UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

REGION III

STATEMENT OF BASIS

Former Millennium Specialty Chemicals

St. Helena Manufacturing Facility

Baltimore, MD

EPA ID: MDD003093507

Prepared by

RCRA Corrective Action Branch 1

Land, Chemicals and Redevelopment Division

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Section 1: Introduction

The United States Environmental Protection Agency (EPA) prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for the former Millennium Specialty Chemicals, St. Helena Facility (Facility or Site) located at 2701 Broening Highway in Baltimore City, Maryland (Figure 1). EPA's proposed remedy for the Facility includes installation of an engineered cover/cap over exposed soil, creek bank stabilization, stormwater system upgrade, monitored natural attenuation of groundwater and land and groundwater use controls.

Colgate Creek is located adjacent to the Facility and requires further investigation. EPA will issue a separate SB proposing a remedy to address existing Facility-related contamination in Colgate Creek after investigations are completed.

The Facility is currently owned by the Lyondell Environmental Custodial Trust (LECT), which was created to take ownership of contaminated properties, including the Facility, once owned by the bankrupt Lyondell Chemical Company. The purposes of LECT includes owning, conducting, managing, and/or funding Agency-selected cleanups of contaminated properties and selling them, including the Facility, in accordance with final remedy decisions.

EPA is providing 30 days for public comment on this SB. EPA may modify its proposed remedy based on comments received during this period. EPA will announce its selection of a final remedy for the Facility in a Final Decision and Response to Comments (FDRTC) document after the public comment period has ended.

The Administrative Record (AR) for the Facility contains all documents, including data and quality assurance evaluations that EPA relied on in proposing the final remedy. Attachment A is the AR Index of Facility documents. Public Participation information is provided in Section 8 of this SB for those interested in reviewing the AR. Information on the Corrective Action Program along with EPA's Facility Fact Sheet is located on https://www.epa.gov/hwcorrectiveaction/hazardous-waste-cleanup-millennium-chemicals-baltimore-md.

The Facility is subject to EPA's Corrective Action Program under the Solid Waste Disposal Act, as amended, commonly referred to as the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6901 et seq. The Corrective Action Program requires that owners/operators of facilities subject to certain provisions of RCRA investigate and address releases of hazardous waste and hazardous constituents. Releases generally impact on- and/or off-site soil and/or groundwater. Maryland is not authorized for the Corrective Action Program under Section 3006 of RCRA, 42 U.S.C. § 6926; therefore, EPA retains primary authority for Corrective Action implementation in Maryland.

Section 2: Facility Background

The Facility is an 18.4-acre property located along Colgate Creek in the St. Helena's section of Baltimore City (Figure 1). Colgate Creek forms the western border of the Facility and the Norfolk Southern railroad right-of-way forms the eastern border. Broening Highway and Dundalk Marine Terminal are located along the southern border. Surrounding the Facility are industrial properties and the St. Helena residential community. The Facility is zoned for heavy industrial use, while the surrounding area is zoned industrial and residential.

General Smelting developed the Facility in 1914, however, General Smelting's Facility operations were undocumented. In 1921, Gliden Chemicals and Pigments Company purchased the Facility for paint pigment production. Zinc lithopone (a white pigment) was produced initially, followed by production of cadmium lithopone (red and yellow pigment) between 1926 and 2005, titanium and zirconium-based pigments between 1927 to 1954 and amorphous silica gel (ASG) between 1969 to 2007. ASG is used in coatings, food, drugs, cosmetics and as a desiccant.

Pigment production ceased in 2005 and ASG production ceased in 2007. In 2008, Facility structures were decommissioned, demolished and removed. Beginning in 2008, portions of the Facility were leased for temporary storage of cargo containers and semi-trailers associated with the adjacent Dundalk Marine Terminal primarily. The Facility is currently unused and is secured by a locked chain-linked fence with periodic security monitoring.

Facility groundwater and soil have areas of elevated metals concentrations, which are consistent with the metals used in the pigment production. Metals and metallic compounds used in the pigment process included zinc, zinc and barium sulfate, cadmium, barium and sodium sulfide, selenium powder and titanium ore (illmenite-$FeTiO_3$). The former zinc and titanium pigment waste management practices are largely undocumented.

Waste products included an insoluble barium sulfide leach residue known as 'black ash' from filter press cake solids, cadmium-rich compounds, iron and selenium press residue, spent caustic solvent, methyl ethyl ketone, acids, ferrous sulfate and titanium compounds. Prior to the 1980's, spent caustic solution was historically discharged directly from the Facility into Colgate Creek.

Section 3: Summary of Environmental Investigations

3.1 Environmental Assessment Reports (Facility Initiated Investigations)

In 2006, Millennium Specialty Chemicals, Inc. conducted a Phase I Environmental Site Assessment (Assessment) in support of its application to the Maryland Department of the Environment's

(MDE) Voluntary Cleanup Program. The Assessment was completed before buildings and other structures were removed. The Assessment identified several known or suspected environmental conditions at the Facility, based on records reviews, worker interviews and a Site visit. The identified conditions include the following:

1. Fill was deposited on the north and west areas of the Facility property along Colgate Creek from 1936 to 1951. The content of the fill material is not known, however, soil boring logs for monitoring wells located in the fill areas identified black slag, slag-like material, cinders, brick and wood fragments mixed in with soil layers. Black ash (barium sulfide waste) from on-Site operations was reportedly spread on the ground by the Colors Plant building, located in the western fill area and was also found within the fill in some areas (fill area is shown in Figure 2);

2. A former lined lagoon used for treatment of process wastewater was filled in and paved over in 1995-96. The lagoon was of unknown age and construction.

