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FINAL RECORD OF DECISION FOR SITE 28 BUILDING 28 X-RAY FACILITY TANK DRAIN  
FIELD NWS YORKTOWN VA  
05/01/2011  
CH2M HILL



Final

## Record of Decision

### Site 28: Building 28 X-Ray Facility Tank Drain Field

Naval Weapons Station Yorktown, Yorktown, Virginia

May 2011

## 1 Declaration

This Record of Decision (ROD) presents the selected remedy of No Action for all media (soil, groundwater, surface water, and sediment) at the Environmental Restoration Program (ERP) Site 28, Building 28 X-Ray Facility Tank Drain Field, at Naval Weapons Station (WPNSTA) Yorktown, Yorktown, Virginia ("Site"). The No Action determination has been made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C §§ 9601 et. seq., and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision is based on information contained in the Administrative Record (AR) file for the Site. Information not specifically summarized in this ROD or its references, but contained in the AR file has been considered and is relevant to the No Action determination for Site 28. Thus, this ROD is based upon and relies on the entire AR file for the Site in making the decision.

The United States Department of the Navy (Navy) is the lead agency and provides funding for ERP activities at Site 28. The Navy and United States Environmental Protection Agency (USEPA) Region 3, the lead regulatory agency, issue this No Action ROD jointly. The Commonwealth of Virginia Department of Environmental Quality (VDEQ), the support regulatory agency, participated throughout the investigation process, has reviewed this ROD and the materials on which it is based, and concurs with this decision for No Action. The No Action determination documented in this ROD for Site 28 does not include or affect any other sites at WPNSTA Yorktown.

### 1.1 Selected Remedy

Based on the findings of environmental investigations completed at Site 28, there is no unacceptable risk to human health or the environment under current or potential future Site uses. Therefore, the selected remedy for Site 28 is No Action for all media (soil, groundwater, surface water, and sediment). Because there are no hazardous substances, pollutants, or contaminants remaining onsite above the levels that allow for unrestricted use and unlimited exposure, a 5-year review will not be required.

**1.2 Navy Authorizing Signature for the No Action Record of Decision for All Media (Soil, Groundwater, Surface Water, and Sediment) at Site 28, Building 28 X-Ray Facility Tank Drain Field, WPNSTA Yorktown, Yorktown, Virginia**



Captain Lowell Crow  
Commanding Officer  
Naval Weapons Station Yorktown

19 MAY 2011

Date

**1.3 USEPA Region 3 Authorizing Signature for the No Action Record of Decision for All Media (Soil, Groundwater, Surface Water, and Sediment) at Site 28, Building 28 X-Ray Facility Tank Drain Field, WPNSTA Yorktown, Yorktown, Virginia**



Henry J. Sokolowski  
Director  
Office of Federal Facility Remediation and Site Assessment

June 9, 2011  
Date

## 2 Decision Summary

### 2.1 Site Description and History

WPNSTA Yorktown is a 10,624-acre installation located on the Virginia Peninsula between the York River and James River in Virginia (**Figure 1**). WPNSTA Yorktown was established in 1918 to support the laying of mines in the North Sea during World War I. During World War II, the facility was expanded to include three trinitrotoluene loading plants and new torpedo overhaul facilities. A research and development laboratory for experimentation with explosives was established in 1944. In 1947, a quality evaluation laboratory was developed to monitor special tasks assigned to the facility, which included the design and development of depth charges and advanced underwater weapons. Today, the primary mission of WPNSTA Yorktown is to provide ordnance, technical support, and related services to sustain the war-fighting capability of the armed forces in support of national military strategy.

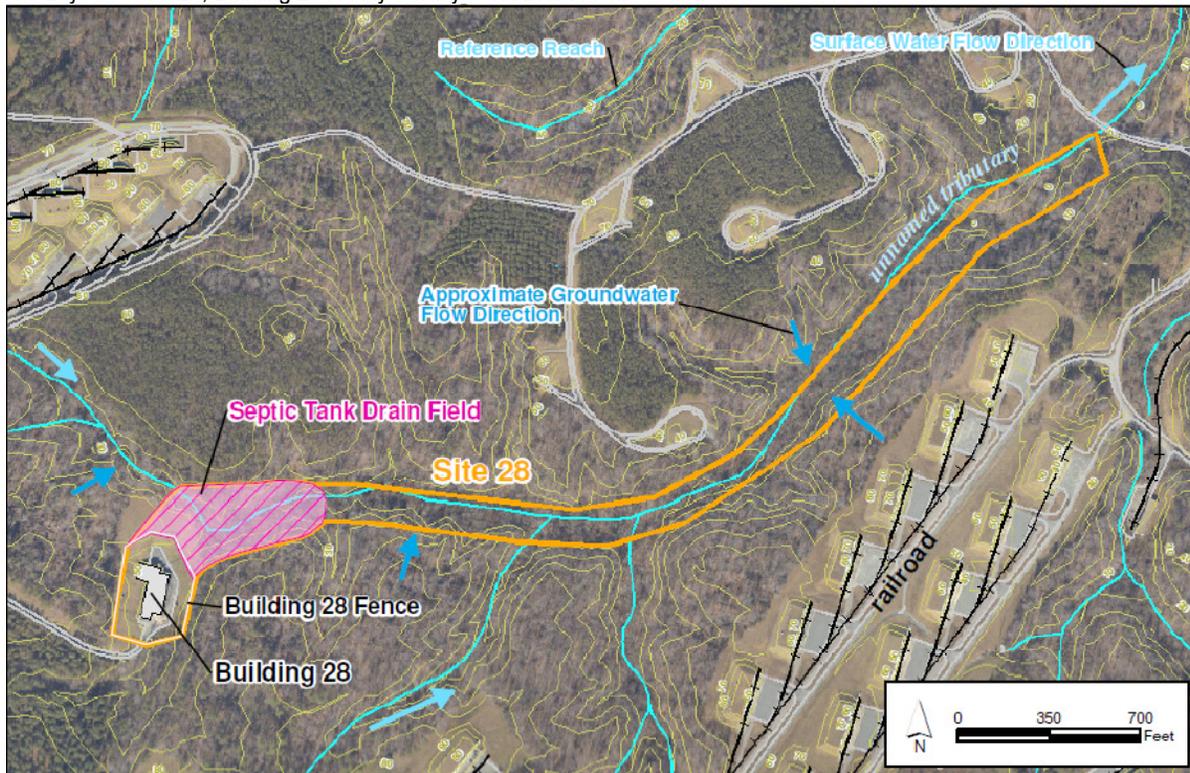
**FIGURE 1**

Regional Location Map with the Location of Site 28, Building 28 X-Ray Facility Tank Drain Field



Site 28 (formerly known as Site Screening Area [SSA] 10), the Building 28 X-Ray Facility Tank Drain Field, encompasses an area approximately 5.8 acres in the central portion of WPNSTA Yorktown, consisting of Building 28, a septic tank drain field, and a portion of an unnamed tributary that drains into the southern branch of Felgates Creek (**Figure 2**). The septic tank received sanitary wastewater from the X-Ray Facility at Building 28 beginning in the late 1960s until 1998, when wastewater was diverted to the sanitary sewer and ultimately to the Hampton Roads Sanitation District wastewater treatment facility.

**FIGURE 2**  
Site Layout – Site 28, Building 28 X-Ray Facility Tank Drain Field



## 2.2 Previous Investigations and Removal Actions

Building 28 was first identified as a source of industrial wastewater discharge to the environment during the 1984 Initial Assessment Study conducted by Naval Energy and Environmental Support Activity (NEESA). As a result, Site 28 was further characterized through a series of investigations, which are summarized in **Table 1** below.

