SECOND FIVE-YEAR REVIEW REPORT FOR ICELAND COIN LAUNDRY SUPERFUND SITE CUMBERLAND COUNTY, VINELAND, NEW JERSEY

Prepared by

U.S. Environmental Protection Agency
Region 2
New York , New York

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEA/WRA	Classification Exemption Area/Well Restriction Area
CFR	Code of Federal Regulations
DCE	Dichloroethene
EAB	Enhanced Anaerobic Bioremediation
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
HHRA	Human Health Risk Assessment
ICs	Institutional Controls
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJGWQS	New Jersey Ground Water Quality Standards
NPL	National Priorities List
O&M	Operation and Maintenance
PCE	Tetrachloroethylene
POET	Point-Of-Entry Treatment
PPB	Parts Per Billion
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SLERA	Screening Level Ecological Risk Assessment
TCE	Trichloroethylene
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the second FYR for the Iceland Coin Laundry Superfund site. The triggering action for this **policy** review is the completion date of the first FYR. This FYR has been prepared due to the fact that the remedial action will not leave hazardous substances, pollutants or contaminants on site above levels that allow for unlimited use and unrestricted exposure but requires five or more years to complete.

The Iceland Coin Laundry Superfund site (site) FYR was led by Michael Zeolla, Remedial Project Manager. Participants included Sharissa Singh, Hydrogeologist, Urzsula Filipowicz, Human Health Risk Assessor, Mindy Pensak, Ecological Risk Assessor, and Pat Seppi, Community Involvement Coordinator.

Site Background

The site is the former dry-cleaning facility (former facility) located at 1888 South Delsea Drive, in the City of Vineland, Cumberland County, New Jersey. The study area which covers approximately 15 acres, encompasses the former facility and the associated contaminated ground water plume migrating to the south/southwest. The contaminated groundwater plume area encompasses South Delsea Drive, Dirk Drive, Garrison Road, Lois Lane, South Orchard Road, West Elmer Road and West Korff Drive (Figure 1-1).

The former Iceland facility consists of a 13,000 square foot, one-story building and adjacent parking areas on approximately 1.4 acres (Figure 1-3). A concrete pad is located in the northwest corner of the property, behind the building. To the west of the site is a mobile home park, to the south are houses and some small commercial buildings. There is a used car sale lot to the north and a vacant property once used as an automobile repair shop across Delsea Drive to the east. Adjacent to the vacant property on the east side of Delsea Drive is a New Jersey Department of Transportation (NJDOT) facility. In July 1997, the property was sold to the current owners who began operating a retail appliance and jewelry store in October 1997.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Iceland Coin Lanudry		
EPA ID: NJ0001360882		
Region: 2	**State:** NJ	**City/County:** Vineland/Cumberland

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Michael Zeolla
Author affiliation: Remedial Project Manager
Review period: 7/31/2014 - 7/31/2019
Date of site inspection: 3/7/2019
Type of review: Policy
Review number: 2
Triggering action date: July 31 2014
Due date *(five years after triggering action date)*: 7/31/2019

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Between June 2002 and December 2003, EPA performed a remedial investigation and feasibility study (RI/FS) for the site. The purpose of the RI/FS was to determine the nature and extent of contamination associated with the site. The RI field investigation focused on the source area and groundwater.

The source area investigation revealed only minor detections of contaminants and concluded that the contaminants likely do not remain within the unsaturated soil zone and only residual levels of contamination remain in on-site soils. The human health risk assessment (HHRA) concluded that contaminated soils did not present an unacceptable risk to current or future residents, workers at the site, or visitors to the site.

The groundwater investigation discovered that the core of the tetrachloroethylene (PCE) and trichloroethylene (TCE) groundwater plume had migrated vertically downward and horizontally to the south/southwest, and that residual contamination remained localized in and around the former facility. The plume extended approximately 4,700 feet south/southwest from the former facility and was about 900 feet in width. The HHRA concluded that groundwater posed an unacceptable risk from potential ingestion and inhalation of PCE and TCE.

An ecological risk assessment was also conducted for the site. This assessment concluded that there were no ecological receptors or habitat identified at the site. As a result, a Screening Level Ecological Risk Assessment (SLERA) was not required.

Response Actions

Initial Response

On September 3, 1987, the City of Vineland Health Department collected a potable well sample, in which TCE was detected. From December 1990 to September 1991, the City of Vineland Health Department collected potable well samples from 55 residences located in the area of Garrison Road and West Korff Drive. Analytical results from these sampling activities revealed levels of volatile organic compounds (VOCs) and mercury above federal and state MCLs in 21 of the 55 well samples. The primary contaminants were PCE, TCE, cis-1 ,2-dichloroethene (cis-1 ,2-DCE), and mercury. The well detected with mercury was subsequently resampled and mercury was not detected.

In November 1991, as a result of the private well contamination, the New Jersey Department of Environmental Protection (NJDEP) installed point-of-entry treatment (POET) units at the affected residences as a temporary remedial measure. In July 1994, the Vineland City Water Department extended public water hook-ups to the affected residences. As of December 2003, four residential wells were still in use; three were used for irrigation only and one was still used for drinking water. The owner refused to be connected to public water and had a POET system installed.

The Site was placed on the EPA's National Priorities List in October 1999.

The September 2006 Record of Decision has the following remedial action objectives (RAOs) to address the site groundwater contamination:

- Prevent ingestion of, and dermal contact with, contaminated groundwater having concentrations in excess of cleanup criteria;

- Restore the groundwater aquifer system to the cleanup criteria within a reasonable timeframe; and

- Prevent vapor intrusion of the VOCs into the Facility or buildings at the source area.

The risk assessment identified the contaminants of concern (COCs) for groundwater as PCE, and its breakdown products, TCE, and cis-1 ,2-DCE, and the remediation goals (RGs) for these COCs set in the 2006 ROD are as follows; PCE at 1 parts per billion (ppb); TCE at 1 ppb; and cis-1,2-DCE at 70 ppb. Since no COCs were present in soils resulting in unacceptable risk, RAOs were not developed for soils at the site.

The major components of the selected remedy include:

- In-situ biological treatment for cleanup of the groundwater at the Iceland Coin Laundry Site. The in-situ treatment will be an enhanced anaerobic bioremediation (EAB) system.

- In addition, enhanced anaerobic biological treatment at the facility area, if necessary. If the design investigation indicates significant soil contamination adjacent to the source area, EAB will also be performed in this area.

- EAB performance monitoring - Wells would be sampled to ensure that the conditions inside and along the edges of the contaminated area are conducive to biodegradation.

- Institutional controls for groundwater would include a Classification Exception Area (CEA) and well drilling restrictions to eliminate human exposure pathways to contaminated groundwater.

- Long-term groundwater monitoring program to track contaminant concentration changes and migration outside the treatment area. The monitoring will be conducted to establish whether contaminants are meeting the appropriate New Jersey Ground Water Quality Standards (NJGWQSs) or Maximum Contaminant Levels (MCLs), whichever are lower.

- If residences or businesses within the aerial extent of the site plume are found to have not yet been connected to public water, EPA would consider connecting them to the public water supply.

Status of Implementation

Based on the findings of the treatability study, a remedial design was completed in September 2007. The design called for the installation of injection and monitoring well, performing multiple rounds of amendment injection, and if necessary perform bioaugmentation. The remedy was implemented in two separate areas; the former facility area and the plume area, located in and around cluster well MW-07.

