UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

LR-16J

Mr. Matthew Montag
Cleveland-Cliffs, Inc.
1724 Linden Avenue
Zanesville, Ohio 43701

RE: **Final Decision and Response to Comments**
Cleveland-Cliffs, Inc. - Zanesville Works – Zanesville, Ohio
EPA ID: OHD 004281598

Dear Mr. Montag:

Please find enclosed for your records the U.S. Environmental Protection Agency's Final Decision and Response to Comments for the Cleveland-Cliffs, Inc. (formerly AK Steel) Zanesville Works facility at 1724 Linden Avenue in Zanesville, Ohio ("the Facility"). Additional detail regarding the final remedy can be found in the Corrective Measures Study ("CMS") and Administrative Record, and schedules and other information not already discussed in the CMS will be provided in a Corrective Measures Implementation Work Plan ("CMI Work Plan").

Considering the extensive detail provided in the CMS, Cleveland-Cliffs may implement the LNAPL recovery portion of the remedy immediately if the Facility chooses and submit the CMI Work Plan following its implementation. EPA requests the CMI Work Plan be submitted within 90 days from receipt of this Final Decision.

If you have any questions, please contact Brandon Pursel of my staff, at 312-353-9229, or pursel.brandon@epa.gov.

Sincerely,

EDWARD NAM

Digitally signed by EDWARD NAM
Date: 2021.08.13 09:46:48 -05'00'

Edward Nam
Division Director
Land, Chemicals and Redevelopment Division

cc: Tom Williams (EPA
Monesh Chabria (EPA)
Nick Petruzzi (Cox-Colvin & Associates)

FINAL DECISION AND RESPONSE TO COMMENTS
REMEDY FOR SOIL AND GROUNDWATER CONTAMINATION

FOR

CLEVELAND-CLIFFS, INC.
ZANESVILLE WORKS
1724 LINDEN AVENUE
ZANESVILLE, OHIO 43701
EPA ID: OHD 004 281 598

I. INTRODUCTION

The U.S. Environmental Protection Agency, Region 5 ("EPA"), presents this Final Decision and Response to Comments ("FD/RC"), which identifies the final remedy selected for the Cleveland-Cliffs, Inc., Zanesville Works Facility ("the Facility"), located in Zanesville, Ohio, pursuant to the Resource Conservation and Recovery Act ("RCRA") Section 3008(h). Included in this FD/RC is a summary of conditions found at the Facility, the risks posed by those conditions, EPA's selected remedy, EPA's public participation activities, EPA's Response to Comments (Attachment I), and an updated Index to the Administrative Record (Attachment II). Prior to issuing this FD/RC, EPA presented the Statement of Basis to the public for review and comment for 30 days from March 25, 2021 to April 23, 2021. EPA received comments from Cleveland-Cliffs, but did not receive any comments from the public. The Statement of Basis is included in this FD/RC as Attachment III.

II. FACILITY CONDITIONS AND PREVIOUS ACTIONS TAKEN

Location and Setting

Cleveland-Cliffs, Inc. currently owns the Facility located at 1724 Linden Avenue in Muskingum County, Zanesville, Ohio. The Facility occupies approximately 90 acres and contains several buildings along the west side of the Muskingum River. The Facility is located in a mixed-use setting that includes recreational, residential, commercial and industrial properties. The Zanesville Municipal Wellfield Superfund Site ("the Superfund Site") is also located immediately to the north of the Facility. The Facility is situated located along the Muskingum River, a tributary of the Ohio River and a navigable waterway within the Mississippi River watershed. Steel-making operations occur in the northern, fenced area of the Facility while the southern area is un-fenced and is used for recreational purposes.

Ownership History

Facility operations began in the early 1900s and the site has been an operational steel mill since that time. The Facility was purchased by ARMCO in the 1920s, who entered into a joint partnership with Kawasaki Steel in 1989 before renaming itself AK Steel Holding Corporation ("AK Steel") in 1993. Cleveland-Cliffs acquired AK Steel Holding Corporation in March 2020, and officially renamed the company in early 2021.

Manufacturing, Releases, and Regulatory History

The Facility currently receives flat rolled steel from Cleveland-Cliffs' Butler Facility in Butler, Pennsylvania and a number of processes are applied to the steel at the request of their customers. These processes include cold rolling, coating, pickling, annealing, and painting. The Facility also manufactures electrical steel used for utilities.

Historically, releases of spent pickle liquor occurred at Solid Waste Management Units ("SWMUs") 1, 3, 7 and 9. At SWMUs 1 and 3, the releases made their way to groundwater, while at SWMUs 7 and 9 only soil was impacted. In 1995, a cavity was discovered in the in-ground tank at SWMU 1 that was likely caused by an overflow of pickle liquor and had resulted in elevated fluoride levels down to the groundwater. Sampling at SWMU 2 recorded high levels of metals such as arsenic, copper, and lead. Elevated levels of chromium consisting of total and hexavalent chrome were found at SWMUs 7 and 9. High levels of metals such as arsenic, lead and chromium were found at SWMUs 21 and 24 in a few samples at depths of less than 10 ft. below ground surface (bgs). PCBs were also detected at SWMU 24 on the north end of the No. 9 Lift Station. SWMU 25, which was also the former wastewater discharge point, recorded high levels of many kinds of metals not seen at other locations at the Facility, such as cyanide and mercury.

Physical Setting and Site Characteristics

The Facility is situated above alluvial deposits and glacial outwash ranging from 75 to 90 feet of thickness and consisting primarily of sand and silt, with isolated clay units. Within this deposit is a thin, saturated gravel layer between 10 to 16 feet bgs in the western and northern portions of the Facility, which behaves as a perched groundwater zone above the regional aquifer. The regional water table is encountered approximately five to 10 feet bgs at the southern portion of the Facility and 25 to 30 feet bgs at the northern portion of the Facility.

The Facility is adjacent to and is hydraulically side-gradient of the Muskingum River, which lies to the east, and is hydraulically upgradient from the Zanesville Wellfield Superfund Site ("Superfund Site"). River flow is to the south, but groundwater flow beneath the Facility is to the north due to pumping at the Superfund Site and at the City of Zanesville Municipal Wellfield ("ZWF") to the northeast and across the Muskingum River, the latter of which provides drinking water to the residents of Zanesville. Remediation wells at the Superfund Site are treating volatile organic compounds ("VOCs") to prevent migration of contaminants to the ZWF. These releases are independent from any releases from Cleveland-Cliffs.

<u>Regulatory History and Corrective Action Background</u>

On October 9, 2002, AK Steel and EPA entered into an Administrative Order under RCRA Section 3013 that required AK Steel to investigate the Facility for areas that could be sources of contamination. As part of that investigation, thirteen SWMUs and six Areas of Concern were identified. AK Steel also identified several releases of hazardous waste, materials or constituents that required investigation and characterization, primarily spent pickle liquor and other acids from various SWMUs.

In 2017, following AK Steel's completion of work required under a RCRA 3013 Administrative Order on Consent ("AOC"), EPA agreed to allow the voluntary implementation of additional remedial actions by AK Steel under EPA oversight. This approach follows the procedures outline in the RCRA Facilities Investigation Remedy Selection Track guidance. Upon acquiring AK Steel, Cleveland-Cliffs assumed responsibility for completing corrective action work at the Facility under the previous agreement and ownership of all past, present and future work.

The voluntary actions agreed to were designed and implemented to protect human health and/or the environment. The Corrective Action program is responsible for ensuring that RCRA-regulated facilities investigate and clean up releases of hazardous waste and hazardous constituents on their property and any releases that have spread beyond the property boundaries, and which pose a risk to human health or the environment. The selected remedies, or clean-up actions, for the Facility were chosen based upon the current and future anticipated use of the property. The Facility is currently operational as an industrial facility and is expected to remain in such operations well into the future.

III. INVESTIGATIONS AND RISK ASSESSMENT

During the investigation phases, environmental media such as soil, groundwater, surface water, sediments, and biota are sampled and analyzed for contamination. Where contaminated media are found, subsequent sampling is usually completed to refine the CSM and define the extent of contamination (how far it may have traveled and how deeply), and to collect enough information for analysis of exposure effects in risk assessments. After each sampling event or investigation phase, EPA evaluates the CSM to determine the adequacy of the data to support decision-making. If data are found to be inadequate, additional data collection is necessary.

All on-site risk assumptions used for evaluating the conditions at the Facility are based upon Cleveland-Cliff's status as an active manufacturer that is expected to continue operating for the foreseeable future. Off-site risks are typically considered for residential uses, regardless of the uses of adjacent properties. Conditions north of the Facility are unique in that the adjacent property is a Superfund site, and work at that property is being performed through EPA's Region 5 Superfund program, separately from work at Cleveland-Cliff's Zanesville Works property. The cleanup activities there are being considered in this Final Decision where appropriate. The areas of notable soil contamination at the Cleveland-Cliffs facility are deeper in the subsurface and not readily accessible. Institutional controls for the Facility will include a non-residential deed restriction and an on-site prohibition against potable uses of groundwater. Should the Facility cease operations and demolish, or cease to maintain, the buildings and pavement, or if the use of the property for other than nonresidential purposes is contemplated, it will be necessary for EPA to revisit all exposure scenarios to evaluate the potential need for additional corrective measures at the Facility.

EPA evaluated the potential for on-site and off-site exposures as well as groundwater use pathways at reasonable points of exposure. The on-site exposures EPA considered were those due to contaminants in soil and groundwater, as well as vapor-phase contaminants via inhalation because contaminants could migrate to indoor air from a source beneath the buildings, also known as the vapor intrusion pathway. Data from monitoring wells located on-site and off-site of

the Facility buildings and previous evaluations of the indoor air exposure pathways showed the vapor intrusion pathway is incomplete, based on vapor concentrations of VOCs in LNAPL and groundwater that are below residential screening criteria. Furthermore, groundwater concentrations are not known to pose a risk to on-site facility workers due to an absence of complete exposure pathways, as discussed in Section IV. Off-site risks from exposure to groundwater impacted by releases from the Facility were determined to be from the drinking water pathway due to the proximity to the ZWF. Finally, off-site ecological exposures in the surface waters and sediments of the Muskingum River were evaluated, and no unacceptable risks were found.

No potentially endangered ecosystems have been identified within the Facility boundaries. Since all the ground surface is covered by structures, concrete, asphalt, or grass, there are no potential risks to endangered ecosystems.

Health Risk Screening Levels

EPA and the predecessor to Cleveland-Cliffs used default, pathway-specific Site Screening Levels ("SSLs") for the chemical compounds (Constituents of Concern ["COCs"]) to evaluate the health risk significance of soil, groundwater and sediment contamination at the Facility. This evaluation focused on the location of the Facility, area land use, future land use, and the most likely pathways of human and ecological exposure to contaminants according to EPA guidance. EPA requires that the screening criteria for each SSL have an allowable risk threshold, with a non-cancer Hazard Index ("HI") of 1 or lower and a target cancer risk between 1×10^{-4} and 1×10^{-6} or lower (i.e., 1 in 1,000,000). The default screening levels used in the evaluation of contaminant data at Cleveland-Cliffs meet these criteria. Sometimes these default criteria are conservative and not representative of conditions on-site. For COCs that exceeded default criteria, site-specific SSLs were developed based on conditions that would be routinely encountered at the Facility and demonstrated that the HI and target cancer risk were met under these exposure assumptions.

Published sources that were used to select SSLs included: 1) EPA Regional Screening Levels ("RSLs") for groundwater and on-site worker and trespasser soil exposure scenarios; 2) EPA Maximum Contaminant Levels (federal regulatory standards for drinking water including groundwater potentially used as drinking water); 3) Ohio EPA's Chemical Information Database and Applicable Regulatory Standards ("CIDARS"); 4) Ohio EPA's published state-wide background levels, and 5) Ohio EPA's published Sediment Reference Values ("SRVs").

Investigations Conducted

Groundwater investigations have been conducted at the Facility between 2003 and the present to ascertain the nature and extent of contamination and to monitor for any changes that may affect the corrective action process. The results of these investigations have been included in Data Reports, and are evaluated against current and future non-residential uses. Cleveland-Cliffs' predecessor submitted a final report in May 2007 using the data collected and assessed current and future risks , and performed additional investigation activities in August and November 2007. An updated Final Report for the RCRA 3013 Order Investigation – Revision 2 ("Final

Report") was submitted in April 2010 and was approved on December 28, 2012 following comments from EPA. In addition to the Final Report, a baseline ecological risk assessment ("BERA") was submitted on November 6, 2013 and was approved in October 2015 after a round of comments and responses.

Impacts to groundwater were found to come from various contaminants including fluoride, chromium and light non-aqueous phase liquids (LNAPL) consisting of petroleum hydrocarbons, and impacts to soil from contaminants including various metals. Fluoride contaminant concentrations currently exceed, and chromium concentrations have historically exceeded, criteria that are protective of drinking water sources such as the ZWF. Soil contaminant concentrations exceed criteria that are protective of pregnant on-site construction workers. Exposure pathways accounted for the small size of the Facility and the short distance contamination would have to travel to migrate beyond the property boundary and impact current and future off-site receptors, including humans, plants and animals.

A fate and transport model was constructed to evaluate scenarios in which exposure points might be impacted from Facility-related contamination; the model was constructed using data collected during the investigation and routine monitoring events. The results from that evaluation process were then compared to the results of modeling performed at the adjacent Superfund Site to ensure consistency in the outputs, such as groundwater flow paths under the localized groundwater pumping activities. The results showed which specific and reasonable scenarios might create a pathway for contamination to migrate from the source, and this information was then used to develop remedial strategies.

IV. SUMMARY OF FACILITY RISKS

Potential Risks to Human Health

Fluoride and chromium in the trivalent and hexavalent oxidation states have been intermittently detected in groundwater on-site and off-site since investigations began. Releases from the Facility impact groundwater off-site, as the groundwater flows north toward the Superfund Site, suggesting that off-site exposure pathways are complete for both residential (potable) and non-residential receptors. Fate and transport modeling was performed under various regional pumping scenarios to establish which scenario might create a situation where groundwater impacted by specific contaminants could potentially reach the Zanesville Municipal Wellfield. On-site and off-site fluoride concentrations exceed the Maximum Contaminant Level ("MCL") promulgated pursuant to the Safe Drinking Water Act, 42 U.S.C. 300f et seq., and fluoride was retained as a COC. Chromium has been detected less frequently and was not detected in the most recent groundwater monitoring event. However, it is being retained as a COC due to the on-going pumping activities in the immediate area.

LNAPL was detected in on-site groundwater, within a shallow perched -water-bearing zone and is measured as total petroleum hydrocarbons ("TPH") at SWMUs 7 and 9. This zone is separate and distinct from the deeper regional aquifer. The fate-and-transport of LNAPL in groundwater can vary depending on the contaminant composition, groundwater chemistry and the geology of the impacted area. Ongoing groundwater monitoring demonstrates that LNAPL is not migrating

downgradient, nor is there a complete exposure pathway to on-site receptors under current use scenarios. Nonetheless, LNAPL will be addressed to account for reasonably anticipated future use scenarios to reduce or eliminate potential exposures.

Various metals, VOCs and semi-volatile organic compounds ("SVOCs") have been detected in soil at various depths. Table 2, below, depicts the highest concentration of a particular COC detected and the SWMU where each COC was discovered, and compares the concentrations to generic, non-site-specific screening criteria. When site-specific criteria were considered, such as exposure frequency and duration, lead in subsurface soils at SWMU 2, SWMU 6 and SWMU 21 was determined to pose a risk only to pregnant construction workers. Other COCs were found to be within acceptable limits due to the frequency of detection, the type of exposure, and whether the COCs could be reasonably encountered by any receptors.

Off-site sediments in the Muskingum River were evaluated based on their proximity to the Facility. Various metals, VOCs and SVOCs were initially determined to be COCs based on comparisons to EPA's generic residential soil criteria. Where there was no available criteria based on human-health exposure from ingestion or fish consumption, with a reference to sediment, a comparison was made to residential soil criteria, EPA viewing these as sufficiently conservative. After performing a more robust assessment based on site-specific scenarios, the HHRA concluded that exposures to sediments did not pose an adverse risk.

Potential Risks to the Environment

Groundwater is not believed to pose a risk to ecological receptors. Common exposure pathways relating to groundwater typically originate where groundwater discharges into surface water. At the Facility, the Muskingum River is primarily a "losing stream," meaning that river water is recharged into the groundwater, rather than groundwater discharging into the surface water body. No other surface water bodies are present on-site, therefore ecological risks are not considered to be present from this pathway. The fate and transport modeling considered the remedial efforts taking place at the Superfund Site, which includes discharge of treated groundwater into surface water. Corrective Action objectives that were summarized in the Statement of Basis include this pathway.[1]

Results from the BERA included a range of HIs from less than 1 to an order of magnitude greater than 1, depending on the COC, ecological exposure pathway, or receptor group. The largest exceedances of the HQ benchmark are chromium for plants and invertebrates, cyanide and sulfide for aquatic groups, and cyanide for the red-tailed hawk or short-tailed shrew. An exceedance of 1 was also calculated for the Indiana bat exposed to certain inorganics including lead. Generally, the ground surface at the Facility is so disturbed and of such poor quality that vegetation growing on-site consists primarily of opportunistic foliage. There is no high-quality ecological habitat on the Facility that could be adversely affected by the soil contaminants, and receptors that were identified as potentially at risk are not believed to be present at the Facility.

[1] The results of the BERA did not demonstrate that this potentially complete pathway poses a risk to ecological or human receptors in surface water. Nonetheless, this pathway is being included in the Final Decision because these activities occur off-site.

Sediments are especially sensitive to impacts from releases and are evaluated accordingly. Several constituents exceeded the State of Ohio's published Sediment Reference Values ("SRVs"), and therefore additional studies were performed to evaluate site-specific and receptor-specific risks. Toxicity testing and macroinvertebrate surveys were performed in the Muskingum River, and results did not show patterns across the study area that indicated adverse impacts to habitat quality. In addition, detections of various contaminants above Ohio SRVs were of low frequency. Overall, risks to ecological receptors via the identified exposure pathways are low, and COCs associated with sediments were not carried forward into the Final Decision.

V. SCOPE OF CORRECTIVE ACTION

Short Term (Less than 1 year)

1) Minimize direct contact to soils for identified receptors at risk from exposure.
2) Contain existing impacts and continue to meet the criteria for the CA725 determination that human health exposures are under control.
3) Contain existing impacts and continue to meet the criteria for the CA750 determination that migration of contaminated groundwater is under control.

Long Term (1 year or more)

1) Demonstrate that the quality of groundwater impacted by releases from Cleveland-Cliffs is stable or improving.
2) Ensure fluoride and chromium concentrations at the point of exposure, identified as the Zanesville Municipal Wellfield, do not exceed the MCLs or RSLs.
3) Monitor groundwater wells to confirm Corrective Action Objectives ("CAOs") are met.
4) Meet CAOs related to LNAPL impacts in groundwater.

Soils

Final remedies must address soil impacts that exceed relevant risk criteria within a timeframe that is reasonable under the circumstances. Facilities must consider all reasonable scenarios in which a person or animal may come into contact with and be adversely impacted by soil contamination, and evaluate remedial strategies that address those pathways. The CAO for the protection of human health against soil contamination is to prevent exposure to soil contaminated with metals at concentrations above non-residential Regional Screening Levels ("RSLs") and the Ohio Voluntary Action Program's ("VAP") Chemical Information Database and Applicable Regulatory Standards ("CIDARS"). The Facility must also prevent exposure to contaminated soil above site-specific risk screening criteria.

