St. Juliens Creek Annex
Fiscal Year 2021 Environmental Restoration Program Goals

St. Juliens Creek Annex RAB Meeting
November 17, 2020
Purpose

• Provide an overview of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process

• Provide an update on the St. Juliens Creek Annex (SJCA) Environmental Restoration Program (ERP) sites and Fiscal Year (FY) 2021 Goals

• Highlight FY 2020 Successes

• Solicit questions or comments
CERCLA Process

Notes:
Yellow boxes indicate “phases” of the ER Process. Blue boxes indicate “milestones”.

Site Closeout

Long-Term Management

Response Complete

Remedial Action - Operation

Remedy In Place

Remedial Action - Construction

Remedial Design

Record of Decision

Remedial Investigation/Feasibility Study

Removal Action

Removal Action

Preliminary Assessment/Site Inspection
St. Juliens Creek Annex Goals

• Established yearly by Fiscal Year (FY)
  – FY 2021 began October 1, 2020 and ends September 30, 2021
• Serves as a budgeting tool for allocating funding
• Prioritizes sites to be investigated and remediated based on potential risk to human health and the environment
• Keeps remediation projects on schedule
56 No Further Action Sites!
3 Sites Currently Active

Site 21 Pre-Remedial Action Conditions

Site 2 Pre-Remedial Action Conditions

Site 4 Pre-Remedial Action Conditions

- St. Juliens Creek Annex Boundary
- Response Complete Site with Land Use Controls
- Remedial Action Site
## Site 2: Waste Disposal Area B

### Background:
- Unlined waste disposal area operated from 1921 to 1942

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<td>Primary: Enhanced reductive dechlorination, monitored natural attenuation, and land use controls Contingency: Permeable reactive barrier</td>
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<td>Surface water</td>
<td>Chlorinated solvents and metals</td>
<td>Cover (eliminates site surface water)</td>
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<td>Soil</td>
<td>Waste, polycyclic aromatic hydrocarbons (PAHs), pesticides, PCBs, and metals</td>
<td>Cover and land use controls</td>
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<td>Sediment (within site)</td>
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<td>Excavation and off-site disposal</td>
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Remedial Action--Construction phase completed in 2014
Site 2: Waste Disposal Area B

• Status: Remedial Action-Operation Phase
  – Remedial Action-Operation activities:
    • Bi-annual groundwater monitoring
    • Additional emulsified vegetable oil injections
    • Land use controls maintenance
    • Compensatory mitigation wetland monitoring
  – Five-Year Reviews
    • Second Five-Year Review (first for Site 2) completed in May 2015
    • Third Five-Year Review (second for Site 2) completed in May 2020
      – Concluded the remedy is protective of human health and the environment.
        » Potential unacceptable risk has been addressed by previous actions and is currently controlled by a combination of a soil cover and land use controls, and remedial action operation maintenance and monitoring
Site 2: Waste Disposal Area B

• Recently Completed and Ongoing Activities:
  – RA-O Groundwater Monitoring
    • Conducted Event 9 in November 2019
    • Conducted Event 10 in May 2020
    • Currently conducting Event 11 (November 2020)
  – Installed additional monitoring wells in July 2020
  – Conducted injection well maintenance and repairs in July and August 2020
  – Completed the FY20 compensatory wetland monitoring in August 2020
  – Conducted the annual Land Use Controls (LUC) Inspection in November 2020
Site 2: Waste Disposal Area B

• FY 2021 Goals:
  – Annual Land Use Controls Inspection
  – Wetland Mitigation, Monitoring, and Maintenance Report
  – Site 2 Vegetation Maintenance Plan
Site 4: Landfill D

• Background
  – Sanitary landfill operated from 1970 to 1981

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<td>Cover &amp; land use controls</td>
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<td>Metal (mercury)</td>
<td>Excavation and off-site disposal</td>
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</tbody>
</table>

– Remedial Action completed in 2005
Site 4: Landfill D

• Status: Response Complete Phase
  – Land use controls maintenance
  – Five-Year Reviews
    • First Five-Year Review completed in May 2010
    • Second Five-Year Review completed in May 2015
    • Third Five-Year Review completed in May 2020
      • Concluded the remedy is protective of human health and the environment
        » Exposure pathways that could result in unacceptable risk has been addressed by previous actions and is currently controlled by a combination of a soil cover and land use controls.
Site 4: Landfill D

