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LETTER AND REGULATOR COMMENTS TO DRAFT TECHNICAL MEMORANDUM
REGARDING SITE SCREENING AREA 15 NO FURTHER ACTION NWS YORKTOWN VA
9/16/2010
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Sawyer, Stephanie/VBO

From: Mills, Jason/VBO
Sent: Thursday, September 16, 2010 9:18 AM
To: Sawyer, Stephanie/VBO
Subject: FW: NWSY: SSA 15 Tech Memo - DEQ Comments
Attachments: Draft SSA 15 NFA TM JNM_082410(DEQ)-9_16_10.doc

Follow Up Flag: Follow up
Flag Status: Completed

Status update on the SSA 15 TM below. I will let you know when we also get EPA's comments and begin revising. Will there be a different PN for the draft final?

Jason Mills
Staff Engineer
CH2M HILL
5700 Cleveland Street, Suite 101
Virginia Beach, VA 23462
Direct: 757-671-6270
Cell: 757-831-9202
www.ch2mhill.com

From: Friedmann, William/VBO
Sent: Thursday, September 16, 2010 9:16 AM
To: Mills, Jason/VBO
Cc: Forshey, Adam/VBO
Subject: FW: NWSY: SSA 15 Tech Memo - DEQ Comments

Jason – I just wanted to pass along VDEQs comments on the SSA 15 Tech Memo. Just hang on to these until we receive EPAs comments. VDEQs comments are minor edits that we will not need to add any more technical justification to.

From: Smith, Wade (DEQ) [<mailto:Wade.Smith@deq.virginia.gov>]
Sent: Thursday, September 16, 2010 8:19 AM
To: tom.kowalski@navy.mil
Cc: Friedmann, William/VBO; Forshey, Adam/VBO; Thomson.Bob@epamail.epa.gov
Subject: NWSY: SSA 15 Tech Memo - DEQ Comments

Thank you for giving the DEQ the opportunity to comment on the August 24, 2010 *Draft Tech Memo* for SSA 15 at NWSY.

The Draft Tech Memo was received by the DEQ on August 30, 2010.

The DEQ's comments are attached (Track Changes via Microsoft Word).

Upon your acceptance of the proposed changes and upon your submittal of the requested revisions, the DEQ will issue an official letter for your files.

Please let me know if you have any questions.

Sincerely,

Wade M. Smith
Remediation Project Manager
Virginia Department of Environmental Quality
Office of Remediation Programs
Phone: (804) 698-4125
wade.smith@deq.virginia.gov

Site Screening Area 15 - Sewage Treatment Plant #1/ Sludge Drying Beds and Discharge Area No Further Action Determination

PREPARED FOR: WPNSTA Yorktown Tier I Partnering Team

PREPARED BY: CH2M HILL

DATE: August 24, 2010

This Technical Memorandum provides a summary of the previous investigations and remedial activities conducted at Site Screening Area (SSA) 15 to support a No Further Action decision for the Sewage Treatment Plant #1/Sludge Drying Beds and Discharge Area at the Naval Weapons Station (WPNSTA) Yorktown, Virginia.

Background

SSA 15 is located in the southeastern corner of WPNSTA Yorktown, east of Site 31 (Barracks Road Landfill Industrial Area), south of Site 12 (Barracks Road Landfill), and directly north of a tributary of Ballard Creek (**Figure 1**). The site is approximately 0.3 acres in size and was the location of the former sewage treatment plant (STP) #1. Currently, the site consists of a predominantly open area surrounded by tree cover. Site topography ranges from 50 to 40 feet (ft) above mean sea level from north to south, resulting in drainage to the south and east towards tributaries of Ballard Creek. The tributaries adjacent to SSA 15 flow to the southeast and converge with other tributaries flowing to the northeast, eventually culminating in Ballard Creek approximately 2,000 ft downgradient of SSA 15.