The following activities were conducted at the former facility:

- Five injection and seven monitoring wells were installed in two phases during April and July 2007. The injection wells formed two treatment zones.

- One round of amendment using emulsified vegetable oil (EVO) was successfully injected into the five injection wells in two phases in May and August 2007.

- Due to the low pH value in groundwater, potassium carbonate solution was injected into the groundwater together with the amendment solution at two of the five injection wells.

- Two rounds of samples were collected from the injection and monitoring wells. Baseline sampling was performed in May and July 2007 and Round 1 was performed in September 2007.

The following activities were accomplished in the plume area:

- Four injection and 13 monitoring wells were installed in March and April 2007.

- One round of amendment using EVO was successfully injected into the four injection wells in April 2007.

- Due to the low pH value in groundwater, sodium bicarbonate solution was injected into the groundwater at three of the four injection wells in June 2007.

- Dehalococcoides spp. (DHC) bacteria were injected into three of the four injection wells in June 2007.

- Six rounds of samples were collected from the injection and monitoring wells; Baseline (in April 2007); Round 1 (in May 2007); Pre-pH Adjustment (in June 2007); Round 2 (in July 2007); Round 3 (in August 2007); and Round 4 (in September 2007).

The following conditions for anaerobic biodegradation through reductive dechlorination were observed during monitoring of the groundwater in some injection wells at the treatment areas:

- Depletion of oxygen and nitrate concentration, indicating groundwater conditions had become anaerobic.

- Reduction of oxidation-reduction potential to iron reducing conditions with generation of ferrous irons, which is a step closer to the optimum conditions for complete reductive dechlorination.

- Reduction of PCE concentrations and generation of low concentrations of vinyl chloride, which is an intermediate product of the PCE dechlorination process.

In addition, EPA determined that EAB treatment would be most effective if it is only used to target the PCE plume greater than or equal to levels of 50 ppb. Below the 50 ppb PCE concentration the EAB treatment would not be effective in treating the PCE. The results and conclusions from these activities can be found in the June 2008 Final Treatability Study Report .

Following the treatability study and initial injections, additional EAB treatment activities were conducted in three stages and the approach was revised as performance monitoring data became

available. Stage 1 consisted of a preliminary investigation to optimize the remedy by refining the vertical and horizontal boundaries of the PCE plume. This investigation was completed in two phases. Phase 1 was conducted from April 2009 to November 2009, and included groundwater sampling from select existing monitoring wells and groundwater screening at 35 locations. Phase 2 was conducted in the summer of 2010 and included groundwater screening at 12 additional screening locations, collection of lithologic and geophysical data, and installation of 7 monitoring wells. The results of this investigation are summarized in a Final Stage 1 Technical Memorandum submitted in August 2011.

Stage 2 consisted of the implementation of a site-wide EAB barrier to reduce further migration of the PCE contaminated groundwater by forming a wall of amendment solution injected into the subsurface through wells installed on the east side of the Garrison Road and South Orchard Road intersection and perpendicular to ground water flow. The following activities were conducted under Stage 2:

- Groundwater screening at 7 locations to modify the proposed EAB barrier were completed in June 2011;

- Thirty-two amendment injections and 14 monitoring and 3 extraction wells that formed the EAB barrier were installed from July to August 2011;

- Amendment injections (EOS 550LS) at the EAB barrier and plume areas were conducted from September to October 2011; and

- Performance monitoring of groundwater.

Based on performance sampling results, additional site-wide monitoring wells were installed, and two hot spot treatment areas with PCE concentrations greater than 100 ppb were identified. The hot spot treatment activities are documented in the *Stage 2 Remedial Action – Round 5 Performance Evaluation Report* (CDM Smith 2016). Following the completion of the hot spot treatment activities, an additional three groundwater performance monitoring events were completed between November 2015 and September 2017. These groundwater sampling events evaluated the progress of the EVO treatment after the hot spot treatment activities.

Private Wells

After becoming aware that private wells were still being utilized within the site area, EPA extended public water connections to four residences in the summer of 2013. Then in August 2016, during the preparation of the CEA application, two additional properties were identified with private wells: the ARC of Cumberland County Evanoff Center (ARC) and the Cumberland County Public Works Vineland Yard facility (County Facility). EPA discovered that a POET system was installed at the ARC by NJDEP but later removed due to analytical results from the well water meeting NJGWQS. It is unclear who installed the POET at the County Facility well. In September 2017, EPA installed a new POET system at the ARC. An existing POET system was in operation at the County Facility.

Vapor Intrusion

Vapor intrusion investigation activities have been conducted at the former Iceland facility since March 2006. A total of 7 sampling events were conducted at the facility. No other properties in the area required testing due to fact that groundwater contamination sinks as it moves off site, creating a clean water barrier at the water table and eliminating vapor intrusion concerns.

Institutional Controls

In August 2016, as part of the ROD requirements, institutional controls for groundwater (in the form of an NJDEP CEA) we put in place to restrict the installation of wells to be used as a drinking water supply to eliminate exposure to contaminated groundwater until the ROD cleanup goals are achieved.

IC Summary Table

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	273 Acres	Restrict installation of wells to eliminate exposure to ground water use.	Classification Exemption Area/Well Restriction Area, August 2016

Systems Operations/Operations & Maintenance

Following the completion of the treatability study in 2007, a total of nine groundwater sampling events were conducted between 2009 and 2017 . One round of groundwater samples was collected in 2009 during the Stage 1 RA and eight rounds of samples were collected during the Stage 2 RA. During this period of groundwater sampling, two amendment injection events were completed; injection at the EAB barrier between September and October 2011, and hot spot treatment between August and September 2015. These events were conducted to enhance the degradation process of PCE and its daughter products (TCE, 1,2-DCE and vinyl chloride (VC)) in the groundwater plume. Groundwater samples from a network of 60 injection and monitoring wells throughout the site were initially collected on a semi-annually basis in 2012 and 2013, and then annually between 2014 and 2017. The samples were analyzed for PCE, TCE, cis 1,2 DCE, vinyl chloride, ethane, and ethene.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** FYR as well as the recommendations from the **last** FYR and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
OU1	Protective	The remedy for OU 1 is protective of human health and the environment because no one is using the contaminated groundwater and the remedy is reducing the contaminant concentrations within the plume. For it to be protective in the long term, the CEA needs to be put in place.

Table 3: Status of Recommendations from the 2014 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
OU1	CEA had not been put in place.	EPA worked with the State to establish the CEA.	Completed	EPA submitted CEA application which was approved by the State.	8/1/2017

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2018, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 42 Superfund sites in New York and New Jersey, including Iceland Coin Laundry site. The announcement can be found at the following web address: http://www.epa.gov/aboutepa/fiscal-year-2019-five-year-reviews

In addition to this notification, a public notice was made available to the Vineland City Health Department for posting on the department's website, as well as the EPA website, on 4/30/2019, stating that a FYR was being conducted and inviting the public to submit any comments to EPA. The results of the review and the report will be made available at: https://www.epa.gov/superfund/iceland-coin-laundry, as well as the Site information repository located at EPA Region 2, Records Center, 290 Broadway, 18th Floor, New York, New York 10007, and at local repository located at Vineland City Health Department, 640 East Wood Street, 3rd Floor, Vineland, New Jersey, 08362.