• Recently Completed and Ongoing Activities:
  – Conduct vegetation maintenance (planned for November 2020)
  – Conduct the annual Land Use Controls (LUC) Inspection (planned for December 2020)

• FY 2021 Goals:
  – Annual Land Use Controls Inspection
Site 21: Industrial Area

• Background:
  – Industrial area
    • Buildings historically used as maintenance and electrical shops and munitions loading facilities; and outdoor areas used for equipment and chemical storage
    • Fuel service station (no longer present)

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<td>In situ chemical reduction, enhanced reductive dechlorination, land use controls</td>
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• Remedial Action-Construction completed in 2011
Site 21: Industrial Area

• Status: RA-Operation Phase
  – RA-Operation activities consisting of:
    • Bi-annual groundwater, storm water, and vapor intrusion monitoring
    • Land use controls maintenance
    • Additional emulsified vegetable oil injections
  – Five-Year Reviews
    • Second Five-Year Review (first for Site 21) completed in May 2015
    • Third Five-Year Review (second for Site 21) completed in May 2020
      – Concluded the remedy is protective of human health and the environment.
        » Potential unacceptable risk has been addressed by previous actions and is currently controlled by land use controls, and remedial action operation maintenance and monitoring

TCE – Trichloroethene
CVOC – Chlorinated Volatile Organic Compounds
Site 21: Industrial Area

• Recently Completed and Ongoing Activities:
  – Completed Round 3 injections from October 2019 to September 2019
  – Conducted the annual land use control (LUC) inspection in November 2020
  – RA-O Vapor Intrusion Monitoring
    • Conducted Event 15 in January 2020
    • Conducted Event 16 in August and September 2020
  – RA-O Groundwater and Stormwater Monitoring
    • Conducted Event 15 in May 2020
    • Currently conducting Event 16 (November 2020)
Site 21: Industrial Area

• FY 2021 Goals:
  – Annual Land Use Controls Inspection
  – Remedial Action-Operation Groundwater and Storm Water Monitoring Event 16 Report
  – Remedial Action-Operation Groundwater and Storm Water Monitoring Event 17 Report
  – Building 81 Vapor Intrusion Technical Memorandum
Facility-wide FY 2021 Goals

• FY2022 through FY2026 Site Management Plan Update
• Per- and Polyfluoroalkyl Substances (PFAS) Preliminary Assessment (PA) Report
• PFAS Site Investigation (SI) Sampling and Analysis Plan
FY 2020 Successes

• Site 2 Well Installation, Maintenance, and Repairs
  – Installed 3 new monitoring wells
  – Repaired 7 out of 10 fouled injection wells, and reinstalled the 3 remaining damaged injection wells

• Site 2 Compensatory Wetlands Monitoring
  – Conducted the FY20 Monitoring event; results indicated the wetland was healthy and functioning as intended.

• Site 21 Injections
  – Completed the Round 3 injections of emulsified vegetable oil and dehalococcoides cultures

• LUC Inspections and Maintenance
  – Completed LUC inspections at Sites 2, 4, and 21

• RAB and Community Outreach
  – Hosted RAB meeting in November 2019
  – Kept public website updated for throughout COVID-19 pandemic with information regarding canceled RAB meeting
Questions/Comments?
Topics

• Review per- and polyfluoroalkyl substances (PFAS) background and history
• Present Preliminary Assessment (PA) objective and overview
• Provide summary of PA activities completed
• Present path forward
• Resources
• Answer questions
What are Per- and Polyfluoroalkyl Substances (PFAS)?

