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Annual Plume Status Report

California Institution for Men Plume
October 2023

CONTAMINANTS

The primary contaminant is tetrachloroethene (PCE). The California maximum contaminant level (MCL) for PCE is 5 micrograms per liter (µgl). The highest concentration of PCE measured historically within the plume is approximately 1,990 µgl.[1] Other contaminants of concern include the following volatile organic compounds (VOCs): trichloroethene (TCE), 1,2-dichloroethene, bromodichloromethane, 1,1,1-trichloroethane, carbon tetrachloride, chloroform, and toluene.

LOCATION

The California Institution for Men (CIM) is a state correctional facility located in the City of Chino. The property is approximately 1,500 acres and is bounded by Eucalyptus Avenue to the north, Euclid Avenue to the east, Kimball Avenue to the south, and Central Avenue to the west. The plume is located predominantly beneath the northwestern portion of the CIM property. Exhibit 1 shows the spatial extent of the PCE plume, as delineated by the Chino Basin Watermaster (Watermaster) in the *2022 State of the Basin Report*.[2] The extent of the plume with detectable PCE concentrations greater than 0.5 µgl is about 4,000 feet long and 3,000 feet wide.

SITE HISTORY

The State of California Department of Corrections and Rehabilitation (State) has operated CIM since 1939. The primary uses of the CIM property include agricultural operations, inmate housing, and correctional facilities. The Heman G. Stark Youth Correctional Facility (Youth Correctional Facility) occupies the eastern portion of the CIM property. There are eleven drinking water supply wells located on the CIM property; six of these wells are actively producing groundwater as of 2023. The CIM operates the drinking water supply wells, a potable water distribution system, and a treatment plant to provide drinking water supply to the CIM facilities, Youth Correctional Facility, and the California Institution for Women. The land surrounding the CIM property was historically used for agriculture and dairy activities but has rapidly developed in recent years for residential and commercial uses.

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[1] Based on a water quality sample collected at MW-7 in 1998.

[2] West Yost. (2023). *Chino Basin Optimum Basin Management Program-2022 State of the Basin Report*. Prepared for the Chino Basin Watermaster. June 2023.

REGULATORY ORDERS

No regulatory orders for site remediation and monitoring were issued by the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) for PCE contamination. The State conducted voluntary cleanup and monitoring under the Santa Ana Water Board's direction from 1992 to 2009. On December 17, 2009, the Santa Ana Water Board determined "No Further Action" was required for remediation and monitoring.

Unrelated to the PCE contamination, there are three leaking underground storage tank (LUST) cleanup sites located on the CIM property that are regulated under the State Water Resources Control Board (State Board) Underground Storage Tank (UST) program. The UST program directs Regional Water Boards to implement a monitoring plan and oversee site closures under the State Board's Low Threat Closure Policy (LTCP). There are no regulatory orders for groundwater remediation or monitoring at the CIM LUST sites. Two of the three sites met the requirements for site closure under the LTCP and were closed by the State Board in 2006. The remaining LUST site is the CIM State Garage LUST, which is currently open with ongoing monitoring and remediation for petroleum hydrocarbons. The CIM State Garage LUST is included in Exhibit 1.

REGULATORY AND MONITORING HISTORY

In 1990, PCE was detected at a concentration of 26 µgl at CIM drinking water supply Well 1. This prompted the California Department of Health Services (CDHS), now the California State Board Division of Drinking Water (DDW), to direct CIM to stop using the well as a source of drinking water. The detection of PCE concentrations in two other CIM drinking water supply wells (1A and 11A) triggered the Santa Ana Water Board to request an investigation of the source and extent of the onsite PCE contamination. Following an initial investigation, the Santa Ana Water Board sent the State a written request to perform a subsurface investigation to define the vertical and lateral extent of PCE in soil at four locations where PCE was detected in soil vapor samples during the investigation.

The Phase I Site Assessment was performed at the CIM site in 1992, and included a review of CIM's history, operations, and chemical use.[3] The investigation identified five potential sites where VOCs were used and could have impacted soil and groundwater. These areas included: the old laundry building, the furniture factory, the vocational shops, the state garage, and the powerhouse.

The Phase II Site Assessment was performed from 1992 to 1994 to assess the presence and concentrations of VOCs in soil vapor, soil, and groundwater beneath the five potential sites identified in Phase I.[4] Seven groundwater monitoring wells were installed and sampled as part of this investigation. The results from the soil and the groundwater investigations showed low concentrations of contaminants throughout the site, with concentrations of PCE in groundwater samples from monitoring wells ranging from 0.6 to 19 µgl. The old laundry facility and nearby areas had the highest concentration of PCE in soil samples and was thus identified as the most likely principal source of VOCs. A Phase III assessment was performed in 1996 to further investigate the distributions of VOC contamination beneath the CIM and included depth

[3] Geomatrix Consultants, Inc. (1992). *Report of Phase I Investigation, VOCs in Soil and Groundwater, Department of Corrections California Institution for Men, Chino*. April 20, 1992.

[4] Geomatrix Consultants, Inc. (1994). *Phase II Assessment of VOCs in Soil and Groundwater, California Institution for Men Chino, California.* Prepared for the Department of General Services Development and Management. October 4, 1994.

discrete groundwater sampling at four exploratory boreholes. The investigation showed three distinct aquifer zones below the CIM, and PCE and other VOCs were migrating laterally from the shallow zone to the intermediate and deep zones where the drinking water supply wells are screened.[5] Between August 1994 and May 2001, a network of 43 monitoring wells at varying depths in the shallow, intermediate, and deep aquifer zones were constructed.

In 1997, the Santa Ana Water Board approved an interim pump-and-treat system for the hydraulic containment of VOC-affected groundwater using Well 1. In 2001, construction began on two new CIM water supply wells (Wells 14 and 15) and associated pipelines to prevent VOC-impacted groundwater at the southern end of the plume from migrating away from the site. Additionally, two agricultural wells were destroyed to protect the deeper aquifer from the downward movement of VOC contaminated groundwater due to pumping.

The 43 monitoring wells were sampled intermittently through 2007 to analyze the extent and concentrations of VOCs in the groundwater beneath the CIM property. It was determined that the VOC impacts to groundwater were limited to the source area and immediately downgradient. Furthermore, the plume had not and was not expected to migrate off the property. A final monitoring event was conducted by the State in January 2007, which included groundwater quality sampling at 39 water supply and monitoring wells at the CIM property.[6] The results of this and previous monitoring events indicated that despite the PCE concentrations exceeding the MCL at three monitoring wells, PCE concentrations in the shallow groundwater were decreasing or remaining stable. PCE concentrations in the deeper aquifer at the CIM drinking water supply wells had been below the MCL since April 2003 with a few exceptions in early/mid 2006. Moreover, there had been no detections of TCE or other VOCs above the MCL in groundwater samples since December 2002. Based on this monitoring through 2007, in February 2007 the State submitted a request to the Santa Ana Water Board for a No Further Action (NFA) finding for groundwater remediation and monitoring at the CIM site. On December 17, 2009, the Santa Ana Water Board issued a determination of NFA for the CIM site.[7]

In March 2019, the Santa Ana Water Board formally rejected the State's request for closure of the State Garage LUST site located northwest of the CIM drinking water supply Well 1A within the center of the PCE plume, and requested further assessment to determine if fuel-related contaminants beneath the site could impact downgradient Well 1A.[8] An investigation was completed in May 2020 and a report on the monitoring and findings was submitted to the Santa Ana Water Board in July 2020.[9] The investigation concluded that: (1) fuel-related contaminants have decreased several orders of magnitude in the perched aquifer below the State Garage LUST site; and (2) the downgradient extent of the dissolved total petroleum hydrocarbon plume from the site is not migrating and has not impacted the CIM water supply Well 1A. However, the findings indicated that gasoline residue remains in the soil downgradient of the

[5] Geomatrix Consultants, Inc. (1997). *Phase III Groundwater Assessment and Remediation Planning Report, California Institution for Men, Chino*. July 21, 1997.

[6] Geomatrix Consultants, Inc. (2007). *January 2007 Groundwater Monitoring PCE Remediation Project California Institution for Men Chino*, *California*. Prepared for the Department of General Services Real Estate Services Division Project Management Branch. May 17, 2007.

[7] California Regional Water Quality Control Board, Santa Ana Region (2009). *Determination of No Further Action (NFA), Tetrachloroethylene Remediation Project, California Institution for Men, Chino*. December 17, 2009.

[8] California Regional Water Quality Control Board, Santa Ana Region. (2019*). Response to Soil Vapor Investigation and Path to Closure, California Institution for Men, Garage*. March 8, 2019.

[9] Avocet Environmental, Inc. (2020). *2020 Annual Groundwater Monitoring and Additional Investigations Report California Institution for Men – State Garage*. July 29, 2020.

source area. Results from the annual groundwater monitoring event in May 2021 indicated that fuel-related contaminants have decreased, and the plume is not migrating or impacting Well 1A.[10] Due to these findings, the State recommended the State Garage LUST site for closure under the LTCP in August 2021, and there has been not action on this since.

REMEDIAL ACTION

In July 1997, the State implemented remediation activities, termed *The PCE Remediation Project,* with an interim remedial measure to pump and treat groundwater from Well 1.[11] The groundwater was treated for VOCs using air stripping. Operation of the air stripper continued until 2004, when the permeability of the air stripper packing was compromised by the accumulation of mineral precipitates. During its operation, the pump-and-treat process at Well 1 removed approximately 58 pounds of PCE and TCE collectively. After 2004, both PCE and TCE concentrations were below the MCL in groundwater extracted from Well 1, and pumping continued without treatment with approval from the CDHS and Santa Ana Water Board. A supplemental remedial measure began in 2001 which included the construction of two new CIM water supply wells (Well 14 and Well 15) located in an area to intercept the toe of the VOC plume, promoting hydraulic containment of the VOCs within the groundwater beneath CIM. Wells 14 and 15 operated without treatment from January 2003 to December 2008; during this time, these two wells removed an additional 14 pounds of PCE and TCE collectively.

The need for remedial action was considered to address elevated levels of PCE in the soil below the old laundry site, but it was determined that it would not be cost-effective in protecting the groundwater quality despite some potential contribution of PCE from the soil to groundwater beneath the site.

Remediation requirements at CIM ended in December 2009 with the Santa Ana Water Board's determination of NFA. Since then, PCE has been periodically detected at concentrations above the MCL at CIM supply Wells 1 and 15. Additionally, other contaminants have been detected above their respective MCLs, including 1,2,3-TCP and nitrate. CIM operates a water treatment plant to remove contaminants for drinking water supply.

MONITORING AND REPORTING

The State conducted voluntary monitoring at CIM from 1992 to 2007 at 43 monitoring wells and 14 water supply wells. Voluntary monitoring ended in December 2009 with the Santa Ana Water Board's determination of NFA. As part of the NFA, the State was required to decommission the monitoring wells located onsite in accordance with California Well Standards (DWR Bulletin No. 74-81). The State decommissioned a majority of these wells and preserved 16 wells to be included in the Watermaster's groundwater-level monitoring program conducted pursuant to the *Optimum Basin Management Program* (OBMP).[12] The location of these wells is included in Exhibit 1.

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[10] Avocet Environmental, Inc. (2021). *2021 Annual Groundwater Monitoring Report and Request for Closure.* Prepared for California Department of Corrections and Rehabilitation, FPCM – Environmental and Regulatory Compliance Section. August 17, 2021.

[11] Geomatrix Consultants, Inc. (2005). *PCE Remediation Project Report. California Institution for Men.* Prepared for the California Department of General Services. July 2005.

[12] Wildermuth Environmental, Inc. (1999). *Optimum Basin Management Program. Phase I Report*. Prepared for the Chino Basin Watermaster. August 19, 1999.

The CIM continues to monitor groundwater quality at its supply wells as part of its water supply operations under DDW regulations. The State samples the active drinking water supply wells for PCE and TCE monthly or bimonthly and reports the data to the DDW. Watermaster routinely collects all groundwater-quality data from the DDW's Water Quality Analyses Database for the CIM potable supply wells as part of the OBMP groundwater-quality monitoring program and uses these data to characterize the areal extent and concentration of the PCE plume every two years. [13]

RECENT ACTIVITY

There has been no further regulatory activity associated with PCE contamination monitoring and remediation at CIM since the NFA determination in December 2009.

The most recent characterization of the plume was completed by Watermaster in the *2022 State of the Basin Report* (Exhibit 1). Based on available data, the PCE plume has shown no significant change since the NFA determination.

The State has recently sampled its drinking water supply wells pursuant to the DDW regulation. Table 1 below summarizes the five-year maximum PCE concentration (July 2018 to June 2023) sampled at the CIM drinking water supply wells.

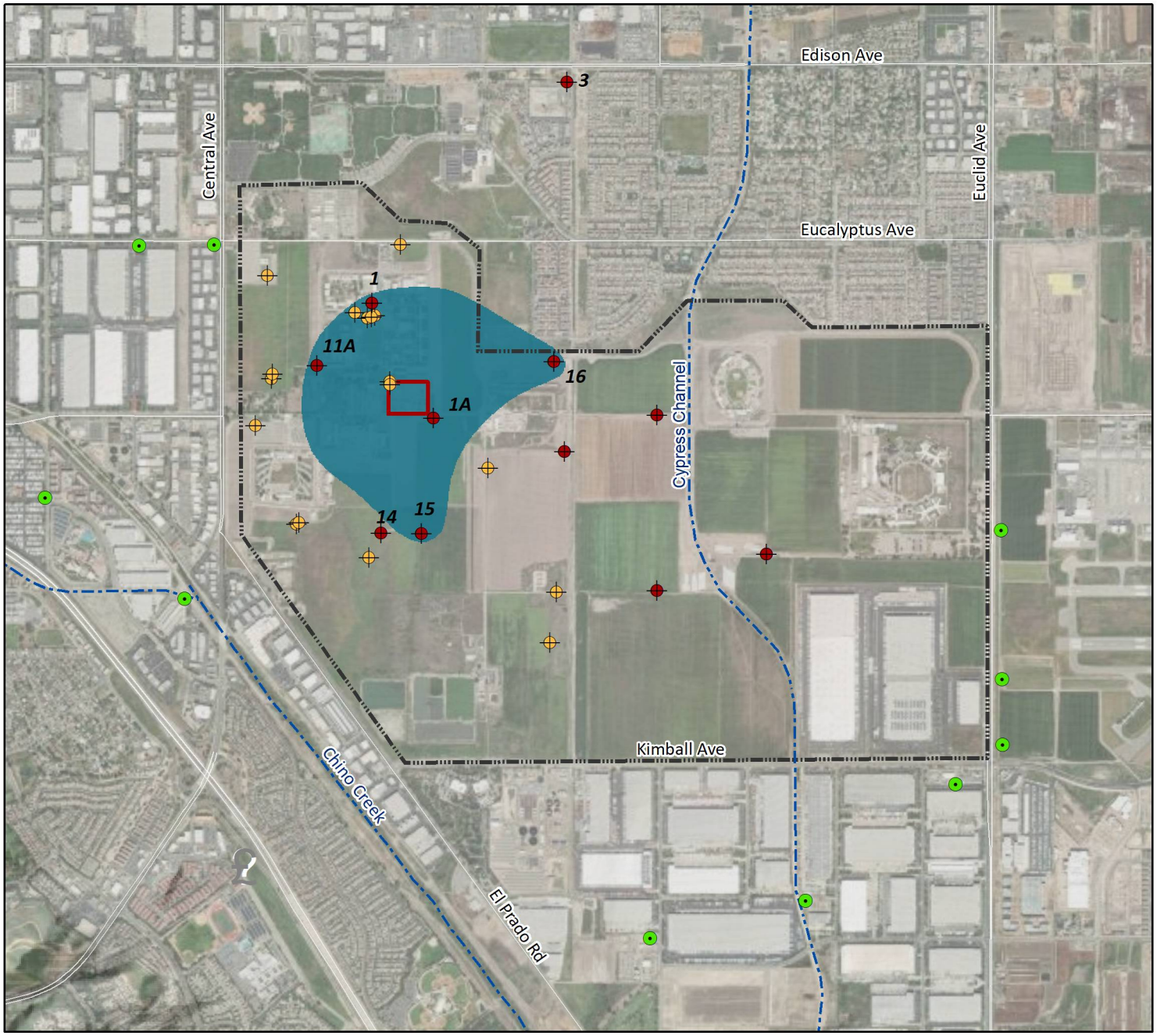
Table 1. Maximum PCE Concentration in CIM Supply Wells between July 2018 – June 2023

Well	Maximum PCE, µgl	Date
1	16	5/17/2023
1A	1.6	11/23/2022
3	ND (<0.5)	all samples during this period
11A	0.88	4/5/2023
15	2.39	5/1/2019
16	0.402	3/6/2019

In August 2021, the State recommended the closure of the CIM State Garage LUST site under the LTCP. [14] This recommendation is currently pending review by the Santa Ana Water Board. There has been no official response from the Santa Ana Water Board on this request.

[13] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/EDTlibrary.shtml

[14] Avocet Environmental, Inc. (2021). *2021 Annual Groundwater Monitoring Report and Request for Closure.* Prepared for California Department of Corrections and Rehabilitation, FPCM – Environmental and Regulatory Compliance Section. August 17, 2021.



Maximum Concentration (µgL)
July 2017 - June 2022

PCE

- ≤ 5
- > 5 to ≤ 10
- > 10 to ≤ 20

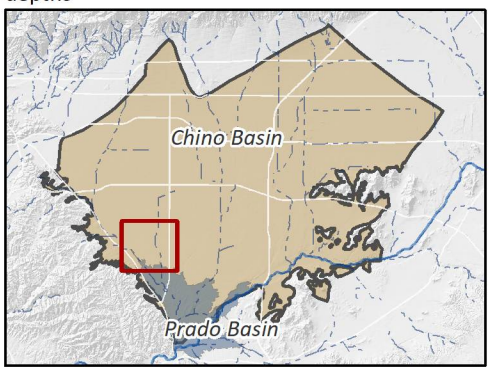
MCL = 5 µgl

(Delineated by Watermaster in the 2022 State of the Basin Report)

- CIM Water Supply Well*
- Other Agency Municipal Water Supply Well
- CIM Monitoring Well Preserved for the Watermaster Groundwater-Level Monitoring Program**
- CIM Property Boundary
- CIM State Garage LUST Boundary
- Streams & Flood Control Channels

*Wells are labeled by well name if mentioned in the report

**Some locations have mutliple wells at various depths



Prepared by:

WEST YOST

0 0.5 Miles

0 0.5 1 Km

Prepared for:

Chino Basin Watermaster
Annual Plume Report

California Institution for Men (CIM)
PCE Plume

Exhibit 1

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Annual Plume Status Report

General Electric Flatiron Plume
October 2023

CONTAMINANTS

The primary contaminant is trichloroethene (TCE). Other contaminants of concern include tetrachloroethylene (PCE), total chromium, and hexavalent chromium. For each of these contaminants, the table below list the California maximum contaminant level (MCL) and maximum concentrations detected in groundwater samples from wells within the plume over the last five years.

Table 1. Maximum Concentration of Contaminants of Concern between July 2018 to June 2023

Contaminant	MCL, micrograms per liter (µgl)	Max Concentration, µgl	Sample Date	Well
TCE	5	33,000 [(a)]	April 2021	MW-22A
PCE	5	5,800	July, 2020	MW-21
Total Chromium	50	5,930	February, 2023	MW-23A
Hexavalent Chromium	50[(b)]	7,000	February, 2023	MW-23A

Notes:

(a) This is the maximum TCE concentration ever measured at a monitoring well in the GE Flatiron plume.