3. Effluent from cadmium pigment production was discharged directly to Colgate Creek until the 1980s, when a pigment filtering effluent treatment system was built. Also, treated Colors Plant process wastewater was directly discharged to Colgate Creek until the mid-1990's under an MDE Permit. In 1993, Plant wastewater discharged into Colgate Creek was shown to be toxic to aquatic life. MDE then required that discharges be routed to the Baltimore City sanitary sewer system for treatment. In 1995-96, the wastewater was conveyed to the City sewer system.

In 2008, Millennium Specialty Chemicals, Inc. completed a Phase II Environmental Site Assessment/Description of Current Conditions Report, which included on-Site soil and groundwater sampling results. The investigation found that on-Site fill was very thick in some areas, notably in the vicinity of the former Colors Plant, and that soil and groundwater samples exhibited elevated levels of metals consistent with the Facility's operational history. Some organic constituents were detected in a few samples, but were generally below screening levels. A limited number of soil samples were collected and analyzed for radionuclides.

3.2 Summary of Environmental Investigations Under RCRA Corrective Action

The Facility generated and stored hazardous wastes on-Site as reported to EPA on its Hazardous Waste Permit Application and General Information forms (November 1980), and therefore is subject to RCRA Corrective Action. In 1984, Millennium Specialty Chemicals, Inc. applied to Maryland for a Controlled Hazardous Substances permit, but in 1985, informed the State that it would no longer store hazardous waste on-Site for longer than 90-days and, therefore, the Facility did not require a permit. On August 18, 2010, EPA and LECT entered into an administrative order on consent (2010 Consent Order) under Section 3008(h) of RCRA, 42 U.S.C. § 6928, to perform Corrective Action at the Facility because of documented releases of hazardous wastes at the Facility.

LECT submitted the following investigations and reports to EPA under the 2010 Consent Order: (1) *Report of Current Site Conditions,* Dec. 2010; (2) *Summary of Preliminary Soil and Groundwater Results, Technical Memorandum*, April 2013; (3) *RCRA Facility Investigation Report*, July 2017; (4) *RCRA Corrective Measures Study Report for Soil and Groundwater*, September 2018; and (5) *Technical Memorandum: Development of Site-Specific Alternate Groundwater Quality Standards*, November 2018. EPA approved each of those documents. The documents present the results of on-Site soil, groundwater sampling and surface water, sediment and sediment pore water sampling results from Colgate Creek. The on-Site soil and groundwater data are summarized in this SB, whereas Colgate Creek data will be presented in a separate forthcoming SB.

In an August 2010 Facility Site Visit Report, EPA identified four solid waste management units (SWMUs) and nine areas of concern (AOCs). Subsequent sampling showed elevated metals concentrations in soil and groundwater located primarily in the former Colors and Zinc plant areas (AOC 5 and 6, respectively) and in the southwestern area of the Facility. Elevated barium concentrations in soil and groundwater were found primarily in the West Fill Area (Figure 2).

A. Soil Results

Surficial soil across the Facility is primarily sand and silt fill from 1 to 15 feet thick with some slag, cinders, ash, broken bricks and pigment discolorations. A deeper fill unit consisting of black sand and silt is from 1 to 30 feet thick in areas along Colgate Creek, as shown on Figure 2. The fill is underlain by interbedded silt and clay with sand lenses 30 to 50 feet thick that sits on a thick basal clay called Arundel clay between 34 to 60 feet below ground surface (bgs).

Soil samples collected during the RCRA Facility Investigation (RFI) were collected from groundwater monitoring well (MW) borings and three other on-Site locations, for a total of 87 samples collected from 31 on-Site locations and two off-Site background locations (Figure 2). Samples were collected from 0-1 foot, 4-5 feet and at 10 -11 feet bgs or above the water table, which ever was deeper. Samples were analyzed for Target Analyte List metals, titanium and hexavalent chromium. In addition, select samples were analyzed for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH) and total organic carbon.

Soil results were screened against MDE's Soil Clean-up Standards (SCS) for non-residential sites and EPA's Regional Screening Levels (RSLs) for industrial settings. MDE's SCS are more conservative than EPA's RSLs. Sampling results showed that, generally, VOC concentrations were below screening levels and, therefore, were acceptable. TPH-diesel range organics were found in only four samples. However, metals concentrations in soil definitively show the impacts of Facility operations. Elevated metals concentrations were generally highest in the western fill area of the Facility where pigment manufacturing took place, and in the southern area along Broening Highway. Arsenic, cadmium and lead were found at a significant number of locations and at levels an order of magnitude

above their respective EPA screening levels. Metals exceeding EPA's screening levels by less than an order of magnitude are antimony and manganese. Metals that exceeded MDE's screening levels include: antimony, arsenic, barium, cadmium, lead, thallium, iron, manganese, chromium, zinc and vanadium. Titanium was detected in all samples including off-Site samples; however, MDE and EPA do not have screening levels for titanium. Background soil samples were collected at two off-Site locations and had metals at lower levels than on-Site soils, except for aluminum and iron, where levels were somewhat comparable to on-Site levels. The human health risk assessment in Section 4 presents the Site-wide soil risk evaluation, which also includes potential risk from radionuclides exposure using the limited soil data set from the Phase II Environmental Site Assessment.

