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FINAL PROPOSED PLAN OPERABLE UNIT 1 (OU 1) SITE 16 MCAS CHERRY POINT NC
09/01/2015
RHEA ENGINEERS AND CONSULTANTS INC



Final Proposed Plan Operable Unit 1, Site 16 September 2015

Marine Corps Air Station Cherry Point, North Carolina

1.0 INTRODUCTION

This Proposed Plan presents the Proposed Remedy for Site 16 located within **Operable Unit (OU) 1** at Marine Corps Air Station (MCAS), Cherry Point, North Carolina. Site 16 (referred to as Landfill at Sandy Branch) is a former borrow area that was subsequently used as a dump area for construction debris and unspecified quantities of other wastes (municipal-type refuse). OU1 is comprised of 12 sites (i.e., Sites 14, 15, 16, 17, 18, 42, 47, 51, 52, 83, 92, and 98) based on their proximity to each other within the industrialized section of MCAS Cherry Point. Five sites (Sites 14, 15, 17, 18, and 40) required **No Further Action (NFA)** and are addressed in the **Record of Decision (ROD)** OU1, Sites 14, 15, 17, 18, and 40 (CH2M HILL, 2010). A sixth site, Site 83, also required NFA and is addressed in the Site 83 ROD (Rhea, 2012). Six of the OU1 sites were identified as contributing **chlorinated volatile organic compounds (cVOCs)** to groundwater (Sites 42, 47, 51, 52, 92, and 98) and are collectively referred to as the OU1 Central **Groundwater Plume Sites**. The OU1 Central Groundwater Plume Sites and Site 16 (Landfill at Sandy Branch) are being investigated separately under the **Comprehensive**

Environmental Response, Compensation, and Liability Act (CERCLA). This Proposed Plan addresses only Site 16. This remedy being selected will be the final action for Site 16. Based on the results of the environmental investigations, interim removal actions, and the historic use as a disposal area with waste remaining in place the Proposed Remedy for Site 16 is **Land Use Controls (LUCs)**.

This Proposed Plan is issued by the United States Department of Navy (Navy) (i.e., Naval Facilities Engineering Command [NAVFAC] Mid-Atlantic, lead agency for site activities, and the MCAS Cherry Point **Environmental Affairs Department [EAD]**), and the **United States Environmental Protection Agency (USEPA)** Region 4, lead regulatory agency, in consultation with the **North Carolina Department of Environment and Natural Resources (NCDENR)** (support agency). This Proposed Plan is submitted in order to fulfill the public participation requirements in CERCLA Section 117(a) and Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**.

This Proposed Plan summarizes information that can be found in the **Remedial Investigation (RI)**

Mark Your Calendar for the Public Comment Period

Public Comment Period

September 29 – November 13, 2015

Submit Written Comments

The Navy, USEPA, and NCDENR will accept written comments on the Proposed Plan during the public comment period. To submit comments or obtain further information, please refer to the insert page.



Attend the Public Meeting

November 4, 2015

Time – 6:00 pm

Place – Havelock Tourist and Event Center

201 Tourist Center Drive

Havelock, North Carolina 28532

Phone: (252) 444-4348

The Navy will hold a public meeting to explain the Proposed Plan and the Proposed Remedy. Verbal and written comments will also be accepted at this meeting.

Location of Information Repository:

For more information, check the MCAS Cherry Point **Environmental Restoration (ER) Program** public web site: <http://go.usa.gov/Dy59> (see Section 6.3 for complete instructions)

If you do not have personal access to the internet, a hardcopy of this Proposed Plan and access to the MCAS ER Program public web site may be obtained from:

Havelock-Craven County Library

301 Cunningham Boulevard

Havelock, North Carolina 28532

(252) 447-7509

Report (TetraTech NUS, 2002), 2009 RI Addendum (CH2M HILL, 2009b), 2012 Site 16 Supplemental RI (CH2M HILL, 2012) and other documents that can be found in the **Administrative Record** for MCAS Cherry Point (see Section 6.3 for access information). A glossary of key terms used in this Proposed Plan is presented in Section 8.0. Key terms are identified in **bold** print the first time they appear.

The Navy and USEPA, in consultation with NCDENR, will make the final decision on the proposed remedial approach for OU1 Site 16 after reviewing and considering information submitted during the 45-day **public comment period**. The Navy, along with USEPA, may amend this Proposed Plan based on new information or comments from the public; therefore, public comment on this Proposed Plan is invited and strongly encouraged. Information on how to participate in the decision-making process is presented in Section 6.0.

2.0 SITE BACKGROUND

2.1 Site Description and Background

MCAS Cherry Point is a 13,164-acre military reservation located just north of the city of Havelock in southeastern Craven County, North Carolina (Figure 1). Commissioned in 1942, the mission of MCAS Cherry Point is to maintain and support facilities, services, and material of the Marine Aircraft Wing. The Air Station has facilities for training and support of the Fleet Marine Force Atlantic aviation units, and is designated as a primary aviation supply point. Surrounding areas include primarily commercial and residential development and public land (Croatan National Forest). In 1994, MCAS Cherry Point was placed on USEPA's **National Priority List (NPL)**, which was established under CERCLA §105(a) for sites contaminated by releases of hazardous substances.

OU1 is an industrial area, approximately 565 acres in size, located in the southwestern portion of MCAS Cherry Point (Figure 1). OU1 is bounded by C Street and Sandy Branch Creek to the northwest, portions of the MCAS Cherry Point flight line and runway to the northeast and southeast, and East Prong Slocum Creek to the southwest.

A **Federal Facilities Agreement (FFA)** entered into between the Navy, USEPA, and the State of North Carolina identified 12 sites to be investigated as part of 2002 RI for OU1 (NAVFAC, 2005) as follows:

- + Site 14 – Motor Transportation;
- + Site 15 – Ditch and Area Behind Naval Aviation Depot (NADEP);
- + Site 16 – Landfill at Sandy Branch;
- + Site 17 – Defense Reutilization and Marketing Offices (DRMO) Drainage Ditch;
- + Site 18 – Facilities Maintenance Compound;
- + Site 42 – Industrial Wastewater Treatment Plant;
- + Site 47 – Industrial Area Sewer System;
- + Site 51 – Building 137 Plating Shop;
- + Site 52 – Building 133 Plating Shop and Ditch Area;
- + Site 83 – Building 96 Former Pesticide Mixing Area;
- + Site 92 – **Volatile Organic Compounds (VOCs)** in Groundwater near the Stripper Barn; and



Figure 1 – MCAS Cherry Point & OU1 Location

- + Site 98 – VOCs in Groundwater near Building 4032.

