



STATEMENT OF BASIS

**CENTURY ALUMINUM OF WEST VIRGINIA
(WVR00016469)**

and

**ALCAN ROLLED PRODUCTS – RAVENSWOOD LLC
(WVD009233297)**

**Formerly
RAVENSWOOD ALUMINUM CORPORATION
RAVENSWOOD, WEST VIRGINIA**

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I. INTRODUCTION

The United States Environmental Protection Agency (EPA) has prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for two (2) parcels on County Road 2/20 in Ravenswood, West Virginia. The parcels are referred to respectively herein as the “Century Aluminum Parcel” and the “Alcan Parcel” (collectively referred to as the “Parcels”). EPA’s proposed respective remedies for the Parcels are described in Section IX, below. This SB highlights key information relied upon by EPA in proposing its remedies for the Parcels.

The Parcels are 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. Sections 6901 *et seq.* The Corrective Action program requires that facilities subject to certain provisions of RCRA investigate and address releases of hazardous waste and hazardous constituents, usually in the form of soil or groundwater contamination, that have occurred at or from their property.

EPA is providing a 30-day public comment period 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 (Final Decision) after the public comment period has ended. Among other options, EPA may require that the final remedy be implemented through enforceable orders and/or permits issued to the current owners of the Parcels.

The Parcels collectively comprise the former Ravenswood Aluminum Corporation facility (Ravenswood Facility or Facility). The Ravenswood Facility consists of the former Kaiser Aluminum & Chemical Corporation (Kaiser) Plant (Former Kaiser Plant) property except for two separate parcels, known as the Spent Potliner Pile and Spent Potliner Vault, respectively. Concurrently with this SB, EPA is soliciting comments on its proposed remedy for the Spent Potliner Pile, referred to herein as the SPP Facility, in a separate Statement of Basis which is also subject to 30-day public comment period. The Spent Potliner Vault is a RCRA landfill, EPA ID No. WVD998800512, and is being monitored by the West Virginia Department of the Environment (DEP).

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

II. RAVENSWOOD FACILITY OWNERSHIP-HISTORY

Kaiser began aluminum reduction and fabrication operations at the Former Kaiser Plant in 1957. Aluminum reduction produces prime aluminum from alumina ore and aluminum fabrication produces plate and coil aluminum alloy.

The Former Kaiser Plant consists of approximately 2600 acres. It is adjacent to the Ohio River, in Jackson County, West Virginia. Of the approximate 2600 acres, only about 860 acres (Industrial Property) have been used for industrial purposes, while the remaining property is

mostly forested. The aluminum plant covers approximately 350 acres of the Industrial Property and the remaining approximate 510 acres include the SPP Facility, an old landfill, a sprayfield, a spent potliner vault, oil recovery ponds, former potliner storage areas and aluminum storage space.

In 1989, Ravenswood Aluminum Corporation (Ravenswood Aluminum or Ravenswood) purchased the Former Kaiser Plant, except for two separate parcels, the SPP Facility and the Spent Potliner Vault, which were retained by Kaiser. In 1997, Ravenswood Aluminum changed its name to Century Aluminum of West Virginia (Century Aluminum). In 1999, Century Aluminum sold its cast house and fabrication plant consisting of approximately 500 acres (Alcan Parcel) to Pechiney Rolled Products (Pechiney). Century Aluminum retained the aluminum plant and continued to produce aluminum (Century Aluminum Parcel).

In 2003, Alcan Inc. purchased Pechiney. Alcan Inc. created "Alcan Rolled Products – Ravenswood" as a wholly-owned subsidiary of Alcan Inc. In October 2007, Rio Tinto PLC acquired Alcan Inc. Alcan Inc. integrated into Rio Tinto PLC's existing aluminium business, resulting in Rio Tinto Alcan Inc. (Alcan).

In 2004, Kaiser divested itself of the SPP Facility and Spent Potliner Vault as part of its bankruptcy proceedings. TRC Environmental Corporation (TRC) took over environmental responsibility for the SPP Facility, the Spent Potliner Vault and the Oil Recovery Ponds. TRC currently owns the SPP Facility and the Spent Potliner Vault and Alcan owns the Oil Recovery Pond property.

In February 2009, Century Aluminum shut down its aluminum production operations at the Ravenswood Facility due to the low demand for aluminum. Century Aluminum's operations could start up at any time pending economic conditions. See Figure 1-1 for Site Location Map and land ownership and Figure 2-2 for Industrial Land Use Area.

III. SUMMARY OF CORRECTIVE ACTION

A. Investigations

In 1976, Kaiser discovered cyanide in production wells located on the Industrial Property. After voluntarily conducting studies, Kaiser determined that cyanide compounds from the SPP Facility had been and were leaching into the groundwater. The uppermost aquifer beneath the SPP Facility is an alluvial aquifer which is present beneath the entire Industrial Property. Deposits within this aquifer consist primarily of sand and gravel outwash. Groundwater within the alluvial aquifer beneath much of the Industrial Property ranges at depth from about 40 to 70 feet below ground surface.

In September 1994, pursuant to Section 3008(h) of RCRA, 42 U.S.C. Section 6928(h), EPA entered into a Consent Order, U.S. EPA Docket Number RCRA-III-071 CA, (1994 Consent Order) with Ravenswood Aluminum requiring Ravenswood to conduct a RCRA Facility Investigation of the Ravenswood Facility.

In April 1995, EPA and Kaiser entered into a Final Administrative Order on Consent, U.S. EPA Docket Number RCRA-III-008-TH, (1995 Consent Order) pursuant to RCRA Section 7003 under which Kaiser was required, among other things, to conduct an RFI of the SPP Facility (SPP RFI), which was one of the two parcels retained by Kaiser after the sale to Ravenswood Aluminum in 1989.

Ravenswood Aluminum conducted the RFI in two phases, in 1995 and 1997, respectively. For the RFI, Ravenswood drilled and sampled 103 soil borings, installed six monitoring wells and one piezometer, replaced one monitoring well, excavated and sampled two exploration trenches, sampled 24 new and existing monitoring wells, and tested four underground pipelines for integrity. Ravenswood's analysis of the samples included the following parameters: eight RCRA metals; cyanide; volatile organic compounds (VOCs); semivolatile organic compounds (SVOCs); polychlorinated biphenyls (PCBs); oil & grease and total petroleum hydrocarbons- special range organics.

