ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF BASIS

Solutia Nitro Facility
Nitro, West Virginia
EPA ID No. WV039990965

Prepared by

Environmental Protection Agency

TABLE OF CONTENTS

- State Support/Agency Acceptance

Attachments

I. INTRODUCTION

The Environmental Protection Agency (EPA) has prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for the Solutia Nitro (Facility), located in Nitro, West Virginia. EPA's proposed remedy for the Facility consists of the isolation and containment of contaminated groundwater source areas, on-site treatment of contaminated groundwater, groundwater monitoring, engineering controls consisting of impermeable and permeable vegetated soil covers to address Facility soils, riverbank stabilization with riprap, and institutional controls to implement land and groundwater use restrictions.

This document explains EPA's basis for recommending the proposed remedies and the Administrative Record (AR) for the Facility contains all documents, including data and quality assurance information, on which EPA's proposed remedy is based. See Section XII, Public Participation, for information on how you may review the AR.

The Facility is subject to the Corrective Action (CA) Program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. §§ 6901 et seq. (Corrective Action Program). The RCRA CA Program is designed to ensure that certain facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and hazardous constituents that have occurred at their property.

Concurrently with this SB, EPA is soliciting comments on a draft Corrective Action Permit (Permit). Pursuant to 40 C.F.R. § 124.7, EPA has prepared this SB to describe the background and basis for the draft Permit and the reasons supporting the proposed remedy. The draft Permit incorporates the remedy proposed in this SB. The components of EPA's proposed final remedy as described in this SB are contained in the Permit, and will be enforceable thereunder once the Permit is finalized and EPA issues a Final Decision and Response to Comments (FDRTC) in which EPA describes the final remedy that is selected for the Facility.

EPA will make a final decision on the draft Corrective Action Permit after considering any information submitted during the public comment period. If no comments are received during the public comment period on the draft permit, the final Corrective Action Permit will be signed and will become effective upon signature. Otherwise, the final Permit will become effective thirty (30) days after the service of notice of the Final Decision or upon conclusion of any appeals filed. EPA will issue a Final Decision and Response to Comments (FDRTC) after considering any comments submitted with respect to the Statement of Basis. The FDRTC will be incorporated into the final Corrective Action Permit and made a part thereof.

Information on the Corrective Action program as well as a fact sheet for the Facility can be found by navigating http://www.epa.gov/reg3wcmd/correctiveaction.htm.

II. FACILITY BACKGROUND

The Facility is located along the eastern (right descending) bank of the Great Kanawha River (Kanawha River) approximately one-half mile north of the City of Nitro in Putnam County, West Virginia.

The Facility encompasses approximately 118 acres divided into two separate areas by Interstate 64: the first, a southern area encompassing approximately 72 acres, which was the former Process Area (PA) and, the second a northern area, encompassing approximately 46 acres, which was the former Wastewater Treatment Area (WTA) and included the wastewater treatment plant and wastewater impoundments. The Facility is located in an area of industrial, commercial and residential land use. Light industrial and commercial facilities are immediately adjacent to the Facility on the north, east and south. Residential areas are located within a 1-mile radius of the Facility in all directions (see Figure 2 for Site Location Map).

The Facility was the previous location of a chemical manufacturing plant that began production of various chemical compounds and explosives in 1918 and continued until mid-2004.

In 1995, as a result of a joint venture between Monsanto Corporation (Monsanto) and Akzo-Nobel, Inc., all production operations, maintenance and facility management of the Nitro plant were transferred from Monsanto to Flexsys, Inc. (Flexsys) This transfer agreement provided Flexsys the entire Facility and substantially all of the assets except the improved real estate and certain limited manufacturing assets. The Facility's November 2, 1990 RCRA Corrective Action Permit, WVD 039990965 (1990 Permit) was modified by EPA (Class I modification) to reflect the change in permittee status from Monsanto to both Monsanto and Flexsys. Under the 1990 Permit, as modified, Flexsys was responsible for active RCRA units and Monsanto was responsible for performing RCRA Corrective Action at the Facility

In 1997 Monsanto spun off its chemical businesses to a newly created, publically held company, Solutia. As a result, Solutia was named the permittee. Solutia acquired Monsanto's interest in Flexsys, including the Nitro facility, as well as Monsanto's solely owned assets and liabilities at the Nitro Facility, including responsibility for RCRA Corrective Action under the permit.

In October 2003, Flexsys ceased all chemical production at the Facility. During 2004, Flexsys began to dismantle, decontaminate, and remove surface structures including the wastewater treatment plant facility. Demolition was completed in December 2005. Solutia remained the owner of all real Facility property and retained responsibility for RCRA Corrective Action.

III. SWMU/AOC SUMMARY

In 1986, EPA conducted a RCRA Facility Assessment (RFA) at the Facility. The results were reported in a December 4, 1986 report entitled, "Phase II Revised RCRA Facility Assessment of the Monsanto Company, Nitro, West Virginia" (RFA Report). The information

obtained during the RFA Report indicated that several areas at the Facility were potential sources of contamination and needed further investigation. Pursuant to the findings in the RFA, EPA issued the Facility the 1990 Permit.

The 1990 Permit required that 14 Solid Waste Management Units (SWMUs) and all environmental media (groundwater, soil, sediment and surface water) be investigated. The RFA Report identified groundwater as the primary environmental media to be investigated. Groundwater investigations were required by the 1990 Permit for all but one of the 14 SWMUs. The 14 defined SWMUs were:

Process Area (PA)

1 - Past Disposal Area (PDA)
Three areas within the PDA
2 - Teepee Incinerator
3 - Niran Residue Pits
4 - Aboveground Equalization / Stormwater Surge Tanks
5 - Facility Sewer System
6 - Building 46 Incinerator

Waste Water Treatment Area (WTA)

Waste Disposal Sites
7 - City of Nitro Dump
8 - Waste Pond
9 - Decontaminated 2,4,5-T Building

Closed Impoundments
10 - Surge Basin
11 - Equalization Basin
12 - Limestone Bed
13 - Emergency Basin
14 - Wastewater Treatment Plant, Consisting of the Activated Sludge Basin; the Secondary Clarifier; and the Tertiary Clarifier

IV. SUMMARY OF ENVIRONMENTAL INVESTIGATIONS

Between 1986 and 2007, numerous environmental investigations were conducted at the Facility. The following remedial actions and stabilization measures took place at the Facility during this 20-year period, including the closure of some SWMUs:

- 1986 RCRA Facility Assessment and 1995 RCRA Facility Investigation.
- 2003 CA-750 (Groundwater) Environmental Indicators Facility Investigation.
- 2004-2006 Expanded Investigation of Site-wide Soils and Groundwater.
- 1986-2007 Site stabilizations and SWMU closures.