During operation, the STP consisted of an Imhoff tank, trickling filter, chlorination unit, and sludge drying bed. Wastewater first entered the plant through the Imhoff tank, which operated as a primary settling basin for the waste. The wastewater was then passed through the trickling filter for biological treatment and pumped back to the Imhoff tank for secondary settling. The wastewater was then chlorinated in the chlorination unit and discharged to the tributary of Ballard Creek. Sludge that had settled in the Imhoff tank was periodically removed and placed in the sludge drying bed prior to being transported for land farming at SSA 6. STP #1 reportedly received and managed only sanitary waste from physical plants and the Officers' Club located nearby, but may have potentially also treated explosives containing and other industrial wastewater.

Potential historical sources of contamination at SSA 15 consist of discharge of contaminated wastewater to the tributaries of Ballard Creek, leaching of contaminated sludge to soil and groundwater, or release of any chemicals used in the on-site operations. WPNSTA personnel have reported that a mercury-containing bearing on the trickling filter cracked during the operation of STP #1, resulting in a release of mercury to the environment. No other releases have been reported or documented.

Previous Investigations

In 1992, Sewage Treatment Plant #1 was first identified in the *Resource Conservation and Recovery Act Solid Waste Management Unit Investigation* as a potential source of contamination to the surrounding environment (A.T. Kearny Inc., 1992). At the time of the investigation, the integrity of the structures could not be verified due to heavy vegetation and standing water. Therefore, due to the potential for STP#1 to have handled hazardous waste, the area was designated as SWMU 127 and carried forward for further investigation.

In 1996, the *Site Screening Process (SSP) for SSAs 1, 6, 7, and 15* investigation directly evaluated surface/subsurface soil, groundwater, surface water, and sediment at SSA 15 (Baker, 1996a). Analytical results identified potential risk due to inorganics in subsurface soils, volatile organic compound (VOC) in surface water, and pesticides in sediment. However, the report concluded that the STP#1 was likely not the source of these constituents and recommended additional sampling prior to closing out the site. Over time, additional groundwater, surface water, and sediment samples have been collected in the vicinity of SSA 15 as part of the following reports:

- *Round One Remedial Investigation Report for Sites 1-9, 11, 12, 16-19, and 21* (Baker, 1993)
- *Round Two Remedial Investigation Report for Site 12* (Baker, 1996b)
- *Site Screening Assessment of Area of Concern 23* (CH2M HILL, 2009/2008a)

In 2001, the Imhoff tank, trickling filter, sludge drying bed, and chlorination unit were removed and the site was regraded. No documentation of the removal action is available. Only anecdotal evidence exists regarding the removal action conducted and confirmation samples collected. No additional sampling or investigation activities have occurred at SSA 15 subsequent to the removal action.

Revised Risk Assessment

Since the finalization of the 1996 SSP, the established risk-based screening criteria in use have undergone multiple rounds of revisions based upon current understanding of contaminant fate, transport, and toxicity to potential receptors. In order to account for these changes, all data presented within this technical memorandum is compared against current screening criteria. Media-specific screening values for ecologically relevant media were established for direct exposure to site media based on the USEPA Region 3 BTAG screening values, where applicable. Alternate screening values from relevant, peer-reviewed literature were used when BTAG values were unavailable or more conservative values were available. Human health screening values used in the evaluation of data collected for this Tech Memo are:

- Surface and Subsurface Soil
 - WPNSTA Yorktown Background (Baker, 1995)
 - USEPA Adjusted Residential Soil Regional Screening Levels (RSLs) (Updated June 2010)
- Groundwater
 - WPNSTA Yorktown Background (Baker, 1995)

- Federal Maximum Contaminant Levels (MCLs)
- USEPA Adjusted Tap Water RSLs (Updated June 2010)
- Sediment
 - USEPA Adjusted Residential Soil RSLs multiplied by 10 (Updated June 2010)
- Surface Water
 - USEPA Adjusted Tap Water RSLs multiplied by 10 (Updated June 2010)

A summary and discussion of all available analytical data related to SSA 15 is provided below.