B. Groundwater Results

Groundwater (GW) beneath the Facility slowly moves through Coastal Plain sediment deposits and fill deposits towards the tidal Colgate Creek and to a lesser degree, towards Dundalk Terminal property, south of Broening Highway.

During the RFI, 28 shallow and 8 deep GW monitoring wells (MWs) were installed on-Site and two MW pairs (shallow/deep) for background monitoring were installed off-Site and upgradient (40 MWs total) (Figure 2). On-site, 15 shallow MWs were installed in the uppermost Patapsco formation and 13 shallow MWs were screened in the fill layer. The Patapsco formation is interbedded sand, silt and clay where the water table aquifer resides. The deep MWs located on- and off-Site were installed to the top of Arundel clay, which acts as a confining unit, impeding downward GW movement. GW was encountered from 2.5 to 12 feet bgs in the shallow MWs and 9.5 to 16 feet bgs in deep wells. A slight tidal influence from Colgate Creek was measured in GW, which diminishes on-Site with increased distance from Colgate Creek.

GW was sampled in 2012, 2014 and 2016. Samples were analyzed for total and dissolved TAL metals, titanium, and in select samples, hexavalent chromium. Also, TCL VOCs and TPH were analyzed. GW results were screened against MDE's GW Clean-up Standards and EPA's RSLs for tap water. The results show that many metals were found at levels above screening levels and constitute the contaminants of concern, with a few metals exceeding screening levels by orders of magnitude in some locations. For example, barium, iron and zinc concentrations were found at levels greater than 300,000 ppb in some locations. Barium had the highest concentration at 2,100,000 ppb at one on-Site MW (Table 1). Metals exceedances were primarily in and around the western fill area; however, iron and manganese were widespread and were found at elevated levels in both shallow and deep off-Site background wells. For most metals, concentrations of total and dissolved were similar. Five on-Site MW locations had pH levels greater than 12. Four of the five shallow MWs with high pH (alkaline) are in the western fill area.

VOC and TPH results showed that only naphthalene and TPH (diesel range) exceeded screening criteria, with low level naphthalene found at three MWs and TPH at 12 MWs.

Most of the dissolved metals in GW are mobile and move laterally in the shallow aquifer to discharge into Colgate Creek. Factors that decrease metals concentrations migrating to Colgate Creek include: (1) dilution from off-Site GW flowing downgradient and mixing with on-Site contaminated GW prior to discharge; (2) dilution and assimilation properties of surface water in the Creek; and (3) geochemical processes that inhibit dissolution of some metals (primarily iron, manganese, zinc, and potentially cadmium), thereby decreasing their mobility in GW (geochemical attenuation).

Table 1
GW Contaminants of Concern - Maximum Concentrations (ppb)

Contaminants of Concern	EPA MCL	EPA RSL-tap	MDE Surface Water[2]	MDE Aquifers I & II	Site GW Maximum Level	Off-Site Background GW MWs
Aluminum	--[1]	20,000	--	200	46,000	980
Antimony	6	6	--	6	250	BDL[3]
Arsenic	10	0.052	36	50	470	1.1
Barium	2,000	2,000	--	2,000	2,100,000	92
Beryllium	4	4	--	4	5	1.6
Cadmium	5	5	8.8	5	6,900	1.2
Chromium (total)	100	100	--	100	130	1.6
Chromium (III)	--	--	--	--	10	NA[4]
Chromium (IV)	--	0.035	1,100	--	9	NA
Copper	1,300	800	3.1	1,000	7,100	11
Iron	--	14,000	--	470	960,000	40,000
Lead	15	15	8.1	50	1,500	1.5
Manganese	--	430	--	50	24,000	13,000
Mercury	2	0.63	0.94	2	15	BDL
Nickel	--	390	8.2	100	480	52
Selenium	50	100	71	50	380	2.6
Silver	--	94	1.9	100	10	BDL
Thallium	2	0.2	--	2	19	BDL
Titanium	--	--	--	940	590	25
Vanadium	--	86	--	11	120	BDL
Zinc	--	6,000	81	5,000	370,000	120

[1]-- No standard developed; [2] MDE's chronic criteria for salt water life (except for copper); [3] BDL – below detection level; [4] NA – Not Analyzed.

C. Subsurface Drain Lines and Outfalls

Seven outfalls were identified at the Facility. Buried pipes conveyed stormwater, process and non-contact cooling water, treated wastewater and historically untreated wastewater to the outfalls. Six outfalls drained to Colgate Creek, and one buried pipe conveyed stormwater to an on-Site pool. Prior to

the 1980s, plant wastewater was discharged directly to Colgate Creek. In 1993, discharge from one outfall (003) was tested and shown to be toxic to aquatic life. As a result, the Facility was required to re-route the cadmium production wastewater to the City of Baltimore sanitary sewer system for treatment. In approximately 2002, three existing outfalls (001, 002, 003) were reportedly combined to form an underwater diffuser located in Colgate Creek. The combined outfall was named Outfall 002, and discharges were piped below the surface of Colgate Creek to the underwater diffuser for dilution in Colgate Creek.