(b) Currently, there is no MCL for hexavalent chromium. There was a California MCL of 10 µgl for hexavalent chromium that was invalidated in 2016. The MCL for total chromium of 50 µgl is currently used to regulate hexavalent chromium. The State Water Resources Control Board Division of Drinking Water is in the process of developing a new MCL for hexavalent chromium.

LOCATION

The General Electric (GE) Flatiron TCE plume is located in the northern Chino Basin within the City of Ontario; it extends south-southwest from the former GE Flatiron Facility, located at 234 East Main Street. The Chino Basin Watermaster (Watermaster) last updated its delineation of the extent of the plume in the *2022 State of the Basin Report*.[1] This characterization is based on the five-year maximum TCE concentration measured between July 2017 and June 2022. Exhibit 1 shows the location and extent of the TCE plume as delineated by Watermaster in 2022. The extent of the plume with TCE concentrations greater than 0.5 µgl measures approximately 0.6 miles wide and about 2.6 miles long.

[1] West Yost. (2023). *Optimum Basin Management Program – 2022 State of the Basin Report*. Prepared for the Chino Basin Watermaster. June 2023.

SITE HISTORY

GE manufactured clothes irons at the Flatiron Facility from the early 1900s to 1982. During World War II, the facility was also used to manufacture equipment to support the war effort for the U.S. War Department. In 1982, GE closed the facility and sold the property. Since then, ownership has changed several times; the property is currently owned by Ontario Business Park, LLC.

REGULATORY ORDERS

- Investigative Order No. 87-146—Requires the characterization of onsite conditions and groundwater beneath and downgradient of the GE Flatiron site using gas surveys, soil boring installation and sampling, and groundwater monitoring well installation and sampling.
- Waste Discharge Requirements (WDRs) and Monitoring and Reporting Programs (M&RPs) Order No. 95-62 and R8-2011-0019 (current)—General WDRs and M&RPs for the discharge of treated water from the pump-and-treat system.

REGULATORY AND MONITORING HISTORY

In 1987, groundwater-quality samples collected from an inactive City of Ontario production well downgradient of the Flatiron Facility had TCE and chromium concentrations above drinking water MCLs. This prompted the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) to request that GE prepare a Phase I investigation to determine if the Flatiron Facility was the source of the contaminants detected. The results of the Phase I investigation prompted the Santa Ana Water Board to issue Investigative Order No. 87-146, requiring GE and West End Investments (the property owner at the time) to characterize onsite conditions and the groundwater flow gradient beneath the Flatiron Facility. The Phase II through V investigations[2, 3, 4, 5] included soil gas surveys, soil boring installation and sampling, as well as groundwater monitoring well installation and sampling, to define the extent of contaminants in groundwater both on and offsite. These investigations conducted from 1987 to 1992 indicated a contaminant plume was present beneath and downgradient of the Flatiron Facility and showed that the TCE and total dissolved chromium concentrations in groundwater were above the California primary MCLs of 5 and 50 µgl, respectively.

In 1993, the results from the multi-phase investigations prompted the proposal of an interim remedial measure (IRM) for groundwater contamination. Local and regional-scale numerical groundwater models were constructed to provide a basis for the design of the IRM and were used to investigate the use of extraction wells to obtain hydraulic containment near the downgradient extent of the plume. In December

[2] Bechtel Environmental, Inc. (1989). *Phase II Soil and Groundwater Investigation, Former GE Flatiron Manufacturing, Ontario, California*. January 1989.

[3] Bechtel Environmental, Inc. (1990). *Phase III Investigation Report*, *Former GE Flatiron Manufacturing, Ontario, California*. August 1990.

[4] Geomatrix Consultants, Inc. and Beak Consultants Ltd. (1992). *Phase IV Investigation Report, 234 East Main Street and Vicinity, Ontario, California*. January 1992.

[5] Geomatrix Consultants, Inc. and Beak Consultants Ltd. (1993). *Phase V Investigation Report, 234 East Main Street and Vicinity, Ontario, California*. January 1993.

1993, extraction well EW-01 was completed. A monitoring well and three piezometers were also constructed nearby to provide observation points during aquifer testing at EW-01. The IRM began in 1996 and involved pumping groundwater from EW-01, treating it at GE Flatiron's groundwater treatment system to remove TCE and other contaminants of concern, and discharging the treated water to the Ely Basins for groundwater recharge. Discharge to the Ely Basins was regulated under WDR Order No. 95-62, issued by the Santa Ana Water Board.

In 1995, a feasibility study was completed to evaluate groundwater and soil remediation alternatives.[6] In October of 1997, the Santa Ana Water Board approved a groundwater remediation alternative that included the ongoing use of extraction well EW-01 and the construction of an additional extraction well (EW-02) near the center of the contaminant plume to pump and treat contaminated groundwater. Extraction well EW-02 was constructed in 1999 and began operation in 2002. In 2003, GE constructed a soil vapor extraction (SVE) system to remove VOC mass from impacted site soils. The system consisted of five SVE wells and a treatment system. It was completed and began operation in 2003.

Due to the Inland Empire Utilities Agency (IEUA) and Watermaster's increased use of the Ely Basins for storm, recycled, and imported water recharge, capacity eventually became insufficient for GE's discharge into the Ely Basins. In 2005, GE began evaluating alternative discharge options for its treated groundwater and decided to install an injection well field at 2025 South Bon View Avenue to accept the treated groundwater. In 2011, the Santa Ana Water Board approved WDR Order R8-2011-0019 to modify the point of discharge for the treated groundwater to injection wells located at this site.[7] The 2011 WDR defines the discharge prohibitions, effluent limitations, and required monitoring and reporting program.

In 2015, GE submitted a work plan to the Santa Ana Water Board to outline a program for evaluating the effectiveness of existing remedial measures and to provide recommendations for additional investigation or remediation.[8] Implementation of the work plan began in 2016 with the drilling of four borings to collect discrete-depth soil and groundwater samples, which were tested for TCE, PCE, total dissolved chromium, and hexavalent chromium.

From May 2016 to March 2017, four additional monitoring well clusters (MW-21 through MW-24) were constructed at the upgradient end of the plume as part of the supplemental remedial investigation activities. Since monitoring began at these well, the highest concentrations of PCE, TCE, total dissolved chromium, and hexavalent chromium associated with the plume are detected at these wells (specifically, MW-21 through MW-23).

In 2016, the Santa Ana Water Board required the development of a conceptual site model that incorporated all historical data, as well as new information from recent investigations. This model was to

[6] Geomatrix Consultants, Inc. (1995). *Feasibility Study Report, 234 East Main Street and Vicinity, Ontario, California*. November 1995.

[7] Santa Ana Regional Water Quality Control Board. (2011). *Issuance of Waste Discharge Requirements for General Electric Company, GE Francis Water Treatment Plant*, *San Bernardino County, Order No. R8-2011-0019*. April 22, 2011.

[8] Amec Foster Wheeler. (2015). *Work Plan for Supplemental Remedial Investigation*, *234 East Main Street and Vicinity, Ontario California*. Prepared for General Electric Company. March 30, 2015.

be used to develop a framework to identify data gaps and guide future decisions on investigation, monitoring, and remedial actions.[9]

One critical component of the conceptual site model, as highlighted by the Santa Ana Water Board, was the installation of a sentinel monitoring well downgradient of the plume. On June 22, 2016, a work plan was submitted to the Santa Ana Water Board, defining the plan and schedule to construct a new-multi-depth well cluster (MW-19) to further assess the dissolved-phase chromium and VOC concentrations downgradient of the known plume extent.[10] The first sampling event at well cluster MW-19 in January 2017 indicated that TCE concentrations in the shallow casing were greater than the MCL. This finding prompted the Santa Ana Water Board to request that an additional monitoring well cluster be constructed downgradient of MW-19 and upgradient of the City of Chino's municipal production well (Chino-11) to allow for further evaluation of the plume's extent. On November 14, 2016, GE submitted a work plan for the construction of well cluster MW-20, to be located about 420 feet upgradient from Chino-11, and by May 2017, construction was complete.[11] The first sampling event at well cluster MW-20 in July 2017 indicated that TCE in the intermediate-depth casing (MW-20B) was greater than the MCL.

In July 2021, the City of Chino wrote a letter to the Santa Ana Water Board to request information on the migration and remediation of the GE Flatiron plume and to investigate whether Chino-11 directly downgradient of the plume, is or will be impacted by the plume. The State of California Division of Drinking Water's (DDW) recommended Chino-11 be sampled for TCE and PCE that potentially migrated from the Flatiron plume to the well. The results yielded concentrations of TCE above the MCL. The Santa Ana Water Board responded to the City of Chino in October 2021, acknowledging that the current extraction well network in the GE Flatiron plume does not adequately address the migration of the plume, and that the TCE contamination in the plume is likely from the migration of the GE Flatiron plume.[12] The Santa Ana Water Board requested that GE install an additional monitoring well cluster downgradient of Chino-11 to further delineate the extent of the plume, and asked that it be constructed before the proposed start-up of Chino-11 since operating the well could complicate the investigation and possibly move the plume into deeper zones. On August 30, 2021, GE submitted a *Work Plan for Groundwater Investigation Downgradient of Chino-11 and Engineering Studies for Installation of Groundwater Extraction Well EW-03* to the Santa Ana Water Board. The objectives of the work plan were to evaluate whether the site-related plume of TCE and hexavalent chromium extends to the area downgradient of Chino-11 with the construction of a new well cluster and to determine the optimum location for an anticipated third extraction well in the area between wells EW-01 and EW-02.[13]

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[9] Amec Foster Wheeler. (2016). *2016 Conceptual Site Model*, *Former General Electric Company Housewares Site 234 East Main Street, Ontario, California*. Prepared for General Electric Company. October 4, 2016.

[10] Amec Forster Wheeler. (2016). *Work Plan for Installation of Cross-Gradient Monitoring Well Clusters, General Electric Company Former Flatiron Facility*. Prepared for General Electric Company. August 15, 2016.

[11] Amec Forster Wheeler. (2016). *Work Plan for Installation of Additional Sentinel Monitoring Well* Cluster, General Electric Company Former Flatiron Facility. Prepared for General Electric Company. November 14, 2016.

[12] Santa Ana Water Board. (2021). Response to the City of Chino's Letter regarding General Electric Flatiron Contaminant Plume for GE Flatiron. Letter dated October 18, 2021.

[13] Wood Environment & Infrastructure Solutions, Inc. (2021). *Work Plan for Groundwater Investigation. Downgradient of Chino 11 and Engineering Studies for Installation of Groundwater Extraction Well EW-03*. Prepared for General Electric Company. August 30, 2021.

In September 2022 GE submitted a *Technical Report for Groundwater Investigation Downgradient of Chino 11* with results from the work done to investigate the presence of VOCs downgradient of Chino-11, as described in work plan.[14] GE installed well cluster MW-25 with three discrete-depth monitoring wells (A, B, C). PCE was not detected in any groundwater samples, TCE was detected only in MW-25C at a concentration of 3.8 µgl and hexavalent chromium was detected in all three wells at concentrations of 9.8-13 µgl. These values are similar to historical concentrations in monitoring wells upgradient of the GE Flatiron site.

REMEDIAL ACTION

Groundwater

In 1996, GE began operation of a groundwater treatment system located at 501 West Francis Street in Ontario, CA. Its two extraction wells (EW-01 and EW-02) began operating in 1996 and 2002, respectively, and are intended to prevent migration of the plume. EW-01 pumps at an approximate rate of 850 gallons per minute (gpm), and EW-02 pumps at a rate of approximately 600 gpm, although the rate at EW-01 is often reduced due to low groundwater levels. Groundwater pumped from the extraction wells is conveyed by separate pipelines to the treatment system where it is combined into a single stream and treated. Pumped groundwater is first treated with an ion exchange resin, which removes chromium, and then with liquid-phase granular activated carbon to remove VOCs. As detailed in WDR Order No. R8-2011-0019, the discharge from the treatment system facility is required to have average monthly concentrations of TCE, PCE, 1,1,1-TCA, and chromium below their respective MCLs of 5, 5, 200, and 50 µgl. Currently, three injection wells (IW-01, IW-02, and IW-03) are used to inject treated water into the Chino Basin. Exhibit 1 shows the locations of the extraction wells, the treatment system facility, and the injection well field.

As of August 2023, EW-01 and EW-02 had extracted about 16,340 acre-feet and 5,147 acre-feet of groundwater, respectively.[15] Collectively, the treatment system has removed approximately 13,485 pounds of TCE and 4,396 pounds of chromium.[16]

Soil

In 2003, in accordance with the *Draft Remedial Action Plan*, GE began operating a soil vapor extraction (SVE) system (SVE1) on the east side of the property to treat TCE and PCE in the soil, as well as 1,1,1-trichlorethane and 1,1,2-trichlorethane.[17,18] The SVE system consisted of five onsite soil vapor extraction wells, which extracted VOC impacted vapors from the shallow soils. In 2007, GE constructed three

[14] Wood Environment & Infrastructure Solutions, Inc. (2022). *Technical Report for Groundwater Investigation Downgradient of Chino 11*. Prepared for General Electric Company. September 1, 2022.

[15] Wood Environment & Infrastructure Solutions, Inc. (2022) *GE Flatiron Facility Treatment System Summary – August 2022.* August 30, 2022 email from Paul Deutsch to Santa Ana Water Board.

[16] WSP USA Environment and Infrastructure Inc. WSP (2023). First Half 2023 Groundwater Monitoring and Remediation Report. Prepared for General Electric Company. July 24, 2023.

[17] Geomatrix. (2002). *Draft Remedial Action Plan*. August 2002.

[18] Geomatrix. (2003). *SVE Implementation Report*. July 2003.

additional SVE wells, which were later connected to the system.[19] There are currently six SVE wells connected to the system, and in total, SVE1 has removed 49,458 pounds of VOCs.[20] On June 21, 2018, GE submitted its *Work Plan for Interim Measures – Phase I Expansion* to the Santa Ana Water Board for an expansion of the SVE system to reduce potential migration of soil vapor off site and to groundwater.[21] Between 2019 and 2020, GE expanded the treatment system to include two additional SVE systems (SVE2 and SVE3) and installed three nested deep SVE wells and three shallow SVE wells on the west side of the property. GE also converted three deep soil vapor probes to nested SVE wells and connected them to the system. On April 8, 2021, following the installation of the new SVE wells, GE submitted the *Implementation of the Phase I Expansion of the Interim Measures* summarizing the work performed.[22] From November 2020 when the system began operation through June 2023 the SVE2 system has removed approximately 80,517 pounds of VOCs.[23]

Monitoring and Reporting

The monitoring and reporting program for the GE Flatiron site includes both plume and remediation system monitoring and reporting. The objectives of the respective programs are to monitor groundwater elevations and the concentrations of the plume over time and to track and evaluate the performance of the remediation system.

The plume monitoring and reporting includes measuring groundwater levels and collecting groundwater-quality samples for chemical analyses from monitoring wells at a quarterly frequency. Currently, depth to groundwater is measured at 36 wells and three piezometers every quarter. Groundwater-quality samples are also collected from 36 monitoring wells and three piezometers, although the number of wells sampled each quarter varies based on the specific quarter's monitoring plan. Water-quality samples are analyzed for dissolved metals, VOCs, and general minerals. Reports summarizing the results of the GE Flatiron groundwater monitoring are published semiannually in January and July.

The remediation system monitoring and reporting consists of the monitoring for the operations for both the groundwater and SVE treatment systems. For the groundwater treatment system, at a minimum, monthly sampling and analysis of the influent to the treatment plant from EW-01 and EW-02 and treated effluent is performed pursuant to WDR Order No. R8-2011-0019. The results from the treatment system monitoring are included in the semiannual reports for the groundwater monitoring. Additionally, monthly

[19] Arcadis U.S., Inc. (2007). *Soil Vapor Extraction System Modification Workplan, General Electric (GE) Flatiron Facility*, *234 E. Main Street, Ontario, CA*. Letter to General Electric Company. August 21, 2007.

[22] WSP USA Environment and Infrastructure Inc. (2023). *Second Quarter 2023 Eastside Shallow Soil Vapor Extraction System Operation, Maintenance, and Monitoring Status Report.* Prepared for General Electric Company. July 24, 2023.[21] Wood Environment & Infrastructure Solutions, Inc. (2018). *Work Plan for Interim Measures – Phase I Expansion*. June 21, 2018.

[21] Wood Environment & Infrastructure Solutions, Inc. (2018). *Work Plan for Interim Measures – Phase I Expansion*. June 21, 2018.

[22] Wood Environment & Infrastructure Solutions, Inc. (2021). *Implementation of the Phase I Expansion of the Interim Measures, General Electric Company Flatiron Facility, 234 East Main Street and Vicinity, Ontario, California*. Prepared for General Electric Company. April 8, 2021.

[23] WSP USA Environment and Infrastructure Inc. (2023). *November 2020 Through Second Quarter 2023 Operation Report, Soil Vapor Extraction System 2.* Prepared for General Electric Company. July 25, 2023.

reports are submitted to the Santa Ana Water Board on the groundwater treatment system operations and compliance for WDR Order No. R8-2011-0019.

For the SVE treatment system, monitoring activities occur both weekly and monthly, and reporting activities occur quarterly in compliance with the Sampling and Monitoring Plan.[24] Additionally, indoor air sampling is conducted on a semiannual basis. Overtime, the monitoring has demonstrated that vapor mitigation measures are effective at controlling vapor intrusion.

All semiannual and monthly reports, and other relevant documents/data, can be found on the State Water Resources Control Board GeoTracker website.[25]

RECENT ACTIVITY

The most recent groundwater monitoring report prepared by GE is the *First Half 2023 Groundwater Monitoring and Remediation Report*.[26] This report summarizes groundwater monitoring at 36 wells and three piezometers, as well as the remediation activities performed between January 1 and June 30, 2023. First quarter groundwater elevation measurements and groundwater samples were collected in February 2023 and second quarter groundwater elevation measurements and groundwater samples were collected in April 2023. The following describes the key findings presented in the report:

- Groundwater flow trended generally towards the south-southwest. Groundwater elevations generally increased from the second half of the 2022 through the first half of 2023.
- Concentrations of all four contaminants of concern remain stable and consistent with historical values.
- MW-22A had the highest concentrations of TCE and PCE (19,000 and 1,100 µgl, respectively).
- MW-23A had the highest concentration of chromium and hexavalent chromium (5,930 and 7,000 µgl, respectively). This is also the highest concentration of hexavalent chromium ever measured at the plume.
- Overall, the highest concentrations of TCE, PCE, total chromium, and hexavalent chromium continue to be detected at onsite wells at the north end of the plume (MW-21 through MW-23).
- In both quarters, TCE and chromium concentrations were below the MCL in wells downgradient of EW-01.
- Approximately 250 acre-feet of groundwater from EW-01 and 177 acre-feet of groundwater from EW-02 were treated and discharged to the Bon View injection well field, removing approximately:
    - 64 pounds of TCE and 23 pounds of total chromium from EW-01
    - 421 pounds of TCE and 73 pounds of total chromium from EW-02

[24] Geomatrix. (2002). *Sampling and Monitoring Plan*. Prepared for General Electric Company. 2002.

[25] https://geotracker.waterboards.ca.gov/profile_report?global_id=SL0607132486

[26] WSP USA Environment and Infrastructure Inc. (2023). *First Half 2023 Groundwater Monitoring and Remediation Report.* Prepared for General Electric Company. July 24, 2023.

On November 10, 2022 GE submitted a *Basis of Design for Well EW-03* to increase groundwater extraction and extend the lifespan of EW-01 and EW-02.[27] The proposed location of EW-03 is shown in Exhibit 1. The plan includes installing a pilot boring near the proposed well location to determine the information necessary to design the well and associated pipeline, as well as evaluate impacts on EW-02 pump performance.