**TABLE 1**  
Summary of Previous Studies and Investigations

Previous Study/Investigation*	Date	Investigation Activities
<p><b>Relative Risk Ranking System, Data Collection Investigation</b></p>	<p>Baker, 1995</p>	<p>In October 1995, three subsurface soil samples and three groundwater samples were collected to gather contaminant, pathway, and receptor information for use in the Navy's Relative Risk Ranking System (<b>Figure 3</b>). The samples were analyzed for target analyte list (TAL) inorganics.</p> <p>The <b><i>analytical results</i></b> (Reference [Ref.] 1) indicated that several metals and cyanide were present in subsurface soil and groundwater and that complete exposure pathways to on-site receptors existed. The results of the Relative Risk Ranking indicated that additional investigation was necessary to characterize the nature of potential contaminants at Site 28.</p>

<sup>1</sup> Reference phrases, presented as ***Bold Italicized Text***, are followed by a corresponding reference number from the References section.

TABLE 1 (CONT.)

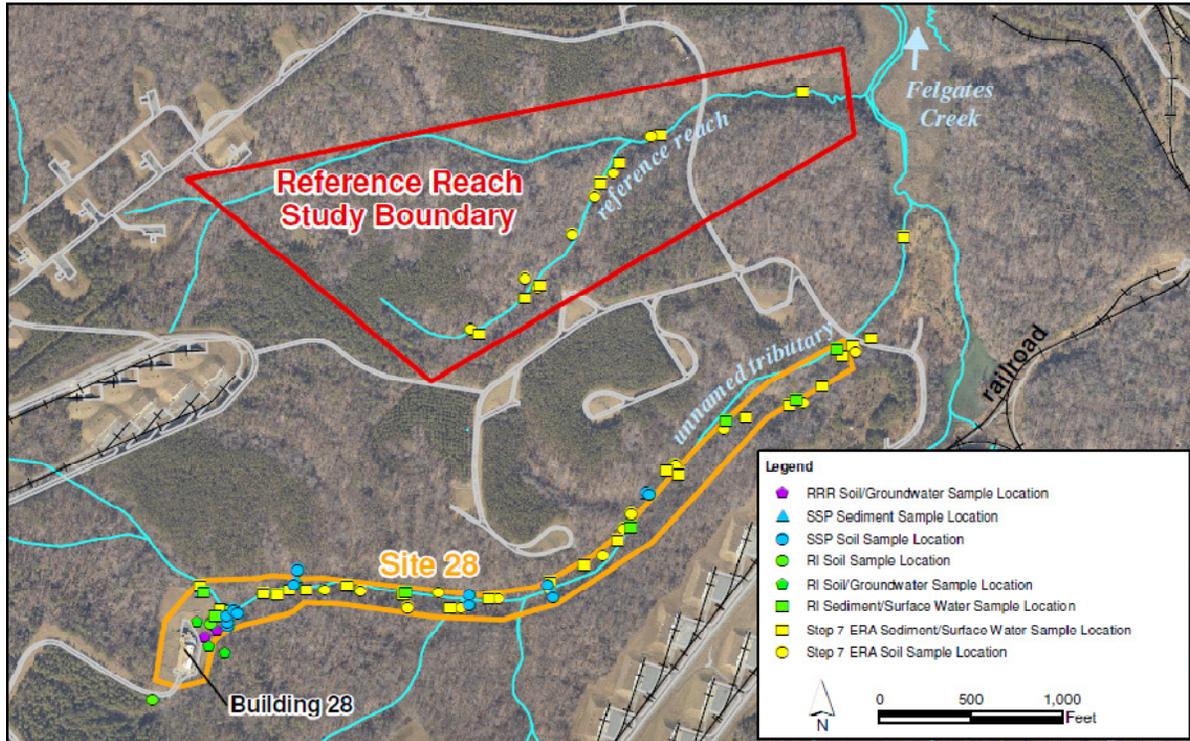
Summary of Previous Studies and Investigations

Previous Study/Investigation	Date	Investigation Activities
Site Screening Process Report for SSA 3, 4, 5, 9, 10, 20, 21, 22, 23, and 24	Baker, 2001	In September 1997, thirteen surface soil, eight surface water, and fifteen co-located surface/subsurface sediment samples were collected to identify the nature and extent of contamination at Site 28 and aid in the completion of a Human Health Risk Screening and Screening-level Ecological Risk Assessment ( <b>Figure 3</b> ). Samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), and TAL inorganics. The <b>analytical results</b> (Ref. 2) indicated potential unacceptable human health risks due to combined exposure to arsenic, iron, and thallium in surface soil. However, because no unacceptable risk was identified to any individual target organ system, it was concluded that adverse human health effects were unlikely. Potential unacceptable risks to ecological receptors were identified due to exposure to inorganics (primarily silver) in surface water and sediment. Based upon these results, a Remedial Investigation (RI) was recommended.
Round One Remedial Investigation Report, Sites 27 through 30	Baker, 2005	Between May and June 2000, thirteen surface soil, five subsurface soil, three groundwater, and eight co-located surface water and surface/subsurface sediment samples were collected to close remaining data gaps and aid in the completion of a Human Health Risk Assessment (HHRA) and a Step 3 Baseline Ecological Risk Assessment (BERA) ( <b>Figure 3</b> ). The samples were analyzed for TCL VOCs, TCL SVOCs, and TAL inorganics. Based on the <b>analytical results</b> (Ref. 3), potential unacceptable human health risks were identified due to combined exposure to arsenic, iron, and vanadium in surface and subsurface soil and chromium and iron in groundwater. However, because no target-organ-specific contaminant exceeded 1.0 and the concentrations of all contaminants detected in soil and groundwater were below maximum background concentrations, No Action was recommended for these media. Potential unacceptable risks to ecological receptors were identified due to silver in surface soil, sediment, and surface water. Additional sediment and surface water samples from the unnamed tributary were recommended either prior to or as a part of a Step 7 BERA.
Ecological Risk Assessment – Step 7	Baker, 2008	Between November 2006 and March 2007, twenty surface soil and thirty co-located surface/subsurface sediment and surface water samples were collected ( <b>Figure 3</b> ). Samples were collected along the length of the unnamed tributary downgradient of Site 28 and along a nearby reference reach and analyzed for TAL inorganics. In addition, toxicity tests were conducted on earthworms, frogs, aquatic invertebrates (amphipods), and fish. <b>Analytical results</b> (Ref. 4) indicated that there was no unacceptable risk to ecological receptors; therefore no further investigation and no remedial action were recommended.

\* The documentation listed is available in the AR and provides information used to support the no action determination for Site 28.

FIGURE 3

Historical Sampling Locations – Site 28, Building 28 X-Ray Facility Tank Drain Field



### 2.3 Scope and Role of Operable Unit

Comprehensive environmental restoration activities at WPNSTA Yorktown began in 1984 under the Navy Assessment and Control of Installation Pollutants program prior to state and federal regulatory oversight of environmental activities at the installation. The Navy Assessment and Control of Installation Pollutants program was modified to become the ERP in 1986 (then known as the Installation Restoration Program [IRP]) to meet the requirements of CERCLA as amended. WPNSTA Yorktown was added to the National Priorities List (NPL) on October 15, 1992 (USEPA ID: VA8170024170). A Federal Facilities Agreement (FFA) between the Navy and USEPA Region 3 was signed in August 1994. This FFA identified CERCLA sites, SSAs, and areas of concern (AOCs) for investigation and possible cleanup, and provided the framework and a schedule to accomplish this work. Subsequent to the FFA, additional sites, SSAs, and AOCs were added to the ERP. Site 28 was evaluated in accordance with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan under the Navy's ERP, the status of which can be found in the current version of the Site Management Plan in the AR file for WPNSTA Yorktown.

