 2009/2010 removal actions (when there were much greater concentrations of pesticides in soil at the site), leaching did not result in groundwater concentrations greater than MCLs/MEGs for the last six rounds (3 years) of sampling (see below for further information).</p> <p>Further monitoring of groundwater was recommended in the 2011 RI Report not because the nature and extent of groundwater contamination has not been determined but to evaluate any groundwater impacts from the 2009/2010 removal actions and to confirm that conditions have stabilized if any impacts are noted. As stated in the RI Report, the Navy recommended discontinuing the monitoring program after the September 2007 monitoring event, but it was decided that the program would be only suspended pending completion of the RI (which was underway at that time). Because soil removal actions (especially at the depths of the 2010 excavation) may potentially cause temporary changes in groundwater conditions, the Navy, EPA, and MEDEP agreed to conduct several additional monitoring events to verify long-term groundwater quality. Although it is expected based on the 12 years of previous data that no additional groundwater monitoring will be required, any determination of the final action for groundwater will not be made until after evaluation of the additional rounds of data.</p>
BACSE stated that they feel that the no further action determination is unacceptable because it would mean that soil from the site could be "dug up, spread around, and even used as clean fill by the future owners or occupants of the site."	The human health risk assessment conducted as part of the RI estimated potential risk associated with subsurface soil for receptors including residents, construction workers, trespassers, and industrial workers. The results indicated that cancer risks and non-cancer hazards were less than EPA and MEDEP acceptable levels for all receptors, meaning that exposure to subsurface soil, even for child and lifetime residents (generally the most sensitive receptors) would not result in unacceptable risk. The results of the conservative human health risk assessment indicate that exposure to remaining concentrations of COCs in site surface and subsurface soil is acceptable for all receptors evaluated. In addition, based on the fact that unlimited use and unrestricted exposure is acceptable for soil at the site (based on risk assessment results), removal and redeposition elsewhere of soil from the site would also be acceptable, especially considering that there would likely be mixing and dilution of impacted site soils and non-site-impacted soils during any removal and redeposition process. These results were the basis for the decision that no further action, including no restrictions on future use of soil from the site, is required from a human health perspective. See below for information concerning the lack of ecological risk.

Summary of Questions/Comments Received During the Public Meeting	
Question/Comment	Navy Response
Ms. Warren also expressed concern about the lack of institutional controls for subsurface soil, specifically mentioning risk from DDT and arsenic in soil associated with construction and landscaping activities and the need for institutional controls requiring a health and safety plan.	See the previous response for general institutional control information. As documented in the approved Remedial Investigation Report, elevated arsenic concentrations in Site 17 soils was determined not to be site related. Arsenic, which is a naturally occurring substance found in soil and groundwater, was also detected at concentrations greater than unrestricted land use concentrations, but it was determined that the arsenic was not a result of contaminant releases from site activities but was related to the fill material used at the site during NAS Brunswick construction and alteration activities that occurred over the course of the approximately 60 years that the base was an active military installation.
BACSE does not disagree that the top 1 foot of soil does not pose unacceptable risk for ecological receptors but does object to the lack of future controls on subsurface soil. BACSE referenced comments provided by MEDEP's consultant on the ecological risk assessment as indicating a risk associated with deeper soil.	The ecological risk assessment was conducted in accordance with standard procedures and with the approved work plan. The main focus of the comments provided by MEDEP's consultant on the ecological risk assessment was the use of data from only the 0- to 1-foot interval for estimation of ecological risks. To address these comments, the Navy included an assessment of estimated ecological risk from exposure to subsurface soil in the uncertainty section of the ecological risk assessment (Appendix C.2 of the final RI Report). The results of this evaluation did not change the conclusions of the ecological risk assessment (i.e., no significant impacts were noted for any of the receptors, and the conclusion that no further action was warranted is still valid). A detailed discussion of the results is included on pages 14 through 18 of Appendix C.2, and numerical results are included in Attachment C.2.6.

**Responses to Comments on the Site 17 Proposed Plan
Submitted by Carol Warren on August 26, 2011**

- 1. Determination of whether additional remediation of soils is necessary is premature until the nature and extent of the contamination of groundwater at Site 127 has been determined. The pesticides and herbicides remaining in the surface and subsurface soils at Site 17 can be expected to leach into groundwater. Leaving the soil contamination in place may make remediation of groundwater impossible. The decision of the appropriate remedy for soils should therefore be deferred until a decision can be made on the action necessary for groundwater.**

Response: The no further action determination related to potential leaching of soil contaminants to groundwater was based on 12 years of groundwater monitoring data collected in accordance with an regulator-approved monitoring program from 1995 (after the 1994 soil removals) to 2007. The results of this monitoring indicated that, even before the 2009/2010 removal actions (when there were much greater concentrations of pesticides in soil at the site), leaching did not result in groundwater concentrations greater than MCLs/MEGs for the last six rounds (3 years) of sampling.