The Final RFI Report was submitted in December 1999. EPA approved the RFI Report in 2004. As part of the EPA-approved Final RFI Report, Ravenswood Aluminum identified the following 13 Areas and 6 Areas of Concern (AOC) within the Facility:

No.	Area	Area or AOC Description
1	Area 1	Old Northwest Potliner Dump
2	Area 2	Potliner Loadout Area
3	Area 3	Former Potliner Management Areas
4	Area 4	Potliner Accumulation and Breakout Buildings
5	Area 5	Former Anode Burnoff Area/Railcar Loadout Building, and Tank Farm
6	Area 6	Oil Recovery Ponds
7	Area 7	Outfall 001 Conveyance
8	Area 8	Sprayfield
9	Area 9	Neutralization Tank
10	Area 11	Tank 1
11	Area 12	Industrial Landfill and Sprayfield Storm Water Drainage Area
12	Area 13	Solid Pitch Unloading and Carbon Plant Storage Drainage Area
13	Area 14	Subsurface Debris Area
14	AOC	Old Landfill
15	AOC	Industrial Landfill
16	AOCs	Interceptor Basin 002 and Interceptor Basin 004
17	AOC	Piping Integrity
18	AOC	Site Wide Groundwater

Ravenswood Aluminum also reported that it visually inspected all of the sumps in the Fabrication Plant during plant shutdown periods to assess potential leakage to groundwater. The integrity of all sumps was found to be good, with no visible cracks.

1. Soils

Ravenswood screened soil sampling results using the Region III Risk Based Concentration (RBC) Table for residential soil ingestion at a Hazard Index (HI) of 0.1 or a cancer risk level of 10^{-6} (Conservative Preliminary Screening Levels or CPSLs). Metal results in soil were compared to background concentrations to assess whether the constituent was present at greater than naturally occurring concentrations. Soils in the following five areas contained constituents that exceeded their respective CPSL: Area 1, Area 3, Area 6, Area 8 and Area 12.

Ravenswood also screened the RFI soil sampling results against Region III RBC Table for industrial soil ingestion values, referred to in the EPA-approved Final RFI Report as Generic Industrial Screening Levels (GISLs). The following chart identifies the Areas where constituents were found to exceed their respective GISLs:

AREA	Name	Constituent(s) of Concern (Soil)
2	Potliner Loadout Area	One Polycyclic Aromatic Hydrocarbon (PAH) exceeded GISL
5	Former Anode Burnoff Area	PAHs exceeded GISL and SSL
7	Outfall 001 Conveyance	PAHs exceeded GISL; PAHs, Metals and PCBs exceeded SSLs
13	Solid Pitch Unloading and Carbon Plant Storage Drainage Area	PAHs exceeded GISLs and SSLs
14	Subsurface Debris Area	One PAH exceeded GISL; One PAH and Chromium exceeded SSLs in the Debris sample.

As part of the EPA-approved Final RFI Report, Ravenswood conducted a risk assessment of the five Areas, listed directly above, with hazardous constituent concentrations that exceeded the GISLs. In 1998, EPA issued a public notice requesting comments on the characterization of future land use of the Industrial Property as industrial. No comments were received. For purposes of the risk assessment, EPA determined that the current and reasonably anticipated land use of the Industrial Property was industrial. The risk assessment concluded that only soils in Area 13, the Solid Pitch Unloading and Carbon Plant Storage Area, exceeded EPA's acceptable risk range for future industrial land use. The COCs contributing to the risk exceedance were polynuclear aromatic hydrocarbons (PAHs). The EPA-approved Final RFI Report identified the need to implement interim measures in Area 13. The Interim Measures performed in Area 13 are discussed below.

2. Groundwater

Groundwater results were compared to both EPA Maximum Contaminant Levels (MCLs) codified at 40 C.F.R. Part 141 and promulgated pursuant to the Safe Drinking Water Act, 42 U.S.C. Section 300g-1, and to West Virginia Groundwater Protection Standards (GWPS). If there were no MCL and no GWPS for a constituent, then EPA Region III RBC tap water value for hazardous constituents was used for screening.

The EPA-approved Final RFI Report identified two constituents, cyanide and fluoride, present in groundwater at concentrations above their respective MCL and GWPS. The MCL and GWPS for cyanide are both 0.2 milligrams per liter (mg/l) and the MCL and GWPS for fluoride are both 4.0 mg/l. With respect to cyanide, Wells SPL-1 and SPL-3, located adjacent to the Spent Potliner Pile, had cyanide concentrations above the MCL and GWPS in August and September 1996; Well DM-5, located near the northeast corner of the Old Northwest Pot Dump, had cyanide concentrations above the MCL and GWPS in March, April and May of 1997. Subsequent sampling results of Well DM-5 for cyanide during the annual sampling from 1998 thru 2004 indicated cyanide levels below the MCL. For fluoride, Well MW-9, located near Interceptor Basin 004, had fluoride concentrations above the MCL and GWPS in 1997; Wells SPL-1 and SPL-3, located adjacent to the Spent Potliner Pile, had fluoride concentrations above the MCL and GWPS in August and September 1996; Well SPL-2, also located near the Spent Potliner Pile, had fluoride concentrations above the MCL and GWPS in August 1997, and Well MW-9 had fluoride concentrations above the MCL and GWPS in August 1997 and October 1997.

In 2005, Century Aluminum (formerly Ravenswood Aluminum) collected additional groundwater samples to update the RFI Report. Results from Century Aluminum's 2005 sampling event showed that groundwater from well SPL-1 contained cyanide concentrations of 0.248 mg/l and groundwater from well SPL-3 contained cyanide concentrations below the MCL of 0.2 mg/l. For fluoride, groundwater samples were taken from wells SPL-1, SPL-2 and SPL-3. Sample results from those wells were all below the MCL and GWPS for fluoride. Only Well MW-9 continued to have fluoride concentrations above the MCL and GWPS during the 2005 sampling event.

IV. INTERIM MEASURES

A. Blocking Well System

In the 1970s, to prevent cyanides from migrating to the Ohio River, Kaiser developed a "blocking well" system by converting two of its production wells into blocking wells. Under natural conditions, groundwater beneath the Industrial Property flows towards the Ohio River. By pumping groundwater from the blocking wells, Kaiser altered the flow of groundwater from the Ohio River toward the blocking wells. Kaiser expanded the blocking well system over time.