The following sites are currently in the RI/FS stage of the CERCLA process:

- Groundwater – Sites 9 and 19
- Groundwater, surface water, and sediment – Sites 1, 3, and 6
- All associated media – Sites 8, 23, 24, 25, 26, 31, 32, 33, and 34

The following sites have a final ROD in place:

- Soil and waste – Sites 1, 3, 4, 6, 21, and 22
- Soil, surface water and sediment – Site 9
- Soil – Site 19
- All associated media – Sites 5, 7, 11, 12, 16, 17, 18, 27, 29, and 30

A final ROD is pending for surface water and sediment at Site 22 and groundwater, surface water and sediment at Sites 4 and 21. The No Action determination documented in this ROD for Site 28 does not include or affect any other site at WPNSTA Yorktown.

## 2.4 Site Characteristics

The Site consists of Building 28, the former septic tank drain field, surrounding terrestrial area, and a portion of an unnamed tributary. The area in the Site vicinity ranges in elevation between 40 to 65 feet (ft) above mean sea level (msl) and slopes steeply northeast toward the unnamed tributary. Surface soil at the site is characterized by silty clay and/or clayey silt with small amounts of fine sand or silt that is red-brown to brown. This soil layer ranges on average from 5 ft to 10 ft below ground surface (bgs), underlain by more granular and fine-grained sand with silt, trace clay deposits, and trace marine shell fragments. Clay lenses are interspersed in subsurface soil and pinch out, replaced by silt deposits with marine shell fragments. These silt deposits become more granular with depth, transitioning to predominantly fine-grained sand with marine shell fragments approximately 20 ft bgs. Groundwater at the site is encountered between approximately 5 and 14 ft bgs in the unconfined Cornwallis Cave Aquifer. Based on Site topography and available groundwater elevations, groundwater flows northeast towards the unnamed tributary. The Site receives surface water runoff from the access road and surrounding wooded area, all of which drain into the unnamed tributary. The unnamed tributary meanders to the northeast along a defined channel through a flat-bottomed floodplain until it reaches Felgates Creek, approximately one mile downgradient of the Site.

## 2.5 Current and Potential Future Land and Resource Uses

Presently, Building 28 is still used as an X-ray facility for ordnance. The building is fenced in and access must be requested before entry is permitted. Building 28 and the remainder of Site 28 is surrounded by dense forest interspersed with roadways and railroad tracks. Potential current uses for Site 28 and immediate surrounding areas are industrial in nature and not anticipated to change unless the mission of base is altered. It is anticipated that WPNSTA Yorktown will remain a military installation for the foreseeable future, and Site 28 will remain the same. Future industrial, recreational, and operational future land use activities may be implemented on the Site provided that activities remain protective of human health and the environment. Based on the results of risk assessments, there are no contaminants detected in groundwater that would pose unacceptable risks to human health if used as a drinking water supply; however, shallow groundwater in the vicinity of Site 28 is not a current or anticipated future source of drinking water at WPNSTA Yorktown due to general low quality and yield and more readily available potable water. Drinking water is supplied by the City of Newport News Waterworks.

## 2.6 Summary of Site Risks

Potential human health risks were evaluated and documented in the Round One RI (**Attachments A-1** and **A-2**) while potential ecological risks were evaluated and documented the Round One RI and Step 7 ERA.

### 2.6.1 Human Health Risk Assessment (HHRA) Summary

Based on the *human health conceptual site model* (Ref. 5 and **Attachment B**), risks were quantitatively evaluated for current adult and adolescent trespassers, current adult industrial/commercial workers, future adult construction workers, and future adult and child residents exposed to surface water, sediment, groundwater, and soil using reasonable maximum exposure (RME) and central tendency exposure (CTE) concentrations. Exposure pathways considered included ingestion and dermal contact for surface water and sediment and inhalation, ingestion, and dermal contact for groundwater and soil.

The RME calculation determines risk based on the highest level of human exposure that could reasonably be expected to occur, whereas the CTE level reflects human exposure to average concentrations across the site. The potential non-cancer hazards, expressed as the hazard index (HI), and cancer risk estimates were calculated using RME concentrations. For non-cancer effects, an HI represents the ratio between the reference dose and the RME dose for a person in contact with

Site constituents of potential concern (COPCs). An HI exceeding 1 indicates that potential health effects are expected to occur. For known or suspected carcinogens, acceptable exposure levels generally are concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between  $10^{-4}$  (a 1 in 10,000 chance of developing cancer) and  $10^{-6}$  (a 1 in 1,000,000 chance of developing cancer) using information on the relationship between dose and response.

Based on RME calculations, **potential unacceptable non-cancer hazards** (Ref. 6) were identified for future child (total non-cancer HI of 1.3) residents from the ingestion of and dermal contact with chromium and iron in groundwater (**Table 2**). However, under CTE calculations, no potential non-cancer hazards were identified for the future child residents (total non-cancer HI of 0.83). The non-cancer hazard is considered acceptable because no target-organ-specific contaminant exceeded 1.0. Additionally, concentrations of chromium and iron detected in groundwater samples were below the maximum base-wide background concentrations, thus indicating that the concentrations of these chemicals detected are representative of naturally occurring conditions and not a CERCLA-related release.

**TABLE 2**  
Summary of Potential Human Health Risks from Exposure to Groundwater

Receptor	Pathway	COC	EPC (mg/L)	Maximum Background (mg/L)	RME Cancer Risk	RME Non-Cancer (HI)	CTE Cancer Risk	CTE Non-Cancer (HI)	CSF (mg/kg-day)	RfD (mg/kg-day)
Future Resident Child	Ingestion	Chromium	0.0337	49.6	N/A	0.72	N/A	0.48	N/A	0.003
		Iron	2.18	48,200	N/A	0.46	N/A	0.31	N/A	0.3
	Dermal	Chromium	0.0337	49.6	N/A	0.15	N/A	0.034	N/A	0.000075
		Iron	2.18	48,200	N/A	0.0024	N/A	0.00052	N/A	0.3
	Total*	--	--	--	N/A	<b>1.36</b>	N/A	0.83	--	--

\* Totals are additive and include all chemicals listed in **Attachments A-1** and **A-2**

**Bold** represents an unacceptable human health risk

CSF = cancer toxicity factor

COC = contaminant of concern

CTE = central tendency exposure

EPC = exposure point concentration

HI = hazard index

mg/kg-day= milligrams per kilogram per day

mg/L= milligrams per liter

N/A = not applicable

RfD = reference dose

RME = reasonable maximum exposure

Based on RME calculations, **potential unacceptable human health hazards** (Ref. 7) were identified for future child residents due to cumulative exposure to metals (arsenic, iron, and vanadium) by ingestion of and dermal contact in surface soil (total non-cancer HI of 1.1) and subsurface soil (total non-cancer HI of 1.5) (**Table 3**). However, under CTE calculations, no unacceptable non-cancer hazards were identified due to either surface soil (total non-cancer HI of 0.45) or subsurface soil (total non-cancer HI of 0.63). Although the total HI for both surface and subsurface soil under RME exceeds the USEPA's acceptable HI of 1, the non-cancer hazard is considered acceptable because no target-organ-specific contaminant exceeded 1.0 and all concentrations of arsenic, iron, and vanadium detected in surface and subsurface soil samples were below the maximum base-wide background concentrations, thus indicating that the concentrations of these chemicals detected are representative of naturally occurring conditions and not a CERCLA-related release.