During the RFI field investigation, only Outfall 003 exhibited a discharge and was sampled during base flow (non-precipitation conditions) and during storm flow. Sample results were screened using EPA Region 3 marine benchmarks and MDE ambient water quality criteria. Barium was found at several orders of magnitude higher than EPA's benchmarks in both baseflow and stormwater conditions. MDE has not set a standard for barium. Cadmium exceeded EPA's benchmark in base and stormwater flow samples and manganese exceeded EPA's benchmark in the base flow sample. Comparing Outfall 003 and Colgate Creek surface water sample results showed that Outfall 003 levels of barium, cadmium and manganese were higher than most of the surface water samples.

Section 4: Human Health Risk Assessment

Current exposure to soil and groundwater contamination at the vacant Facility is controlled. The Facility is fenced, gated and locked with frequent security checks. Approximately 80% of the Site surface is covered by concrete, asphalt or gravel. The surface, where historic operations took place, is almost completely covered. Site access from Colgate Creek is limited and monitored by the Maryland Port Administration. Also, groundwater is not used at the Facility or locally because the City of Baltimore supplies public water to the Facility and surrounding area properties. No public water supply wells were identified within a 1-mile radius of the Facility.

The Baseline Human Health Risk Assessment (HHRA) evaluated risk scenarios for on-Site trespassers, future workers (construction, maintenance, routine) and off-Site residents (current and future) for exposure to Facility surface and subsurface soil and groundwater. The results of the HHRA are summarized in Table 2. Risk is evaluated on cumulative cancer risk (CCR) and non-cancer effects measured as a hazard index (HI). EPA and MDE have slightly different acceptable CCR ranges: EPA's acceptable CCR range is 1 person in 10,000 persons to 1 person in 1 million persons ($1x10^{-4}$ to $1x10^{-6}$) developing cancer due to a life time exposure to a contaminant. MDE's acceptable CCR is not exceeding 1 person in 100,000 ($1x10^{-5}$) people developing cancer. For both EPA and MDE assessments, the HI is not to exceed 1. On Table 2, an acceptable CCR or HI is denoted as "Yes," and an unacceptable CCR is denoted as "No."

Table 2 Baseline Human Health Risk Assessment Results for Soil Exposure		
Risk Scenario	**EPA**	**MDE**
Trespasser (current)	Yes CCR, Yes HI	No CCR, Yes HI
Construction Worker (future)	Yes CCR, No HI	No CCR, No HI
Routine Worker (future)	No CCR, No HI	No CCR, No HI
Maintenance Worker (future)	Yes CCR, No HI	No CCR, No HI
Residents – off-Site (current & future)[1]	Yes CCR, Yes HI	Yes CCR, Yes HI

[1] Residential exposure: inhalation of on-site soil constituents.

For groundwater, the CCR and HI exposures are within EPA's and MDE's acceptance limits; however, four shallow and one deep MWs had a pH value above 12, which is corrosive to skin and could pose a physical hazard to maintenance or construction workers during excavations extending into the water table.

4.1 Environmental Indicators

Under the Government Performance and Results Act (GPRA), EPA has set national goals to address RCRA corrective action facilities. Under GPRA, EPA evaluates two key environmental clean-up indicators (Environmental Indicators) for each facility: (1) Current Human Exposures Under Control; and (2) Migration of Contaminated Groundwater Under Control. The Facility met both Environmental Indicators for the total Facility in December 2016 and February 2019, respectively. The Environmental Indicator forms are linked to EPA's Fact Sheet for this Facility (see Section 1).

Section 5: Corrective Action Objectives (CAOs)

1. Soil

EPA's CAO for soil is to prevent human exposure to soil contaminants that are above the EPA and MDE acceptable risk range of $1x10^{-5}$ to $1x10^{-6}$ and above a non-cancer HI of 1 for industrial scenarios. Also, EPA's CAO for soil is to prevent off-Site migration of contaminated soil into Colgate Creek, to protect ecological receptors.

2. Surface water

EPA's CAO for surface water is to protect ecological receptors in Colgate Creek from potential unacceptable contaminant loading from Facility stormwater/groundwater discharge flowing to Colgate Creek through the outfalls.

3. Groundwater (GW) and Technical Impracticability

EPA expects final remedies to return usable GW to its maximum beneficial use, where practicable, within a reasonable timeframe. Where returning contaminated GW to its maximum beneficial use is not technically practicable, EPA generally expects facilities to prevent or minimize the further migration of a plume, prevent exposure to the contaminated GW, and evaluate further risk reduction. Technical impracticability (TI) for contaminated GW refers to a situation where achieving final GW cleanup standards is not practicable from an engineering perspective. The term 'engineering perspective' refers to factors such as feasibility, reliability, scale or magnitude of a project, and safety.

EPA has determined that restoration of GW to drinking water standards known as Maximum Contaminant Levels (MCLs) promulgated at 40 C.F.R. Part 141 pursuant to Section 1412 of the Safe Drinking Water Act, 42 U.S.C. Section 300g-1 at the Facility is technically impracticable for the following reasons:

1) Facility waste containing metals were released to the soil and fill, which then leached into GW in the shallow aquifer underlying the Facility. To reduce on-going GW loading from contaminated soil, excavation of soil and fill would be required for over a third of the Facility to depths of 2 to 12 feet. From an engineering or cost perspective, excavation is not feasible given the areal extent and depth of the soil/fill;

2) Currently available remedial technologies capable of permanently restoring GW to MCLs are energy and cost intensive to implement within an acceptable time frame (20 – 30 years);

3) The Facility evaluated the potential for Facility contaminants (metals) to adversely impact Colgate Creek via GW discharge and found that the majority of the metals in GW do not present a risk to Colgate Creek due to low GW seepage rates compared to Colgate Creek's dilution capacity.