Groundwater

EPA expects final remedies to return groundwater to its maximum beneficial use within a timeframe that is reasonable under the circumstances. For facilities associated with aquifers that are either currently used for drinking water supply or have the potential to be used for drinking water supply, EPA will require the groundwater meet National Primary Drinking Water Standard MCLs promulgated pursuant to the Safe Drinking Water Act, 42 U.S.C. §§ 300f et seq., and codified at 40 C.F.R. Part 141, or to EPA RSLs for tap water for chemicals for which there are no applicable MCLs. This can be a short-term or long-term goal based on the remedial strategy selected.

The CAOs for the protection of human health and the environment for groundwater are as follows:

1) Prevent exposure to groundwater contaminated with fluoride, chromium and TPH above residential and non-residential RSLs, MCLs, and Ohio VAP Risk-Based Drinking Water Standards at the points –of exposure. For fluoride and chromium, the point of exposure is the Superfund site. For LNAPL and TPH, the point of exposure is the current extent of impacts identified during the RFI.
2) Reduce mass or volume of LNAPL by physical removal in on-site groundwater using several lines of evidence to determine remedy success.
3) Continue to implement active remedial measures for on-site groundwater contamination and ensure LNAPL removal prevents migration of TPH from groundwater through soil gas to indoor air and human receptors.
4) Continue implementing the final corrective measures and demonstrate efficient plume contraction and stabilization such that the CAOs are achieved on-site and MCLs are met and maintained at the property line point of compliance with and without active remedial measures.

Indoor Air

EPA expects final remedies to address pathways that pose risks to occupants of buildings that may be impacted by subsurface contamination within a timeframe that is reasonable given the circumstances. Facilities must consider all reasonable scenarios in which contaminants may migrate into indoor air and evaluate remedial strategies that address those pathways. The CAO for the protection of human health for indoor air is to ensure LNAPL removal does not create a condition where the indoor air exposure pathway becomes complete. Cleveland-Cliffs will establish baseline soil gas data prior to LNAPL removal, and collect post-removal data afterward.

VI. SELECTED FINAL REMEDY

Current conditions at the Facility indicate the only complete exposure pathways that are of concern due to releases from Cleveland-Cliffs are groundwater impacts affecting the on-site and off-site drinking water and soil impacts affecting pregnant construction workers. Other off-site impacts are not attributable to Cleveland-Cliffs and are being addressed separately, and those efforts will continue. Under the reasonable assumption that these conditions will remain unchanged for the foreseeable future, EPA has selected the following remedy components for the Facility. Following the issuance of this FD/RC and prior to the implementation of the final remedy, Cleveland-Cliffs shall develop a Corrective Measures Implementation (CMI) Work Plan that briefly describes and summarizes how they intend to carry out these activities.[2]

[2] The Corrective Measures Study, which was used as part of EPA's consideration of the Final Decision, included significant detail regarding how Cleveland-Cliffs intends to carry out these activities. The CMI Work Plan may reference the CMS to simplify the development of the CMI Work Plan and quickly implement the remedy.

Soil Remedy

1) Land use restrictions in an environmental restrictive covenant (covenant) that limit land use within the existing fenced portion of the Facility to industrial and non-residential uses to address any contamination remaining onsite above the risk criteria range of 10^{-5} The covenant, which would be recorded on the Facility property, would among other things: (a) require that prior to engaging in any soil disturbance activities, Cleveland-Cliffs and any future property owner or operator present to EPA for approval workplans for managing Facility soils, media and/or debris, maintaining any existing caps, and managing any potential Facility-wide vapor intrusion in accordance with state and federal regulations; (b) require that with respect to disturbing the deeper soils at SWMUs 2, 6, and 21, Cleveland-Cliffs and any future property owner or operator develop for EPA's prior approval a Soil Management Plan that includes the requirement that pregnant construction workers use appropriate personal protective equipment; (c) prohibits residential use of the Facility property; and (d) requires that the vapor intrusion pathway be considered if a property use different from current use is ever proposed in the future.

Groundwater Remedy

1. A restriction in an environmental restrictive covenant, as described above, that prohibits the construction of wells within the fenced portion of the Facility to extract groundwater for any purpose other than site remediation, investigation of subsurface contaminants associated with a release of hazardous constituents into the environment, and other purposes necessary for facility industrial processes and operations.
2. Long-term stewardship of any City of Zanesville ordinance that similarly requires City approval prior to the installation of any groundwater wells.
3. LNAPL source recovery to reduce the volume of LNAPL free-product beneath the western portion of the main building to reduce risks of potential exposure pathways for current and reasonably anticipated future uses or eliminate the pathways altogether.
4. An active contingency plan to contain groundwater in the event future groundwater monitoring at the compliance wells along the fence line reveal higher than anticipated concentrations of fluoride, chromium or hexavalent chromium in the northern portion of the Facility.
5. Monitored stability that would evaluate site-wide groundwater trends to verify that concentrations of contaminants in groundwater remains stable or are decreasing. This would also ensure that identified exposure point receptors would not be at risk from any contamination that is left in place at the Facility. Cleveland-Cliffs will also be required to perform at least one 5-year review.

EPA has decided that controls at the Facility will be maintained through a restrictive covenant that will, at minimum:

1) Be recorded on the property deed, delineating the restricted area of contaminated soil and post-removal LNAPL area, if applicable.
2) Include a prohibition on potable use of on-site groundwater.[3]

[3] The Facility uses on-site groundwater for manufacturing-related industrial purposes. The restrictions on potable groundwater use will not apply to process wells and process water.

3) Include a non-residential property-use restriction.
4) Include a requirement that a Soil Management Plan be developed prior to the start of any excavation work to protect workers, specifically pregnant construction workers, who may have to excavate contaminated soil in the future.
5) Include a notice that will be placed on the deed requiring the vapor intrusion pathway be considered if property use is ever proposed to change in the future.[4]

EPA will re-evaluate its final remedy decision for the Cleveland-Cliffs site if the Agency learns that conditions, such as land use, have changed in ways that may increase risk of human or environmental exposure to contamination, or if any vapor intrusion investigation identifies a complete vapor intrusion pathway. If any engineered structures are to be demolished or the Facility owner/operator considers the use of the contaminated property for purposes other than non-residential, EPA will revisit this Final Decision and may require additional corrective measures. EPA may also require revisions to the proposed Restrictive Covenant or other actions necessary to address risks to human health or the environment.

EPA will document all the above-described institutional controls by entering restrictive covenants on the property deed. These covenants will be enforceable by Ohio EPA and by EPA. EPA will also require that existing municipal ordinances be monitored to ensure provisions for well installation approval remain in place.

Cleveland-Cliffs must demonstrate a financial ability to complete corrective action, including constructing the proposed remedy and monitoring site conditions following remedy construction, as needed, by securing an appropriate financial instrument, consistent with the requirements of 40 C.F.R §§ 264.142 and 264.144. Cleveland-Cliffs will develop a detailed cost-estimate as part of the Corrective Measures Implementation Work Plan. Cleveland-Cliffs may use any of the following financial mechanisms to make the demonstration: financial trust, surety bonds, letters of credit, insurance, and/or qualification as a self-insurer (corporate guaranty) by means of a financial test. After successfully completing the construction phase of the remedy, Cleveland-Cliffs may request that EPA reduce the amount of the financial assurance to the amount necessary to cover the remaining costs of the remedy, including any yearly operation and maintenance costs. Cleveland-Cliffs may make similar requests of EPA as the operation and maintenance phase of the remedies proceeds and ceases.

Cleveland-Cliffs must ensure all controls and long-term remedies are maintained and operate as intended. Cleveland-Cliffs will submit an annual certification that all controls are in place and remain effective. In addition, long-term remedies will be reviewed and inspected on a five-year basis, as long as necessary, to ensure the remedy is functioning as intended; the exposure assumptions, toxicity data, cleanup levels, and CAOs are still valid; and any information that comes to light that could call into question the protectiveness of the remedy is considered.

[4] Potential for human exposure to vapor-phase COCs in indoor air at the Facility is currently controlled by workplace regulation under OSHA and plant ventilation systems, and past sampling to evaluate this pathway from subsurface contamination demonstrates the VI pathway is incomplete at the time of this Final Decision. The applicability of this restriction is based on LNAPL likely remaining at some volume after removal activities are complete.

VII. CRITERIA ON WHICH THE FINAL REMEDY SELECTION IS BASED

As explained further in EPA's Statement of Basis for the proposed Final Remedy Decision, EPA has evaluated its Final Remedy using the following criteria:

1) Overall protectiveness of human health and the environment;
2) Attainment of media cleanup objectives;
3) Control of the sources of releases;
4) Long-term reliability and effectiveness;
5) Reduction of toxicity, mobility, and volume of waste;
6) Short-term effectiveness;
7) Implementability;
8) Cost;
9) Community acceptance of remedy; and
10) State support and acceptance of remedy

VIII. EVALUATION OF THE SELECTED REMEDY

Criteria 1 and 3 have largely been achieved for soil contaminated with lead at the Facility. For groundwater contamination, data demonstrates that Criteria 1 and 3 are currently being met when exposure points are considered and analytical data establish that contaminant concentrations are stable or decreasing. The short-term cleanup objectives are currently being met for soil and groundwater impacts, and long-term objectives will be met following the execution of the RC, completion of LNAPL recovery efforts and long-term monitoring with an implementable contingency plan. After these activities are completed, Criteria 1, 2, 3, 4 and 6 will be fully met.

The removal of LNAPL will satisfy Criterion 5, as will the long-term monitoring to ensure the exposure pathways at the exposure points remain incomplete. This activity, in addition to the execution of the RC are very implementable and are commonly used at contaminated facilities, and therefore satisfy Criterion 7. In their entirety, the costs are reasonable for the current and future conditions of the Facility and the off-site area around the Facility.

Finally, the Statement of Basis was publicly noticed on March 25, 2021 and a public comment period was open for 30 days allowing anybody form the public to comment on the proposed remedy. EPA received no comments (other than those received from Cleveland-Cliffs), which indicates the proposed remedy was acceptable and Criteria 9 and 10 are satisfied.

IX. PUBLIC PARTICIPATION ACTIVITIES

EPA held a 30-day public comment period for the proposed remedy identified in the Statement of Basis from March 25, 2021 to April 23, 2021. March 25, 2021, EPA gave notice of the comment period through the *Zanesville Recorder*. EPA offered to hold a public meeting if requested by concerned parties. EPA did not receive a request for a public meeting and no public meeting was held.

During the public comment period, the Statement of Basis, Public Notice, and Administrative Record were available for public inspection in the John McIntire Library, 220 North Fifth Street, Zanesville, Ohio 43701 and at the EPA Region 5 Records Center, 77 West Jackson Boulevard, Chicago, Illinois. Records were also available on a public-facing website created specifically for the public comment period and public noticing.

X. DECLARATION

Based on the information in the Final Decision and Response to Comments and the Administrative Record compiled for this corrective action decision at the Cleveland-Cliffs Facility in Zanesville, Ohio, EPA has determined that the Final Remedy is appropriate and is protective of human health and environment for the anticipated current and future uses of the property.

EDWARD NAM

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Edward Nam
Division Director
Land, Chemicals and Redevelopment Division

Date

ATTACHMENT 1

RESPONSE TO COMMENTS

FINAL DECISION & RESPONSE TO COMMENTS
CLEVELAND-CLIFFS – ZANESVILLE WORKS
EPA ID: OHD 004 281 598

EPA received no comments from the public other than from Cleveland-Cliffs, or requests for a public meeting during the public comment period. Comments received from Cleveland-Cliffs are included herein in italics. EPA's responses to those comments are as follows.

Cleveland-Cliffs Comment 1: *As you are aware, Cleveland-Cliffs acquired AK Steel Holding Corporation in March 2020. To further streamline this acquisition, AK Steel Corporation changed its name to Cleveland-Cliffs Steel Corporation in early 2021. Therefore, please make all future references to "Cleveland Cliffs Steel Corporation" or "Zanesville Works" rather than "AK Steel."*

EPA Response: Acknowledged. The Statement of Basis and other documents and resources were prepared prior to the official name change. The FD/RC will reflect this change.

Cleveland-Cliffs Comment 2: *Within the SB, there is discussion of requirements to mitigate the vapor intrusion (VI) pathway for current and future non-residential structures throughout the Zanesville Works property. Current SB language also suggests that this requirement be incorporated into land use restrictions and once the restrictions are executed, Cleveland-Cliffs would need to begin VI assessments and continue these assessments after LNAPL recovery activities are completed. Additionally, Corrective Action Objection [sic] "c" on page 10 of the SB indicates that active remedies should continue to be implemented to address indoor air until cleanup criteria is achieved. The EPA-approved 3013 Order Final Investigation Report included a VI assessment that indicated there was no potential for unacceptable VI risks due to the presence of the LNAPL. This understanding was further conveyed in the EPA-approved CMS Report. As such, the CMS Report identified a procedure for performing an additional VI assessment within a single building after LNAPL recovery activities have been completed. If results of the VI future assessment are acceptable, the CMS Report indicated that no further evaluation of the VI pathway would be required. Because there is no potential for unacceptable VI under current conditions, there are no active VI remedies. Cleveland-Cliffs believes COA "c" should be removed, that VI-related requirements do not need to be included in a deed restriction, and any discussions regarding VI requirements in the forthcoming Decision Document should be reflective of the conclusions and procedures in the previously approved documents.*

EPA Response: As the comment stated, the CMS addressed baseline and post-removal conditions should the data show an absence of any complete VI pathway. EPA acknowledges the current and apparent absence of a complete VI pathway based on historic sampling performed during the RFI. EPA expects the active LNAPL recovery efforts will ensure this pathway remains incomplete and the post-removal VI verification sampling will confirm this. The purpose of this CAO is to account for the possibility that a VI pathway will remain following LNAPL recovery.

EPA agrees that if the post-removal data are acceptable, then no continued VI actions would be necessary. The CMS included a situation where vapor intrusion post-removal verification sampling is not favorable, triggering additional evaluation efforts. EPA does not agree, however, that a deed restriction is not warranted. LNAPL will likely remain at some volume following removal, and the deed restriction will address this by requiring any future property owner to

evaluate this pathway in the event of redevelopment that alters the existing structure. The Statement of Basis and FD do not specify how this evaluation should be done because future conditions and site use will be the primary drivers associated with that evaluation. The FD will clarify that this pathway is incomplete, and that EPA intends only baseline sampling, and that post-removal verification sampling will be needed unless that the baseline sampling suggests a complete pathway is present.

Cleveland-Cliffs Comment 3: *Throughout the SB, there is reference to unacceptable risk for the on-site construction worker and the measures that will be used to mitigate the associated risk. We request that all references to the on-site construction worker be clarified to be the "on-site pregnant construction worker" because the risk assessment demonstrated there are no potential risks to a construction worker unless they are pregnant.*

EPA Response: Acknowledged. This is an appropriate clarification that is supported by risk assessments performed during the investigation.

Cleveland-Cliffs Comment 4: *There are various inaccurate references to establishing a prohibition of installing groundwater supply wells for any use other than remediation and investigation. The EPA-approved CMS Report indicates there will be a prohibition for potable use of groundwater via an environmental covenant. The Zanesville Works currently operates multiple process wells. The continued use of these process wells and the ability to install additional process wells is essential to support facility operations. It is requested that the prohibition on groundwater use clearly reflect this understanding in the forthcoming Decision Document.*

EPA Response: The Statement of Basis intended to apply only to potable water use. Cleveland-Cliffs uses groundwater for process purposes, and that was also a key component of the fate and transport modeling performed as part of the CMS. This clarification will be made in the FD.

Cleveland-Cliffs Comment 5: *The SB indicates that LNAPL is present within "on-site groundwater." Although this is a true statement, we request that it be clarified that LNAPL is present in "on-site groundwater within a shallow perched water-bearing zone" to not cause potential confusion with the deeper regional groundwater aquifer.*

EPA Response: Acknowledged. This clarification will be reflected in the FD. EPA will refer readers to the investigation documents in the Facility Record Index for additional information on this clarification.

Cleveland-Cliffs Comment 6: *Various constituents of concern (COCs) detected above generic screening levels at multiple investigation units are identified through discussion in text and tables. When reading the text and tables, it is not apparently clear that the majority of these COCs were determined by the risk assessments (both human health and ecological) to be present at acceptable concentrations and thus were not carried into the CMS. Additionally, some of the screening limits identified in Tables 1 and 2 are not appropriate for the RCRA Program. Specifically, Ohio EPA VAP and Ohio CIDAR should not be referenced in text or tables. These screening levels were never utilized during the 3013 investigation or risk assessment as they are*

associated with a program outside of RCRA. For Table 2, there should be a footnote to clarify that only lead associated with the pregnant construction worker was carried into the CMS. Table 2 is also missing an identified for concentration units. For Table 3, there should be a footnote to clarify that the BERA determined that there were no unacceptable risks and that no constituents were carried into the CMS.

EPA Response: The Statement of Basis is not intended to be an all-encompassing document. Instead, EPA refers the public to the Facility Record Index for the totality of the background information that helped EPA make its final decision. With regard to the risk assessments, EPA agrees that the site-specific criteria demonstrate that the majority of the COCs did not need to be carried over into the CMS, and briefly discussed this in the Human Health Risk Evaluation and Ecological Risk Evaluation sections in Section IV of the Statement of Basis. In response to the comment about the screening criteria that were used in the Statement of Basis, EPA regularly utilizes state and local criteria to assess overall protectiveness and satisfy state and community acceptance balancing criteria, even if the RFI or CMS did not utilize them. It should be reiterated that EPA considers these documents but does not limit its review to them alone. Nonetheless, EPA believes that the site-specific risk assessments were ultimately more appropriate and agrees regarding the COCs that were carried forward into the CMS. EPA will include additional language in the FD to ensure that this is clear. Finally, the comment regarding Table 2 is acknowledged and the concentration units were milligrams per kilogram (mg/kg).

Cleveland-Cliffs Comment 7: *The text discussion and Table 4 summary of CAOs for groundwater should be further clarified. As agreed between Cleveland-Cliffs and EPA, the CAO performance standard for fluoride, chromium, and hexavalent chromium in groundwater consists of alternate concentration limits (ACLs) based on the inability to return groundwater to its maximum beneficial use due to contamination at the immediately adjacent and downgradient Superfund site and their deed that restricts potable use of groundwater. A groundwater flow and contaminant transport model was used to simulate the groundwater flow conditions and contaminant transport as part of developing the ACLs, which was approved by EPA. The ACLs serve to be protective for off-site potable use of groundwater at the point of exposure (i.e., City wellfield on the opposite side of the Muskingum River), while on-site protection will be addressed through prohibition of potable use of groundwater. MCLs (or tap water RSLs if an MCL is not available) are not the appropriate COA performance standards for the property boundary, as is currently stated in the SB. The inability to return groundwater to its maximum beneficial use should also be clearly stated in the forthcoming Decision Document. Although it is considered a general long-term goal (not a requirement) by EPA, it is not feasible in this specific instance due to the presence of the downgradient Superfund site.*

EPA Response: Cleveland-Cliffs is correct that the inclusion of the MCL or tapwater RSLs for their respective COCs is intended to reflect a long-term cleanup goal. EPA does not believe this goal can be achieved in the short term based on current on-site and off-site conditions. Groundwater monitoring is expected to continue at some frequency well into the future and contingencies are planned in the event the modeled concentrations are exceeded. Therefore, including as a long-term, passive goal is appropriate. The modeled concentration limits referred to as ACLs will serve as interim goals. Those goals are currently being met and are expected to continue to be met into the future.

