2026 DoW Environmental Awards
Environmental Restoration – Installation: Defense Distribution Depot San Joaquin

Introduction

The Defense Distribution Depot San Joaquin (DDJC) is an active distribution center operated by the Defense Logistics Agency (DLA) to supply military services with the equipment and materials needed to fulfill their missions. The combined civilian and military population is approximately 1,333 persons. Located in California's San Joaquin Valley, DDJC sits approximately 1.5 miles southeast of the City of Tracy, a community incorporated in 1910. The area surrounding the City of Tracy is used primarily for agriculture. Several unincorporated communities surround DDJC in addition to large urban communities. These include the City of Stockton, approximately 15 miles to the northeast, and the City of Modesto, approximately 25 miles southeast of the Depot.

DDJC consists of the Depot and Annex properties. The 448-acre active portion of the DDJC installation (the Depot) forms a triangle. The Annex property, which consists of 460 acres of agricultural land north of the Depot, was acquired in 1993. About 75 percent of the Depot is covered with buildings (primarily warehouses), asphalt, or concrete.

Background

In 1942, DDJC originated as a "sub depot" of the United States Army's Quartermaster Corps, Oakland Army Depot. In 1963, operational control of the site was transferred to DLA, though the Army retains ownership of the property.

Current supply activities at DDJC include storage, handling, preservation, packaging, and shipment of food, medical, construction, clothing, electronic, industrial, and general supplies to military services within the western United States and throughout the Pacific Rim region.

Past Depot mission activities that resulted in environmental contamination included vehicle maintenance, fueling, material stockpiling, drum storage, waste disposal, and wastewater management. These tasks required using petroleum hydrocarbon fuels and several other industrial chemicals and materials. Inadvertent releases of chemicals and materials contaminated Depot soil, soil vapor, and groundwater.

Environmental studies have been on-going at DDJC since 1980, when soil and groundwater contamination were first detected at 25 solid waste management units (SWMUs). Between 1986 and 1992, an initial remedial investigation (RI) was conducted. The results of the RI led to the site being listed on the Comprehensive Environmental Response, Compensation, and Liability Act's (CERCLA's) National Priorities List (NPL) as a Superfund site in 1990. In 1991, DLA, the United States Environmental Protection Agency (EPA), California Department of Toxic Substances Control (DTSC), and California Regional Water Quality Control Board (RWQCB) signed the Federal Facility Agreement (FFA) for DDJC. The regulatory agencies provide oversight, consisting of technical support and review of all investigative and cleanup activities.

Supporting the Mission and Readiness

At DDJC, DLA has focused the restoration program on achieving protectiveness of human health and the environment with minimal disruption to the mission. All cleanup strategies consider the future anticipated use of the site, and cleanup goals have been negotiated with the regulatory agencies based upon Federal and State drinking water standards and DDJC's Master Plan. Land use controls (LUCs), where needed, allow for future development of the site while also protecting construction workers, military personnel, and other employees who work at the installation. Where new projects and modernization at the Depot are planned within LUC areas, the Environmental Management Division works with the Facilities & Engineering Division to plan for and mitigate environmental issues, within the requirements of the LUCs, thus maintaining installation resilience and mission readiness.

Summary of Challenges
Cleanup of the site has been ongoing for decades. Long-term challenges for the restoration of the site were threefold:

1. Technical: Three primary contaminant classes (volatile organic compounds [VOCs], pesticides, and petroleum hydrocarbons) are present in three different media (soil, soil vapor, and groundwater). Remedial approaches and technologies differ for each contaminant class and each contaminated media.
2. Regulatory: Oversight by the federal government (EPA) and two State of California agencies (RWQCB and DTSC) requires compliance with both Federal and State regulatory criteria that have become increasingly stringent over the last several decades.
3. Community Relations: Off-site contaminant migration required purchase of the adjacent (Annex) property to assure that the land would not be developed, and residential water users would not be affected by the contaminated groundwater. DLA also engages with private property owners for access to those off-site contaminated areas that were not purchased to sample drinking water wells, conduct soil and groundwater investigations, and install and sample groundwater monitoring wells.

Organization, Staffing, & Management Approach
The DLA has taken an aggressive approach to management of the DDJC Installation Restoration Program (IRP), resulting in the achievement of the goal to expedite the environmental remediation. The restoration program is overseen by the IRP Manager at DLA with support provided by contractors with decades of experience at the site. DLA actively manages the program through the FFA to ensure deadlines are met and milestones achieved. Technical decisions are vetted through experts with our contractor partners, and funding is provided by DLA Headquarters.

For DDJC, DLA utilizes annual, firm fixed price contracts to limit its risk. Achievement of milestones, site-specific expertise, and cost savings are necessary elements for contractors to remain engaged. In addition, DLA maintains a strong working relationship with funding managers to identify future funding needs and ensure funds are in place to avoid costly delays.

