

**Background & Regulatory Setting**

The Former Offutt Air Force Base, Atlas “D” Missile Site 3 (Site 3) is approximately four miles southeast of Missouri Valley, Iowa, and was one of three Atlas “D” missile sites operated by the U.S. Air Force. The property was acquired by the U.S. Government in 1958-1959 and used for the maintenance, storage, and potential launch of Atlas “D” intercontinental ballistic missiles. In 1965, Site 3 was declared excess property by the Department of Defense (DoD). The property is currently under private ownership (residential and agricultural).

The U.S. Army Corps of Engineers (USACE) is following the authority of the Defense Environmental Restoration Program for Formerly Used Defense Sites statute [10 USC 2701 (a) (2)]. The investigation and remedial actions are required to be consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [40 CFR 300.415(b)]. DoD is the lead agency, and the Iowa Department of Natural Resources is the lead regulator. Site 3 is currently in the Feasibility Study (FS) phase of the CERCLA process, as highlighted in blue under the CERCLA Remedial column in **Figure 1**.

**Site Contaminants**

As a result of previous military operations associated with missile operations, the following contaminants have been identified:

In groundwater

- Trichloroethene (TCE)
- 1,2-Dichloroethane
- cis-1,2-dichloroethene (DCE)
- trans-1,2-DCE
- Vinyl chloride

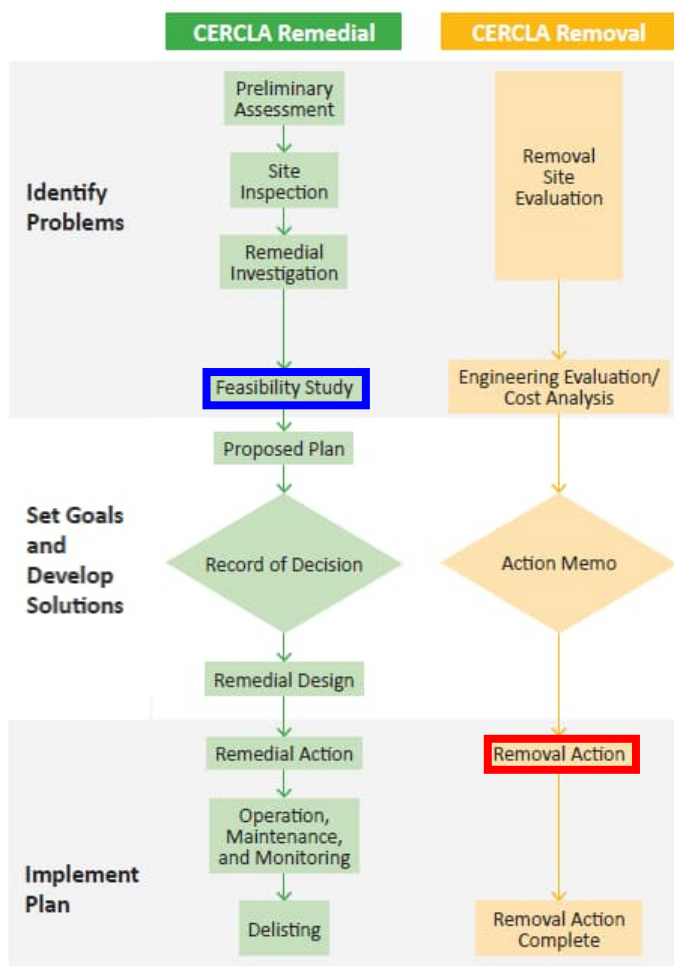
In soil

- Polychlorinated biphenyls (PCBs)

*Contaminant concentrations in surface water and sediment samples collected from tributaries of Euclid Creek were less than human health and ecological screening levels.*

**Response Actions**

Environmental investigations have been ongoing since 2012. These include a Preliminary Assessment to initially identify the presence of contamination, and the recently completed Remedial Investigation (RI), which delineated the nature and extent of contamination and assessed human health and ecological risks. In response to groundwater contaminants in residential wells, USACE installed 28 in-line granular activated carbon (GAC) treatment systems to treat drinking water at affected residences (red and yellow locations on **Figure 2**). The USACE also excavated and thermally treated PCB-impacted soils for reuse in the excavated areas. The GAC treatment systems and soil remediation are removal actions, as highlighted in red under the CERCLA Removal column in **Figure 1**.