With EPA approval, Ravenswood Aluminum began operating the blocking well system as a requirement under the Interim Measures provision of the 1994 Consent Order. Prior to that time, Ravenswood Aluminum had been operating the blocking well system on a voluntary basis in coordination with Kaiser. The blocking well system continues to operate today. It currently consists of six wells pumping at a combined average rate of 1,200 to 1,300 gallons per minute (gpm) or about 1.7 to 1.8 million gallons per day. The extracted groundwater is discharged to the Ohio River in accordance with the West Virginia National Pollutant Discharge Elimination System Permit, No. WV0000779 (NPDES Permit) issued to Century Aluminum, the current

owner of the property on which the NPDES outfall is located. Due to the blocking well system, the cyanide and fluoride concentrations in groundwater beneath the Industrial Property have decreased significantly and have dropped to below their respective MCL in most of the monitoring wells.

B. Area 6 – Oil Recovery Ponds

Area 6, the Oil Recovery Ponds, is located west of the fabrication plant in an area now owned by Alcan. Prior to 1985, Kaiser used a leaded gear lubricant and generated a waste oil that contained lead concentrations of greater than 5 mg/l. The waste oil was stored in three Oil Recovery Ponds in Area 6 which had leached into the groundwater below the Ponds. In 1988, Kaiser dredged, solidified and removed the contents of the three Ponds, which were the potential sources of lead contamination. The Ponds, storage tanks and associated equipment were closed in accordance with a West Virginia Department of Natural Resources (WVDNR) RCRA interim status closure plan.

In accordance with the 1994 Consent Order, Ravenswood Aluminum submitted and EPA approved an Interim Measures Work Plan which included the installation of recovery wells. The recovery wells recovered floating oil in groundwater in the vicinity of Area 6 with a pneumatic oil recovery system (pneumatic system). The pneumatic system began operating in September 1995 and is currently operating at the Facility. To date, it has recovered over 430 gallons of oil. In July 2009, TRC, which assumed responsibility under the 1994 Consent Order, submitted a Corrective Measures Study (CMS) Addendum for Area 6 in which alternative remedies were screened and evaluated. EPA approved the CMS addendum in 2011. The findings in the EPA-approved CMS Addendum concluded that the oil plume in Area 6 is shrinking and that the volume of remaining recoverable oil is approximately 2,947 gallons. TRC continues to operate the pneumatic system.

C. Area 7 - Outfall 001 Conveyance

Area 7, Outfall 001 Conveyance, is located west of the fabrication plant in an area now owned by Alcan. Area 7 has been investigated for possible releases from the fabrication plant and storm water run-off. The EPA-approved Final RFI Report identified PAHs in sediment at Area 7 at concentrations exceeding industrial screening levels. A site specific risk assessment was performed for Area 7 which showed that under the construction worker exposure scenario the risk level was acceptable.

In 1999, Century Aluminum sold approximately 500 acres of the Ravenswood Facility property, which included the casting and fabrication plants, to Pechiney. Pechiney built its own outfall conveyance to handle waste water and storm water from the fabrication plant. Consequently, by 2000, Pechiney no longer needed to use Area 7 as an outfall. In accordance with the 1994 Consent Order, Century Aluminum proposed an interim measure to return Area 7 to a more natural state and install a synthetic and vegetative cover over the remaining contaminated sediment. EPA approved the interim measure, and in 2002, Century Aluminum installed the cover over Area 7.

D. Area 13 - Solid Pitch Unloading and Carbon Plant Storage Drainage Area

Area 13, the Solid Pitch Unloading and Carbon Plant Storage Drainage Area, is located north of the aluminum production area. The EPA-approved Final RFI Report documents the presence of fragments of solid coal tar pitch at the unloading area and along the railroad track in Area 13. The EPA-approved Final RFI Report also identified soils in the drainage area leading from the unloading area as having PAHs in concentrations above industrial soil screening levels. In March 2001, EPA approved an Interim Measures workplan under which Century Aluminum removed solid pitch residues from Area 13. Following post-excavation confirmation sampling, potential risk to human health was recalculated for Area 13. Risks estimated for industrial land use in the railroad track area still exceed acceptable risk ranges because some smaller coal tar pitch remains in the subsurface soils. However, risks associated with industrial land use for the remainder of Area 13 are below industrial soil screening levels. Century Aluminum constructed a perimeter fence around Area 13 to restrict access to plant personnel only. To prevent human exposure to the contaminants remaining in place, EPA will require warning signs be placed along the railroad track to prevent contact with the carbon pitch found along the railroad track, even though it is no longer in use.

V. BLOCKING WELL SHUTDOWN EVALUATION

In May 2007, EPA approved a Blocking Well Shutdown Work Plan in order for TRC to evaluate, among other things, whether under non-pumping conditions, groundwater contamination was migrating to the Ohio River. TRC conducted the Blocking Well Shutdown Evaluation (Shutdown Evaluation) for six months starting in July 2007 with a baseline sampling event occurring in June 2007. During the Shutdown Evaluation, TRC monitored water table elevations and groundwater quality to assess the rate of water elevation change, the anticipated final water table configuration, and changes in constituent concentrations. EPA approved TRC's Shutdown Evaluation Report in August 2008. The Shutdown Evaluation Report found that cyanide and fluoride concentrations in groundwater exceeded their respective MCL in those wells surrounding the SPP Facility, which was consistent with the results in the RFI Report.

In addition, during the Shutdown Evaluation, groundwater from Well LF-3, located in the vicinity of Area 15, the Industrial Landfill, had fluoride concentrations above the MCL and GWPS in October 2007 and January 2008. Arsenic concentration in wells MW-8s and MW-11 also exceeded the MCL and GWPS (0.01mg/L) during the Shutdown Evaluation.

As a follow up to the Shutdown Evaluation Report, TRC evaluated the potential for cyanide and fluoride to migrate to the Ohio River when the blocking wells were turned off. To do so, TRC developed a groundwater flow model for the Industrial Property along with a fate and transport model. Based on the modeling results, TRC concluded that neither cyanide nor fluoride will reach the Ohio River at concentrations above its respective MCL.

VI. SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

Century Aluminum performed a site-specific human health risk assessment which included the identification of constituents of concern exposure assessment, a toxicity assessment, and a risk characterization for the Ravenswood Facility. The results are presented in their entirety in Section 22 of the EPA-approved Final RFI Report and are summarized in the Executive Summary of that report.