Therefore, EPA's Corrective Action Objectives for Facility GW are to control human exposure to hazardous constituents remaining in GW and ensure that contaminated GW will not impact ecological receptors nor adjacent water bodies. GW at the Facility is not used now nor will it be used in the future as a source or potential source for drinking water. There are no human receptors regarding GW consumption; however, construction and maintenance/utility workers may have dermal exposure to caustic GW in the few areas with very high pH (12+).

LECT provided a technical basis for the development of site-specific Alternate Groundwater Quality Standards (AGWQS) that will protect ecological receptors in Colgate Creek to use as GW clean-up goals for the shallow aquifer beneath the Facility.

To determine potential GW impact to Colgate Creek, seepage from the shallow aquifer to surface water (SW) was calculated. Then GW dilution in Colgate Creek was used to assess which GW contaminants (metals) have the potential to exceed SW Quality Standards (SWQS), once mixed with SW. Geochemical transformation and attenuation of contaminants potentially exceeding SWQS were evaluated to determine speciation, precipitation and estimated SW concentrations in Colgate Creek.

The evaluations determined that most Site GW contaminants (metals) do not present a risk to Colgate Creek due to dilution in Colgate Creek SW. Iron, manganese and zinc in GW will not impact the Colgate Creek due to geochemical attenuation. Table 3 shows the AGWQS to be used as GW clean-up endpoints and compares MDE SWQS or EPA Region III BTAG[1] Marine Screening Benchmarks (which are data screening levels and not clean-up levels) and existing Colgate Creek background metals concentrations from an upstream location.

Table 3
Site Specific Alternate GW Quality Standards (ppb)

Dissolved Metals	Surface Water Quality Standards	Colgate Creek Background Levels	Alternate GW Quality Standards
Aluminum	87	100 U	NA
Antimony	500	5 U	1,495
Arsenic	36	16	75
Barium	4	43	43
Cadmium	8.8	5 U	34.7
Calcium	116,000	117,000	NA
Chromium-total	57.5	10 U	153
Cobalt	23	0.5	68
Copper	3.1	57	NA
Iron	300	100 U	NS
Lead	8.1	5 U	14.3
Magnesium	82,000	341,000	NA
Manganese	120	14	NS
Nickel	8.2	6	12.6
Potassium	53,000	125,000	NA
Selenium	71	49	115.2
Sodium	680,000	292,000	1,460,040
Thallium	21.3	5 U	54.1
Vanadium	20	10 U	40.1
Zinc	81	25 U	194

U- below lab detection limit; NA – not applicable: Bkgd. >SWQS; NS – Fe & Mn won't exceed SWQS geochemically; [1] – BTAG: Biological Technical Assistance Group at EPA Region III.

Section 6: Proposed Remedy

Under the 2010 Consent Order, LECT submitted its *RCRA Corrective Measures Study Report for Soil and Groundwater* (September 2018) (CMS) of potential remedies for EPA's consideration. Seven treatment technologies were evaluated in the CMS. EPA evaluated the alternatives presented and considers the following (proposed) remedies (CMS Alternative 3) as capable of meeting EPA's CAO goals for soil, GW and Colgate Creek.

1. **Soil:** Installation of a durable engineered soil barrier where no barrier is currently present; and repair existing building foundations, slabs and pavement as necessary to provide a sufficient barrier to prevent direct contact with soil, inhalation of dust and to contain run-off of contaminated soil to Colgate Creek.

2. **Surface water:** (a) Stormwater control – (i) abandonment of existing underground stormwater pipes, drains and former outfalls and (ii) installation of a new stormwater drainage system to minimize erosion and control run-on/run-off; and (b) bank stabilization along Colgate Creek to prevent erosion and potential bank failure.

3. **Groundwater:** Compliance with an EPA approved monitoring plan demonstrating Monitored Natural Attenuation (MNA) of GW until contaminant levels meet the Site-Specific Alternate GW Quality Standards (Table 3). The GW monitoring plan shall provide, at minimum, for the evaluation and reporting of the GW data to assess the progress and effectiveness of the remedy in achieving the CAOs.

4. **Long-term Remedy Management:** (a) Implementation of an EPA-approved Operation and Maintenance Program to include inspection and repair of on-Site fencing, soil barriers, stream bank stabilization measures and storm management; (b) implementation and compliance with the Institutional Controls discussed in Section 5 below; (c) implementation of an EPA-approved Soil Management Plan to govern any soil excavation and maintain worker safety in compliance with applicable OSHA requirements and practices; and (d) implementation of an EPA-approved MNA Plan.