Site 16 (Figure 2) is the subject of this Proposed Plan. Descriptions of the site and its status are presented in Sections 3.0 and 4.0. Other OU1 sites are being or have been addressed separately under CERCLA, including the following:

- + Six sites associated with the OU1 central groundwater plume (Sites 42, 47, 51, 52, 92 and 98);
- + Sites 14, 15, 17, 18, and 40, categorized as NFA sites (ROD, CH2M HILL, 2010); and
- + Site 83 – NFA (ROD, Rhea, 2012).

Site 16 (referred to as Landfill at Sandy Branch) is approximately 19 acres in area and is located at the western limits of OU1. The site is bordered by the Sandy Branch Creek to the north, East Prong Slocum Creek to the west, a wetland area to the

south, and an access road to the east (Figure 2).

Although Site 16 was given the name “Sandy Branch Landfill,” this site was a construction debris dump site. The potential sources of contamination at Site 16 include materials (mostly construction debris) dumped at the Sandy Branch Landfill from 1946 to 1948, and six accumulated surface debris piles that contained asbestos-containing material, construction debris, and soil contaminated with petroleum hydrocarbons. These debris piles were removed in 1997 (Section 2.2.4).

The site is currently used for storage and solid waste handling (i.e., transfer) and storage of bulk materials (e.g., riprap, gravel, fill dirt, mulch). It was once used for solid waste recycling activities, but no longer. There are several buildings and an automobile impound lot located on the site.



Figure 2 – Site 16 Location

2.2 Summary of Previous Investigations and Cleanup Actions

Environmental investigations were conducted at Site 16 between 1983 and 2011. The areas of these investigations are depicted on Figure 3. The following sections describe each investigation or action that has taken place at OU1 Site 16.

2.2.1 Initial Assessment Study

An Initial Assessment Study (IAS) (Water and Air Research, Inc., 1983) was performed at 14 separate sites within OU1, including Site 16, to evaluate the “existence of pollutants that may have contaminated a site or that pose an imminent health hazard for people located on or off the installation.” The IAS reports that between 1946 and 1948, up to 20,000 gallons of waste oil, one or more 55-gallon drums of potassium cyanide, and unspecified quantities of other wastes (municipal-type refuse) were reportedly disposed of at Site 16. Aerial photographs are reported to indicate possible dumping after 1949.

2.2.2 Remedial Investigation Interim Report

From 1984 to 1987, investigations were conducted at Site 16 and documented in the RI Interim

Report (NUS Corporation, 1988). Nine monitoring wells were installed at the site and were sampled during three events. Concurrent with the groundwater investigation, surface water and sediment samples were collected from East Prong Slocum Creek and Sandy Branch. The results showed the presence of VOCs within groundwater and surface water at Site 16. Subsequent investigation activities would later conclude that the VOCs detected in groundwater and surface water at Site 16 did not originate onsite, but migrated from upgradient source areas within other OU1 sites (Central Groundwater Plume – see Section 2.2.9).

2.2.3 Resource Conservation and Recovery Act Facility Investigations

Multiple **Resource Conservation and Recovery Act (RCRA) Facility Investigations (RFIs)** were conducted at Site 16 from 1990 to 1993 and documented in the following reports:

- + RCRA Facility Investigation Report, Units 5, 10, 16, and 17 Marine Corps Air Station, Cherry Point, North Carolina (Halliburton NUS, 1991);