Surface Soil Results

Five surface soil samples were collected for analysis during the 1996 SSP (Figure 2). No additional surface soil samples have been collected in the vicinity of SSA 15 prior or subsequent to this investigation. Surface soil samples were located independently of subsurface soil samples collected during this investigation. All samples were analyzed for Target Compound List (TCL) VOCs, TCL semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), explosives, and Target Analyte List (TAL) metals including cyanide.

Organics

No VOCs, PCBs, or explosives were detected, while no SVOCs were detected exceeding human health or ecological screening values, in any samples collected. Two pesticides were detected in exceedance of ecological screening values, but neither pesticide was detected in the background data set. Various pesticides and herbicides were historically applied to the soil at Department of Defense facilities for the purpose of controlling pests and weeds, which may have resulted in the accumulation of these chemicals in environmental media. This type of pesticide accumulation is distinct from pesticide contamination that is the result of improper storage, disposal, or use. Based upon a Technical Bulletin prepared by the U.S. Army Corps of Engineers (USACE, 2004), pesticides registered under the Federal Insecticide, Fungicide, and Rodenticide Act and used for their intended purpose are not subject to the remedial requirements of CERCLA or the Resource Conservation and Recovery Act based solely on concentrations present. There is no historical information indicating a site-specific release of pesticides at SSA 15 and no indication of a plume. Therefore, there are no unacceptable risks associated with organics in SSA 15 surface soil.

Inorganics

Of the inorganics detected, five exceeded both associated risk-based screening values and maximum base-wide background concentrations (Table 1):

- Chromium exceeded the human health and ecological risk screening values in one sample location. However, the mean exposure point concentration, 10.8 mg/kg, is below the maximum background concentration. In addition, concentrations of chromium as high as 20.7 mg/kg (YS12-SS36) were historically detected upgradient of Site 12 (Baker, 1996b; Figure 4-2). Therefore, concentrations of chromium detected in surface soil are representative of naturally occurring conditions in the area and not a site-related release.

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- Iron exceeded the associated human health risk screening value in two sample locations. However, the mean exposure point concentration, 12,200 mg/kg, is below the associated maximum background concentration. In addition, iron is a human nutrient essential for health at low concentrations and toxic only at very high doses. The assumption of an incidental ingestion of 200 mg/day by a future child resident (ages 7 months to 8 years) and 100 mg/day by an adult would result in an RME iron intakes of 4.78 mg/day and 2.39 mg/day, respectively. This is below the recommended daily allowance range of 7-11 mg/day for children and 8-11 mg/day for adults (Institute of Medicine, 2005). Therefore, even after other sources of dietary iron are accounted for, exposure to iron in surface soil is not likely to pose a health concern for either future child or adults residents.
- Mercury exceeded the ecological screening value at one sample location. Mercury was not detected in the background data set, making any detection of the metal potentially site related. Based on verbal reports of a mercury release from a broken mercury-containing bearing, there is the potential for mercury to be site related.
- Selenium exceeded the ecological screening value at three sample locations. However, the presence of selenium is not consistent with historic site activities. In addition, all selenium data was K-qualified, indicating that actual concentrations present are likely to be lower than those reported.
- Vanadium exceeded the human health risk screening value in one sample location. However, the mean exposure point concentration, 20 mg/kg, is below both the background and human health screening value.

An additional two surface soil samples were collected in the vicinity of SSA 15 by Black and Veatch in 1996. The exact locations of the two additional samples are unavailable. This data indicated elevated concentrations of cadmium (10.4 mg/kg), chromium (42.9 mg/kg), mercury (4.7 mg/kg), silver (53.4 mg/kg), and vanadium (65.8 mg/kg) within one sample location located in the sludge drying beds. This analytical data contrasts with sample AS15-SS05, also collected within the sludge drying beds, which indicated no exceedances of any inorganics. However, these additional samples were not validated by a third party. Furthermore, any elevated concentrations within the sludge drying beds would have been directly addressed as part of the removal action.