Further monitoring of groundwater was recommended in the 2011 RI Report not because the nature and extent of groundwater contamination has not been determined but rather to evaluate any groundwater impacts from the 2009/2010 removal actions and to confirm that conditions have stabilized if any impacts are noted. As stated in the RI Report, the Navy recommended discontinuing the monitoring program after the September 2007 monitoring event, but it was decided that the program would be only suspended pending completion of the RI (which was underway at that time). Because soil removal actions (especially at the depths of the 2010 excavation) may potentially cause temporary changes in groundwater conditions, the Navy, EPA, and MEDEP agreed to conduct several additional monitoring events to verify long-term groundwater quality. Although it is expected based on the 12 years of previous data that no additional groundwater monitoring will be required, any

determination of the final action for groundwater will not be made until after evaluation of the additional rounds of data.

Based on the current site conceptual model, it is reasonable to conclude that if the greater concentrations of pesticides and herbicides in Site 17 soils prior to 2010 did not leach to groundwater at unacceptable concentrations in the approximately 31 years since dumping reportedly stopped at the site (in 1976), the lesser concentrations remaining after the 2009/2010 removal actions will not result in leaching at levels that result in unacceptable groundwater concentrations. This conclusion will be evaluated based on the results of additional round of groundwater data to be collected.

2. Institutional controls are needed.

If contamination remains in place, particularly in subsurface soils, institutional controls, such as a soils management plan and health and safety guidelines for construction workers, are needed. Inappropriate disposal of contaminated soil and exposure of workers to contamination in subsurface soils should be prevented. The base instruction is no longer applicable, and must be replaced.

Response: Based on the results of the human health risk assessment conducted as part of the RI, estimated risks to construction workers exposed to post-removal action concentrations of COCs in surface and subsurface soils at Site 17 are acceptable (less than EPA and MEDEP target levels). Based on this information, land use restrictions and/or additional health and safety procedures for construction workers are not required.

Removal of all elevated concentrations of site-related chemicals in soil is not required to be protective of human health (i.e., "contamination" can remain in place and not pose an unacceptable risk to human health). The results of the conservative human health risk assessment, conducted in accordance with standard procedures, indicate that exposure to remaining concentrations of COCs in site soil is acceptable for all receptors evaluated (including construction workers exposed to subsurface soil). In addition, based on the fact that unlimited use and unrestricted exposure is acceptable for soil at the site (based on risk assessment results), removal and redeposition elsewhere of soil from the site would also be acceptable, especially considering that there would likely be mixing and dilution of impacted site soils and non-site-impacted soils during any removal and redeposition process.

3. Limiting the assessment of ecological risk to the top one foot of soil does not have an adequate scientific basis.

The Navy's response to criticism of the ecological risk assessment was inadequate. Invertebrates do not limit their activity to the top foot, and birds that feed on them are not able to avoid organisms that have been exposed to the pesticides and herbicides in subsurface soils. Future disturbance of the soils, particularly in the absence of restrictions, may increase exposure. The Navy's follow-on responses to the MEDEP consultant's comments discount or belittle these concerns.

Response: The ecological risk assessment was conducted in accordance with standard procedures and with the approved work plan, and the Navy has provided additional technical analysis to support a conclusion that there are no unacceptable risks. Although not required for technical compliance/completeness, the Navy included an assessment of estimated ecological risk from exposure to subsurface soil (samples from 1 to 3 and 1 to 4 feet below ground surface) in the uncertainty section of the ecological risk assessment (Appendix C.2 of the final RI Report). The results of this evaluation did not change the conclusions of the ecological risk assessment (i.e., no significant impacts were noted for any of the receptors, and the conclusion that no further action was warranted is still valid). A detailed discussion of the results is included on pages 14 through 18 of Appendix C.2, and numerical results are included in Attachment C.2.6. Therefore, although the Navy believes that the ecological risk assessment is correct and complete using only data from the 0- to 1-

foot soil interval, the conclusion that no further action is required would have been the result even if deeper soil had been included in the evaluation.

**Responses to Comments on the Site 17 Proposed Plan
Submitted by BACSE on August 31, 2011**

1. Groundwater at Site 17

BACSE understands that the Proposed Plan, and the resulting Record of Decision the Navy hopes to sign by the end of September 2011, addresses only the soil at Site 17. Groundwater at the site will be addressed in a separate Proposed Plan and Record of Decision after the Navy collects and evaluates a minimum of three rounds of groundwater monitoring data. BACSE looks forward to reviewing the Proposed Plan for Site 17 groundwater at a future date.

Response: Noted. No response required.