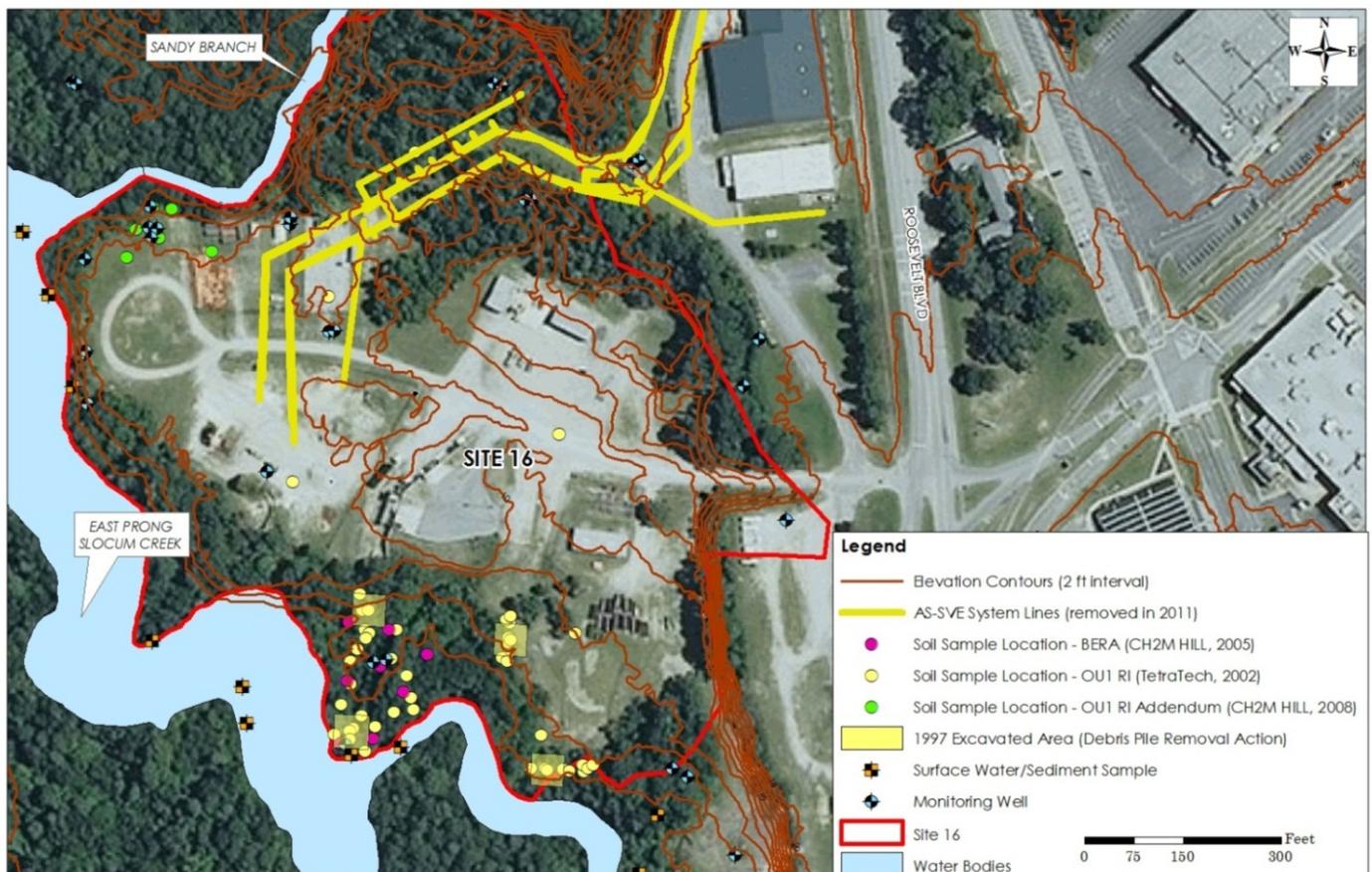


Figure 3 – Previous Investigations

- + Final Technical Direction Memorandum for Units 10 and 16, Marine Corps Air Station Cherry Point, North Carolina (Halliburton NUS, 1992); and
- + Final RCRA Facilities Investigation, 21 Units, Marine Corps Air Station Cherry Point, North Carolina (Halliburton NUS, 1993).

The investigations conducted at Site 16 included a soil-gas survey, collection of multiple soil samples, monitoring well installations, groundwater sampling, and surface water and sediment sampling. The results showed the presence of VOCs within groundwater. Subsequent investigation activities would conclude that the VOCs detected in groundwater at Site 16 did not originate onsite, but migrated from upgradient source areas within other OU1 sites (Central Groundwater Plume – see Section 2.2.9).

2.2.4 CERCLA TCRA – Debris Pile Removal

In 1997, a CERCLA **Time-Critical Removal Action (TCRA)** was conducted in the southwest portion of Site 16 to remove six debris piles, along with tanks, empty storage vessels, and other construction debris. Approximately 2,091 tons of asbestos-containing material, debris, and soil contaminated with petroleum hydrocarbons, asbestos, and lead were disposed at an offsite regulated facility. Confirmation soil samples were collected to verify the condition of the area following removal of the stockpiled contaminated material (OHM, 1998).

2.2.5 2002 OU1 RI

A final remedial investigation was conducted (OU1 RI TetraTech NUS, 2002) to collect adequate chemical data across OU1 to determine the nature and extent of contamination, and to determine whether the contamination presented an unacceptable risk to human health or the environment. Data from historical site investigations were used in conjunction with additional soil, sediment, groundwater, and surface water samples collected for the 2002 OU1 RI.

The risk evaluation combined the data from Sites 16, 83 and BRAC Site 5. The results identified potential unacceptable risks to human health from exposure to **polycyclic aromatic hydrocarbons (PAH)** and pesticide compounds in soil for the hypothetical future resident and construction

workers. It also recommended further evaluation of the potential ecological receptors these areas.

Risks associated with exposure to groundwater were evaluated OU1-wide for the Surficial, Yorktown, and Castle-Hayne aquifers. Potential unacceptable risks were identified for potential future potable use of groundwater from the **Surficial Aquifer**, due to cVOCs, carcinogenic PAHs, arsenic, iron and thallium. The arsenic and iron are associated with background conditions, and the occurrence of thallium was attributed to false-positive detections related to the laboratory analytical method. No risk was identified for the Yorktown and Castle Hayne aquifers (TetraTech, 2002).

Risks were also evaluated OU1-wide for surface water and sediment exposures. The estimated cancer risk for exposure to OU1 sediments by child residents and lifetime residents exceeded USEPA target levels. The risk was associated with PAHs observed in one sediment sample within Schoolhouse Branch, not adjacent to Site 16. All other receptors potentially exposed to sediment were below or within the USEPA target risk range of 10^{-4} and 10^{-6} and **hazard indices (HIs)** were below the acceptability threshold of 1.0 (TetraTech, 2002).

2.2.6 Step 3a Addendum Screening-Level Ecological Risk Assessment

The Step 3a Addendum to the Screening-Level Ecological Risk Assessment (CH2M HILL, 2003) was prepared to further refine the receptor exposure scenarios, delineate more-specific contaminant sources, delineate the spatial extent of such contamination, and develop a better understanding of potential risks to ecological receptors at OU1. The report presented an evaluation of existing analytical data within Site 16, and a portion of Site 16 was identified as an area posing potential ecological risk that should receive further evaluation through a Baseline Ecological Risk Assessment (BERA).

2.2.7 OU1 BERA

An evaluation of the ecological risks posed by the environmental conditions at Site 16 was presented in the OU1 BERA (CH2M HILL, 2005) along with the Post-BERA Work Plan (CH2M HILL, 2006). The OU1 BERA concluded that there are no site-related risks for receptors within Site 16. Additional details associated with the ecological risk assessment are included in Section 4.2.

2.2.8 2009 Additional Groundwater Investigation

In 2009, additional field activities were conducted at OU1 to further characterize the extent of the cVOC groundwater plume. Five monitoring wells (16GW48 through 16GW52) were installed at Site 16 to serve as part of the OU1 Central Groundwater Plume long-term monitoring and to assess potential of the Site 16 soil contaminant leachability. The groundwater results showed no leaching of Site 16 chemicals of potential concern (COPCs) from the soil to the groundwater at Site 16 (CH2M HILL, 2009a).