Data Review

The major unconfined unit at the site is the Kirkwood-Cohansey which is highly permeable and under aerobic conditions. Depth to groundwater ranges from approximately 6 to 30 feet bgs and the groundwater flow direction is to the southwest. The center of the contaminant groundwater plume has migrated away from the original source, the facility area, and moved downward in the aquifer to just above and within the fine-grained unit. Overall, the contaminant groundwater has migrated more than 5,000 feet downgradient of the facility area

PCE and its degradation daughter products were compared to the NJGWQS. The NJGWQS for PCE, TCE, and VC is 1 ppb, and for cis-1,2-DCE is 70 ppb. In addition, PCE concentrations were compared to the target goal of 50 ppb as per the remedial design specifications.

The former facility, plume, hotspot, and EAB barrier areas are the focus of this review. The results were used to evaluate the effects of the amendment solution injection on the PCE and PCE-daughter products concentrations within the groundwater plume and the nature and extent of the groundwater plume.

Former Facility (Source) Area

Groundwater samples were collected from four (4) monitoring wells: MW-31S, MW-31I, MW-29 and MW-30 annually from 2015 through 2017. These four wells were selected for monitoring events because they are located in the source area and historical contaminant concentrations consistently exceed NJGWQS. All of these source area wells are located within close proximity to amendment injection lines at the facility.

PCE concentrations in MW-31S decreased from 35 ppb in 2009 to 2.9 ppb in 2017 and decreased from 34 ppb in 2009 to 0.88 ppb 2017 in MW31I. PCE concentrations in MW-29 decreased from 39 ppb in 2009 to 1.2 ppb in 2017 and decreased from 29 ppb in 2009 to 4.2 ppb in 2017 in MW-30. During this sampling period, there were slight fluctuations of PCE concentrations. Overall PCE concentrations are decreasing in these wells, except from 2016 to 2017, where PCE concentrations slightly increased while remaining above NJGWQS. TCE and the other daughter products were reduced to below their NJGWQS (See Table A).

Plume Area

The plume area is located in and around MW-07 where historically high concentrations of site COCs are located downgradient of the facility area. Amendment injections were performed in the plume area in April 2007 and in October 2011. The initial amendment injection occurred at four injection wells (INJ-1, INJ-2, INJ-4, and INJ-5) and the second amendment injection occurred at three (3) monitoring wells MW-21I, MW-21S, and MW-23I.

Groundwater samples were collected from MW21D, MW22S, MW22I, MW22D and MW07I, which are located in the northern portion of the plume area. These monitoring wells are located

near injection wells INJ-1, MW21I and MW21S. The wells exhibit a decreasing trend from 2009 to 2017, with a maximum PCE concentration of 160 ppb detected in MW22I in 2009 to an estimated minimum PCE concentration of 0.3J ppb in MW22S. From 2009 through 2017, these wells also exhibited some seasonal fluctuations, however, the most recent laboratory results from 2017 indicate that PCE concentrations in most of these wells still remain above the NJGWQS, with the exception of MW22S which was below its regulatory standard. The most recent laboratory data from 2017 indicates that TCE and the other daughter products have been mostly non-detect, however TCE, cis 1,2 DCE and VC have been sporadically detected slightly above their groundwater quality standards in 2017 (See Table B).

Groundwater samples were also collected from monitoring wells MW24S, MW24I, MW24D, MW23S, MW23D and MW25I which are located in the southern portion of the plume area. The wells are located near injection wells INJ-2, INJ-4 and MW23I.

All shallow wells were non-detect for site COCs except for MW-24S which had a PCE concentration was 2.9 ppb. PCE, TCE and/or cis-1,2-DCE concentrations exceeded NJGWQS in MW-24I and MW-25I. VC concentrations were below detection limits at all intermediate wells. PCE concentrations in MW-25I decrease from 150 ppb in 2014 (Round 4) to non-detect in 2017 (Round 7), but cis-1,2-DCE remained elevated at 78 ppb in 2017 (Round 7), indicating active biodegradation of PCE and accumulation of one of its daughter products. PCE concentrations in MW-23D and MW-24D exceeded the NJGWQS in 2009 but concentrations significantly decreased through 2017 (Round 7). TCE concentrations in these wells ranged between 0.84 ppb in MW-21D to 3.2 ppb in MW-23D in 2017 (Round 7) (See Table C).

Overall, at the time of Round 7 sampling event, 6 years after the second amendment injection at the plume area and 2 years after the hot spot treatment, PCE concentrations only exceeded 50 µg/L in MW-7I. PCE concentrations in other wells were less than 23 µg/L. Results from MW-25I and MW-36 indicated on-going anaerobic biodegradation of PCE.

EAB Barrier Area

The EAB Barrier Area is downgradient of the Plume Area. The results from performance monitoring events conducted between April 2012 and December 2017 (Rounds 1–7) indicated that the 50 ppb PCE concentration plume at the EAB barrier area bifurcated into northern and southern portions. Monitoring wells identified as MW-39 and MW-40 are located upgradient in the northern portion of the plume. Monitoring wells identified as MW-12I, MW-41, MW-42, MW-43, MW-47 and MW 48 are located downgradient in the southern portion of the plume.

Monitoring wells identified as MW-44, MW-45, MW-34I, MW-34D and MW-46 are located downgradient of the southern portion of the plume. Injection wells INJ-14 and INJ-15 are part of the EAB barrier wall and are used as monitoring wells to evaluate the performance of the EAB barrier area. Thirteen of the 15 above listed wells are screened within the EAB treatment zone (approximately 75-88 feet deep) and evidence of the amendment injection was observed in these 13 wells. Monitoring wells MW-12I (northern portion) and MW-34D (southern portion) are screened deeper than the EAB treatment zone (approximately 100-110 feet deep) and showed no signs of impact from the amendment injection (See Table E).

The baseline PCE concentration in MW-39, located upgradient of the northern portion of the plume in the EAB barrier area was detected at 88 ppb in 2011. After the EAB treatment injection activities, PCE concentrations in MW-39 ranged from 59 ppb in 2012 (Round 1) to maximum concentration of 100 ppb in 2012 (Round 2). The baseline PCE concentration in MW-44, located in the southern portion of the plume in the EAB barrier wall was detected at 56 ppb in 2011. But after the EAB barrier injection activities, PCE concentrations in MW-44 ranged from to 4.5 ppb in 2012 (Round 2) 20 ppb in 2014 (Round 4). Trend analysis of these wells indicate that PCE concentrations decreased after the EAB barrier treatment injections in 2011, however, concentrations have rebounded after 2014 with sporadic fluctuations and still remain above regulatory standards (See Table D).

PCE biodegradation continued in INJ-14 and INJ-15, as evidenced by the increase of cis-1,2-DCE and the decrease of PCE. Following the 2014 (Round 4) sampling event, TCE was not detected in either of the two injection wells INJ-14 and INJ-15.

For the five wells (MW-41, MW-42, MW-43, MW-47 and MW-48), located downgradient of the northern portion of the plume at the EAB barrier wall, the average PCE concentration decreased from 96.4 ppb in the baseline sampling event to 34.8 ppb in 2017 (Round 7), a 63.9 percent reduction. PCE concentrations in MW-41 continues to be above 50 ppb (See Table F).

For the three wells (MW-45, MW-34I and MW-46), located downgradient of the southern portion of the plume in the EAB barrier wall, the average PCE concentration decreased from 58.7 ppb in 2011 (Baseline) to 25.9 ppb in 2017 (Round 7), a reduction of 55.9 percent (See Table E).

Overall, the contaminant concentrations in wells at the EAB barrier or downgradient of the EAB barrier appear to be stable or decreasing with the highest PCE and TCE concentrations at 19 µg/L and 2.3 µg/L, respectively.

