RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA725)

Current Human Exposures Under Control

Facility Name: **Tetra Micronutrients, Inc. (formerly American MicroTrace Corporation)**
Facility Address: **71025 569th Avenue, Fairbury, Nebraska 68352**
Facility EPA ID #: **NED000610550**

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?

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

_____ If no - re-evaluate existing data, or

_____ If data are not available skip to #6 and enter"IN" (more information needed) status code.

Tetra Micronutrients, Inc. (TM) (formerly American MicoTrace Corporation Corporation [AMT]) is located at 71025 569th Avenue, south of Highway 8, southeast of Fairbury, Nebraska (see Figure 1). TM is owned by Tetra Technologies, Inc. TM recycles zinc bearing materials to recover zinc sulfate, which is then produced as powdered and granular forms. The facility occupies about 20 acres of the 35-acre site. The active portion of the facility includes raw material and product warehouses, a tank house, a dry material production area, offices, and a laboratory. A wetland lies north of the plant on the property, and Brawner Creek flows south along the western plant boundary, towards the Little Blue River.

SWMUs and AOCs identified at TM to date are described below (Tetra Tech EM Inc. 1998). Attachment 1 shows the layout of the facility and locations of the SWMUs and AOCs.

SWMU 1, Solid Waste Refuse Collection Area: The solid waste refuse collection area consists of a trash compactor and a roll-off box. The SWMU receives solid wastes, including empty paper bags, broken pallets, cardboard, and domestic solid waste. Storm water collected in this area flows to a sump on the East Pad and is pumped into the storm water storage tank located to the west of the East Sump (SWMU 13). There is no record or documentation of a release from this SWMU.

SWMU 2, Septic Tank and Tile Field: The septic tank and tile field receive only domestic sanitary waste. Originally constructed in 1979, the unit was upgraded in 1987 with 250 feet of additional tile field. The SWMU is permitted as a Class V injection well by the Nebraska Department of Environmental Quality.

SWMU 3, Drainage Channel: The drainage channel runs from the former drying beds at the TM facility (see SWMU 4 description) to Brawner Creek. This SWMU previously was known as the "Waterway." The drainage channel is a well defined pathway that drains storm water from the northern and western areas of the plant. Storm water runoff from the western roof area and the railroad track is collected and used in plant processes.

A reinforced concrete storm water settling basin, with a 150-gallon-per-minute sump pump and a capacity of 8,000 gallons, is located at the lower end of the channel, before it drains into Brawner Creek. Its primary function is to trap floating debris and collect initial runoff that may contain sediments. Some of the storm water collected in the storm water settling basin is pumped to the plant as process make-up water. Remaining effluent flows along the drainage channel and discharges into Brawner Creek through an 18-inch corrugated metal pipe.

SWMU 4, Drying Beds and Surrounding Area: The former drying beds are located on the western side of the railroad tracks. Prior to 1987, the beds were used as a holding area for lead cake generated during zinc sulfate production. The drying beds are constructed of concrete and cover about 6,000 square feet. The drying beds were clean closed in accordance with Resource Conservation and Recovery Act (RCRA) regulations in 1990 (U.S. Environmental Protection Agency [EPA] 1996). Around September 1996, the drying beds were renovated for use as a secondary containment area. The area is fitted with a storm water recovery sump. Four 20,000-gallon holding tanks (AOC 3) were installed in 1996 to collect storm water for use as process make-up water.

SWMU 5, Sulfuric Acid Storage Area: The sulfuric acid storage area is the area surrounding the sulfuric acid storage tanks. Releases in this area consisted of sulfuric acid, and impacted soil was removed and placed in SWMU 6, the Waste Pile (Terracon Environmental Inc. [Terracon] 1992). Previously, four 18,000-gallon horizontal tanks in a bermed area were located just east of the railroad spur. In November 1994, the tanks were decommissioned and taken to Beatrice, Nebraska, for recycling (AMT 1994). After the tanks were removed, the soil immediately beneath the tanks was removed and the remaining soil was treated to neutralize any acid. One foot of clean soil was spread on top of the treated area. The area was then covered with gravel and rock. Upon completion, three new 18,000-gallon tanks were installed on the reinforced concrete foundation, along with a secondary containment system (HWS Consulting Group, Inc. [HWS] 1998a).

SWMU 6, Waste Pile: The waste pile consisted of contaminated soil removed from SWMUs 4 and 5 (Terracon 1992). No containment measures were provided to control surface water runoff or fugitive dust emissions when the waste pile was first generated. In November of 1996, the waste pile was covered with plastic (ENTACT 1996). The soil pile was removed in January 1997 and disposed of, in compliance with all federal and state regulations (AMT 1997).

SWMU 7, Drainage Culvert: The drainage culvert is located on the eastern side of the facility, next to the county road (Tetra Tech EM Inc. 1998). Surface soil staining was described similar to that observed at SWMU 3, the Drainage Channel (Terracon 1992).