2.2.9 OU1 RI Addendum

The 2002 OU1 RI was amended in 2009 by a report that presented an updated evaluation of the site conceptual model, nature and extent of detected constituents in soil and groundwater, and potential risks to human health and the environment within OU1. This report focused on the OU1 Central Groundwater Plume Sites, and provided updates on the status of each OU1 site (CH2M HILL, 2009b).

This report also included the results from an additional investigation conducted at Site 16 in the area of monitoring well 16GW04 to evaluate whether Site 16 was a potential source of cVOCs in groundwater. The investigation included six soil samples and eight groundwater samples. This report identified that Site 16 is not the source of elevated cVOC concentrations within the Surficial Aquifer, which are instead the result of upgradient sources that are associated with the “OU1 Central Groundwater Plume” (CH2M HILL, 2009b). The cVOC groundwater contamination observed beneath Site 16 is being addressed separately as part of the OU1 Central Groundwater Plume Proposed Plan (CH2M HILL, 2014) and upcoming ROD.

2.2.10 Supplemental Remedial Investigation

A Supplemental Remedial Investigation (SRI) (CH2M HILL, 2012) reviewed the data and findings obtained from both historical and more recent investigations to characterize and summarize the nature and extent of COPCs in soil and groundwater in regards to potential environmental and human health risks. An Updated **Human Health Risk Assessment (HHRA)** was included in the SRI. The Updated HHRA evaluated the current risk at Site 16 using current risk assessment methods to evaluate soil samples collected only from Site 16 (baseline risk

assessment evaluated soils from two additional sites). The updated HHRA concluded that there are no unacceptable human-health risks from sources attributable to Site 16. The updated HHRA is discussed more fully in Section 4.1.

Based on the data collected at Site 16, the SRI concluded that the environmental media have been adequately characterized. Based on current site conditions, no potential unacceptable risks to human health or the environment exist from site-related contamination. Further, it was determined that previous removal actions (both debris and soil) eliminated potential future sources of contamination. The SRI recommended proceeding to an NFA Proposed Plan and ROD; however, due to the unknown waste remaining in place, LUCs are being recommended as the proposed remedy.

3.0 SITE CHARACTERISTICS

3.1 Physical Characteristics

Site 16 is located in the western portion of OU1. The ground surface slopes from approximately 2 feet above mean sea level (amsl) along the shoreline of East Prong Slocum Creek upwards to approximately 25 feet amsl along the eastern perimeter of Site 16.

East Prong Slocum Creek is located to the southwest of Site 16 (Figure 2). East Prong Slocum Creek flows into Slocum Creek and the Neuse River. East Prong Slocum Creek has been classified by NCDENR as a Class C freshwater body.

The hydrogeologic framework beneath OU1 consists of nine hydrostratigraphic units, five aquifers and four confining units that extend to a depth of approximately 500 feet. From shallowest to deepest, the aquifers with associated confining units include: the Surficial, Yorktown, Pungo River, Upper Castle Hayne, and Lower Castle Hayne aquifers. Each aquifer is separated by a confining unit except where these units are absent or discontinuous.

A **paleochannel** was identified within southwestern OU1, as determined from United States Geological Survey (USGS) studies, lithologic descriptions, and groundwater levels from OU1 monitoring wells. Groundwater levels outside (northeast) of the paleochannel demonstrate a downward vertical gradient, while groundwater

levels within the paleochannel area indicate an upward vertical gradient. Site 16 is located within the limits of the paleochannel.

Groundwater generally flows in a westward direction across Site 16 towards East Prong Slocum Creek. The average horizontal hydraulic gradient is approximately 0.003 feet per foot (ft/ft), and the average horizontal groundwater velocity is approximately 0.1 to 0.2 feet per day (ft/day) (CH2M HILL, 2009). East Prong Slocum Creek is recharged by groundwater and by precipitation within the drainage basin.

3.2 Debris

Site 16 is a former borrow pit area that was subsequently used as a construction debris dump site. Although the site was named Sandy Branch Landfill, the site was clearly a construction debris dump site. Construction debris typically includes inert-types of materials, such as wood, bricks, concrete, and metal. Although there has not been a subsurface debris investigation, only construction debris has been encountered during subsurface activities at the site such as drilling, sampling, and trenching.

Site 16 also had dumped construction debris on the surface. In 1997, six surface debris piles, along with tanks, empty storage vessels, and other construction debris, were removed from Site 16 (Section 2.2.4). The surface piles consisted of asbestos-containing material and construction debris.

The dumped surface debris has been removed from Site 16, but the extent of the subsurface debris has not been thoroughly investigated. The subsurface debris appears to be scattered with more construction debris in the north and very little debris in the central portion of the site.

3.3 Nature and Extent of COPCs

The potential sources of COPCs at Site 16 include materials disposed of at the Sandy Branch Landfill from 1946-1948, and six accumulated debris piles at Site 16, which have been removed. The historical sampling activities at Site 16 used to evaluate the nature and extent of contamination included soil, groundwater, sediment, and surface water sampling as part of the 2002 OU1 RI (TetraTech NUS, 2002), soil sampling as part of the OU1 BERA (CH2M HILL, 2006), soil and groundwater sampling as part of the OU1 RI Addendum (CH2M HILL, 2009b), and 2009

groundwater sampling as part of the 2009 Additional Groundwater Investigation (CH2M HILL, 2009a) activities.

The COPCs identified in the 2012 SRI (CH2M HILL, 2012) are discussed in the following sections.

3.3.1 Soil

During OU1 RI activities, VOCs (benzene and methylene chloride), **semi-volatile organic compounds (SVOCs)** (benzo(a)-anthracene, benzo(a)-pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)-anthracene, indeno(1,2,3)pyrene), pesticides (dieldrin, α -Benzene-hexachloride, and heptachlor epoxide), **polychlorinated biphenyls (PCBs)** (Aroclor 1254 and Aroclor 1260), and inorganics (metals, such as arsenic, chromium, and iron) were detected above the screening criteria. Although the above COPCs were detected above the soil-to-groundwater leaching criteria, these constituents were not detected in the groundwater. Much of the current construction debris has been in place for over 50 years, and the groundwater monitoring shows that potential COPCs leaching to groundwater is negligible; therefore, it is expected that COPCs will not leach into the groundwater in the future.