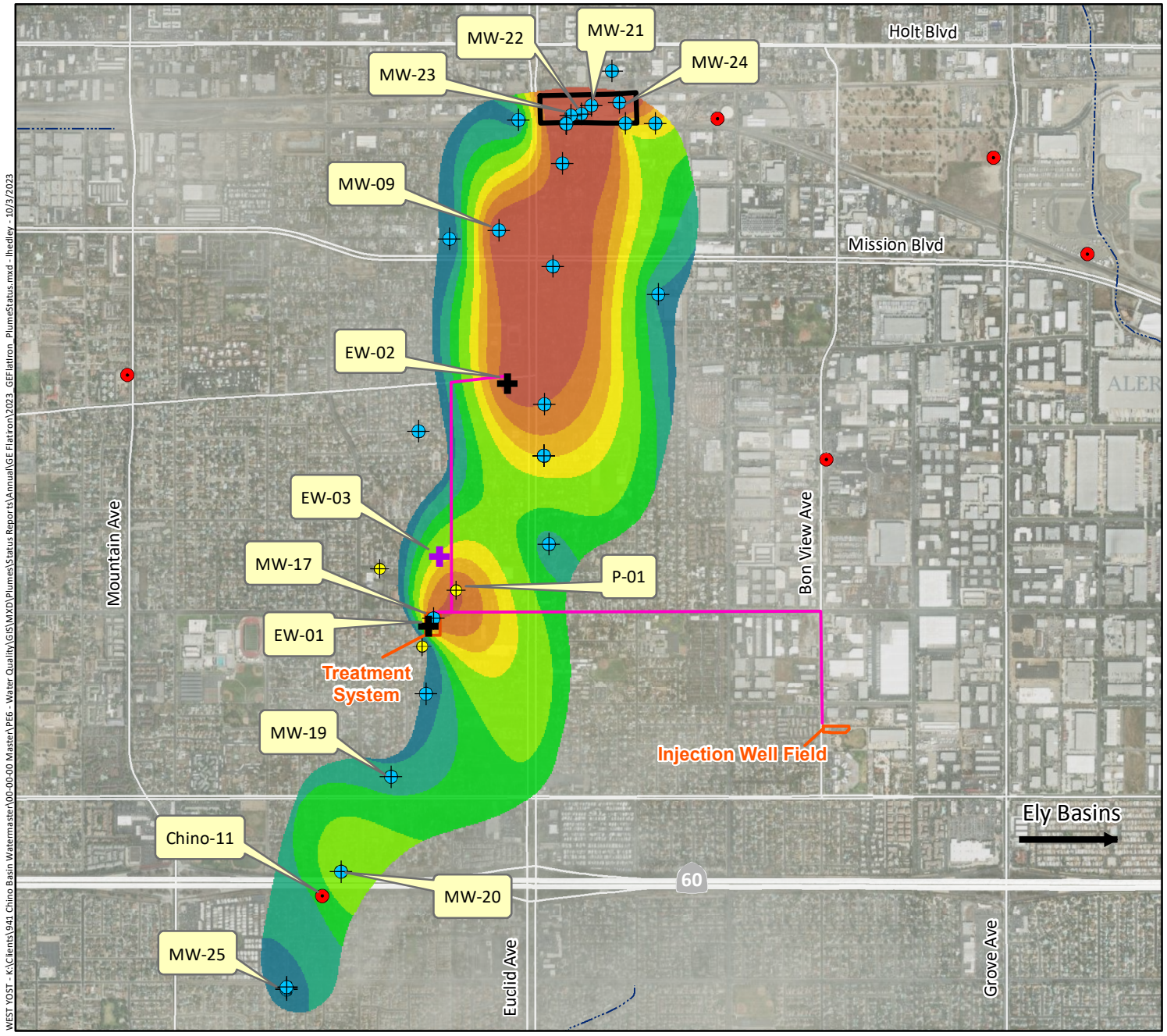
On May 24, 2023 a *Work Plan to Evaluate the Presence of Selected Per- and Poly-Fluoroalkyl Substances* (PFAS) was submitted on behalf of GE.[28] The work plan was requested in a March 17, 2023 letter from the Santa Ana Water Board to evaluate for PFAS from historical releases at the GE Flatiron site. A phased approach to the PFAS investigation will be conducted which includes collecting groundwater samples from five existing monitoring wells, four of which contain hexavalent chromium concentrations greater than the MCL, including: P-01, MW-09, MW-17 and MW-23A. A sample will also be collected from a deeper monitoring (MW-23B) well to assess the potential vertical distribution of PFAS in the groundwater.

During the reporting period, *Facility Treatment System Summaries* were posted to GeoTracker monthly providing information on the current system status, including well operation, water quality compliance sampling, and system operation. The reports detail operations of the two extraction wells and three injection wells, including any period of shutdowns. Over the last year through September 2023, EW-01 and EW-02 treated 440 and 435 acre-feet, respectively, and both experienced temporary periods of shutdown.

GE will continue remediation and monitoring at the Flatiron Facility with the next groundwater monitoring activities scheduled for October 2023. The next semiannual monitoring report will be submitted to the Santa Ana Water Board in 2024.

[27] Wood Environment & Infrastructure Solutions, Inc. (2022). *Basis of Design for Well EW-03*. Prepared for General Electric Company. November 10, 2022.

[28] WSP USA Environment and Infrastructure Inc. (2023). *Work Plan to Evaluate the Presence of Selected Per- and Poly-Fluoroalkyl Substances*. Prepared for General Electric Company. May 24, 2023.



Maximum Concentration (µgL)
July 2017 - June 2022

TCE

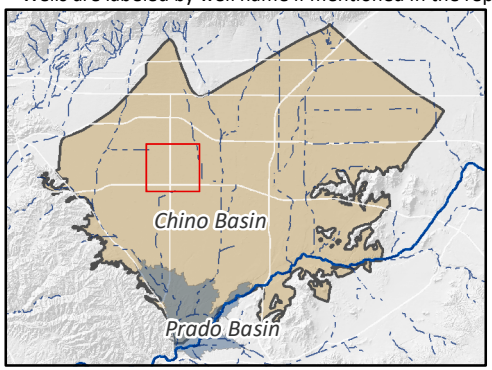
- > 0.5 to ≤ 5
- > 5 to ≤ 10
- > 10 to ≤ 20
- > 20 to ≤ 50
- > 50 to ≤ 100
- > 100 to ≤ 200
- > 200 to ≤ 500
- > 500

MCL = 5 µgl

(Delineated by Watermaster in the 2022 State of the Basin Report)

- GE Extraction Well
- Proposed Location of New Extraction Well
- GE Monitoring Well (some locations have multiple wells at various depths)*
- GE Piezometer
- Active/Inactive Potable Municipal Water Supply Well
- Conveyance Pipeline
- Former GE Flatiron Property Boundary

* Wells are labeled by well name if mentioned in the report



Prepared by:

WEST YOST

0 0.5 Miles

0 0.5 1 Km

Prepared for:

Chino Basin Watermaster
Annual Plume Report

General Electric (GE) Flatiron
TCE Plume

Exhibit 1

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Annual Plume Status Report

General Electric Test Cell Plume
October 2023

CONTAMINANTS

The primary contaminant is trichloroethene (TCE). Other contaminants of concern include the following volatile organic compounds (VOCs): tetrachloroethene (PCE), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), and cis-1,2-dichloroethene (cis-1,2-DCE). For each of these contaminants, the table below list the California maximum contaminant level (MCL) and maximum concentrations detected in groundwater samples from wells within the plume over the last five years.

Table 1. Maximum Concentration of Contaminants of Concern between July 2018 to June 2023

Contaminant	MCL, micrograms per liter (µgl)	Max Concentration, µgl	Sample Date	Well
TCE	5	2,300 [(a)]	10/2018	OW-15p-i
PCE	5	55	04/2020	MW-8-s
1,1-DCE	6	32	07/2020	OW-18-d
1,2-DCA	0.5	2.2	01/2020	MW-8-s
cis-1,2-DCE	6	32	04/2019	MW-9-s

Notes:
(a) This is the maximum TCE concentration ever measured at a monitoring well in the GE Test Cell plume.

LOCATION

The General Electric (GE) Test Cell plume is located in the central Chino Basin in the City of Ontario, south of the Ontario International Airport. It extends southwest from the former GE Engine Services Test Cell Facility (Test Cell Facility) located at 2264 East Avion Place. The plume is elongated and extends offsite from the facility in a downgradient direction approximately 1.9 miles, and measures approximately 0.6 miles wide. The most recent delineation of the extent of the plume was done by Chino Basin Watermaster (Watermaster) for the *2022 State of the Basin Report*.[1] This characterization is based on the five-year maximum TCE concentration measured over the period of July 2017 through June 2022. Exhibit 1 shows

[1] West Yost Associates. (2023). *Chino Basin Optimum Basin Management Program, 2022 State of the Basin Report.* Prepared for Chino Basin Watermaster. June 2023.

the location and extent of the plume as delineated by Watermaster in 2022, compared to the most recent characterization by GE in its *2023 Second Quarter Groundwater Monitoring Report*.[2]

SITE HISTORY

From 1956 to 2010, the Test Cell Facility was used to test and maintain commercial and military jet engines. Chlorinated solvents used at the facility for cleaning and degreasing, including TCE, were stored in 55-gallon drums and aboveground storage tanks. In the early 1970s, TCE was replaced with 1,1,1-TCA, which was then replaced in 1981 with isopropyl alcohol—the only solvent used onsite through 1996. Until 1974, wastewater with residual solvents, along with fuel and oil residues, was diverted to below-ground separators where it was recycled. Excess wastewater from the separators occasionally flowed into a natural wash along the north side of the property, which drained into the Cucamonga Creek. From 1974 to 1980, two dry wells were connected to the separators, extending approximately 270 feet below ground surface (ft-bgs). From 1980 to 2006, wastewater continued to be captured by the separators where it was either recycled or treated offsite. Beginning in 2006, the wastewater was stored in above ground storage tanks and transported offsite for treatment and disposal. The Test Cell Facility ceased operations in 2011, and the site is currently vacant.

REGULATORY ORDERS

- State of California Department of Health Services (CDHS) Docket No. 88/89- 009CO. Consent Order Health and Safety Code Section 25355.5(a)(1)(B) and 25355.5 (a)(1)(C). In the Matter of: General Electric Engine Maintenance Center. September 1988. This Order required GE to perform a remedial investigation and feasibility study to evaluate and monitor soil, surface water, and groundwater contamination at the site and to prepare a remedial action plan.

REGULATORY AND MONITORING HISTORY

In 1984, an investigation performed by C.H.J, Inc. soil engineers detected TCE, PCE, 1,1,1-TCA, and dibromochloromethane in soil samples in the vicinity of the dry wells. Results from this investigation were deemed invalid due to inappropriate analytical methods.[3] In 1985, another consulting firm retained by GE detected 1,1,1-TCA, TCE, and PCE in onsite subsurface soil samples.[4] An investigation performed in 1987 revealed the presence of multiple VOCs in the soil near the disposal sites.[5]

In 1988, a Consent Order was signed between GE and the CDHS (now Department of Toxic Substances and Control [DTSC]) to initiate an investigation of soil, surface water, and groundwater contamination, and the appropriate remedial actions. In 1990, GE performed a Phase I remedial soil investigation to

[2] WSP USA Environment and Infrastructure Inc. (2023). *Second Quarter 2023 Groundwater Monitoring Report*. Prepared for GE Engine Services Test Cell Facility. July 5, 2023.

[3] The investigation is described in State of California Department of Health Services. (1998). Docket No. 88/89-009CO. Consent Order Health and Safety Code Section 25355.5(a)(1)(B) mad 25355.5 (a)(1)(C). In the Matter of General Electric Engine Maintenance Center. September 1988.

[4] Ibid.

[5] Dames & Moore. (1987). *Subsurface Investigation, Ontario California, for General Electric Aviation Services Operations.* Prepared for GE Engine Services Test Cell Facility. February 4, 1987.

determine the impacts of VOCs and jet fuel in the soil in the vicinity of the dry wells and Cucamonga Creek.[6] During the Phase I remedial investigation, VOCs were detected in soil samples collected onsite and in excavated soil from the dry wells. Phase II of the remedial investigation was to assess groundwater conditions beneath the site, including an evaluation of the nature, extent, and migration characteristics of dissolved VOCs in groundwater.[7,8] In 1991, as part of the Phase II investigation, GE installed seven monitoring wells onsite and upgradient of the site. Monitoring performed at these wells indicated the presence of VOCs in groundwater beneath the Test Cell Facility with the possibility of offsite migration. Pursuant to the DTSC 1988 Consent Order, a feasibility study and a remedial investigation was completed in 1993, and a remedial action plan was prepared in 1994.[9,10,11] The remedial action identified was an in-situ soil vapor extraction treatment system (VETS) to reduce VOCs to levels that would not impact groundwater. The VETS began operating in 1996.

In 1994, the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) was retained as the lead agency to oversee the groundwater investigation, while the DTSC maintained oversight of the soil investigation and operation of the VETS. The Santa Ana Water Board requested an offsite investigation be performed to determine the extent of groundwater contamination. An extensive offsite investigation was completed in multiple phases from 1995 to the early 2000s. The initial phase was completed in 1995 and included the installation of four offsite monitoring wells. Offsite groundwater investigations continued from 1996 to the early 2000s when 22 additional offsite monitoring wells were constructed within multi-depth well clusters. Monitoring at these wells indicated that the VOC plume composed of TCE, cis-1,2-DCE, and 1,1-DCE (byproducts of TCE degradation) extended offsite and that TCE concentrations were highest in the intermediate and deep aquifer zones. In 2003, GE submitted a groundwater feasibility study to the Santa Ana Water Board (2003 Feasibility Study), followed by a draft remedial action plan (RAP) in 2006.[12,13] The 2003 Feasibility Study and 2006 RAP identified pump-and-treat and monitored natural attenuation as remedial alternatives.

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[6] Dames & Moore. (1990). *Phase I Remedial Investigation, Engine Maintenance Center Test Cell Facility, Ontario, California*. Prepared for General Electric Company. 1990.

[7] Dames & Moore. (1990). *Phase II A Remedial Investigation Work Plan, Engine Maintenance Center Test Cell Facility, Ontario, California*. Prepared for General Electric Company. 1990.

[8] Dames & Moore. (1991). *Phase II B Remedial Investigation, Engine Maintenance Center Test Cell Facility, Ontario, California*. Prepared for General Electric Company. 1991.

[9] Dames & Moore. (1993). *Feasibility Study Report*, *General Electric Jet Engine Test Cell Facility, Jet Engine Test Cell Facility, 2264 Avion Place, Ontario, California*. 1993.

[10] Dames & Moore (1993). *Remedial Investigation Report*, *Jet Engine Test Cell Facility, 2264 Avion Place, Ontario California*. 1993

[11] Dames & Moore. (1994). *Remedial Action Plan for Impacted Soil, General Electric Jet Engine Test Cell Facility, 2264 Avion Place, Ontario, California*. September 16, 1994.

[12] Geosyntec. (2003). *Groundwater Feasibility Study – GE Engines Test Cell Facility, Ontario, California*. Prepared for GE Engine Services. December 3, 2003.

[13] Geosyntec. (2006). *Draft Groundwater Remedial Action Plan*, *GE Engine Services Test Cell Facility, 2264 Avion Place, Ontario, California*. Prepared for GE Engine Services Test Cell Facility. November 17, 2006.

In 2005 and 2008, GE submitted five-year review reports to the DTSC in compliance with the 1988 Consent Order on the evaluation of the soil VETS.[14,15] Following the 2008 report, GE requested site closure and to cease operation of the soil VETS. The DTSC granted final closure and completion of the soil remediation in 2009 with the condition that institutional controls were implemented to limit the site to commercial/industrial uses.

Following the closure of the soil VETS, GE continued conducting quarterly groundwater monitoring at their network of onsite and offsite monitoring wells and constructed additional multi-depth wells at six locations.

In May 2019, the DTSC transferred regulatory oversight of all environmental activities at the Test Cell Facility to the Santa Ana Water Board, including the soil investigation, for the following reasons: (1) the Santa Ana Water Board was the lead agency overseeing the groundwater investigations related to the site; (2) there had been recent increasing trends in VOC concentrations in some groundwater monitoring wells that could have required additional evaluation; and (3) to minimize any overlap of the investigation or cleanup activities between the two agencies.

In 2019, the Santa Ana Water Board stated that the impacts to groundwater and soil had not been adequately addressed and indicated that monitored natural attenuation may not be suitable as the only groundwater remedial action, and requested that GE prepare a Conceptual Site Model (CSM) to aid in determining the appropriate remedial action.[16] GE submitted the CSM to the Santa Ana Water Board in November 2019.[17] The CSM showed that TCE concentrations near the onsite source area (old dry wells) have decreased one to two orders of magnitude since monitoring began, demonstrating the success of the onsite remediation of soil vapor. Also, TCE concentrations in the most downgradient monitoring well (OW-11) have remained below the MCL since monitoring began. Several monitoring wells located along the northern edge of the plume have, however, shown notable increases in TCE concentrations since around 2016, likely due to displacement from increased recharge at the Ely Basins. Overall, the CSM concluded that natural attenuation is occurring and has maintained a stable groundwater plume.

In October 2021, GE conducted sampling of on-site SVE wells to evaluate if VOC concentrations in soil vapor have rebounded and whether the historical SVE systems had sufficiently removed VOCs. This work was conducted in accordance with the *Work Plan for On-Site Soil Vapor and Groundwater Investigation* which was partially approved by the Santa Ana Water Board on October 1, 2021.[18] The SVE well sampling occurred from October 4 through 11, 2021 and the results were submitted to the Santa Ana Water Board

[14] Geosyntec. (2005). *First Five-Year Review Report Shallow Soil Remedy.* Prepared for GE Engine Services Test Cell Facility, City of Ontario, San Bernardino County, California. July 15, 2005.

[15] Geosyntec. (2008). *Second Five-Year Review Report, GE Engine Services Test Cell Facility, 2264 Avion Place Ontario, California.* Prepared for GE Engine Services. October 27, 2008.

[16] Email correspondence with Mr. Alan Kouch at the Santa Ana Water Board on September 19, 2019.

[17] Wood Environmental & Infrastructure Solutions, Inc. (2019). *Conceptual Site Model Former General Electric Engine Services Test Cell Facility*. Prepared for General Electric Company. November 5, 2019.

[18] Wood Environmental & Infrastructure Solutions, Inc. (2021). *Work Plan for On-Site Soil Vapor and Groundwater Investigation*. Prepared for General Electric Company. July 29, 2021.

in January 2022.[19] The data will be presented and analyzed in a technical report at a later time with other data being collected on the Test Cell property.

REMEDIAL ACTION

Groundwater

The 2003 Feasibility Study and 2006 draft RAP identified two groundwater remediation alternatives:

1. Extraction and treatment of groundwater for areas that have VOC concentrations approximately ten times the MCL (>50 µgl).
2. Monitored natural attenuation of groundwater for areas that have VOC concentrations less than ten times the MCL.

Following the submittal of the draft RAP, GE determined that the plume extending downgradient from the facility with TCE concentrations above 50 µgl had decreased in size from about 4,000 feet to about 2,600 feet. Fate and transport modeling indicated that either natural attenuation or a pump-and-treat alternative would decrease the TCE in the plume to concentrations equal to or less than the MCL within the same time frame of 50 years. In 2008, GE met with the Santa Ana Water Board to discuss the status of the plume and to reevaluate the RAP to consider monitored natural attenuation as the primary remedial action. Based on this discussion, GE agreed to install additional monitoring well clusters between the former GE facility and well cluster OW-16, located in the center of the plume.[20] This well was selected because, at the time, it had the highest historical offsite TCE concentrations in the intermediate and deep intervals of the aquifer. Pursuant to this agreement, two offsite well clusters (OW-17 and OW-18) and one onsite well cluster (MW-8) were installed in August and September 2009. The 2006 draft RAP was withdrawn in February 2010, and since then, GE and the Santa Ana Water Board have continued to meet to evaluate if monitored natural attenuation is the appropriate remedial action for the Test Cell Facility.

