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DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environnemental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:	National Copper Products, Inc.
Facility Address:	Prairie Rhonde Road, Dowagiac, MI
Facility EPA ID #:	MID 005 068 507

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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 Migration of Contaminated Groundwater Under Control@ EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

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. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective levels (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

☒ If yes - continue after identifying key contaminants, citing appropriate "levels" and referencing supporting documentation.

☐ If no - skip to #8 and enter YE status code, after citing appropriate levels, and referencing supporting documentation to demonstrate that groundwater is not contaminated.

☐ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

General Background
In 1983, a leak from an underground storage tank (UST) containing trichloroethylene (TCE) caused a release to the groundwater. The residents in the area were subsequently put on city water and National Copper, then Sunstrand, was ordered by the State of Michigan to install and operate a pump and treat system to clean up the groundwater. Subsequently, the company added purge well systems off-site as well as a soil vapor extraction (SVE) system at the source area. . Upon request by the state of Michigan, the U. S. EPA began working with NCP to continue the remediation efforts at the facility. Therefore, on June 2, 2006, National Copper Products entered into an RCRA 3008(h) Administrative Order on Consent with the U. S. EPA.

Hydrogeology
The upper aquifer extends to depths of 50-60 feet below ground surface (bgs) within the plant area and extends slightly deeper toward the west and northwest. The upper half of the saturated zone in the upper aquifer consists of fine sand and the lower half consists of coarse sand, gravel and gravel-sand mixtures. There is little vertical gradient within these two halves. Just below the upper aquifer is a laterally variable zone, referred to as the aquitard zone. The thickness of this zone varies from one foot to more than 20 feet and consists of silt, clay, silty sand, and inter-bedded sand and silt layers. The soil below the aquitard zone consists of inter-bedded sand and gravel that together form a semi-confined aquifer with a general upward hydraulic gradient (Third Quarter 2007 Monitoring Report, December 13, 2007).

Current Contamination
Maximum concentrations of volatile organic carbons (VOCs) found at the most recent sampling event were compared to the maximum contaminant levels (MCLs) or when one is not provided Region 9 PRGs for tap water Metals were investigated in 2002 and again in 2006 and it was found that metals in the groundwater were below MCLs except for lead which showed a slightly elevated concentration of 4.4 μg/L compared to the MCL of 4 μg/L. MCLs were used as a screening level as a conservative approach to determine what contaminants are present in the groundwater (see Table 1). See Figure 1 that shows the boundary of TCE contamination above the MCL of 5 μg/L. TCE was chosen to indicate the extent of contamination because it is the main contaminant of concern and typically where TCE is found exceeding screening levels, the other contaminants listed in Table 1 are found as well (Third Quarter 2007 Monitoring Report, December 13, 2007).

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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 appropriate levels (appropriate for the protection of the groundwater resource and its beneficial uses).

Table 1-Maximum Concentrations of Constituents Exceeding the MCL at the NCP Facility

Contaminant	Date of Sample	Well	Maximum Concentration (µg/L)	MCL (µg/L)
Trichloroethylene	1/2008	06-18/2	8500	5
1,1,1-Trichloroethane	1/2008	06-18/1	830	200
cis-1,2-Dichloroethene	9/2007	97-214B	2400	70
trans-1,2-Dichloroethene	9/2007	97-213B	130	100
Vinyl Chloride	9/2007	83-27B	29	2
1,1-Dichloroethylene	9/2007	06-18/1	56	7
Methyl ethyl ketone	9/2007	06-23	28	13
Lead	9/2006	RL-2	4.4	4

Data is from Third Quarter 2007 Monitoring Report and the Environmental Indicator Determination Report submitted by EarthTech for National Copper Products, March 2008.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within the existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

☒ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the existing area of groundwater contamination[2]).

☐ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the existing area of groundwater contamination"[2]) - skip to #8 and enter 'NO' status code, after providing an explanation.

☐ If unknown - skip to #8 and enter 'IN' status code.

Rationale and Reference(s): *Third Quarter Monitoring Report, December 13, 2007*
Phase I Current Conditions Report, March 2002
Current Conditions Report, June 2005

See Figure 1 for a description of the facility and the surrounding area.

The facility proper is surrounded by several surface water bodies as well as a fen (a periodically wet area due to groundwater) to the north and northeast and a wetland northwest. The water bodies include Unnamed Drain to the west, Pine Lake Drain to the east and Pine Lake to the north. The wells near the Unnamed Drain or downgradient of the drain do not show contaminants above screening criteria. A seep in that area (UT-2), depicted as a blue oval on Figure 1, historically showed exceedances of screening criteria. To address this, a purge well was installed near the seep. Since that time the seep has either been dry or the results have not shown concentrations above appropriate screening levels. There are other seeps along unnamed drain as well but often are dry since the remediation system has been operating.