3.3.2 Groundwater

The monitoring well network at Site 16 consists of 32 wells that provide the basis for defining the nature and extent of contamination in groundwater. VOCs have been detected in the upper and lower aquifers at Site 16. In the 2009 OU1 RI Addendum (CH2M HILL, 2009b) it was concluded that the "occurrence of TCE [trichloroethene] within the upper and lower surficial aquifers beneath Site 16 is a result of the migration of the plume originating beneath Building 133" (OU1 Central Groundwater Plume). The detections are not a result of former Site 16 activities, but from other upgradient sources.

SVOCs and PCBs were not detected above screening levels in the groundwater at Site 16 (CH2M HILL, 2009a).

In 1994, 4,4- dichlorodiphenyldichloroethene (4,4-DDE) was detected slightly above the groundwater standards defined in the **North Carolina Administrative Code, Title 15A, Subchapter 2L (NC 2L GWS)**; however, subsequent samples were below the NC 2L GWS and not detected in other downgradient wells.

The metals manganese, iron, and thallium were detected above the NC 2L GWS and/or twice the base-wide background in the groundwater beneath, and adjacent to Site 16. Detections of thallium are the result of false positives. The manganese and iron detections are attributable to background conditions.

3.3.3 Surface Water and Sediment

As part of the 2002 OU1 RI (TetraTech NUS, 2002), surface water and sediment samples were collected from East Prong Slocum Creek and Sandy Branch. VOCs, SVOCs, PCBs, pesticides, and metals were observed in surface water and sediment at both water bodies. Manganese at Sandy Branch and chlordane, arsenic, manganese, and thallium at East Prong Slocum Creek were observed in the surface water above the **North Carolina Surface Water Quality Standard (NC2B)** standards. Detections of thallium are the result of false positives. Chlordane was detected at 0.0057 µg/L, which is slightly above the NC2B standard of 0.004 µg/L.

4.0 SUMMARY OF SITE RISKS

Based on the available data, there are no unacceptable human-health or ecological risks from sources attributable to Site 16. Although it is presumed that Site 16 will continue to be used for industrial purposes in support of the MCAS, the risk assessments took into account a wide range of potential land uses. The following sections summarize the risk assessments that have been performed on Site 16.

4.1 Human Health Risk Assessment

4.1.1 Baseline HHRA

In the 2002 OU1 RI, a baseline HHRA was performed to evaluate potential health risks for all media at OU1. Potential excess lifetime cancer risks and non-cancer HI were calculated for several potential receptors, including construction workers, maintenance workers, full-time employees (including military personnel), adolescent trespassers, adult recreational users, and future child and adult residents.

The OU1 baseline HHRA for the 2002 OU1 RI concluded the following:

- + **Soil** – Calculated cancer risks for exposure to the soil group exceeded USEPA’s target cancer

What is Human Health Risk and How is it Calculated?

A human health risk assessment estimates the "baseline risk." This is an estimate of the likelihood of health problems occurring if no cleanup action was taken at a site. To estimate the baseline risk at a site, the Navy performs the following four-step process:

- Step 1: Analyze Contamination**
- Step 2: Estimate Exposure**
- Step 3: Assess Potential Health Dangers**
- Step 4: Characterize Site Risk**

In **Step 1**, the Navy looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies help the Navy to determine which contaminants are most likely to pose the greatest threat to human health.

In **Step 2**, the Navy considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency (how often) and length of exposure. Using this information, the Navy calculates a "reasonable maximum exposure (RME)" scenario that portrays the highest level of human exposure that could reasonably be expected to occur.

In **Step 3**, the Navy uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. The Navy considers two types of risk: (1) cancer risk, and (2) noncancer risk. The likelihood of any kind of cancer resulting from a contaminated site is generally expressed as an upper bound probability; for example, a "1 in 10,000 chance." In other words, for every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than normally would be expected to from all other causes. For noncancer health effects, the Navy calculates a "hazard index." The hazard index represents the ratio between the "reference dose," the dosage at which no adverse health effects are expected to occur, and the "reasonable maximum exposure," the estimated maximum exposure level for a given category of individuals coming into contact with contaminants at the Site. The key concept is that a "threshold level" (measured usually as a hazard index of less than 1) exists below which noncancer health effects are no longer predicted.

In **Step 4**, the Navy determines whether site risks are great enough to cause health problems for people at or near the site. The results of the three previous steps are combined, evaluated, and summarized. The Navy adds up the potential risks from the individual contaminants and exposure pathways and calculates a total site risk.

risk range. An Updated HHRA (included in the SRI [CH2M HILL, 2012]) was completed in 2011, using both historical and more recent soil sampling data (Section 4.1.2).

- + **Groundwater** – Risks associated with exposure to groundwater were evaluated for the Surficial, Yorktown, and Castle-Hayne Aquifers for all of OU1. The calculated HI and cancer risks for potential future potable use of the surficial aquifer exceeded USEPA’s target levels. As noted previously, the risk associated

with OU1, Site 16 groundwater is related to the OU1 Central Groundwater Plume and not from contamination at Site 16. This risk associated with groundwater is addressed under separate documents (CH2M HILL, 2014).

- + **Sediment** – Estimated cancer risk for exposure to OU1 sediment was associated with SVOCs observed in one sediment sample within Schoolhouse Branch, which is not part of Site 16. All other receptors potentially exposed to sediment were below or within the USEPA’s target risk range.
- + **Surface Water** – HI and cancer risk levels were within USEPA’s acceptable levels for OU1 surface water.

4.1.2 Updated HHRA for Soil

An Updated HHRA (included in the SRI [CH2M HILL, 2012]) was prepared for Site 16 using soil data collected during the 2002 OU1 RI, from October 1994 through September 2000, and data from eight surface soil samples collected for the OU1 BERA (CH2M HILL, 2005) in May 2004. Human health risks associated with exposure to constituents detected in soil were evaluated for potential exposure pathways based on existing site conditions and current and potential future site use.