Soil

In 1996, pursuant to the 1988 Consent Order, GE began operating the VETS to remove VOCs in the soil onsite and to prevent the soil contaminants from entering groundwater. The treatment system operated from 1996 to 2005, with verification monitoring from 2004 to 2007. During this time, GE was required to submit a review and reevaluation of the remedial actions every five years. The *Second Five-Year Review Report* was submitted to the DTSC in October 2008 and concluded that the soil remediation program had significantly reduced VOC concentrations in soil to levels that are no longer harmful to human health or groundwater quality.[21] It also indicated that there was no significant VOC rebound after treatment ceased in 2005. The report recommended that soil remediation be deemed complete, and that the DTSC grant final closure on soil remediation. The DTSC granted final closure in 2009 with the condition that institutional controls to limit the site to commercial/industrial use were implemented.

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[19] Wood Environmental & Infrastructure Solutions, Inc. (2022). *Data Transmittal for On-Site Soil Vapor Well Sampling*. Letter sent on behalf of GE Engine Services Test Cell Facility to the Santa Ana Water Board. January 24, 2022.

[20] Geosyntec. (2009). *Monitoring Well Installation Work Plan, GE Engines Services Test Cell Facility.* Prepared for GE Engine Services Test Cell Facility. July 2, 2009.

[21] Geosyntec. (2008). *Second Five-Year Review Report, Ge Engine Services Test Cell Facility*. Prepared for GE Engine Services Test Cell Facility. October 27, 2008.

MONITORING AND REPORTING PROGRAM

The objectives of the monitoring program are to evaluate the extent and magnitude of the plume emanating from the Test Cell Facility and to support the ongoing evaluation of monitored natural attenuation as a remedial action. Groundwater monitoring is performed quarterly and consists of measuring groundwater levels and collecting groundwater samples at 35 onsite and offsite monitoring wells and measuring groundwater levels at four piezometers located adjacent to the Ely Basins. Exhibit 1 shows the locations of all monitoring sites. Quarterly groundwater quality samples are analyzed for VOCs and reports summarizing the results and conclusions of the monitoring are published each quarter. These reports and all data that have been collected by GE since 2005 are posted on the State Water Resources Control Board GeoTracker website.[22]

Annual soil sampling and monitoring ceased following the approval of the request for closure of the VETS in 2009. Since then, soil-vapor has been sampled twice, once in 2014 and again in 2021, per request of the Santa Ana Water Board.

RECENT ACTIVITY

The most recently submitted monitoring report for the GE Test Cell Facility is the *Second Quarter 2023 Groundwater Monitoring Report*.[23] Groundwater quality samples and groundwater-level measurements were collected at 35 monitoring wells and groundwater level measurements were collected at four Ely Basin piezometers owned by San Bernadino County. The monitoring event was conducted in April and May 2023. The following summarizes some of the key results and conclusions contained in the report:

- Groundwater sampling indicated the presence of detectable concentrations of 12 VOCs, with TCE having the highest concentrations in most wells.
- TCE concentrations exceeded the MCL in 25 of the 35 wells sampled and three wells were non-detect for TCE.
- Overall, detected TCE concentrations at wells onsite and adjacent to the former GE Test Cell Facility remain relatively low, with a maximum TCE concentration of 29 µgl at well MW-9-s.
- The highest TCE concentrations in groundwater are detected at approximately 3,000 feet downgradient of the former GE Test Cell Facility boundary, as confirmed in well OW-16-i with a concentration of 2,000 µgl.
- The most downgradient monitoring well (OW-11) has had TCE concentrations below the MCL since groundwater monitoring began.
- Groundwater elevations are generally within historical ranges. Higher elevations were observed closer to the Ely Basins, indicating recharge was likely occurring at the Ely Basins at the time of water level monitoring and sample collection.

[22] https://geotracker.waterboards.ca.gov/profile_report?global_id=SL208133868

[23] WSP USA Environment and Infrastructure Inc. (2023). *Second Quarter 2023 Groundwater Monitoring Report.* Prepared for General Electric Company. July 5, 2023.

- Two piezometers (OW-4p and OW-8p) were removed from the monitoring program starting in October 2022 due to several quarters of inconsistent water level data and the inability to collect water quality samples.

In March 2023, the Santa Ana Water Board approved three work plans that will address specific requests regarding plume extent.[24] The work plans include:

- *Off-Site Groundwater Investigation.* This work plan is to investigate and delineate the vertical and lateral extent of the plume on either side of the Ely Basins and at the plume front.
- *Plume Migration Control Near the Former GE Engine Services Test Cell Facility.* This work plan is for the feasibility, design, and installation of plume migration control system in the relatively higher concentration core of the plume.
- *Plan for Groundwater Sampling Upgradient from Well OW-6*. This work plan is to perform an investigation west and northwest of the site for potential contributing sources. Exhibit 1 shows the proposed locations of the boreholes.

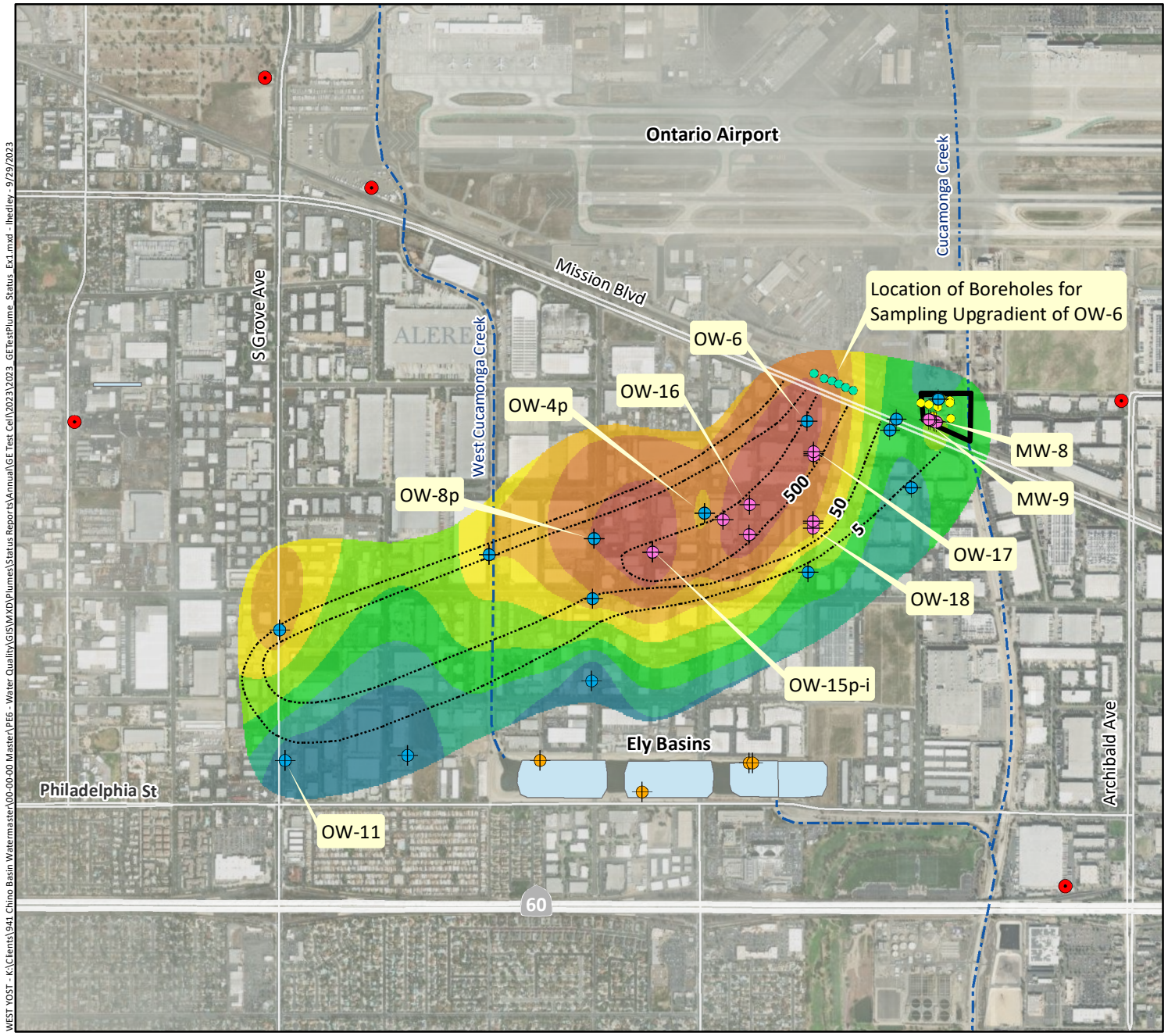
In April 2023 GE and the Santa Ana Water Board determined that the plume needs to be carefully defined through assessing upgradient contributions before selecting a site for groundwater extraction and treated water injection or discharge.[25] Following these offsite groundwater investigations, GE plans to submit an updated conceptual site model for the plume, plume sources, and related pathways, which will then guide the site selection for a plume migration control system.

Between April and July 2023, GE installed vapor probes and deep groundwater monitoring wells at seven onsite locations (MW-10D to MW-16D). The locations of the deep groundwater monitoring wells are shown in Exhibit 1. GE is currently in the process of installing shallow and intermediate monitoring wells at two onsite locations.

In July 2023, GE and the Santa Ana Water Board met to discuss GE activities at the Test Cell Facility. At the meeting it was discussed that there would be a pause on the activities in the three work plans approved in March 2023 and GE would focus on preparing a summary report of all the data that has been collected over the past year and a half. While this report is being prepared, GE will begin drilling boreholes to sample groundwater upgradient from Well OW-6 to identify potential sources of TCE and other VOCs that may be contributing to the plume. The locations of these boreholes are shown in Exhibit 1.

[24] Wood Environmental & Infrastructure Solutions, Inc. (2022). Work Plans for Off-Site Groundwater Investigations and Plume Migration Control Near the Former General Electric Engine Services Test Cell Facility. April 14, 2022.

[25] April 18, 2023 email transmittal of call between GE, WSP and the Santa Ana Water Board.



Maximum Concentration (µgL)
July 2017 - June 2022

TCE

- 0.5 to ≤ 5
- > 5 to ≤ 10
- > 10 to ≤ 20
- > 20 to ≤ 50
- > 50 to ≤ 100
- > 100 to ≤ 200
- > 200 to ≤ 500
- > 500

MCL = 5 µgl

(Delineated by Watermaster in the 2022 State of the Basin Report)

Contours of TCE Concentration (µgl) in the shallow zone delineated by WSP Consultants in the 2023 Quarter 2 Groundwater Monitoring Report

Former GE Test Cell Property Boundary

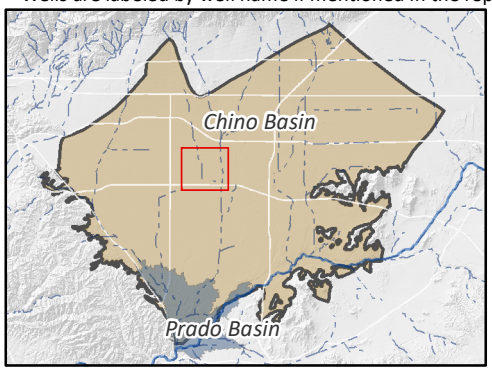
General Electric Active Monitoring Wells*

- Single Casing
- Multi-Depth Cluster
- Piezometers
- New Monitoring Well Drilled in 2023

Active/Inactive Potable Municipal Water Supply Wells

Streams & Flood Control Channels

* Wells are labeled by well name if mentioned in the report



Prepared by:

WEST YOST

N

0 0.5 Miles

0 0.5 1 Km

Prepared for:

Chino Basin Watermaster
Annual Plume Report

General Electric (GE) Test Cell
TCE Plume

Exhibit 1

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Annual Plume Status Report

Former Kaiser Steel Mill Plume and CCG Ontario Monitoring and Remediation October 2023

CONTAMINANTS

From 1983 to 1993, the primary contaminants of concern (COCs) for the Former Kaiser Steel Mill site were total dissolved solids (TDS) and total organic carbon (TOC). In 2008, additional investigations commenced to identify other COCs. Currently, the COCs associated with the site include hexavalent chromium, carbon tetrachloride, and chloroform. The maximum concentrations of these COCs detected in groundwater samples collected from the Former Kaiser Steel Mill site from July 2018 through June 2023 compared to the maximum contaminant levels (MCLs) are shown in Table 1 below.

Table 1. Maximum Concentration of Contaminants of Concern between July 2018 and June 2023

Contaminant	MCL, µgl	Max Concentration, µgl	Sample Date	Well
Hexavalent Chromium	50[(a)]	261	May, 2023	MW-14S
Carbon Tetrachloride	0.5	6.2	August, 2019	MW-25
Chloroform	80	16.6	February, 2023	SW-3

Notes:
µgl = micrograms per liter
(a) Currently, there is no MCL for hexavalent chromium. There was a California MCL of 10 µgl for hexavalent chromium that was invalidated in 2016. The MCL for total chromium of 50 µgl is currently used to regulate hexavalent chromium. The State Water Resources Control Board Division of Drinking Water is in the process of developing a new MCL for hexavalent chromium.

TDS and TOC are no longer considered COCs associated with Former Kaiser Steel Mill site.

LOCATION

The Former Kaiser Steel Mill site is a 1,200-acre parcel in an unincorporated area of the San Bernardino County between the Cities of Fontana and Ontario. The site is bounded by Whittram Avenue to the north, Interstate 10 to the south, and Etiwanda and Cherry Avenues to the west and east, respectively. Exhibit 1 shows the location of the Former Kaiser Steel Mill site.

SITE HISTORY

The Kaiser Steel Corporation operated the Kaiser Steel Mill from 1942 to 1983, and during peak production, the facility was the largest steel producer in the western United States. From 1942 through 1972, solid and liquid wastes produced from manufacturing processes were disposed of in waste pits and unlined surface

impoundments for percolation and evaporation throughout the site. In the early 1970s, the surface impoundments were lined to eliminate percolation to groundwater. In 1987, the Kaiser Steel Corporation filed for bankruptcy and reorganized into Kaiser Resources, Inc., which became Kaiser Ventures, Inc. in 1995.

After the Kaiser Steel Corporation ceased steel operations in 1983, portions of the property were divided and leased or sold to the following organizations:

- Chemwest Industrial, Inc., a chemical manufacturing company, leased land in the southwest portion of the property (East Slag Pile Area in Exhibit 1) but no longer operates onsite.
- California Steel Industries (CSI) purchased and continues to operate 458 acres to manufacture rolled steel.
- The Auto Club Speedway (formerly California Speedway) was constructed by the Penske Corporation on 500 acres in the northern corner of the site in 1995.
- CCG Ontario, LLC (CCG)[1] purchased 592 acres along the western and southern portions of the property in 2000 and inherited responsibility for site contamination, remediation, and monitoring from Kaiser Ventures, Inc. (see Exhibit 1 for the property location).

REGULATORY ORDERS

There have been several regulatory orders issued to various tenants of the Former Kaiser Steel Mill site for the investigation and remediation of soil and groundwater contamination:

- Regional Water Quality Control Board Santa Ana Region (Santa Ana Water Board) Cleanup and Abatement Order (CAO) No. 87-121 (August 1987)—Required Kaiser Steel Corporation to initiate a Phase IV groundwater investigation and implement a remediation action alternative for groundwater contamination.
- California Department of Health Services (now Department of Toxic Substances Control (DTSC)) Consent Order with the Kaiser Steel Corporation (August 1988)—Required the Kaiser Steel Corporation to investigate any release of contamination to air, soil, surface water, and groundwater, and to ensure appropriate remedial measures were taken.
- Santa Ana Water Board CAO No. 91-40 (March 1991)—Required Kaiser Resources, Inc. perform a feasibility study for a salt-offset remediation alternative for groundwater contamination.
- California Department of Health Services (now DTSC) Consent Order with CSI (August 1995)—Required CSI to conduct a Site Investigation, perform health risk assessment at the CSI property, and develop and implement an action plan to remediate contaminations on site.
- DTSC Imminent and Substantial Endangerment Determination Consent Order with CCG (August 2000)—Transferred responsibility of investigation and remedial activities associated with the 592 acres purchased by CCG and the sale of the Coal Tar Pits Parcel from Kaiser Ventures, Inc. to CCG.

[1] CCG Ontario is a subsidiary of Prologis, a real-estate and supply chain logistics company.

REGULATORY AND MONITORING HISTORY

In July 1983, a phased investigation of potential groundwater contamination, resulting from the disposal of high-salinity wastewater to unlined ponds during its early years of operation, was performed at the Former Kaiser Steel Mill site. The Phase I and II investigations were completed in December 1983 and identified 28 waste sites and four likely point-sources that contributed to TDS and TOC groundwater contamination beneath the facility.[2] Groundwater samples were collected at existing onsite and offsite wells to determine the preliminary extent of groundwater contamination and to assess groundwater quality downgradient from the site. The Phase III investigation, completed in March 1986, resulted in the construction of monitoring wells at six additional locations (five single-nested and one quadruple-nested wells).[3] Based on these investigations, three separate TDS plumes were identified: one located onsite, extending to a depth of 770 feet below ground surface (ft-bgs), and two that migrated offsite. Additionally, one TOC plume was identified onsite extending to a depth of approximately 100 ft-bgs. The Phase III investigation determined that the TDS plumes were moving downgradient at a rate of 100 to 300 feet per year with the potential to impact downgradient municipal production wells.

In 1987, the Santa Ana Water Board issued CAO No. 87-121 to the Kaiser Steel Corporation in response to the findings of the phased investigations, which required a Phase IV groundwater investigation to further characterize the plume's extent and evaluate remediation strategies, such as groundwater extraction and treatment.[4]

On August 22, 1988, a Consent Order was signed between the Kaiser Steel Corporation and the California Department of Health Services, Toxic Substances Control Division (now known as the DTSC) to ensure that any release or threatened release of contamination to the air, soil, surface water, or groundwater at the site was thoroughly investigated, and that appropriate remedial actions were taken.[5] Two preliminary assessments/site investigations were completed in August 1988 and January 1989. The results of these investigations were published in the *Resource Conservation and Recovery Act* (*RCRA) Facility Assessment Report*, which identified twenty areas for remedial investigation.[6] The Phase I and II remedial investigations were completed in April and October of 1990, respectively.[7] The results of these investigations concluded that three areas of the Former Kaiser Steel Mill site required remediation and further investigation: the tar pits, the byproducts plant area, and the east slag pile. The phase II remedial investigation also found that the cooling tower sludge bed required minor material removal. Due to the limited remediation required, it was recommended that the cooling tower sludge bed be included in the remedial action plan for the east slag pile. The Phase II remedial investigation also concluded that material from the furnace dust/mill scale piles would require removal. Ultimately this material was recycled into

[2] James M. Montgomery and Associates. (1983). *Final Report, Kaiser Steel Corporation Groundwater Evaluations*. December 1983.

[3] James M. Montgomery and Associates. (1986). *Kaiser Steel Corporation Phase III Groundwater Investigation*. Prepared for Kaiser Steel Corporation. March 1986.

[4] Santa Ana Water Board. (1987). *Cleanup and Abatement Order No. 87-121 for Kaiser Steel Corporation Fontana, San Bernardino County*. August 26, 1987.

[5] DTSC Docket No. HAS 87/88-032CO. Consent Order (Health and Safety code sections 205,25355.1(a)(1)) August 22, 1988.

[6] JMM. (1989). *RCRA Facility Assessment Report*. Prepared for Kaiser Steel Resources, Inc. January 1989.