**TABLE 3**  
Summary of Potential Human Health Risks from Exposure to Soil

Receptor	Media	Pathway	COC	EPC (mg/kg)	Maximum Background (mg/kg)	RME Cancer Risk	RME Non-Cancer (HI)	CTE Cancer Risk	CTE Non-Cancer (HI)	CSF (mg/kg-day) <sup>-1</sup>	RfD (mg/kg-day)
Future Child Resident	Surface Soil	Ingestion	Arsenic	5.67	63.9	$4.7 \times 10^{-6}$	0.12	$1.6 \times 10^{-6}$	0.04	1.5	0.0003
			Iron	14,462	46,400	N/A	0.31	N/A	0.1	N/A	0.3
			Vanadium	21.7	64.7	N/A	0.14	N/A	0.046	N/A	0.001
		Dermal	Arsenic	5.67	63.9	$4.8 \times 10^{-7}$	0.0013	$3.2 \times 10^{-7}$	0.0082	1.5	0.0003
			Iron	14,462	46,400	N/A	0.01	N/A	0.007	N/A	0.3
			Vanadium	21.7	64.7	N/A	0.18	N/A	0.12	N/A	0.000026
	Total*	--	--	--	$5.5 \times 10^{-6}$	<b>1.1</b>	$1.9 \times 10^{-6}$	0.45	--	--	
	Subsurface Soil	Ingestion	Arsenic	8.3	42.7	$6.8 \times 10^{-6}$	0.18	$2.3 \times 10^{-6}$	0.059	1.5	0.0003
			Iron	25,800	51,100	N/A	0.55	N/A	0.18	N/A	0.3
			Vanadium	22	70.3	N/A	0.14	N/A	0.047	N/A	0.001
		Dermal	Arsenic	8.3	42.7	$7 \times 10^{-7}$	0.018	$4.7 \times 10^{-7}$	0.012	1.5	0.0003
			Iron	25,800	51,100	N/A	0.019	N/A	0.012	N/A	0.3
Vanadium			22	70.3	N/A	0.18	N/A	0.12	N/A	0.000026	
Total*	--	--	--	$7.5 \times 10^{-6}$	<b>1.5</b>	$2.7 \times 10^{-6}$	0.63	--	--		

\* Totals are additive and include all chemicals listed in **Attachments A-1 and A-2**

**Bold** represents an unacceptable human health risk

CSF = cancer toxicity factor

COC = contaminant of concern

CTE = central tendency exposure

EPC = exposure point concentration

HI = hazard index

mg/kg-day= milligrams per kilogram per day

N/A = not applicable

RfD = reference dose

RME = reasonable maximum exposure

**No potentially unacceptable human health risks** (Ref. 8) were identified to any receptor from exposure to on-site sediment or surface water. Based upon the risk calculations and management decisions described above the Navy and USEPA Region 3, in partnership with the VDEQ, agree that there is no unacceptable risk to human health due to exposure to soil, groundwater, surface water, or sediment, and no further investigation or remedial action is warranted.

## 2.6.2 Ecological Risk Assessment Summary

The Ecological Risk Assessment (ERA) conducted for Site 28 consisted of Steps 1 through 7, in accordance with Navy and USEPA policy and guidance. Exposure routes evaluated included direct contact with soil, surface water, and sediment (aquatic lower-trophic level receptors), root uptake from sediment (aquatic plants), ingestion of surface water (aquatic and terrestrial upper-trophic level receptors), incidental ingestion of sediment (aquatic upper-trophic level receptors), and ingestion of plant and animal tissues (aquatic upper-trophic level receptors). Groundwater was not evaluated since it does not present a direct exposure point for wildlife at the Site and adequate surface water and sediment data were available for evaluation.

In order to assess risk to ecological receptors, the environmental setting, chemical fate and transport, ecotoxicity and potential receptors and complete exposure pathways were first identified. This information was used to develop an **ecological conceptual site model** (Ref. 9 and **Attachment C**) and **ecological assessment and measurement endpoints** (Ref. 10). Both terrestrial and aquatic pathways were assessed to be complete at Site 28. These receptor pathways were based on contaminants in soil, surface water, and sediment.

**Media-specific screening values** (Ref. 11) for ecologically relevant media (i.e., soil, surface water, and sediment) were established for the assessment based on the USEPA Region 3 Ecological Soil Screening Levels and National Ambient Water Quality standards. Alternate screening values from relevant, peer-reviewed literature were used when values were unavailable or more conservative values were available. **Ingestion screening values** (Ref. 12) for dietary exposures were derived only for contaminants with the potential to bioaccumulate. Ingestion screening values were derived for both chronic No Observed Adverse Effect Level and chronic Lowest Observed Effect Level endpoints. Toxicological information from the literature for wildlife species most closely related to the receptor species was used, where available, but was supplemented by laboratory studies of non-wildlife species (e.g., laboratory mice) where necessary.

Next, based on detected chemical concentrations and established screening values, hazard quotients (HQs) were calculated to characterize the potential for contaminants to pose unacceptable ecological risk using both conservative and more realistic exposure assumptions. HQs represent a ratio of the exposure level to an ecological effect level and are an estimate of potential risk. Maximum, mean (arithmetic and geometric), and 95 percent upper concentration limit concentrations of soil, surface water, and sediment contaminant concentrations were used in this step to estimate potential exposures for the ecological receptors selected to represent the assessment endpoints at Site 28. Contaminants with HQs greater to or equal to 1.0, the level at which receptors are expected to demonstrate adverse reactions to a chemical, were **identified as COPCs** (Ref. 13). These COPCs were then **compared to base-wide and reference reach background concentrations** (Ref. 14) to determine if concentrations of these contaminants were statistically significantly different from naturally occurring concentrations.

Finally, toxicity tests were conducted on terrestrial earthworms (*Eisenia fetida*) and aquatic fish (*Pimephales promelas*), frogs (*Rana sphenoccephala*) and invertebrate amphipods (*Hyalella azteca*) in order to directly evaluate the toxicity and bioavailability of contaminants in soil, surface water, and sediment. The effects of chemical concentrations on organism survival, growth, and/or fecundity were evaluated by placing each organism in lab-controlled microcosms composed of soil and sediment from Site 28, the nearby reference reach, or laboratory prepared reference media over an extended period of time. Surface water was evaluated by running laboratory prepared water over sediment to mimic the contributions of Site sediment to surface water. Laboratory prepared reference media was used as a negative control to ensure that organisms used in the study were in good health prior to the study and not negatively impacted by conditions unrelated to Site media. **Results of the toxicity testing** (Ref. 15) were statistically compared to determine if effects of exposure to Site media were significantly different from the reference reach.

The Step 7 ERA identified several inorganics as COPCs based on calculated HQ, but only silver was retained based on statistically significant exceedances of both base-wide and reference background concentrations in surface water and sediment; no exceedances in soil were identified. Elevated silver concentrations in surface water were only observed in total (suspended) samples. Total surface water samples do not adequately reflect the bioavailability of contaminants detected, as contaminants may be strongly bound to particulate matter suspended in the water and unlikely to pose risk to receptors. In addition, although silver concentrations detected in surface water and sediment exceeded screening criteria, these criteria are not a direct measurement of risk posed to receptors. Toxicity tests conducted on earthworms, frogs, and amphipods found no significant patterns in growth or survival for any receptor group. Toxicity tests conducted on fish indicated instances of reduced growth in study organisms; however, these differences were not found to be statistically significant enough to indicate unacceptable risk. Therefore, no unacceptable risk was identified due to Site surface water or sediment. The Step 7 ERA concluded that exposure to site soil, surface water, and sediment resulted in no adverse effects and; therefore, **no unacceptable risk** (Ref. 16) exists to on-site ecological receptors.