**Figure 1** Typical CERCLA Remediation and Removal Processes  
<https://www.navfac.navy.mil/Divisions/Environmental/Products-and-Services/Environmental-Restoration/Mid-Atlantic/Oceana-NAS/>

**Current Status**

The RI improved the understanding of the nature and extent of contamination at and beyond Site 3, as shown in **Figure 3**. The RI also improved the understanding of the site geology, hydrogeology, and groundwater geochemistry, which influence contaminant movement through the shallow, intermediate, and deep water-bearing zones (WBZs). With the information generated from the RI, the CERCLA process can continue into the FS phase.

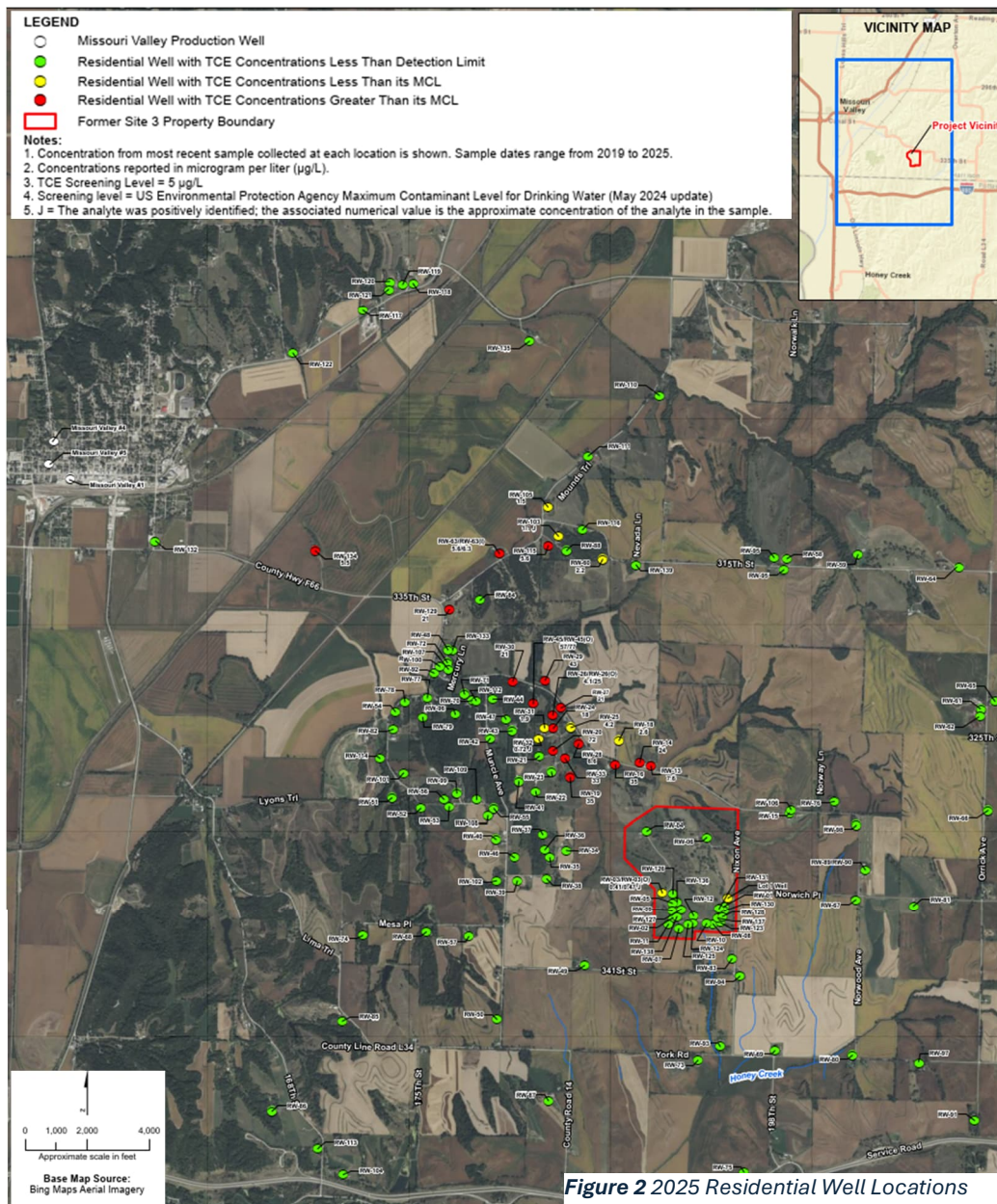
To support future remedial activities at Site 3 and address the TCE in the shallow and intermediate WBZs shown in **Figure 3**, the following pilot studies

