DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name:	AK Steel-Mansfield Plant
Facility Address:	913 Bowman Street, Mansfield, OH
Facility EPA ID #:	OHD 004 157 418

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

☒ If yes - check here and continue with #2 below.

☐ If no - re-evaluate existing data

☐ If data are not available skip to #6 and enter AIN@ (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of ACurrent Human Exposures Under Control@ EI

A positive ACurrent Human Exposures Under Control@ EI determination (AYE@ status code) indicates that there are no Aunacceptable@ human exposures to Acontamination@ (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all Acontamination@ subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The ACurrent Human Exposures Under Control@ EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program=s overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "**contaminated**"[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media of Concern	Yes	No	?	Rationale / Key Contaminants
Groundwater	x			PCBs, acetone, 1,3-dichlorobenzene, 1,4-dichlorobenzene, arsenic, chromium, cadmium
Air (indoors) [2]	x			There were some volatile organic carbons detected in the groundwater that may be a potential concern if buildings exist in those areas.
Surface Soil (e.g., <2 ft)	x			arsenic, iron, lead
Surface Water		x		No detection of contaminants in Rocky Fork Creek, the Water Recirculation Reservoirs/Skimmed Oil Tanks (SOT) or the ravine below the landfill.
Sediment	x			PCBs, arsenic, lead
Subsurface Soil (e.g., >2 ft)	x			arsenic, iron, lead, zinc, PCBs
Air (outdoors)		x		There were no exceedances of Region 9 PRGs for particulates and it is in an inactive area of the facility.

☐ If no (for all media) - skip to #6, and enter a YE status code after providing or citing appropriate "levels", and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

☒ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

☐ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s): *Final Report for Site Investigative Work, August 2002*
Additional Data for CA725 Determination, June 2005

A Site Investigation was performed in 2002 at the AK Steel-Mansfield Works Facility per the September

[1] AContamination@ and Acontaminated@ describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based Alevels@ (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

30, 1998 Administrative Order. Additional sampling was performed in April, 2005 to provide additional data for this Human Health Environmental Indicator Determination. After evaluating all of the data, it was found that soil, groundwater, and sediment had constituents above the appropriate screening levels. The screening levels used in this determination are the following: maximum contaminant levels (MCLs) or Tap Water EPA Region 9 Preliminary Remediation Goals (R9 PRGs) for groundwater; R9 PRGs at a $1x10^{-5}$ carcinogenic risk for surface soil, subsurface soil, and sediment; and Ohio EPA standards for human health exposure to surface water for surface water.

Media	Contaminant	Screening Criteria	Area	Sample ID	Result
Surface Soil	Arsenic	16 mg/kg	EAF Dust Landfill	LF-1B	20 mg/kg
				LF-5A	21 mg/kg
	Iron	100,000 mg/kg		LF-1B	223,000 mg/kg
				LF-5A	224,000 mg/kg
	Lead	*1,100 mg/kg		LF-1B	23,700 mg/kg
				LF-5A	5,710 mg/kg
			Slag Processing Area (SPA)	SPA-SS-01	3,770 mg/kg
				SPA-SS-02	1,510 mg/kg
				SPA-SS-03	1,490 mg/kg
				SPA-SS-04	1,830 mg/kg
				SPA-SS-05	2,170 mg/kg
	Iron	100,000 mg/kg	Water Recirculation Reservoirs/Skimmed Oil Tank (SOT)	SOT-MW-2	104,000 mg/kg
				SOT-8	111,000 mg/kg
Subsurface Soil	Arsenic	16 mg/kg	EAF Dust Landfill	LF-1B (24-26 ft.)	16 mg/kg
				LF-3B (24-26 ft.)	21 mg/kg
				LF-6A (2-4 ft.)	42.5 mg/kg
	Iron	100,000 mg/kg		LF-6A (2-4 ft.)	156,000 mg/kg
	Lead	1,100 mg/kg			18,100 mg/kg
	Zinc	100,000 mg/kg			142,000 mg/kg
	PCB-1242	7.44 mg/kg			82.1mg/kg
Sediment	PCB-1248	7.44 mg/kg	Ravine Area	RA-SD-01	9.10 mg/kg
	Lead	1,100 mg/kg		LF-SS-2	8,090 mg/kg
	Arsenic	16 mg/kg	Rocky Fork Creek	RFC-7 (1993)	22.7 mg/kg
				RFC-8 (1993)	18.6 mg/kg