Hot Spot Treatment

Based on the results of the EAB performance data collected after the treatability study and EAB barrier injections, several locations (monitoring wells MW-07I and MW-36) continue to show PCE concentrations above the 50 ppb target goal. Because of these findings, EPA approved additional EAB injection (hot spot) treatment for areas with PCE concentrations above 100 ppb. Hot spot treatment activities were conducted at a total of 31 temporary injection points to the north (T-20 to T-40) and south (T10 to T-19) of cluster well MW-07 in the plume area. In addition, a total of 9 temporary injection points to the north (T-5 to T-9) and south (T-1 to T-4) of MW-36 were installed in August and September 2015 (Figure 1-5).

Several monitoring wells are upgradient of cluster well MW-07 and the hot spot treatment injection zone in the plume area, including MW-33I and MW-50. The results from MW-50 indicated that while PCE and TCE continued to exceed their NJGWQS of 1 ppb, the concentrations appear to be decreasing from 2015 to 2017. No VOC concentrations were detected in MW-33I in any of the groundwater samples collected. In addition, PCE was only

detected slightly above the NJGWQS of 1 ppb at 1.7 ppb in 2016 (Round 6) and 2.1 ppb in 2017 (Round 7) in MW-51, which is south of cluster well MW-07 and the hot spot treatment injection zone.

Groundwater data was collected from MW-36 to evaluate hot spot treatment injection results since it is located just downgradient of cluster well MW-07. Analytical results indicate that both PCE and TCE concentrations continued to exceed their NJGWQS of 1 ppb from 2015 (Round 5) to 2017 (Round 7). PCE concentrations decreased from a maximum of 150 ppb in 2012 (Round 2) to 16 ppb in 2017 (Round 7). Similarly, TCE concentrations decreased from a maximum of 24 ppb in 2012 (Round 2) to 3.7 in 2017 (Round 7). This indicates that the treatment injection is effectively working to reduce mass concentrations. Cis-1,2-DCE concentrations increased from 9.7 ppb in 2015 (Round 5) to 59 ppb in 2017 (Round 7) and are below the NJGWQS of 70 ppb .

Well clusters MW-21, MW-22, MW-23 and MW-24 are screened within the shallow, intermediate and deep zones of the groundwater plume. These wells are located upgradient of MW-07 but in between the north and south hot spot treatment injection zones. Groundwater data from these wells were evaluated to assess groundwater quality within the shallow, intermediate and deep zones of the groundwater plume.

For shallow zone wells (65-75 feet deep), the site related VOCs were non-detect or below NJGWQS, except for MW-24S, where PCE was detected at 5.6 ppb in 2015 (Round 5), and 2.9 ppb in 2017 (Round 7).

For intermediate zone wells (75-85 feet deep), PCE and TCE concentrations decreased significantly in MW-21I, MW-22I, MW-23I, MW-24I and MW-25I from 2011 (Baseline) to 2017 (Round 7). In addition, site related VOC contaminant concentrations in MW-21I and MW-23I are either non-detect or below NJGWQS from 2013 (Round 3) to 2017 (Round 7). Also, PCE and TCE concentrations in MW-22I remains above NJGWQS while increasing slightly from 2015 (Round 5) to 2017 (Round 7). PCE and TCE concentrations in MW-24I were non-detect from 2012 (Round 2) to 2015 (Round 5) but edged above NJGWQS in 2016 (Round 6) and 2017 (Round 7). Site related VOC contaminant concentrations in MW-25I were reduced to below NJGWQS by 2017 (Round 7) except cis-1,2-DCE which increased from 2015 (Round 5) to 2017 (Round 7) . Cis-1,2-DCE concentrations in the intermediate zone wells, specifically monitoring wells MW-21I and MW-23I were below NJGWQS from 2012 (Round 1) to 2017 (Round 7) except for 2014 in MW-21I at 82 ppb. Cis-1,2-DCE concentrations in MW-23I were below the NJGWQS while MW-24I remained above the NJGWQS from 2012 (Round 1) to 2017 (Round 7). VC was detected in these intermediate zone wells from 2012 to 2014. After hot spot treatment injection in 2015, the VC concentrations dropped to below NJGWQS. PCE and TCE concentrations decreasing, coupled with cis-1,2-DCE concentrations increasing, indicates continued active biodegradation.

For deep zone wells (85-95 feet deep), PCE concentrations exceed the NJGWQS of 1 ppb in MW-21D, MW-22D, MW-23D and MW-24D from 2015 through 2017. However, PCE concentrations are decreasing in MW-21D and MW-24D and increasing in MW-22D and MW-23D. TCE was non-detect in all of these deep zone wells in 2015. However, TCE was detected slightly above its NJGWQS of 1 ppb in 2016 (Round 6) and 2017 (Round 7). Cis-1,2-DCE and

VC concentrations were not detected in any of the deep zone wells from 2012 (Round 1) to 2016 (Round 6) until 2017 (Round 7).

Overall, contaminant concentrations have been significantly reduced from the EAB treatment at the barrier area and after hot spot injection. However, contaminant concentrations still remain above regulatory standards in wells which will require further performance evaluation through future groundwater sampling events.

Private Well

Two private wells (on the ARC and County properties) are equipped with POET systems to remove site-related VOC contaminants from groundwater. Samples were collected quarterly in 2017 and 2018 at three locations; 1) the entry point prior to the lead activated carbon unit; 2) the midpoint (between two activated carbon units); and 3) the exit point of the system and analyzed for site related VOC contaminants from September 2017 to September 2018. Prior to the POET system installation, PCE was detected at 7.1 ppb (above the NJGWQS) and 0.21 ppb in groundwater from the entry points of the ARC and County Facility properties, respectively.

After the POET system was installed, PCE influent (pretreatment) concentrations ranged from non-detect to 0.21 ppb at ARC facility. Influent PCE concentrations ranged from 7.4 ppb to 4.7 ppb at County Facility. No site-related VOC contaminants were detected in samples between or after the two activated carbon units.

Vapor Intrusion

The last sampling event was completed in February 2018 (See Figure 1). The results of the sub-slab samples collected beneath the former facility indicated that PCE was detected above current risk-based screening criteria similar to previous events but TCE was not detected. The building's indoor air continues to show no levels above current levels of concern for PCE but TCE was detected at one indoor location (1.02 $\mu g/m^3$). However, the TCE detected in indoor air is not site-related based on previous sampling events. Overall, the data results show that vapor intrusion pathway is not currently a concern for occupants of the former facility but periodic sampling for vapor intrusion will continue to ensure the protectiveness of human health and the environment.

Overall Technical Summary

In summary, concentrations in the source area and plume have decreased significantly since injections began in 2009. Over the long term, additional performance monitoring events are needed to evaluate the continued effectiveness of the hot spot treatment injection areas and EAB barrier area. Based on the results of these subsequent performance monitoring events, additional amendment injection events may be needed to further reduce site related VOCs. In addition, long-term monitoring is a component of the remedy and is a requirement of the ROD. Annual performance monitoring is necessary to evaluate the long-term impact of the hot spot treatment over the next 5 to 10 years while the site related VOC contaminated plume will continue to be monitored for the duration of the project.