Groundwater contaminant concentrations above the detection limit have either been stable or have been decreasing for some time, and that is expected to continue following the Final Decision. EPA used the process described in OSWER Directive 9481.00-6C (pertaining to ACLs at permitted facilities) in concurring with the compliance criteria developed for this site, thus ensuring the long-term remedial strategy would protect human health and the environment

Cleveland-Cliffs Comment 8: *The SB identifies various required submittals following issuance of the Decision Document. However, the majority of these submittals have already been provided in the EPA-approved CMS Report. Page 16 of the SB indicates a groundwater monitoring plan will be prepared. Attachment C of the CMS Report is the Corrective Action Groundwater Monitoring Plan, which includes a Groundwater Contingency Plan. Page 18 of the SB indicates a health and safety plan must be developed to assure appropriate personal protective equipment is utilized by the pregnant construction worker. The health and safety plan is considered an integral component of the soil management plan. The CMS Report indicates that the environmental covenant will require the preparation and implementation of a soil management plan. Furthermore, the CMS Report indicates that the soil management plan will not need to be prepared until such time that the need for disturbance of soil at the subject units becomes necessary to allow provisions to be tailor to the specific activity. Page 19 of the SB indicates a detailed cost estimate for financial assurance will be developed as part of the CMI work plan. Although we do need to develop a detailed cost estimate, we believe there is no need to prepare a CMI work plan, as all necessary information, procedures, and plans are included in the CMS Report. In additional to the Groundwater Monitoring Plan, the CMS Report also included a detailed plan and schedule for LNAPL source recovery (Attachment B). No other data is needed to begin implementation of the Groundwater Monitoring Plan or LNAPL recovery plan. The anticipated information to be submitted following issuance of the Decision Document consists of the following:*

- *Detailed cost estimate for financial assurance*
- *Proposed environmental covenant*

EPA Response: The CMI Work Plan is intended to tie together the Final Decision, the Facility Record and the implementation strategy. The document acts as a 'jumping off point' that will serve as the baseline for the remedial period. Referring to the CMS as the final CMI Work Plan may risk inflexibility should site conditions improve, and the CMS is not intended to serve that purpose. The CMI Work Plan may refer to the CMS to simplify and streamline its development. The comment highlights that the CMS already goes into significant detail about the strategy, and EPA will refer the public to that document to ensure it understands how Cleveland-Cliffs intends to implement the key components of the final remedy. The CMI Work Plan will address those other items not discussed in detail in the CMS, such as a groundwater monitoring schedule, or any updated quality assurance project plans and sampling and analysis plans.

ATTACHMENT 2

INDEX TO THE ADMINISTRATIVE RECORD

FINAL DECISION & RESPONSE TO COMMENTS
CLEVELAND-CLIFFS – ZANESVILLE WORKS
EPA ID: OHD 004 281 598

U.S. ENVIRONMENTAL PROTECTION AGENCY

ADMINISTRATIVE RECORD
FOR THE
AK STEEL CORP. ZANESVILLE OPERATIONS SITE
ZANESVILLE, MUSKINGUM COUNTY, OHIO

ORIGINAL
FINAL DECISION AND RESPONSE TO COMMENTS
AUGUST 1, 2021
SEMS ID: 964385

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15	962099	4/1/10	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendix C for the RCRA 3013 Order Investigation - Calculation of Soil Screening and Leach-Based Screening Levels	4

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ATTACHMENT 3

STATEMENT OF BASIS

FINAL DECISION & RESPONSE TO COMMENTS
CLEVELAND-CLIFFS – ZANESVILLE WORKS
EPA ID: OHD 004 281 598

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF BASIS

For

Proposed Soil and Groundwater Cleanup

At

AK Steel - Zanesville Works

1724 Linden Avenue, Zanesville, Ohio
OHD 004 281 598

TABLE OF CONTENTS

ATTACHMENTS

ACRONYMS

AOC	Administrative Order on Consent
AOI	Area of Interest
AST	Above Ground Storage Tank
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Total Xylenes
BUSTR	Bureau of Underground Storage Tank Regulations
CAO	Corrective Action Objective
CMS	Corrective Measures Study
ESL	Ecological Screening Level
EPA	U.S. Environmental Protection Agency
HHRA	Human Health Risk Assessment
HI	Hazard Index
IC	Institutional Control
MCL	Maximum Contaminant Level (Drinking Water)
LNAPL	Light Non-aqueous Phase Liquid
PA/VSI	Preliminary Assessment/Visual Site Inspection
PCB	Polychlorinated biphenyl
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
RFI	RCRA Facility Investigation Report
SB	Statement of Basis
SVOCs	Semi-volatile Organic Compounds
SWMU	Solid Waste Management Unit
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
UST	Underground Storage Tank
VISLs	Vapor Intrusion Screening Levels
VOCs	Volatile Organic Compounds
WQS	Water Quality Standards

SECTION I: INTRODUCTION AND PURPOSE OF THE STATEMENT OF BASIS

This Statement of Basis ("SB") document is the United States Environmental Protection Agency's ("EPA") proposed approach to remediate and manage contaminated environmental media at AK Steel Zanesville Works, located at 1724 Linden Avenue, Zanesville, Muskingum County, Ohio (zip 43701) ("AK Steel" or "Facility"). EPA's proposed remedy includes placing land use restrictions on the property, establishing institutional and engineering controls, implementing active and passive recovery techniques to remove groundwater contamination, and prevent risks to the drinking water supply. These measures will protect current and future Facility users and downgradient property users from contamination-based health effects. The details of the proposed remedy are provided below.

EPA invites written comments from the public on the proposed remedy. Additionally, if a member of the public requests it, EPA will host a public meeting, either in person or virtually, to answer questions and receive additional comments. Public comments will be used to inform EPA's final decision regarding the remedy selection. EPA will publish a Final Decision and Response to Comments document conveying EPA's decision about how the Facility will be remediated, within 30 days after the close of the comment period. See pages 20 and 21 for instructions on how to provide comments to EPA on the SB and for the open comment period dates.

This document summarizes information that can be found in greater detail in the *RCRA FIRST Corrective Measures Proposal* (AK Steel Corporation, 2019) and other documents contained in the Facility Record for this Facility

Voluntary Approach

In 2017, following AK Steel's completion of work required under a RCRA 3013 Administrative Order on Consent ("AOC"), EPA agreed to allow the voluntary implementation of additional remedial actions by AK Steel under EPA oversight.

The voluntary actions agreed to were designed and implemented to protect human health and/or the environment. The Corrective Action program is responsible for ensuring that RCRA regulated facilities investigate and clean up releases of hazardous waste and hazardous constituents on their property and any releases that have spread beyond the property boundaries, and which pose a risk to human health or the environment. The selected remedies, or clean-up actions, for AK Steel were chosen based upon the current and future anticipated use of the property. The Facility is currently operational and is expected to remain operational well into the foreseeable future.

Remedy Summary

After reviewing the results of soil and groundwater sampling, past environmental practices, historical investigations and remedial activities, EPA is proposing to actively monitor and reduce the mass and volume of chemical and metal constituents in groundwater to address contamination at and from the Facility. For a full explanation of the proposed remedies, see Section VI: Proposed Final Remedy and Evaluation of Alternatives.

Proposed Remedies
EPA is proposing that AK Steel implement the following remedy at the Facility to address contaminated soils and groundwater:

- Record land use restrictions at the Facility limiting future use to industrial and require assessments and mitigation of the vapor intrusion pathway for future non-residential structures.
- Establish and maintain engineering and institutional controls at the Facility to prevent exposure to remaining contaminated subsurface soil and groundwater exposure during any future construction and excavation activities for protection of construction workers.
- Prepare a Contaminated Soil Management Plan for the Facility to manage all soils, media, and/or other debris in accordance with the applicable requirements of all relevant state and federal regulations.
- Implement Groundwater Use Restrictions at the Facility to prohibit the installation of groundwater supply wells and protect construction workers from exposure to contaminated groundwater at the Facility.
- Undertake active and passive source recovery activities to address light non-aqueous phase liquids ("LNAPL") on-site.
- Monitor plume stability at the Facility to verify that fluoride and chromium concentrations are stable or decreasing and compare to the results from the fate transport model to evaluate any risks to exposure point receptors.
- Demonstrate and maintain financial ability to complete the proposed remedy and long-term monitoring by securing an appropriate financial instrument.

Contamination will be addressed by reducing or eliminating exposure pathways through land use restrictions, groundwater use restrictions and source recovery for LNAPL on-site. Controls will include land use restrictions requiring that due care be taken during any removal or disturbance of site surfaces. Finally, fluoride and chromium concentrations will be monitored to ensure that on-site and off-site receptors are not at risk from historic releases at the Facility.

SECTION II: FACILITY BACKGROUND

Location and Setting

AK Steel Corporation currently owns the Facility located at 1724 Linden Avenue in Muskingum County, Zanesville, Ohio. The Facility occupies roughly 90 acres and contains several buildings along the west side of the Muskingum River. The Facility is located in a mixed-use setting that includes recreational, residential, commercial and industrial properties, and neighbors the Zanesville Wellfield Superfund Site immediately to the north. The Facility is also located along the Muskingum River, a tributary of the Ohio River and a navigable waterway within the Mississippi River watershed. Steel-making operations occur in the northern, fenced area of the Facility while the southern area is un-fenced and is used for recreational purposes.

Ownership History

Facility operations began in the early 1900s and the site has been an operational steel mill since that time. The Facility was purchased by ARMCO in the 1920s, who entered into a joint partnership with Kawasaki Steel in 1989 before renaming itself AK Steel Holding Corporation in 1993. Cleveland-Cliffs acquired AK Steel Holding Corporation in March of 2020.

Manufacturing, Release, and Regulatory History
The Facility receives flat rolled steel from AK Steel's Butler Facility in Butler, Pennsylvania and a number of processes are applied to the steel at the request of their customers. These processes include cold rolling, coating, pickling, annealing, and painting. The Facility also manufactures electrical steel used for utilities.

Historically, releases of spent pickle liquor occurred at Solid Waste Management Units ("SWMUs") 1, 3, 7 and 9. At SWMUs 1 and 3, the releases made their way to groundwater, while at SWMUs 7 and 9 only soil was impacted. In 1995, a cavity was discovered in the in-ground tank at SWMU 1 that was likely caused by an overflow of pickle liquor and had resulted in elevated fluoride levels down to the groundwater. Sampling at SWMU 2 recorded high levels of metals such as arsenic, copper, and lead. Elevated levels of chromium consisting of total and hexavalent chrome were found at SWMUs 7 and 9. High levels of metals such as arsenic, lead and chromium were found at SWMUs 21 and 24 in a few samples at depths less than 10 ft. below ground surface (bgs). PCBs were also detected at SWMU 24 on the north end of the No. 9 Lift Station. SWMU 25, which was also the former wastewater discharge point, recorded high levels of many kinds of metals not seen at other locations at the Facility, such as cyanide and mercury.

On October 9, 2002, AK Steel and EPA entered into an order under RCRA Section 3013 that required AK Steel to investigate the Facility for areas that could be sources of contamination. Thirteen SWMUs were identified, as well as six Areas of Concern. AK Steel identified several releases of hazardous waste, materials or constituents that required investigation and characterization, primarily spent pickle liquor and other acids from various SWMUs. After the initial investigation, AK Steel performed additional work to ascertain the full nature and extent of contamination, prepare a final report using all of the data collected, and assess current and future risks. A final report was submitted in May 2007, and additional investigative activities were performed in August and November 2007. An updated *Final Report for the RCRA 3013 Order Investigation – Revision 2* ("Final Report") was submitted in April 2010 and was approved on December 28, 2012 following comments from EPA. In addition to the Final Report, a baseline ecological risk assessment ("BERA") was submitted on November 6, 2013 and was approved in October 2015 after a round of comments and responses.

Environmental Indicators
EPA has developed two "environmental indicators" ("EIs") to track conditions that affect human health and groundwater impacts at RCRA facilities. The Human Exposure EI, or CA 725, is used to document that there aren't any unacceptable human exposures to contamination at a facility, and the Groundwater EI, or CA 750. is used to identify whether any contaminated groundwater on the facility is stabilized and not migrating. These EIs are used to assess whether early intervention is needed, such as an interim measure to prevent people drinking contaminated groundwater. The EI evaluations use available environmental data, such as measurements of contaminants in groundwater to inform the process.

The Facility-wide investigation began in 2003 and characterized the nature and extent of contamination to satisfy the AOC's requirements that the Facility demonstrate that the CA725 and CA750 were achieved. The Facility demonstrated that a positive determination for CA750, "Migration of Contaminated Groundwater Under Control" was appropriate, and EPA

subsequently issued that determination on March 30, 2004. Following frequent communication and additional sampling activities, EPA determined that the CA725, Current Human Exposures Under Control, was appropriate and issued the determination on June 30, 2005.

Physical Setting and Site Characteristics

Soil

The Facility is situated above alluvial deposits and glacial outwash ranging from 75 to 90 feet of thickness and consisting primarily of sand and silt, with isolated clay units. Within this deposit is a thin, saturated gravel layer between 10 to 16 feet bgs in the western and northern portions of the Facility, which behaves as a perched groundwater zone above the regional aquifer.

Hydrogeological Setting

The regional water table is encountered approximately five to 10 feet bgs at the southern portion of the Facility and 25 to 30 feet bgs at the northern portion of the Facility. The Facility is adjacent to and is hydraulically side-gradient of the Muskingum River, which lies to the east, and is hydraulically upgradient from the Zanesville Wellfield Superfund Site ("Superfund Site"). River flow is to the south, but groundwater flow beneath the Facility is to the north due to pumping at the Superfund Site and at the City of Zanesville Municipal Wellfield ("ZWF"), the latter of which provides drinking water to the residents of Zanesville. Remediation wells at the Superfund Site are treating volatile organic compounds ("VOCs") to prevent migration of contaminants to the ZWF. These releases are independent from any releases from AK Steel.

Ecological Setting

To the east of the Facility, as stated earlier, is the Muskingum River, a warm water habitat with vegetative buffer and potential nesting sites for birds and roosting sites for bats. AK Steel submitted an ecological risk assessment ("ERA") on May 24, 2007 that identified the Northern Area of the South Property Area ("NSP"), the Southern Area of the Southern Property Area ("SSP") and the Muskingum River as areas with habitats that may be impacted by and be at risk from exposure to certain contaminants.

The Facility is located in an area within the range of several threatened and endangered species, as identified in the ERA. At the time of the ERA, the Indiana bat and the bald eagle were considered federally endangered and threatened, respectively, and the northern madtom and mountain madtom, both freshwater fish, were considered endangered by the State of Ohio. Presently, the Indiana bat remains endangered and the northern long-eared bat is listed by US Fish and Wildlife services as threatened at and around the Facility area. In addition to mammals, the fanshell, sheepnose mussel and snuffbox mussel are endangered clams and the rabbitsfoot clam is threatened.

Surface Water

As stated above, the Facility is located along the Muskingum River which is a navigable waterway and part of the Mississippi River Watershed. According the Ohio Department of Natural Resources, it is the longest river that lies entirely within the State of Ohio. Used as a commercial route, river flow is controlled by locks and dams to allow vessels to travel in both directions.

SECTION III: SUMMARY OF ENVIRONMENTAL INVESTIGATION

The purpose of a Corrective Action Remedial Facility Investigation ("RFI") is to determine whether hazardous waste or hazardous constituents were released into the environment at a facility, and if so, to evaluate the significance of the releases in terms of risk to human health and the environment. The investigation is governed by a conceptual site model ("CSM"), which illustrates site physical characteristics, sources of contaminants, their fate and transport, affected environmental media, and potentially exposed people (in categories such as office and construction workers) and ecological receptors (plants and animals).

During the investigation phases, environmental media such as soil, groundwater, surface water, sediments, and biota are sampled and analyzed for contamination. Where contaminated media are found, subsequent sampling is usually completed to refine the CSM and define the extent of contamination (how far it may have traveled and how deeply), and to collect enough information for analysis of exposure effects in risk assessments. After each sampling event or investigation phase, EPA evaluates the CSM to determine the adequacy of the data to support decision-making. If data are found to be inadequate, additional data collection is necessary.

Site Investigation Summary of Results

Groundwater investigations have been conducted at the Facility between 2003 and the present day to ascertain the nature and extent of contamination and to monitor for any changes that may affect the corrective action process. The results of these investigations have been included in Data Reports, and results are evaluated against current and future non-residential uses. Impacts to groundwater were found to come from various contaminants including fluoride, chromium and light non-aqueous phase liquids (LNAPL) consisting of petroleum hydrocarbons, and impacts to soil come from contaminants including various metals. Fluoride and chromium contaminant concentrations found exceed criteria that are protective of drinking water sources such as the Zanesville Municipal Wellfield, and soil contaminant concentrations exceed criteria that are protective of on-site construction workers. Exposure pathways accounted for the small size of the Facility and the short distance contamination would have to travel to migrate beyond the property boundary and impact current and future off-site receptors including humans, plants and animals.

A fate and transport model was constructed to evaluate scenarios where exposure points may be impacted from Facility-related contamination; the model was constructed using data collected during the investigation and routine monitoring events. The results from that model were then compared to the modeling performed at the adjacent Superfund Site to ensure consistency in the outputs, such as groundwater flow paths under the localized groundwater pumping activities. The results showed which specific and reasonable scenarios may create a pathway for contamination to leave the source, which were then used to develop remedial strategies.

Table 1 below includes groundwater monitoring results for contaminants that have been considered as contaminants of concern ("COCs"). Table 2 depicts soil contamination detected during various investigation activities exceeding relevant screening criteria, and Table 3 depicts concentrations in the Muskingum River sediments adjacent to the Facility boundary. For additional Facility investigation details, see the Final Report referenced above. Facility documents can be found at https://www.epa.gov/hwcorrectiveactionsites/epa-rcra-id-ohd004281598 and the document repository (see Section VII for additional information).

SECTION IV: SUMMARY OF RISK EVALUATION

Human Health Risk Evaluation

The information and data collected in the RFI are used to determine whether the contamination presents an unacceptable risk to human health. This is done in a human health risk assessment, which can be found in the Final Report. EPA has developed a cancer risk range to evaluate what is acceptable to protect the public. Cancer risk is often expressed as the maximum number of new cases of cancer projected to occur in a population due to exposure to the cancer-causing substance over a 70-year lifetime. For example, a cancer risk of one in one million means that in a population of one million people, not more than one additional person would be expected to develop cancer as a result of the exposure to the substance causing that risk. EPA utilizes the acceptable exposure level, or "risk goal" defined within the National Contingency Plan ("NCP") for site enforcement and cleanup decisions. The NCP defines the acceptable excess additional lifetime cancer risk as generally a range between $1x10^{-6}$ – $1x10^{-4}$ for determining remediation goals. This represents a range from one in ten thousand to one in one million.

If the contaminants are noncancer causing but could cause other health problems, then a hazard index ("HI") quotient is used. To be acceptable to the EPA, the HI quotient for all contaminants must be less than one. The HI is the ratio of the concentration of a contaminant to its human health screening value.

Groundwater

Fluoride and chromium in the trivalent and hexavalent oxidation states have been intermittently detected in groundwater on-site and off-site since investigations began. As groundwater flows north toward the Superfund Site, site-related releases impact groundwater off-site, suggesting that off-site exposure pathways are complete for both residential (potable) and non-residential receptors. Fate and transport modeling was performed under various regional pumping scenarios to establish which scenario may create an environment where groundwater impacted by specific contaminants could potentially reach the Zanesville Municipal Wellfield. Fluoride concentrations exceed the Maximum Contaminant Level ("MCL") promulgated Pursuant to the Safe Drinking Water Act, 42 U.S.C. 300f et seq., both on-site and off-site, and so it was retained as a COC based on this effort. Chromium has been detected less frequently and was not detected in the most recent groundwater monitoring event however it is being retained as a COC due to the on-going pumping activities in the immediate area.