*The screening level used for lead is based on the N HANES III National Data in Adult Lead model for Region 5 States.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table
Potential **Human Receptors** (Under Current Conditions)

"Contaminated Media"	Resident	Worker	Day Care	Construction	Trespasser	Recreation	Food[3]
Groundwater	No	No	No	Yes	No	No	No
Air (indoors)	No	No	No	No	No	No	No
Soil (surface <2 ft.)	No	Yes	No	Yes	Yes	No	No
~~Surface Water~~							
Sediment	No	Yes	No	Yes	No	Yes	No
Soil (subsurface >2 ft.)	No	No	No	Yes	No	No	No
~~Air (outdoors)~~							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors= spaces for Media which are not Acontaminated@ as identified in #2 above.

2. Enter Ayes@ or Ano@ for potential Acompleteness@ under each AContaminated@ Media – Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential AContaminated@ Media - Human Receptor combinations (Pathways) do not have check spaces (A___@). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

☐ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter @YE@ status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

☒ If yes (pathways are complete for any AContaminated@ Media - Human Receptor combination) - continue after providing supporting explanation.

☐ If unknown (for any AContaminated@ Media - Human Receptor combination) - skip to #6 and enter AIN@ status code.

Rationale and Reference(s): *Final Report for Site Investigative Work, August 2002*
Additional Data for CA725 Determination, June 2005

Industrial Worker
Soil and Sediment:
The main area of concern for exposure risk to the industrial worker is through the soil in the EAF Dust Landfill, Slag Processing Area and the Water Recirculation Reservoirs/SOT and through the sediment in the Ravine Area. In these areas, the surface soil exceeded R9 PRGs at an excess cancer risk of $1x10^{-5}$ for the industrial worker. The Rocky Fork Creek runs through the property and arsenic was found in the sediment above the screening level. Subsurface soil is not a pathway of concern because industrial workers are not expected to dig further than 2 feet below the ground surface and therefore would not be exposed to the subsurface soil (greater than 2 feet below the ground surface).

Groundwater:

The groundwater is not used for drinking water on site. In addition, the workers are not expected to dig further than 2 feet below the ground surface and therefore would not hit the water table. Therefore, groundwater is not a complete pathway for the industrial worker.

Indoor Air:

The indoor air pathway is not complete for the industrial worker because there were no buildings where volatile organic carbons (VOCs) were detected in the groundwater or soil.

Construction Worker

Surface and Subsurface Soil:

There are contaminants above appropriate screening levels for the surface and subsurface soil. The only area where sediment might be a potential pathway of concern for the construction worker is in the Ravine Area.

Groundwater:

There is potential for a construction worker to come in contact with the contaminated groundwater during excavation activities.

Indoor Air:

The indoor air pathway for the construction worker is not complete because the construction worker most of the work performed by a construction worker is outdoors.

Trespassers

The contaminants in the surface soil were above screening levels for the industrial worker. The screening levels can be used as a surrogate for the trespasser based on the duration and frequency of exposure. Therefore, this is a potential pathway of exposure to the trespasser.

Recreation

Rocky Fork Creek did not have any detection of metals, volatile organic carbons (VOCs), or semi-volatile organic carbons (SVOCs) in the surface water. However, the sediment did have arsenic at levels above the R9 PRGs for the industrial worker for sediment on site and residential exposure scenario for sediment off-site.

Residential

Even though there were several contaminants in the groundwater above the MCLs, the groundwater is not used as a drinking water source. The majority of municipal water is from a surface water source and the remainder of the municipal water comes from a different aquifer. In addition, it should be noted that except for sediment contamination mentioned under the recreational exposure scenario above, all of the contamination is on-site and there are no residences on site.

Day Care Facilities and Food Pathway

There are no day care facilities on the facility grounds. Also, no food is grown on the facility property.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **Asignificant@**[3] (i.e., potentially Aunacceptable@ because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the Acontamination@); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable Alevels@) could result in greater than acceptable risks)?