To keep the regulatory agencies (EPA, RWQCB, and DTSC) apprised of the status of the environmental program, DLA holds monthly teleconference calls to discuss schedule, and quarterly meetings to address both schedule and technical issues. In 2024, when the RWQCB brought up concerns with the dispersion remedy (natural attenuation) for groundwater in an isolated groundwater plume offsite and east of the Annex, DLA recognized at one of the quarterly meetings the RWQCB's basis for the concern and modified the data presentation to address this technical disagreement. This decision-based partnering allows senior managers from each stakeholder to engage and to identify key issues.

Cleanup Milestones
DLA's program management techniques (schedule, contracts, and partnering) have positioned active treatment remedies for closure. By clearly identifying schedule milestones, DLA effectively communicated mission requirements to the project team. Clearly defined milestones enabled the IRP team to identify steps necessary to end soil remediation and plan actions to complete the groundwater remedy, while controlling and even reducing program costs. The key milestones achieved in FY2024 & FY2025 are listed below.

- SWMU 24 bioventing well decommissioning to remove a discontinued soil remedy's infrastructure.
- Area 3 soil vapor extraction (SVE) closeout and decommissioning, returning full use to DDJC of a 4-acre portion of the Depot. This enhances DDJC's ability to perform the mission to receive, store, and ship military supplies and equipment as the Department of War's primary western strategic distribution hub.
- SWMU 3 soil and groundwater investigation to rule out the presence of a continuing source for groundwater contamination.

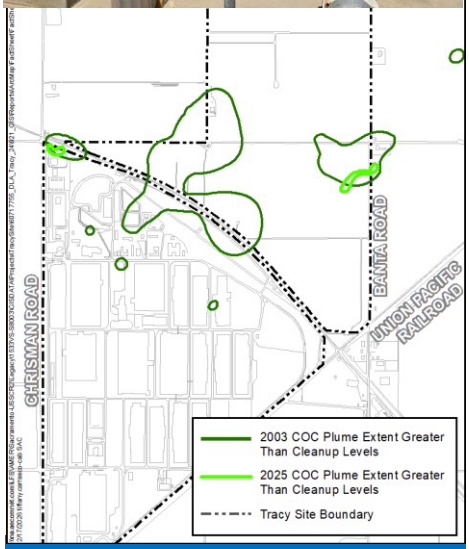
- Extraction well installation to address isolated contamination within a deeper portion of the aquifer.
- Well decommissioning to remove monitoring and extraction wells that are no longer needed for the groundwater program.
- Upgrades to the ageing groundwater treatment plant to improve the plant's efficiency and reduce shutdowns.
- Aggressive maintenance at groundwater extraction wells to increase their performance.
- December 2024 Memorandum to the Site File for extension of the dispersion remedy to maintain that remedy for an off-site groundwater plume, rather than having to implement a costly active remedy and retain dispersion as a more "green' and sustainable approach.

Community Involvement Programs

DLA has a robust community involvement program and executes the restoration program in accordance with the approved Community Involvement Plan. The plan was developed by DLA in collaboration and with the approval of the regulatory agencies. The plan provides guidance for record keeping, factsheet distribution, community outreach for sampling access, and public engagement for activities such as when milestones are reached.

Although there was not enough community interest to form a Restoration Advisory Board, DLA has been proactive in public communications. DLA maintains a publicly available information repository on-site and has encouraged community involvement through distribution of factsheets. DLA also maintains an on-site public outreach official, so that community members can comment on the program or request information from the information repository.

Periodically, DLA hosts tours of the facility for the EPA, RWQCB, and DTSC. The tours allow DLA to give the regulatory agencies a first-hand review of the various remediation locations, hear and understand agency concerns and issues, and directly address those at the location. DLA has found that pairing technical discussions with the agencies at the site leads to better agency understanding and cooperation.



Groundwater extraction and dispersion have reduced the contaminant plume sizes and concentrations to less than cleanup levels across much of the area.

Positioning for an End to Active Remediation

Since 2012, when all remedies were in-place and operating, the DDJC IRP has moved toward completion of the active remediation and reduction of groundwater impact areas, requiring less monitoring and treatment. Annual progress has supported these goals and brought DLA to a point where it is able to declare soil remediation is complete. Groundwater remediation continues, but the plumes are a fraction of their original size, requiring substantially less effort to control and money to remediate.

<u>Summary of Accomplishments for FY2024 & FY2025 (1 Oct 2023 – 30 Sept 2025)</u>

The DDJC IRP achieved the major milestone of closing out the last active soil remedy at the Depot and positioned the groundwater cleanup for closure, which is expected within the coming decade. Additionally, DLA continues to reduce requirements for long-term monitoring, resulting in cost savings and the return to

mission for those areas.