LNAPL was detected in on-site groundwater and is measured as total petroleum hydrocarbons ("TPH") at SWMUs 7 and 9. The fate-and-transport of LNAPL in groundwater can vary depending on the contaminant composition, groundwater chemistry and the geology of the impacted area. Ongoing groundwater monitoring demonstrates that LNAPL is not migrating downgradient, nor is there a complete exposure pathway to on-site receptors under current use scenarios. Nonetheless, LNAPL will be addressed to account for reasonably anticipated future use scenarios to reduce or eliminate potential exposures.

Table 1: Contaminants in Groundwater Above Screening Criteria

Well ID	COC	MCL (mg/L)	Ohio EPA VAP Risk Based Drinking Water (mg/L)	EPA RSL for Tapwater (mg/L)	Result (µg/L)	Sample Date	Well Location
CP-01	Fluoride	4	1.2	0.8	16	12/2/2020	On-site
MW-09	Fluoride	4	1.2	0.8	6.6	12/2/2020	On-site
MW-09D	Fluoride	4	1.2	0.8	6.9	12/2/2020	On-site
MW-09DD	Fluoride	4	1.2	0.8	6	12/2/2020	On-site
MW-10	Fluoride	4	1.2	0.8	2.9	12/2/2020	On-site
MW-25	Fluoride	4	1.2	0.8	8.2	12/2/2020	On-site
MW-28B	Fluoride	4	1.2	0.8	3.8	12/3/2019	Off-site
MW-32	Fluoride	4	1.2	0.8	4.3	12/3/2019	On-site
I-1	Fluoride	4	1.2	0.8	1	12/3/2019	Off-site

Notes: Highlighted cells indicate exceedances of appropriate criteria.

Soil

Various metals, VOCs and semi-volatile organic compounds ("SVOCs") have been detected in soil at various depths. Table 2, below, depicts the highest concentration of a particular COC detected and the SWMU where each COC was discovered compared to generic, non-site-specific screening criteria. When site-specific criteria are considered, such as exposure frequency or duration, lead in subsurface soils at SWMU 2, SWMU 6 and SWMU 21 was determined to pose risk to pregnant construction workers. Other COCs were found to be within acceptable limits due to the frequency of detection, the type of exposure, or other factors.

Table 2: Highest Soil Concentration Exceeding Relevant Screening Criteria

Constituent	Maximum Detection	Location	Background Concentration	EPA RSL	Ohio CIDAR
Arsenic	357	Black Beauty Area	17.8	3	100
Aroclor-1260	4.3	Southern Property North	N/A	0.99	20
Benzo(a)Anthracene	31	Black Beauty Area	N/A	21	610
Benzo(b)Fluoranthene	30	Black Beauty Area	N/A	21	620
Benzo(a)Pyrene	21	Black Beauty Area	N/A	2.1	62
Chromium	598	Bottom Ash Pile	13.7	63	240
Lead	87400	SWMU 2	47	800	800
Naphthalene	75000	Black Beauty Area	N/A	17	420
TPH	12000	SWMU 7/9	N/A	420	N/A

Notes: Highlighted cells indicate exceedances of appropriate criteria.

Sediment

Off-site sediments in the Muskingum River were evaluated based on the proximity to the Facility. Various metals, VOCs and SVOCs were initially determined to be COCs based on comparisons to EPA's generic residential soil criteria. No criteria based on human-health exposure from ingestion or fish consumption with a focus on sediment were available, so comparison to residential soil was believed to be more conservative. After performing a more

robust assessment based on site-specific scenarios, the HHRA concluded that exposures to sediments did not pose adverse risk.

Ecological Risk Evaluation

The information and data collected in the RFI are used to determine whether the contamination presents an unacceptable risk to the environment. Risk is assessed by evaluating concentrations of individual contaminants against exposure thresholds for identified receptors and, like human health risk evaluations, a hazard index is calculated. The ERA concludes that several contaminants of potential concern ("COPCs") are present when ecological risks are considered but are generally not of concern when considering the frequency of detections above ecological screening levels ("ESLs").

Groundwater

Groundwater is not believed to pose a risk to ecological receptors. Common exposure pathways relating to groundwater typically originate where groundwater discharges into surface water. At the Facility, the Muskingum River is primarily a "losing stream," meaning that River water is recharged into the groundwater, rather than groundwater discharging into the surface water body. No other surface water bodies are present on-site, therefore ecological risks are not considered to be present from this pathway.

Soil

Risk assessments consider both quantitative and qualitative attributes of a facility and surrounding area. Results from the BERA included a range of HIs from less than 1 to an order of magnitude greater than 1 depending on the COC, ecological exposure pathway, or receptor group. The largest exceedances of the HQ benchmark are chromium for plants and invertebrates, cyanide and sulfide for aquatic groups, and cyanide for the red-tailed hawk or short-tailed shrew. An exceedance of 1 was also calculated for the Indiana bat exposed to certain inorganics including lead. Generally, the ground surface at the Facility is so disturbed and of such poor quality that vegetation growing on-site consists primarily of opportunistic foliage. There is no high-quality ecological habitat on the Facility that could be adversely affected by the soil contaminants, and receptors that were identified as potentially at risk are not believed to be present at the Facility.

Sediment

Quite often, bodies of water are important to the interactions between plants and animals and the pathways by which plants and animals can be exposed to the contaminants. Sediments are especially sensitive to impacts from releases and are evaluated accordingly. Several constituents exceeded the State of Ohio's published Sediment Reference Values ("SRVs"), and therefore additional studies were performed to evaluate site-specific and receptor-specific risks. Toxicity testing and macroinvertebrate surveys were performed in the Muskingum River, and results did not show patterns across the study area that indicated adverse impacts to habitat quality. In addition, detections of various contaminants above Ohio SRVs (Table 3) were of low frequency. Overall, risks to ecological receptors via the identified exposure pathways are considered to be low.

Table 3: Highest Sediment Concentration Exceeding Generic Screening Criteria

Constituent	Maximum Concentration (mg/kg)	Location	Ohio EPA Sediment Reference Values (mg/kg)
Beryllium	1.3	SWMU 25 Sediment	0.8
Cadmium	2.6	SWMU 25 Sediment	0.8
Chromium	195	SWMU 25 Sediment	53
Cobalt	21.8	SWMU 25 Sediment	12
Copper	59.3	SWMU 25 Sediment	33
Lead	447	SWMU 25 Sediment	47
Mercury	0.53	SWMU 25 Sediment	0.12
Nickel	106	SWMU 25 Sediment	61
Zinc	297	SWMU 25 Sediment	170

SECTION V: CORRECTIVE ACTION OBJECTIVES

The proposed final remedy and associated remedial goals are designed to protect human health and the environment by mitigating risk to current and potential future receptors. EPA's short-term goals for this Facility are:

a. Control all current human exposures to contamination at or from the Facility. Specifically, AK Steel must eliminate significant or unacceptable exposures for all media known to be, or reasonably suspected to be, contaminated with hazardous wastes or hazardous constituents above risk-based levels, for which there are complete pathways between contamination and human receptors.
b. Ensure groundwater can continue to be used for its maximum beneficial uses wherever practical and ensure current and future on-site and off-site receptors are not at risk from exposure to releases from the Facility. AK Steel must monitor the groundwater contamination to ensure that the fluoride and chromium contamination levels do not cause any harm to downgradient receptors. AK Steel must also recover LNAPL to the extent practicable and evaluate the vapor intrusion pathway at existing buildings. Finally, AK Steel must ensure that conditions leading to exposure to contaminated soils at SWMUs 2, 6 and 21 are mitigated.

EPA's long-term goals for the remedy being proposed for final remedy selection are the following:

a. Protect human health and the environment through long-term stewardship of the Site by monitoring the effectiveness of the final remedy.
b. Attain the applicable media (e.g., soil, water, air) cleanup standards in order to protect future users of the Site as well as users of neighboring properties.
c. Control the sources of the releases to the extent practicable so that the expectations in CA725 and CA750 continue to be met.
d. Manage all remediation waste in compliance with applicable standards.

Presented below are the cleanup objectives, or Corrective Action Objectives ("CAOs"), for the affected media on-site and off-site.

Soils
EPA expects final remedies to address soil impacts that exceed relevant risk criteria within a timeframe that is reasonable given the particular circumstances of the project. Facilities must consider all reasonable scenarios in which a person or animal may come into contact with and be adversely impacted by soil contamination and evaluate remedial strategies that address those pathways. The CAO for the protection of human health against soil contamination is preventing exposure to soil contaminated with metals above non-residential Regional Screening Levels ("RSLs") and Ohio Voluntary Action Program ("VAP") Chemical Information Database and Applicable Regulatory Standards ("CIDARS"). The Facility must also prevent exposure to contaminated soil above site-specific risk screening criteria.

Groundwater
EPA expects final remedies to return groundwater to its maximum beneficial use within a timeframe that is reasonable given the particular circumstances of the project. For facilities associated with aquifers that are either currently used for drinking water supply or have the potential to be used for drinking water supply, EPA will require the groundwater be remediated to National Primary Drinking Water Standard MCLs promulgated pursuant to the Safe Drinking Water Act, 42 U.S.C. §§ 300f et seq., and codified at 40 C.F.R. Part 141, or to EPA RSLs for tap water for chemicals for which there are no applicable MCLs.

The CAOs for the protection of human health and the environment for groundwater are as follows:

a. Prevent exposure to groundwater contaminated with fluoride, chromium and TPH above residential and non-residential RSLs, MCLs, and Ohio VAP Risk-Based Drinking Water Standards.
b. Reduction of mass or volume of LNAPL in on-site groundwater using several lines of evidence to determine remedy success.
c. Continue to implement active remedial measures for on-site groundwater contamination to prevent migration of TPH from groundwater into soil gas to indoor air to receptors until cleanup criteria is achieved.
d. Continue implementing the final corrective measures and demonstrate efficient plume contraction and stabilization such that the CAOs are achieved on-site and MCLs are met and maintained at the property line point of compliance with and without active remedial measures.

Indoor Air
EPA expects final remedies to address pathways that pose risks to occupants of buildings that may be impacted by subsurface contamination within a timeframe that is reasonable given the particular circumstances of the project. Facilities must consider all reasonable scenarios in which contaminants may migrate into indoor air and evaluate remedial strategies that address those pathways. The CAOs for the protection of human health for indoor air are monitoring sub-slab soil gas and taking necessary action to ensure LNAPL removal does not create a pathway for indoor air exposure to contaminated groundwater.

Cleanup Timeframes

Short-term and long-term goals have been developed to protect human health and environment while accounting for land use at or near the Facility. The goals at this Facility can be summarized as ensuring groundwater can continue to be used for its maximum beneficial uses wherever practical and ensuring current and future on-site and off-site receptors are not at risk from exposure to releases from the Facility. AK Steel must monitor the groundwater contamination to ensure that the fluoride and chromium contamination levels do not cause any harm to downgradient receptors. AK Steel must also recover LNAPL to the extent practicable and evaluate the vapor intrusion pathway at existing buildings. Finally, AK Steel must ensure that exposure to contaminated soils at SWMUs 2, 6 and 21 are mitigated. The criteria AK Steel will be evaluated against are as follows:

Short Term (Less than 1 year)

a. Minimize direct contact to soils for identified receptors at risk from exposure.
b. Contain existing impacts and continue to meet the criteria for the CA725 determination that human health exposures are under control.
c. Contain existing impacts and continue to meet the criteria for the CA750 determination that migration of contaminated groundwater is under control.

Long Term (1 year or more)

a. Demonstrate that the quality of groundwater impacted by releases from AK Steel is stable or improving.
b. Ensure fluoride and chromium concentrations at the point of exposure, identified as the Zanesville Municipal Wellfield do not exceed the MCLs or RSLs.
c. Groundwater wells must be monitored to confirm CAOs are met.
d. Meet CAOs related to LNAPL impacts in groundwater.

Table 4: Corrective Action Objectives

Environmental Media	Corrective Action Objectives (MCL = maximum contaminant level, TR = carcinogenic target risk)				
	Human Health Residential	Human Health Non-Residential	Ecological Receptors	Cross-media Transfer	Resource Restoration
Groundwater	Fluoride Prevent drinking water exposure above 4 mg/L. Chromium (Total) Prevent drinking water exposure above .1 mg/L Chromium (VI) Prevent drinking water exposure above 3.5E-4 mg/L (10E-5 risk) LNAPL Prevent migration of LNAPL impacts from migrating beyond the existing point-of-compliance	Fluoride Prevent drinking water exposure above 4 mg/L. Chromium (Total) Prevent drinking water exposure above .1 mg/L Chromium (VI) Prevent drinking water exposure above 3.5E-4 mg/L (10E-5 risk) LNAPL Prevent migration of LNAPL impacts from migrating beyond the existing point-of-compliance.	See Surface Water Environmental Media	N/A	Achieve asymptotic volume reduction of LNAPL for six recovery events over a six-month period. Achieve an LNAPL transmissivity goal of .8 ft^2/day at MW-08 and MW-31 where measurement is practicable.
Soil	N/A	Prevent direct exposure to lead at SWMUs 2, 6 and 21 for on-site, pregnant construction workers	N/A	N/A	N/A

Environmental Media	**Corrective Action Objectives** (MCL = maximum contaminant level, TR = carcinogenic target risk)				
	Human Health Residential	Human Health Non-Residential	Ecological Receptors	Cross-media Transfer	Resource Restoration
Surface Water	N/A	N/A	Chromium (Total) Prevent exposure to aquatic receptors from chromium above .011 mg/L.	N/A	N/A
Air (Indoor)	N/A	Prevent exposure in structures located above LNAPL.	N/A	Eliminate the migration of LNAPL vapors into indoor air	N/A
Other	N/A	N/A	Prevent disturbances to any endangered species habitats (Indiana Bat)	N/A	N/A

SECTION VI: PROPOSED FINAL REMEDY AND EVALUATION OF ALTERNATIVES

The proposed final remedy and associated CAOs is designed to protect human health and the environment by mitigating risk to current and potential receptors. AK Steel evaluated remedial options for the Facility, which are detailed in the Corrective Measures Study ("CMS") Report (*RCRA FIRST Corrective Measures Study Report*, July 2019). EPA has threshold and balancing criteria to determine the applicability of each remedial alternative in relation to the specific circumstances of the impacts defined at the Facility.

The three remedial Threshold Criteria are:

1) Whether the remedy protects human health and the environment based on reasonably anticipated land use(s), both now and in the future.
2) Whether the remedy achieves media cleanup objectives appropriate to the assumptions regarding current and reasonably anticipated land use(s), and current and potential beneficial uses of water resources.
3) Whether the remedy controls the sources of releases to achieve elimination or reduction of any further releases of hazardous wastes or hazardous constituents that may threaten human health and the environment.

The seven remedial Balancing Criteria are:

1) Long-term reliability and effectiveness (long-term effectiveness should consider reasonably anticipated future land uses)
2) Reduction of toxicity, mobility, and volume of waste
3) Short-term effectiveness
4) Implementability (technical feasibility and availability of services and materials)
5) Cost
6) Community acceptance of remedy
7) State/support agency acceptance

Summary of Alternatives

The CMS included several alternatives that were considered as part of remedy selection. Below is a summary of each Alternative:

- Alternative 1: Land Use Restrictions
  Land use restrictions are common legal mechanisms put in place to ensure that reasonably anticipated future uses remain applicable and that future uses do not pose an increased risk to human health or the environment if contamination remains at the facility. A Restrictive Covenant would be recorded on the deeds of the Facility to limit land use to industrial uses, require soil management restrictions by requiring the Facility owner to manage Facility soils, media and/or debris in accordance with state and federal regulations, maintain any existing caps, and manage any potential Facility-wide vapor intrusion. Facility owners would be required to practice due care to ensure that any remaining contamination is not exacerbated by activities at the Facility, such as the existing site-wide excavation policy. This alternative would be needed as a follow up to other, active remedies.

- Alternative 2: Groundwater Use Restrictions
  A Restrictive Covenant would be recorded on the deed of the Facility prohibiting the construction of wells to extract groundwater for any use other than for the purposes of remediation and investigation of subsurface contaminants associated with a release of hazardous constituents into the environment. The Restrictive Covenant would permit short-term dewatering for construction purposes so long as the work performed does not result in a new release or exacerbate any existing contamination. This alternative would be needed as a follow-up and in addition to other, active groundwater remedies.

- Alternative 3: LNAPL Source Recovery
  Mass or volume reduction via physical removal is a common approach to LNAPL remediation, especially at facilities where treating the source directly is not as practical. Of the different types of pumps evaluated, it was determined that a peristaltic pump would be effective and easy to implement and would achieve the stated objectives. Several metrics to evaluate the performance of the remedy were established, and decision endpoints were selected based on those metrics. LNAPL removal with a peristaltic pump would continue until one or more of the metrics are achieved, at which point an absorbent sock will be used to supplement additional LNAPL removal. Waste generated, including the removed LNAPL and absorbent socks, will be recycled or disposed of in accordance with applicable local, state or federal regulations.

- Alternative 4: Groundwater Containment
  A contingency plan was established in the event that fluoride, chromium or hexavalent chromium concentrations in groundwater exceed the levels in Table 4. This contingency plan includes confirmation sampling, additional monitoring well installation and containment well installation to pump groundwater and prevent further migration off-site.

- Alternative 5: Monitored Stability
  Monitored stability would evaluate groundwater trends in an effort to verify that concentrations of contaminants in groundwater remain stable. This Alternative would be a continuation of the existing Facility-wide groundwater monitoring frequency and schedule. Recommendations will be made for subsequent monitoring needs based on results from each monitoring event and will be evaluated against the performance of other selected Alternatives.

- Alternative 6: Bioaugmentation/Biostimulation
  Drilling either vertically or horizontally for the purposes of in-situ treatment was evaluated as a potential Alternative for hexavalent chromium in groundwater. One or more injection wells would be installed and screened in the perceived source areas to promote conditions that would better facilitate transformation of hexavalent chromium into the less toxic trivalent oxidation state.

- Alternative 7: In-situ Chemical Treatment of Fluoride in Groundwater
  This Alternative includes the treatment of fluoride in groundwater by precipitating out cations and anions from groundwater for absorption by an additional reagent. The process would involve adjusting the pH in groundwater to more basic levels (pH > 7) and precipitated fluoride would then be removed from the system. Compounds consisting of Bauxsol, calcium polysulfide, and slaked lime were all considered as possible treatment options.

- Alternative 8: Excavation
  Excavation is considered for the fluoride, chromium and hexavalent chromium source areas. Excavation will remove the vadose zone and source areas, including any source soils entirely, and backfilling with clean soil will follow. The source areas are located partially beneath existing structures, limiting the available excavation footprint.

- Alternative 9: In-situ Chemical Treatment of Fluoride in Soil
  Vadose zone soils would be targeted for in-situ treatment by flushing reductants through impacted soils to reduce the leachability of fluoride. The procedure would include raising the pH of the system followed by techniques to immobilize fluoride to reduce the concentrations in downgradient wells. The procedure would require multiple injections, while avoiding unintended byproducts production from the reductants coming into contact with acidic subsurface environments. Compounds consisting of Bauxsol, calcium polysulfide, slaked lime and sodium hydroxide were all considered as possible treatment options.