5. **Institutional controls (ICs):** The land and GW use restrictions necessary to maintain industrial/commercial land use, prohibit use of on-Site GW as a drinking water source and prevent human exposure to Facility contaminants will be implemented through federal, state and/or local enforceable mechanisms. Those mechanisms include administrative orders, Environmental Covenants pursuant to the Maryland Uniform Environmental Covenants Act (Maryland Code Annotated, Environment § 1-800 et. seq.) or state/local laws and regulations. State regulations include the Maryland Well Construction Regulations, COMAR 26.03.01.05,

which prohibit the installation of individual water systems where adequate community systems are available. Local regulations include Baltimore County Bill No. 17-13, § 2.19.1, which require connection to the public water supply system where such a system is available within 500 feet of an owner's property line.

The Facility owner shall provide EPA with a coordinate survey, as well as a metes and bounds survey of the Facility boundary. Mapping the extent of the land use restrictions will allow for presentation in a publicly accessible mapping program such as Google Earth or Google Maps.

Section 7: Evaluation of the Proposed Remedy

This Section describes EPA's criteria for evaluating the proposed remedy, consistent with EPA guidance. The evaluation is in two phases. In the first phase, EPA evaluates the proposed remedy using three 'threshold' decision criteria as general goals. Remedies that meet the initial threshold criteria are further evaluated in phase two, where EPA evaluates remaining proposed remedies using seven balancing criteria (Table 4).

Table 4

Threshold Criteria	Evaluation
1. Protect human health and the environment	Risks posed to human health and the environment from exposure to Facility contaminants are: (1) future worker and trespasser inhalation of dust contaminated with metals; (2) construction/maintenance worker dermal exposure to high pH GW; and (3) ecological receptors in Colgate Creek. The proposed remedy: (1) cap/cover all exposed soil; (2) stabilize Creek bank to prevent erosion; (3) upgrade stormwater management; and, (4) restrict land/GW use to industrial and non-potable use, respectively, thereby meeting criteria goals.
2. Achieve media cleanup objectives	Proposed remedies must meet the cleanup objectives for current and anticipated future land and GW use. The objective is to protect future workers and trespassers from contaminants left in place and protect ecological receptors in Colgate Creek. The proposed remedy addresses CAOs by capping contaminated soil, stabilizing Colgate Creek banks and establishing GW clean-up goals.
3. Control the Source of Releases	In all proposed remedies, EPA seeks to eliminate or reduce further release of any remaining hazardous wastes/hazardous constituents from the Facility that may present an unacceptable risk to human health and the environment. The proposed remedy controls release of metals into the air (dust) and into Colgate Creek by capping contaminated soil and bank stabilization.

Table 4 (con't)	
Balancing Criteria	Evaluation
1. Long-Term Reliability and Effectiveness	The proposed remedy will maintain protection of human health and the environment over time by controlling exposure to contaminants remaining on-Site. Long term effectiveness of the proposed remedy will be monitored and maintained by periodic inspections and repairs to the soil covers/caps, Creek bank stabilization and stormwater infrastructure, as needed, and adherence to ICs and the worker safety plan for subsurface work.
2. Reduction of toxicity, mobility, or volume of hazardous constituents	The proposed remedy will reduce mobility of contaminants by soil capping and Creek bank stabilization. Also, abandonment of underground pipes to outfalls on the Creek with modern stormwater management will control migration of contaminants to Colgate Creek. Metals levels in GW should diminish over time.
3. Short-term effectiveness	The proposed remedy will immediately reduce potential exposure to soil contaminants by capping exposed soil and reduce ecological exposure to contaminants by controlling Site runoff and discharge to Colgate Creek.
4. Implementability	The proposed remedy is readily implementable at the Facility. Currently, Facility soils are 80% capped. The Facility is vacant with no buildings or other structures to hinder construction of the remedy.
5. Cost	LECT will develop a cost estimate for remedy implementation as part of a Corrective Measures Implementation Plan to be submitted to EPA and will provide a basis for demonstrating financial assurance compliance.
6. Community Acceptance	Community acceptance of the proposed remedy will be evaluated based on comments received during the public comment period and will be described in EPA's Final Decision and Response to Comments.
7. State Acceptance	MDE has provided input to EPA throughout the investigations and supports the proposed remedy.

Section 8: Financial Assurance

The Facility will be required to demonstrate and maintain financial assurance on an amount included in the Corrective Measures Implementation Plan for completion of the remedy pursuant to the standards contained in Federal regulations 40 CFR § 264.145 and 40 CFR § 264.143.

Section 9: Public Participation

Those interested are invited to comment on EPA's proposed remedy. The public comment period

will last 30 calendar days from the date that notice is published in a local newspaper. Comments may be submitted by mail, fax, e-mail, or phone to Barbara Smith at the address and phone number listed below.

A public meeting will be held upon request. Requests for a public meeting should be made to Barbara Smith (see below). A meeting will not be scheduled unless one is requested.