A. Soil Exposure Pathways

A site specific risk assessment was performed for each of the Areas listed below for the COCs identified:

- Area 2 (Potliner Loadout Area) - Benzo(a)pyrene
- Area 5 (Former Anode Burnoff Area) - Benzo(a)anthracene,
Benzo(a)pyrene ,
Benzo(b)fluoranthene,
Indeno(1,2,3-cd)pyrene
- Area 7 (001 Outfall Conveyance) - Benzo(a)anthracene,
Benzo(a)pyrene ,
Benzo(b)fluoranthene,
Dibenz(a,h)anthracene
- Area 13 (Solid Pitch Unloading Area and
Carbon Plant Storage Drainage Area) - Benzo(a)anthracene,
Benzo(a)pyrene ,
Benzo(b)fluoranthene,
Benzo(k)fluoranthene,
Dibenz(a,h)anthracene
Benzo(g,h,i)perylene,
Indeno(1,2,3-cd)pyrene
- Area 14 (Subsurface Debris Area) - Benzo(a)pyrene

Given that the Facility's current and reasonably foreseeable land use is industrial, and there are no expectations that the Facility would be converted to residential use, the likely exposure pathway for contaminated soils would be potential future construction and/ or industrial workers. Therefore, the human health risk assessment considered the following current and future exposure scenarios:

- Current Facility worker
- Future industrial worker

- Construction worker
- Railroad area worker
- Adolescent trespasser
- An off-site hypothetical resident

The calculated risk for all Areas and all evaluated pathways were found to be within EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6} , with the exception of the future industrial land use in Area 13. Within Area 13, only the railroad tracks exceed the acceptable risk range for industrial use due to the carbon pitch remaining between the tracks.

B. Groundwater Exposure Pathways

A risk calculation was not performed for current exposures to groundwater at the Facility because there is no current exposure pathway for groundwater. Groundwater contamination related to the Facility is prevented from migrating to the Ohio River by the blocking well system. While there is no current use or planned future use of the impacted groundwater at the Facility, EPA's long-term cleanup objective is to restore groundwater at the Facility to drinking water standards (MCLs). Until the groundwater is restored to drinking water standards, EPA proposes that institutional controls be implemented at the Facility to prohibit groundwater uses that could result in human exposure.

VII. SUMMARY OF ECOLOGICAL ASSESSMENT

As part of the EPA-approved Final RFI Report, an ecological setting evaluation was conducted for the Industrial Property. The ecological setting report concluded that 376 acres of the studied area consisted of industrial facilities, while 440 acres of the studied area consisted of mowed grass areas and 44 acres consisted of woodlands. The RFI Report concluded that two areas, Area 7, the 001 Outfall Conveyance, and Area 8, the Sprayfield, may be of concern based on the ecological screening evaluation. Additional sampling conducted at Area 7 demonstrated that affected solids were not migrating to the Ohio River. In addition, ecological risk calculations demonstrated that ecological effects hazard quotients were within the acceptable risk range for a shrew and woodcock residing at the south end of Area 8.

VIII. CORRECTIVE ACTION OBJECTIVES

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

A. Soils

The Corrective Action Objective for Facility soils is to control human and environmental exposure to the hazardous wastes and hazardous constituents that remain in place at the Facility.

B. Groundwater

The Corrective Action Objective for contaminated groundwater at the Facility is to restore groundwater to drinking water standards. These standards are established by the Maximum Contaminant Levels (MCLs) promulgated at 40 CFR 141, pursuant to Section 1412 of

the Safe Drinking Water Act (SDWA), 42 USC Section 300g-1. For contaminants of concern without an applicable MCL, EPA's Risk Based Concentration (RBC) for tap water established by EPA Region III in 2006 will be used. Thus, the groundwater cleanup standards for the Facility are as follows:

Cyanide	0.2 mg/l	MCL
Fluoride	4.0 mg/l	MCL
Lead	0.15 mg/l	MCL
Arsenic	0.01 mg/L	MCL

IX. SUMMARY OF PROPOSED REMEDY

A. Century Aluminum Parcel

EPA's proposed remedy for the Century Aluminum Parcel consists of the following components:

1. Operation, Maintenance and Monitoring of Engineering Controls

EPA's proposed final remedy includes requirements to operate, maintain and monitor the synthetic and vegetative cover over Area 7, the existing security fence and cameras around the entire Century Aluminum Parcel and the security fence and cameras around Area 13 in order to prevent trespassing on or disturbance of contaminated soils at the Century Aluminum Parcel. EPA is proposing installing warning signs along the railroad tracks within Area 13 to prevent contact with soil contaminated with carbon pitch along the railroad tracks.

2. Monitored Natural Attenuation of Contaminants in Groundwater

EPA is proposing monitored natural attenuation (MNA) with institutional controls as the final remedy for groundwater at the Century Aluminum Parcel, as well as the Alcan Parcel. The existing blocking well system will be turned off to allow MNA. Natural attenuation refers to a system where a variety of physical, chemical, or biological processes act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. As decomposition of the contaminants takes place, compounds called "breakdown products" are produced. Ultimately, the breakdown products are also decomposed resulting in compounds which are not a threat to human health or the environment. MNA simply refers to the act of collecting samples to "monitor" the natural attenuation process. As the data show the concentration of cyanide are decreasing and EPA anticipates that they will continue to do so under MNA. EPA's proposed remedy requires the development and implementation of a Groundwater Monitoring Plan to be approved by EPA and WVDEP. The Groundwater Monitoring Plan will detail which wells will be monitored and the frequency of the groundwater monitoring.

Even though there are no current consumptive uses of contaminated groundwater at the Century Aluminum Parcel, it is EPA's goal that groundwater be restored to drinking water standards to be protective of potential future use. Until groundwater is restored to drinking water

standards, EPA is proposing to restrict consumptive use of the groundwater through the implementation of water use restrictions listed in Section 4 below.

3. Development and Implementation of a Materials Management Plan

EPA's proposed remedy requires the development and implementation of a Materials Management Plan to be approved by EPA and WVDEP before any earth moving activities, including construction and drilling, can be done on the Century Aluminum Parcel. The Materials Management Plan will detail how soil and groundwater will be managed during any future subsurface activities conducted at the Century Aluminum Parcel, including but not limited to Areas 2, 5, 7 and 13. The Materials Management Plan will detail how all excavated soils will be handled and disposed. The Materials Management Plan will include analysis of constituents detected at the parcel during the RFI, such as PAHs, cyanide and fluoride.

Soil remediation cleanup standards will be EPA Region III's Risk-Based Concentrations (RBCs) for industrial screening levels. In addition, all soils that are to be disposed of will be sampled and disposed of in accordance with applicable State and Federal regulations. In addition, the Materials Management Plan will include soil stabilization requirements to minimize contact between storm water runoff and the parcel soils. Soil stabilization measures may include the construction of berms to prevent storm water from flowing onto certain areas as well as the construction of sumps with pumps to remove ponded water from low lying areas.