Based on the available analytical data, no unacceptable risk to current or future human receptors exists at SSA 15. Risk to non-sessile ecological receptors is minimal due to the small size of the SSA (0.3 acres) and the spatially isolated nature of the exceedances. No stressed vegetation is apparent in any historical or current photos and an abundance of vegetation within the sludge drying bed was noted during the 1996 SSP. Furthermore, removal of the sludge drying beds and associated woody vegetation, subsurface Imhoff tank, and subsurface trickling filter in 2001 likely resulted in the disturbance and removal of significant quantities of surface soil across the SSA, homogenizing and reducing the concentrations present. Based on these risk management considerations, there is no unacceptable risk associated with inorganics in surface soil at SSA 15.

TABLE 1
Surface Soil Inorganic COPCs

COPCs	Adjusted Residential RSL (mg/kg)	Eco Screening Value (mg/kg)	Maximum Background (mg/kg)	A15SS01 0-0.5' bgs (mg/kg)	A15SS02 0-0.5' bgs (mg/kg)	A15SS03* 0-0.5' bgs (mg/kg)	A15SS04 0-0.5' bgs (mg/kg)	A15SS05 0-0.5' bgs (mg/kg)
Chromium	0.29	13	18.3	20.4	7.6	4	16.9	5.4
Iron	5,500	NSV	19,900	22,400	3,970	3,900	23,900	7,000
Mercury	2.4	0.1	ND	ND	0.59 K	ND	ND	ND
Selenium	39	0.52	0.55	0.91 K	ND	0.67 K	1.1 K	ND
Vanadium	39	130	34.7	39.2	9.9	8.3	28.2	14.6

* Duplicate sample collected at this location. Values presented are the higher of the two reported values.

Bold indicated exceedance of both background and screening value.

bgs - below ground surface

mg/kg - milligrams per kilogram

K - Reported values may be biased high

ND - Not Detected

NSV - No Screening Value

RSL - Regional Screening Level

Subsurface Soil Results

Twelve subsurface soil samples were collected for analysis from four sample locations during the 1996 SSP (**Figure 2**). No additional subsurface soil samples have been collected in the vicinity of SSA 15 prior or subsequent to this investigation. Subsurface soil samples were co-located with groundwater samples, with three samples collected at three separate depth intervals (1-3 ft bgs, 9-13 ft bgs, and 19-23 ft bgs) from each sample location prior to well installation. All samples were analyzed for TCL VOCs, TCL SVOCs, pesticides/ PCBs, explosives, and TAL metals including cyanide.

Organics

No pesticides, PCBs, or explosives were detected in any samples collected and no VOCs or SVOCs were detected exceeding human health screening values. Therefore, there is no unacceptable risk associated with organics in subsurface soils at SSA 15.

Inorganics

Of the inorganics detected in subsurface soil, only iron and thallium were detected exceeding both the residential RSL and maximum base-wide background concentration. Both of these exceedances were detected in one sample location, A15-SB04, at a composited depth of 9 to 11 ft bgs (**Table 2**). In a duplicate sample collected at this location, iron was detected below the maximum background value, while thallium was not detected. Due to the depth at which these exceedances were detected, it is unlikely that a complete exposure pathway for ecological receptors exists. In addition, due to the spatially isolated nature of the exceedances, it is unlikely that these elevated concentrations are site-related. Therefore, there is no unacceptable risk associated with inorganics in subsurface soils at SSA 15.

TABLE 2
Subsurface Soil COPCs

COPCs	Residential RSL (mg/kg)	Maximum Background (mg/kg)	A15SB01 1-3' bgs (mg/kg)	A15SB01 9-11' bgs (mg/kg)	A15SB01 21-23' bgs (mg/kg)	A15SB02 1-3' bgs (mg/kg)	A15SB02 11-13' bgs (mg/kg)	A15SB02 19-21' bgs (mg/kg)
Iron	5,500	51,100	15,000	N/A	11,100	23,400	16,800	8,930
Thallium	0.51	0.44	ND	N/A	ND	ND	ND	ND

COPCs	Residential RSL (mg/kg)	Maximum Background (mg/kg)	A15SB03* 1-3' bgs (mg/kg)	A15SB03 9-11' bgs (mg/kg)	A15SB03 21-23' bgs (mg/kg)	A15SB04 1-3' bgs (mg/kg)	A15SB04* 9-11' bgs (mg/kg)	A15SB04 21-23' bgs (mg/kg)
Iron	5,500	51,100	7,550	14,700	7,830	35,700	73,500	10,100
Thallium	0.51	0.44	ND	ND	ND	ND	1.3 L	ND

* Duplicate sample collected at this location. Values presented are the higher of the two reported values. Bold indicates an exceedance of maximum background and risk-based screening values.