The Updated HHRA used current risk assessment methods, updated as necessary from the risk assessment methodology used for the 2002 OU1 RI HHRA. The screening levels used to select the COPCs for further quantitative evaluation in the new risk assessment were updated from the values used in the 2002 OU1 RI (the USEPA Region 9 preliminary remediation goals) to the current USEPA **Regional Screening Level (RSL)** table values (USEPA, 2010). The exposure factors used to calculate daily intake values were updated to currently used values, where necessary. Also, in the 2002 OU1 RI, soils at Sites 16, 83, and BRAC Site 5 had been evaluated as one soil group. The updated HHRA evaluated only soil samples collected at Site 16.

In the original HHRA, the excess lifetime cancer risk for all exposure scenarios was between the 1×10^{-4} to 1×10^{-6} USEPA target value, with the exception of the future adult/child resident. The carcinogenic risk for a future adult/child resident was 2×10^{-4} , which is slightly above the USEPA excess lifetime cancer risk target range of 1×10^{-4} to 1×10^{-6} . The Updated HHRA documented that

the carcinogenic risks come primarily from arsenic, chromium, and SVOCs. The recalculated carcinogenic risk is 7×10^{-5} , which is within the USEPA excess lifetime cancer risk target range of 1×10^{-4} to 1×10^{-6} . Therefore, the results of the Updated HHRA indicate that for both current and potential future land use, Site 16 soil does not pose unacceptable health risks to the receptors evaluated in the Updated HHRA.

4.2 Ecological Risk Assessment

The OU1 **Ecological Risk Assessment (ERA)** was documented in the OU1 RI. This ERA can be considered a screening-level assessment because it is based on comparing chemical concentrations against conservative screening values and an evaluation of historical ecological data. This ERA represented Steps 1 and 2 of the eight-step ERA process. This initial ERA evaluated habitats within soil (various soil groupings across OU1), surface water and sediment. The results of the soil grouping evaluation that contained Site 16 required further study (see below). Surface water and sediment samples collected from East Prong Slocum Creek near Site 16 did not drive the ecological risk at OU1.

An evaluation of the ecological risks posed by the environmental conditions at Site 16 was presented in the OU1 BERA (CH2M HILL, 2005) along with the Post-BERA Work Plan (CH2M HILL, 2006).

As part of the OU1 BERA additional soil samples and toxicity samples from small insects were collected from within Site 16 to fill data gaps and to address areas of uncertainty. The samples within Site 16 were evaluated in the OU1 BERA from the “Southwest Area of Ecological Concern” (SW AOEC). The SW AOEC is an approximately 2-acre wooded peninsula within Site 16 located north of East Prong Slocum Creek and southwest of Building 1811. Based on the results of the Step 3a Addendum (CH2M HILL, 2003), metals (e.g., mercury, zinc) and PCBs were identified as constituents of potential concern (COPCs) for the SW AOEC.

Surface soil samples were collected within Site 16 (SW AOEC) and analyzed for SVOCs, pesticides, PCBs, metals, and cyanide. In addition, the samples were subjected to 28-day toxicity tests utilizing small insects called *Collembolan* (common name: Springtail), which are ecologically important organisms within most terrestrial environments.

A total of 25 metals, as well as eight pesticides, 14 PAHs, and four SVOCs were detected in the eight SW AOEC soil samples from within Site 16. PCBs were not detected in any of the samples. The results of the toxicity testing showed that, compared to reference group survival and reproduction, the SW AOEC samples did not show significantly reduced survival or reproduction. None of the detected chemical concentrations were correlated with adverse effects.

The OU1 BERA concluded that there are no site-related risks for ecological receptors within Site 16.

5.0 SCOPE AND ROLE OF RESPONSE ACTION

Based on the available data, as determined during the Updated HHRA (CH2M HILL, 2012), there are no unacceptable human-health or ecological risks from sources attributable to Site 16. Although Site 16 has been thoroughly investigated, the extent of subsurface debris was not evaluated. Environmental investigations conducted at the site have determined that a CERCLA-related release has not occurred and is not likely to occur in the future that would result in potential unacceptable risks to human health and the environment. However, since there is the potential to encounter unknown subsurface debris, the proposed remedy is LUCs.

LUCs will be implemented to prohibit non-industrial land use within the site boundary, which includes restrictions on the construction of residential housing or residential use.

The LUCs will include, but not be limited to: land use restrictions in the Base Master Plan process, deed and/or lease restrictions, and administrative procedures. The LUC performance objectives for Site 16 are as follows:

- + Prevent direct contact with subsurface debris that could potentially pose an unacceptable risk to receptors; and
- + Ensure land use within the site boundary is controlled, unless or until additional action is implemented that mitigates potentially unacceptable risks associated with unrestricted land use.

The LUCs will be implemented and maintained by the Navy and MCAS Cherry Point. The details of the actual LUC boundaries will be finalized in the Remedial Design document. The institutional control boundary encompassing the site will be surveyed by a professional land surveyor. The LUC implementation actions, including monitoring and enforcement requirements, will be provided in the Remedial Design document that will be prepared by the Navy after the ROD has been finalized.

The Navy will maintain, monitor (including conducting periodic inspections), and enforce the LUCs according to the requirements contained in the ROD and Remedial Design document.

The remedy chosen through the Proposed Plan process will be the final action for this site under CERCLA. The Site 16 remedy will not include or affect any other sites or operable units at MCAS Cherry Point. The Navy and USEPA, with concurrence from NCDENR, concluded that LUCs are the appropriate remedy because there is a potential for exposure to unknown subsurface debris that may pose an unacceptable risk to receptors in the future.

Based on the evaluation of the data and information currently available, the Navy concludes that the Proposed Action meets the statutory requirements of CERCLA for protection of human health and the environment.

The Central Groundwater Plume, which is located under several sites, including Site 16, is addressed under a separate Proposed Plan (CH2M HILL, 2014) and ROD.

6.0 PUBLIC PARTICIPATION

Public participation at MCAS Cherry Point includes a **Restoration Advisory Board (RAB)**, public meetings, a public information repository, newsletters, fact sheets, public notices, and an ER Program web site. The Community Involvement Plan for MCAS Cherry Point provides detailed information on community participation for the ER Program. The RAB was formed in December 1995 and consists of community members and representatives of the USEPA, NCDENR, NAVFAC Mid-Atlantic, and MCAS Cherry Point. RAB meetings are held periodically and are open to the public to provide an opportunity for comments and questions. The OU1 investigations, findings,

and the potential remedial approaches have been presented and discussed at multiple RAB meetings.