Site Inspection

A site inspection was conducted on 3/7/2019. In attendance were Michael Zeolla, the EPA Remedial Project Manager, and Kershu Tan and Grace Chen, of CDM Smith. The purpose of the inspection was to observe and assess the protectiveness of the remedy. Interviews were conducted with the owners of the appliance store (former facility), the owner of the property where the treatability study was conducted, and the ARC executive director where a POET system was installed in September 2017. During our interview with ARC, the school director indicated that the school building would be connected to public water after Cumberland County extends the waterline main down to the County Facility property adjacent to ARC. In addition, injection and monitoring wells and the POET system on the ARC property were inspected. No deficiencies were observed.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

The remedy for the site is in-situ enhanced anaerobic biological treatment for cleanup of the groundwater with performance and long-term monitoring, and institutional controls in the form of a CEA. In addition, EPA would consider connecting residences and businesses to the public water supply within the aerial extent of the site plume if they were found to have not yet been connected. The RAOs for the remedy are defined as preventing ingestion of, and dermal contact with, contaminated groundwater having concentrations in excess of cleanup criteria; restoring the groundwater aquifer system to the cleanup criteria within a reasonable timeframe; and preventing vapor intrusion of the VOCs into the Facility or buildings at the source area.

Contaminated groundwater is being treated through amendment injections. The injections conducted to date have resulted in a decrease of PCE concentrations and in reduced overall contaminant mass in the groundwater. Contaminant degradation continues at wells MW-25I and MW-36 due to hot spot treatment. Data collected from 2009 to 2017 shows decreasing site-related COC concentrations and reduced contaminant plume mass. A review of the geochemistry and concentration data from 2015 to 2017 indicates that the overall extent of the plume is in steady state. Contaminant mass continues to decrease, but at a slower rate than previous years. However, elevated PCE and/or TCE concentrations remain above NJGWQS in localized areas between the plume area and the EAB barrier area. Although there are areas within the groundwater plume that remain above regulatory standards, the overall reduction of site contaminant concentrations indicates that the remedy is functioning as intended by the decision document. The dilute groundwater plume downgradient of the EAB barrier continues to migrate in a south/southwest direction. However, all downgradient properties are either connected to public water or have POET systems.

The POET systems at the ARC and County properties are currently removing site-related VOC contaminants from the groundwater, and in the future, both properties will be connected to public water by Cumberland County.

However, additional performance monitoring events are needed to continue to evaluate effectiveness. Based on the results of these subsequent performance monitoring events, additional injection events may be conducted. In addition, the implementation of a CEA in August 2016 has eliminated any exposure to contaminated groundwater from the installation of drinking wells.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

There have been no physical changes to the site that would adversely affect the protectiveness of the remedy. Land use assumptions, exposure assumptions and pathways, and clean up levels considered in the ROD followed the Risk Assessment Guidance for Superfund used by the Agency and remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid.

The groundwater RAOs used at the time of the remedy selection remain valid. NJ GWQS were selected as cleanup criteria for the site COCs (which include PCE, TCE and cis-, 2-DCE). The NJ GWQS have not changed for the site COCs since the signing of the ROD and they too remain valid.

The BHHRA determined that potential risk from soils available for direct contact did not exceed unacceptable levels; however, exposure to contaminated groundwater beneath the site would result in unacceptable risk to the current and future child/adult resident and site worker. Most residents in the vicinity of the site have been connected to the public water supply, eliminating the groundwater exposure pathway. However, recent data suggests that the VOC contaminated plume is migrating in the area of the ARC and County properties. Therefore, POET systems were installed to eliminate exposure to the groundwater, and in the future, both properties will be connected to public water by Cumberland County. In addition, to ensure vapor intrusion into indoor air is not a completed pathway, sub slab and indoor air samples have been collected from the former facility building since 2006. A review of the data collected in 2018 indicated elevated concentrations of PCE continue to be detected beneath the slab of the on-site building, however indoor air detections of PCE are below levels of concern. To ensure the remedy remains protective, periodic vapor intrusion sampling will continue at the former facility building.

The plume does not discharge to any water bodies so ecological risks are still not a concern at the site.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

No information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

There are no issues/recommendations associated with the site remedy.

VII. PROTECTIVNESS STATEMENT

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy at OU1 is protective of human health and the environment.	

VIII. NEXT REVIEW

The next FYR report for the Iceland Coin Laundry Superfund Site is required five years from the completion date of this review.

Appendix A

Data Tables

Table A
Facility Area Groundwater COCs Sampling Results (ppb)

Contaminants of Concern	MW-29		MW-30		MW-31S		MW-31I	
	2009	2017	2009	2017	2009	2017	2009	2017
Tetrachloroethylene (PCE)	**39**	**1.2**	**29**	**4.2**	**35**	**2.9**	**34**	0.88
Trichloroethylene (TCE)	**1.9**	0.5 U	**1.5**	0.58	0.5 U	0.5 U	**2.3**	0.5 U
1,2-Dichloroethylene	1.9	0.35 J	3.9	0.63	0.5 U	0.5 U	1.6	0.5 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table B
Northern Plume Area Groundwater COCs Sampling Results (ppb)

Contaminants of Concern	MW-07I		MW-21D		MW-21I		MW-22I		MW22D	
	2009	2017	2009	2017	2009	2017	2009	2017	2009	2017
Tetrachloroethylene (PCE)	**130**	**51**	**11**	**3.2**	**190**	0.5 U	**160**	**19**	**35**	**4.9**
Trichloroethylene (TCE)	**34**	**7.7**	**2.8**	0.84	**31**	0.5 U	**38**	**2.8**	**7.7**	**1.1**
1,2-Dichloroethylene	**70**	18	48	11 J	16	30	36	20	6.1	9.8
Vinyl Chloride	0.5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**3.9**

Table C
Southern Plume Area Groundwater COCs Sampling Results (ppb)

Contaminants of Concern	MW-24S		MW-24I		MW-24D		MW-23I		MW23D		MW-25I	
	2009	2017	2009	2017	2009	2017	2009	2017	2009	2017	2009	2017
Tetrachloroethylene (PCE)	**33**	**2.9**	**170**	**1.6**	**89**	**7.1**	**170**	0.5 U	**30**	**18**	**190**	5 U
Trichloroethylene (TCE)	**11**	0.58	**31**	0.66	**19**	**1.6**	**33**	0.5 U	**9.7**	**3.2**	**21**	5 U
1,2-Dichloroethylene	5.3	7.9	16	**83**	18	15	18	1.8 J	40	6.6	19	**78**
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.42J	0.5 U	**1.4**	0.5 U	0.5 U	0.5 u	0.59	0.5 U	5 UJ

Table D
North Portion of EAB Barrier Area Groundwater COCs Sampling Results (ppb)

Contaminants of Concern	MW-39		MW-40		MW-22S		MW-22I		MW22D	
	2009	2017	2009	2017	2009	2017	2009	2017	2009	2017
Tetrachloroethylene (PCE)	**88**	**82**	**36**	**70**	**35**	0.3 J	**160**	**19**	**35**	**4.9**
Trichloroethylene (TCE)	**8**	**11**	**5**	**11**	**12**	0.5 U	**38**	**2.8**	**7.7**	**1.1**
1,2-Dichloroethylene	5.3 J	23	3.1	15	8.9	0.5 UJ	36	20	6.1	9.8
Vinyl Chloride	8 U	5 U	2.5 U	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**3.9**

ppb – parts per billion
UJ - non-detect with an approximate quantitation limit
U - nondetect (detection limit is indicated)
J - estimated value
Highlighted and bold values exceed the New Jersey Groundwater Quality Standard of 1 ppb for PCE, TCE and vinyl chloride, and 70 ppb for 1,2 DCE.