COPC - Contaminant of Potential Concern
bgs - below ground surface
L - Reported values may be biased low
mg/kg - milligram per kilogram

N/A - Not Analyzed
ND - Not Detected
RSL - Regional Screening Level

Groundwater

A total of six groundwater samples have been collected in the vicinity of SSA 15 (Figure 2). Four groundwater samples were collected from temporary piezometers installed during the 1996 SSP. Temporary piezometers were advanced within the shallow Cornwallis-Cave Aquifer to depths ranging from 27 to 29 ft bgs. All samples were collected from the middle of the screened interval and analyzed for TCL VOCs, TCL SVOCs, pesticides/PCBs, explosives, and TAL total and dissolved metals including cyanide. One groundwater sample was collected from permanent monitoring well YS12-GW14 installed during the 1996 Round Two RI and an additional groundwater sample was collected from this monitoring well during the 2008 SSA. YS12-GW14 was advanced within the shallow Cornwallis-Cave Aquifer to a depth of 29 ft bgs. Groundwater samples collected as part of the 1996 Round Two RI were analyzed for only-TCL VOCs only. Groundwater samples collected as part of the 2008 SSA were analyzed only for TCL VOCs and TAL metals and cyanide.

Organics

During the 1996 SSP, eight VOCs were detected in hydropunch groundwater samples, of which only trichloroethene (TCE) exceeded human health screening values. TCE was detected in one sample location exceeding both the Tap Water RSL and MCL. During the 1996 Round Two RI, two VOCs were detected in YS12-GW14, of which only TCE exceeded the Tap Water RSL and MCL. This monitoring well was sampled again as part of the 2008 Site Screening Assessment Report for AOC 23. TCE was not detected during this round of sampling. Although VOCs have been historically detected in groundwater in the vicinity of SSA15 at concentrations exceeding risk screening values, the presence of VOCs is not consistent with historic site use at SSA 15. Since the 1996 SSP, concentrations of VOCs

detected within SSA 15 and Site 12 have been attributed to the upgradient industrial area. The WPNSTA Yorktown partnering team signed a consensus statement on October 3, 2006 (Consensus Statement 9-1-06-45), agreeing that groundwater VOC contamination would be addressed as part of Site 31.

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No SVOCs, PCBs, or explosives were detected in any groundwater samples collected. No pesticides were detected above human health screening values. Although pesticides were detected at low concentrations during the 1996 SSP in two monitoring wells, A15-HP02 and A15-HP04, the SSP Report indicated that these concentrations were associated with surface soil falling into the borehole during sampling. Therefore, pesticide concentrations detected in groundwater samples are not representative of site conditions and no further action is required to address organics in groundwater at ~~SAA-SSA~~ SSA 15.

Inorganics

Of the twenty-two total inorganics detected during the 1996 SSP, twenty-one exceeded human health screening and/or maximum background values. In contrast, only one dissolved inorganic, manganese, was detected exceeding both the Adjusted Tap Water RSL and maximum background concentration in one sample location. Therefore, elevated total inorganic concentrations detected were likely associated with suspended particulates in the groundwater samples resulting from the construction of the temporary piezometers. Temporary piezometers installed at SSA 15 did not have a sand filter-pack installed around the screen and did not undergo development, resulting in increased turbidity in collected samples. Therefore, it is expected that total inorganic concentrations of groundwater samples collected from temporary piezometers at SSA 15 would far exceed background groundwater concentrations collected from permanent monitoring wells. As these total inorganic concentrations detected are not representative of site conditions, results are not presented in Table 3. The dissolved manganese exceedance was detected in only one sample location. Therefore, due to the lack of an apparent plume and any site-related contaminants in soil or groundwater that could contribute to reducing conditions, manganese concentrations are not considered site related.