- Kanawha River sediment and surface water sampling in 2001, 2002, and 2003.

For all environmental investigations, groundwater concentrations were screened against federal Maximum Contaminant Levels (MCLs) promulgated pursuant to Section 42 U.S.C. §§ 300f et seq. of the Safe Drinking Water Act and codified at 40 CFR Part 141, or EPA Region III Screening Levels (RSL) for tap water for chemicals for which there are no applicable MCL. Soil concentrations were screened against EPA RSLs for residential soil and industrial soil.

In August and September of 1994, pursuant to the RFA Report and the 1990 Permit, Monsanto conducted further investigations of the 14 SWMUs. The results were reported in the "RCRA Facility Investigation and Stabilization/Corrective Measure Plan" (RFI/SCMP), dated May 5, 1995, and the "RCRA Facility Investigation and Stabilization/Corrective Measure Addendum" (RFI/SCMP Addendum), dated August 7, 1995.

A Stabilization/Corrective Measures Study Report (SCM Study Report), dated February 29, 1996, included a site-specific human health risk assessment and ecological evaluation of site media. The SCM Study Report concluded the residual concentrations of hazardous constituents do not present unacceptable human health or ecological risks.

Based on the SCM Study Report findings, Monsanto implemented several stabilization/corrective measures and waste minimization/source control elements to ensure the site is maintained in a stable condition, including:

  - Restoration of the process sewer system
  - Groundwater extraction and treatment system for TCE hot spot areas
  - In-situ groundwater bio-sparging system for a hot spot area in the WTA
  - Light Non Aqueous Phase Liquids (LNAPL) recovery from groundwater in the PDA
  - Continued groundwater monitoring
  - Capping and restoration of the Surge and A3 Basins
  - Continued site waste minimization activities

Completion of the 1995 RFI was followed by several years of continuing Facility operations, during which time several focused environmental investigative studies were conducted to provide additional environmental data. Several of the studies are summarized as follows:

- In November 1998 and May through June 1999, an EPA On-Scene Coordinator (OSC) directed a Roy F. Weston, Inc. (WESTON) Site Assessment Technical Assistance (SATA) team to collect 17 sediment samples from the Facility and adjacent to the west in the Kanawha River. The 17 sediment samples had dioxin detections. The highest results of dioxin were detected in samples collected from a sediment sample adjacent to the WTA and a sediment sample collected adjacent to the PDA (1648.2 parts per trillion (ppt), and 951.7 ppt, respectively).

- In June 1999, seven composite surface soil samples were collected from a three-acre parcel, the former HUB Property (a.k.a. AES Property). The former HUB Property is

located adjacent to the northeast of the PDA (south of Interstate 64) and is currently owned by Solutia. The samples were submitted for analysis of dioxin. The seven soil samples had dioxin detections. The concentrations of dioxin ranged from 622 ppt to 5060 ppt.

- In September 2001, during average flow conditions in the Kanawha River, 13 surface water samples and 23 sediment samples were collected from three segments (Segments A, B, and C) adjacent to the west of the Facility in the Kanawha River. Two background samples were also collected. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) and TCL semi volatile organic compounds (SVOCs). Concentrations of TCL VOCs and TCL SVOCs were not detected in the surface water samples. Sediment samples collected from three locations adjacent to the PDA contained concentrations of TCL VOCs.

- In December 2002, 27 sediment samples (including three background samples) were collected from the Kanawha River adjacent to the west of the Facility. Eighteen of the sediment samples were collected from four new segments (Segments D, E, F, and G). The sediment samples were analyzed for TCL VOCs and TCL SVOCs. Twenty-six sediment samples were analyzed for dioxin. Fifteen of the sediment samples, one of which was a background sediment sample, contained detectable concentrations of TCL VOCs. Six of the sediment samples, two of which were background sediment samples, contained detectable concentrations of TCL SVOCs. Twenty-three of the sediment samples contained detectable concentrations of dioxin. Surface water samples (including two background samples) were collected from the Kanawha River adjacent to the west of the Facility in 18 locations. Twenty-six of the surface water samples, two of which were background surface water samples, contained detectable concentrations of TCL VOCs.

  Additionally, 40 passive vapor diffusion (PVD) samplers were placed in the Kanawha River sediment at 19 locations. The PVD samplers were submitted for analysis of TCL VOCs. Eleven samples contained detectable concentrations of TCL VOCs.

- In August 2003, 21 surface water samples (including two background samples) were collected from the four segments of the Kanawha River sampled in December 2002 (Segments D, E, F, and G). The surface water samples were submitted for analysis of TCL VOCs, TCL SVOCs, and dioxin. Eighteen of the surface water samples, including one background surface water sample, contained detectable concentrations of TCL VOCs.

2003 Environmental Indicators Facility Investigation

Solutia completed an initial groundwater investigation in 2003 (EI Investigation) and results were documented in the "Documentation of Environmental Indicator Determination Report," dated December 2003 (EI Report). Additional analytical results relevant to the EI Investigation with respect to surface water and sediments were documented on the "Revised Data Report, CA-750 Groundwater Environmental Indicators," dated May 2004 (EI Data

Report). The EI Data Report summarized the field and analytical work conducted at the Facility during 2003 EI Investigation and added data from the Kanawha River Sediment and Surface Water Sampling events of 2001, 2002, and 2003. All data collected from these four events were presented in the EI Data Report appendices.

The EI Investigation of Facility groundwater included the advancement of direct push points at 34 locations, 21 within the PA and 13 within the WWTU. The objective of the EI Investigation was to collect representative groundwater samples from three distinct depths at each temporary sampling location and define the horizontal and vertical extent of groundwater containing Facility related constituents.