The Materials Management Plan will include a Health and Safety Plan, Sampling and Analysis Plan and Quality Assurance Project Plan. The Health and Safety Plan will among other things, identify the locations at the Facility where contaminants remain in soils; detail how future on-site workers and contractors will be notified about such locations and about the presence of the contaminated soil.

4. Compliance with and Maintenance of Institutional Controls

Because contamination will remain in the soils and groundwater at the Century Aluminum Parcel, EPA's proposed final remedy includes land and water use restrictions to prevent human exposure to the remaining contaminants. The land and water use restrictions will be implemented through ICs. ICs are non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use and inform subsequent purchasers of the environmental conditions at the Facility and of EPA's final remedy for the Facility.

These land and water use restrictions may include the following:

- i. a restriction on the use of groundwater beneath the property for potable purposes or any other use that could result in human exposure, unless such use is required by the Final Remedy or until groundwater is restored to drinking water standards,
- ii. a restriction on well drilling at the property without prior written EPA approval, to prevent inadvertent exposure to the contaminated groundwater and adverse affects to the Final Remedy,

- iii. a restriction that the property not be used for any purpose other than industrial unless it is demonstrated to EPA that another use will not pose a threat to human health or the environment and EPA provides prior written approval for such use,
- iv. a restriction that earth moving activities, including drilling, and construction activities are prohibited on the property unless it is demonstrated to EPA that such activity use will not pose a threat to human health or the environment and EPA provides prior written approval for such activity, and
- v. a restriction on any activity that may damage or impair the existing synthetic and vegetative cover over Area 7.

EPA anticipates that the above land and water use restrictions will be implemented through an environmental covenant to be entered pursuant to the West Virginia Uniform Environmental Covenants Act (UECA), W.Va.Code, § 22-22B-1, *et seq.* and to be recorded with the deed for the Century Aluminum Parcel. In addition to the restrictions listed above, EPA anticipates that the long-term monitoring and maintenance of Area 7 will be included in the environmental covenant. If EPA, in its sole discretion, deems that other institutional controls are necessary to protect human health or the environment, EPA has the authority to require such institutional controls.

5. Reporting Requirements

EPA's proposed remedy includes the following reporting requirements for the Century Aluminum Parcel:

- i. Compliance with and effectiveness of institutional controls and engineering controls implemented at the Century Aluminum Parcel shall be evaluated on an annual basis. The evaluation will include, but not be limited to, a review of groundwater and land uses within 1 mile of the Century Aluminum Parcel property boundary, and zoning maps or planning documents that may affect future land use in the impacted area. A report documenting the findings of the evaluation shall be provided to EPA and WVDEP.
- ii. Compliance with and effectiveness of MNA in reducing contaminant concentrations and restoring the groundwater to MCLs shall be evaluated and included in the Groundwater Monitoring Plan.

B. Alcan Parcel

EPA's proposed remedy for the Alcan Parcel consists of the following components:

1. Operation, Maintenance and Monitoring of Engineering Controls

EPA's proposed final remedy includes requirements to operate, maintain and monitor the the existing security fence and cameras around the entire Alcan Parcel in order to prevent trespassing on or disturbance of contaminated soils at the Alcan Parcel.

2. Monitored Natural Attenuation of Contaminants in Groundwater

EPA is proposing Monitored Natural Attenuation (MNA) with Institutional Controls as the final remedy for groundwater at the Alcan Parcel, with the exception of the Oil Recovery Ponds (see Section 5 below). Natural attenuation refers to a system where a variety of physical, chemical, or biological processes act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. As decomposition of the contaminants takes place, compounds called "breakdown products" are produced. Ultimately, the breakdown products are also decomposed resulting in compounds which are not a threat to human health or the environment. MNA simply refers to the act of collecting samples to "monitor" the natural attenuation process. As the data show the concentration of cyanide are decreasing and EPA anticipates that they will continue to do so under MNA. EPA's proposed remedy requires the development and implementation of a Groundwater Monitoring Plan to be approved by EPA and DEP. The Groundwater Monitoring Plan will detail which wells will be monitored and the frequency of the groundwater monitoring.

Even though there are no current consumptive uses of contaminated groundwater at the Alcan Parcel, it is EPA's goal that groundwater be restored to drinking water standards to be protective of potential future use. Until groundwater is restored to drinking water standards, EPA is proposing to restrict consumptive use of the groundwater through the implementation of water use restrictions listed in Section 5 below.

3. Development and Implementation of a Materials Management Plan

EPA's proposed remedy requires the development and implementation of a Materials Management Plan to be approved by EPA and DEP before any earth moving activities, including construction and drilling, can be done on the Alcan Parcel. The Material Management Plan will detail how soil and groundwater will be managed during any future subsurface activities conducted at the Alcan Parcel, including but not limited to Area 14. The Materials Management Plan will detail how all excavated soils will be handled and disposed. The Materials Management Plan will include analysis of constituents detected at the parcel during the RFI, such as PAHs, cyanide and fluoride.

Soil remediation cleanup standards will be EPA Region III's Risk-Based Concentrations (RBCs) for industrial screening levels. In addition, all soils that are stockpiled will be sampled and disposed of in accordance with applicable State and Federal regulations. In addition, the Materials Management Plan will include soil stabilization requirements to minimize contact between storm water runoff and the parcel soils. Soil stabilization measures may include the construction of berms to prevent storm water from flowing onto certain areas as well as the construction of sumps with pumps to remove ponded water from low lying areas.

The Materials Management Plan will include a Health and Safety Plan, Sampling and Analysis Plan and Quality Assurance Project Plan. The Health and Safety Plan will among other

things, identify the locations at the Facility where contaminants remain in soils; detail how future on-site workers and contractors will be notified about such locations and about the presence of the contaminated soil.

4. Oil Recovery Ponds – Area 6

EPA's proposed remedy for the Oil Recovery Ponds - Area 6 is a combination of free product removal, monitoring and ICs. EPA proposes to require free product removal via the pneumatic system or other EPA and DEP-approved recovery system until no recoverable product, as measured to 1/8th of an inch, is attained. Although there have been no exceedances of MCLs or GWPS during the monitoring of the dissolved phase of the oil plume under the Oil Recovery Ponds, EPA also proposes to require continued monitoring of the dissolved phase for lead as well as continued monitoring of the product thickness. The ICs described immediately below will minimize the potential for human exposure to contamination by preventing earth moving activities in Area 6, as well as the installation of groundwater wells.