are being implemented to assess the feasibility and effectiveness of three potential remedies:

- Zero-valent iron (ZVI) injection via hydraulic fracturing
- ZVI injection via conventional injection wells
- Bioelectrochemical remediation (E-Redox)

The pilot studies were initiated in August and September 2024. Quarterly groundwater sampling to monitor treatment effectiveness is in progress.

**Exhibit 1** presents photographs of pilot study implementation. The pilot study results will be used to support the final remedy selection for the site.



**Figure 2 2025 Residential Well Locations**

**How does ZVI work?**

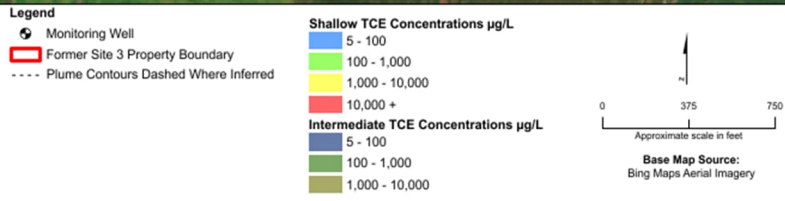
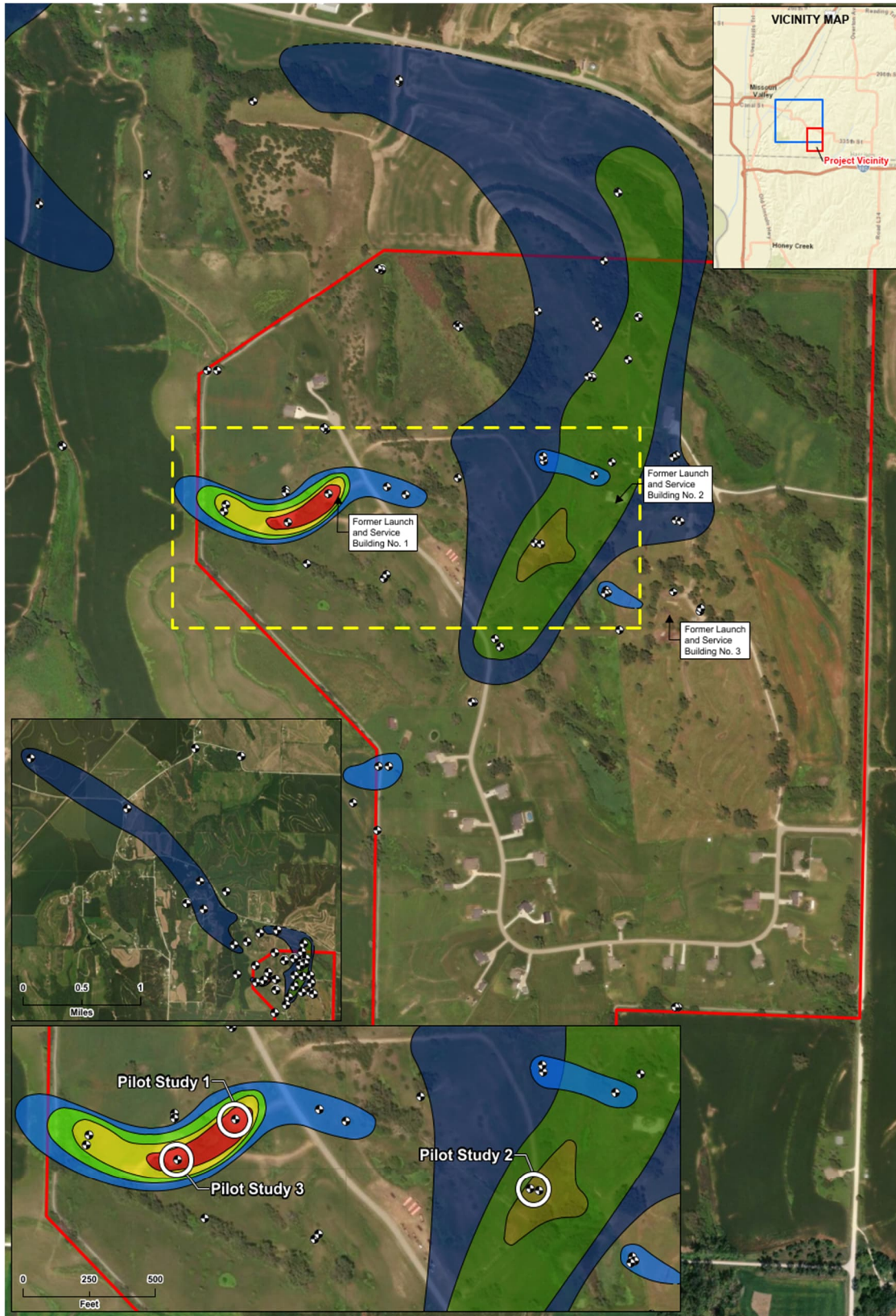
- ZVI slowly oxidizes (“rusts”) in the environment
- Oxidation of ZVI reduces TCE, where chlorine atoms are replaced with hydrogen atoms leaving non-toxic end products such as ethane, ethene, and acetylene
- Benefit: ZVI does not migrate downgradient and potentially impact drinking water quality