☒ If no (exposures can not be reasonably expected to be significant (i.e., potentially Aunacceptable@) for any complete exposure pathway) - skip to #6 and enter AYE@ status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to Acontamination@ (identified in #3) are not expected to be Asignificant.@

☐ If yes (exposures could be reasonably expected to be Asignificant@ (i.e., potentially Aunacceptable@) for any complete exposure pathway) - continue after providing a description (of each potentially Aunacceptable@ exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to Acontamination@ (identified in #3) are not expected to be Asignificant.@

☐ If unknown (for any complete pathway) - skip to #6 and enter AIN@ status code

Rationale and Reference(s): *Final Report for Site Investigative Work, August 2002*
Additional Data for CA725 Determination, June 2005

The 3 areas of concern (the SPA, the EAF Dust Landfill, and the Ravine Area) are located in close proximity to each other and they are located within an inactive portion of the facility. This area is the topographically higher portion of the property located immediately northeast of where slag is currently processed. There is only one access road leading to this inactive area, and the area is generally not used. In addition, present day plant operations do not require routine worker access to this area. Therefore, the surface soil, outdoor air, and sediment exposure pathways to the industrial worker are currently incomplete in this area. In addition, the Water Recirculation Reservoirs/SOT area had levels of iron in the surface soil in two samples above the appropriate screening level. A 95% UCL was calculated for this area and it was found to be 73,717 mg/kg. This is below the screening level of 100,000 mg/kg for iron exposure to the industrial worker.

Since the Rocky Fork Creek runs through the site, two different recreational scenarios were evaluated: the industrial worker recreation scenario and the off-site recreational scenario. As stated above, the surface water did not have contaminants above screening levels. The only sediment contaminant was arsenic. For the industrial worker recreational user, the 95% Upper Confidence Level (UCL) was calculated for the arsenic data for the sediment in Rocky Fork Creek. It was found to be 12.8 mg/kg, which is lower than the screening level for arsenic of 16 mg/kg. Arsenic was also found in the offsite Rocky Fork Creek sediments. The concentration of 9.32 mg/kg was found in past investigations. Although this concentration exceeds the residential PRG of 3.9 mg/kg, from a recreational standpoint, exposure frequency and duration are considerably less compared to the residential scenario. Thus, the excess cancer risk resulting from the residential recreation exposure scenario is not significant.

The trespasser exposure scenario is currently not a concern because the SPA, EAF Dust Landfill, and the Ravine Area are in a very remote area located on the outskirts of the City of Mansfield. The approximate distance from the nearest public road or residence is ½ mile. The area surrounding the SPA is heavily wooded and plant security personnel routinely monitor by vehicle the area approximately 6 times per day.

[3] If there is any question on whether the identified exposures are Asignificant@ (i.e., potentially Aunacceptable@) consult a human health Risk Assessment specialist with appropriate education, training and experience.

The construction worker exposure to surface soil, subsurface soil, sediment, and groundwater contaminants is not significant because they are required to use appropriate personal protective equipment (PPE) per the facility Health and Safety Plan.

5. Can the Asignificant@ **exposures** (identified in #4) be shown to be within **acceptable** limits?

☐ If yes (all Asignificant@ exposures have been shown to be within acceptable limits) - continue and enter AYE@ after summarizing and referencing documentation justifying why all Asignificant@ exposures to Acontamination@ are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

☐ If no (there are current exposures that can be reasonably expected to be Aunacceptable@)- continue and enter ANO@ status code after providing a description of each potentially Aunacceptable@ exposure.

☐ If unknown (for any potentially Aunacceptable@ exposure) - continue and enter AIN@ status code

Rationale and Reference(s):

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

☒ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the AK Steel-Mansfield Works facility, EPA ID # OHD 004 157 418, located at 913 Bowman Street, Mansfield, OH under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

☐ NO - "Current Human Exposures" are NOT "Under Control."

☐ IN - More information is needed to make a determination.

Completed by (signature) _____ Date _____
(print) Jill Groboski
(title) Environmental Engineer

Supervisor (signature) _____ Date _____
(print) George Hamper
(title) Section Chief
(EPA Region or State) EPA Region 5

Locations where References may be found:
EPA Region 5
77 W. Jackson Blvd.
Chicago, IL 60614

Contact telephone and e-mail numbers

(name) Jill Groboski
(phone #) 312-886-3890
(e-mail) jill.groboski@epa.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.