The EI Data Report presented analytical results and summarized the field efforts and methods used to collect the groundwater, sediment, and surface water samples described in the following work plans:

- *Site Assessment Work Plan – Final; CA-750 Groundwater Characterization Investigation; Process and Wastewater Treatment Plant Areas, Flexsys America, L.P. Facility, Nitro, WV, May 2003*
- *Supplemental Surface Water and Sediment Sampling Work Plan – Final; Kanawha River Reach, Flexsys America, L.P. Facility, Nitro, WV, September 13, 2002 as supplemented by letter to Jennifer Shoemaker, dated November 12, 2002*
- *Kanawha River Sediment and Surface Water Sampling Work Plan – Final; Kanawha River Reach, Flexsys America, L.P. Facility, Nitro, WV, September 2001*

All EI Investigation conclusions were based on these analytical results and summarized in the CA-750 EI Questionnaire which concluded that:

- Groundwater contains COCs above MCLs, or RSL for tap water, as applicable.
- It is unknown if the migration of COC-affected groundwater has stabilized on the northern and southern Facility boundaries.

The second conclusion regarding possible migration of COCs necessitated an additional investigation. This investigation, the Expanded RCRA Facility Investigation (ERFI), is detailed in the following discussion on Facility stabilizations and SWMU closures.

V. FACILITY STABILIZATION MEASURES AND SWMU CLOSURES

The stabilization measures and SWMU closures listed below were completed before the ERFI was conducted in 2004-2006.

- SWMU closures in the WTA
- SWMU 8 - 0.5-acre waste pond
- SWMU 10 – Surge Basin
- SWMU 12 - Limestone bed
- SWMU 11 - 5 million gallon Equalization Basin

- SWMU 13 - 10 million gallon Emergency Basin
- A3 Basin
- SWMU 14 – Waste Treatment Plant – consisting of the 2-million gallon Activated Sludge Basin; Secondary and Tertiary Clarifiers; and Digester
- SWMU 4 - four above ground Equalization/Stormwater Surge Tanks in the PA
- SWMU 5 - Sitewide combination process/stormwater sewer closed, stabilized and isolated
- SWMUs 1, 2, 3 and 6 - PDA stabilization
- Riverbank slough stabilization

These SWMUs and areas of interest represent multiple areas that were stabilized and closed as part of the plant closure and West Virginia RCRA Permit closeout. These areas were further addressed with barrier walls and capping as part of Facility-wide environmental engineering controls to prevent contaminated groundwater and contaminated surface water runoff from leaving the Facility.

Expanded Investigation of Facility-wide Soils and Groundwater

In October 2003 Flexsys ceased operations at the Facility and began to dismantle all of its operational facilities. While Solutia continued to operate at the Facility, in 2004, EPA, WVDEP and Solutia conducted an extensive review of the Facility operational history and the historical environmental data, including the recently completed EI Data Report, pursuant to Solutia's continued obligations under the 1990 Permit.

EPA concluded that an additional Facility environmental characterization would be required for groundwater, Facility soils and some SWMUs to address some remaining data gaps. In addition, EPA determined that groundwater flow within the Facility may be a transport mechanism for dioxin to offsite receptors (*i.e.*, the Kanawha River), and that additional information is needed to determine whether groundwater within the Facility was transporting dioxin to other offsite receptors.

Detailed work plans were developed and approved by the Agencies for the ERFI for groundwater and the ERFI for soils in November 2004 and May 2006, respectively. Results from the ERFI investigations were documented in a February 2007 ERFI Report.

Conclusions and Outcomes

The environmental investigations discussed above resulted in a thorough Facility characterization and understanding of the nature and extent of Facility wastes; provided additional delineation of identified Facility COCs; defined COC transport mechanisms; and defined affected environmental media. Major conclusions from these investigations and the CSM are detailed in the ERFI Reports and summarized as follows:

- Dioxin is migrating from the Former 2,4,5-T Manufacturing Area, the PDA, and the Closed Wastewater Impoundments via the groundwater and/or surface water pathways and discharging to the Kanawha River. Although TCDD flux is less than 15% of the safe

loading level (16.5 ug/l), migration from these source areas should be controlled because the WV Ambient Water Quality Criteria (WVAWQC) for 2,3,7,8 TCDD in the Kanawha River is .014 pg/l, a very low number established to protect human health.

- Tetrachloroethene (PCE) or its breakdown products, trichloroethylene (TCE); dichloroethene (DCE); and vinyl chloride (VC), are migrating from the Former Rubber Chemicals Manufacturing Area via the groundwater pathway and discharging to the Kanawha River. Even though TCE concentrations in the Kanawha River downgradient of the former process area are below the 81 ug/l WVAWQC, migration from this source area should be controlled to ensure that this criterion will continue to be achieved. Additional VOCs/SVOCs that exceeded their respective MCLs or Screening Levels were identified in on-site groundwater.

- Removal and disposal and/or onsite treatment of source areas and waste disposal areas at the Facility are impracticable for the following reasons:
    - The presence of dioxin in Facility environmental media and the unavailability of offsite treatment / disposal alternatives within the United States;
    - The areal and vertical extent of affected media;
    - The overall volume of affected soils, waste and groundwater on this 118-acre Facility and
    - Heterogeneity of wastes in source areas.

VI. INTERIM REMEDIAL MEASURES

Solutia agreed to complete the following Interim Remedial Measures (IRMs) at the Facility to control and contain releases and prevent exposure to contamination that may pose unacceptable risks to human health or to the environment. The work plans to complete the IRMs were approved by EPA and WVDEP after a review process completed by the Agencies with assistance from the Army Corps of Engineers (ACE).

A. Facility-wide Groundwater - Source Area Containment and Treatment

Because the presence of dioxin in Facility groundwater is at levels which render it impracticable to treat and discharge, soil-bentonite slurry walls were installed in order to isolate and contain groundwater source areas. Installation began in 2011 and was completed in 2016. Over 8000 linear feet (LF) of 3-foot thick soil-bentonite slurry walls were installed surrounding four areas totaling approximately 22 acres of the 118-acre Facility. The areas contained included parts of the PA, virtually all of the PDA (LNAPL migration control), and two areas in the WTA. The bottom of the soil-bentonite slurry walls were keyed into the bedrock, which is present at an average depth of approximately 60 feet below grade throughout the Facility. The installed slurry walls met the required permeability specification of $<1x10^{-7}$cm/sec (see Figure 1 for location of slurry walls).