## 2.7 No Action Determination

Exposure to soil, groundwater, surface water, and sediment at Site 28 poses no unacceptable risk to human health or the environment. The Navy in partnership with the USEPA Region 3 and VDEQ agree No Action is required under CERCLA for Site 28. Site conditions allow for unlimited use and unrestricted exposure. No remedial response action and no restrictions on any land use are necessary at Site 28.

## 2.8 Community Participation

Community participation at WPNSTA Yorktown includes a Restoration Advisory Board (RAB), public meetings, public information repositories, newsletters, fact sheets, public notices, and an ERP website. The Community Involvement Plan for WPNSTA Yorktown provides detailed information on community participation for the ERP. The RAB was formed in 1994 and consists of community members, and representatives of the USEPA Region 3, the VDEQ, and the Navy. RAB meetings are held twice per year and are open to the public to provide opportunity for public comment and input.

The investigations conducted at Site 28, the findings, and the Proposed Plan (PP) that forms the basis for this No Action ROD have been presented and discussed with the RAB. In addition, in accordance with Section 117(a) of CERCLA, the Navy provided a public comment period from July 26, 2010 through September 9, 2010 for the Site 28 No Action PP. In accordance with 40 CFR 300.430(f) (3)(1)(A), a notice of availability was published in *The Virginia Gazette* and the *Daily Press* on July 24 and 25, 2010, respectively. The PP was available for review during the public comment period at the York County Public Library - Yorktown (8500 George Washington Memorial Highway, Yorktown, VA 23692, 757-890-3377). The public comment period included a public meeting to present the PP which was held on August 18, 2010 at the York County Public Library – Yorktown. No comments were received during the public comment period for the Site 28 No Action PP.

This ROD, the PP, and all other information that supports this No Action determination are available in the AR. The AR is accessible to the public at:

Public Affairs Office  
NAVFAC Atlantic  
6506 Hampton Blvd  
Norfolk, VA 23508-1278  
757-322-8005

### 3 Responsiveness Summary

The participants in the public meeting included RAB members representing the Navy and VDEQ. Since no one from the public or RAB members outside the Navy and VDEQ attended the meeting, no presentation was made and no questions or concerns were received during the meeting. No meeting transcript was generated. In addition, no written comments, concerns, or questions were received by the Navy, USEPA, or VDEQ during the public comment period.



# References

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
Ref. 1	<b>analytical results</b>	Table 1	Baker. 1995. Final Relative Risk Ranking System, Data Collection Investigation, Naval Weapons Station, Yorktown, Virginia. Appendix B, SSA 10 Soil and Groundwater Tables. AR No. 00675.
Ref. 2	<b>analytical results</b>	Table 1	Baker. 2001. <i>Final Site Screening Process Report, Vols. 1 through 3</i> , Naval Weapons Station, Yorktown, Virginia. Tables 10-1 through 10-8 AR No. 01350, 01351, 01352
Ref. 3	<b>analytical results</b>	Table 1	Baker. 2005. Final Round One Remedial Investigation Report for Sites 27, 28, 29, and 30, Naval Weapons Station Yorktown, Yorktown, Virginia. July. Figure 2-2 and Tables 4-11 through 4-18. AR No. 2079
Ref. 4	<b>Analytical results</b>	Table 1	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Appendix A. AR No. 2276
Ref. 5	<b>human health conceptual site model</b>	Section 2.6.1	Baker. 2005. <i>Final Round One Remedial Investigation Report</i> , Naval Weapons Station, Yorktown, Virginia. July. Figure 6-2. AR No. 2079
Ref. 6	<b>potential unacceptable non-cancer hazards</b>	Section 2.6.1	Baker. 2005. <i>Final Round One Remedial Investigation Report</i> , Naval Weapons Station, Yorktown, Virginia. July. Table 6-22. AR No. 2079
Ref. 7	<b>Potential unacceptable human health hazards</b>	Section 2.6.1	Baker. 2005. <i>Final Round One Remedial Investigation Report</i> , Naval Weapons Station, Yorktown, Virginia. July. Table 6-23. AR No. 2079
Ref. 8	<b>No potentially unacceptable human health risks</b>	Section 2.6.1	Baker. 2005. <i>Final Round One Remedial Investigation Report</i> , Naval Weapons Station, Yorktown, Virginia. July. Table 6-22. AR No. 2079

REFERENCES

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
Ref. 9	<b>ecological conceptual site model</b>	Section 2.6.2	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Figure 2-4. AR No. 2276
Ref. 10	<b>ecological assessment and measurement endpoints</b>	Section 2.6.2	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Table 2-14. AR No. 2276
Ref. 11	<b>Media-specific screening values</b>	Section 2.6.2	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Table 4-2. AR No. 2276
Ref. 12	<b>Ingestion screening values</b>	Section 2.6.2	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Tables 4-4 through 4-5. AR No. 2276
Ref. 13	<b>identified as COPCs</b>	Section 2.6.2	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Tables 5-1 through 5-8C. AR No. 2276
Ref. 14	<b>compared to base-wide and reference reach background concentrations</b>	Section 2.6.2	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Tables 5-9 through 5-12. AR No. 2276
Ref. 15	<b>Results of the toxicity testing</b>	Section 2.6.2	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Tables 5-13 through 5-18. AR No. 2276
Ref. 16	<b>no unacceptable risk</b>	Section 2.6.2	CH2M HILL. 2008. Ecological Risk Assessment - Step 7 Site 28 - Building 28 X-Ray Facility and Drain Field, Naval Weapons Station, Yorktown, Virginia. August. Section 7. AR No. 2276

Detailed site information reference in this ROD in bold blue text is contained in the Administrative Record.

For access to information contained in the Administrative Record for WPNSTA Yorktown please contact:

Public Affairs Office, NAVFAC Atlantic  
 6506 Hampton Blvd  
 Norfolk, Virginia 23508-1278  
 Phone: (757) 322-8005