One vertical profile location (VP-23) showed concentrations of TCE above MCLs, but due to the environmental conditions of the wetland in that area, it was not practical to install a downgradient well. Well 06-21 was installed just upgradient at the edge of the wetland to monitor this edge of the plume and has shown concentrations above the MCL. Therefore, two temporary wells were installed as part of the Environmental Indicator effort to show that the migration of contaminated groundwater is under control. They are located northwest of the plume edge on the downgradient side of the Unnamed Drain. Neither of these wells showed contaminants of concern above MCLs.

Pine Lake was assessed in 2002 as part of gathering data for the Current Conditions Report. No contaminants of concern were found above appropriate screening levels. The Pine Lake Drain flows into Pine Lake and is located to the northeast of the facility. One well near the Pine Lake Drain exceeds the MCL for TCE, but the wells downgradient (on the other side) of the drain do not show concentrations above the reporting limit.

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[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

Several interim measures have been performed at the facility. In 1984, source removal of the leaking underground storage tank along with some of the surrounding soil that was accessible and would not interfere with the structural support of the building. In 1984, a groundwater remediation system that consisted of twelve purge wells was installed per a Consent Judgment between UTC/Sundstrand (the previous owner of the property) and the State of Michigan. In addition to the twelve-well purge system, an air sparging and soil vapor extraction system were installed.

4. Does contaminated groundwater **discharge** into **surface water** bodies?

☒ If yes - continue after identifying potentially affected surface water bodies.

☐ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

☐ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

There are several surface water bodies that surround the facility as stated in the previous question. They are as follows: Unnamed Drain to the west and northwest, Pine Lake to the north, and Pine Lake Drain to the north and north east. In addition, wetlands are located northwest of Pine Lake and a fen is located north east of the facility, south of Pine Lake Drain (see Figure 1).

5. Is the **discharge** of contaminated groundwater into surface water likely to be **insignificant** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater level, and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

☒ If yes - skip to #7 (and enter YE status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater level, the value of the appropriate level(s), and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

☐ If no - (the discharge of contaminated groundwater into surface water is potentially significant) continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater level the value of the appropriate level(s), and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater levels, the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

☐ If unknown - enter IN status code in #8.

Rationale and Reference(s): *Third Quarter 2007 Monitoring Report, December 13, 2007*
Environmental Indicator Determination Report submitted by EarthTech for National Copper Products, March 2008.

The wells chosen for comparison to the Michigan Rule 57 Water Quality Values are those located closest to one of the three surface water bodies mentioned in question three and four (see Figure x). Water quality standards were used to take into account potential ecological receptors that may be found in the surface water bodies surrounding the site. As seen in Table 3 below, none of the concentrations found in the wells were above surface quality standards.

Table 3-Maximum Concentration of VOCs taking into account a 10 times dilution factor

Contaminant	Well	Maximum Concentration (µg/L)	Max. Concentration Diluted 10 times (µg/L)	Surface Water Quality Standard* (µg/L)
Trichloroethylene	06-20/3	70	7.0	200
1,1,1-Trichloroethane	83-18B	6.8	0.68	89
cis-1.2-Dichloroethene	83-18B	230	23	230
trans-1,2-Dichloroethene	83-18C	9.6	0.96	1,500
Vinyl Chloride	83-18C	16	1.6	930
1,1-Dichloroethane	83-18B	7.4	0.74	740
Lead	RL-2	4.4	0.44	46

*The Final Chronic Value (FCV) for each contaminant was used

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be **"currently acceptable"** (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

☐ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

☐ If no - (the discharge of "contaminated" groundwater can not be shown to be **"currently acceptable"**) - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

☐ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):

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[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the existing area of contaminated groundwater?"

☒ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the existing area of groundwater contamination."

☐ If no - enter NO status code in #8.

☐ If unknown - enter IN status code in #8.

Rationale and Reference(s):

As stated previously, a groundwater remediation system is in place at the site that consists of several purge well systems, a SVE system, and air sparging system. In addition, a groundwater monitoring plan is in place per the Corrective Action Monitoring Plan dated 2007. This consists of semi-annual monitoring of most of the wells on site with quarterly monitoring on the wells that were installed in 2006. In addition, the site is still undergoing corrective action per the RCRA 3008(h) Order with the U. S. EPA Region 5.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA750)

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

☒ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the National Copper Products Facility, EPA ID #located in Dowagiac, MI. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

☐ NO - Unacceptable migration of contaminated groundwater is observed or expected.