Table E
Southern Portion of EAB Barrier Area Groundwater COCs Sampling Results (ppb)

	At the Barrier				Downgradient of the Barrier					
Contaminants of Concern	MW-44		MW-45		MW-34I		MW-34D		MW-46	
	2009	2017	2009	2017	2009	2017	2009	2017	2009	2017
Tetrachloroethylene (PCE)	**56**	**15**	**65**	**50**	**68**	**9.8**	**12**	0.86	**43**	**18**
Trichloroethylene (TCE)	**4.3**	**1.6**	5 U	**5.1**	**4.6**	5 U	**4.8**	0.5 U	**2.7 U**	**1.4**
1,2-Dichloroethylene	2.7	0.34 J	5 U	2.2 J	3.2	5 U	25	0.96	2.7	5 UJ
Vinyl Chloride	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	1.1	0.5 U	2.5 U	5 U

Table F
Downgradient North Portion of EAB Barrier Area Groundwater COCs Sampling Results (ppb)

Contaminants of Concern	MW-41		MW-42		MW-43		MW-47		MW-48	
	2009	2017	2009	2017	2009	2017	2009	2017	2009	2017
Tetrachloroethylene (PCE)	**99**	**79**	**110**	**14**	**130**	**41**	**100**	**12**	**43**	**28**
Trichloroethylene (TCE)	**8**	**13**	**6.6**	**2.9**	**5.2**	**7.1**	**2.5**	**3.1**	**1.1**	**4.9**
1,2-Dichloroethylene	5.3	42	7.4	**76**	4.8	8.9	2.2	34 J	1.8	36
Vinyl Chloride	5 U	5 U	5 U	5 U	0.5 U	5 U	0.5 U	5 U	2.5 U	5 U

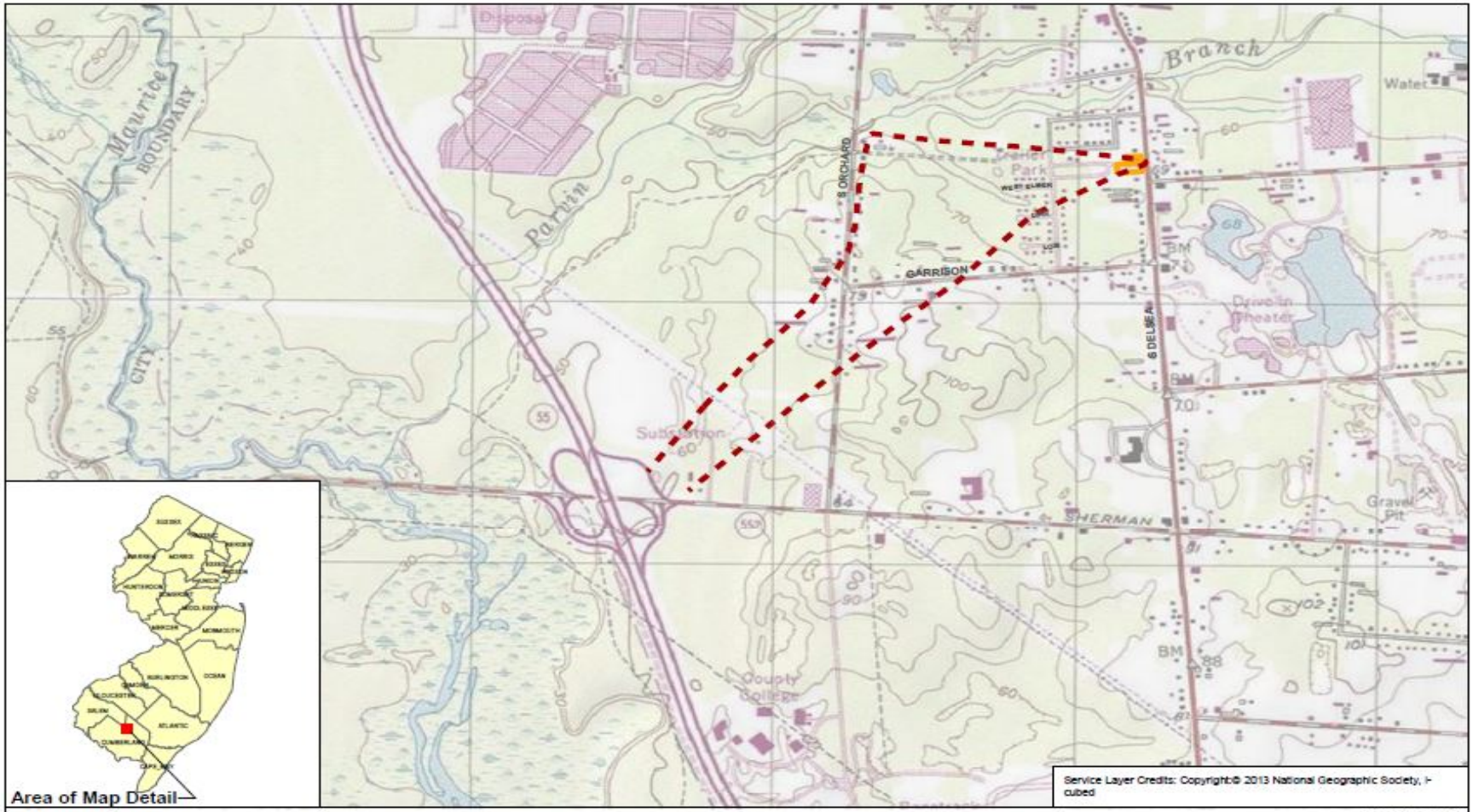
Table G
Areas Downgradient of Barrier Groundwater COCs Sampling Results (ppb)

Contaminants of Concern	MW-37		MW-38D		MW-35S		MW-35I		MW-54	
	2011	2017	2009	2017	2009	2017	2009	2017	2015	2017
Tetrachloroethylene (PCE)	**46**	**9.2**	**17**	**19**	**4.1**	0.55	**14**	**11**	**22**	**19**
Trichloroethylene (TCE)	**1.9**	**1.3**	**1.1**	**2.2**	0.38	0.5 U	0.79	**1.8**	**2.5**	**2.3**
1,2-Dichloroethylene	2.3 J	0.6	2	**3.6**	0.26	0.5 U	1.5	1.6	2.2	3.3
Vinyl Chloride	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

ppb – parts per billion
UJ - non-detect with an approximate quantitation limit
U - nondetect (detection limit is indicated)
J - estimated value
Highlighted and bold values exceed the New Jersey Groundwater Quality Standard of 1 ppb for PCE, TCE and vinyl chloride, and 70 ppb for 1,2 DCE.