5. Compliance with and Maintenance of Institutional Controls

Because contamination will remain in the soils and groundwater at the Alcan Parcel, EPA's proposed final remedy includes land and water use restrictions and reporting requirements to prevent human exposure to the remaining contaminants. The land and water use restrictions and reporting requirements will be implemented through ICs. ICs are non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use and inform subsequent purchasers of environmental conditions.

These land and water use restrictions may include the following:

- i. A restriction on the use of groundwater beneath the property for potable purposes or any other use that could result in human exposure, unless such use is required by the Final Remedy or until groundwater is restored to drinking water standards,
- ii. A restriction on well drilling on the property without prior written EPA approval, to prevent inadvertent exposure to the contaminated groundwater and adverse affects to the Final Remedy,
- iii. A restriction that the property not be used for any purpose other than industrial unless it is demonstrated to EPA that another use will not pose a threat to human health or the environment and EPA provides prior written approval for such use, and
- iv. A restriction that earth moving activities, including drilling, and construction activities are prohibited on the property unless it is demonstrated to EPA that such activity use will not pose a threat to human health or the environment and EPA provides prior written approval for such activity.

EPA anticipates that land and water use restrictions will be implemented through an environmental covenant to be entered pursuant to the West Virginia Uniform Environmental

Covenants Act (UECA), W.Va.Code, § 22-22B-1, et seq. and to be recorded with the deed for the Alcan Parcel. If EPA, in its sole discretion, deems that other institutional controls are necessary to protect human health or the environment, EPA has the authority to require such institutional controls.

6. Reporting Requirements

EPA's proposed remedy includes the following reporting requirements for the Alcan Parcel:

- i. Compliance with and effectiveness of institutional controls and engineering controls implemented at the Alcan Parcel shall be evaluated on an annual basis. The evaluation will include, but not be limited to, a review of groundwater and land uses within 1.0 mile of the Alcan Parcel property boundary, and zoning maps or planning documents that may affect future land use in the impacted area. A report documenting the findings of the evaluation shall be provided to EPA and DEP.
- ii. Compliance with and effectiveness of MNA in reducing contaminant concentrations and restoring the groundwater to MCLs shall be evaluated and included in the Groundwater Monitoring Plan.

X. EVALUATION OF PROPOSED REMEDY

This section provides a description of the criteria EPA uses to evaluate proposed remedies under the Corrective Action Program. The criteria are applied in two phases. In the first phase, EPA evaluates three Threshold Criteria as general goals. In the second phase, if there is more than one remedy which meets the Threshold Criteria, EPA evaluates seven Balancing Criteria to determine which proposed remedy alternative provides the best relative combination of attributes. EPA's proposed remedy is protective of human health and the environment, therefore, EPA is not choosing among alternative remedies and an evaluation of the balancing criteria is unnecessary.

A. Threshold Criteria

1. Overall Protection of Human Health and the Environment

EPA's proposed remedies for soils are protective of human health and the environment. The extent of soil contamination is limited or present at depth (not at surface). Therefore, under current land use conditions, contaminated soil can be left in place with acceptable health risks. EPA proposes implementing institutional controls to prevent potential future exposure due to unanticipated land use change or construction activities that may deviate from the current exposure scenario. Interim measures activities undertaken in Area 13 and Area 7 have already resulted in protection of human health and the environment. Existing engineering controls such

as security fences, security personnel and security cameras provide controlled access to areas where soils are contaminated.

For groundwater, MNA with ICs will be protective of human health and the environment. There are no human health threats associated with domestic uses of the contaminated groundwater originating from the Facility because groundwater is not used for drinking water purposes. The modeling conducted as a follow-up to the Blocking Well Shutdown Evaluation Report, showed that with the blocking well system shutdown, neither cyanide nor fluoride will reach the Ohio River at concentrations above its respective MCL.

As part of the CMS, set out in Appendix G, TRC performed a surface water dilution calculation for cyanide and fluoride with the blocking well system shutdown to assess potential impacts to human health and the environment at the point of exposure (i.e. Ohio River). For cyanide, TRC calculated the discharge to the Ohio River upon mixing would be 0.013 ppb of cyanide, which is well below the 5 ppb West Virginia Surface Water Standard for aquatic life and human health. For fluoride, the value TRC calculated was 0.11 ppb, which is well below the West Virginia Surface Water Standard for aquatic life and human health value of 1400 ppb. By further comparison, TRC's calculated value of 0.013 ppb discharge of cyanide being discharged to the Ohio River under MNA would be significantly less than the 19.7 ppb of cyanide currently allowed under the Century Aluminum NPDES permit. EPA estimates that 0.61 lbs per day of cyanide is permitted to be discharged to the Ohio River thru the Century Aluminum NPDES outfall, compared to 0.0062 lbs per day under the MNA remedy. Therefore, the proposed MNA remedy will shutdown the existing blocking well system and the groundwater discharge of cyanide to the Ohio River thru the Century Aluminum NPDES. In addition, MNA will effectively address the remaining fluoride and cyanide in groundwater at the Facility through decomposition while ICs will prevent future exposure or use of the contaminated groundwater while the groundwater is being remediated through MNA. The blocking well system shutdown demonstrated that extraction is no longer the best or most effective method to clean up the remaining contamination. Similarly, the blocking well shutdown demonstrated the MNA is the most efficacious method to treat the remaining groundwater contamination. This is consistent with EPA Guidance. See "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites", April 1999.

For the oil recovery ponds, due to the lack of mobility of the dissolved phase constituents coupled with the natural degradation of the oil, the proposed remedy is protective of human health and the environment. There is no current exposure to the mineral based oil since it is over 45 feet deep and groundwater is not used.

2. Ability to Attain Media Clean-up Objectives

EPA's proposed remedies meet the cleanup objectives based on assumptions regarding current and reasonably anticipated land and water resource use(s). For soils, the current and reasonably anticipated future use is industrial. The institutional controls and engineering controls required in EPA's proposed remedy provide the necessary safeguards to ensure the Parcels maintain their industrial use.