The proposed remedy must be reviewed against the remedy selection criteria, noting how it compares to the other options under consideration. A combination of Alternatives 1, 2, 3, 4 and 5 provide the most effective remedy to protect human health and the environment and the Facility and surrounding community when the threshold criteria and balancing criteria are considered. The remedy selection criteria are as follows:

- Overall Protection:
  The selected remedies all directly contribute to the protection of human health and environment. By implementation of the selected remedy, the toxicity and volume of contaminated soil and groundwater left in place will be contained or reduced further by Alternatives 3 and 4. The closest point of exposure to contaminated groundwater is at the Zanesville Municipal Wellfield, and continued monitoring will demonstrate whether the metrics in Table 4 are met. Alternatives 1 and 2 will prevent potential unacceptable exposure of workers to contaminated soil and groundwater left in place, and Alternative 5 will ensure CAOs are being met. Appropriate worker safety and health requirements for the proper handling of hazardous materials during remedial activities also will be required. Ecological risks are considered to be de minimis based on results from the BERA.

- Attainment of Media Cleanup Standards:
  The cleanup standards at the Facility are performance-based, given the lack of complete exposure pathways under current use. The fluoride, chromium and hexavalent chromium impacts appear stable, and the compliance wells continue to demonstrate that off-site exposure point receptors are not at risk. Alternative 3 will reduce the mass and volume of LNAPL in groundwater to the extent that is technologically practicable, therefore reducing the amount of contamination in groundwater that poses risks associated with current and future uses of the Facility. Compliance with applicable groundwater protection standards would be addressed by monitoring the existing wells to determine the remedial alternatives' efficacy. AK Steel will include a groundwater monitoring plan to assess the compliance with the groundwater standards for all identified contaminants and will continuously reevaluate the regional conditions to ensure the results of the fate-and-transport modelling are applicable.

  Alternatives 6, 7 and 9 pose complications due to the nature and extent of contamination, and also to access restrictions. Alternative 6 poses risks associated with containing existing contamination. Bench-scale studies were performed for Alternatives 7 and 9, and while the results were favorable, unintended and counterproductive consequences could follow, such hydrogen sulfide gas production, or the release, through flushing, of more untreated fluoride into groundwater than is currently occurring.

- Controlling the Sources of Releases:
  Alternative 3 will address the sources that contribute to groundwater contamination. Institutional controls and monitoring alone would not control the leaching or migration of contaminants through less-contaminated soils and groundwater, and bench-scale tests demonstrated that other available remedial approaches may exacerbate the groundwater and soil impacts, and would be difficult to control. Alternative 5 would monitor the

current conditions from sources left in place to ensure they remain stable, and Alternative 4 is in place as a contingency in the event exceedances at the compliance wells indicate risks remain at the point of exposure.

- Long-term Reliability and Effectiveness:
  AK Steel has been monitoring groundwater contamination for over 20 years, and no adverse impacts have been discovered beyond what has been discussed in the Final Report. All Alternatives would be successful in meeting this criterion. Limiting future groundwater use, land use, and implementing contingency alternatives will ensure that pathways that contribute to any future exposures are mitigated. Additionally, removal of contaminants from the Facility through the implementation of Alternative 3 will provide reliable long-term cleanup at the Facility.

- Reduction of Toxicity, Mobility, or Volume of Wastes:
  Alternatives 3 and 8 would be expected to result in reductions of toxicity, mobility with the reduction of volume of LNAPL and fluoride at the Facility. Fluoride is expected to attenuate without risk to exposure point receptors, and chromium impacts have only been intermittently detected in recent monitoring events. Bench scale studies for Alternatives 6, 7 and 9 for in-situ demonstrated the possibility of exacerbating the extent of groundwater contamination.

- Short-term Effectiveness:
  Given the nature and extent of contamination in its current state, Alternatives 1, 2, 5 and 8 are expected to meet this criterion. Land use restrictions would be executed shortly after the issuance of the Final Decision and Response to Comments. Excavation would quickly remove contamination, although construction may pose complications. Other Alternatives that are dependent on how subsurface contaminants respond to the active measures cannot be guaranteed to meet CAOs in a short-term time period.

- Implementability:
  There may be local and state requirements regarding the format of the required deed restriction or other institutional controls. Alternative 5 is a continuation of the existing groundwater monitoring schedule and no significant issues have occurred to date, therefore there is no expectation of issues. If needed, processes and procedures to implement Alternative 4 can be carried over from existing Facility activities. Alternative 3 does not require extensive work to implement, and minimal disturbance of daily Facility activities is expected. Other remedies, especially Alternative 8, would likely have resulted in significantly disturbing existing Facility features or would have required extensive construction or maintenance.

- Community Acceptance
  Other than the adjoining Superfund site, the surrounding community is currently not impacted by contamination at or from the Facility. AK Steel is also not located in an Environmental Justice ("EJ") area. None of the Alternatives were expected to affect the day-to-day lives of community members. The selected Alternatives are expected to restore the Facility to its maximum beneficial use in a manner that is not intrusive or invasive to the surrounding community.

- State Acceptance
  Alternatives 1 through 5 and Alternative 8 are frequently used at contaminated facilities across the State of Ohio at some capacity. Contamination is also frequently left in place when there is no risk of exposure and remedial options are deemed to be impractical. Alternatives 3 and 4 will ensure that selected remedies continue to be protective and any remaining contamination will not pose unacceptable risk. Alternatives 6, 7 and 9 may be accepted, although the technical complications the pose, as discussed above, render them less favorable.

- Cost
  Costs were estimated for each alternative and are based on assumptions that varied in complexity depending on how heavily each Alternative was considered. When Alternatives were equally acceptable as evaluated against the other balancing criteria, costs were considered in greater detail when deciding between corrective measure alternatives. For example, Alternative 6, 7 and 9 were considered as possibilities and were carried over into the cost estimate accordingly, but when other criteria were considered, these Alternatives were not evaluated in greater detail. Costs for Alternative 8 were not estimated at all after considering the significant barriers associated with excavating the source areas.

Table 5: Cost Comparison of Effective Active Remedy Alternatives

Corrective Measures Alternatives	Cost
Alternative 1: Land Use Restrictions	$ 50,000.00
Alternative 2: Groundwater Use Restriction	$ 50,000.00
Alternative 3: LNAPL Recovery	$ 91,800.00
Alternative 4: Groundwater Contingency	$ 3,050,300.00
Alternative 5: Monitored Stability	$ 607,900.00
Alternatives 6, 7 or 9: Source Zone Treatment	$ 1,481,000.00

Proposed Final Remedy

After evaluating the Alternatives with reference to the Threshold and Balancing Criteria, EPA determines that a remedy comprised of Alternatives 1-5 will best address the risks to human health and the environment presented at the Facility. The active measures are intended to remove groundwater contamination to the extent possible in order to achieve the CAOs. Where contamination cannot be remediated, institutional controls will be used to protect existing Facility workers and visitors, as well as off-site areas. Finally, data collected from routine groundwater monitoring will be used to evaluate the protectiveness of the active measures and institutional controls. In the unlikely event a contingency action is needed to prevent exposure, AK Steel will take actions outlined in the CMS.

<u>Soil Remedy Alternative</u>

a. Alternative 1: Land use restrictions would restrict land use within the existing fenced portion to industrial and non-residential uses to address any contamination above the risk criteria range of 10^{-5} left onsite. Furthermore, AK Steel must develop a health and safety plan to assure that construction workers use appropriate personal protective equipment when disturbing deeper soils at SWMUs 2, 6 and 21 that remain contaminated. Finally,

this Alternative includes soil management restrictions at those SWMUs that require the Facility owner to manage Facility soils, media and/or debris in accordance with state and federal regulations, maintain any existing caps, and manage any potential Facility-wide vapor intrusion.

Groundwater Remedy Alternative

a. Alternative 2: Groundwater use restrictions within the fenced portion of the Facility would prohibit the construction of wells to extract groundwater for any use other than for the purposes of remediation and investigation of subsurface contaminants associated with a release of hazardous constituents into the environment. City of Zanesville ordinances also require City approval prior to the installation of any groundwater wells.
b. Alternative 3: LNAPL source recovery to reduce the volume of LNAPL free-product beneath the western portion of the main building to reduce risks of potential exposure pathways for current and reasonably anticipated future uses or eliminate the pathways altogether.
c. Alternative 4: Groundwater containment to address fluoride and chromium impacts along the northern portion of the Facility from SWMUs 1 and 3 would be an active contingency plan that would be implemented in the event future groundwater monitoring events reveal higher than anticipated concentrations of fluoride, chromium or hexavalent chromium at the compliance wells in Table 4.
d. Alternative 5: Monitored stability that would evaluate site-wide groundwater trends in an effort to verify that concentrations of contaminants in groundwater remains stable or are decreasing. This Alternative would also ensure that identified exposure point receptors would not be at risk from any contamination that is left in place at the Facility. AK Steel will also be required to perform at least one 5-year review to ensure the remedy continues to be protective and CAOs are being met.

Institutional Controls

Institutional Control ("IC") remedies restrict land or resource use at a facility through legal instruments. ICs are distinct from engineered or construction remedies. ICs preclude or minimize exposures to contamination or protect the integrity of a remedy by limiting land or resource use through means such as rules, regulations, building permit requirements, well-drilling prohibitions and other types of ordinances. For an IC to become part of a remedy, there must be binding documentation such as land-use restrictions in the environmental covenant, local zoning restrictions, or rules restricting private wells. At AK Steel, Alternatives 1 and 2 will be implemented within the fenced portion of the facility with an environmental covenant which will restrict the use of groundwater and require safety precautions in the event contaminated soil in the subsurface is disturbed.

Financial Assurance

AK Steel must demonstrate a financial ability to complete corrective action, including constructing the proposed remedy and monitoring site conditions following remedy construction, as needed, by securing an appropriate financial instrument, consistent with the requirements of 40 C.F.R §§ 264.142 and 264.144. AK Steel will develop a detailed cost-estimate as part of the Corrective Measures Implementation Work Plan. AK Steel may use any of the following financial mechanisms to make the demonstration: financial trust, surety bonds, letters of credit, insurance, and/or qualification as a self-insurer (corporate guaranty) by means of a financial test.

After successfully completing the construction phase of the remedy, AK Steel may request that EPA reduce the amount of the financial assurance to the amount necessary to cover the remaining costs of the remedy, including any yearly operation and maintenance costs. AK Steel may make similar requests of EPA as the operation and maintenance phase of the remedies proceeds and ceases.

Long Term Care

AK Steel must ensure all controls and long-term remedies are maintained and operate as intended. AK Steel will submit an annual certification that all controls are in place and remain effective. In addition, long term remedies will be reviewed and inspected on a five-year basis to ensure the remedy is functioning as intended; the exposure assumptions, toxicity data, cleanup levels, and CAOs are still valid; and any information that comes to light that could call into question the protectiveness of the remedy is considered.

SECTION VII: PUBLIC PARTICIPATION AND INFORMATION REPOSITORY

EPA requests feedback from the community on the proposal to select the Alternatives described above as the final remedy for the AK Steel - Zanesville Works Facility. On March 25, 2021, EPA placed an announcement in the Zanesville Times Recorder, (https://www.zanesvilletimesrecorder.com), to notify the public of the availability of this Statement of Basis document, its supporting Administrative Record, and the opportunity to request a public meeting, either in-person or virtually, on EPA's proposed corrective action for the Site. The public comment period will last thirty (30) calendar days from the date of the public notification in the local newspaper, from March 25, 2021 to April 23, 2021. We encourage community members to submit any comments regarding the proposed remedy in writing by April 23, 2021. If requested during the public comment period, EPA will also host a public meeting in [location] to receive feedback directly. Send comments to EPA in writing at the EPA mailing address or the email address listed below. To submit comments or to request a public meeting, contact EPA Project Manager Brandon Pursel (see contact information below).

Following the 30-day public comment period, EPA will prepare a *Final Decision and Response to Comments* document that will identify the selected remedy for the Facility. The document will address all significant written comments and any significant oral comments generated at a public meeting, if a meeting is held. EPA will make the *Final Decision and Response to Comments* document available to the public. If such comments or other relevant information would cause EPA to propose significant changes to the currently proposed remedy, EPA will seek additional public comments on any proposed revised remedy.

At the conclusion of the comment period, EPA will summarize public comments and prepare the *Final Decision and Response to Comments* document, which will become part of the EPA Site Record. To send written comments or obtain further information, contact:

Brandon Pursel
U.S. EPA Region 5
77 W. Jackson Blvd. (M/C LR-16J)
Chicago, IL 60604
Ph: (312)-353-9229
E-mail: pursel.brandon@epa.gov

The Site Record contains all information considered when making this proposal. The Site Record (documents about the Site) may be reviewed at these locations (please call for hours):

John McIntire Library
220 North Fifth Street
Zanesville, Ohio 43701

Monday-Thursday	Friday & Saturday	Sunday
9:30 a.m. to 8:00 p.m.	9:30 am to 6:00 pm.	1:00 p.m. - 5:00 p.m.

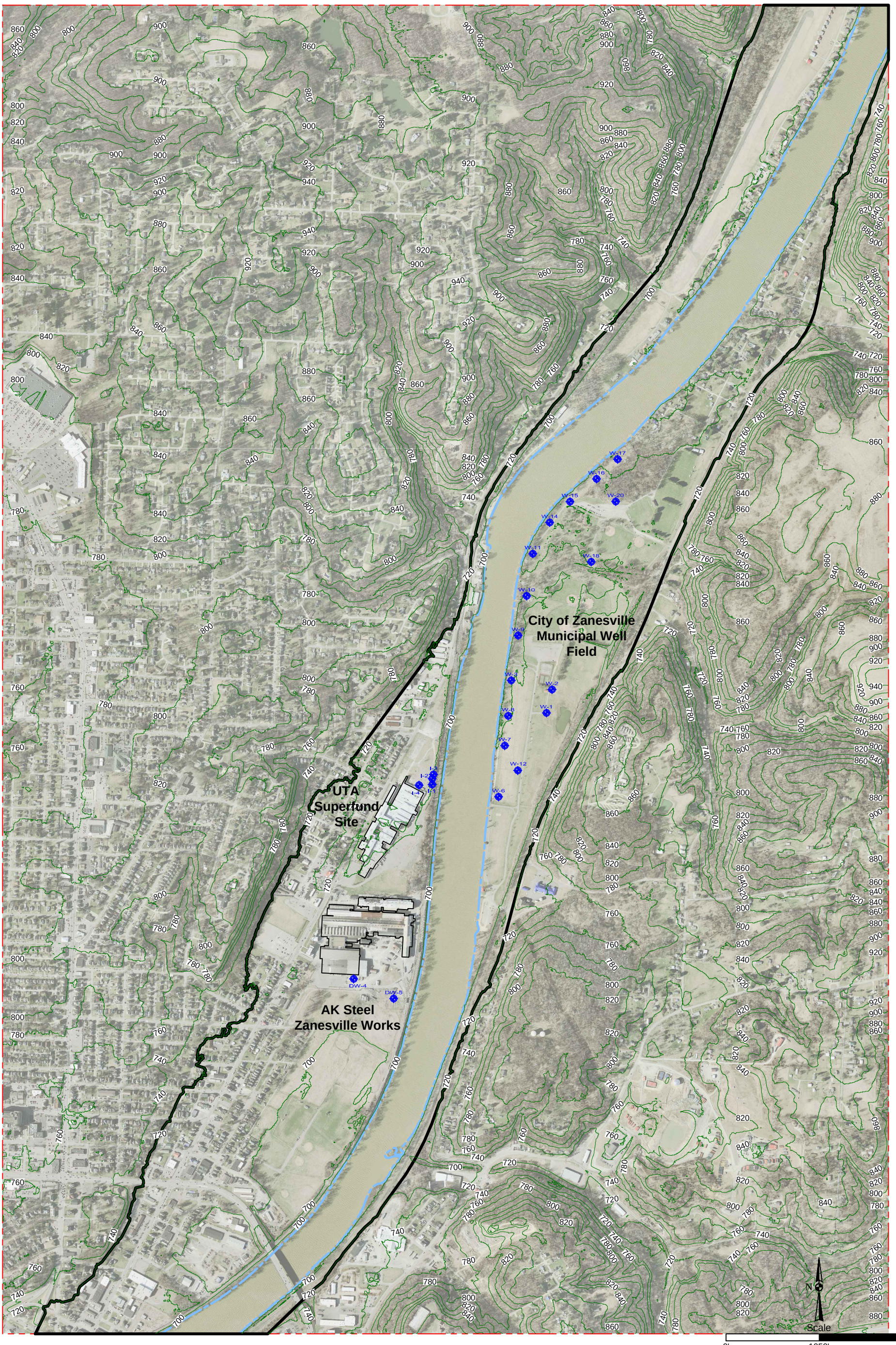
U.S. EPA, Region 5
Land, Chemicals and Redevelopment Division Records Center
77 West Jackson Boulevard, 7th Floor
Chicago, Illinois 60604
(312) 353-5821
Mon-Fri, 8:30 a.m. - 5:00 p.m.

Next Steps

Following issuance of the *Final Decision and Response to Comments* document, AK Steel will prepare a Corrective Measures Work Plan. The Plan will identify any additional data collection needed to implement the corrective measures, along with the specifications for completing the selected corrective measures. The Plan will provide a detailed construction schedule. Based on the proposed corrective measures, EPA anticipates that the majority of the remedial measures can be completed within one year of the Final Decision.