[7] https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=60001356

the cement industry and didn't require further remediation. For each of the three areas, individual feasibility studies and remedial action plans were prepared and remediation for all three areas occurred between 1995 and 1999.

In 1990, Kaiser Resources, Inc. (formerly Kaiser Steel Corporation) initiated plans for a 'salt-offset' as an alternative to groundwater extraction and treatment of the TDS and TOC plumes. In March 1991, the Santa Ana Water Board rescinded CAO No. 87-121 and issued CAO No. 91-40, which allowed Kaiser Resources, Inc. to complete a feasibility study for a salt-offset program. The *Phase IV Groundwater Remediation Feasibility Study Draft Report* was published in 1991; it analyzed a salt-offset alternative and nine other groundwater remediation alternatives.[8] In 1993, CAO No. 91-40 was rescinded when Kaiser Resources, Inc. and the Santa Ana Water Board entered into a settlement agreement (known as the Salt Offset Agreement). Under the Salt Offset Agreement, Kaiser Resources, Inc. would contribute financial resources and dedicate its Chino Basin water rights to support the construction and operation of the Chino Basin Desalters in exchange for release from any future liability for TDS and TOC contamination. Kaiser Resources, Inc. made a one-time contribution of $1.5 million and 25,000 acre-feet of its water rights established under the Chino Basin Judgement.

Between 1986 and 1994, an interim groundwater-quality monitoring program was implemented to further characterize the extent of the TDS and TOC groundwater contamination. The monitoring program consisted of a sampling a network of 30 onsite and offsite monitoring and production wells, including newly constructed monitoring wells KOSF-1 and Kaiser-MP2. The maximum TDS and TOC concentrations detected in groundwater samples during this time were 1,600 milligrams per liter (mgl) and 70 mgl, respectively.

In 1995, the DTSC issued the Consent Order for CSI to develop and implement an Expedited Remedial Action Plan (ERAP) on its property that was purchased from the Former Kaiser Steel Mill Site.[9] Pursuant to the ERAP, a site investigation was performed at 28 areas on the CSI property which identified 31 Areas of Concern (AOCs). In 2004 and 2013, carcinogen risk assessments of onsite soil indicated that 26 AOCs do not require further remediation other than restrictions that land use can only be industrial uses. The selected mitigation measures for the remaining AOCs included the installation of a surface soil cover system (cap) and maintaining an existing surface cap.[10] Contaminant fate and transport analyses conducted as part of the site investigation indicated that there are no risks to the underlying groundwater at these areas. Annual cap inspections and five-year reviews are ongoing with supplemental characterization and remedial actions conducted intermittently.

In 2000, CCG purchased 592 acres of the Former Kaiser Steel Mill site and entered into a Consent Order with the DTSC, transferring responsibility for the remediation of site-related contamination from Kaiser Ventures, Inc. (formerly Kaiser Steel Corporation and Kaiser Resources Inc.) to CCG.[11] The 2000 Consent

[8] Mark J. Wildermuth. (1991). *Phase IV Groundwater Remediation Feasibility Draft Report*. Prepared for Kaiser Steel Resources, Inc. November 1991.

[9] DTSC No. HAS 95/96-068 Expedited Remedial Action Voluntary Enforceable Agreement (Health and Safety Code Section 25398.2b). August 8, 1995.

[10] DTSC. (2015). *Approval of the Final Remedial Design and Implementation Plan for Area of Concern (AOC) 9 and AOC 22, California Steel Industries, Inc., Fontana, California*. September 15, 2015.

[11] DTSC Docket No. I&SE – CO 00/01-001. Imminent and Substantial Endangerment Determination and Consent Order (Health and Safety code sections 25355.5(a)(1)(B) and (C), 25358.3 (a), 58009 and 58010. August 10, 2000.

Order also required CCG to perform groundwater investigations and, if necessary, develop remediation alternatives for COCs other than TDS and TOC.

REMEDIAL ACTION

As previously noted, remediation activities associated with the TDS and TOC plumes ended with the adoption of the 1993 Salt Offset Agreement.

The 1988 Consent Order between the DTSC and Kaiser Ventures, Inc. required remediation and further investigation of several areas. Following initial investigations, remedial action plans were prepared for each of the main areas identified for remediation. Between 1995 and 1999, waste was removed from several areas, caps were constructed, and further investigations into some areas found that those areas did not require additional remedial work.

In 1995 the Consent Order between the DTSC and CSI required remediation, which ultimately included the installation of a surface soil cover system (cap) and maintenance an existing surface cap. No remedial action was required for groundwater.

The 2000 Consent Order between the DTSC and CCG, who had acquired a portion of the property from Kaiser Ventures, Inc. overrode the 1988 Consent Order and divided the site into four 'Operable Units' (OUs) (see Exhibit 1 for OU boundaries) and required remediation of each OU. The following describes the Remedial Action Plans (RAPs) for OU-1 through OU-4:

- **OU-1 – Tar Pits.** The RAP included an in-situ solidification of the tar and surrounding soil and the construction of a cover system (cap) over the tar pits parcel.[12] The DTSC approved the final amended RAP in 2001.[13]
- **OU-2 – Auto Club Speedway/By-Products Area.** The RAP included the removal and treatment of contaminated sludge waste, construction of a two-foot protective soil layer and a 13-acre cap over the protective soil layer, and groundwater monitoring.[14] The DTSC approved the final RAP on May 1, 1995.[15]
- **OU-3 – East Slag Pile Landfill Area (ESPLA).** The RAP included the construction of a four-foot thick monolithic soil cover, a landfill gas collection and control system, landfill gas monitoring probes, pavement on the upper surface of east slag pile, a surface water

[12] Arcadis Geraghty & Miller, Inc. (2001). *Second Amendment to the Remedial Action Plan – Operable Unit No. 1 Tar Pits Parcel, Former Kaiser Steel Corporation, Fontana, California*. Prepared for Kaiser Ventures. December 10, 2001.

[13] DTSC. (2001). *Letter from Thomas M. Cota – Final Second Amendment to the Remedial Action Plan for the Kaiser Steel Site, Operable Unit Number 1, Tar Pits Area*. December 20, 2001.

[14] Iris Environmental. (2014). *Third Five-Year Review Report Auto Club Speedway Operable Unit No. 2, By-Products Area Former Kaiser Steel Mill Facility San Bernardino County, California*. Prepared for CCG-Ontario LLC. June 2014

[15] DTSC. (1995). *Letter – Remedial Action Plan for Kaiser Resources, Inc. Operable Unit No. 2 is Approved*. May 1, 1995.

drainage system, groundwater monitoring, and long-term operations and maintenance of at least 30 years.[16] The DTSC approved the final RAP on October 31, 2007.[17]

- **OU-4 – Chemwest Upper Ponds/Consolidated Waste Cell/Aboveground Storage Tanks/Chrome Ponds and Adjacent Areas (CCAC)**. The RAP included the construction of a cap over the CCAC, groundwater monitoring, and long-term operations and maintenance. The DTSC approved the final RAP on February 13, 2009.[18]

The above remedial actions specified for OU-1 through OU-4 have been implemented. Site maintenance, inspection, and monitoring reports on the implemented remedial measures at the OUs are published quarterly, semi-annually, and annually to ensure the completed remedies are operating properly.

In 2008, an additional operable unit, Sitewide Groundwater OU-5, was established to prescribe site-wide groundwater monitoring in accordance with the 2000 Consent Order between the DTSC and CCG. The 2008 *Groundwater Remedial Investigation Work Plan* (2008 Work Plan) was prepared to address site-wide data gaps in characterizing groundwater contamination other than TDS and TOC and to develop a long-term, site-wide monitoring program.[19] The 2008 Work Plan was approved by the DTSC on November 3, 2008 and resulted in the creation of the site-wide groundwater monitoring program which included construction of new monitoring wells at 24 locations and eight quarterly sampling events from 2009 to 2011. Data collected from the sampling efforts were used to perform a health risk assessment by comparing contaminant concentrations detected in the offsite groundwater monitoring wells with Environmental Protection Agency regional screening levels (RSLs). Hexavalent chromium, carbon tetrachloride, and chloroform were detected at concentrations above the risk-based screening concentrations and were therefore determined to be site-wide constituents of concern, warranting continued monitoring.

On September 1, 2016, CCG completed the *Final Groundwater Remedial Investigation Report/Feasibility Study and Remedial Action Plan* (2016 Final RI/FS and RAP), which included the results of the 2009-2011 site-wide groundwater monitoring program and selected the RAP for Sitewide Groundwater OU-5 as monitored natural attenuation. [20] In September 2016, DTSC approved the RAP and requested CCG to submit a Remedial Design and Implementation Plan (RDIP) to implement the RAP for Sitewide Groundwater OU-5.[21] A draft RDIP for Sitewide Groundwater, including a *Water Quality Sampling and*

[16] Shaw Environmental, Inc. (2007). *Remedial Action Plan – East Slag Pile Landfill, Former Kaiser Steel Mill Site, Fontana, California*. Prepared for CCG Ontario, LLC. August 2007.

[17] DTSC. (2007). *Letter from Rebecca Chou – Approval of the Final Remedial Action Plan for the East Slag Pile Landfill (ESPL) Area, Former Kaiser Steel Mill, Fontana, California*. October 31, 2007.

[18] Shaw Environmental, Inc. (2009). *Final Remedial Action Plan OU-4.* Prepared for CCG Ontario LLC. January 2009.

[19] Shaw Environmental, Inc. (2008). *Groundwater Remedial Investigation Work Plan; Former Kaiser Steel Mill.* Prepared for CCG Ontario LLC. October 2008.

[20] Iris Environmental, Inc. (2016). *Final Groundwater Remedial Investigation Report/Feasibility Study and Remedial Action Plan*. Prepared for CCG Ontario, LLC. September 2016.

[21] DTSC. (2016). *Letter from Eileen Mananian – Approval of the Final Groundwater Remedial Investigation/Feasibility Study and Remedial Action Plan, Former Kaiser Steel Mill, Fontana, California*. September 13, 2016

Analysis Plan, was submitted to the DTSC for review in November 2016.[22] In subsequent correspondences, the DTSC provided comments of the draft RDIP due to the presence of carbon tetrachloride potentially migrating offsite, and asked for the following in a September 26, 2019 letter to support the completion of the RDIP: establishment of a Decision Tree in the RDIP that outlines specific procedures to be taken when action levels (one-half the MCL) are exceeded at downgradient monitoring points; sampling of the wells specified in the Draft RDIP; and update the conceptual site model and discussion of next steps. CCG completed the draft Decision Tree for Sitewide Groundwater OU-5 on December 21, 2020. After a round of DTSC comments and CCG edits, and final Decision Tree for Sitewide Groundwater OU-5 was approved on December 10, 2021.

MONITORING AND REPORTING

Current groundwater monitoring activities are performed pursuant to the long-term[23] operations and maintenance plans for OU-2,[24] OU-3,[25] and OU-4.[26] Exhibit 1 shows the locations of the current well sites monitored for OU-2 through OU-4.

Table 2 below summarizes the number of monitoring wells, sampling frequency, and duration of sampling for each monitored OU.

Table 2. Summary of Operable Units, Monitoring Wells, and Monitoring Frequency

Operable Unit	No. of Wells	Sampling Frequency (Duration)
OU-2	5	Quarterly (2009-2014); Semi-annual (2015-present)
OU-3	9	Quarterly (2009-2014); Semi-annual (2015-present)
OU-4	11	Quarterly (2009-present)

Note:
There are a total of 37 monitoring wells in OU-2 through OU-5. Some wells were specifically installed outside OU boundaries, and other wells were installed inside multiple OU boundaries; as a result, multiple wells are sampled as part of more than one OU monitoring program.

Per the 2000 Consent Order, CCG is required to prepare monitoring reports and five-year site-wide review reports that evaluate whether the remedial actions remain protective of human health and the environment. Groundwater monitoring reports for OU-2, OU-3, and OU-4 are prepared on a quarterly or semi-annual basis. The first *Sitewide Five-Year Review Report* was submitted to the DTSC on April 1, 2016.[27]

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[22] RPS Iris Environmental (2016). *Draft Remedial Design and Implementation Plan, Sitewide Groundwater, Former Kaiser Steel Mill Site, San Bernardino County, California*. November 3, 2016.

[23] Long-term includes at least 30 years of operations and maintenance for each OU.

[24] SCS Engineers. (1995). *Operation & Maintenance Agreement – Operable Unit No. 2*. Prepared for Kaiser Resources, Inc. September 1995.

[25] Shaw Environmental, Inc. (2010). *Operations and Maintenance Plan – East Slag Pile Landfill Area, Former Kaiser Steel Mill Facility, Fontana, California*. Prepared for CCG Ontario, LLC. June 2010.

[26] Shaw Environmental, Inc. (2010). *Operations and Maintenance Plan – Chemwest Upper Ponds/Consolidated Waste Cell, Above-Ground Storage Tanks, Chrome Ponds, and Adjacent Areas, Former Kaiser Steel Mill Facility, Fontana California*. Prepared for CCG Ontario, LLC. June 2010.

[27] RPS Iris Environmental (2016). *Final Sitewide Five-Year Review Report*. Prepared for CCG Ontario LLC. April 2016.

An initial proposed site-wide groundwater monitoring program for OU-5 was included in the draft 2016 RDIP for Sitewide Groundwater submitted to the DTSC for review in November 2016. There have been several subsequent correspondences with the DTSC, and actions taken by CCG in an effort to review and finalize the RDIP for OU-5. CCG is currently working with DTSC to finalize the RDIP for Sitewide Groundwater OU-5 and monitoring activities for OU-5 will initiate once the RDIP is finalized.

Watermaster samples eleven monitoring wells annually at four downgradient locations for the Key Well Groundwater Quality Monitoring Program (KWGWQMP) and provides monitoring results to CCG upon request. These key wells include five Former Kaiser Steel Mill site monitoring wells in two locations and six Chino Basin Management Zone 3 (MZ3) monitoring wells in two locations shown in Exhibit 1. Table 3 below summarizes the contaminants with concentrations that exceeded the MCL at one or more monitoring wells in the KWGWQMP over the last five years from July 2018 to June 2023.

Table 3. Concentration of Contaminants Detected above the MCL at Key Wells Sampled by Watermaster between July 2018 to June 2023

Contaminant	MCL	Max Concentration	No. of Wells Exceeded MCL
1,1-Dichloroethene	6 µgl	18 µgl	1
1,2,3-Trichloropropane	0.005 µgl	0.0085 µgl	1
Chromium	50 µgl	590 µgl	2
Nitrate[(a)]	10 mgl	14 mgl	3
Perchlorate	6 µgl	10 µgl	2
TDS	500 mgl	770 mgl	2
Turbidity	5 NTU	78 NTU	5
Trihalomethanes	80 µgl	83 µgl	1

Note:
Not all key wells were sampled in August and September 2021.
µgl = micrograms per liter
mgl = milligrams per liter
NTU = nephelometric turbidity unit
(a) Nitrate as nitrogen

Watermaster will conduct its 2023 annual KWGWQMP groundwater sampling by the end of 2023.

RECENT ACTIVITY

In March 2022, CSI submitted a letter to the DTSC in response to a 2019 request from the DTSC to CSI to conduct a groundwater investigation on its property, because of increasing chromium concentration at the CCG well MW-16s which is downgradient of the CSI site.[28,29] The response letter provided a summary of a historical and statistical evaluation of already available data conducted by CSI for both the CCG and CSI properties. The evaluation concluded that levels observed downgradient of CSI are not indicative of a

[28] DTSC (2019). *Request for Groundwater Investigation Work Plan, California Steel Industries, Inc., Fontana, California (Site Code: 490001)*. December 30, 2019.

[29] Terraphase Engineering. (2022). *Response to Request for Groundwater Investigation Work Plan, California Steel Industries, Inc., 14000 San Bernardino Avenue, Fontana, California (Site Code: 49001), S044.001.010*. Letter to the DTSC. March 28, 2022.

release from the CSI site and appear related to the well's proximity to the waste management units on the former Kaiser property. It is CSI's opinion that this groundwater investigation is not needed. As of August 2023, there has been no formal response from the DTSC on this response letter.

Following the approval of the Decision Tree for the Sitewide Groundwater OU-5 RDIP in December 2021, a revised RDIP was submitted to DTSC for review on June 17, 2022. DTSC provided comments on the revised RDIP, and updates are currently being prepared by CCG. Monitoring activities for the OU-5 will start once the RDIP is finalized.

On June 30, 2022, a Revised Water Quality Sampling and Analysis Plan for OU-4 (OU-4 WQSAP) was submitted for DTSC review. DTSC provided comments on the plan on September 26, 2022 and an updated OU-4 WQSAP is being prepared to incorporate these comments. A post-closure permit modification is required prior to implementation of the updated OU-4 WQSAP. Based on DTSC input, the permit renewal process is expected to begin during second quarter 2023.

On August 2023, the DTSC reviewed and accepted the Second Sitewide Five-Year Review Report, which is available on EnviroStor.[30] The report concluded the remedial actions are functioning as intended. The next site-wide five-year report will be submitted in 2025.

Semi-annual groundwater monitoring events for OU-2 and OU-3, and quarterly groundwater monitoring events for OU-4 continue pursuant to their operations and maintenance plans. For the most recent monitoring event at OU-2 and OU-3 during the first half of 2023, there were no MCL exceedances of the COCs, however, hexavalent chromium exceeded its public health goal (0.02 µg/L) at both OU-2 and OU-3. Table 4 summarizes the concentrations of COCs for the second quarter monitoring event at OU-4 in May 2023. Groundwater levels at all three OUs remained consistent with past levels.