For groundwater, the proposed MNA with ICs will attain the media cleanup criteria by

restoring groundwater to drinking water standards. Under EPA's proposed remedy, groundwater will have to be monitored until the concentration of each constituent does not exceed the constituent's respective Maximum Contaminant Level (MCL) 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, for three consecutive years. The blocking well system has reduced the mass of contamination in groundwater. MNA will be a follow-up to the active remediation (i.e. blocking well system) that has been implemented and is ongoing. The proposed use of MNA as a follow-up to an active remediation measure that has already been implemented is clearly detailed in the MNA guidance document, OSWER Directive 9200.4-17P. Specifically the guidance documents states: "EPA expects that MNA will be most appropriate when used in conjunction with other remediation measures (e.g., source control, groundwater extraction), or as a follow-up to active remediation measures that have already been implemented." When the blocking well system was temporarily shut down in 2007 for evaluation, only the monitoring wells around the SPP Facility continued to exceed the MCL for cyanide. During the shutdown, groundwater levels reverted to their normal levels, which impacted subsurface soils not previously in contact with groundwater during the blocking well operation. When the blocking well system is operating, the groundwater wells around the SPP Facility are at or below the MCL for cyanide. The blocking well system depresses groundwater levels when operating, thereby not allowing groundwater to come in contact with impacted subsurface soil. Therefore, shutting down the blocking well system which is no longer effective and allowing restoration of groundwater through MNA is appropriate and reasonable for this site.

EPA is proposing institutional controls to prevent future exposure to contaminated groundwater while the remediation goals are reached through the proposed MNA remedy.

3. Source Control

The SPP Facility was the main source of cyanide contamination in the groundwater. When rain came in contact with the spent potliner material, cyanide was formed and leached into the soils. In 1982, the spent potliner material was covered with a liner which eliminated the leaching of cyanide. The SPP is being addressed in a separate Statement of Basis in which EPA proposes to require repair, maintenance and replacement of the liner, as necessary, which will continue to control the source of the cyanide contamination.

With respect to Area 6, the Oil Recovery Ponds, the pneumatic oil recovery system has recovered over 430 gallons of oil to date. Prior to that, in 1988 and 1989 Kasier closed the oil recovery ponds, storage tanks and associated equipment in accordance with a WVDNR-approved RCRA interim status closure plan and removed all potential sources from the Area. Data submitted with the CMS Addendum Study (2009) have shown that the oil plume has not moved in over 20 years, and it continues to shrink and will naturally degrade. The proposed remedy requires continued operation of the pneumatic oil recovery system.

XI. PUBLIC COMMENT

Interested persons are invited to comment on EPA's proposed decision. The public comment period will last thirty (30) calendar days from the date that notice is published in the

Jackson Star News. Comments may be submitted by mail, fax, e-mail, or phone to Michael Jacobi at the address listed below.

A public meeting will be held upon request. Requests for a public meeting should be made to Michael Jacobi at the address listed below. A meeting will not be scheduled unless one is requested.

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

U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103
Telephone Number: (215) 814-3435
Attn: Mr. Michael Jacobi

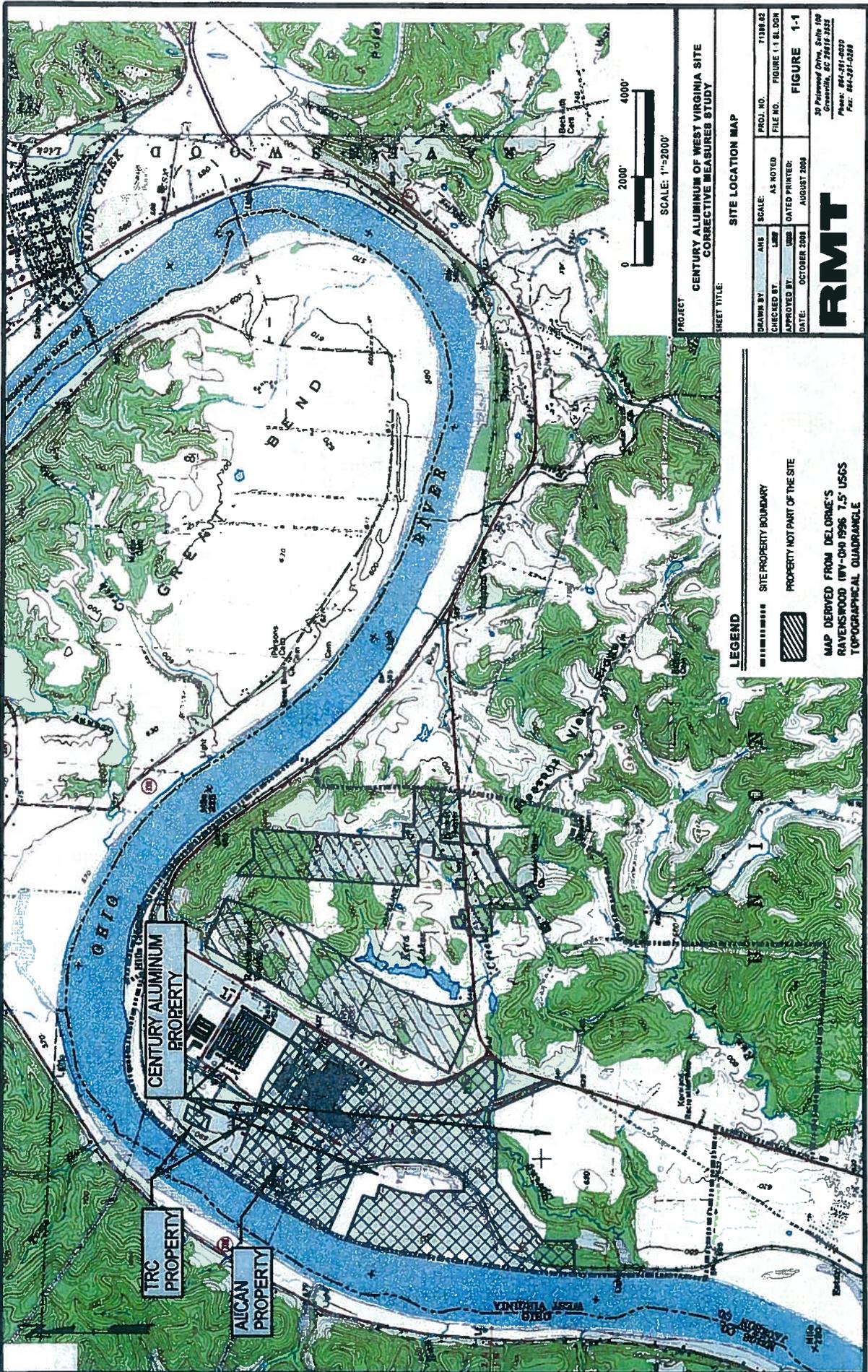
Following the 30-day public comment period, EPA will evaluate the public's comments and prepare a Final Decision and Response to Comments (FDRTC) that identifies the final selected remedy. The FDRTC will also address all significant written comments and any significant oral comments generated at the public meeting, if held. The FDRTC will be made available to the public. If, on the basis of such comments or other relevant information, significant changes are proposed to the corrective measures identified by EPA in this Statement of Basis, EPA may seek additional public comments.