Groundwater from inside of the four soil-bentonite slurry wall containment areas will be extracted to maintain inward gradient across the barrier walls via extraction wells. The extracted groundwater will be collected, treated and the discharged to surface water via an NPDES permitted outlet. Pumping and treatment of groundwater from within the groundwater

containment areas will be continued until such time that Solutia can demonstrate that the concentrations of constituents in the groundwater outside of the groundwater containment areas are below MCLs, or RSLs for tap water, as applicable, or until the Facility can demonstrate that pumping and treatment of groundwater for gradient control is not needed to achieve groundwater cleanup objectives.

EPA provided oversight during the construction and installation of the soil-bentonite slurry walls.

B. Facility-wide Soils and SWMUs - Caps and Covers

In 2012 through 2016, Solutia installed four types of caps and covers over virtually the entire 118-acre Facility. The four types of caps and covers installed at the Facility were as follows:

- Low Permeability Caps over all containment areas - Consisting of a non-woven geotextile, 40-mil low density polyethylene geomembrane, composite drainage layer including perforated pipe and aggregate underdrains, and an 18-inch soil cover layer.
- Low-Permeability Covers - Consisting of a 40-mil low density polyethylene geomembrane, non-woven geotextile and an 18-inch soil layer.
- Permanent Permeable Cover – Consisting of a nonwoven geotextile and an 18-inch soil layer.
- Approximately 2400 linear feet of the Facility's river bank along the Kanawha River was covered and armored with rip-rap.

VII. CORRECTIVE ACTION OBJECTIVES

EPA has identified the following Corrective Action Objectives (CAOs) for soils and groundwater at the Facility:

- **Soils**

  The CAOs for Facility soils is the prevention of unacceptable human exposure to contaminated industrial soils at all levels, with "unacceptable exposure" defined as carcinogenic risks > $1x10^{-6}$ and a Hazard Index for non-carcinogenic risks of > 1.

- **Groundwater**

EPA expects final remedies to return usable groundwater to its maximum beneficial use, where practicable, within a timeframe that is reasonable. Until groundwater is restored to MCLs, EPA expects facilities to prevent or minimize the further migration of a plume, prevent exposure to the contaminated groundwater, and evaluate further risk reduction.
However, treatment of the dioxin contamination in Facility groundwater to its MCL is not

practicable nor cost effective because of its extremely low MCL and its wide distribution in groundwater on-site.

Therefore, EPA's CAO's for Facility groundwater are to control exposure to the hazardous constituents remaining in the groundwater, prevent a discharge of dioxin contaminated groundwater into the site-adjacent Kanawha River that could cause the Kanawha River to exceed its Allowable Maximum Daily Load for that compound, and reduce concentrations of contaminants in impacted groundwater in areas outside of the containment areas to ultimately restore that groundwater to MCLs

VIII. Proposed Remedy

EPA's proposed remedy for the Facility is a combination of Engineering Controls (ECs) and Institutional Controls (ICs) for soils and groundwater at the Facility. ECs are engineered and constructed physical barriers, structures, or systems designed to contain and/or prevent exposure to contamination. ICs are non-engineered instruments, such as administrative and legal controls, that impose restrictions on use of contaminated property or resources to minimize the potential for human exposure to contamination and protect the integrity of a remedy. Components of the ECs will include a program of containment-in-place of groundwater contaminant source areas and monitored natural attenuation to address contaminated groundwater outside the containment areas.

IX. Implementation of Proposed Remedy

A. Engineering Controls

1. Source Area Containment and Treatment

EPA proposes to require the continuation of current IRM's (See Section VI, above) to address Facility groundwater source areas in order to manage the potential for off-site transport of COCs, primarily dioxin, and to mitigate potential exposure pathways. Contaminated groundwater from within the groundwater containment areas will be pumped, treated and discharged under the Facility's WV NPDES permit to achieve an inward gradient in each groundwater containment area. Pumping and treatment of groundwater from within the containment areas will be continued until such time as the Facility can demonstrate that the concentrations of constituents in the groundwater outside of the containment areas are below MCLs or WVDEP acceptable limits or until the Facility can demonstrate that pumping and treating groundwater for gradient control is no longer needed to achieve groundwater cleanup objectives outside the containment area.

EPA also proposes to require the continued maintenance of the existing impermeable and permeable vegetated soil covers and the riprap placed on the Facility riverbank for stabilization.

The following is a list of the major elements of the proposed remedy for Source Area Containment and Treatment:

1. Groundwater source areas will be contained by barrier walls and impermeable caps.
   a. Contaminated groundwater source areas to be pumped at sufficient rates to maintain inward hydraulic gradients across the barrier walls.
   b. The extracted water to be treated prior to discharge to surface water via NPDES permitted outfall.
   c. An area-wide groundwater flow model to be developed to support the specific Site groundwater source area containment design and monitoring plan.

2. Facility soils to receive engineered covers to prevent contact with underlying contaminated soil. In addition, the Facility's riverbank along the Kanawha River will be stabilized and covered with riprap to mitigate potential COC exposure pathways and to prevent the potential transport of COCs off-site.

3. Periodic monitoring of groundwater and surface water will be conducted in accordance with an EPA- approved Monitoring Plan. EPA anticipates that the source control measures (containment-in place) provides the bulk of the controls for management of contaminants in the groundwater. The remaining contamination in groundwater outside of the containment areas will naturally attenuate, and will ultimately achieve our groundwater cleanup levels (drinking water standards) without further treatment.