• Man-made compounds
• Used since the 1950s in many products
  – Stain-resistant carpets
  – Nonstick cookware
  – Water-repelling fabrics
  – Food packaging
  – Firefighting foam
  – Plating shop mist suppression systems
• Useful properties result in their persistence in the environment
  – Heat resistant
  – Flame retardant
  – Do not readily degrade
• Found in blood of people, wildlife, and fish worldwide
Some PFAS Chemistry and Properties

• PFAS
  – Suite of thousands of chemicals
  – Carbon chains are different lengths
  – Per-FAS means all carbons are bonded with fluorine
  – Poly-FAS means some carbons are bonded with fluorine

• Chemical properties
  – Hydrophobic (repel water) and lipophobic (repel oil)
  – Water soluble
  – Affinity for interfaces
    • Form films on water and oil surfaces
    • Often found where air meets water, soil meets water, and free product fuel meets water

• Strong carbon-fluorine bond requires a lot of energy to break
  – Very persistent in the environment
# A Brief History of PFAS

## Development Time Period

<table>
<thead>
<tr>
<th>PFAS</th>
<th>1930s</th>
<th>1940s</th>
<th>1950s</th>
<th>1960s</th>
<th>1970s</th>
<th>1980s</th>
<th>1990s</th>
<th>2000s</th>
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<tbody>
<tr>
<td>PTFE</td>
<td>Invented</td>
<td>Non-Stick Coatings</td>
<td></td>
<td></td>
<td>Waterproof Fabrics</td>
<td></td>
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<tr>
<td>PFOS</td>
<td>Initial Production</td>
<td>Stain &amp; Water Resistant Products</td>
<td>Firefighting Foam</td>
<td></td>
<td></td>
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<td></td>
<td>U.S. Reduction of PFOS, PFOA, PFNA (and other select PFAS²)</td>
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<tr>
<td>PFOA</td>
<td>Initial Production</td>
<td>Protective Coatings</td>
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<tr>
<td>PFNA</td>
<td>Initial Production</td>
<td>Architectural Resins</td>
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<tr>
<td>Fluorotelomers</td>
<td>Initial Production</td>
<td>Firefighting Foams</td>
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<td></td>
<td></td>
<td>Predominant form of firefighting foam</td>
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<tr>
<td>Dominant Process³</td>
<td>Electrochemical Fluorination (ECF)</td>
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<td></td>
<td></td>
<td>Fluoro-telomerization (shorter chain ECF)</td>
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<tr>
<td>Pre-Invention of Chemistry / Production</td>
<td>Initial Chemical Synthesis / Production</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Commercial Products Introduced and Used</td>
</tr>
</tbody>
</table>

Source: Interstate Technology and Regulatory Council (ITRC) History and Use factsheet
Navy Use of AFFF

• For Navy, the most common source of PFAS to the environment is use of AFFF
  • Past training, emergency response
• Navy use of AFFF for fire fighting operations starting in the late 1960s and early 1970s following issuance of the military specification (MILSPEC) for a fluorocarbon-based AFFF in 1969
  • MILSPEC are performance-based
  • Different AFFF formulations
Preliminary Assessment Overview

• A Preliminary Assessment (PA) is typically conducted at the beginning of the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA) process

• An installation-specific Preliminary Assessment (PA) for PFAS is currently in progress at SJCA

• The PA is being conducted to assess the potential PFAS source areas, and determine what areas warrant further investigation

• Areas that are determined to warrant further investigation will be carried forward into the Site Inspection (SI) phase (which is the next phase of the CERCLA process)
Preliminary Assessment Overview

- The objectives of the PFAS PA are to:
  - Identify and catalog all potential or actual PFAS sources
  - Eliminate from further consideration those areas where there is no evidence of a PFAS release or suspected release and document the rationale for their elimination
  - Identify areas requiring further PFAS investigation
  - Identify receptors and migration pathways
  - Determine whether an emergency response action is warranted because of current complete exposure pathways (e.g. on-Base or off-Base drinking water source within one-mile downgradient of potential source area)
  - Set priorities for a base-wide Site Inspection (SI) (if necessary)
Preliminary Assessment Overview

• Examples of potential PFAS Source Areas evaluated in the PA
  • AFFF releases
    • Fire-fighting training areas
    • Crash sites
    • Crash truck testing, cleaning, or refilling areas
    • Hangars, buildings, or bulk fuel storage with fire suppression systems
    • Areas used for firetruck and fueler maintenance
  • Other sources
    • Plating shops with certain mist suppression systems
    • Wastewater sprayfields
    • Wastewater sludge disposal areas
Preliminary Assessment Activities

• A document review was conducted to help identify and characterize potential PFAS releases
  • Examples of documents reviewed include:
    • Current and historical environmental program documents
    • Environmental liabilities databases
    • Virginia Department of Environmental Quality databases and records
    • Base records such as hazardous waste inventories, compliance reports, spill logs, etc.
    • National Archives
    • Online and web searches
    • Historical mapping
Preliminary Assessment Activities

• Interviews were conducted with current and former Base employees to validate and verify data collected during the document review and provide supplemental information.