TABLE 3
Dissolved Inorganic Exceedances in Groundwater

COPC	Adjusted Tap Water RSL (µg/L)	MCL (µg/L)	Maximum Background (µg/L)	A15HP01 (µg/L)	A15HP02* (µg/L)	A15HP03 (µg/L)	A15HP04 (µg/L)	YS12GW14 (µg/L)
Manganese	88	NSV	54.4	155	20.2	1.8	1.9	17

* Duplicate sample collected at this location. Values presented are the higher of the two reported values. Bold indicated exceedance of both background and screening value.

COPC - Contaminant of Potential Concern
 MCL - Maximum Contaminant Limit
 NSV - No Screening Value
 NSV - No Screening Value
 RSL - Regional Screening Level
 µg/L - micrograms per liter

Groundwater collected from YS12-GW14 as part of the 1996 Round Two RI was not analyzed for inorganics; however, an additional sample was collected from this monitoring well as part of the 2008 SSA. Elevated concentrations of total chromium exceeded both the Adjusted Tap Water RSL and maximum background concentration. However, dissolved chromium at this sample location was below the human health screening value, indicating

that total chromium concentrations were associated with suspended materials. In addition, elevated total chromium concentrations were also detected in monitoring wells located across and upgradient of Sites 12 and 31 during this sampling event (e.g., YS12-GW05, YS12-GW11, YS12-GW17, YS12-GW26, and YS12-GW27) (Figure 10). Therefore, the total chromium concentrations detected in groundwater sample YS12-GW14 is not representative of site conditions and no further action is required to address inorganics in groundwater at SAA-SSA 15.

Sediment Results

A total of seven co-located surface and subsurface sediment samples have been collected in the vicinity of SSA 15; one as part of the 1993 Round One RI (12SD08), two as part of the 1996 SSA (A15SD01, A15SD02); and four as part of 1996 Round Two RI (12SD09, 12SD12, 12SD18, and 12SD20) (Figure 2). Surface and subsurface sediment samples were collected from 0-4 and 4-8 inch intervals, respectively. All samples were analyzed for TCL VOCs, TCL SVOCs, pesticides/ PCBs, explosives, and TAL metals including cyanide. Results of the analysis is summarized below and presented in Table 4.

Organics

No explosives were detected in any samples collected and no SVOCs were detected exceeding human health or ecological screening values. Elevated concentrations of VOCs, pesticides, and PCBs were detected exceeding human health and/or ecological screening values. However, as discussed previously, concentrations of VOCs have been attributed to Site 31 and will be addressed as part of future investigations and remedial actions at that site. Pesticides were identified in several upgradient and downgradient sample locations with no discernable pattern. There is no historical information indicating a site-specific release of pesticides at SSA 15; therefore, pesticide concentrations are likely a result of intended use and not a site-related release. Concentrations of PCBs detected were detected in one sediment sample, YS12-SD12. This sample location is adjacent to Site 12 and receives runoff from the site. While no PCBs were detected in any other media associated with SSA 15, PCBs were historically detected in Site 12 soils. Therefore, concentrations of PCBs detected are likely related to Site 12 and not SSA 15 and no further action is required to address organics in sediment at SSA 15.

Inorganics

Of the inorganics detected, three exceeded human health or ecological screening values.