The Administrative Record contains all the information considered by EPA for the proposed remedy at this Facility. The Administrative Record is available at the following location:

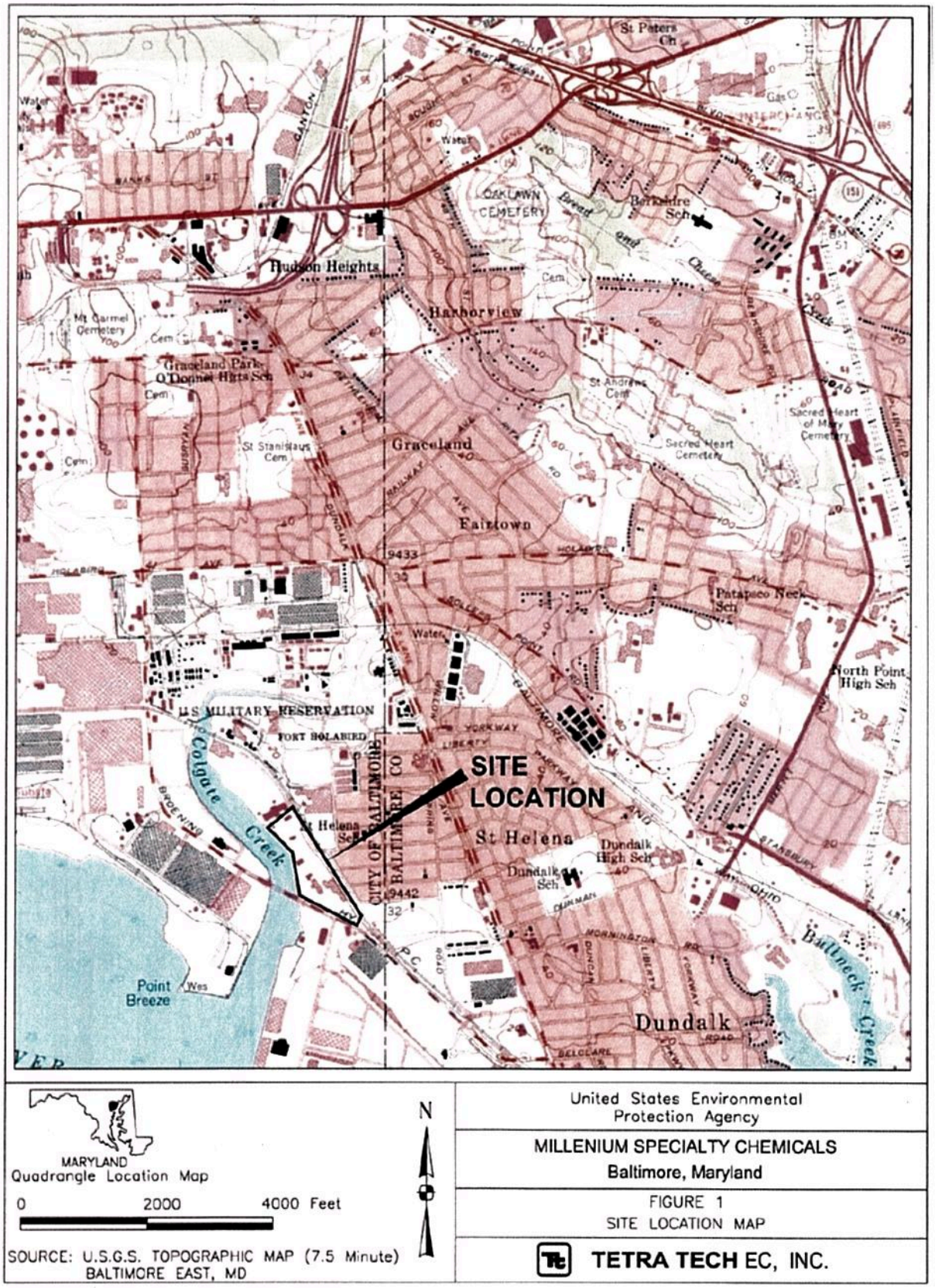
U.S. EPA Region III
1650 Arch Street (3LD10)
Philadelphia, PA 19103