• Site visits were conducted to identify any evidence of PFAS releases and potential receptors and migration pathways, to identify all areas of concern, and fill in any data gaps identified during data review and interviews.
Preliminary Assessment Activities

• The PFAS PA is currently ongoing

• 49 areas were initially identified for evaluation

• 4 areas have been identified to move forward to the SI phase of investigation
  
  • Regional Fire Training Academy

  • Site 5 – Burning Grounds Group which includes a Potential Fire Training Area

  • Site 15 – Fire Training Area Group which includes Building 271- Former Fire Station

  • Site 21 – Industrial Area including Site 9, Building 249, and Building 104

• Additional sites may be identified prior to the PA being finalized
Path Forward for SJCA

• Following the PA, an SI will be conducted to confirm environmental releases or propose no further investigation

• As with typical CERCLA process, public input welcome and formally solicited during process
Resources

• Secretary of the Navy

• Virginia Department of Environmental Quality (VDEQ)

• Agency for Toxic Substances and Disease Registry (ATSDR) (division of the Centers for Disease Control)

• United States Environmental Protection Agency (USEPA)
  – https://www.epa.gov/pfas

• Interstate Technology Regulatory Council (ITRC)
  – https://pfas-1.itrcweb.org/fact-sheets/
Questions?
St. Juliens Creek Annex
Third Five-Year Review

St. Juliens Creek Annex RAB Meeting
November 17, 2020
Objectives

• Review the purpose and process of the Five-Year Review

• Provide a summary of the sites included in SJCA Third Five-Year Review

• Present the findings and conclusions of SJCA Third Five-Year Review

• Answer questions
Five-Year Review

Purpose:

• Required under the Comprehensive Environmental Response Compensation Liability Act (CERCLA) when remedial actions result in any hazardous substances, pollutants, or contaminants remaining at a site

  – Example: The remedy for a site is construction of a soil cover over a landfill

  – First Five-Year Review is required five years after the first remedial action is initiated at a facility

  • First Five-Year Review for St. Juliens Creek Annex was completed in 2010 (following initiation of the remedial action at Site 4)

• Objective is to determine if the selected remedy remains protective of human health and the environment

  – If it is determined that the remedy is no longer protective, the remedy may be modified
Five-Year Review

• Five-Year Reviews identify the following for each site reviewed:
  – Any issues that currently prevent the remedy from being protective or may do so in the future
  – Recommendations and follow-up actions to address any issues identified
  – Determination of protectiveness of human health and the environment, from one of the following options:
    • Protective
    • Will be protective once the remedy is complete
    • Protective in the short-term; however, in order for the remedy to be protective in the long-term, follow-up actions need to be taken
    • Not protective, unless the following action(s) are taken in order to ensure protectiveness
    • Protectiveness cannot be determined until additional information is obtained
Five-Year Review

**Process:**

- **Identify sites where remedial actions resulted in waste remaining in place**
- **Evaluate protectiveness of human health and the environment**
  - Review requirements in Decision Documents (e.g., Record of Decisions)
  - Review post remedy documents and findings
  - Conduct site inspections
- **Involve community**
  - Place notice in local newspaper
  - Notify RAB at meetings
- **Develop report**
  - Present protectiveness evaluation
  - Present potential issues, recommendations, and follow-up actions
  - Summarize protectiveness determinations
Identification of Sites Requiring Review

- Site 2 – Waste Disposal Area B
  - Action ROD, remedial action ongoing to address contaminants remaining on site; left waste in place
  - **Five-Year Review required**

- Site 4 – Landfill D
  - Action ROD, remedial action completed; left waste in place
  - **Five-Year Review required**

- Site 21 – Industrial Area
  - Action ROD, remedial action ongoing to address contaminants remaining on site
  - **Five-Year Review required**
Five-Year Review

Protectiveness Statements:

• Protectiveness statements are issued for each site evaluated in the Five-Year Review
  – For SJCA, this includes Sites 2, 4, and 21

• For installations that have achieved construction complete, an installation-wide protectiveness statement is also issued covering all remedies that do not allow for unlimited use and unrestricted exposure

• Protectiveness for each site/installation can be protective (or will be protective), protective in the short term, or not protective
Community Involvement is also a key aspect of the Five-Year Review process.