Appendix B

Figures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CITY
Parvin
Branch
S ORCHARD
GARRISON
S DELSEA
SHERMAN
Subdivision
Gravel Pit
Area of Map Detail
Service Layer Credits: Copyright© 2013 National Geographic Society, i-cubed
Site Area
Facility Boundary
Feet
0
750
1,500
3,000
Figure 1-1
Site Location Map
Iceland Coin Laundry Superfund Site
Vineland, Cumberland County, New Jersey
CDM Smith
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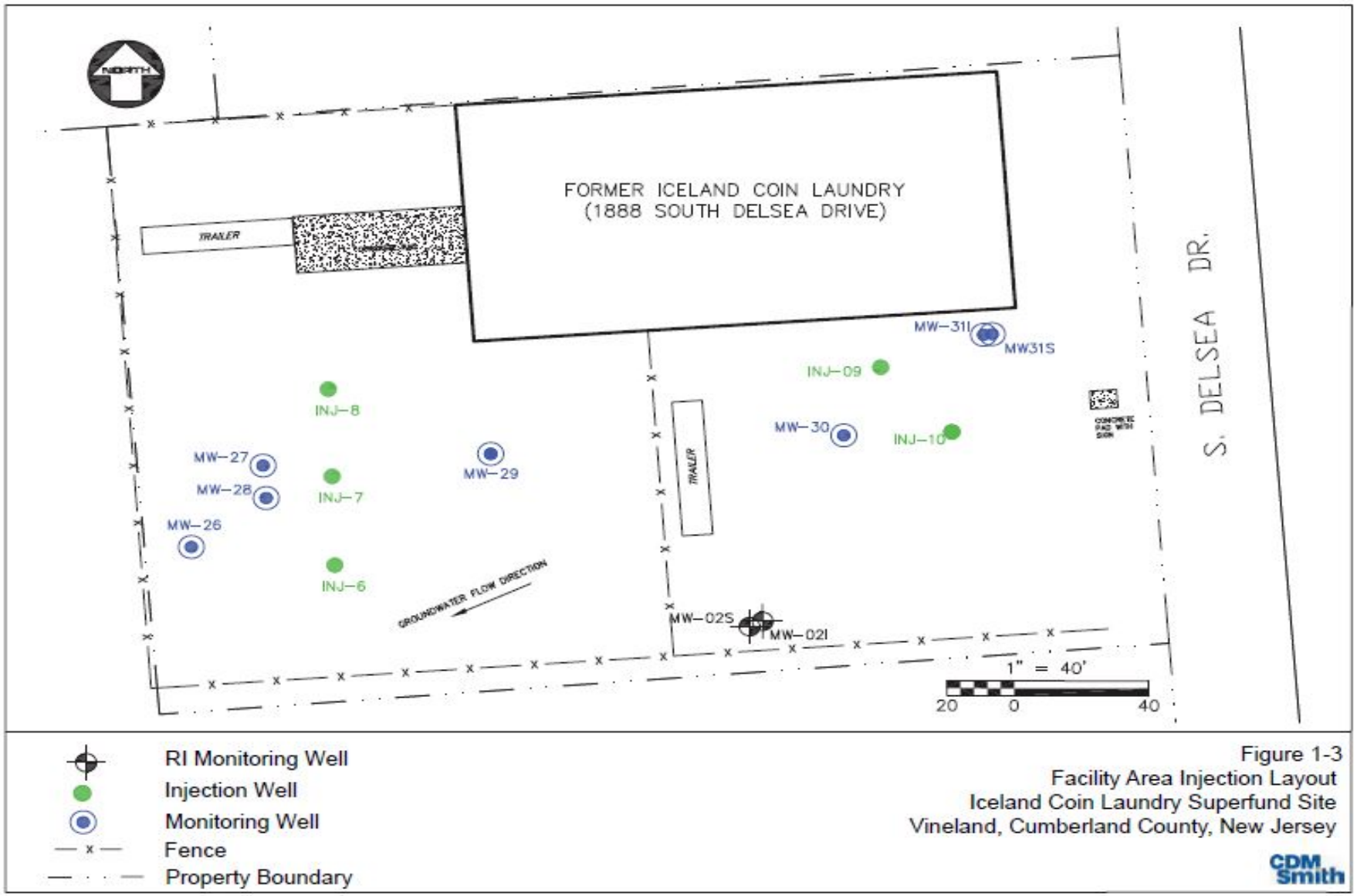

Figure 1-3
Facility Area Injection Layout
Iceland Coin Laundry Superfund Site
Vineland, Cumberland County, New Jersey

CDM Smith

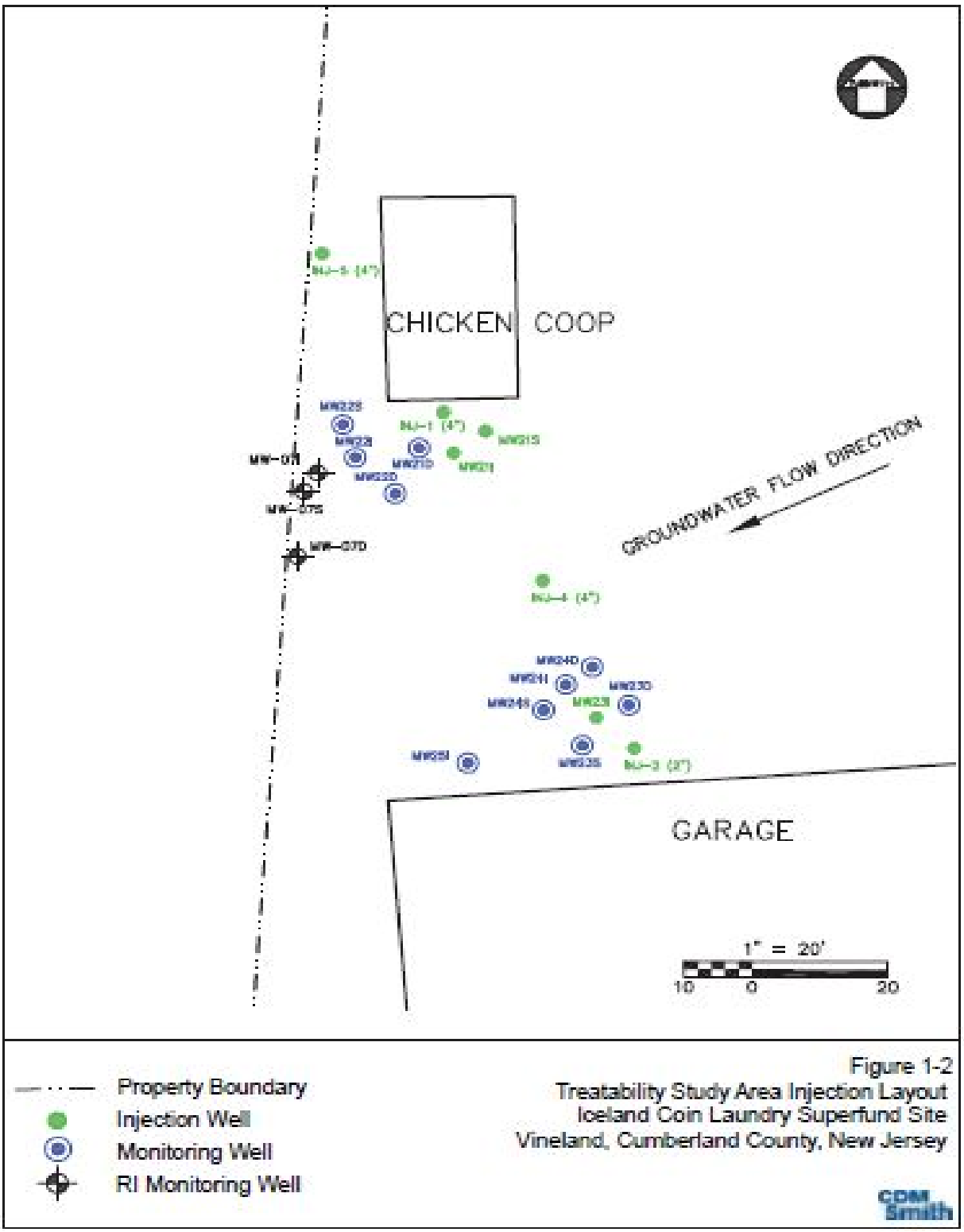

Figure 1-2
Treatability Study Area Injection Layout
Iceland Coin Laundry Superfund Site
Vineland, Cumberland County, New Jersey