Table 4. Maximum Concentration of Contaminants of Concern for Recent Monitoring at OU-4

Primary MCL, µgl	Contaminant	Max Concentration, µgl	Number of Wells Exceeded MCL
0.5	Carbon Tetrachloride	2.08	1
50	Total Chromium	276	3
80	Chloroform	5.34	0

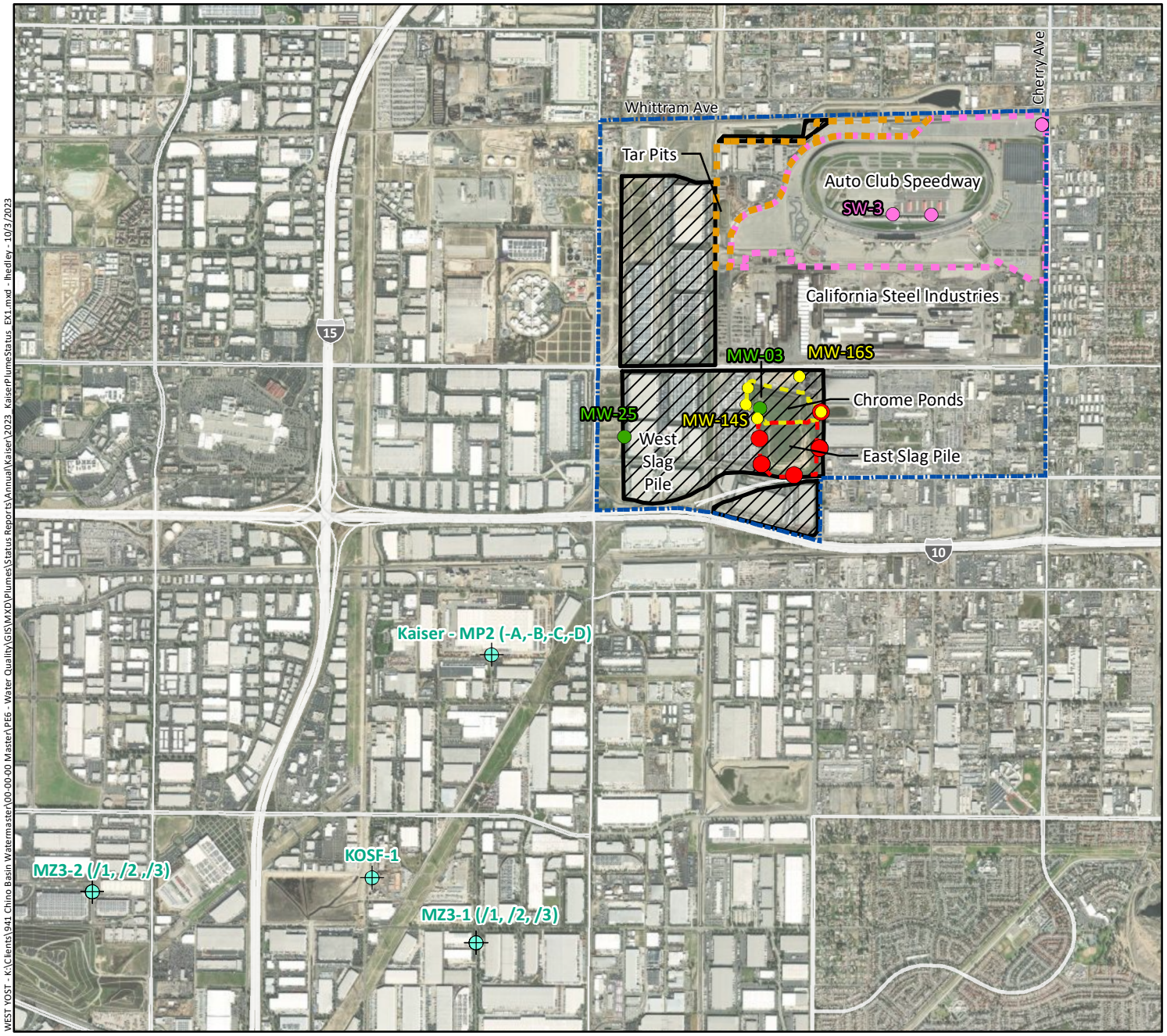
In response to the DTSC's comments on the "*Well MW-03 Alternatives Evaluation*" document for the destruction and replacement of well MW-03 in OU-4, RMD submitted a Well MW-03 Destruction Work Plan and a Downgradient Well Installation Work Plan in May 2023.[31,32] Based on discussions with DTSC, a permit modification/renewal will be needed prior to implementation of well

[30] RMD Environmental Solutions. (2021). *Second Sitewide Five-Year Review Report*. Prepared for CCG Ontario LLC. May 14, 2021.

[31] RMD Environmental Solutions. (2023). *Well MW-03 Destruction Work Plan, Operable Unit No. 4 – CCAC, Former Kaiser Steel Mill Site, San Bernardino County, California*. May 19, 2023.

[32] RMD Environmental Solutions. (2023). *Downgradient Well Installation Work Plan, Operable Unit No. 4 – CCAC, Former Kaiser Steel Mill Site, San Bernardino County, California*. May 19, 2023.

destruction activities, however, because the replacement well location is currently accessible, installation will be scheduled upon DTSC approval of the work plan.



Original Property Extent of Former Kaiser Steel Mill

Property Extent Purchased by CCG Ontario From Kaiser Ventures Inc. in 2000 (592 acres)

Operable Unit (OU) Boundaries

- OU-1
- OU-2
- OU-3
- OU-4

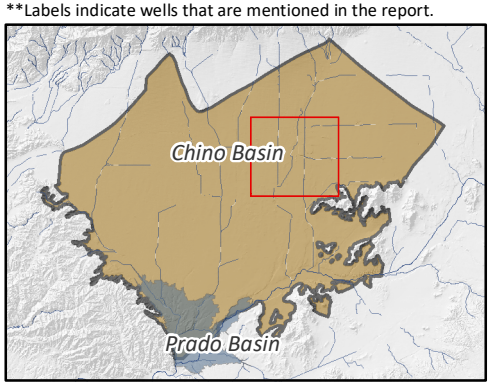
CCG Site Monitoring Wells* (some locations have multiple wells at various depths)**

- OU-2
- OU-3
- OU-4
- Other

Monitoring Wells Sampled Annually by Watermaster for the KWGWMP (some locations have wells at various depths)

*Multiple wells are part of more than one OU monitoring program and are shown as overlapping wells.

**Labels indicate wells that are mentioned in the report.



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Prepared by:

WEST YOST

N

0 1 Miles

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Prepared for:

Chino Basin Watermaster
Annual Plume Report

Former Kaiser Steel Mill and CCG Ontario Plume

Exhibit 1

WEST YOST
Water. Engineered.

23692 Birtcher Drive
Lake Forest CA 92630

949.420.3030 phone
530.756.5991 fax
westyost.com

Annual Plume Status Report

Milliken Landfill Plume
October 2023

CONTAMINANTS

The primary contaminant is trichloroethene (TCE). The California maximum contaminant level (MCL) for TCE is 5 micrograms per liter (µgl). The maximum TCE concentration detected in groundwater samples collected from wells within the plume area during the last five years (July 2018 to June 2023) is 9.2 µgl (measured at well M-8B in January 2020). The highest concentration of TCE ever measured on site is 178 µgl (measured at well M-2B in April 1997). Other contaminants of concern include the following volatile organic compounds (VOCs): tetrachloroethene (PCE), dichlorodifluoromethane, trichlorofluoromethane, 1,1-dichloroethane, and cis-1,2-dichloroethene.

LOCATION

The Milliken Sanitary Landfill (MSL) is located in the City of Ontario along the northwest intersection of Milliken Avenue and Mission Boulevard. The MSL occupies an area of approximately 196 acres, about one mile west of Interstate 15 and 1.2 miles southeast of Ontario International Airport. The MSL is owned and managed by the County of San Bernardino Solid Waste Management Division (County). The MSL TCE plume extends downgradient from the site in a southwestern direction. The Chino Basin Watermaster (Watermaster) last updated its delineation of the extent of the plume in the *2022 State of the Basin Report*.[1] This characterization is based on the five-year maximum TCE concentration measured over the period of July 2017 through June 2022. The extent of the plume is about 2,400 feet wide and 1,700 feet long. Exhibit 1 shows the location and extent of the TCE plume as delineated by Watermaster, compared to the County's most recent delineation of the extent of total VOCs.[2]

SITE HISTORY AND CLOSURE

The MSL was operated as a Class III Municipal Solid Waste Management Unit, accepting non-hazardous waste from 1958 to March 1999. On June 24, 1991, the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) issued Cleanup and Abatement Order (CAO) No. 91-92 to the County and other

[1] West Yost Associates. (2023). *Chino Basin Optimum Basin Management Program, 2022 State of the Basin Report.* Prepared for Chino Basin Watermaster. June 2023.

[2] Geo-Logic Associates. (2015). *County of San Bernardino Workplan: Investigation of Off-Site Impacts to Groundwater at the Milliken Sanitary Landfill*. Prepared for County of San Bernardino Solid Waste Management Division. July 2015.

landfill operators in the Santa Ana Region.[3] The order required the correction of drainage and erosion control deficiencies on the landfill property that could potentially cause the discharge of pollutants to groundwater. In 1994, the CAO was rescinded when the landfills achieved compliance, and concurrently, Order No. 94-17 was adopted to amend the Waste Discharge Requirements (WDRs) for all landfills in the Santa Ana Region and combine them under one WDR and Monitoring and Reporting Program (M&RP).[4] In 1996, the Santa Ana Water Board issued Cease and Desist Order No. 96-41 for the MSL for failure to maintain the drainage and erosion control systems.[5] In October 1999, the Santa Ana Water Board approved the *Final Closure and Post Closure Maintenance Plan* for the MSL.[6] The MSL began its multiphase closure process while still accepting waste. Phase one, termed the "East Mound Closure", was completed in March 1997, and was a pilot project to aid in the design of a soil cover for the rest of the landfill to prevent soil contaminants from leaching into the groundwater during precipitation events. Phase two, termed the "North and East Slope Closure", was completed in 1997 and included the construction of a six-foot-thick monolithic cover over 45 acres of the landfill. The final phase of the landfill closure was completed in March 2005 when the remaining 72 acres of the landfill were covered with a four-foot-thick monolithic cover.

Since its closure, the County maintains the MSL drainage and erosion control systems to ensure, to the greatest extent possible, that ponding, infiltration, inundation, erosion, slope failure, and washout are prevented during peak storm flows. The drainage control facilities consist of a network of earthen berms, benches, asphalt down drains and V-channels, concrete channels, reinforced concrete pipes, and sedimentation basins.

Since 2017, the County has leased a portion of the MSL property to PVN Milliken, LLC for a photovoltaic solar facility. The three-megawatt power generating solar facility consists of about 14.5 acres of solar panels located on the top and intermediate decks of the closed landfill. Exhibit 1 shows the footprint of this facility.

REGULATORY ORDERS

- Waste Discharge Requirements (WDR) and Monitoring and Reporting Program (M&RP) Order No. 81-3 and subsequent WDRs and M&RPs Order Nos. 93-57, 94-17, 96-40, 98-89, and R8-2015-0040 (current). Requirements for the design, construction, and maintenance of run-on runoff drainage control systems at the landfill and the supportive monitoring and reporting

[3] Santa Ana Water Board. (1991). *Cleanup and Abatement Orders for County and City Landfills (CAO) No. 91-92*. Letter from Gerard J. Thibeault to the County of San Bernardino Solid Waste Management Department. June 24, 1991.

[4] Santa Ana Water Board. (1994). *Tentative Order No. 94-17, Amending Waste Discharge Requirement for Municipal Solid Waste Landfills Within the Santa Ana Region*. Letter from Kurt V. Berchtold to the County of San Bernardino Solid Waste Management Department. February 9, 1994.

[5] Santa Ana Water Board. (1996). *Tentative Cease and Desist Order No. 96-41, for Violations of WDRs (Order No. 81-3, as Amended by Order No. 93-57, Order No. 94-17, and Order No. 96-40) at the Milliken Sanitary Landfill, San Bernardino County*. April 5, 1996.

[6] Project Navigator, Ltd. (1999). *Final Postclosure Maintenance Plan, Milliken Sanitary Landfill*. Prepared for the County of San Bernardino Solid Waste System Division. September 1999.

requirements. Orders Nos. 93-57, 94-17, 96-40, and 98-89 are combined WDRs and M&RPs for all landfills in the Santa Ana Region.

- CAO Order No. 91-92. Requirement for the MSL to correct drainage and erosion control deficiencies that existed on the landfill property.
- Cease and Desist Order No. 96-41. Requirement for the MSL to submit a workplan with a schedule for the design and construction of a permanent and effective drainage and erosion control system and for the implementation of the workplan.
- WDRs R8-2002-0033, amended by R8-2002-0085 and R8-2013-0020. General WDRs for the re-injection/percolation of extracted and treated groundwater within the Santa Ana Region. Terminated in May 2019 because the pump-and-treat system is no longer operable.[7]
- Water Code Section 13267 Order No. R8-2020-0033 (For the Determination of the Presence of Per- and Polyfluoroalkyl Substances (PFAS) at Closed Municipal Solid Waste Landfills Within the Santa Ana Region, San Bernardino County). Requirement to prepare workplan, conduct sampling and analysis, and submit sampling results to determine the presence of PFAS.

REGULATORY AND MONITORING HISTORY

On February 26, 1981, the Santa Ana Water Board adopted WDR No. 81-3 for the discharge of municipal solid wastes to land at the MSL.[8] The WDR addressed the placement, monitoring, and reporting of waste at the landfill; however, it did not require groundwater monitoring. In 1987, groundwater monitoring began with the installation of five monitoring wells as part of the Solid Waste Assessment Test (SWAT) investigation.[9] The initial monitoring results indicated that there were multiple contaminants in the groundwater underlying and adjacent to the landfill at concentrations significantly above background levels. The contaminants included multiple VOCs: dichlorodifluoromethane, 1,1-dichloroethene, PCE, and TCE.

On May 1989, the Santa Ana Water Board requested that the County investigate the nature and extent of the VOC contamination. The County submitted a workplan to the Santa Ana Water Board in July 1989 to implement the Phase I Evaluation Monitoring Program (EMP) and began implementing the approved Phase I EMP in 1992.[10] During the implementation of the Phase I EMP, the County installed ten new

[7] Santa Ana Water Board. (2019). *Termination of Regulatory Coverage Under Waste Discharge Requirements, Order No. R8-2002-0033, Groundwater Cleanup Project for Milliken Sanitary Landfill, San Bernardino County.* Letter from Cindy Li to the County. May 9, 2019.

[8] Santa Ana Water Board. (1981). *Order No. 81-3, Waste Discharge Requirements for the County of San Bernardino Solid Waste Management, Milliken Sanitary Landfill.* February 26, 1981.

[9] IT Corporation. (1989). *Final Report Solid Waste Assessment Test Milliken Sanitary Landfill, Project No. 240275*. Prepared for County of San Bernardino Environmental Public Works Agency Solid Waste Management Department. June 1898.

[10] IT Corporation. (1989). *Quarterly Report: Subchapter 15 Detection Monitoring Program for Cajon, Colton, Midvalley, Milliken, Plunge Creek, San Timoteo, and Yucaipa Landfills*. Prepared for County of San Bernardino Solid Waste Management Division. July 1989.

monitoring wells: eight wells downgradient from the facility and two wells upgradient from the facility.[11] Contaminants including TCE and PCE were detected in the new downgradient monitoring wells. After the implementation of the Phase I EMP, the County installed three additional monitoring wells along the southern boundary of the property, as well as one well upgradient and six wells downgradient of the property to further characterize the lateral and vertical extent of the TCE plume.

In January 1996, the County submitted a workplan for the Phase II EMP to install two additional monitoring wells along the southern boundary of the facility and two additional monitoring wells downgradient. The workplan was approved by the Santa Ana Water Board in February 1996.[12] Under the direction of the Santa Ana Water Board, the County completed the Phase II EMP and an Engineering Feasibility Study in 1998.[13,14] Groundwater flow modeling was performed to support the selection of an appropriate remediation strategy.[15]

The Santa Ana Water Board approved a remediation alternative that included: (1) a pump-and-treat system for onsite contaminated groundwater and (2) monitored natural attenuation for offsite contaminated groundwater. Construction of the Point of Compliance Corrective Action Program (CAP) pump-and-treat system was completed on March 4, 1999 and consisted of 13 groundwater extraction wells located at the downgradient edge of the MSL site. Offsite monitoring for natural attenuation began at four offsite wells in 1998.

In 2000, groundwater levels began to decline monotonically in the vicinity of the MSL and by 2007, the groundwater level dropped below the total depths of all 13 onsite extraction wells and five offsite monitoring wells. In response, the Santa Ana Water Board requested that the County complete an updated feasibility study to evaluate the effectiveness of the remediation strategy and the extent of the contaminant plume. In March 2013, the County finalized the Updated Engineering Feasibility Study for the MSL (2013 Feasibility Study).[16] The 2013 Feasibility Study evaluated several potential alternative treatments to mitigate the plume. The County concluded that monitored natural attenuation was the appropriate remediation alternative. This revised remediation alternative was approved by the Santa Ana Water Board on May 15, 2013.

The County and PVN Milliken, LLC submitted a revised Final Post-Closure Maintenance Plan in November 2016 and a land use plan in December 2016 to modify the MSL's end use plan to include the solar plant

[11] Converse Consultants Inland Empire. (1994). *Groundwater Contamination Evaluation, Milliken Sanitary Landfill*. Prepared for the County of San Bernardino Solid Waste Management Division.

[12] Santa Ana Water Board. (1996). *Milliken Landfill – Addendum to Phase II Workplan, Contaminant Plume Investigation.* Letter from Dixie B. Lass. February 6, 1996.

[13] Geo-Logic Associates. (1998). *Phase II Evaluation Monitoring Report, Milliken Sanitary Landfill*. Prepared for the County of San Bernardino Solid Waste System Division. May 1998.

[14] Geo-Logic Associates. (1998). *Engineering Feasibility Study, Milliken Sanitary Landfill*. Prepared for the County of San Bernardino Solid Waste System Division. May 1998.

[15] Geo-Logic Associates. (1999). *Groundwater Flow Model, Milliken Sanitary Landfill*. Prepared for the County of San Bernardino Solid Waste System Division. February 1999.

[16] Geo-Logic Associates. (2013). *Updated Engineering Feasibility Study for Corrective Action, Milliken Sanitary Landfill County of San Bernardino, California*. Prepared for the County of San Bernardino Solid Waste System Division. March 2013.

on the landfill surface.[17,18] The Santa Ana Water Board approved the plans in January 2017.[19] The revised post-closure maintenance plan provides a basis for plan inspection, maintenance, and monitoring of the MSL during the post-closure maintenance period. The revised land use plan describes PVN Milliken's modification to the landfill, and its responsibility to maintain and monitor the land in a way that does not impact groundwater and surface water quality.

In 2018, the County performed an evaluation of offsite impacts to groundwater at the MSL in response to a June 17, 2015 letter from the Santa Ana Water Board.[20] The 2015 letter requested that the evaluation of offsite impacts include the following actions: (1) update the 1998 groundwater-flow model to incorporate the non-operating groundwater pump-and-treat system and use updated monitoring data; (2) collect gas samples from specified landfill gas probes; and (3) prepare a report and evaluate the need for corrective action based on the findings. Based on the results of the updated modeling and monitoring for the offsite evaluation, the County proposed the installation of a downgradient monitoring well (see Exhibit 1) and a soil-gas investigation to determine whether soil gas mitigation is necessary. The Santa Ana Water accepted the proposed actions on March 29, 2018.[21] Since then, the County has conducted two pilot studies on a Soil Vapor Extraction (SVE) system, the most recent of which was completed in late-2019.[22]

REMEDIAL ACTION

As previously noted, the original remedial action plan of a pump-and-treat system and monitored natural attenuation was revised due to declining water levels. All 13 onsite extraction wells and five of the eight offsite monitoring wells dried up as groundwater elevations declined below well depths, causing the pump-and-treat system to cease operations in 2007. The 2013 Feasibility Study identified monitored natural attenuation, coupled with the existing mitigation measures, as the best remedial alternative of downgradient groundwater impacts and included certain trigger points that would require mitigation measures to be initiated. These trigger points include:

[17] Project Navigator, Ltd. (2016). *Final Postclosure Maintenance Plan Milliken Sanitary Landfill 36-AA-0054 Ontario, California. Prepared for the County of San Bernardino Department of Public Works – Solid Waste Management Division on behalf of PVN Milliken, LLC*. September 10, 1999. Revised June 2004. Revised 2014. Revised November 2016.

[18] Project Navigator, Ltd. (2016). *Land Use Plan for the Milliken Sanitary Landfill 36-AA-0054 Ontario, California, County of San Bernardino.* Prepared for the County of San Bernardino Department of Public Works – Solid Waste Management Division on behalf of PVN Milliken, LLC. December 2016.

[19] Santa Ana Water Board. (2017). *Approval of the Revised Final Post Closure Maintenance Plan and Land Use Plan for Milliken Landfill, Ontario, San Bernardino County*. January 19, 2017.

[20] Santa Ana Water Board. (2015) *Groundwater Impacts Evaluation for Milliken Sanitary Landfill, San Bernardino County*. June 17, 2015

[21] Santa Ana Water Board. (2018). *Evaluation of Off-Site Impacts to Groundwater at the Milliken Sanitary Landfill, San Bernardino County Global ID: L1000745844*. March 29, 2018. Letter from Keith Person on behalf of Cindy Li.

[22] Geo-Logic Associates in Association with Invirotreat Inc. (2020). *Pilot Test No. 2 Results Soil Vapor Extraction System Milliken Sanitary Landfill San Bernardino, California*. February 12, 2020.