Attachment 1

Figures



Legend

- Groundwater Flow and Contaminant Transport Model Grid
- Muskingum River Valley Aquifer
- Muskingum River Boundary
- Production Well
- Surface Topography Contour (ft amsl)

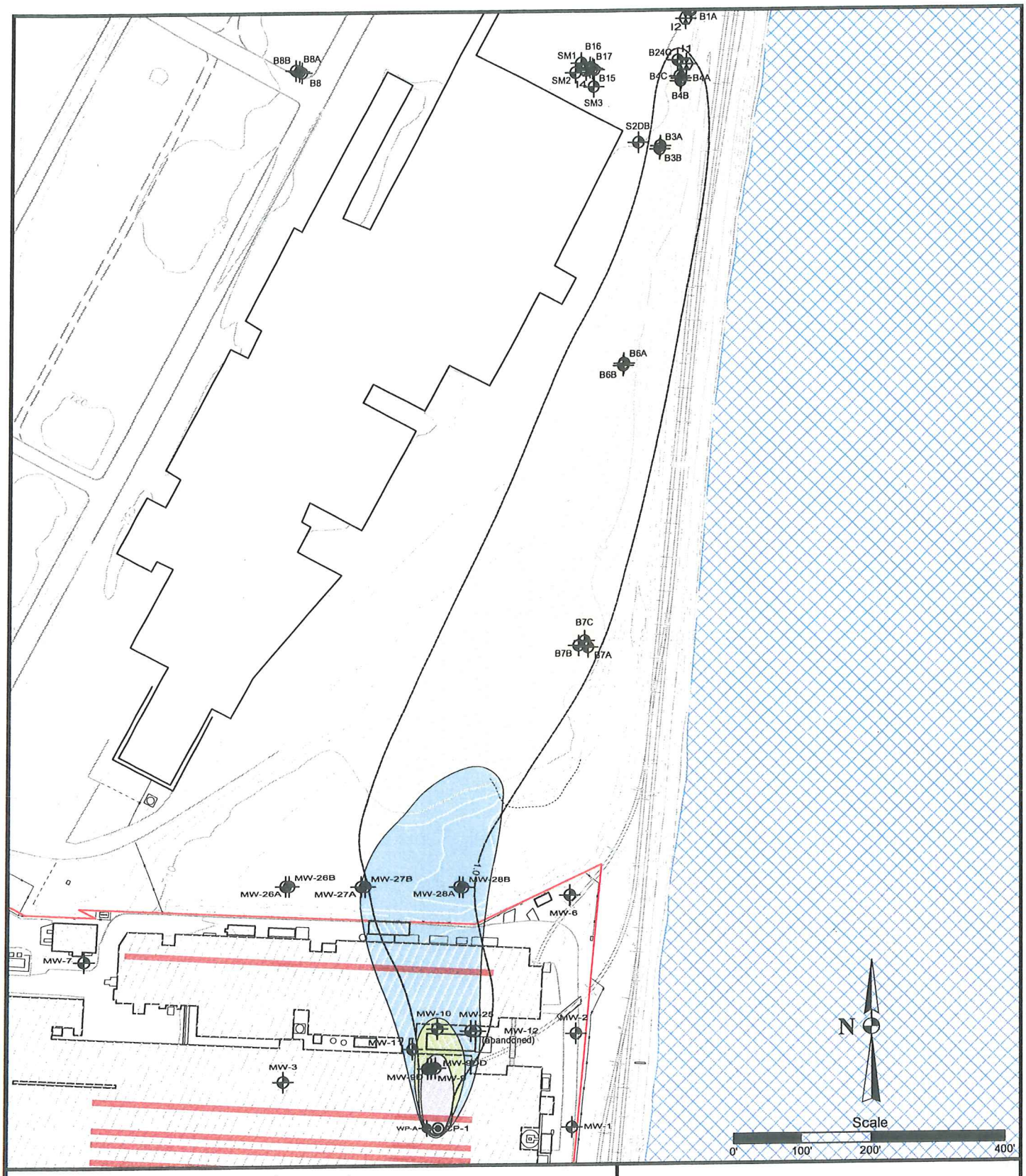
Source of Aerial Photograph: OGRIP, 2014.

Surface Topography of the Muskingum River Valley, AK Steel Corporation - Zanesville Works, Zanesville, Ohio

Cox-Colvin & Associates, Inc. Environmental Services

Figure 2-1

DWG NAME: Model Groundwater Flow
DATE: 12/15/2017



Legend

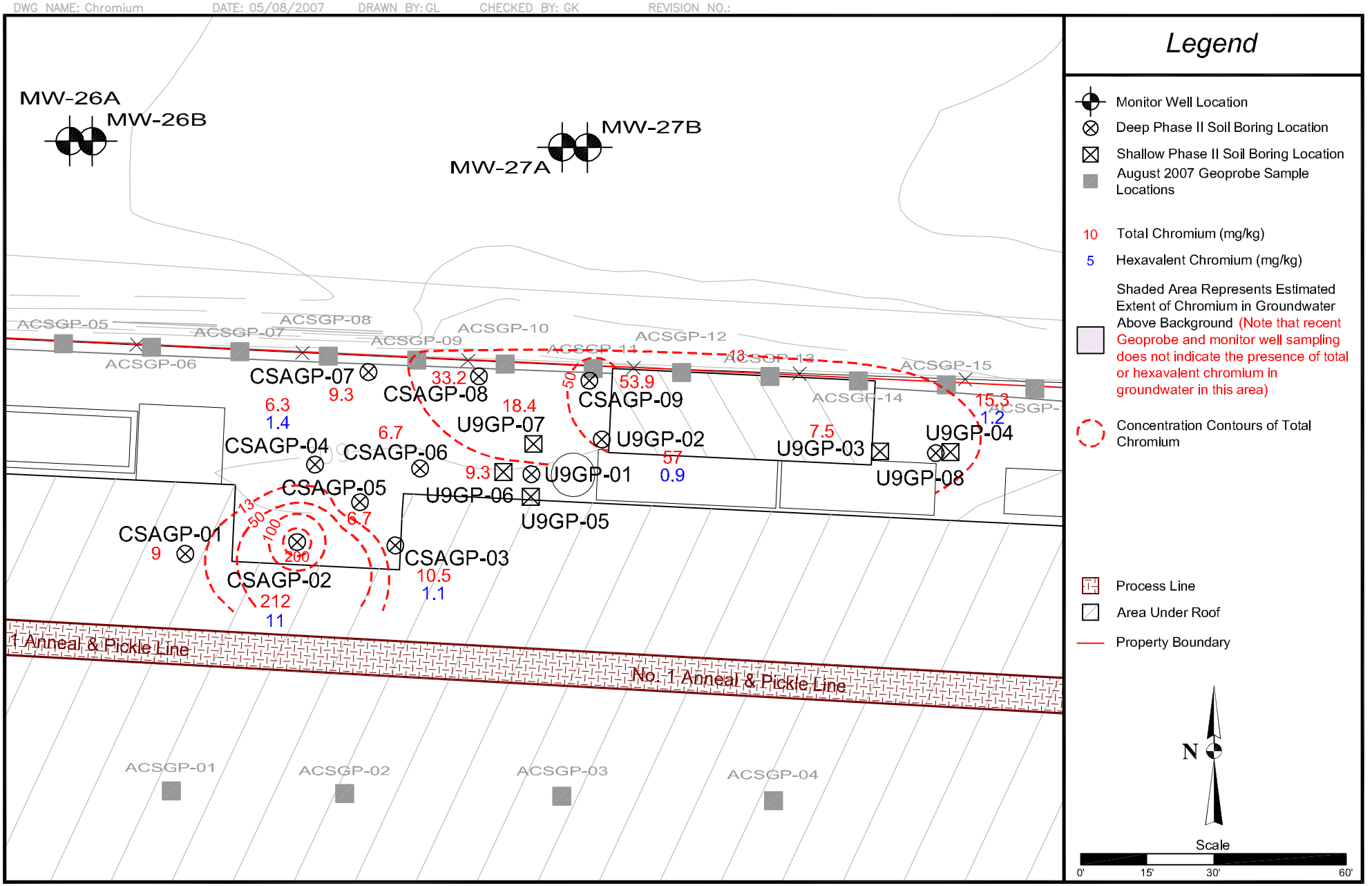
- DW-2 — Production Well
- MW-1 — Aquifer Monitor Well
- MW-12 — Perched Zone Monitor Well
- CP-1 — Recovery Well
- I1 — Treatment Well
- Property Line
- 710 — Ground Surface Elevation Contour
- Calcium Above Background
- Magnesium & Nickel Above Background
- Sulfate Above Background
- Fluoride Above Background

Cox-Colvin & ASSOCIATES, INC.
ENVIRONMENTAL SERVICES

Figure 5-22

Primary Constituents in the Groundwater Plume
Originating at SWMU 1,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

DWG NAME: Chromium DATE: 05/08/2007 DRAWN BY: GL CHECKED BY: GK REVISION NO.:



Legend

- Monitor Well Location
- Deep Phase II Soil Boring Location
- Shallow Phase II Soil Boring Location
- August 2007 Geoprobe Sample Locations
- 10 Total Chromium (mg/kg)
- 5 Hexavalent Chromium (mg/kg)
- Shaded Area Represents Estimated Extent of Chromium in Groundwater Above Background (Note that recent Geoprobe and monitor well sampling does not indicate the presence of total or hexavalent chromium in groundwater in this area)
- Concentration Contours of Total Chromium
- Process Line
- Area Under Roof
- Property Boundary

N

Scale

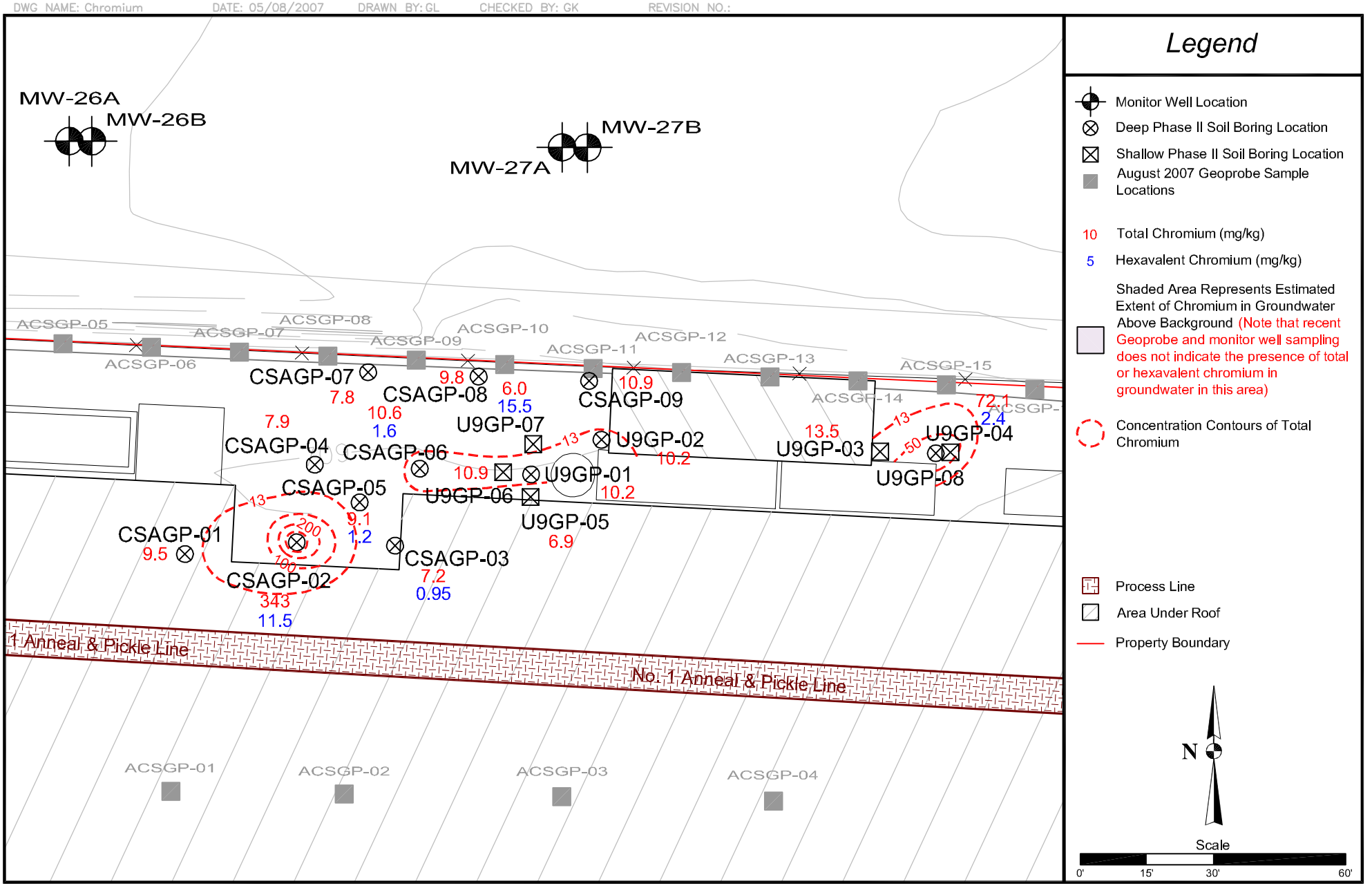
0' 15' 30' 60'

Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

Total and Hexavalent Chromium Detected in Soil at the 0 to 2 ft Depth Interval,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure
5-25

DWG NAME: Chromium DATE: 05/08/2007 DRAWN BY: GL CHECKED BY: GK REVISION NO.:



Legend

- Monitor Well Location
- Deep Phase II Soil Boring Location
- Shallow Phase II Soil Boring Location
- August 2007 Geoprobe Sample Locations
- 10 Total Chromium (mg/kg)
- 5 Hexavalent Chromium (mg/kg)
- Shaded Area Represents Estimated Extent of Chromium in Groundwater Above Background (Note that recent Geoprobe and monitor well sampling does not indicate the presence of total or hexavalent chromium in groundwater in this area)
- Concentration Contours of Total Chromium
- Process Line
- Area Under Roof
- Property Boundary

N

Scale

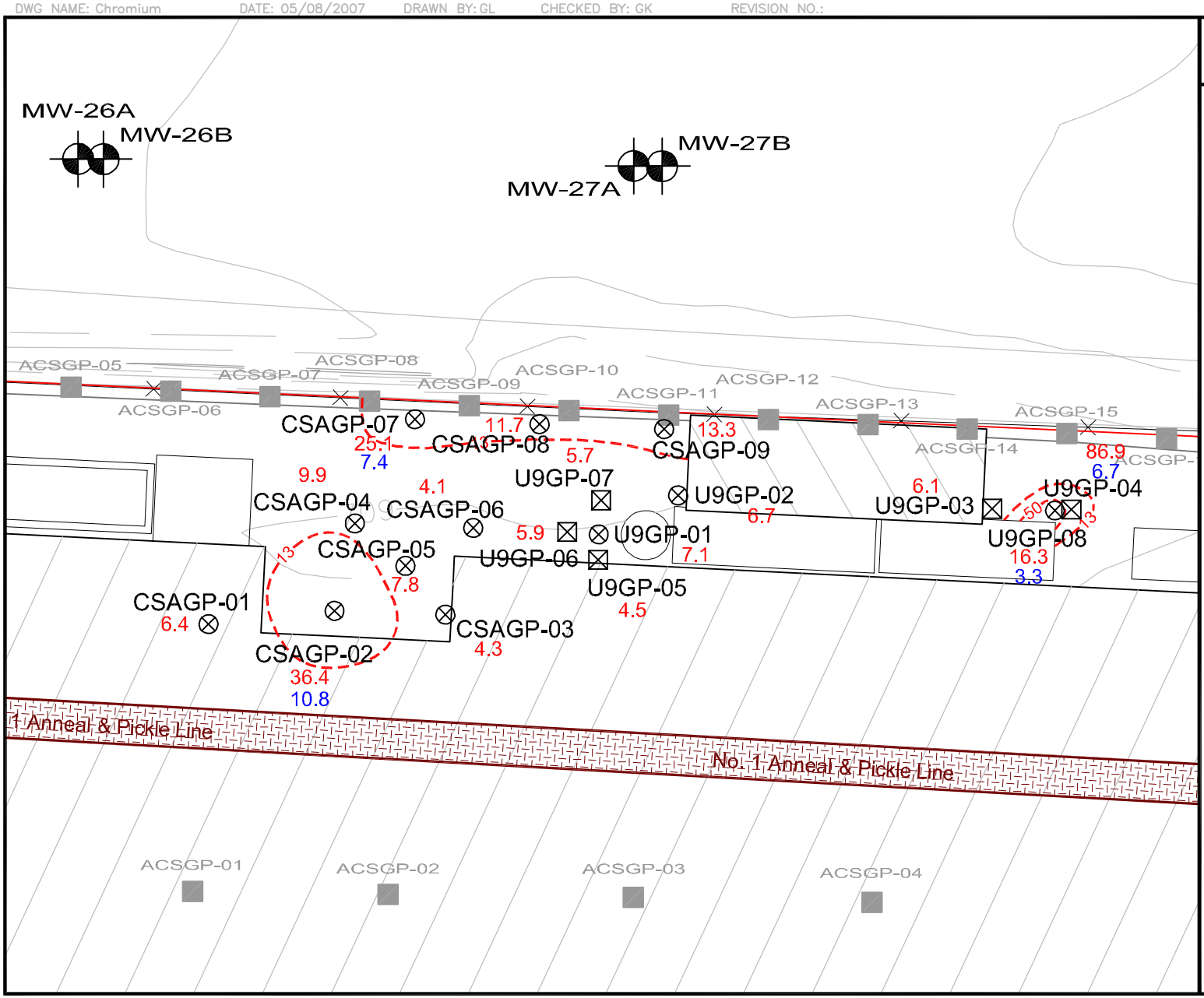
0' 15' 30' 60'

Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

Total and Hexavalent Chromium Detected in Soil at the 2 to 5 ft Depth Interval,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure
5-26

DWG NAME: Chromium DATE: 05/08/2007 DRAWN BY: GL CHECKED BY: GK REVISION NO.:



Legend

- Monitor Well Location
- Deep Phase II Soil Boring Location
- Shallow Phase II Soil Boring Location
- August 2007 Geoprobe Sample Locations
- 10 Total Chromium (mg/kg)
- 5 Hexavalent Chromium (mg/kg)
- Shaded Area Represents Estimated Extent of Chromium in Groundwater Above Background (Note that recent Geoprobe and monitor well sampling does not indicate the presence of total or hexavalent chromium in groundwater in this area)
- Concentration Contours of Total Chromium
- Process Line
- Area Under Roof
- Property Boundary

N

Scale

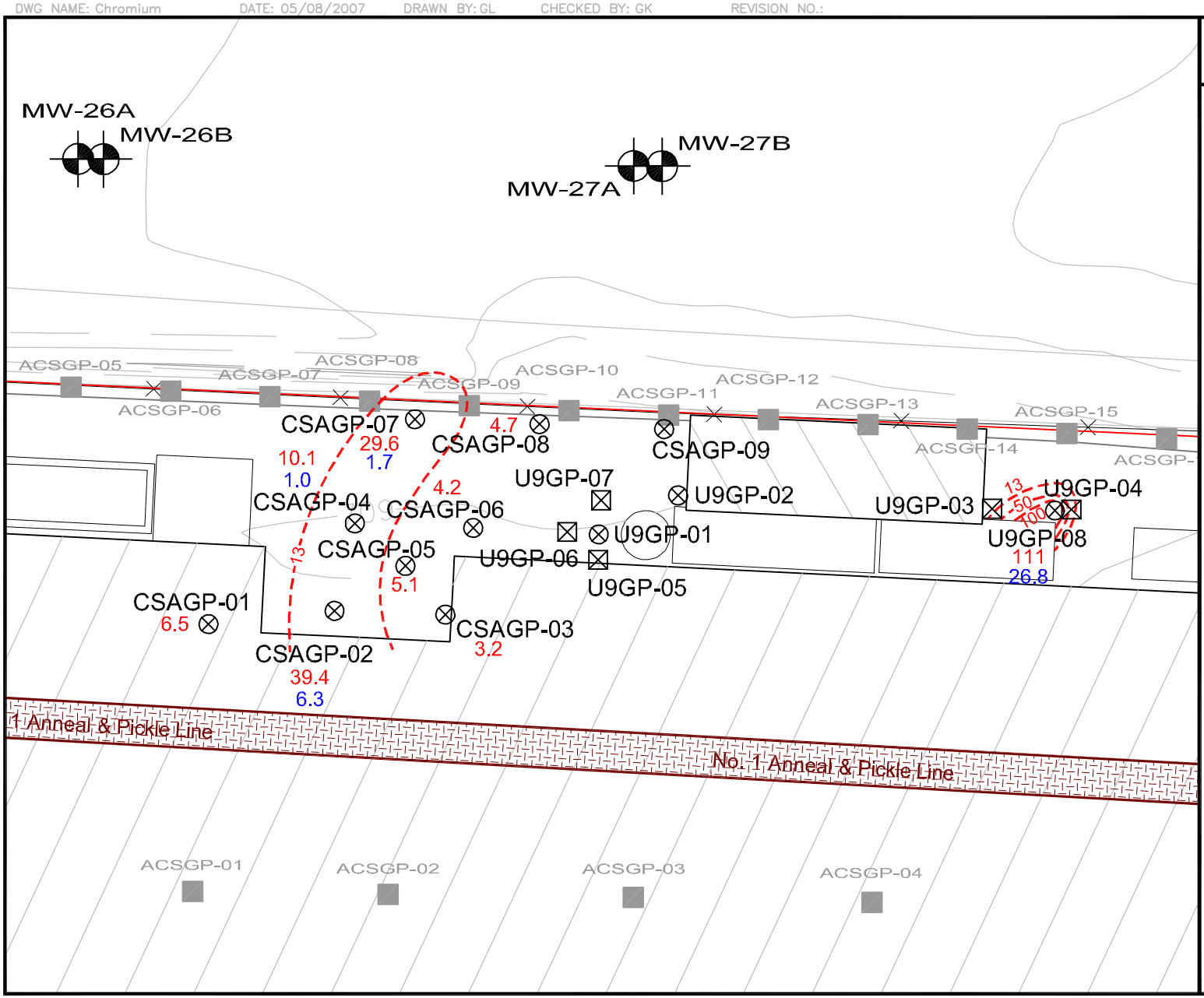
0' 15' 30' 60'

Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

Total and Hexavalent Chromium Detected in Soil at the 8 to 10 ft Depth Interval,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure
5-27

DWG NAME: Chromium DATE: 05/08/2007 DRAWN BY: GL CHECKED BY: GK REVISION NO.:



Legend

- Monitor Well Location
- Deep Phase II Soil Boring Location
- Shallow Phase II Soil Boring Location
- August 2007 Geoprobe Sample Locations
- 10 Total Chromium (mg/kg)
- 5 Hexavalent Chromium (mg/kg)
- Shaded Area Represents Estimated Extent of Chromium in Groundwater Above Background (Note that recent Geoprobe and monitor well sampling does not indicate the presence of total or hexavalent chromium in groundwater in this area)
- Concentration Contours of Total Chromium
- Process Line
- Area Under Roof
- Property Boundary

N

Scale

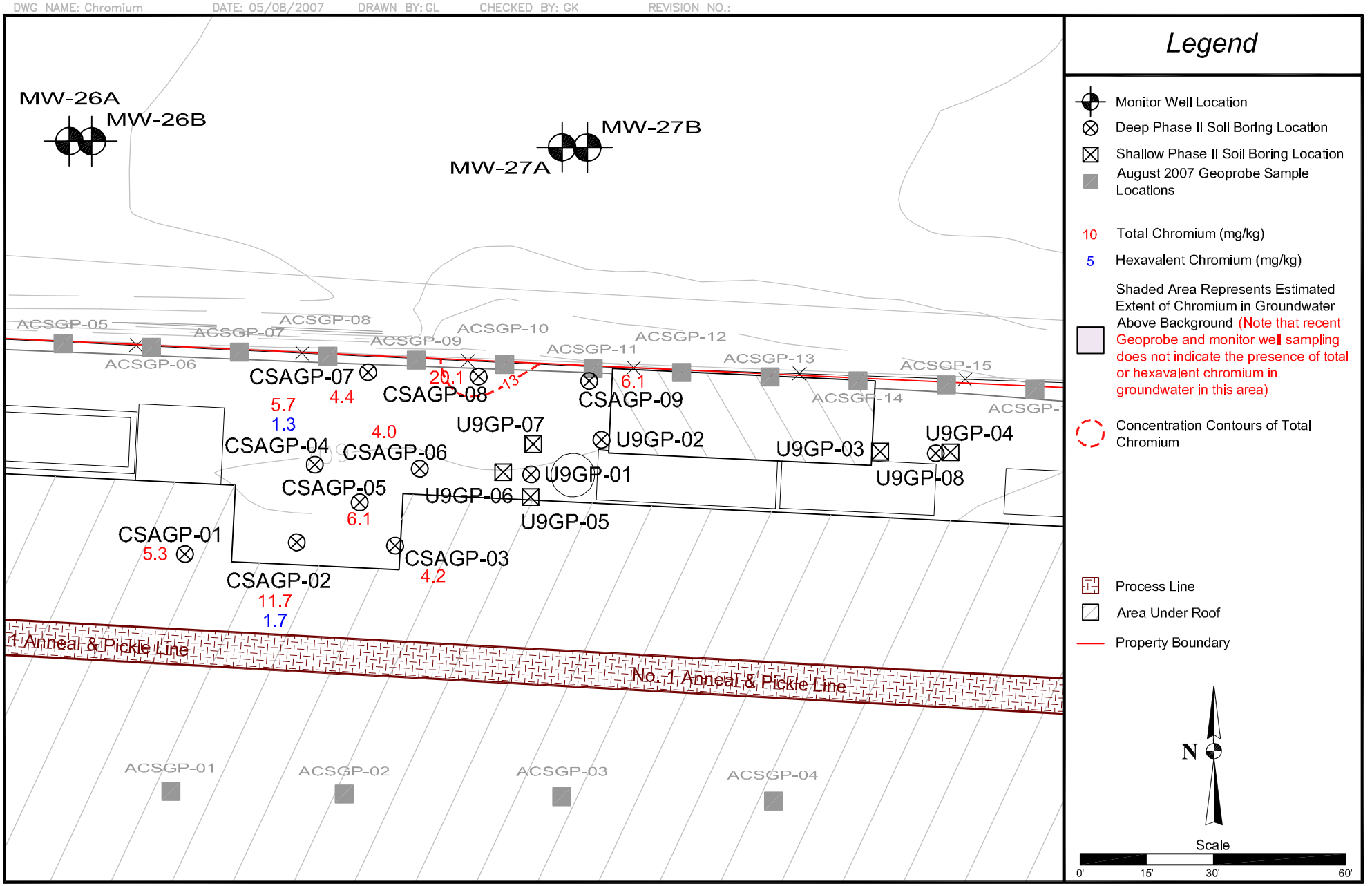
0' 15' 30' 60'

Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

Total and Hexavalent Chromium Detected in Soil at the 13 to 15 ft Depth Interval,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure
5-28

DWG NAME: Chromium DATE: 05/08/2007 DRAWN BY: GL CHECKED BY: GK REVISION NO.:



Legend

- Monitor Well Location
- Deep Phase II Soil Boring Location
- Shallow Phase II Soil Boring Location
- August 2007 Geoprobe Sample Locations
- 10 Total Chromium (mg/kg)
- 5 Hexavalent Chromium (mg/kg)
- Shaded Area Represents Estimated Extent of Chromium in Groundwater Above Background (Note that recent Geoprobe and monitor well sampling does not indicate the presence of total or hexavalent chromium in groundwater in this area)
- Concentration Contours of Total Chromium
- Process Line
- Area Under Roof
- Property Boundary

N

Scale

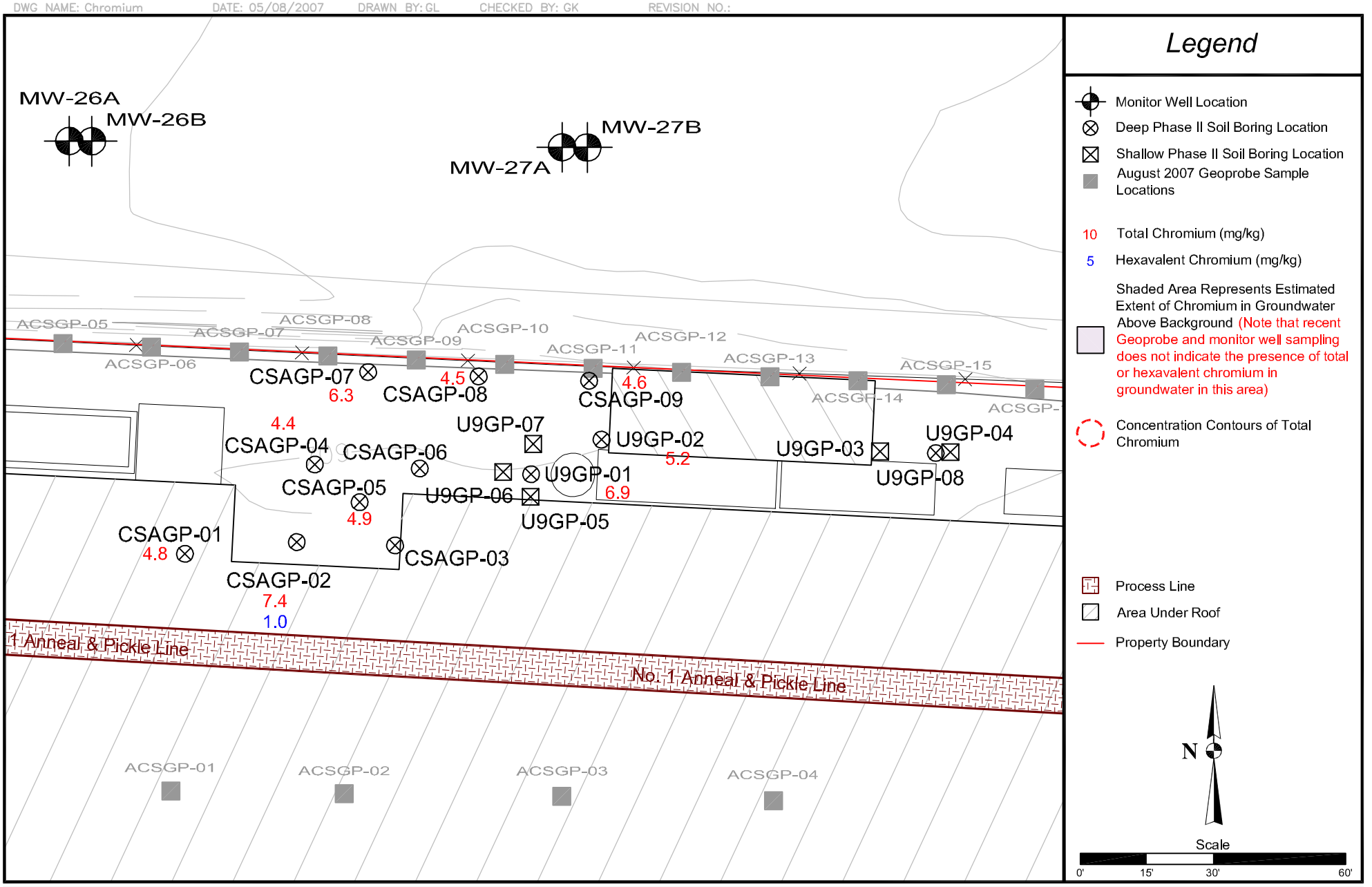
0' 15' 30' 60'

Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

Total and Hexavalent Chromium Detected in Soil at the 20 to 23 ft Depth Interval,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure
5-29

DWG NAME: Chromium DATE: 05/08/2007 DRAWN BY: GL CHECKED BY: GK REVISION NO.:



Legend

- Monitor Well Location
- Deep Phase II Soil Boring Location
- Shallow Phase II Soil Boring Location
- August 2007 Geoprobe Sample Locations
- 10 Total Chromium (mg/kg)
- 5 Hexavalent Chromium (mg/kg)
- Shaded Area Represents Estimated Extent of Chromium in Groundwater Above Background (Note that recent Geoprobe and monitor well sampling does not indicate the presence of total or hexavalent chromium in groundwater in this area)
- Concentration Contours of Total Chromium
- Process Line
- Area Under Roof
- Property Boundary

N

Scale

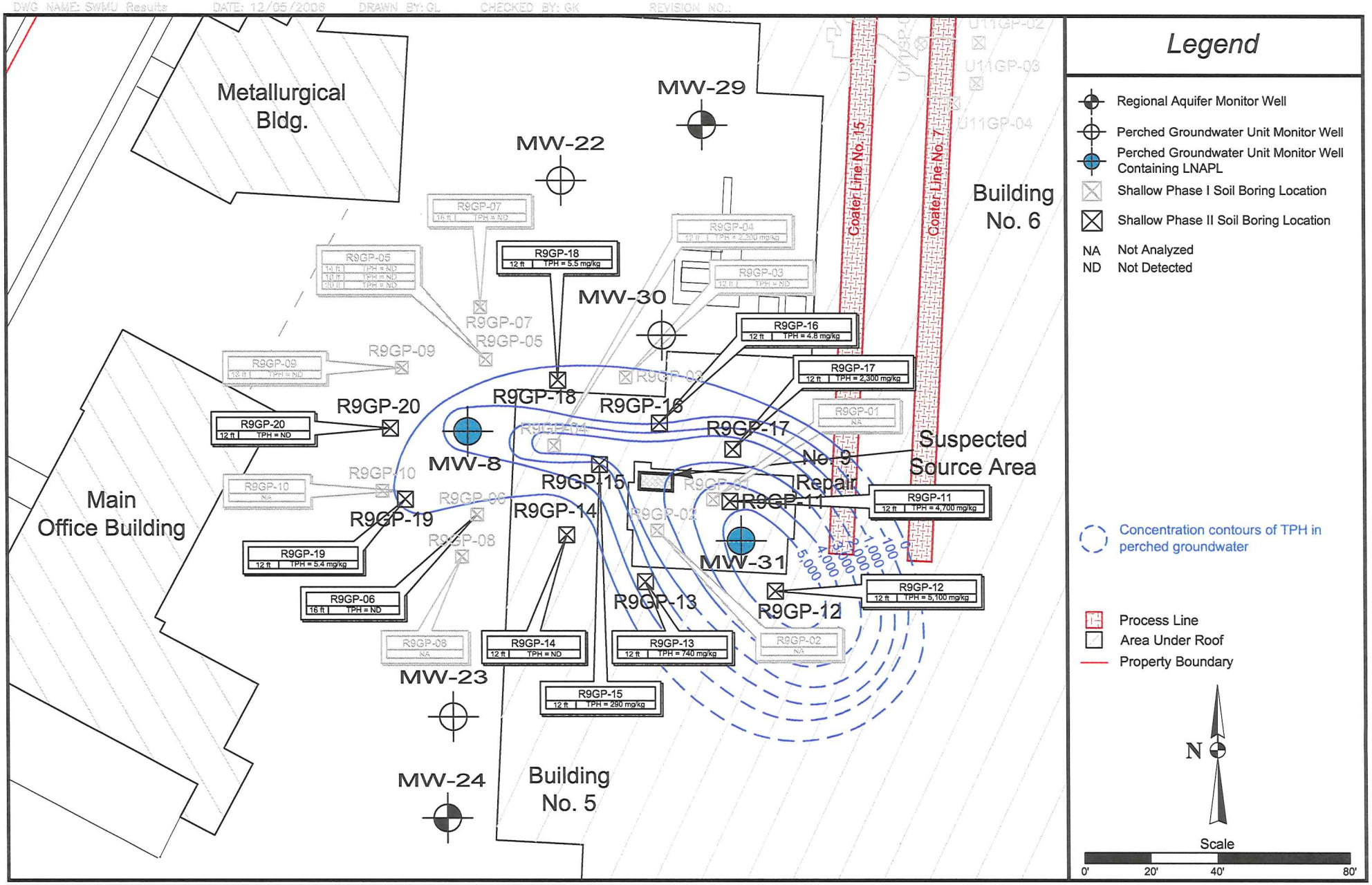
0' 15' 30' 60'

Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

Total and Hexavalent Chromium Detected in Soil at the 24 to 27 ft Depth Interval,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure
5-30

DWG NAME: SWMU Results DATE: 12/05/2006 DRAWN BY: GL CHECKED BY: GK REVISION NO.:



Legend

- Regional Aquifer Monitor Well
- Perched Groundwater Unit Monitor Well
- Perched Groundwater Unit Monitor Well Containing LNAPL
- Shallow Phase I Soil Boring Location
- Shallow Phase II Soil Boring Location
- NA Not Analyzed
- ND Not Detected
- Concentration contours of TPH in perched groundwater
- Process Line
- Area Under Roof
- Property Boundary

N

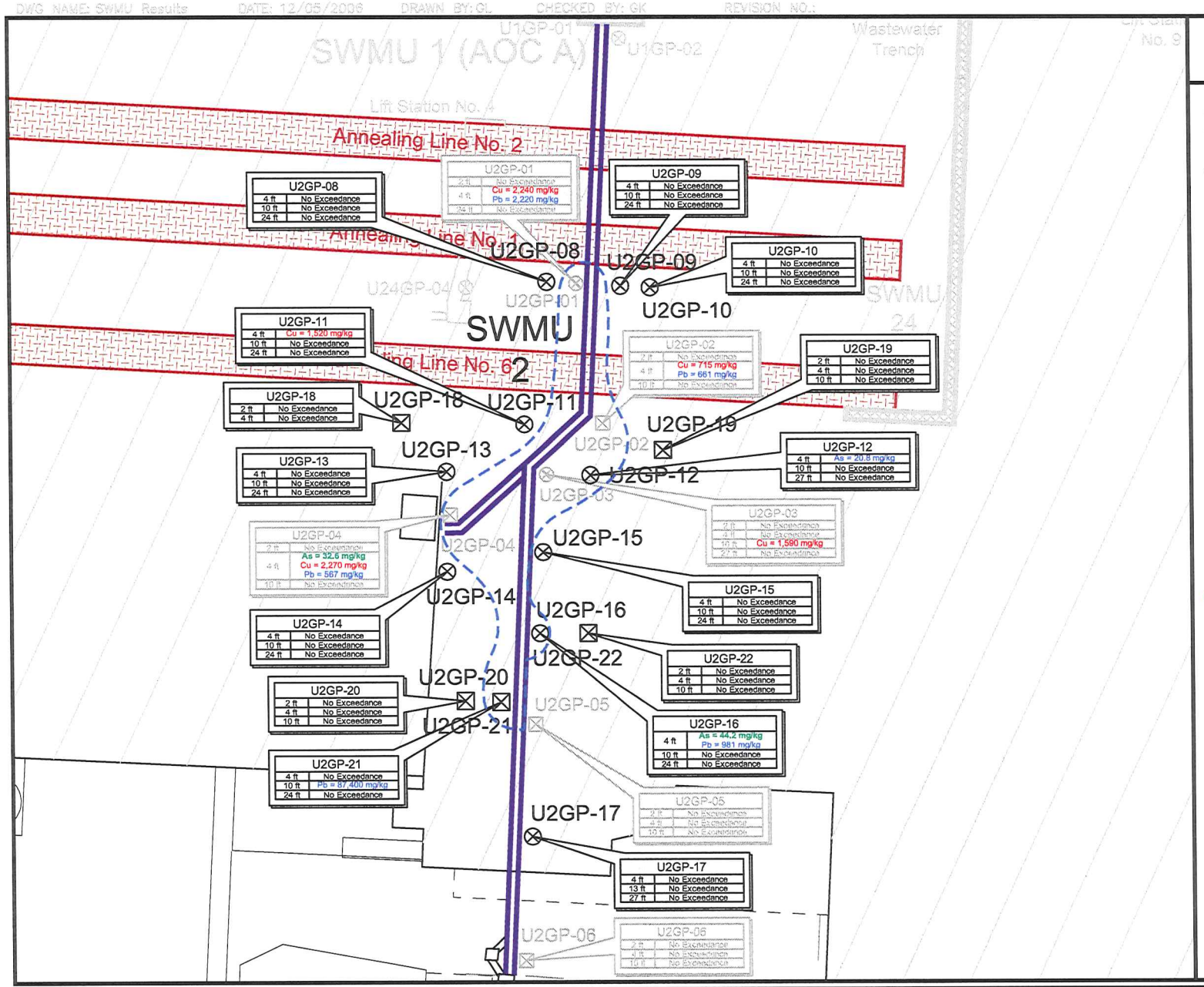
Scale: 0' 20' 40' 80'

Cox-Colvin & Associates, Inc. Environmental Services

LNAPL Investigation Sampling Locations and TPH Results,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure 5-31

DWG NAME: SWMU Results DATE: 12/05/2006 DRAWN BY: GL CHECKED BY: GK REVISION NO.:



Legend

- Deep Phase I Soil Boring Location
- Shallow Phase I Soil Boring Location
- Deep Phase II Soil Boring Location
- Shallow Phase II Soil Boring Location

12 Concentrations in blue exceed US EPA Region IX Preliminary Remediation Goals (PRGs) for residential soil and background.