CDM Smith

Legend

- Abandoned Biobarrier Extraction Well
- Existing Monitoring Well
- Biobarrier Injection Well
- Abandoned Biobarrier Injection Well
- Estimated 50 µg/L PCE Isopleth (2010)

Note:
PZ - Piezometer
S - Shallow Well
I - Intermediate Well
D - Deep Well

0 50 100 200 Feet

Figure 1-4
Biobarrier Injection Layout
Iceland Coin Laundry Superfund Site
Vineland, Cumberland County, New Jersey

CDM Smith

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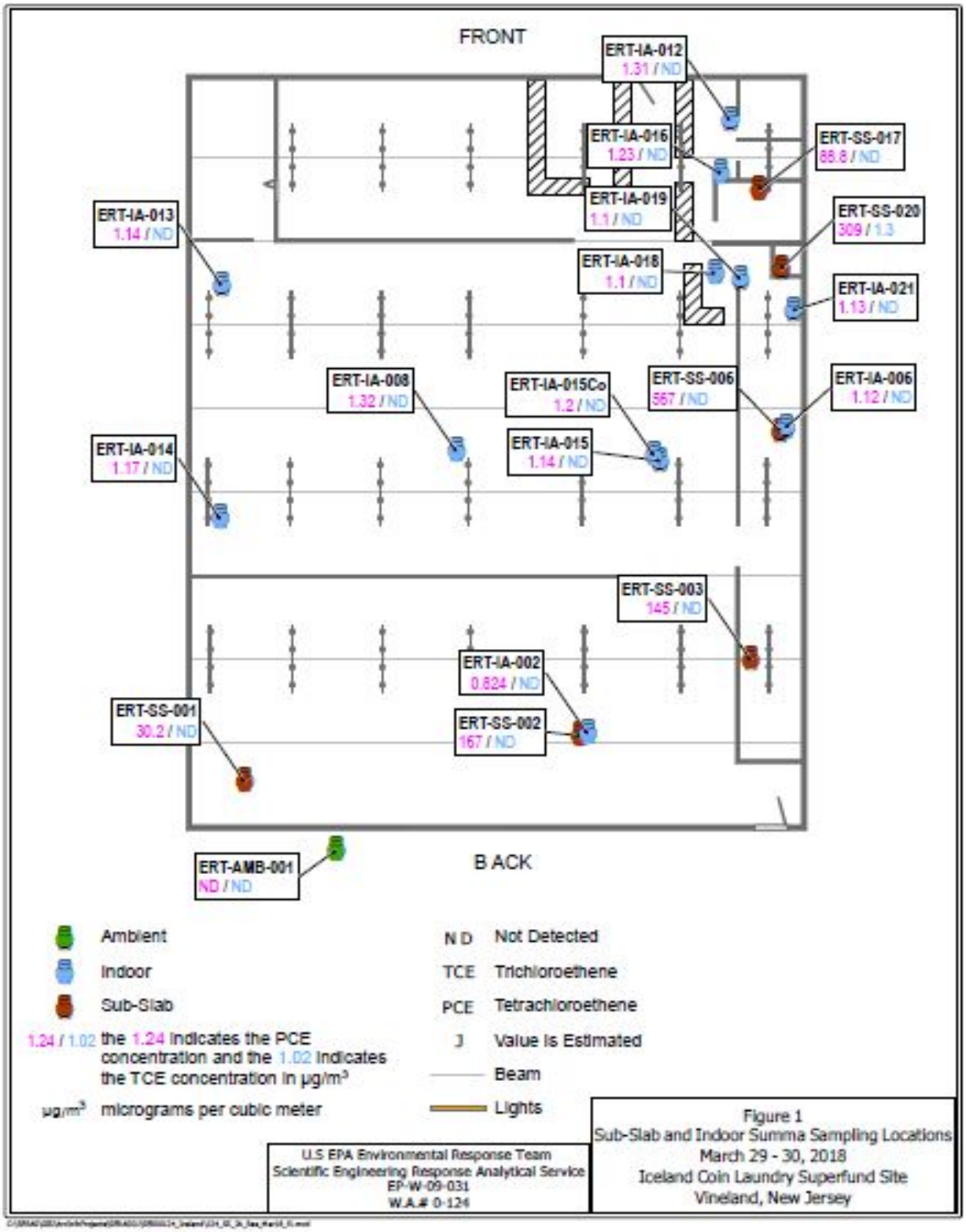
Note, Hot Spot Treatment was performed using temporary injection points.

Figure 1-5
Hot Spot Treatment Areas
Iceland Coin Laundry Superfund Site
Vineland, Cumberland County, New Jersey
1/8/2018

CDM Smith

angelja R:\68991_Iceland\02_MXD\Round7\Report\Figure 1-5_HotSpot_TreatmentAreas.mxd 1/8/2018


FRONT
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ERT-IA-016
1.23 / ND
ERT-SS-017
88.8 / ND
ERT-IA-019
1.1 / ND
ERT-IA-013
1.14 / ND
ERT-SS-020
309 / 1.3
ERT-IA-018
1.1 / ND
ERT-IA-021
1.13 / ND
ERT-IA-008
1.32 / ND
ERT-IA-015Co
1.2 / ND
ERT-SS-006
567 / ND
ERT-IA-006
1.12 / ND
ERT-IA-015
1.14 / ND
ERT-IA-014
1.17 / ND
ERT-SS-003
145 / ND
ERT-IA-002
0.824 / ND
ERT-SS-001
30.2 / ND
ERT-SS-002
167 / ND
ERT-AMB-001
ND / ND
B ACK
Ambient
Indoor
Sub-Slab
1.24 / 1.02 the 1.24 indicates the PCE concentration and the 1.02 indicates the TCE concentration in µg/m³
µg/m³ micrograms per cubic meter
N D Not Detected
TCE Trichloroethene
PCE Tetrachloroethene
J Value is Estimated
Beam
Lights
U.S EPA Environmental Response Team
Scientific Engineering Response Analytical Service
EP-W-09-031
W.A.# 0-124
Figure 1
Sub-Slab and Indoor Summa Sampling Locations
March 29 - 30, 2018
Iceland Coin Laundry Superfund Site
Vineland, New Jersey

APPENDIX C

Chronology of Events	**Date(s)**
Facility operated a dry cleaning and laundry business	1953-1971
VCHD collected potable well samples	1987-1990
NJDEP installed temporary POET units to 21 residents	1991
VCHD extended public water connections to the residents	1994
Final listing on EPA National Priorities List	1999
RI/FS preformed by EPA	2002-2003
ROD issued by EPA	2006
Remedial design and well network completed	2007
Treatability study completed	2008
RA Stage 1 Phase 1 completed	2009
RA Stage 1 Phase 2 completed	2010
RA Stage 1 EAB Technical Memorandum submitted	Aug 2011
RA Stage 2 - Baseline Monitoring	Sept 2011
RA Stage 2 - Bio Barrier Amendment Injection Inplementation	Oct 2011
RA Stage 2 - Round 1–4 Performance Monitoring	2012-2014
Ra Stage 2 - Hot Spot Treatment Completed	Sept 2015
RA Stage 2 - Rounds 5-7 Performance Monitoring	2015-2017
POET Installation	Sept 2017