**Why hydraulic fracturing?**

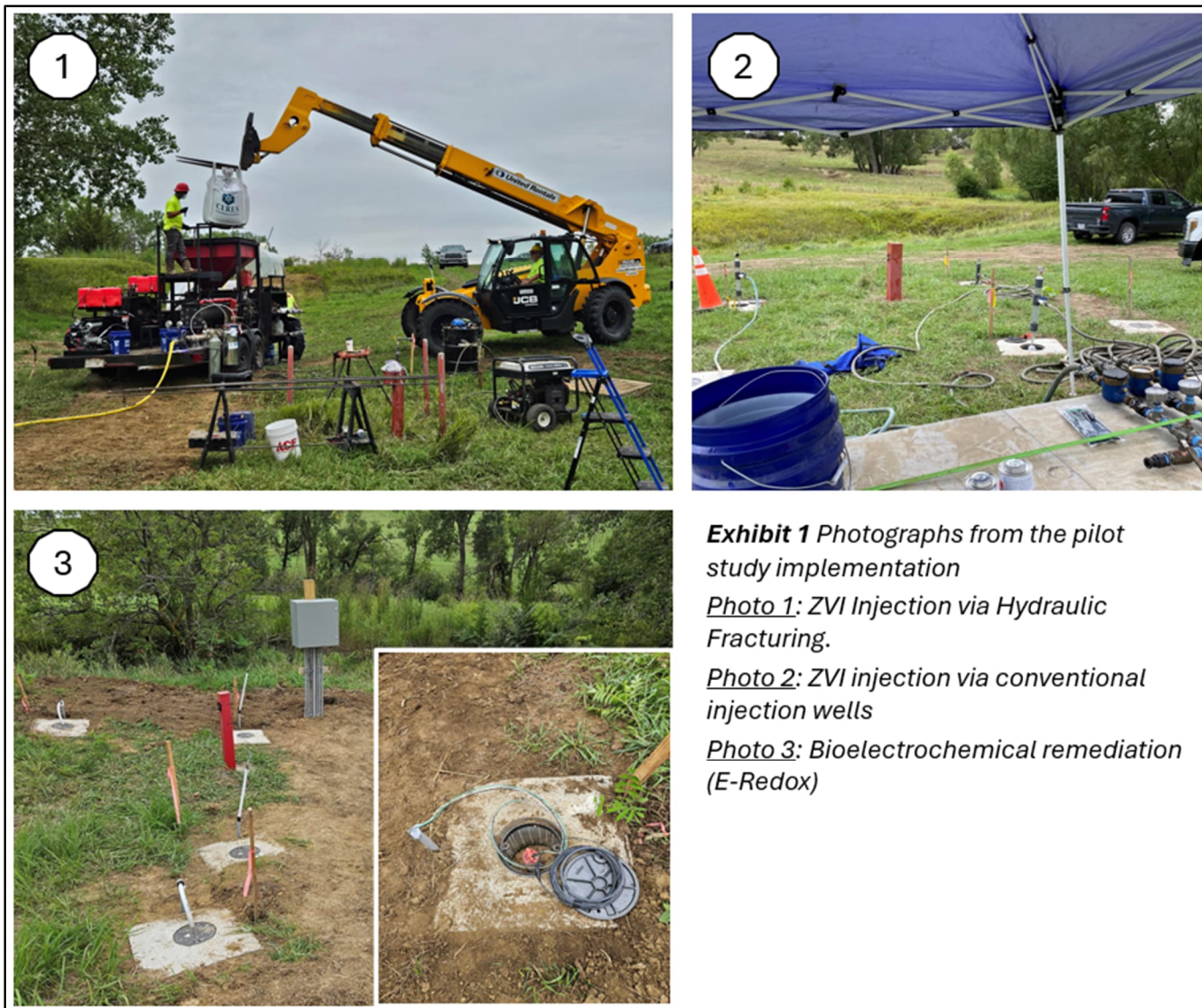
- Ideal for low permeability soils like silts and clays
- Enables injection of ZVI particles (like fine sand) that cannot be injected via wells; these “large” ZVI particles can remain active and reduce TCE for years

**How does E-Redox work?**

- Electrodes are installed in conventional wells
- The electrodes are connected to residential power and a current is established
- The electrical current accelerates the same oxidation reduction processes facilitated by the ZVI injections, but using natural soil components



**Figure 3** 2024 Extent of TCE in Shallow and Intermediate Water-Bearing Zones and Pilot Study Locations



**Exhibit 1** Photographs from the pilot study implementation  
*Photo 1: ZVI Injection via Hydraulic Fracturing.*  
*Photo 2: ZVI injection via conventional injection wells*  
*Photo 3: Bioelectrochemical remediation (E-Redox)*

**Path Forward**

USACE will

- Continue site sampling, pilot study performance monitoring, and GAC treatment system operations and maintenance
- Prepare an FS presenting the findings from the pilot studies to develop and evaluate remedial alternatives for the site
- Propose a remedy in the Proposed Plan, followed by a Record of Decision (ROD), to document the selected protective remedy. The ROD is expected to be final in 2027.
- Continue ongoing communication with the public, including a yearly annual public meeting and updated fact sheets.

**Administrative Record:**

Missouri Valley Public Library  
420 East Huron Street, Missouri Valley, IA 51555  
712-642-4111

**Points of Contact:**

Scott Sawyer, Project Manager  
USACE, Omaha District  
402-250-0329  
Milton.S.Sawyer@usace.army. mil

USACE Public Affairs Office  
1616 Capitol Ave., Omaha, NE 68102  
402-995-2417  
Omaha.usace-pa@usace.army.mil