## **Attachment A**

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ATTACHMENT A-1

Summary of RME Cancer Risks and Hazard Indices based on 2005 HHRA

Site 28, Building 28 X-Ray Facility and Drain Field, Yorktown, Virginia

Receptor	Media	Exposure Route	Cancer Risk	COPCs with Cancer Risk >10 <sup>-4</sup>	Hazard Index	COPCs with HI >1
Current/Future Adult Trespassers	Surface Soil	Ingestion	2.9 x 10 <sup>-7</sup>	--	0.0093	--
		Inhalation	6.6 x 10 <sup>-10</sup>	--	0.00003	--
		Dermal Contact	1.7 x 10 <sup>-7</sup>	--	0.021	--
		Total	4.6 x 10 <sup>-7</sup>	--	0.03	--
	Surface Water	Ingestion	3 x 10 <sup>-7</sup>	--	0.0016	--
		Dermal Contact	1.8 x 10 <sup>-8</sup>	--	0.000094	--
		Total	3.2 x 10 <sup>-7</sup>	--	0.041	--
	Sediment	Ingestion	2.2 x 10 <sup>-7</sup>	--	0.0075	--
		Dermal Contact	1.3 x 10 <sup>-7</sup>	--	0.018	--
		Total	3.5 x 10 <sup>-7</sup>	--	0.026	--
Current/Future Adolescent Trespassers	Surface Soil	Ingestion	1.3 x 10 <sup>-7</sup>	--	0.014	--
		Inhalation	3.1 x 10 <sup>-10</sup>	--	0.000047	--
		Dermal Contact	5.1 x 10 <sup>-8</sup>	--	0.021	--
		Total	1.8 x 10 <sup>-7</sup>	--	0.035	--
	Surface Water	Ingestion	1.4 x 10 <sup>-7</sup>	--	0.0024	--
		Dermal Contact	5.4 x 10 <sup>-9</sup>	--	0.000095	--
		Total	1.4 x 10 <sup>-7</sup>	--	0.0025	--
	Sediment	Ingestion	1 x 10 <sup>-7</sup>	--	0.012	--
		Dermal Contact	3.9 x 10 <sup>-8</sup>	--	0.018	--
		Total	1.4 x 10 <sup>-7</sup>	--	0.03	--
Current/Future Industrial/Commercial Workers	Surface Soil	Ingestion	7.4 x 10 <sup>-7</sup>	--	0.029	--
		Inhalation	2.1 x 10 <sup>-8</sup>	--	0.0011	--
		Dermal Contact	8.9 x 10 <sup>-7</sup>	--	0.13	--
		Total	1.7 x 10 <sup>-6</sup>	--	0.16	--
	Subsurface Soil	Ingestion	1.1 x 10 <sup>-6</sup>	--	0.042	--
		Inhalation	3.7 x 10 <sup>-8</sup>	--	0.0023	--
		Dermal Contact	1.3 x 10 <sup>-6</sup>	--	0.18	--
Future Adult Construction Workers	Subsurface Soil	Total	2.4 x 10 <sup>-6</sup>	--	0.22	--
		Ingestion	6 x 10 <sup>-7</sup>	--	0.58	--
		Inhalation	1.7 x 10 <sup>-9</sup>	--	0.0027	--
		Dermal Contact	3.8 x 10 <sup>-8</sup>	--	0.13	--
Future Adult Residents	Surface Soil	Total	6.4 x 10 <sup>-7</sup>	--	0.71	--
		Ingestion	2 x 10 <sup>-6</sup>	--	0.081	--
		Inhalation	4.6 x 10 <sup>-9</sup>	--	0.00027	--
		Dermal Contact	4.2 x 10 <sup>-7</sup>	--	0.065	--
	Subsurface Soil	Total	2.4 x 10 <sup>-6</sup>	--	0.15	--
		Ingestion	2.9 x 10 <sup>-6</sup>	--	0.12	--
		Inhalation	8.3 x 10 <sup>-9</sup>	--	0.00054	--
		Dermal Contact	6.1 x 10 <sup>-7</sup>	--	0.087	--
	Groundwater	Total	3.5 x 10 <sup>-6</sup>	--	0.21	--
		Ingestion	--	--	0.51	--
Dermal Contact		--	--	0.053	--	
		Total	--	--	0.56	--

ATTACHMENT A-1

Summary of RME Cancer Risks and Hazard Indices based on 2005 HHRA

Site 28, Building 28 X-Ray Facility and Drain Field, Yorktown, Virginia

Receptor	Media	Exposure Route	Cancer Risk	COPCs with Cancer Risk >10 <sup>-4</sup>	Hazard Index	COPCs with HI >1
Future Adult Residents (cont.)	Surface Water	Ingestion	2.4 x 10 <sup>-7</sup>	--	0.0016	--
		Dermal Contact	1.4 x 10 <sup>-8</sup>	--	0.000094	--
		Total	2.5 x 10 <sup>-7</sup>	--	0.0017	--
	Sediment	Ingestion	3.5 x 10 <sup>-7</sup>	--	0.015	--
		Dermal Contact	3.7 x 10 <sup>-8</sup>	--	0.0063	--
		Total	3.9 x 10 <sup>-7</sup>	--	0.021	--
Future Child Residents	Surface Soil	Ingestion	4.7 x 10 <sup>-6</sup>	--	0.76	--
		Inhalation	2.3 x 10 <sup>-9</sup>	--	0.00052	--
		Dermal Contact	4.8 x 10 <sup>-7</sup>	--	0.29	--
		Total	5.5 x 10 <sup>-6</sup>	--	<b>1.05</b>	--
	Subsurface Soil	Ingestion	6.8 x 10 <sup>-6</sup>	--	<b>1.1</b>	--
		Inhalation	4.1 x 10 <sup>-9</sup>	--	0.0011	--
		Dermal Contact	7 x 10 <sup>-7</sup>	--	0.39	--
		Total	7.5 x 10 <sup>-6</sup>	--	<b>1.49</b>	--
	Groundwater	Ingestion	--	--	<b>1.2</b>	--
		Dermal Contact	--	--	0.16	--
		Total	--	--	<b>1.36</b>	--
	Surface Water	Ingestion	2.8 x 10 <sup>-7</sup>	--	0.0072	--
		Dermal Contact	5.7 x 10 <sup>-9</sup>	--	0.00015	--
		Total	2.9 x 10 <sup>-7</sup>	--	0.0074	--
	Sediment	Ingestion	8.2 x 10 <sup>-7</sup>	--	0.14	--
Dermal Contact		4.2 x 10 <sup>-8</sup>	--	0.029	--	
Total		8.6 x 10 <sup>-7</sup>	--	0.17	--	

ATTACHMENT A-2

Summary of CTE Cancer Risks and Hazard Indices based on 2005 HHRA

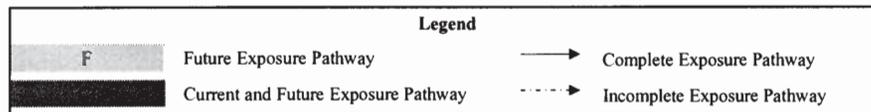
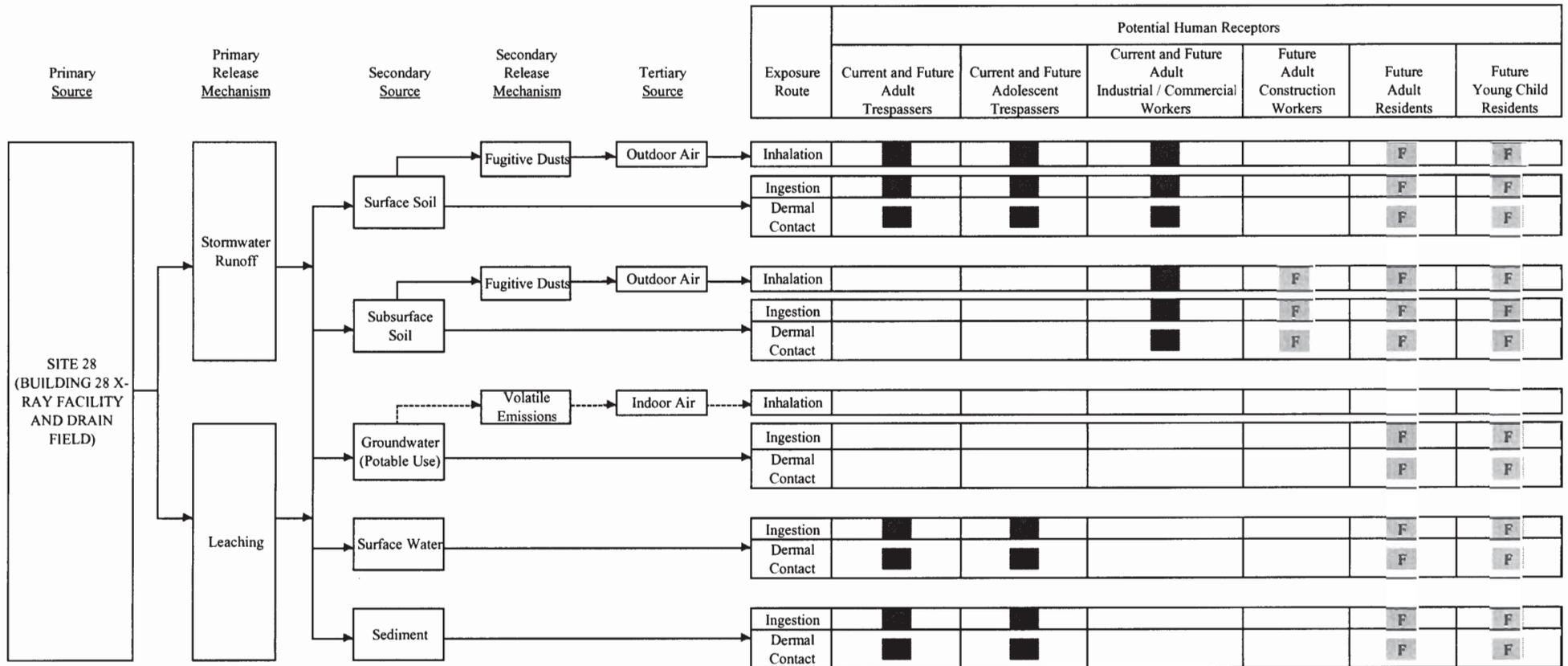
Site 28, Building 28 X-Ray Facility and Drain Field, Yorktown, Virginia