Nearby residents and other interested parties are strongly encouraged to use the comment period to relay any questions and concerns about OU1 Site 16 and the Proposed Action. The Navy will summarize and respond to comments in a responsiveness summary, which will become part of the official ROD.

This Proposed Plan fulfills the public participation requirements of CERCLA Section 117(a), which specifies that the lead agency (i.e., the Navy) must publish a plan outlining any remedial alternatives evaluated or removal actions completed for the site and identify the Proposed Action. All documents referenced in this Proposed Plan are available for public review as part of the Administrative Record for MCAS Cherry Point. Instructions for accessing the Administrative Record are provided in Section 6.3.

6.1 Public Comment Period

The public comment period for the Proposed Plan provides an opportunity for the community to provide input regarding the proposed action for Site 16 – Landfill at Sandy Branch. The public comment period will be from September 29, 2015 through November 13, 2015, and a public meeting will be held on November 4, 2015 at 6:00 p.m. at the Havelock Tourist and Event Center. All interested parties are encouraged to participate in the Navy's CERCLA activities at MCAS Cherry Point. The meeting will provide an additional opportunity to submit comments on the Proposed Plan. A public notice will be published in area newspapers announcing the availability of the Proposed Plan and the public comment period. In addition, a public notice will also be published in area newspapers announcing the date, time, and location of the public meeting.

Written comments must be postmarked no later than November 13, 2015. The back page included with this Proposed Plan may be used to provide written comments. Please fold the page and add postage where indicated; however, the use of this form is not required.

6.2 Record of Decision

After the public comment period, the Navy and MCAS Cherry Point, in conjunction with the USEPA and with concurrence from NCDENR, will determine whether the LUCs remedy proposed in

During the comment period, interested parties may submit written comments to the following addresses:

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(757) 322-0325

Ms. Gena Townsend
US Environmental Protection Agency,
Region 4
Superfund Division
Atlanta Federal Center
61 Forsyth St.
Atlanta, GA 30303
(404) 562-8538

Ms. Marti Morgan
NC Dept. of Environment and Natural
Resources
Superfund Section
1646 Mail Service Center
Raleigh, NC 27699-1646
(919) 707-8342

this plan should be modified on the basis of comments received. Any required modifications will be made by the Navy. If modifications substantially change the Proposed Action, additional public comments may be requested. If not, the Navy, MCAS Cherry Point, and USEPA will prepare and sign the ROD, with concurrence from the State of North Carolina. The ROD will detail the Proposed Action chosen for the site, and will include the Navy's responses to comments received from the public.

6.3 Available Information

The Community Involvement Plan and technical reports supporting the remedial decision are available for public download via the MCAS Cherry Point ER Program Public web site, and can be accessed at <http://go.usa.gov/Dy59>, by selecting the "[Administrative Record File](#)" link.

Note: Some internet browsers do not include Department of Defense (DoD) digital security certificates, which may result in a security warning recommending the user not to proceed. Though there is no harm in proceeding, to avoid such security alerts, first download the DoD Root CA Certificates by following the instructions at the following web site: <http://dodpki.c3pki.chamb.disa.mil/rootca.html>.

If you do not have personal access to the MCAS Cherry Point ER Program public web site, a hardcopy version of this Proposed Plan may be obtained at the Havelock-Craven County Library (301 Cunningham Boulevard, Havelock, North Carolina 28532) during normal business hours. The library can be contacted at (252) 447-7509.

7.0 REFERENCES

CH2M HILL, 2003. *Step 3A Addendum to the Ecological Risk Assessment, Operable Unit 1, MCAS Cherry Point*. March.

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CH2M HILL, 2009b. *Final OUI Remedial Investigation Addendum*. Marine Corps Air Station Cherry Point, Cherry Point, North Carolina. April.

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Air Station Cherry Point, North Carolina. November.

Halliburton NUS. 1993. *Final RCRA Facilities Investigation, 21 Units, Marine Corps Air Station Cherry Point, North Carolina*. June.

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OHM, 1998. *CERCLA Time-Critical Removal for OUI, Site 16 Debris Piles, Marine Corps Air Station, Cherry Point, North Carolina*. January.

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Water and Air Research, Inc., 1983. *Initial Assessment Study of Marine Corps Air Station Cherry Point, North Carolina*, Prepared for Naval Energy and Environmental Support Activity (NEESA). March.

8.0 GLOSSARY

Administrative Record: A compilation of documents and information for CERCLA sites that is made available to the public for review.

Chlorinated Volatile Organic Compounds (cVOCs): Volatile organic compounds (VOCs) are organic compounds (i.e., they contain carbon) that readily evaporate, or volatilize. Chlorinated VOCs are VOCs in which chlorine atoms substitute for one or more hydrogen atoms in the compound's structure (e.g., trichloroethene, 1,1,1-trichloromethane). CVOCs are a common component of solvents for grease removal and dry cleaning, and are commonly toxic in nature.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):

A Federal law passed in 1980 (United States Code Title 42, Chapter 103), commonly referred to as the "Superfund" Program, that regulates and provides for cleanup and emergency response in connection with numerous existing, inactive hazardous waste disposal sites that endanger public health and safety or the environment. CERCLA was amended by Superfund Amendments and Reauthorization Act (SARA) in 1986.

Ecological Risk Assessment (ERA): An evaluation of the risk posed to ecological receptors (i.e., plants and animals) if remedial activities are not performed at the site.

Environmental Affairs Department (EAD): A department within Marine Corps Air Station Cherry Point that exists to sustain and enhance mission readiness through compliance with relevant laws and regulations, prevention of pollution, and continual program improvement through an environmental management system.

Environmental Restoration (ER) Program: Established in 1984 to help identify, investigate, and cleanup contamination on Department of Defense (DOD) properties; conducted under the auspices of CERCLA of 1980 and SARA of 1986; the DOD equivalent to the USEPA.