2. Groundwater Outside Containment Area - Monitored Natural Attenuation

The Facility is required to maintain a groundwater monitoring program to demonstrate that the inward gradient across the barrier walls is maintained as applicable and that the groundwater contamination outside of the containment area is being reduced through natural attenuation. EPA anticipates that, once the sources are contained the remaining contamination in groundwater outside the barrier walls will naturally attenuate, and will ultimately achieve our groundwater cleanup levels (below MCLs or WVDEP acceptable limits) without further treatment. Therefore, the proposed remedy for groundwater outside the barrier walls consists of monitored natural attenuation with continued monitoring until groundwater cleanup levels are met, and compliance with and maintenance of groundwater use restrictions, to be implemented though institutional controls.

B. Institutional Controls

Under this proposed remedy, some contaminants remain in the groundwater and soil at the Facility above levels appropriate for residential uses. Because some contaminants remain in the soil and groundwater at the Facility at levels that exceed residential use, EPA's proposed remedy requires the compliance with and maintenance of land and groundwater use restrictions. EPA proposes to implement the land and groundwater use restrictions necessary to prevent human exposure to contaminants at the Facility through enforceable ICs, such as; a permit; orders and/or an Environmental Covenant, pursuant to the West Virginia Uniform Environmental Covenants Act to be recorded with the deed for the Facility property.

The ICs shall include, but not be limited to, the following land and groundwater use restrictions:

- Groundwater at the Facility shall not be used for any purpose other than operation, maintenance, and monitoring activities required by EPA unless it is demonstrated to EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and EPA, provides prior written approval for such use;

- The Facility property shall not be used for residential purposes unless it is demonstrated to EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy, and EPA, provides prior written approval for such use;

- All earth moving activities, including excavation, drilling and construction activities, in the areas at the Facility where any contaminants remain in soils above EPA's Screening levels for non-residential use or groundwater above Federal MCLs/Tap Water RBCs, shall be prohibited unless it is demonstrated to EPA, that such activity will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy, and EPA, provides prior written approval for such use;

- No new wells will be installed on Facility property unless it is demonstrated to EPA that such wells are necessary to implement the final remedy and EPA provides prior written approval to install such wells;

X. EVALUATION OF EPA's PROPOSED REMEDY

This section provides a description of the criteria used to evaluate the proposed remedy consistent with EPA guidance, "Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed Rule," 61 Fed. Reg. 19431, May 1, 1996. The criteria are applied in two phases. In the first phase, EPA evaluated three decision threshold criteria as general goals. In the second phase, for those remedies that meet the threshold criteria, EPA then evaluated seven balancing criteria.

1. Threshold Criteria

- **Protect Human Health and the Environment**

  Overall protection of human health and the environment addresses the ability of an alternative to eliminate, reduce or control threats to public health or the environment through institutional controls, engineering controls, removal or treatment.

  With respect to groundwater, containment of contaminated source areas is the primary remedy for the Facility. Groundwater containment and natural monitored

attenuation employed at the Facility has been a primary tool in effectively and reliably protecting public health and the environment. Groundwater from inside the four soil-bentonite slurry wall containment areas will be extracted to maintain inward gradients across the barrier walls via extraction wells until such time that the Facility can demonstrate that the concentrations of constituents in the groundwater outside of the groundwater containment areas are below MCLs and WVDEP acceptable limits or until the Facility can demonstrate that pumping and treatment of groundwater for gradient control is not needed to achieve groundwater cleanup objectives.

The captured groundwater will be treated at the on-site waste water treatment plant. In addition, the existing groundwater monitoring plan will be modified as necessary to monitor groundwater quality in areas outside of the groundwater containment areas and to evaluate the effectiveness of hydraulic containment..

With respect to Facility soils, all contaminated soil has been capped with a soil cover. Some covers are impermeable and some are permeable. There is no direct exposure to subsurface soil under current land use, and direct exposure of future construction or excavation workers will be controlled by Facility procedures and appropriate health and safety plans. Land use restrictions are proposed in order to minimize the potential for human exposure to contamination.

- **Achieve Media Cleanup Objectives**

EPA's proposed remedies meet the media cleanup objectives based on assumptions regarding current and reasonably anticipated land and water resource use(s). The remedy proposed in this SB is based on the current and future anticipated land use at the Facility as commercial or industrial.

To manage [and treat] groundwater impacted from SWMU-related releases of contaminants and to ensure the ongoing protectiveness of human health and the environment, Solutia has installed soil-bentonite slurry walls for containment of source areas and has installed groundwater pumping wells for gradient control of containment areas. With respect to the groundwater contamination outside of the slurry walls, under EPA's proposed remedy the Facility is required to maintain a groundwater monitoring program to demonstrate that the contamination is being reduced through natural attenuation and will ultimately achieve MCLs.

The engineered slurry wall and cap system requires maintenance and monitoring. The ongoing maintenance and monitoring will continue through the life of the proposed remedy to maintain its effectiveness in order to ensure safety to human health and the environment.

- **Remediating the Source of Releases**

In all proposed remedies, EPA seeks to eliminate or reduce further releases

of hazardous wastes and hazardous constituents that may pose a threat to human health and the environment. With the completion of the engineered slurry wall and cap system and the installation of the water treatment plant, the infiltration of surface water will be significantly reduced, resulting in a significant reduction in the potential for leaching. Contaminated groundwater will be contained within the slurry wall system and be captured and treated prior to discharge, contaminated soils will remain under the surface to ensure protection to human health and the environment.

2. **Balancing/Evaluation Criteria**

- **Long-Term Effectiveness**

The potential for human exposure through direct contact with contaminated subsurface soil and groundwater has been controlled by the engineering controls currently in place at the Facility. In addition, EPA proposes to implement land and groundwater use restrictions necessary to prevent human exposure to contaminants at the Facility through enforceable ICs, such as a permit, order and/or an Environmental Covenant.

To manage groundwater impacted from SWMU-related releases and to ensure the ongoing protectiveness of human health and the environment, the Facility installed soil-bentonite slurry walls as source containment and continues to pump and treat groundwater from within the containment areas for gradient control. Furthermore, a groundwater monitoring program is being performed to ensure hydraulic containment is working and contaminant concentrations are decreasing over time through natural attenuation.

- **Reduction of Toxicity, Mobility, or Volume of the Hazardous Constituents**

The reduction of toxicity, mobility and volume of hazardous constituents will continue by natural attenuation at the Facility. Reduction of contaminants will be accomplished by the engineered cap placed on the soil contaminated areas and will be verified by the results of the ground water monitoring program. Mobility of contaminants will continue to be controlled through the pumping activities in the groundwater containment areas.