- Arsenic exceeded the human health risk screening value in two surface sediment samples and one subsurface sediment sample. However, the results of long-term monitoring (LTM) of surface sediment associated with Site 12 indicate that arsenic concentrations have been steadily declining in sediment following the 1997 removal action conducted at Site 12 (CH2M HILL, 2008b). Therefore, arsenic concentrations detected in sediment are attributed to historic activities at Site 12 and are not related to SSA 15.
- Chromium exceeded the human health risk screening value in three surface and subsurface sediment sample locations. However, the maximum concentrations of chromium in both surface sediment (7 mg/kg) and in subsurface sediment (20.2 mg/kg) are less than or similar to the maximum base-wide surface soil background

concentration (18.3 mg/kg) and less than the maximum upgradient surface soil concentration (20.7 mg/kg). In addition, concentrations of chromium elevated above the human health risk screening value were detected in sediment samples located in upgradient tributaries that did not receive effluent discharge from SSA 15 (YS12-SD09). Therefore, chromium concentrations detected in sediment are likely the result of erosion and deposition of naturally occurring concentrations in surrounding surface soil, rather than historical effluent discharge from SSA 15.

- Mercury exceeded the ecological screening value in one sample location in surface sediment and three sample locations in subsurface sediment. However, the potential sources of mercury to sediment were removed during the 1997 removal action at Site 12 and the 2001 removal action at SSA 15. Monitoring of surface sediment for mercury within the tributary shared by Site 12 and SSA 15 and downgradient water bodies indicates a generally decreasing trend in mercury concentrations following the completion of removal actions, with no mercury detected in the vicinity of SSA 15 during the latest round of sampling in 2007 (CH2M HILL, 2008b). With the sources of mercury removed, sediment concentrations are expected to continue to decline over time due to scouring of sediment along the streambed during periods of heavy flow. Mercury will continue to be monitored as part of LTM at Site 12.
- Therefore, no further action is required to address inorganics in sediment at SSA 15.

TABLE 4
Inorganic COPCs in Sediment

COPC	Adjusted Residential Soil RSL x10 (mg/kg)	Eco Screening Value (mg/kg)	YS12-SD08 0-4" bgs (mg/kg)	A15-SD01 0-4" bgs (mg/kg)	A15-SD02* 0-4" bgs (mg/kg)	YS12-SD09 0-4" bgs (mg/kg)	YS12-SD12 0-4" bgs (mg/kg)	YS12-SD18 0-4" bgs (mg/kg)	YS12-SD20 0-4" bgs (mg/kg)
Arsenic	3.9	9.79	ND	ND	ND	2.6 K	4.1	1.1	2.6
Chromium	2.9	43.4	2.1	2.6 L	3.1 L	7	ND	ND	5.6
Mercury	24	0.18	ND	0.23	ND	ND	ND	ND	ND

COPC	Adjusted Residential Soil RSL x10 (mg/kg)	Eco Screening Value (mg/kg)	YS12-SD08 4-8" bgs (mg/kg)	A15-SD01 4-8" bgs (mg/kg)	A15-SD02* 4-8" bgs (mg/kg)	YS12-SD09 4-8" bgs (mg/kg)	YS12-SD12 4-8" bgs (mg/kg)	YS12-SD18 4-8" bgs (mg/kg)	YS12-SD20 4-8" bgs (mg/kg)
Arsenic	3.9	9.79	ND	1.3	0.74	2.5 K	4.6	1.5	2.6
Chromium	2.9	43.4	ND	2.4 L	2.3 L	6.5	20.2	ND	8.4
Mercury	24	0.18	ND	0.33	0.44	ND	0.75	ND	ND

* Duplicate sample collected at this location. Values presented are the higher of the two reported values. Bold indicated exceedance of both background and screening value.

bgs - below ground surface
COPC - contaminant of potential concern
L - Reported value may be biased low

mg/kg - milligram per kilogram
ND - not detected
RSL - Regional Screening Level

Surface Water Results

A total of seven surface water samples, co-located with sediment samples, were collected in the vicinity of SSA 15; one as part of the 1993 Round One RI (12SW08), two as part of the

1996 SSA (A15SW01, A15SW02); and four as part of 1996 Round Two RI (12SW09, 12SW12, 12SW18, and 12SW20) (Figure 2). Samples were generally analyzed for TCL VOCs, TCL SVOCs, pesticides/PCBs, explosives, and TAL metal including cyanide. Dissolved metals were not analyzed for as part of the 1996 SSP.

