US EPA ARCHIVE DOCUMENT

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: National Copper Products, Inc (Sunstrand)
Facility Address: Prairie Ronde Road, Dowagiac, MI
Facility EPA ID #: MID 005 068 507

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 "IN" (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 "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (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 "contamination" 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 "Current 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)?

Table 1-Reasonable Suspected Contaminated Media of Concern

Media	Yes	No	?	Rationale / Key Contaminants
Groundwater	x			Trichloroethylene (TCE), 1,1,1-trichloroethane (TCA), cis-1,2-dichloroethylene (DCE), trans-1,2-DCE, vinyl chloride (VC) are all found to be above their respective drinking water standards (MCL) (see table 2 for maximum concentrations).
Air (indoors)[2]	x			The indoor air of one house had a concentration of TCE above the screening criteria per the U. S. EPA vapor intrusion guidance of 0.22 ug/m^3.
Surface Soil (e.g., <2 ft)		x		Soil sampling was conducted around the leaking underground storage tank in the Old Oil and Solvent Storage Room. No surface soil samples showed contamination above screening criteria.
Surface Water		x		Surface water was sampled from seeps in the fen area north of the facility, Pine Lake, Pine Lake Drain, and the Unnamed Drain and was found to be below surface water quality standards. Part 31 of the Michigan Natural Resources and Environmental Protection Act (Public Act 451 of 1994, as amended) were used in this determination.
Sediment	x			Sediment was sampled from the fen, Pine Lake, Pine Lake Drain, and the Unnamed Drain. Sediments in Pine Lake were found to have arsenic above the Michigan Department of Environmental Quality (MDEQ) Part 201 direct contact screening criteria.
Subsurface Soil (e.g., >2 ft)		x		Soil sampling was conducted around the leaking underground storage tank in the Old Oil and Solvent Storage Room. No subsurface soil samples were above MDEQ Part 201 direct contact screening criteria.
Air (outdoors)	x			TCE concentration in ambient air exceeded the Region 9 PRG ambient air screening level.

☐ 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 ach "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.

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[1] "Contamination" and "contaminated" 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 "levels" (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.

Rationale and Reference(s)

Facility Background and History

National Copper Products (NCP) is a copper tubing manufacturing facility that makes copper tubing out of billets. In 1983, TCE was found in the facility drinking water well. This led to an investigation into neighboring residents' drinking water wells. In 1984, the State of Michigan ordered the Facility (then Sunstrand) to install and maintain a pump and treat groundwater remediation system. In addition, a soil vapor extraction system was installed at one of the source areas. An air sparging system was also installed. After a referral from the state of Michigan, the United States Environmental Protection Agency (U. S. EPA) began negotiations on a 3008(h) Order with National Copper Products in 2004 and an Administrative Order on Consent was signed in November 2005 with the U. S. EPA.

Table 2-Maximum Groundwater Concentrations (Third Quarter 2006 Monitoring Report, Mursch 2006)

CONTAMINANT	DEPTH (ft.)	MAXIMUM CONCENTRATION (µg/L)	MCL (µg/L)
Trichloroethylene	30	5,100	5
1,1,1-Trichloroethane	30	440	200
cis-1,2-Dichloroethene	43	940	70
trans-1,2-Dichloroethene	43	190	100
Vinyl Chloride	66	83	2

Explanation for "No" in Table 1

Surface Soil
Data collected during the initial remedial investigation in 1984 for areas within the property boundaries showed a maximum concentration of TCE in surface soils to be 820 µg/kg. The screening criterion used for industrial land use for direct soil contact is Michigan Department of Environmental Quality (MDEQ) Part 201 value of 500,000 µg/kg of TCE. In addition, impacted soils within the boundary of the manufacturing building were excavated in 1982 (SECOR 2002). Additional soil sampling was performed in 2002 as part of the Current Conditions Report. The maximum concentration of TCE in surface soil was 170 µg/kg at a depth of 2-3 feet below ground surface (SECOR 2002).

Surface Water
Surface water was sampled in 2002 as part of a Current Conditions Report (SECOR, 2002) and the results were below screening criteria. In addition, surface water is sampled semi-annually as part of the facility's surface water and groundwater monitoring program.

Subsurface Soil
Between the initial investigation in 1984 and the 2002 investigation, TCE concentrations have decreased from 6,700 µg/kg to 52 µg/kg (Mursch 2002). The MDEQ Part 201 value for industrial soil direct contact is 500,000 µg/kg and therefore the levels found during the past investigations are below the screening criterion for TCE. The area around the source of TCE contamination was excavated and covered with a concrete slab which the building now sits upon. Another area of the facility, the Old Borrow Pit, was used for disposal of furnace bricks. This area was also investigated and subsequently excavated, filled and now has vegetation growing over the area. The results for metals after the excavation were below the screening criteria and the MDEQ approved of the levels.