- **Short-Term Effectiveness**

The proposed remedy does not involve any activities, such as construction or excavation that would pose short-term risks to workers, residents, and the environment. EPA anticipates that the land use restrictions and the on-going groundwater programs will continue after the issuance of the Final Decision and Response to Comments. A groundwater monitoring program is already in place and will be updated as necessary based on monitoring results.

- **Implementation**

  The proposed remedy is readily implementable. Groundwater monitoring is already in place and operational. EPA proposes that the ICs be implemented through an enforceable mechanism such as an order, permit and/or an Environmental Covenant pursuant to the West Virginia Uniform Environmental Covenants Act. Therefore, EPA does not anticipate any regulatory constraints in implementing its proposed remedy.

- **Cost**

  The proposed remedy is cost effective. The significant costs associated with this proposed remedy was the major interim measure that included the construction of slurry walls; the capping of areas of soil contamination; and construction of a waste water treatment plant that was completed in 2016. The costs for the maintenance of the cap system and for the continuation of the groundwater monitoring program are estimated to be around $95,000 per year. The costs associated with recording and enforcing a permit, order, and/or environmental covenant are anticipated to be minimal.

- **Community Acceptance**

  EPA will evaluate Community acceptance of the proposed remedy during the public comment period, and it will be described in the FDRTC.

- **State Support/Agency Acceptance**

  WVDEP has reviewed and concurred with the proposed remedy for the Facility. Furthermore, EPA has solicited WVDEP input and involvement throughout the investigation process at the Facility.

XI. FINANCIAL ASSURANCE

EPA will require the Facility to provide assurances of financial responsibility for completing the Remedy. Financial Assurance details for RCRA CA will be incorporated into the EPA-issued RCRA Corrective Action Permit.

XII. PUBLIC PARTICIPATION

Written comments on this SB and the Draft Corrective Action Permit will be accepted during the forty-five (45) day comment period. A final permit decision regarding the remedy

proposed for the Facility will not be made until the public comment period has closed and all comments have been evaluated and addressed. Based on new information or comments from the public, EPA may modify the proposed remedy and/or the Draft Corrective Action Permit.

Following review of the comments, EPA will respond to the comments and finalize the remedy and the Permit. The proposed remedy in this SB is a preliminary determination and should another remedy be selected based upon public comment or new information, any significant differences from this SB could cause a reopening of the public comment period and the reissuance of a revised SB.

The public comment period will last forty-five (45) calendar days from the date that notice is published in a local newspaper in order to provide an opportunity for public comment and involvement during the evaluation of this proposal. This SB provides only a summary description of the investigations and activities performed at this Facility. EPA encourages the public to review the documents in the Administrative Record (AR) to gain a more comprehensive understanding of the activities that have been conducted at the Facility and the proposals under consideration. The AR contains all information considered by EPA in reaching this proposed remedy and is available for public review during normal business hours at:

U.S. EPA Region III
1650 Arch Street
Philadelphia, PA 19103
Contact Mr. William Wentworth
Phone: 215-814-3184
E-mail: wenworth.willam@epa.gov

Interested parties are encouraged to review the AR and comment on EPA's proposed remedy. Comments may be submitted by mail, fax, or e-mail to the EPA RCRA Corrective Program Manager at the address listed below.

If requested, during the forty-five (45) day public comment period, EPA will hold a public hearing to accept oral comments on the proposed remedy. Comments made at the hearing will be transcribed, and a copy of the transcript will be added to the AR. Requests for a public meeting should be made to:

Mr. William Wentworth
U.S. Environmental Protection Agency
Region III
1650 Arch Street - 3WC23
Philadelphia, PA 19103-2029
Office: (215) 814-3184
Fax: (215) 814-3113
E-mail: wentworth.william@epa.gov

All persons who comment on this proposed remedy and draft Corrective Action Permit receive a copy of the FDRTC and final Corrective Action Permit. Others may obtain a copy by contacting the RCRA Corrective Action Program Manager at the address listed above.