Organics

No SVOCs, pesticides, PCBs, or explosives were detected in any samples collected. VOCs were detected in surface water samples exceeding human health and ecological screening values. However, as discussed previously, concentrations of VOCs have been attributed to Site 31 and will be addressed as part of future investigations and remedial actions at that site. Therefore, no further action is required to address organics in surface water at SAA-SSA 15.

Inorganics

Elevated concentrations of multiple total metals were detected in surface water samples collected during each of the investigations. However, in every instance, corresponding dissolved metals samples were below human health and ecological screening values, an indication that total metal concentrations are the result of suspended sediment. The two total metals detected exceeding risk screening values during the 1996 SSP without a corresponding dissolved metal sample for comparison were barium and cadmium. These metals are not consistent with historic site use at SSA 15 and were not identified as COPCs in any other media at the site. Therefore, they are likely also the result of suspended sediment concentrations.

Although the data available is no longer representative of current conditions at SSA 15 due to the transitory nature of surface water and the age of the analytical samples, no site-related COPCs were identified in surface water during these historic rounds of sampling. Since the 2001 removal action, the potential source of any contaminants to site surface water has been eliminated and any contaminant contributions from SSA 15 are expected to have declined even further over time. Therefore, no further action is required to address inorganics in surface water at SAA-SSA 15.

Summary

Based on the information reviewed and summarized in this Technical Memorandum, there are no unacceptable risks to human health or the environment at SSA 15 - Sewage Treatment Plant #1/Sludge Drying Beds and Discharge Area based on the following rationale:

- Surface Soil – Detected average concentrations of chromium, iron, and vanadium were below maximum background concentrations. Detected concentrations of mercury and selenium were spatially isolated and likely reduced to below screening values by the mixing and removal of soil associated with the 2001 removal of the Imhoff tank, trickling filter, sludge drying bed, and chlorination unit.
- Subsurface Soil – Detected concentrations of iron and thallium were spatially isolated in deep subsurface soil (9 – 11 ft bgs) and were not detected in a duplicate sample collected at the same location.

- Groundwater – Detected concentration total chromium and manganese are not related to historic site activities. Concentrations of VOCs are attributed to upgradient Site 31 and will be addressed as part of future actions conducted at that site.
- Sediment – Detected concentrations of arsenic, chromium, pesticides, and PCBs detected in sediment are not related to historic site activities. Potential sources of mercury to site sediment were removed during the 2001 removal action at SSA 15. In addition, mercury concentrations will continue to be monitored for mercury as part of LTM at Site 12.
- Surface Water – Concentrations of elevated total metals were not detected above screening values in dissolved samples. Following the 2001 removal action, potential sources of contaminants to surface water were removed. Concentrations of VOCs are attributed to upgradient Site 31 and will be addressed as part of future actions conducted at that site.

The Navy and USEPA, in partnership with the VDEQ, ~~agree have determined that there are~~ no potential risks exist and that no further action is required at SSA 15.

No Further Action Consensus

Based on the information reviewed and summarized in this Technical Memorandum, the Navy and USEPA, in partnership with the VDEQ, agree that there are no potential unacceptable risks to human health or the environment at Site SSA 15 - Sewage Treatment Plant #1/Sludge Drying Beds and Discharge Area and therefore a no further action is required at the site. ~~The Navy and USEPA, in partnership with the VDEQ, have determined that there are no potential risks exist at Site SSA 15 and that no further action is required at this screening area.~~

Mr. Tom Kowalski;
NAVFAC Mid-Atlantic _____ Date _____

Mr. Rob Thomson;
USEPA Region 3 _____ Date _____

Mr. Wade Smith;
Virginia DEQ _____ Date _____

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Attachments

- 1 Figure 1
- 2 Figure 2
- 3 Figure 4-2: Positive Detections of Select Inorganic Compounds in Surface Soil – Site 12 (RI, 1996)
- 4 Figure 10: Concentrations of Inorganics Exceeding RSLs or MCLs in Groundwater (SSA, 2008)

Attachments