- When the total VOC load[23] in samples from downgradient monitoring well M-8A or M-8B exceeds the model-predicted VOC concentrations for two consecutive quarters, this will trigger improvements to the existing landfill gas extraction system.
- Once improvements to the landfill gas extraction system are implemented and a statistically significant increasing VOC concentration trend is identified in monitoring well M-8A or M-8B over a one-year period, this will trigger a requirement for additional mitigation measures to be implemented.

The trigger points were approved by the Santa Ana Water Board in 2013.[24] If additional remedial action is deemed necessary based on these trigger points, the most appropriate and cost-effective remediation measure will be evaluated at that time. The 2013 Feasibility Study also specified that if VOC concentrations increase to one-half of the model-predicted VOC concentrations in wells at the center of the plume, an additional offsite monitoring well would be necessary near well M-19 to monitor the natural attenuation of the plume in the lower aquifer as the plume moves away from the site.

From October to December 2019 the County conducted a second SVE pilot test (Pilot Test No. 2) to evaluate the feasibility of using the now dry extraction wells for the pump-and-treat system to remove VOCs from the soil vapor in the vadose zone above the water table. The SVE pilot test involved using all the 13 dry groundwater extraction wells installed along the downgradient edge of the MSL (see Exhibit 1) that connect to a 4-inch conveyance header-line routing to a SVE treatment unit. The County submitted a report to the Santa Ana Water Board on February 12, 2020 describing the results of the pilot test, which concluded that full-scale operation of an SVE system at the MSL will be an effective means to minimize the potential for VOC impacts to groundwater without negatively impacting the operations of the landfill gas collection system at the site.[25]

MONITORING AND REPORTING

The County conducts groundwater, surface water, and soil-pore gas monitoring at the MSL. The monitoring program consists of 26 groundwater monitoring wells, two piezometers, and three surface water monitoring stations. There are also five soil-pore gas monitoring probes, and one landfill gas condensate station for monitoring VOCs in soil and vapor. Groundwater quality and groundwater levels are collected quarterly at the monitoring wells that are not dry (more than half are typically dry). Surface-water quality sampling is conducted quarterly when there is water at the sites. Field soil-gas screening is performed semi-annually during the second and fourth quarters, and a measurement is collected for laboratory analysis when methane is detected at a concentration that is greater than five percent in volume. Landfill gas condensate sampling is conducted annually in the fourth quarter. Extraction wells are also checked quarterly but have been consistently dry. Additionally, the County also submits monthly

[23] Statistically significant increasing or decreasing trends are determined using Sen's Slope/Mann Kendall trend test.

[24] Santa Ana Water Board. (2013). *Identification of Triggers for Additional Corrective Action System for the Milliken Landfill, San Bernardino County*. Letter dated May 15, 2013.

[25] Geo-Logic Associates in Association with Invirotreat Inc. (2020). *Pilot Test No. 2 Results Soil Vapor Extraction System Milliken Sanitary Landfill San Bernardino, California*. February 12, 2020.

inspection reports of site maintenance to the Santa Ana Water Board. These reports and all data that have been collected since 2005 are posted on the State Water Resources Control Board GeoTracker website.[26]

The groundwater data collected during the quarterly sampling events is statistically analyzed to identify increasing or decreasing trends of VOCs and other constituents of concern. The quarterly groundwater monitoring data are also used to assess the natural attenuation of the offsite extent of the plume. VOC concentrations at monitoring wells M-8B and M-8A (if not dry) are used to determine if there are triggers that would necessitate further corrective actions. These triggers are based on model-predicted concentrations from the 1999 groundwater modeling preformed to evaluate the pump-and-treat system. Exhibit 1 shows the locations of wells M-8A and M-8B. The following table shows the model-predicted VOC concentrations over time:

Table 1. Model Predicted Total VOC Load to Trigger Remedial Action at the MSL

Year	Total VOC Load at M-8A or M-8B [(a)], µgl	Year	Total VOC Load at M-8A or M-8B[(a)], µgl	Year	Total VOC Load at M-8A or M-8B [(a)], µgl
2013	120	2027	123	2041	50
2014	123	2028	117	2042	45
2015	125	2029	112	2043	40
2016	128	2030	106	2044	35
2017	130	2031	101	2045	30
2018	130	2032	96	2046	25
2019	129	2033	90	2047	20
2020	128	2034	85	2048	18
2021	127	2035	80	2049	16
2022	126	2036	75	2050	14
2023	125	2037	70	2051	13
2024	124	2038	65	2052	12
2025	124	2039	60	2053	11
2026	123	2040	55	2054	10

Notes:
(a) Total VOC load (µgl) equals the sum of all detected VOC concentrations in a given sample.

In November 2020, the County conducted a one-time monitoring event for per- and polyfluoroalkyl substances (PFAS) pursuant to an Investigative Order by the Santa Ana Water Board pursuant to California Water Code Section 13267.[27] Sampling for PFAS occurred at four monitoring wells (M-5B, M-2D, M-6B, M-15B) and one landfill gas condensate location. The final report was submitted to the Santa Ana Water Board on December 30, 2020. Perfluoro-n-pentanoic acid (PFPeA) and 6:2 fluorotelomer sulfonate (6:2 FTS) were detected at concentrations above the laboratory reporting limits at wells M-5B, M-6B, and M-15B, and perfluorohexane sulfonate (PFHxS) and perfluorooctanoic acid (PFOS) were detected above the

[26] https://geotracker.waterboards.ca.gov/profile_report?global_id=L10007458441

[27] Santa Ana Water Board. (2020). *Water Code Section 13267 Order No. R8-2020-0033, For the Determination of the Presence of Per- and Polyfluoroalkyl Substances (PFAS) at Closed Municipal Solid Waste Landfills Within the Santa Ana Region, San Bernardino County*. July 21, 2020.

laboratory reporting limits at well M-5B but below the California (CA) notification level for PFOS of 6.5 nanograms per liter (ngl).[28] All wells sampled had perfluorooctanoic acid (PFOA) concentrations below the CA notification level of 5.1 ngl.

RECENT ACTIVITY

In April 2023, the County submitted the 2022 Annual Summary Monitoring Report and First Quarter 2023 Monitoring Report, which presents the results of the 2022 groundwater monitoring period from April 1, 2022 through March 31, 2023. [29]

The County's most recent monitoring events occurred in April of 2023 and the results were reported in the Second Quarter 2023 Monitoring Report submitted to the Santa Ana Water Board in July 2023.[30] During the sampling event, groundwater levels were measured at nine monitoring wells and one piezometer, and groundwater-quality samples were collected at six monitoring wells and one piezometer. Eight monitoring wells, one piezometer, and all three surface water monitoring stations were dry. Observed groundwater elevation changes were consistent with previous seasonal changes. VOCs (including TCE) were detected in five wells, however all were below their respective MCLs. During the previous quarter, one well (M-8B) exceeded the MCL for TCE. Field parameters, general chemistry parameters, and dissolved metals exceeded the applicable MCLs in one or more wells or piezometers, however, all were in historical ranges, and none had a statistically significant increasing trend. Well M-8A was dry and the total VOC load for well M-8B was below the predicted total VOC load threshold of 125 µgl for 2023 to trigger remedial action. All 13 extraction wells were not able to be monitored during this sampling event because of continued lower water level conditions and dry wells. No methane was detected in the soil-pore gas screening samples. Exhibit 1 shows the monitoring wells that were sampled during the second quarter of 2023, and the wells that were dry.

Ongoing source control and routine monitoring and reporting will continue with no additional action recommended.

In May 2023, the South Coast Air Quality Management District issued a permit for the SVE extraction and treatment system using the 13 existing dry groundwater extraction wells for the removal of VOCs in soil to minimize potential VOC impacts to groundwater. Since April 2023, work began to transition the 13 existing extraction wells to SVE wells and operation of the SVE extraction and treatment system is expected to begin in the third quarter of 2023.

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[28] Geo-Logic Associates. (2020). *Results for Sampling and Analyses of Per – and Polyfluoroalkyl Substances at Select Santa Ana Region Closed Landfill Facilities.* December 30, 2020.

[29] Geosyntec. (2023). *First Quarter 2023 and 2022 Annual Summary Monitoring Report Water Quality Monitoring Program Corrective Action Program Milliken Sanitary Landfill Ontario, CA*. Prepared for San Bernardino County Solid Waste Management Division. April 28, 2023.

[30] Geosyntec. (2023). *Second Quarter 2023 Monitoring Report Water Quality Monitoring Program Corrective Action Program Milliken Sanitary Landfill Ontario, California*. Prepared for San Bernardino County Solid Waste Management Division. July 26, 2023.

WEST YOST - K:\Clients\941 Chino Basin Watermaster\00-00-00 Master\PE6 - Water Quality\GIS\MXD\Plumes\Status Reports\Annual\Milliken Landfill 2023\2023_MillikenPlume_Status_Ex1_v2.mxd - lhedley - 10/5/2023

Maximum Concentration (µgL)
June 2017 - June 2022

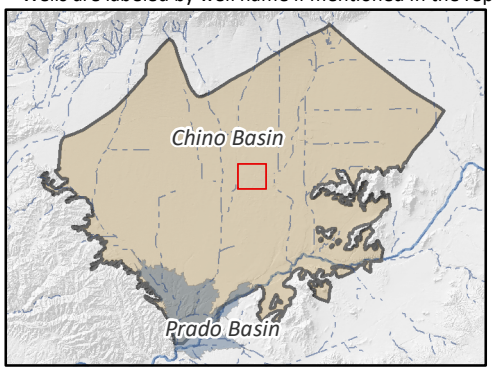
TCE
- 0.5 to ≤ 5
- > 5 to ≤ 10
- > 10 to ≤ 20
- > 20 to ≤ 50

MCL = 5 µgl

(Delineated by Watermaster in the 2022 State of the Basin Report)

County of San Bernardino Monitoring Wells*
- Sampled in 2023
- Dry in 2023
- Proposed new well location in 2018. Well has not been constructed yet.
- Surface Water Monitoring Station (Dry)
- Former Groundwater Extraction Well Being Converted to SVE Well
- Extent of Solar Facility
- Milliken Sanitary Landfill Boundary

* Wells are labeled by well name if mentioned in the report



Prepared by:

WEST YOST

N

0 0.25 Miles

0 0.25 0.5 Km

Prepared for:

Chino Basin Watermaster
Annual Plume Report

Milliken Sanitary Landfill
TCE Plume

Exhibit 1

WEST YOST
Water. Engineered.

23692 Birtcher Drive
Lake Forest CA 92630

949.420.3030 phone
530.756.5991 fax
westyost.com

Annual Plume Status Report

Stringfellow Plume
October 2023

CONTAMINANTS

The primary contaminants at the Stringfellow site are perchlorate, trichloroethene (TCE), and chloroform. The California maximum contaminant levels (MCL) for perchlorate and TCE are 6 micrograms per liter (µgl) and 5 µgl, respectively. Chloroform does not have an MCL but is assessed to a cleanup level of 6 µgl for the Stringfellow site.[1] The maximum contaminant concentrations detected in groundwater for the recent five years within the various designated zones of the Stringfellow site are shown in Table 1 below.

Table 1. Five-Year Maximum Contaminant Concentrations in Stringfellow by Zone between July 2018 to June 2023

Contaminant	MCL or Cleanup Level, µgl	Five-Year Maximum Concentration – July 2018 – June 2023, µgl	
		Zones 1-3 (Within Pyrite Canyon)	Zone 4 (Downgradient of Pyrite Canyon)
Perchlorate	6	10,000	140
TCE	5	280,000	24
chloroform	6	11,000	15

Additional contaminants at the site include other volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, para-chlorobenzene sulfonic acid, n-nitrosodimethylamine, and various heavy metals. Furthermore, the groundwater beneath the former waste evaporation ponds has a pH of <4.

LOCATION

The Stringfellow plume is located in the City of Jurupa Valley in the eastern portion of the Chino Basin in Riverside County. The plume extends south-southwest from Pyrite Canyon in the Jurupa Mountains which is the location of the former Stringfellow hazardous waste facility (Stringfellow site). The plume is geographically divided into four groundwater zones in consideration of various operational and remediation activities: three in Pyrite Canyon, and one downgradient from the canyon. These zones shown in Exhibit 1, include:

- **Zone 1 (On-site/Upper Mid-Canyon Area)** is located in the northern most part of Pyrite Canyon and includes the original 17-acre disposal facility. It is divided into two areas (Zone 1A and Zone 1B) that are separated by a man-made clay barrier constructed downgradient of the evaporation ponds in 1980 to mitigate subsurface flow. Zone 1A is

[1] Cleanup levels were established for TCE (5 µgl and equal to the MCL) and chloroform (6 µgl) in the Interim Records of Decision 4 by the United States Environmental Protection Agency.

located upgradient of the clay barrier and includes the former evaporation ponds. Zone 1B extends 600 feet south of the barrier below the evaporation ponds and includes the Pyrite Canyon Treatment Facility.

- **Zone 2 (Mid-Canyon Area)** comprises the central portion of Pyrite Canyon and includes the Pre-Treatment Plant and a line of extraction wells.
- **Zone 3 (Lower Canyon Area)** extends from just south of the extraction wells in Zone 2 to just north of Highway 60 and includes the Lower Canyon Treatment Facility.
- **Zone 4** is the largest zone and extends from Highway 60 to immediately north of the Santa Ana River; it is a residential and light industrial area in the City of Jurupa Valley and includes the Community Well Head Treatment System.

In addition to these four zones, there are two areas defined by the United States Environmental Protection Agency (USEPA) in Pyrite Canyon (Area 1 and Area 2) where the USEPA conducts investigations to characterize potential additional sources of perchlorate that contribute to surface water runoff and groundwater contamination in Zones 1-4. These areas are also shown in Exhibit 1.

Exhibit 1 shows the general extent of the TCE plume originating from the former Stringfellow site with detectable concentrations of TCE greater than or equal to 0.5 µgl, as delineated by the Chino Basin Watermaster (Watermaster) for the *2022 State of the Basin Report*.[2] The plume is approximately 3.2 miles long and 0.3 miles wide and extends from Zone 1 to the midpoint of Zone 4 near the Community Wellhead Treatment System.

Exhibit 1 also shows the general extent of the perchlorate plume originating from the Stringfellow site with concentrations greater than or equal to 6 µgl, as delineated in the *2020 Annual Groundwater Monitoring and Remedy Effectiveness Evaluation Report*.[3] The perchlorate plume extends from Zone 1 approximately 0.94 miles south/southwest to Zone 3, and then extends again through Zone 4 approximately 3.6 miles to just north of the Santa Ana River. The width of the perchlorate plume varies between approximately 0.1 and 1 mile. There are also several smaller perchlorate plumes to the east and west of the main plume as shown in Exhibit 1. The source of these plumes is undetermined. Investigations in USEPA Areas 1 and 2 have indicated that there are also sources of perchlorate located upstream and lateral to the Stringfellow site that are contributing to the groundwater plume in addition to the perchlorate originating from the Stringfellow site.[4,5]

The extent of the chloroform plume, which is much smaller than the TCE and percolate plumes, is limited to Zones 1 and 2 and is not shown in Exhibit 1.

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[2] West Yost Associates. (2022). *Optimum Basin Management Program - 2022 State of the Basin Report*. Prepared for the Chino Basin Watermaster. June 2023.

[3] Kleinfelder. (2023). *2020 Annual Groundwater Monitoring and Remedy Effectiveness Evaluation Report, Stringfellow Superfund Site.* Prepared for California Department of Toxic Substances Control. June 23, 2023.

[4] CH2M. (2017). *Draft Final Remedial Investigation Report EPA Area 1, Stringfellow Superfund Site, Jurupa Valley, California*. Prepared for U.S. Environmental Protection Agency, Region 9. April 2017.

[5] Ramboll US Corporation. (2020). *EPA Area 2 Remedial Investigation Report, Stringfellow Superfund Site, Jurupa Valley, California*. Prepared for California Environmental Protection Agency, Department of Toxic Substances Control. April 6, 2020.

SITE HISTORY

Stringfellow Quarry Company Inc. operated the Stringfellow site as a Class I Hazardous Waste Disposal Facility from 1956 to 1972 pursuant to the issuance of a land use variance by the Riverside County Planning Commission in 1952. During this time, an estimated 34 million gallons of industrial liquid waste containing spent acids, caustics, solvents, pesticide byproducts, metals, and other organic and inorganic constituents—derived primarily from electroplating, metal finishing, and pesticide manufacturing—were deposited in as many as 20 evaporation ponds (located within Zone 1a on Exhibit 1).[6] Liquid wastes were also sprayed into the air to reduce the volume of wastes accumulating in the ponds. In 1969, heavy rainfall caused the disposal ponds at the facility to overflow resulting in the discharge of contaminated liquids to Pyrite Creek. In 1978, heavy rains again threatened to cause the ponds to overflow, and the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) authorized an 800,000-gallon release from the ponds to prevent a larger uncontrolled release caused by the heavy rains.

Between 1975 and 1980, following closure of the site, approximately 6.5 million gallons of liquid wastes were removed from the facility. Following the removal activities, the USEPA and the United States Coast Guard (USCG) assisted the Santa Ana Water Board with the initiation of response actions and site investigation studies. In October 1981, the Stringfellow site was placed on the USEPA Interim Priorities List of Hazardous Waste Sites. On December 30, 1982, the Stringfellow site was proposed for the USEPA's final National Priorities List (NPL) as a Superfund site, and on September 8, 1983 it was placed on the final NPL. In 1993 the Department of Toxic Substances Control (DTSC) assumed responsibility for maintenance of the Stringfellow site on behalf of the State of California through a Cooperative Agreement with the USEPA. Since that time, over 45 phases of investigation, feasibility testing, and remedial actions have been performed by various entities at the site. A record of these activities and associated reports can be found on the DTSC EnviroStor website.[7]

REGULATORY ORDERS

From 1983 to 1990, the USEPA adopted four interim Records of Decision (RODs) to guide remediation efforts at the Stringfellow site. The following summarizes the four RODs and major remedial actions set forth therein:

- **ROD 1** (USEPA 1983).[8] The first ROD directed completion of several initial abatement activities including: fencing the site, erosion control, hauling and disposal of contaminated liquids, and interim source control.
- **ROD 2** (USEPA 1984).[9] The second ROD included the construction of the Pre-Treatment Plant in the mid-canyon area located within Zone 2.

[6] U.S. Army Corps of Engineers. (2016). *Fifth Five-Year Review Report for Stringfellow Superfund Site Riverside County, California*. September 2016.

[7] https://www.envirostor.dtsc.ca.gov/public/

[8] United States Environmental Protection Agency (USEPA). (1983). *EPA Superfund, Record of Decision: Stringfellow Acid Pits Site*. USEPA ID: CAT080012826, OU01, Mira Loma, California. July 1983.

[9] United States Environmental Protection Agency (USEPA). (1984). *Record of Decision, Stringfellow Acid Pits, Summary of Remedial Alternative Selection*. July 1984.

- **ROD 3** (USEPA 1987).[10] The third ROD included the installation of an upgradient surface water diversion north of the original contamination site within Zone 1A, and the installation of a groundwater barrier system in the lower canyon area located within Zone 3.
- **ROD 4** (USEPA 1990).[11] The fourth ROD delineated the site into four geographic zones (Zones 1-4, as described above), and directed the construction of the Community Wellhead Treatment Facility in Zone 4, the dewatering of the of the original disposal area in Zone 1, field testing of soil vapor extraction, and field testing of the reinjection of treated groundwater in the upper canyon area.