_____ _____

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

APPENDIX A

ADMINISTRATIVE RECORD INDEX

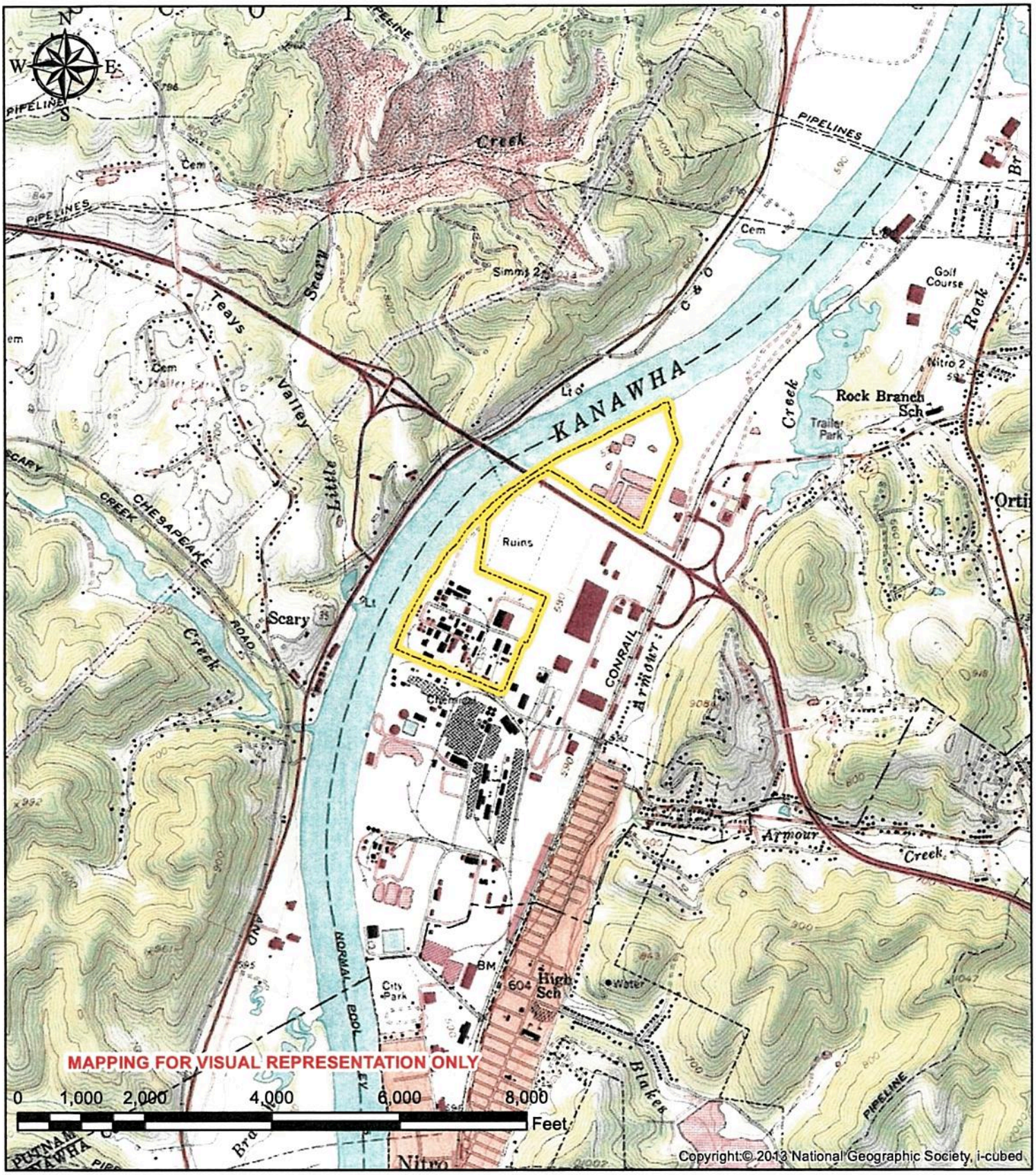
Solutia Nitro Site
Nitro, West Virginia
Permit No. WV039990965
Administrative Record

Date	Title	Author
4/8/1994	RFI Work Plan Revision No. 1	Roux Associates, Inc.
8/5/1994	Facility Sewer System Stabilization Work Plan Evaluation Study	Roux Associates, Inc.
5/5/1995	RCRA Facility Investigation and Stabilization/Corrective Measure Plan	Roux Associates, Inc.
8/7/1995	RCRA Facility Investigation and Stabilization/Corrective Measure Plan Addendum	Roux Associates, Inc.
2/29/1996	Stabilization/Corrective Measures Study Report	Roux Associates, Inc.
11/27/1996	Detailed Sewer Stabilization Measures Plan	Roux Associates, Inc.
9/25/1998	Summary of Ground-Water Sampling and LNAPL Monitoring Data	Roux Associates, Inc.
1/25/1999	Stabilization/Corrective Measures Effectiveness Report	Roux Associates, Inc.
5/12/2000	Response to USEPA Comments of Corrective Measures Effectiveness Report	Roux Associates, Inc.
3/26/2001	Corrective Measures Study Work Plan	Roux Associates, Inc.
9/13/2002	Supplemental Surface Water and Sediment Sampling Work Plan, Solutia Inc. Facility; 1 Monsanto Road, Nitro, West Virginia	Roux Associates, Inc.
Dec-01	Evaluation of Environmental Indicator for Migration of Contaminated Ground-Water Under Control - RCRIS Code CA750, Solutia, Inc. Facility	Roux Associates, Inc.
12/28/2001	Report on Phase 1A Activities	Roux Associates, Inc.
9/30/2002	Response to August 1, 2001 Comment letter from Jennifer Shoemaker "Review of Report of Phase 1A Activities Corrective Measures Study"	Potesta & Associates, Inc.
2003	Migration of Contaminated Groundwater Under Control Environmental Indicators Report (CA-750 EI)	Potesta & Associates, Inc.
May-03	Site Assessment Work Plan – Final; CA-750 Groundwater Characterization Investigation; Process and Wastewater Treatment Plant Areas, Flexsys America, L.P. Facility, Nitro, WV	Potesta & Associates, Inc.
Dec-03	Documentation of Environmental Indicator Determination Report, , Interim Final 2/5/99	Potesta & Associates, Inc.
Dec-03	CA-750 Groundwater Indicators Data Evaluation Report	Potesta & Associates, Inc.
May-04	Revised Data Report, CA-750 Groundwater Environmental Indicators	Potesta & Associates, Inc.
Nov-04	Expanded RFI-Groundwater Work Plan	Potesta & Associates, Inc.
May-06	Final Expanded RFI-Soils and SWMUs Work Plan	Potesta & Associates, Inc.
2/16/2007	Final Draft Expanded RCRA Facility Investigation Report	Potesta & Associates, Inc.
4/9/2010	Final Interim Measures Work Plan, Solutia Inc. Nitro Site, Nitro, West Virginia	Potesta & Associates, Inc.
10/19/2009	Interim Measures Work Plan	Potesta & Associates, Inc.
11/3/2009	Draft Interim Measures Work Plan	Potesta & Associates, Inc.
6/7/2010	Work Plan for Interim Measures Geotechnical Study	Potesta & Associates, Inc.
1/21/2011	Interim Measures Slurry Wall Installation - Slurry Wall Technical Specifications / Response to Comments	Potesta & Associates, Inc.
5/4/2011	Interim Measures Slurry Wall Installation - Operations Plan	GSI Environmental Inc.
5/4/2011	Interim Measures Slurry Wall Installation - Health and Safety Plan	GSI Environmental Inc.
5/4/2011	Interim Measures Slurry Wall Installation - Contingency Plan	GSI Environmental Inc.
5/4/2011	Interim Measures Slurry Wall Installation - Storm Water Runoff and Water Management Plan	GSI Environmental Inc.
6/3/2011	Interim Measures Slurry Wall Installation Response to Comments Re: May 4, 2011 Submittal of Contractor Pre-Construction Deliverables	Potesta & Associates, Inc.
9/9/2011	Groundwater Model Development and Flow Simulations, Solutia Nitro Site, Nitro, West Virginia	GSI Environmental Inc.
12/13/2011	Work Plan - RCRA Interim Measures Final Caps and Covers Installation	Potesta & Associates, Inc.
5/5/2012	RCRA Interim Measures Final Caps and Covers Design Drawings and Technical Specifications	Potesta & Associates, Inc.
3/11/2013	Interim Measures Effectiveness Monitoring Plan	Potesta & Associates, Inc.
3/11/2013	Well Evaluation for Remediation Effectiveness	GSI Environmental Inc.
6/11/2013	Borrow Soil Sampling and Analysis	Potesta & Associates, Inc.
5/15/2015	Final Caps and Covers Maintenance and Monitoring Plan, Solutia Inc. Nitro Site, Nitro, West Virginia	Potesta & Associates, Inc.
2/22/2016	Interim Measures Effectiveness Monitoring Plan Annual 2015 Report	Potesta & Associates, Inc.
3/14/2016	Corrective Measures Study Report; Solutia Inc. Nitro, WV Site	Potesta & Associates, Inc.