2. The No Further Action Decision for Soils is Unacceptable

In the Proposed Plan, the Navy states that No Further Action is needed for soils at Site 17. A No Further Action decision means that there will be no restrictions in the future on how the soil at the site is used. The soil can be dug up, spread around, and even used elsewhere as "clean fill" by the future owners or occupants of the site.

BACSE finds the No Further Action decision unacceptable. The Navy's risk assessment focused primarily on the top foot of soil, the "surface soil", and concluded that this one-foot thick layer of soil did not pose unacceptable risks to ecological receptors. As illustrated by the Problem Formulation section on page 5 of the Proposed Plan, only the risks associated with current surface soil exposure were considered.

But potential future uses of the site in which deeper soils could be disturbed by excavation and other activities were not assessed. The comments and responses submitted by the Maine DEP's risk assessment consultant that are included in Appendix F in the *Remedial Investigation Plan for Site 17* speak very clearly to the risk associated with deeper soil at the site. And the history of remedial actions at Site 17 underscores the dangers presented by the pesticides found in the Site 17 soils. Past remedial efforts were driven in part by the risks posed to ecological receptors.

Response: The ecological risk assessment was conducted in accordance with standard procedures and with the approved work plan. The main focus of the comments provided by MEDEP's consultant on the ecological risk assessment was the use of data from only the 0- to 1-foot interval for estimation of ecological risks. To address these comments, the Navy included an assessment of estimated ecological risk from exposure to subsurface soil in the uncertainty section of the ecological risk assessment (Appendix C.2 of the final RI Report). The results of this evaluation did not change the conclusions of the ecological risk assessment (i.e., no significant impacts were noted for any of the receptors, and the conclusion that no further action was warranted is still valid). A detailed discussion of the results is included on pages 14 through 18 of Appendix C.2, and numerical results are included in Attachment C.2.6.

The uncertainty associated with chemical concentrations following the mixing/dilution resulting from soil disturbance would add significant uncertainty to any assessment of potential risks (i.e., the magnitude of uncertainty associated with any estimated post-disturbance chemical concentrations would make the estimated risks of very limited value in risk management decision making). As stated in Section 1.4.3 of Appendix C.2, "exposure to subsurface soil was not {initially} evaluated due to the considerable amount of uncertainty associated with predicting subsurface soil concentrations after potential re-development."

The human health risk assessment conducted as part of the RI estimated potential risk associated with subsurface soil for receptors including residents, construction workers, trespassers, and industrial workers. The results indicated that cancer risks and non-cancer hazards were less than EPA and MEDEP acceptable levels for all receptors, meaning that exposure to subsurface soil, even for child and lifetime residents (generally the most sensitive receptors) would not result in unacceptable risk. The results of the conservative human health risk assessment, conducted in accordance with standard procedures, indicate that exposure to remaining concentrations of COCs in site surface and subsurface soil is acceptable for all receptors evaluated. In addition, based on the fact that unlimited use and unrestricted exposure is acceptable for soil at the site (based on risk assessment results), removal and redeposition elsewhere of soil from the site would also be acceptable, especially considering that there would likely be mixing and dilution of impacted site soils and non-site-impacted soils during any removal and redeposition process. These results were the basis for the decision that no further action, including no restrictions on future use of soil from the site, is required from a human health perspective.

Therefore, based on the results of the human health and ecological risk assessments, unrestricted exposure to subsurface soil does not pose unacceptable risks to human or ecological receptors, whether that exposure occurs within Site 17 or at another location after removal from Site 17. The results of these risk assessments form the basis for the Navy's no further action determination.

3. Omission of Protective Land Use Restrictions and Controls

BACSE does not disagree with the Navy that the top foot of soil, the surface soil, at Site 17 does not pose an unacceptable risk to ecological receptors. BACSE objects to the lack of future controls on the subsurface soils that would prevent them from being dug up and used as surface soil or "clean fill" either at Site 17 or elsewhere in the community. Furthermore, it is BACSE's understanding that with a No Further Action decision, any cleanup costs that might arise when subsurface soil is excavated and used would be at the expense of the owner/occupant, and not the Navy.

BACSE cannot support the Navy's preferred remedial alternative of No Further Action for soil at Site 17, and recommends that institutional controls to manage the risk posed by subsurface soils at Site 17 be imposed. Institutional controls are necessary to prevent the unrestricted disturbance or excavation and relocation of the contaminated soil that remains beneath the ground surface at Site 17.

Response: As stated above, based on the results of the human health and ecological risk assessments, there is no unacceptable risk from unrestricted exposure to subsurface soil that would necessitate placing restrictions on its disturbance, excavation, or relocation. Unrestricted exposure to subsurface soil does not pose unacceptable risks to any human receptors, including residents, workers, or trespasser, or to any ecological receptors. Therefore, no Site 17 soil restrictions are needed or proposed to be protective of human health or the environment.