References

Earth Tech 1984. Remedial Investigation of the Sundstrand Facility.

Earth Tech 2005. Summary of Soil Gas Sampling, May 2005.

Earth Tech 2006. Air Sampling Results, National Tube/Sunstrand Heat Transfer Plant, Dowagiac, MI – May 2006.

Earth Tech 2007. Air Sampling and Analyses – Addendum. January 25, 2007.

Earth Tech February 2007. Memo, Results of Ecological Studies. February 23, 2007.

Earth Tech May 2007. Ecological Studies – Surface Water Monitoring. Letter report to Jill Groboski, U. S. EPA.

MDEQ 2006, Part 201. Residential and industrial-commercial Part 201 generic cleanup criteria and screening levels; Part 213 Tier 1 risk-based screening levels (RBSL's). RRD OP. Memo No. 1.

MDEQ 2007, Rule 57. Rule 57 Water Quality Values. April 25, 2007.

MDNR 1991. Assessment of Mercury Contamination in Selected Michigan Lakes, 1987-1990. Surface Water Quality Division Staff Report, December 1991.

Mursch 2002. Geotechnical Investigation, National Copper Products, Inc. 415 East Prairie Ronde Street, Dowagiac, Michigan. September, 2002.

Mursch 2005. Current Conditions Report. National Copper Products, Inc. Facility, Dowagiac, Michigan

Mursch May 2006. First Quarter 2006 Monitoring Report, National Copper Products, Inc. 415 East Prairie Ronde Street, Dowagiac, Michigan. May, 2006.

Mursch December 2006. Third Quarter 2006 Monitoring Report. National Copper Products, Inc. 415 East Prairie Ronde Street, Dowagiac, Michigan. December 31, 2006.

SECOR 2002. Phase I Current Conditions Report. National Copper Facility, Dowagiac MI. Prepared for Michigan Department of Environmental Quality Environmental Response Division, Kalamazoo District Office, March 2002.

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?

Table 3-Summary Exposure Pathway Evaluation Table for 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.)~~							
~~Surface Water~~							
Sediment	No	No	No	No	Yes	Yes	No
~~Soil (subsurface >2 ft.~~							
Air (outdoors)	Yes	Yes	No	Yes	No	No	No

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.
2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media – Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). 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 "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

☐ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale on incomplete pathway:

Residential Exposure Scenario

Groundwater: The residents do not use the groundwater for drinking water. According to the SECOR 2002 report, by 1990 the City of Dowagiac extended the supply of municipal water to the properties west and northwest of the property. As of 1997, one residence with a well is located in the Burmax Court area, which is located in the northwest of the investigation area. This well was sampled in September of 2006. The only contaminant of concern that was detected was cis-1,2-DCE at a concentration of 1.3 μg/L, which is below the drinking water standard of 70 μg/L.

Indoor Air: Soil gas samples and sub-slab samples were taken around selected houses on Louise Street. Those houses where the soil vapor levels were above the Vapor Intrusion Guidance screening criteria for further investigation, an indoor air sample was taken. After testing the indoor air in these three houses, only one required the use of indoor air mitigation that was installed in December 2006. The indoor air was sampled again in April and the levels were still above the screening criteria of 1 μg/m^3. The owner of NCP purchased the property and the residents moved out during the 2nd week of June 2007. Currently, the house is vacant and there are plans for the house to be demolished by the end of June 2007. One resident currently uses the groundwater for flushing the toilet and laundry in the basement. An indoor air sample was taken and analyzed for TCE and found to be at below the action level of 1 μg/m^3.

Industrial Worker Exposure Scenario

Groundwater: The workers do not drink the groundwater on site and therefore this exposure pathway is not complete at this time.

Sediment: The surface water bodies are all off site and therefore workers would not be exposed to this pathway.

Indoor Air: A soil vapor extraction system (SVE) is in place underneath the building at the source area, which minimizes the risk to workers from volitization of TCE into the indoor air. There is a neighboring industrial facility to the northeast of National Copper Products. The maximum concentration of TCE in the groundwater around the facility is 70 μg/L, which is below the MDEQ Part 201 criteria for the groundwater to indoor air pathway for a residential exposure scenario (15,000 μg/L). Therefore, this pathway is incomplete at this time.

Construction Worker Scenario

Groundwater: If construction occurs on the site and the construction workers have to dig below the water table, there is potential for them to encounter groundwater contaminated with volatile organic carbons (VOCs).