To provide perspective in context of the entire cleanup program, it should be noted that DLA has been on an expedited cleanup track at DDJC since 2010. That year, the catalyst for accelerated cleanup was EPA placing the site on a listing to achieve Construction Complete within two years. Seemingly impossible at the time due to a need for design and construction of three additional remedial actions and two additional decision documents, DLA scrutinized the program and developed an aggressive schedule that achieved the Construction Complete milestone.

The momentum from this effort has carried into DLA's planning and execution all the way to the present. The need for teamwork and collaboration among DLA, their contractors, regulatory agencies, and the community paved the way for continuing along a route of completing milestones and realizing cleanup completion.

Closing Out Active Soil Remediation, Enhancing DLA's Ability to Perform Their Mission

Going into the achievement period, DLA was actively remediating soil at one remaining location, Area 3. This location historically was used for outdoor drum storage, and spills may have occurred from leaking stored drums and/or accidents in the handling of the stored drums. The area is mainly flat, paved with asphalt, and is used for truck trailers and equipment laydown and storage. The remedy for Area 3 was SVE.

Full-scale SVE started in June 2001 and the SVE system operated periodically until June 2023. In 2015 and again in 2021, DLA enhanced the effectiveness of the SVE remedy by employing the innovative technology of pneumatic fracturing of vadose zone soils to increase the permeability of the clayey soils and enhance the air flow and reach of the SVE well network. During pneumatic fracturing, high pressure gas was injected into the subsurface creating a "spider-web" of fractures throughout the subsurface. The vacuum induced by the SVE system could then more effectively extract the contaminated soil vapor through the subsurface fractures. DLA optimized the SVE using pneumatic fracturing and focused SVE on a smaller area to treat the contamination hot spots more aggressively.

The Area 3 SVE system was shut down in June 2023 for rebound monitoring during 2023–2024. This was done to evaluate the efficacy of the SVE and reduction of VOC concentrations within the soil vapor. During the 10-month rebound monitoring period, the Area 3 SVE system remained off. The results from sampling and analyses during the rebound monitoring period showed that DLA's optimization strategy achieved the cleanup levels. VOC concentrations remained less than the cleanup levels at all locations, except one, where one sample result in the middle of the rebound period was over the cleanup level. DLA concluded that the result indicated that the residual VOCs were localized, and the increase was temporary and would not persist.

LUCs are maintained at Area 3 following completion of SVE.

The cleanup levels for Area 3 were developed to protect groundwater. The challenge at Area 3 was that vadose-zone soils are primarily clay that is approximately 23 feet thick, and are variably interbedded with silt and some localized, sand horizons. The low-permeability deposits slow VOC migration to groundwater; however, they also restrict SVE's ability to mobilize and remove contamination. Residual VOCs were sorbed to fine-grained soil in Area 3 and continued to diffuse into soil vapor. By focusing SVE on areas where higher VOC concentrations remained and employing the innovative pneumatic fracturing process, DLA was able to reach the residual contamination.

DLA's contractor prepared a Remedial Action Completion Report (RACR). The RACR used the SVE's rebound monitoring results, along

with groundwater results from wells within and downgradient from Area 3, to demonstrate that the vadose-zone cleanup standards have been achieved. The conclusion of the RACR was that restarting the SVE system was unwarranted, and the groundwater protection remedial action objective was achieved. As noted earlier, the cleanup levels were for protection of groundwater quality. The remaining VOC concentrations met the cleanup levels but were greater than levels protective of human health. DLA manages the residual risk to human health through LUCs that restrict how the area can be used and require that any future building be built with measures that protect future occupants from breathing vapors originating in the subsurface at Area 3. DLA has no plans to build within Area 3 and will continue to use the area for truck trailers and equipment laydown and storage.

EPA and the State agencies approved the RACR and EPA issued a letter that approved the completion of the SVE remedial action. In March 2025, the SVE's underground infrastructure was decommissioned, and the above ground equipment was removed. The system decommissioning returned Area 3 to full use by DLA, enhancing DDJC's ability to perform the mission to receive, store, and ship military supplies and equipment as the Department of War's primary western strategic distribution hub.

Extraction well redevelopment and rehabilitation have been key to maintaining the performance of the groundwater remedy.

Positioning to End the Groundwater Cleanup

During the achievement period, optimization of the groundwater remedy, including monitoring, extraction, and treatment components, has been ongoing as concentrations of the contaminants of concern (COC) (trichloroethene [TCE], tetrachloroethene, and the pesticide dieldrin) continue to decrease and plumes are reduced in size. Implementation of the groundwater remedy has been so successful in reducing COC concentrations that the majority of extraction wells were shut down before FY2024. During the achievement period, DLA decommissioned three extraction wells, in addition to seven monitoring wells no longer needed to evaluate the performance of the groundwater remedy. Decommissioning of wells reduces DLA's environmental liabilities, as well as restores land for mission use, in addition to allowing DLA to salvage and reuse parts.