APPENDIX B

Figure 1 – Areas Enclosed by Slurry Walls

Figure 2 – Site Location Map



Legend

Solutia Property

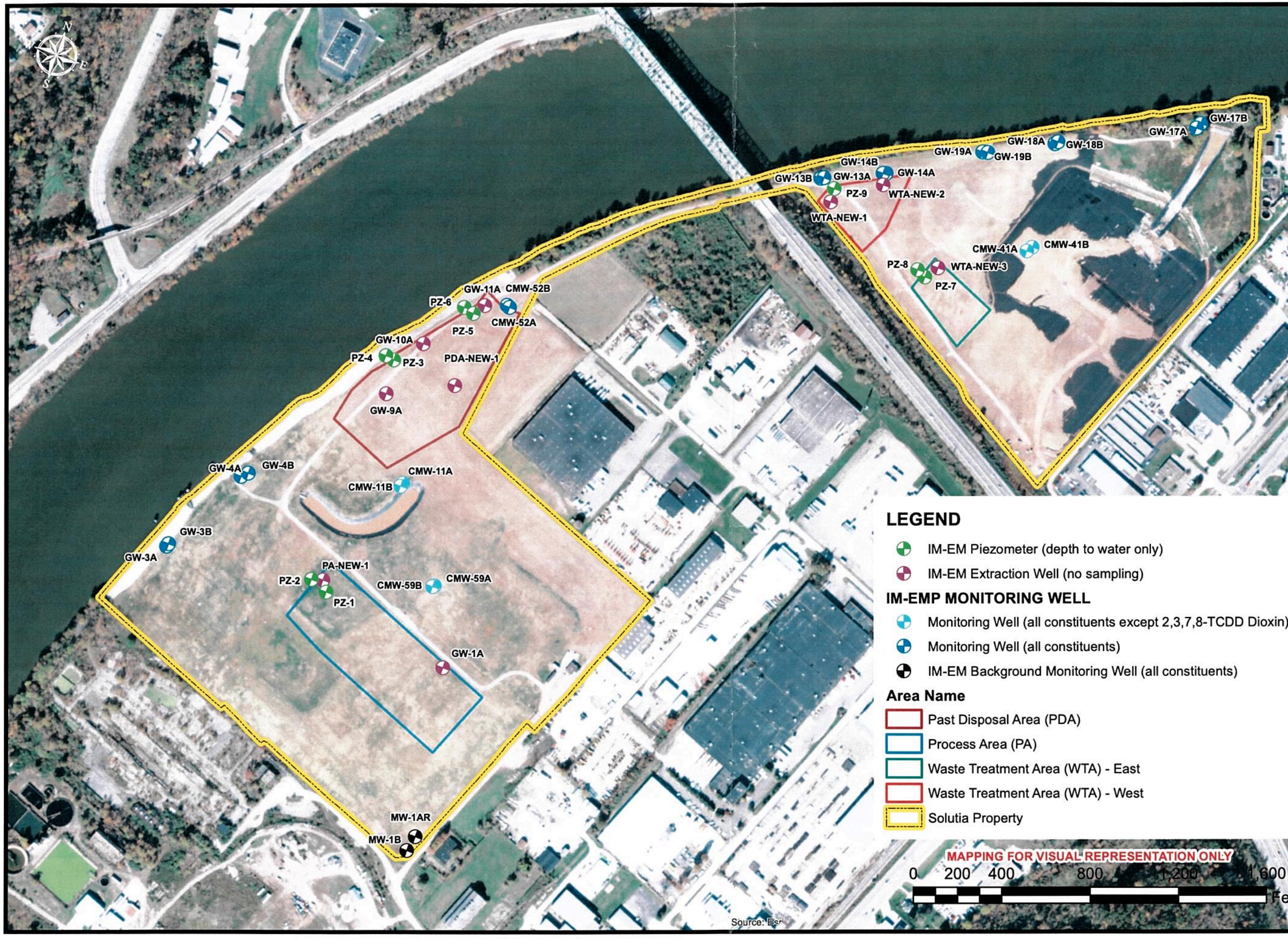
POTESTA
ENGINEERS AND ENVIRONMENTAL CONSULTANTS

DATE: FEBRUARY 2016
PROJECT NO.: 0101-01-0081
SCALE: SEE SCALE BAR

SITE LOCATION MAP
SOLUTIA INC. NITRO SITE
NITRO, PUTNAM CO., WV

FIGURE 2

G:\Projects\2001\01-0081 Solutia (new)\Map Documents\02-17-2016_SiteLocationMap.mxd



Scale: SEE SCALE BAR | Drawn: LMS

Date: FEBRUARY 15, 2016 | Checked:

Project No. 01-0081-700F | Approved:

G:\Projects\2001\01-0081 Solutia (new)\Map Documents\2015MWMap_rev2_15_16.mxd

POTESTA

SOLUTIA INC.
NITRO, WEST VIRGINIA
SITE

FINAL INTERIM MEASURES
EFECTIVENESS MONITORING (IM-EM)
MONITORING WELL, EXTRACTION
WELL, AND PIEZOMETER
LOCATIONS

Figure
1