Sediment: This pathway is not complete because surface water bodies do not exist on the facility property and therefore construction worker would not be expected to work in or near sediment of surface water bodies.

Indoor Air: It is assumed that construction workers will spend most of the working day outdoors, so this pathway is not complete.

Recreation/Trespasser Scenario

Groundwater: This is not a complete pathway for this exposure scenario because the recreational user would not drink the groundwater.

Indoor Air: The recreational user and the trespasser would not spend any time indoors, and therefore this pathway would not be applicable to this exposure scenario.

Food Scenario

Groundwater: One resident does use the groundwater for water supply to a minnow farm. The groundwater surrounding the area had a maximum concentration of TCE of 130 µg/L. This was compared to the MDEQ Rule 57 Aquatic Maximum Value for TCE of 1,110 µg/L. Therefore, this pathway is incomplete.

Sediment: Volatiles were not detected in the sediment.

Rationale on potential for complete pathway

Residential Exposure Scenario

Outdoor Air: One resident uses the groundwater for a minnow farm, which could expose the resident to TCE vapors. There is also a potential pathway for residents to be exposed to soil vapor if there is any excavation on property outside of NCP control.

Industrial worker exposure scenario

Outdoor Air: TCE concentrations in the ambient air exceeded the residential screening criteria.

Construction Worker Scenario

Groundwater: If construction occurs on the site and the construction workers have to dig below the water table, there is potential for them to encounter groundwater contaminated with volatile organic carbons (VOCs).

Recreation/Trespasser/Food Scenario

Sediment: Sediment results showed arsenic above screening criteria in Pine Lake. Therefore potential exists for a complete pathway to recreational users exposed to the sediment.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[3] (i.e., potentially "unacceptable" 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 "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

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

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

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

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

Rationale and Reference(s):

Industrial Worker to Outdoor Air Pathway
TCE at a maximum concentration of 0.6 $\mu g/m^3$ was detected at the down wind direction of the API separator. The API separator is regulated via an air permit and a National Pollutant Discharge Elimination Systems (NPDES) permit. Although the TCE concentration in the ambient air exceeded the screening criteria, the concentration was found to be well with in the range of typical background concentrations (0.1 to 3.9 $\mu g/m^3$) in ambient air of urban areas.

Resident to Outdoor Air Pathway
The minnows are raised in a trough structure which is contained in a separate building. The groundwater flows continuously into the trough via flow spigots. A drop pipe allows continuous overflow discharge of the water. The building is well ventilated allowing significant exchange of building air with fresh air. In addition, the maximum TCE concentration in groundwater detected in the vicinity of this property was 130 $\mu g/L$ (Mursch 2006) which is well below the groundwater volatilization criteria for indoor air. This pathway is a conservative surrogate for outdoor air volatilization from ground water due to considerable dilution in the outdoor. The soil gas concentration was found to be 0.088 $\mu g/m^3$ which is well below typical background concentrations (0.1 to 3.9 $\mu g/m^3$) in ambient air of urban areas. Therefore, the volatilization from groundwater and soil gas is not expected to significantly impact the outdoor air in the residential area.

Resident/Off-site Construction Worker Soil Vapor Pathway
The maximum concentration of soil vapor in the residential area was 320 $\mu g/m^3$. This sample was taken at the property where TCE indoor air concentrations exceeded the action level. The house was sold to NCP, vacated, and institutional controls (such as fencing) will be placed on the property to prevent subsurface disturbance or construction on the property.

Construction Worker to Groundwater Pathway
At the facility, the water table does not start until 15-20 feet below ground surface. It is not expected that construction workers would dig deeper than 20 feet. In addition, construction is not anticipated in the near future.

Recreational/Trespasser to Sediment Pathway
Arsenic at a maximum concentration of 28.7 mg/kg in the pine lake sediment exceeded the part 201 residential screening criteria which is 7.6 mg/kg. A statistical evaluation was conducted on 13 sediment samples and 95% upper confidence of the mean was calculated. Applying a site specific recreational receptor exposure frequency of 42 days per year and at a exposure point concentration of 21.2 mg/kg, the excess cancer risk for direct contact was calculated to be 0.3 e-5. As per part 201 criteria, the cancer risk for arsenic does not exceed a target cancer risk of 1e-5 and therefore is considered protective and not significantly impact the recreational receptors.

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

☐ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" 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 "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

☐ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" 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 National Copper Products Facility, EPA ID # MID located at Dowagiac, MI 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) Jill Groboski Date 6/26/07
(print) Jill Groboski
(title) Project Manager

Supervisor (signature) George Hamper Date 6-28-07
(print) George Hamper
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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.