Receptor	Media	Exposure Route	Cancer Risk	COPCs with Cancer Risk >10 <sup>-4</sup>	Hazard Index	COPCs with HI >1
Future Adult Residents	Surface Soil	Ingestion	2.5 x 10 <sup>-7</sup>	--	0.027	--
		Inhalation	1.2 x 10 <sup>-9</sup>	--	0.00018	--
		Dermal Contact	1.1 x 10 <sup>-7</sup>	--	0.043	--
		Total	3.6 x 10 <sup>-7</sup>	--	0.07	--
	Subsurface Soil	Ingestion	3.7 x 10 <sup>-7</sup>	--	0.039	--
		Inhalation	2.1 x 10 <sup>-9</sup>	--	0.00036	--
		Dermal Contact	4.4 x 10 <sup>-7</sup>	--	0.17	--
		Total	8.1 x 10 <sup>-7</sup>	--	0.21	--
	Groundwater	Ingestion	--	--	0.24	--
		Dermal Contact	--	--	0.015	--
		Total	--	--	0.25	--
	Surface Water	Ingestion	9 x 10 <sup>-8</sup>	--	0.0016	--
		Dermal Contact	5.4 x 10 <sup>-9</sup>	--	0.000094	--
		Total	9.5 x 10 <sup>-8</sup>	--	0.0016	--
	Sediment	Ingestion	6.6 x 10 <sup>-8</sup>	--	0.0075	--
Dermal Contact		1.4 x 10 <sup>-8</sup>	--	0.0063	--	
Total		8 x 10 <sup>-8</sup>	--	0.014	--	
Future Child Residents	Surface Soil	Ingestion	1.6 x 10 <sup>-6</sup>	--	0.25	--
		Inhalation	1.5 x 10 <sup>-9</sup>	--	0.00035	--
		Dermal Contact	3.2 x 10 <sup>-7</sup>	--	0.2	--
		Total	1.9 x 10 <sup>-6</sup>	--	0.45	--
	Subsurface Soil	Ingestion	2.3 x 10 <sup>-6</sup>	--	0.36	--
		Inhalation	2.7 x 10 <sup>-9</sup>	--	0.00071	--
		Dermal Contact	4.7 x 10 <sup>-7</sup>	--	0.26	--
		Total	2.7 x 10 <sup>-6</sup>	--	0.63	--
	Groundwater	Ingestion	--	--	0.79	--
		Dermal Contact	--	--	0.034	--
		Total	--	--	0.83	--
	Surface Water	Ingestion	2.8 x 10 <sup>-7</sup>	--	0.0072	--
		Dermal Contact	5.7 x 10 <sup>-9</sup>	--	0.00015	--
		Total	2.9 x 10 <sup>-7</sup>	--	0.0074	--
	Sediment	Ingestion	4.1 x 10 <sup>-7</sup>	--	0.07	--
Dermal Contact		4.2 x 10 <sup>-8</sup>	--	0.029	--	
Total		4.5 x 10 <sup>-7</sup>	--	0.099	--	

## **Attachment B**

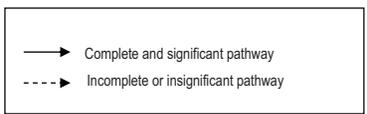
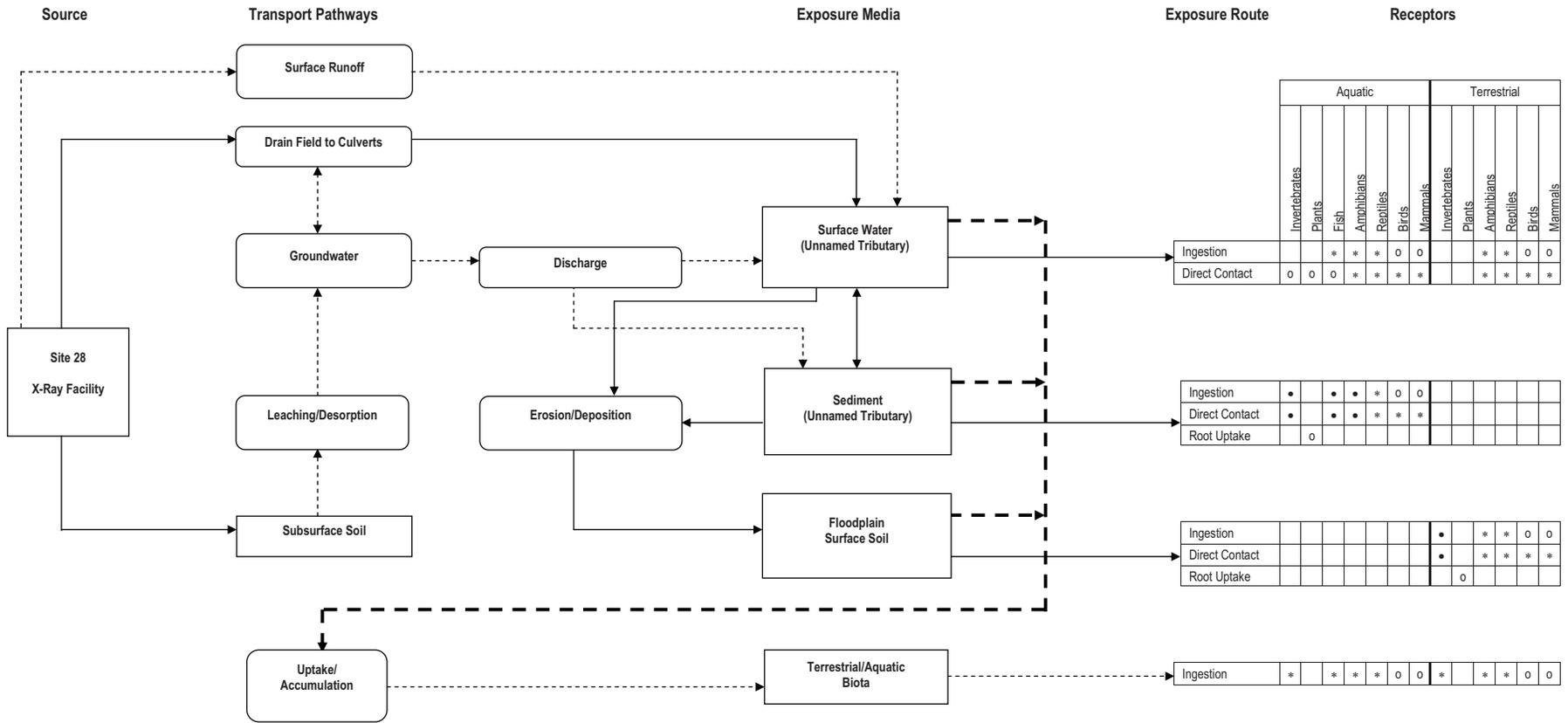
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**FIGURE 6-2  
FLOWCHART OF POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS  
SITE 28 (BUILDING 28 X-RAY FACILITY AND DRAIN FIELD)  
NAVAL WEAPONS STATION YORKTOWN  
YORKTOWN, VIRGINIA**