A fifth and final ROD (ROD 5), outlining the final remedial action objectives for Zones 1, 2, 3, and 4, is currently being prepared based on the *Interim Final Technical Impracticability Evaluation* (TIE) and the *Final Supplemental Feasibility Study Addendum for Zones 1 to 3* (2022 Feasibility Addendum). The TIE states that while current remedial actions are effective at containing the plume, there are no remedial actions that would be effective at restoring groundwater to regulatory levels, while the Feasibility Addendum identifies remedial alternatives that will best help contain the plume.[12,13]

REMEDIAL ACTION

In 1980, prior to the first ROD, the Santa Ana Water Board adopted an interim abatement program to contain the waste and minimize the risk of further contaminant migration. Several remedial solutions were implemented, including the removal of liquid waste from ponds, partial neutralization and capping of wastes, the construction of a subsurface clay barrier wall downgradient from the pond area, and drainage control features.

Following the completion of remedial measures required by ROD 1 and the issuance of ROD 2, a groundwater extraction and treatment system was developed and has become the primary remedial action implemented at the site. The groundwater extraction and treatment system, which has expanded over time, currently consists of a network of over 70 extraction wells throughout Zones 1-4 and two treatment plants operated by the DTSC on behalf of the State of California: the Pyrite Canyon Treatment Facility and the Community Wellhead Treatment System. The Pre-Treatment Plant and Lower Canyon Treatment Facility are no longer active. Exhibit 1 shows the locations of the four treatment plants; the following is a brief description of each:

- **Pyrite Canyon Treatment Facility.** This plant is located in Zone 1B and treats contaminated groundwater from extraction wells in Zones 1, 2, 3, and 4 (wells CTN-TW1 and CTS-TW1). The Pyrite Canyon Treatment Facility was constructed in 2017 to replace the aging infrastructure of Pre-Treatment Plant and began operating on April 4, 2017. The treatment

[10] United States Environmental Protection Agency (USEPA). (1987). *Record of Decision: Stringfellow Acid Pits, Summary of Remedial Alternative Selection (Early Implementation Action)*. June 1987.

[11] United States Environmental Protection Agency (USEPA). (1990). *Record of Decision: Stringfellow Hazardous Waste Site*. September 1990.

[12] Ramboll US Consulting, Inc. (2022). *Interim Final Technical Impracticability Evaluation Report, Stringfellow Superfund Site, Jurupa Valley, California*. Prepared for California Environmental Protection Agency Department of Toxic Substances Control. March 11, 2022.

[13] Ramboll US Consulting, Inc. (2022). *Final Supplemental Feasibility Study Addendum for Zones 1 to 3, Stringfellow Superfund Site, Jurupa Valley, California*. Prepared for California Environmental Protection Agency Department of Toxic Substances Control. March 11, 2022.

facility uses granular activated carbon (GAC) to treat for low pH, pesticides, metals, perchlorate, and VOCs. Treated effluent is stored onsite and then released to the Inland Empire Brine Line and the Orange County Sanitation Districts wastewater collection, treatment, and disposal facilities under permit from the Santa Ana Watershed Project Authority. Some of the treated effluent is used for utility water at the treatment facility.

- **Community Wellhead Treatment System.** This plant is located in Zone 4 and treats contaminated groundwater pumped from two wells in Zone 4 for VOCs and perchlorate (Wells CTP-TW1 and CTP-TW2). Treated effluent is discharged to Pyrite Creek under an NPDES permit and can also be used for irrigation by local residents.
- **Pre-Treatment Plant.** This plant is located in Zone 2 and began operating in 1985 pursuant to the second ROD. It formerly treated VOCs in groundwater from extraction wells in Zones 3 and 4 and stored at the Lower Canyon Treatment Facility. The Pre-Treatment Plant was shut down on October 29, 2019 and since then groundwater from the Zone 3 and Zone 4 extraction wells has been redirected to the Pyrite Canyon Treatment Facility for treatment. As of October 2021, the decommission of the Pre-Treatment Plant facility had been placed on hold with no date to resume demolition.
- **Lower Canyon Treatment Facility.** This facility is located in Zone 3 and formerly treated groundwater pumped from extraction wells in Zones 3 and 4 for VOCs. Treated effluent from the Lower Canyon Treatment Facility was piped to and stored at the Pre-Treatment Plant and subsequently released to the Inland Empire Brine Line. Currently, the facility is in a stand-by state. Since October 29, 2019, groundwater extracted from Zones 3 and 4 has been first stored at the Lower Canyon Treatment Facility and then pumped for treatment at the Pyrite Canyon Treatment Facility.

In 2021, the DTSC submitted a report to the USEPA on results of the Pyrite Canyon Groundwater Flow Model, to further assess the effectiveness of groundwater extraction systems at preventing site-related chemicals in groundwater from migrating further down canyon and into Zone 4.[14] The Pyrite Canyon Groundwater Flow Model demonstrates that groundwater flow is towards the center of Pyrite Canyon, consistent with the conceptual model and the observed extent of the perchlorate plume. It also confirmed that existing extraction systems are adequately capturing contaminants, except for areas located to the west of the extraction systems.

The USEPA has initiated groundwater and soil investigations to develop remedial actions for perchlorate for Areas 1 and 2 in Pyrite Canyon, potentially from sources on the west and east sides of Pyrite Canyon. A draft remedial investigation report for Area 1 (completed in 2017) and a remedial investigation report for Area 2 (completed in 2018) will inform feasibility studies to support the selection of a remedial action.[15, 16] A revised Remedial Investigation report was prepared by Ramboll to evaluate the results of the USEPA investigation for Area 2 (completed in April 2020).[17]

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[14] Ramboll US Corporation. (2021). *Pyrite Canyon Groundwater Flow Model.* Prepared for California Department of Toxic Substances Control. January 27, 2021.

[15] CH2M. (2017). *Draft Final Remedial Investigation Report EPA Area 1, Stringfellow Superfund Site, Jurupa Valley, California*. Prepared for U.S. Environmental Protection Agency, Region 9. April 2017

[16] Ramboll US Corporation. (2018). EPA Area 2 Remedial Investigation Report Stringfellow Superfund Site, Jurupa Valley California. October 19, 2018.

[17] Ramboll US Corporation. (2020). *EPA Area 2 Remedial Investigation Report, Stringfellow Superfund Site Riverside County, California*. Prepared for California Department of Toxic Substances Control. April 6, 2020.

MONITORING AND REPORTING

Currently there are more than 600 wells that are actively monitored for groundwater elevations and/or groundwater quality at and downgradient of the Stringfellow site. Groundwater monitoring is performed in accordance with the *2016 Site-Wide Groundwater and Surface Water Monitoring Plan*.[18] The DTSC performs routine monitoring either annually or quarterly to evaluate groundwater quality and reports its findings in quarterly and annual reports, as well as in annual groundwater remedy effectiveness evaluation reports. In general, new wells are sampled quarterly for two years and then incorporated into the annual sampling schedule. The number and type of wells monitored in each zone or area are summarized in Table 2 below. The DTSC also provides monthly reports to the Santa Ana Water Board, USEPA, and the Santa Ana Watershed Project Authority on the operation and effectiveness of the groundwater pump-and-treat system.

Table 2. Monitoring Well Schedule

Zone or Area	Number of Wells	Well Type				
		Monitoring Well	Extraction Well	Piezometer	Extraction Sump	Water Supply Well
1A	130	86	38	0	6	-
1B	73	51	11	11	-	-
2	35	27	8	0	-	-
3	131	119	12	0	-	-
4	197	154	4	36	-	3
USEPA Area 1/2	36	36	0	0	-	-
Total	**602**	**473**	**73**	**47**	**6**	**3**

In 2005, the DTSC initiated surface water sampling to evaluate perchlorate concentrations in storm water runoff in Pyrite Creek and its tributary channels. Currently, surface water sampling and reporting are executed pursuant to the *Final Surface Water Sampling and Analysis Plan* and are performed during qualifying storm events, which are classified using the following criteria: at least 72 hours of dry weather have elapsed since a previous storm event and a storm event produces sufficient runoff during daylight hours to perform sampling.[19]

Watermaster collects all relevant groundwater and surface water data from the DTSC's Stringfellow Interface for Data and Documents (SIDD database) on a bi-annual basis as part of its Chino Basin Data Collection effort. These data are periodically used by Watermaster to support its basin management initiatives.

[18] Kleinfelder. (2016). *Final Sitewide and Surface Water Monitoring Plan and Sampling and Analysis Plan Stringfellow Superfund Site, Jurupa Valley California*. Prepared for California Department of Toxic Substances Control. July 19, 2016.

[19] Geo-Logic Associates. (2016). *Final Surface Water Sampling and Analysis Plan; Stringfellow Superfund Site*. Prepared for California Department of Toxic Substances Control. July 2016.

RECENT ACTIVITY

The most recent groundwater monitoring report, the 2022 *Annual Groundwater Sampling and Analysis Report* was submitted by the DTSC to the USEPA on January 18, 2023.[20] Groundwater levels and groundwater-quality samples were collected from 318 wells and piezometers. Groundwater quality samples and level measurements were unable to be collected at 69 of the other scheduled wells for various reasons such as access restrictions and insufficient water.

The most recent surface water monitoring report, the *2021-2022 Annual Surface Water Sampling and Analysis Report* was submitted by the DTSC to the USEPA on January 18, 2023.[21] The report provides a summary of the one stormwater monitoring event for the 2021-2022 rain year, conducted in December 2021 at seven sites. From 2022 to 2023, there were four stormwater monitoring events. The results from these events are available on GeoTracker, however, the annual surface water monitoring report for 2022-2023 has not yet been submitted to the Santa Ana Water Board.

The Final 2020 *Annual Groundwater Monitoring and Remedy Effectiveness Evaluation Report* was submitted by the DTSC on June 29, 2023.[22] The report concludes that the remedial actions have been effective in reducing contaminants by removing a substantial mass of solutes. Between 2009 and 2020, 1,648 pounds of TCE, 310 pounds of chloroform, and 188 pounds of perchlorate were removed from groundwater at the site via the treatment systems. In general, contaminant concentrations in groundwater are decreasing across the site and the spatial extent of all contaminants of concern is similar to previous monitoring events. There is evidence that there may be additional sources of perchlorate contamination from the west and east sides of Pyrite Canyon (USEPA Areas 1 and 2) contributing to the contamination downgradient.

On June 15, 2023, the DTSC held a Stringfellow site briefing in which the findings of the May 2022, *Zone 4 Monitored Natural Attenuation Technical Memorandum* were presented. Overall, the perchlorate plume was found to be stable, with concentrations expected to drop below the MCL as a result of continued active remediation and natural attenuation by dilution and dispersion over the next 20 to 30 years.[23] Additionally, the natural attenuation processes occurring in sediments near the Santa Ana River area via biodegradation and dilution/dispersion due to the biochemical conditions in these sediments, are effective in decreasing perchlorate levels and the plume is not contributing to levels of perchlorate in the Santa Ana River.

On September 28, 2023, the USEPA approved the 2022 Feasibility Addendum, which provides: (1) recommendations to optimize existing remedies; (2) additional remedial action objectives for Zone 3; and (3) recommendations for three Remedy Optimization Alternatives to reduce migration of site-related contamination from Zone 3 to Zone 4. Although more costly, the 2022 Feasibility Addendum identifies the installation of a horizontal well as the most effective alternative to reduce the migration of site-related contamination from Zone 3 to Zone 4. The USEPA and DTSC are expected to release a proposed plan to present the preferred remediation alternatives for ROD 5. Following the selection of a remedy, the USEPA

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[20] Geo-Logic Associates. (2023). *2022 Annual Groundwater Sampling and Analysis Report*, *Jurupa Valley California*. Prepared for California Department of Toxic Substances Control. January 18, 2023.

[21] Geo-Logic Associates. (2023). *2021-2022 Annual Surface Water Sampling and Analysis Report, Stringfellow Superfund Site, Riverside County, California*. Prepared for California Department of Toxic Substances Control. January 18, 2023.

[22] Kleinfelder. (2023). *2020 Annual Groundwater Monitoring and Remedy Effectiveness Evaluation Report, Stringfellow Superfund Site.* Prepared for California Department of Toxic Substances Control. June 23, 2023.

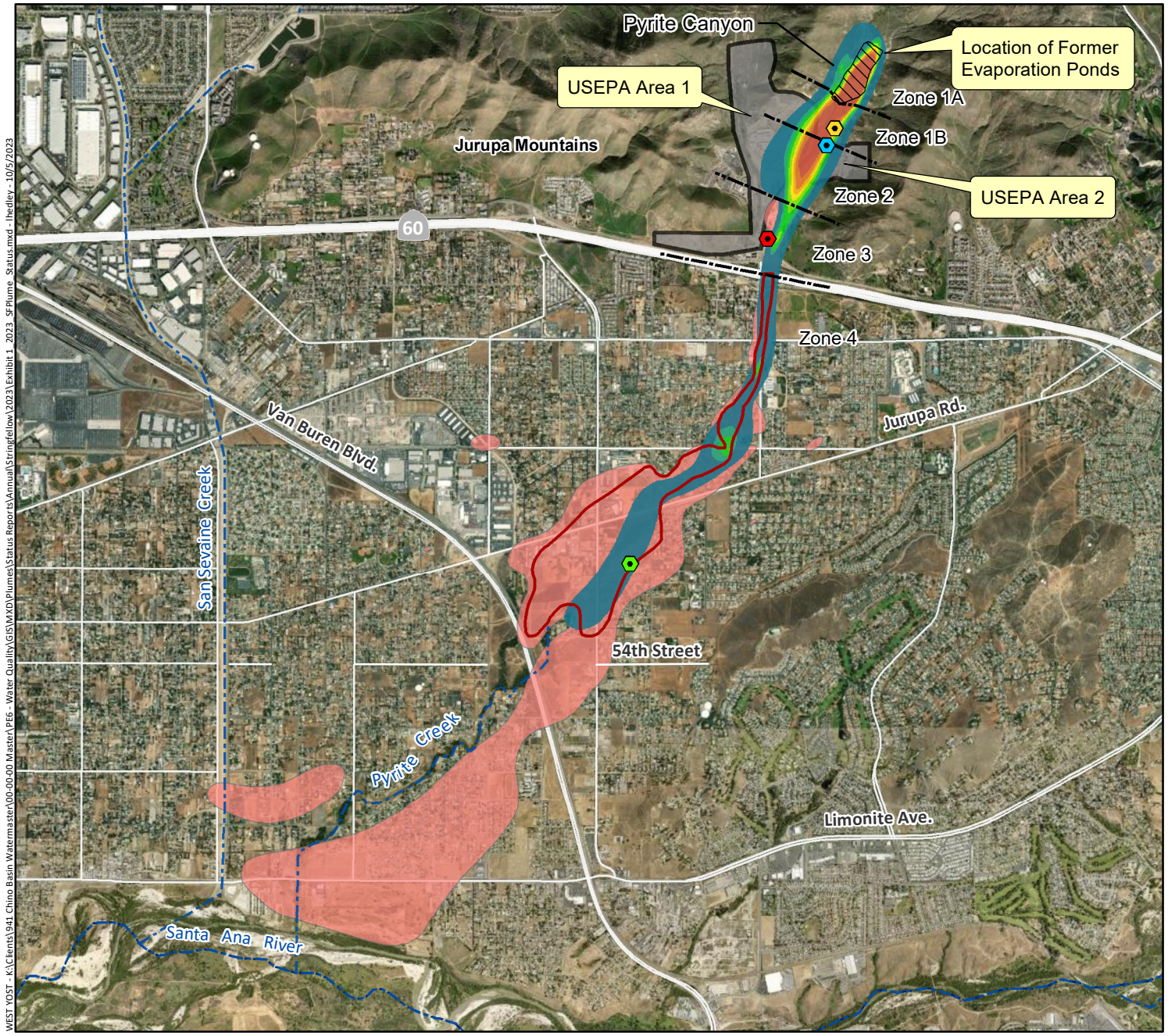
[23] Kleinfelder. (2022). *Revised Final Zone 4 Monitored Natural Attenuation Technical Memorandum,* Jurupa Valley California. Prepared for California Department of Toxic Substances Control. May 26, 2022.

will prepare the Final ROD 5 to provide a rationale for the selected remedy and outline its goals. ROD 5 is expected to be completed by September 2024.

On August 30, 2023, the DTSC submitted the *Final Zone 4 Data Gap Investigation Report* to the USEPA, which presents the Zone 4 Data Gap Investigation (DGI) field activities from 2015-2018 along with results for the Santa Ana River and Monitored Natural Attenuation investigations conducted in Zone 4.[24] The objectives of the DGI were to: (1) provide data to better define the extents of site-related contaminants in the groundwater in Zone 4; (2) evaluate perchlorate, VOCs, and other contaminants of concern in soil and groundwater; and (3) evaluate how monitored natural attenuation can remedy perchlorate in Zone 4. The results of the investigation have allowed for differentiation of perchlorate in groundwater based on chemical composition. Based on the investigation, the DTSC has updated its Conceptual Site Model to define two perchlorate plumes in Zone 4: (1) the Undifferentiated Perchlorate Plume that extends south towards the Santa Ana River and is attributed to releases from multiple sources in and near Pyrite canyon as well as perchlorate releases from sources in Jurupa Valley, including historical application of perchlorate-containing fertilizers; and (2) the Pyrite Canyon Synthetic Perchlorate Plume that extends to about 54th Street which is defined as the contiguous aquifer zone in which perchlorate concentrations exceed the MCL and the fraction of synthetic perchlorate is dominant (70% or greater). The Zone 4 remedy will target perchlorate contamination within the Pyrite Canyon Synthetic Perchlorate Plume. The extent of perchlorate in Zone 4 appears stable in the both the undifferentiated and synthetic plumes and concentrations are declining. The DTSC continues to inform the communities in the City of Jurupa Valley of updates on the remediation and monitoring of the Stringfellow Site through its annual Community Update Fact Sheet.[25]

[24] Kleinfelder, Inc. (2023). *Final Zone 4 Data Gap Investigation Report Jurupa Valley California.* Prepared for California Department of Toxic Substances Control. August 30, 2023.

[25] California Department of Toxic Substances Control. (2022). *Legacy Landfills Office Community Update: Stringfellow Superfund Site.* October 2022.



Maximum Concentration (µgL)
July 2017 - June 2022

TCE
- 0.5 to ≤ 5
- > 5 to ≤ 10
- > 10 to ≤ 20
- > 20 to ≤ 50
- > 50 to ≤ 100
- > 100 to ≤ 200
- > 200 to ≤ 500
- > 500

MCL = 5 µgl

(Delineated by Watermaster in the 2022 State of the Basin Report)

Extent of Perchlorate Plume (≥ 6 µgl)

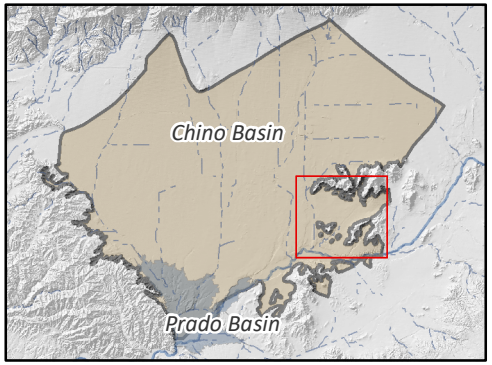
Undifferentiated Perchlorate Plume
Delineated by Kleinfelder in the 2020 Annual Groundwater Monitoring and Remedy Effectiveness Evaluation Report (2023)

Zone 4 Pyrite Canyon Synthetic Perchlorate Plume
Delineated by Kleinfelder in the Final Zone 4 Data Gap Investigation Report (2023)

Groundwater Treatment Facilities
- Pyrite Canyon Treatment Facility
- Pre-Treatment Plant
- Lower Canyon Treatment Facility
- Community Wellhead Treatment System

Boundary Between Remediation Zones

Streams & Flood Control Channels



Prepared by:

WEST YOST

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0 1 Miles

0 1 2 Km

Prepared for:

Chino Basin Watermaster
Annual Plume Report

Stringfellow
TCE and Perchlorate Plumes
Exhibit 1