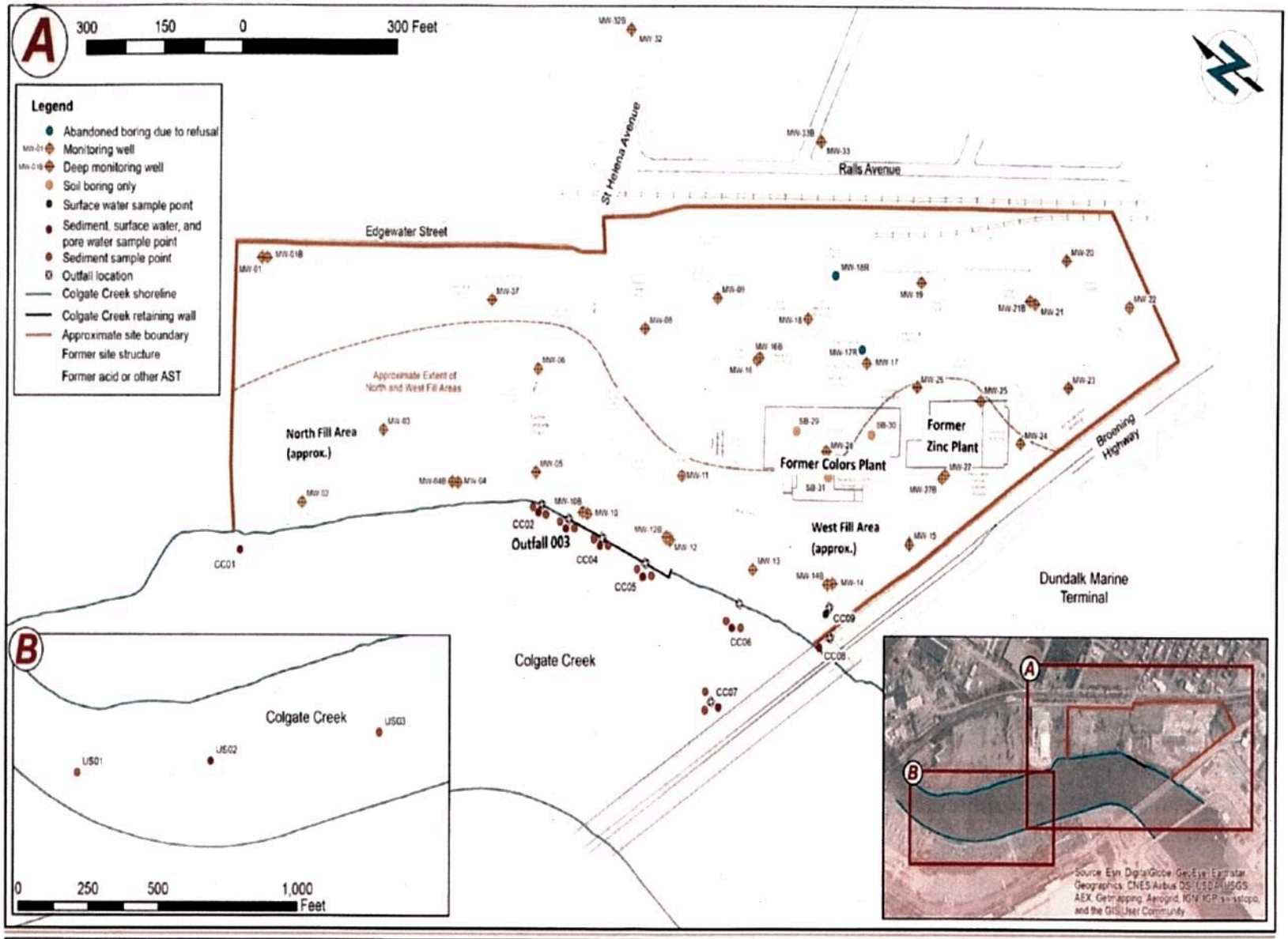
Contact: Barbara Smith
Phone: (215) 814-5786
Fax: (215) 814-3113
Email: Smith.Barbara@epa.gov

Section 10: Signature

Date: 7.1.19

John A. Armstead, Director
Land, Chemicals and Redevelopment Division
US EPA, Region III


SITE LOCATION
Hudson Heights
Harborview
Graceland
Fairfield
St Helena
Dundalk
Point Breeze
Colgate Creek
Patapsco Neck
North Point High Sch
U.S. MILITARY RESERVATION
FORT HOLABIRD
CITY OF BALTIMORE CO
Dundalk High Sch
Dundalk Sch
St Helena Sch
Graceland Park O'Donnel Hgts Sch
Berkshire Sch
OAKLAWN CEMETERY
Mt Carmel Cemetery
St Stanislaus Cem
St Andrews Cem
Sacred Heart Cemetery
Sacred Heart of Mary Cemetery
9433
9442
MARYLAND
Quadrangle Location Map
0
2000
4000 Feet
N
SOURCE: U.S.G.S. TOPOGRAPHIC MAP (7.5 Minute)
BALTIMORE EAST, MD
United States Environmental Protection Agency
MILLENIUM SPECIALTY CHEMICALS
Baltimore, Maryland
FIGURE 1
SITE LOCATION MAP
TETRA TECH EC, INC.



RAMBOLL ENVIRON

DRAFTED BY: cbowles | DATE: 3/20/2015

Sample Location Map

Former Millennium Specialty Chemicals St. Helena Manufacturing Facility
Baltimore, Maryland

Figure 2

Attachment A

Administrative Record – Index of Documents

2006, December 15; *Phase I Environmental Site Assessment, St. Helena Manufacturing Facility, Baltimore, MD*, Blasland, Bouck & Lee, Inc.

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2010, August 13; *Final RCRA Site Visit Report - Former Millennium Specialty Chemicals, EPA ID No. MDD003093507*, USEPA, Region III, Corrective Action Program.

2010, August 18; *EPA Administrative Order on Consent under § 3008(h) RCRA in the Matter of: Lyondell Environmental Custodial Trust, St. Helena Manufacturing Facility, Baltimore, MD.*

2010, December; *Report of Current Site Conditions, Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, ENVIRON.

2012, April; *RCRA Facility Investigation Work Plan, Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, ENVIRON.

2013, April 16; *Technical Memorandum: Summary of Preliminary Soil and Groundwater Results, RCRA Facility Investigation - Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, ENVIRON.

2013, August; *RFI Work Plan Addendum, Work Plan, Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, ENVIRON International Corporation.

2015, July; Appendix I – Human Health Risk Assessment and Appendix J – Screening Level Ecological Risk Assessment, *Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, Ramboll Environ.

2016, June 17; *RFI Work Plan Addendum No. 2, Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, Ramboll Environ.

2017, July; *RCRA Facility Investigation Report, Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, Ramboll Environ US Corporation (Ramboll).

2018, September; *RCRA Corrective Measures Study Report for Soil and Groundwater, Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, Ramboll Environ US Corporation (Ramboll).

2018, November; *Technical Memorandum: Development of Site-Specific Alternate Groundwater Quality Standards, Former Millennium Specialty Chemicals, St. Helena Manufacturing Facility, Baltimore, MD*, Ramboll.