DLA's contractor has proactively maintained extraction well performance to improve contaminant mass reduction and retain plume capture. The extraction wells are periodically redeveloped as their flow rates are found to decline, which is a continual issue for DDJC because the fine-grained nature of the aquifer system leads to well filter packs clogging with fine materials. Recently, two of the extraction wells were found to have developed fouling issues caused by iron-reducing bacteria, which led to a well disinfection program to return the wells to their prior performance.

DLA's contractor also upgraded components of the groundwater treatment plant to maintain the plant's uptime. This included doubling filtration capacity for water that accumulated in the treatment pad. In addition, a containment alarm and shut off to the power and control panel area were added to improve worker safety in wet conditions. Proactive maintenance and upgrades to the extraction wells and treatment plant extend the life of the extraction and treatment systems, improve reliability, and reduce replacement costs.

These maintenance efforts coincide with DLA's optimization of the groundwater remedy within the downgradient TCE plume within the eastern part of the Annex and extending offsite. In 2025, two extraction wells were installed and connected to the treatment infrastructure. The purpose of the wells is to optimize the groundwater remedy by improving the TCE contaminant capture in the Middle Hydrologic Zone and reduce the contaminant cleanup time.

The TCE plume in the eastern part of the Annex extends offsite into cherry and almond orchards. Banta Road separates the orchards from DDJC's Annex. Banta Road also separates different groundwater remedies. The remedy west of Banta Road, within the Annex, is groundwater extraction and treatment. The remedy east of Banta Road is dispersion (natural attenuation). The timeframe for the dispersion remedy was set at 30 years (1995 to 2025) in various decision documents. Based on monitoring data, the remedial action objective to remediate TCE concentrations to the cleanup level was met, except possibly for a small area immediately east of Banta Road. The well data demonstrated the effectiveness of the dispersion remedy. However, TCE concentrations had been consistently less than the cleanup level for only 2 to 4 years and additional time was needed to demonstrate the efficacy of the remedy. Therefore, the December 2024 Memorandum to the Site File was prepared to extend the dispersion remedy an additional 10 years, from 2025 to 2035. In addition, extraction of the TCE plume west of Banta Road has been ongoing since 1999 and is expected to continue for 3 to 5 more years with installation of the new extraction wells that extend to contamination deeper than the previously existing wells were able to reach. Therefore, until the extraction and treatment remedy west of Banta Road is completed, monitoring the effectiveness of the dispersion remedy still is needed to confirm that TCE concentrations remain less than the cleanup level at the wells east of Banta Road. Continuing the dispersion remedy is cost effective, as the cost is only groundwater monitoring, rather than the cost to design, construct, and operate a treatment remedy. In addition, the dispersion remedy has a more "green' and sustainable approach.

Remedial action enhancements have resulted in a cost avoidance of more than $20 million and nearly 30 years of treatment system operations and monitoring.

Innovative Techniques

DLA has employed a number of innovative techniques over the years to pilot test evolving technologies and determine the best methods of environmental cleanup. The most effective technique has continued to be the use of pneumatic fracturing for improving effectiveness of SVE systems. Area 3 pneumatic fracturing provided a long-term success for the SVE system. After completion of the fracturing, DLA was able to remove critical mass of the contamination that resulted in the cleanup levels being met. This represents ending the last active soil cleanup process at DDJC. DLA is now able to move forward with evaluating the applicability of de-listing from the NPL.

DLA is further committed to ensuring selected remedies are incorporating "green" remediation components. We have consistently recycled system components such as reusing two extraction well vaults from decommissioned wells for the two extraction wells installed in 2025. Additionally, DLA has been annually committed to shutting down operations and decommissioning monitoring wells no longer required for plume management. The reduction in the active extraction network has resulted in reducing pumped and treated groundwater from a high of 700 gallons per minute (gpm) to the present rate of 75 gpm, resulting in a net energy savings as well as a reduction in carbon emissions.

Distinction from Past Success

As mentioned above, never before has DLA been able to say "complete" to active soil remediation. Success in this achievement period has brought DLA to a point of potential de-listing from the NPL, which was the ultimate goal in 1990 when DDJC was first listed on the NPL. This milestone would not have been possible without the strong management of the program by DLA, the collaboration between DLA, regulatory agencies, and contractor teams, and the technical success realized through innovative techniques and contaminant fate and transport knowledge. It is truly a success worthy of recognition.

Orientation to Mission

DLA has focused the restoration program on achieving protectiveness of human health and the environment without disruption to the mission. All cleanup strategies consider the ongoing and future anticipated use of the site and environmental liabilities and impacts in accordance with DLA's Strategic Plan.