EPA anticipates that the final remedy will be implemented using available legal authorities possibly including, but not necessarily limited to, RCRA Section 3008(h), 42 U.S.C. 6928.

DATE: 8/17/11


Abraham Ferdas, Director
Land and Chemicals Division
US EPA, Region III

J:\ACAD\00-71386\ 02\FIGURE 1-1.SLD.DGN
 AHS 8/5/08



PROJECT		CENTURY ALUMINUM OF WEST VIRGINIA SITE CORRECTIVE MEASURES STUDY	
SHEET TITLE:		SITE LOCATION MAP	
DRAWN BY	AHS	SCALE	AS NOTED
CHECKED BY	USE	DATED PRINTED:	AUGUST 2008
APPROVED BY	USE	FILE NO.	FIGURE 1-1 SLDDGN
DATE:	OCTOBER 2008	FIGURE	1-1

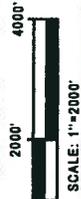
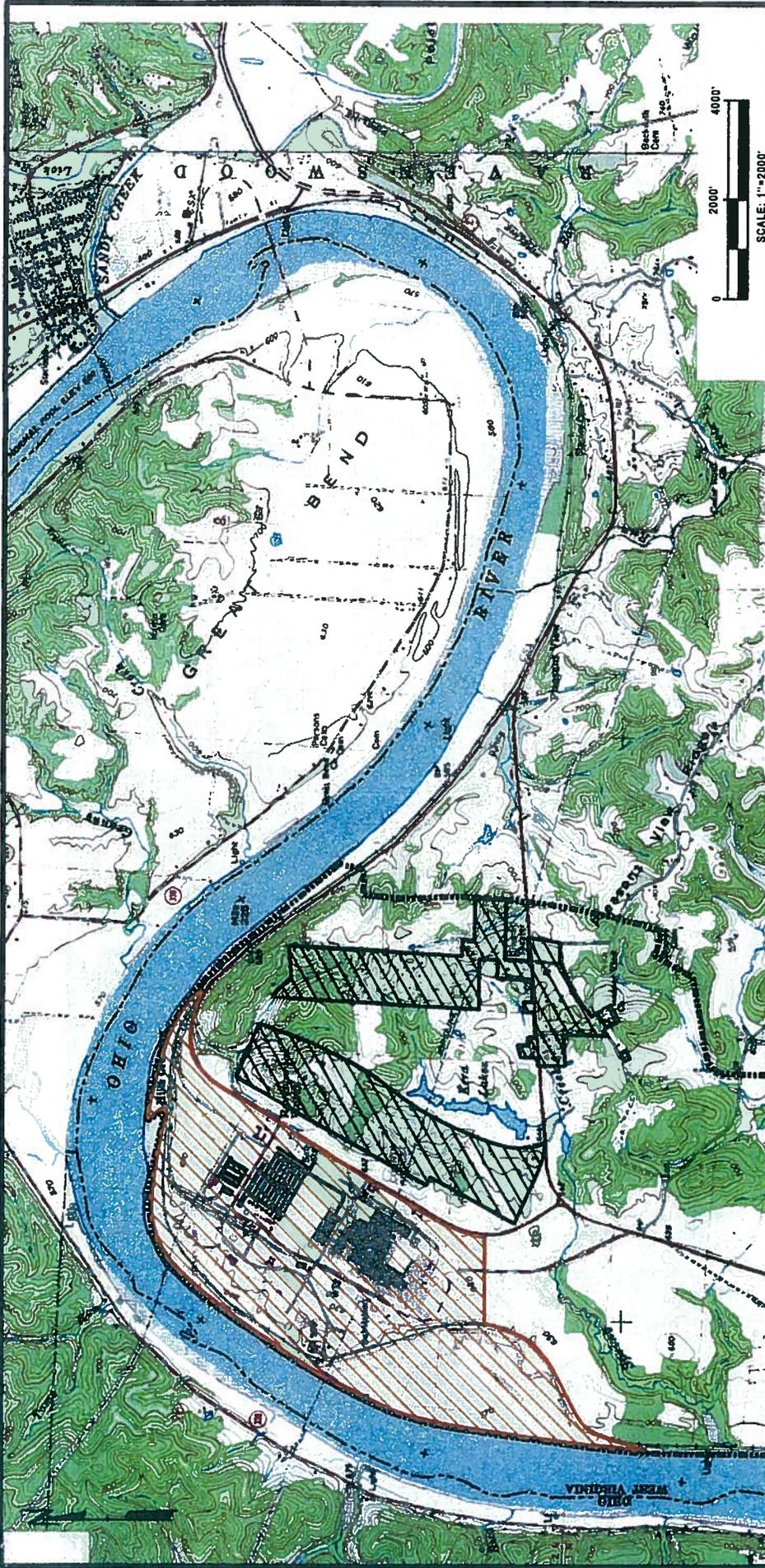
LEGEND

-  SITE PROPERTY BOUNDARY
 -  PROPERTY NOT PART OF THE SITE
- MAP DERIVED FROM DELOANE'S
 RAVENSWOOD (BY-040 1996, 1.5' USGS
 TOPOGRAPHICAL QUADRANGLE

RMT

30 Pleasant Drive, Suite 100
 Greenville, SC 29615 3533
 Phone: 864-291-0020
 Fax: 864-291-0289

J:\CAD\00-71386\ 02\FIGURE 1-2 LUDGN
 AHS 8/6/08



PROJECT: CENTURY ALUMINUM OF WEST VIRGINIA SITE
 CORRECTIVE MEASURES STUDY

SHEET TITLE: DESIGNATED INDUSTRIAL LAND USE AREA

DRAWN BY: AHS	SCALE: AS NOTED	PROJ. NO. 71386 02
CHECKED BY: LMC	DATE: AS NOTED	FILE NO. FIGURE 1-2 LU DRN
APPROVED BY: JEP	DATED PRINTED: AS NOTED	FIGURE 1-2
DATE: OCTOBER 2008	AUGUST 2008	

RMT

39 Palmetto Drive, Suite 100
 Greenville, SC 29615-3202
 Phone: 864-291-0009
 Fax: 864-291-0266

LEGEND

- SITE PROPERTY BOUNDARY
- PROPERTY NOT PART OF THE SITE
- AREA OF SITE IN INDUSTRIAL LAND USE

MAP DERIVED FROM DELOMUE'S
 RAVENSWOOD (WV-04) 1996 7.5' USGS
 TOPOGRAPHICAL QUADRANGLE