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

Completed by	(signature)	Jill Groboski	Date 4/8/08
	(print)	Jill Groboski	
	(title)	Environmental Engineer	
Supervisor	(signature)	George Hamper	Date 4-7-08
	(print)	George Hamper	
	(title)	Chief, Corrective Action Section	
	(EPA Region or State)	5	

GH 3/27/08

Locations where References may be found:
U. S. EPA Region 5 Records Center, 7th Floor 77 W. Jackson Blvd. Chicago, IL 60604

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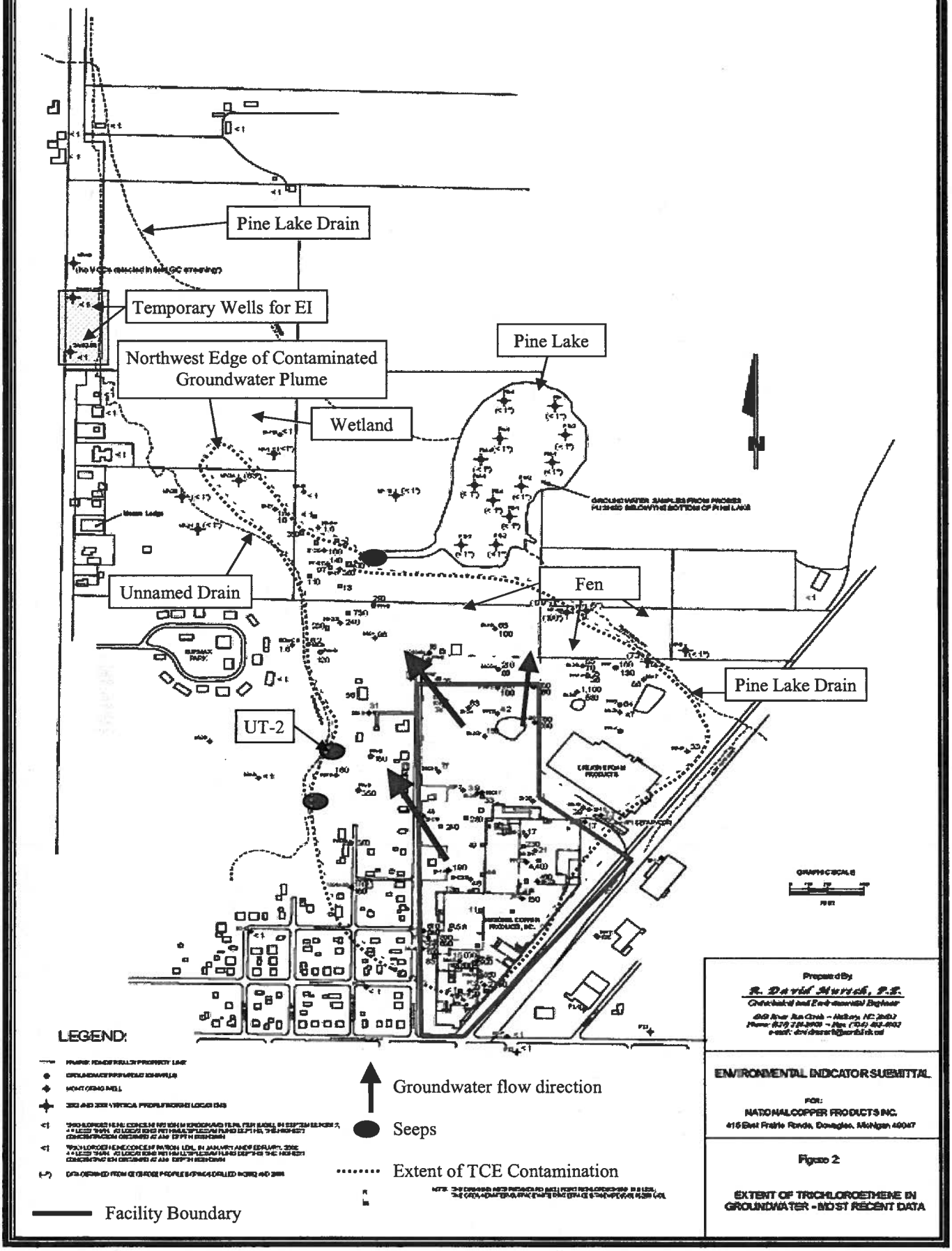
FIGURE 1 of CA 750 DETERMINATION FOR THE NCP FACILITY