15 Concentrations in red exceed the US EPA Region IX Soil Screening Level at a dilution attenuation factor (DAF) of 20 and background.

15 Concentrations in green exceed both the residential PRG and the SSL and background.

Extent of constituents above US EPA Region IX PRGs and background

Process Line

Area Under Roof

Boundary of SWMU.

Property Boundary

N

Scale

0' 15' 30' 60'

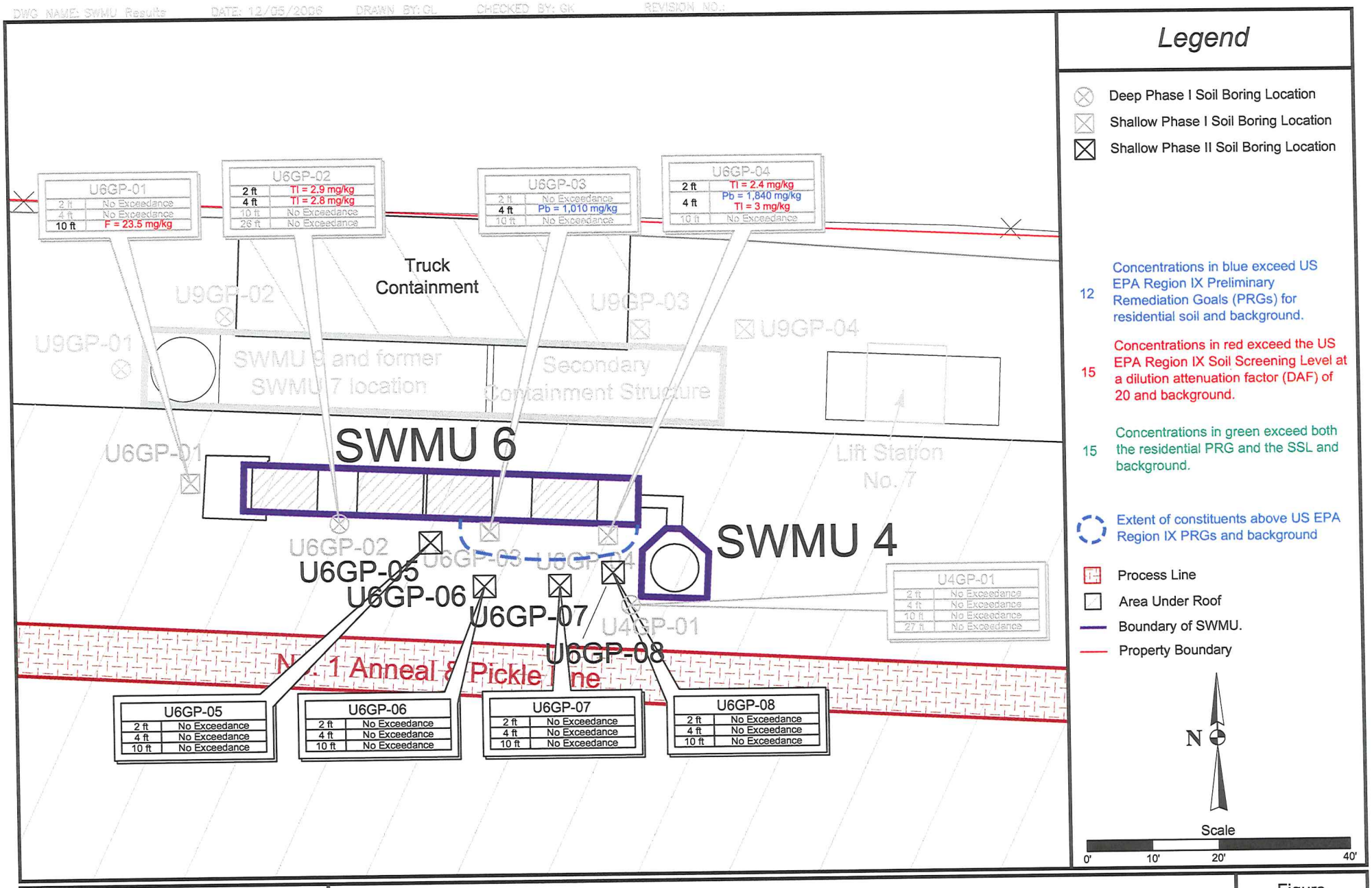
Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

SWMU 2 Sampling Locations and Data Evaluation Results,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure

5-2

DWG NAME: SWMU Results DATE: 12/05/2006 DRAWN BY: CL CHECKED BY: GK REVISION NO.:



Legend

- Deep Phase I Soil Boring Location
- Shallow Phase I Soil Boring Location
- Shallow Phase II Soil Boring Location

12 Concentrations in blue exceed US EPA Region IX Preliminary Remediation Goals (PRGs) for residential soil and background.

15 Concentrations in red exceed the US EPA Region IX Soil Screening Level at a dilution attenuation factor (DAF) of 20 and background.

15 Concentrations in green exceed both the residential PRG and the SSL and background.

- Extent of constituents above US EPA Region IX PRGs and background
- Process Line
- Area Under Roof
- Boundary of SWMU.
- Property Boundary

N

Scale

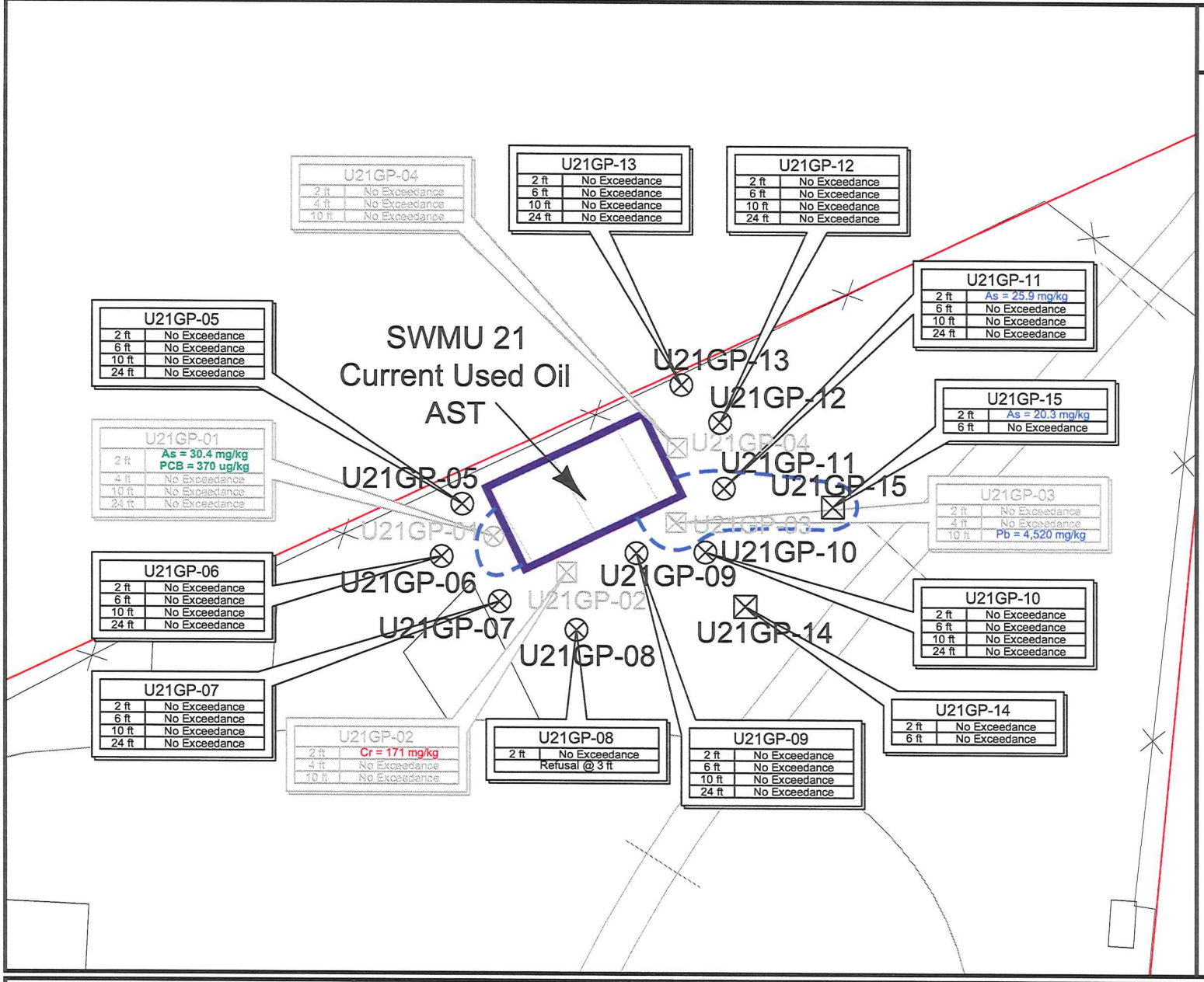
0' 10' 20' 40'

Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

SWMU 4 and SWMU 6 Sampling Locations and Data Evaluation Results,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure 5-4

DWG NAME: SWMU Results DATE: 12/05/2008 DRAWN BY: CL CHECKED BY: GK REVISION NO.:



Legend

- Deep Phase I Soil Boring Location
- Shallow Phase I Soil Boring Location
- Deep Phase II Soil Boring Location
- Shallow Phase II Soil Boring Location

12 Concentrations in blue exceed US EPA Region IX Preliminary Remediation Goals (PRGs) for residential soil and background.

15 Concentrations in red exceed the US EPA Region IX Soil Screening Level at a dilution attenuation factor (DAF) of 20 and background.

15 Concentrations in green exceed both the residential PRG and the SSL and background.

Extent of constituents above US EPA Region IX PRGs and background

Process Line

Area Under Roof

Property Boundary

N

Scale

0' 10' 20' 40'

Cox-Colvin & ASSOCIATES, INC. ENVIRONMENTAL SERVICES

SWMU 21 Sampling Locations and Data Evaluation Results,
AK Steel Corporation - Zanesville Works,
Zanesville, Ohio

Figure

5-10

Attachment 2

Facility Record Index

U.S. ENVIRONMENTAL PROTECTION AGENCY

PENDING ADMINISTRATIVE RECORD
FOR THE
AK STEEL CORP. ZANESVILLE OPERATIONS SITE
ZANESVILLE, MUSKINGUM COUNTY, OHIO

ORIGINAL
STATEMENT OF BASIS
MARCH 25, 2021
SEMS ID: 964385

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1	962052	7/15/98	Wesley, W., TechLaw, Inc.	Armco Zanesville Plant	Preliminary Assessment/Visual Site Inspection Report	50
2	962056	9/30/02	U.S. EPA	AK Steel Corporation - Zanesville Works	Administrative Order on Consent	66
3	962054	3/31/04	U.S. EPA	_ _ _ _ _	Documentation of Environmental Indicator Determination - Signed Migration of Contaminated Groundwater Under Control	8
4	1008370	5/14/04	Kinsall, G. and Colvin, G., Cox-Colvin & Associates, Inc. Environmental Services	German, V., Ohio EPA	First - Fourth Quarter 2003 Groundwater Monitoring Results	782
5	962055	6/30/05	U.S. EPA	_ _ _ _ _	Documentation of Environmental Indicator Determination - Signed Current Human Exposures Under Control	14
6	962092	4/1/06	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Hexavalent Chromium and Fluoride Sampling - Analytical Results and Figures	5
7	962095	6/26/06	Kinsall, G., Cox-Colvin & Associates, Inc. Environmental Services	Levengood, C., AK Steel Corporation	Letter Report re: Phase II Geoprobe Investigation Results	71

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9	962085	4/2/08	Knapp, M., US Department of Interior, Fish and Wildlife Service	Dilley, M., MAD Scientist, LLC	Letter re: Response to Federally Listed Threatened and Endangered Species Update Request	2
10	1008365	3/16/09	Kinsall, G., Cox-Colvin & Associates, Inc. Environmental Services	McConaghy, C., U.S. EPA	First - Fourth Quarter 2008 Groundwater Monitoring Results	583
11	1008364	2/24/10	Kinsall, G., Cox-Colvin & Associates, Inc. Environmental Services	McConaghy, C., U.S. EPA	First - Fourth Quarter 2009 Groundwater Monitoring Results	585
12	962096	4/1/10	Kinsall, G., Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Final Report for the RCRA 3013 Order Investigation - Volume I: Text, Figures, Tables, Plates - Revision 2	286
13	962097	4/1/10	Kinsall, G., Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendix A for the RCRA 3013 Order Investigation - Human Health Risk, Assessment - Revision 2	144
14	962098	4/1/10	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendix B for the RCRA 3013 Order Investigation - May 24, 2007 Ecological Risk, Assessment - Revision 2	105
15	962099	4/1/10	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendix C for the RCRA 3013 Order Investigation - Calculation of Soil Screening and Leach-Based Screening Levels	4

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17	962101	4/1/10	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendix E for the RCRA 3013 Order Investigation - Soil Sampling and Drilling Logs, Well Construction Details and Field Equipment Calibration Records	696
18	962102	4/1/10	Colvin, G., Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendices F and G (Part 1) for the RCRA 3013 Order Investigation - Analytical Report	24,572
19	962103	4/1/10	Colvin, G., Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendices F and G (Part 2) for the RCRA 3013 Order Investigation - Analytical Report	19,574
20	962104	4/1/10	Colvin, G., Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendices F and G (Part 3) for the RCRA 3013 Order Investigation - Analytical Report	12,480
21	962105	4/1/10	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendices F and G (Part 4) for the RCRA 3013 Order Investigation - Analytical Report	9075
22	962106	4/1/10	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Appendices F and G (Part 5) for the RCRA 3013 Order Investigation - Analytical Report	7283
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26	962088	11/1/12	Risk-Based Remedies RBR Consulting, Inc.	Cox-Colvin & Associates, Inc. Environmental Services	Baseline Ecological Risk Assessment	572
27	962093	11/6/12	McConaghy, C., U.S. EPA	Levengood, C., AK Steel Corporation	Letter re: Approval with Modifications of the Final Report for the RCRA 3013 Order Investigation	2
28	962091	12/5/12	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Addendum to Revision 2 of the Final Report for the RCRA 3013 Order Investigation - Soil Sampling Locations - Figures and Tables	9
29	962094	12/17/12	Levengood, C., AK Steel Corporation	McConaghy, C., U.S. EPA	Letter re: Addendum to Revision 2 of the 3013 Order Final Report	14
30	1008361	1/30/14	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Dodds, J., U.S. EPA	First - Fourth Quarter 2013 Groundwater Monitoring Results	58
31	962107	5/23/14	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	Summary of RCRA Corrective Action-Related Activities	3
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34	962057	11/17/15	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Third Quarter 2015 Groundwater Monitoring Results	132
35	962108	1/1/16	Muskingum County Water Department	General Public	2016 Drinking Water Consumer Confidence Report - Northwest System	3
36	962053	2/1/16	_ _ _ _ _	_ _ _ _ _	Summary of Current and Proposed Groundwater Monitoring Program Schedule	1
37	962109	2/12/16	Pursel, B., U.S. EPA	File	Groundwater Monitoring Network Change of Scope Statistical Analysis	40
38	962110	2/25/16	Pursel, B., U.S. EPA	Montag, M., AK Steel Corporation - Zanesville Works	Letter re: Review of AK Steel Proposal to Amend Groundwater Monitoring Frequency of Select Wells	4
39	1008359	8/19/16	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	First and Second Quarter 2016 and First - Fourth Quarter 2015 Groundwater Monitoring Results	77
40	962059	8/19/16	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Second Quarter 2016 Groundwater Monitoring Results	175
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42	962029	2/6/17	AK Steel Corporation - Zanesville Works	_ _ _ _ _	Proposed Approach for Implementation and Completion of RCRA Corrective Action	2

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44	962062	5/22/17	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	First Quarter 2017 Groundwater Monitoring Results	58
45	962030	5/31/17	Pursel, B., U.S. EPA	Montag, M., AK Steel Corporation - Zanesville Works	Letter re: Meeting Minutes for May 17, 2017 Remedy Selection Process Meeting	9
46	962031	6/14/17	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Interim Memorandum - LNAPL CMS Approach	5
47	962049	7/11/17	Pursel, B., U.S. EPA	Montag, M., AK Steel Corporation - Zanesville Works	Letter re: LNAPL CMS Approach	2
48	962063	8/25/17	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Second Quarter 2017 Groundwater Monitoring Results	141
49	962032	11/8/17	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Email re: Summary of CMS Agreements for LNAPL	2
50	962064	11/29/17	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Third Quarter 2017 Groundwater Monitoring Results	60
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54	962034	4/2/18	Toerek Associates, Inc.	U.S. EPA	Draft Review of the Simulation of Groundwater Flow and Contaminant Transport and Development of Alternative Concentration Limits Modeling Report	2
55	962037	4/9/18	Pursel, B., U.S. EPA	Montag, M., AK Steel Corporation - Zanesville Works	Letter re: Technical Review of Simulation of Groundwater Flow and Contaminant Transport and Development of Alternative Concentration Limits	4
56	962033	5/4/18	Petruzzi, N. and McCready, R., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Response to Comments, Simulation of Groundwater Flow and Contaminant Transport and Development of Alternate Concentration Limits	25
57	962038	5/29/18	Martin, B., Toerek Associates, Inc.	Pursel, B., U.S. EPA	Cover Letter - Evaluation - Responses of EPA's Technical Comments - Simulation of Groundwater Flow and Contaminant Transport Modeling and Development of Alternative Concentration Limits	1
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63	962045	8/2/18	Pursel, B., U.S. EPA	Montag, M., AK Steel Corporation - Zanesville Works	Letter re: Review of Simulation of Groundwater Flow and Contaminant Transport and Development of Alternative Concentration Limits	2
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65	962081	11/12/18	Petruzzi, N. and Creal, C., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Third Quarter 2018 Groundwater Monitoring Results	60
66	962068	1/28/19	Petruzzi, N., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Fourth Quarter 2018 Groundwater Monitoring Results	141

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68	962047	4/30/19	Pursel, B., U.S. EPA	Montag, M., AK Steel Corporation - Zanesville Works	U.S. EPA Technical Review of the RCRA First Corrective Measures Study Report	4
69	962048	6/13/19	Pursel, B., U.S. EPA	Montag, M., AK Steel Corporation - Zanesville Works	U.S. EPA Letter re: Review of the RCRA First Corrective Measures Study Report Response to Comments	1
70	962050	7/19/19	Montag, M., AK Steel Corporation - Zanesville Works	Pursel, B., U.S. EPA	Cover Letter re: RCRA First Corrective Measures Study Report - Revision 1	2
71	962051	7/19/19	Cox-Colvin & Associates, Inc. Environmental Services	AK Steel Corporation - Zanesville Works	RCRA First Corrective Measures Study Report - Revision 1	371
72	962080	9/16/19	Petruzzi, N. and Creal, C., Cox-Colvin & Associates, Inc. Environmental Services	Pursel, B., U.S. EPA	Second Quarter 2019 Groundwater Monitoring Results	165
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