## **Attachment C**

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**FIGURE 2-4**  
**ECOLOGICAL CONCEPTUAL MODEL**  
**BASELINE ECOLOGICAL RISK ASSESSMENT – SITE 28**  
**NAVAL WEAPONS STATION YORKTOWN**  
**YORKTOWN, VIRGINIA**

• - Key pathway/receptor - evaluated quantitatively  
 o - Other pathway/receptor - evaluated quantitatively/qualitatively  
 \* - Receptor not directly evaluated

## **Response to Comments**

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CH2MHILL

CH2M HILL  
5700 Cleveland Street, Suite 101  
Virginia Beach, VA 23462  
Tel 757.518.9666

January 7, 2011

Mr. Rob Thompson  
Office of Federal Facility Remediation  
United States Environmental Protection Agency, Region III  
1650 Arch Street  
Philadelphia, PA 19103-2029

Subject: Response to Comments on *Draft Record of Decision 28: Building 28 X-Ray Facility; Naval Weapons Station Yorktown, Yorktown, Virginia, August 2010*

Dear Mr. Thompson:

On behalf of the U.S. Department of the Navy's Naval Facilities Engineering Command (NAVFAC), CH2M HILL has prepared this letter in response to your December 8, 2010 e-mail, providing comments for the subject document. Comments received are shown in *italics*, followed by the Navy's response in blue.

❖ Comment #1 – *[Table 1] Define [SSA]*

**Response:** SSA was defined previously in Section 2.1, therefore no changes to the ROD were made.

❖ Comment #2 – *[Section 2.3, Scope and Role of Operable Unit] Is this [ERP] short for something.*

**Response:** ERP is short for Environmental Restoration Program which is defined in Section 1. No changes were made to the ROD.

❖ Comment #3 – *[Section 2.5, Current and Potential Future Land and Resources Uses] If the mission of the base is changed, would EPA need to revisit the No Action ROD?*

**Response:** Exposure to soil, groundwater, surface water, and sediment at Site 28 poses no unacceptable risk to human health or the environment; therefore if the mission of the base were to change, the ROD would not need to be revisited.

❖ Comment #4 – *[Section 2.6.2, Ecological Risk Assessment Summary] should these [No Observed Adverse Effect Level and Lowest Observed Effect Level] be abbreviated?*

**Response:** No Observed Adverse Effect Level and Lowest Observed Effect Level were not abbreviated since they are only used once in the document. No changes to the ROD were made.

Mr. Rob Thompson

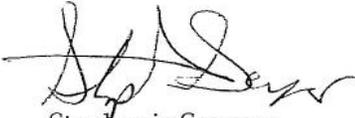
Page 2

January 7, 2011

In addition, editorial changes were made however they are not discussed on a case by case basis within this letter. If you have any questions or comments regarding the above response to comments, please feel free to contact me at 757-671-6273.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read 'Stephanie Sawyer', written over a horizontal line.

Stephanie Sawyer

Project Manager

cc: Mr. Thomas Kowalski/NAVFAC  
Mr. Wade Smith/VDEQ  
Mr. Bill Friedmann/CH2M HILL  
Mr. Adam Forshey/CH2M HILL  
Project File



CH2MHILL

CH2M HILL  
5700 Cleveland Street, Suite 101  
Virginia Beach, VA 23462  
Tel 757.518.9666

January 7, 2011

Mr. Wade Smith  
Remedial Project Manager  
Office of Remediation Programs  
Virginia Department of Environmental Quality (VDEQ)  
P.O. Box 1105  
Richmond, Virginia 23218

Subject: *Response to Comments on Draft Record of Decision 28: Building 28 X-Ray Facility; Naval Weapons Station Yorktown, Yorktown, Virginia, August 2010*

Dear Mr. Smith,

On behalf of the U.S. Department of the Navy's Naval Facilities Engineering Command (NAVFAC), CH2M HILL has prepared this letter in response to your September 14, 2010 e-mail, providing comments for the subject document via track changes in the Word file. Comments received are shown in italics, followed by the Navy's response in Blue.

- ❖ *Comment #1 – [Section 2.3, Scope and Role of Operable Unit] Different format than 4, 21, & 22 ROD, is this info required in the ROD?*

**Response:** The Scope and Role of Operable Unit section is an EPA requirement of the ROD. The formatting of this section was revised to include information regarding the current status of WPNSTA Yorktown sites and is consistent with the Sites 4, 21, and 22 ROD.

- ❖ *Comment #2 – [Section 2.6.2, Ecological Risk Assessment Summary] Confusing, please reword. [...based on the assessment based on the USEPA Region 3 Ecological Soil Screening Levels...]*

**Response:** The sentence that includes this statement was revised to read as follows:

*Media-specific screening values* (Ref. 11) for ecologically relevant media (i.e., soil, surface water, and sediment) were established for the assessment based on the USEPA Region 3 Ecological Soil Screening Levels and National Ambient Water Quality standards.

Mr. Wade Smith  
Page 2  
January 7, 2011

In addition, editorial changes have been made and are not discussed on a case by case basis within this letter. If you have any questions or comments regarding the above response to comments, please feel free to contact me at 757-671-6273.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read 'Stephanie Sawyer', with a horizontal line drawn through it.

Stephanie Sawyer  
Project Manager

cc: Mr. Thomas Kowalski/NAVFAC  
Mr. Rob Thompson /USEPA  
Mr. Bill Friedmann/CH2M HILL  
Mr. Adam Forshey/CH2M HILL  
Project File

## **VDEQ Concurrence**

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## COMMONWEALTH of VIRGINIA

### DEPARTMENT OF ENVIRONMENTAL QUALITY

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[www.deq.virginia.gov](http://www.deq.virginia.gov)

L. Preston Bryant, Jr.  
Secretary of Natural Resources

David K. Paylor  
Director

(804) 698-4000  
1-800-592-5482

May 23, 2011

Mr. Henry J. Sokolowski, Director  
Office of Federal Facility Remediation and Site Assessment (3HS10)  
U.S. Environmental Protection Agency, Region 3  
1650 Arch Street  
Philadelphia, PA 19103-2029

**RE: Final Record of Decision  
Site 28 – Building 28 X-Ray Facility Tank Drain Field  
Naval Weapons Station Yorktown  
Yorktown, Virginia**

Dear Mr. Sokolowski:

The Virginia Department of Environmental Quality (DEQ) staff has reviewed the Final Record of Decision (Final ROD) for Site 28 – Building 28 X-Ray Facility Tank Drain Field located at Naval Weapons Station Yorktown (NWSY), Yorktown, Virginia. The DEQ concurs with the No Action determination, as described in the May 2011 Final ROD, which was signed by Lowell Crow (Captain, U.S. Navy, Commanding Officer) on May 19, 2011.

Please contact Wade Smith at (804) 698-4125 or [wade.smith@deq.virginia.gov](mailto:wade.smith@deq.virginia.gov) with any questions.

Sincerely,

A handwritten signature in cursive script that reads 'Durwood H. Willis'.

Durwood H. Willis  
Director, Office of Remediation Programs

cc: Tom Kowalski, NWSY  
Milt Johnston, DEQ, TRO  
Wade Smith, DEQ, CO  
Rob Thomson, EPA  
Moshood Oduwole, EPA



**For access to the Administrative Record or  
additional information on the IR Program, contact:**

Public Affairs Office  
NAVFAC Atlantic  
6506 Hampton Blvd.  
Norfolk, Virginia 23508  
Phone: (757) 322-8005