Federal Facilities Agreement (FFA): An agreement between the USEPA, the affected state, and DoD facilities (i.e., MCAS Cherry Point). The general purposes of the FFA are as follows:

1. Ensure that the environmental impacts associated with past and present activities at the site are thoroughly investigated and appropriate remedial action taken as necessary to protect the public health, welfare, and the environment.
2. Establish a procedural framework and schedule for developing, implementing and monitoring appropriate response actions at the site in accordance with CERCLA/SARA, the NCP, Superfund guidance and policy, RCRA, RCRA guidance and policy.
3. Facilitate cooperation, exchange of information and participation of the parties in such actions.

Groundwater: The supply of freshwater beneath the Earth's surface that occurs in the pore spaces between soil grains or within fractures in geologic formations that are fully saturated.

Hazard Index (HI): For non-cancer health effects, the Navy calculates a "hazard index." The hazard index represents the ratio between the "reference dose," the dosage at which no adverse health effects are expected to occur, and the "reasonable maximum exposure," the estimated maximum exposure level for a given category of individuals coming into contact with contaminants at the Site. The key concept is that a "threshold level" (measured usually as a hazard index of less than 1) exists below which non-cancer health effects are no longer predicted.

Human Health Risk Assessment (HHRA): A qualitative and quantitative evaluation of the risk posed to human health by the presence of specific pollutants. Elements include the following: identification of the hazardous substances present in the environmental media; assessment of exposure and exposure pathways; assessment of the toxicity of the site's hazardous substances; and, characterization of human health risks.

Land Use Controls (LUCs): Legal and administrative measures to protect human health and the environment when residual contamination is left on site. LUCs limit human exposure by restricting activity, use, and access to properties with residual contamination.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The Federal regulations that guide determination of the sites to be corrected under both the Superfund (CERCLA) program and the program to prevent or control spills into surface waters or elsewhere.

National Priority List (NPL): A list developed by USEPA of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

No Further Action (NFA): Remedial Action in which no response action is performed and no restrictions on land use are necessary.

North Carolina 2L Groundwater Quality Standard (NC 2L GWS): The Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina, North Carolina Administrative Code, Title 15A, NCDENR Division of Water Quality, Subchapter 2L.

North Carolina Department of Environment and Natural Resources (NCDENR): The state agency responsible for administration and

enforcement of environmental regulations in North Carolina.

North Carolina Soil Screening Levels (NC SSLs): Calculated soil contaminant concentrations for the protection of the groundwaters of North Carolina. They reflect the levels of each chemical above which the potential exists for the contaminant to migrate through the soil and contaminate the groundwater. The SSLs are calculated by multiplying the North Carolina Groundwater Quality Standards (NC 2L GWS) by soil contaminant fate and transport factors.

North Carolina Surface Water Quality Standards (NC2B): Enforceable standards developed by NCDENR: The maximum allowable contaminant concentrations in surface waters in the state, which may be tolerated without creating a threat to human health or which would otherwise render the groundwater unsuitable for its intended best usage.

Operable Unit (OU): One or more potentially contaminated sites that have been grouped together due to their proximity to each other or due to similarity of contamination.

Paleochannel: A remnant of a former river or stream channel that has been filled and overlain by younger sediments.

Polychlorinated Biphenyls (PCBs): A class of organic compounds with 1 to 10 chlorine atoms attached to a biphenyl, which is a molecule composed of two benzene rings. PCBs were widely used for many applications, especially as dielectric fluids in transformers and capacitors and coolants. Due to PCB toxicity and classification as persistent organic pollutants, PCB production was banned by the United States Congress in 1976.

Polycyclic Aromatic Hydrocarbons (PAHs): are hydrocarbons, organic compounds containing only carbon and hydrogen that are composed of multiple aromatic rings. PAHs are neutral, nonpolar molecules; they are found in fossil fuels (oil and coal) and in tar deposits, and are produced, generally, when insufficient oxygen or other factors result in incomplete combustion of organic matter (e.g., in engines and incinerators, when biomass burns in forest fires, etc.).

Public Comment Period: The time allowed for the members of a potentially affected community to express views and concerns regarding an action proposed to be taken by USEPA, such as a

rulemaking, permit, or Superfund remedy selection.

Record of Decision (ROD): A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and public comments that were considered regarding the selected remedy.

Regional Screening Level (RSL): Developed by the USEPA, RSLs are chemical-specific concentrations for individual contaminants in air, drinking water, and soil that may warrant further investigation or site cleanup. These levels are based upon human health risk.

Remedial Investigation (RI): A study in support of the selection of a remedy at a site where hazardous substances have been released. The RI identifies the nature and extent of contamination, and analyzes human health and ecological risk associated with the detected constituents.

Resource Conservation and Recovery Act (RCRA): RCRA, as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA), requires the establishment of a management system for hazardous waste (Subtitle C), non-hazardous solid waste (Subtitle D), and underground storage tanks (Subtitle I). RCRA also provides corrective action authority for cleanup of pre-RCRA hazardous waste management units and non-hazardous **solid waste management units**.

Restoration Advisory Board (RAB): An advisory group for the restoration process with members from the public, the Navy, and regulatory agencies. The purpose of the RAB is to gain effective input from the stakeholders on cleanup activities and increase installation responsiveness to the community's environmental restoration concerns.

Semi-volatile Organic Compounds (SVOCs): Organic compounds (i.e. they contain carbon) that have high enough vapor pressures under normal conditions to vaporize and enter the atmosphere.

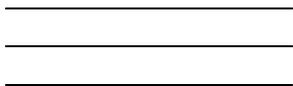
Surficial Aquifer: An aquifer is a saturated, permeable geologic formation that is capable of yielding water in usable quantities via a well. The Surficial Aquifer is the uppermost aquifer in the Coastal Plain of North Carolina, where MCAS Cherry Point is located. The Surficial Aquifer is unconfined, meaning that its upper surface is the water table rather than a confining unit.

Time-Critical Removal Action (TCRA): Removal action under the CERCLA removal authority to achieve quick, protective results at Superfund sites, consistent with all legal requirements, including public participation.

United States Environmental Protection Agency (USEPA): The Federal agency responsible for administration and enforcement of CERCLA (and other Federal environmental statutes and regulations).

Volatile Organic Compounds (VOCs): Organic compounds (i.e., carbon-containing) that readily evaporate, or volatilize.

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stamp
here

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