At the initiation and completion of the Five-Year Review, all potentially interested parties are notified:

- One public notice is placed in the local newspaper at the initiation of the Five-Year Review.
- A second public notice is placed in the local newspaper at the completion of the Five-Year Review to notify the public the document has been completed and is available for review.
Overview of the Third Five-Year Review

• The Third Five-Year Review was conducted for SJCA and included Sites 2, 4, and 21

• Review was conducted for the period of May 20, 2015 to May 19, 2020
  – The Navy signed the Second Five-Year Review on May 19, 2015, which is the Navy’s triggering action for the Third Five-Year Review

• A public notice was placed in the local newspaper at the initiation of the SJCA Third Five-Year Review in March 2019

• A public notice was also placed in the newspaper following completion of the Five-Year Review in May 2020, and the Final signed document will be placed in the information repository at Major Hillard Library
Site 2 - Waste Disposal Area B

• Background:
  – 6.3 acre unlined waste disposal area operated from 1921 to 1942
  – The ROD was signed in January 2011 and the selected remedy consisted of:
    – Soil cover over waste, soil, and sediment
    – Excavation of sediment in St. Juliens Creek
    – Enhanced reductive dechlorination within the high-concentration target area of the shallow groundwater plume
    – Monitored natural attenuation within the low-concentration target area of the shallow aquifer groundwater plume
    – Land use controls
    – Additionally, a contingency permeable reactive barrier was included in the remedy
  – The Remedial Action–Construction phase completed in 2014
  – The Interim Remedial Action Completion Report was signed in September 2015 to document Remedy-in-place (RIP)
Site 2 - Waste Disposal Area B

- Nature of contamination - media and constituents of concern for Site 2 is summarized in the table

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Site 2 - Waste Disposal Area B
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• Status: Remedial Action-Operation Phase
  – Remedial Action-Operation activities:
    • Bi-annual groundwater monitoring
    • Additional emulsified vegetable oil injections
    • Land use controls maintenance
    • Compensatory mitigation wetland monitoring
  – Previous Five-Year Reviews
    • Site 2 was first included in the Second Five-Year Review for SJCA, signed in May 2015
    • Second Five-Year Review Concluded the remedy is protective in the short-term and identified the following issues that needed to be addressed to ensure long-term protectiveness:
      » Cleanup level for naphthalene in groundwater was not protective of potential future use. (addressed in FY17)
      » Emerging contaminants perchlorate & 1,4-dioxane potentially present in groundwater but not evaluated. (addressed in FY17)
      » Groundwater data was not yet available to determine if the remedy was functioning (addressed in FY17)
Site 2 - Waste Disposal Area B

• Site 2 Third Five-Year Review Conclusions
  • There were no issues, recommendations, or follow-up actions identified for Site 2
  • Site 2 was determined to be protective.

Site 2 Protectiveness Statement

The remedy as Site 2 is in place, functioning as designed, and is protective of human health and the environment. Exposure pathways that could result in unacceptable risk have been addressed by previous remedial action activities and continue to be controlled through a combination of soil cover and land use controls, and remedial action-operation maintenance and monitoring is ongoing. There have been no changes in the physical condition of the site that would affect the protectiveness of the remedy.
Site 4 - Landfill D

• Background:
  – 8.3 acre landfill operated from 1970 to 1981
  – Nature of contamination
    • Waste/Soil: SVOCs, one PCB, and inorganics
    • Sediment: inorganics
  – The ROD was signed in September 2004 and the selected remedy consisted of:
    • Soil cover over the waste
    • Removal of the eastern drainage ditch sediment
    • Land use controls
  – The Remedial Action Completion Report was signed in October 2006 to document response complete (RC).
Site 4 - Landfill D

• Nature of contamination - media and constituents of concern for Site 4 is summarized in the table

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Site 4 - Landfill D

• Status: Response Complete Phase
  – Land use controls maintenance
  – Previous Five-Year Reviews
    • First Five-Year Review completed in 2010
      – Concluded the remedy was protective and there were no issues, recommendations, or follow-up actions identified for Site 4 in 2010
    • Second Five-Year Review completed in 2015
      – Concluded the remedy was protective and there were no issues, recommendations, or follow-up actions identified for Site 4 in 2015
Site 4 – Landfill D

• Site 4 Third Five-Year Review Conclusions
  • There were no issues, recommendations, or follow-up actions identified for Site 4
  • Site 4 was determined to be protective.

Site 4 Protectiveness Statement

The remedy as Site 4 is in place, functioning as designed, and is protective of human health and the environment. Exposure pathways that could result in unacceptable risk have been addressed by previous remedial action activities and continue to be controlled through a combination of a soil cover and land use controls. There have been no changes in the physical condition of the site that would affect the protectiveness of the remedy.
Site 21 – Industrial Area

• Background:
  – 20.8 acre industrial area where buildings historically used as maintenance and electrical shops and munitions loading facilities; and outdoor areas used for equipment and chemical storage
  – Nature of contamination
    • Shallow groundwater: VOCs
  – The ROD was signed in October 2011 and the selected remedy consisted of:
    • In-situ chemical reduction
    • Enhanced reductive dechlorination
    • Land use controls
    • Additionally, it was determined that vapor intrusion monitoring was warranted until shallow groundwater cleanup levels were achieved (although no potential risk associated with the vapor intrusion pathway were identified)
  – The Interim Remedial Action Completion Report was signed in July 2013 to document Remedy-in-place (RIP)
Site 21 - Industrial Area

- Nature of contamination - media and constituents of concern for Site 21 is summarized in the table

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Site 21 - Industrial Area
Site 21 - Industrial Area

• Status: RA-Operation Phase
  – RA-Operation activities consisting of:
    • Bi-annual groundwater, storm water, and vapor intrusion monitoring
    • Land use controls maintenance
    • Additional emulsified vegetable oil injections
  – Previous Five-Year Reviews
    • Site 21 was first included in the Second Five-Year Review for SJCA, signed in May 2015
    • Second Five-Year Review Concluded the remedy is protective in the short-term and identified the following issue that needed to be addressed to ensure long-term protectiveness:
      » Emerging contaminants perchlorate & 1,4-dioxane potentially present in groundwater but not evaluated. (addressed in FY17)
Site 21 – Industrial Area

- Site 21 Third Five-Year Review Conclusions
  - There were no issues, recommendations, or follow-up actions identified for Site 21
  - Site 21 was determined to be protective.

Site 21 Protectiveness Statement

The remedy as Site 21 is in place, functioning as designed, and is protective of human health and the environment. Exposure pathways that could result in unacceptable risk have been addressed by previous remedial action activities and continue to be controlled by land use controls, and remedial action-operation maintenance and monitoring is ongoing. There have been no changes in the physical condition of the site that would affect the protectiveness of the remedy.
Other Findings

PFAS:

• Per- and polyfluoroalkyl substances (PFAS) is currently an emerging contaminant of concern in the CERCLA program and at SJCA

• It was documented in the “Other Findings” section of the Five-Year Review, that a facility-wide Preliminary Assessment/Site Inspection (PA/SI) is scheduled to be completed for PFAS.

• The Preliminary Assessment (PA) for PFAS for SJCA is currently being conducted.
• Sites 2, 4, and 21 were determined to be protective of human health and the environment

• Therefore, the protectiveness statement issued basewide was protective as well

SJCA achieved construction complete on July 7, 2016, and the remedial actions for Sites 2, 4, and 21 are protective of human health and the environment; therefore, SJCA is protective of human health and the environment.
Summary of Third Five-Year Review

• The Five-Year Review report will be made available for review:

  • On the St. Juliens Creek Annex Environmental Restoration Program public web site (http://go.usa.gov/xGmmW)

  • A hard copy will be placed in the St. Juliens Creek Annex Information Repository in Major Hillard Library in Chesapeake, Virginia

• Questions regarding the Five-Year Review results can be addressed to:

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• The next Five-Year Review will be completed in 2025
Questions/Comments?