SWMU 8, Used Equipment Storage Area: The used equipment storage area initially was located in the northwestern corner of the facility. This area, also referred to as the “bone yard” or “Dump Area” (Tetra Technologies, Inc. 1998; Terracon 1992), is now located just west of the railroad car unloading area, on a concrete pad with secondary containment. The area is 110 feet long and 61 feet wide and is surrounded by a

6-inch-high concrete curb. Storm water from the SWMU is drained into SWMU 4, the former drying bed area (HWS 1998a). Accumulated storm water is pumped into holding tanks (AOC 3) for use as process make-up water.

SWMU 9, Process Wastewater Basin: The process wastewater basin also is referred to by plant personnel as the "West Sump." Wastewater from the leaching process is collected in a sump on the western side of the tank house for use in plant processes. The basin is constructed of 8-inch-thick reinforced concrete. It is 4 feet 7 inches deep, 11 feet 4 inches wide, and 31 feet long (HWS 1998a). The estimated volume of water collected and recycled on a daily basis totals 20,000 gallons. No releases from this SWMU have been reported.

SWMU 10, Former Solvent Degreasing Unit: Naphtha degreasing solvents were used at the former solvent degreasing unit in the maintenance shop. The self-contained unit was serviced monthly. Spent solvent was picked up for recycling and fresh solvent delivered. The unit is no longer present at the facility. No documented releases have occurred from this SWMU (AMT 1997).

SWMU 11, Waste Oil Collection Area: The waste oil collection area is located inside of the maintenance shop. About two 55-gallon drums of waste oil per year are collected at the unit and recycled. The waste oil drums are stored inside of the shop on a concrete pad. No documented releases have occurred from this SWMU (AMT 1997).

SWMU 12, By-products Building: Lead slurry is pumped from the tank house to the filter press in the by-products building. Lead cake with a moisture content of 30 to 40 percent currently is stored in a bunker in bulk form and is sent to a hazardous waste landfill (Tetra Technologies, Inc. 1998). Lead sulfate slurry is piped into the by-products building and dewatered with an air-over-hydraulic press. The lead cake is stored in a storage bunker next to the press. The storage bunker walls are 8 feet tall and are constructed of 8-inch-thick reinforced concrete on three sides. A drain box is located in the northeastern corner of the bunker to catch liquids drained from the bunker. The liquid collected in the drain box is pumped to a sump located to the south of the bunker (HWS 1998a). Water collected in the sump is pumped back to the tank house for use as process make-up water. No documented releases have occurred from SWMU 12 (Terracon 1992).

SWMU 13, East Sump: The east sump is a sump that receives liquids that may accumulate on the floor near the presses at the east end of the tank house. The sump is located in the press area of the tank house. The sump is constructed of 8-inch-reinforced concrete and is 4 feet deep, 5 feet wide, and 9 feet long (HWS 1998a). There are no documented releases from this SWMU (Tetra Tech EM Inc. 1998).

AOC 1, Filter Press: The press area contains four presses that formerly managed cadmium, copper and manganese filter cake. Currently, only cadmium cake is generated in the press area (Tetra Technologies, Inc. 1998). The filter presses generate solid waste that is being managed as hazardous waste. The waste generated in the cadmium and finish cake presses is manually removed from the presses and transported to the by-products building. Lead cake is manually removed from the lead cake press and placed in the storage bunker in the by-products building. The potential for spillage exists while removing the filter cake from the presses and transporting it to the storage bunker.

AOC 2, Process Silos: All zinc oxide raw materials are stored in closed buildings with concrete floors or in AOC 2, the Process Silos, which are steel bulk storage silos. The silos are used to meter zinc oxide into the leach tanks in the tank house. There are two zinc oxide silos in the TM facility. The silos are 18 feet in diameter and 40 feet high. Currently, only one of the two silos stores zinc oxide used to make fertilizer (Tetra Technologies, Inc. 1998). Rail cars are unloaded directly into the steel storage silos by a pneumatic unloading system. Supersacks of material are stored in closed buildings until they are emptied into the silos by a hopper and bucket elevator. The hopper is fitted with a hood and doors connected to a fabric filter baghouse to control fugitive emissions. The silos are inspected daily (AMT 1996).

AOC 3, Storm Water Holding Tanks: Four storm water holding tanks are located in SWMU 4, the former drying bed area. Each has a capacity of 20,000 gallons. The tanks are constructed of fiberglass (HWS 1998a). The drying beds were renovated in September 1996 for use as a secondary containment area. The area is fitted with a storm water recovery sump.

AOC 4, Groundwater: An initial groundwater assessment indicated elevated levels of zinc, arsenic, chromium, barium, and lead in an area beneath SWMU 4 (Terracon 1992).

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 [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act] from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater		X		
Air (indoors)[2]	X			
Surface Soil (e.g.,<2 ft)	X			**Please see below**
Surface Water		X		
Sediment	X			
Subsurf. Soil (e.g., >2 ft)		X		
Air (outdoors)	X			

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

__X__ 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):

The site is located south of Highway 8 and southeast of Fairbury, Nebraska. The facility was constructed by Eagle-Picher Industries in 1979, and AMT purchased the facility in August 1988. In October 1995, Tetra Technologies, Inc., purchased the facility from AMT. The facility currently operates under the name TM.

TM is an active facility operating 24 hours a day, 7 days a week and employs about 55 people (HWS 1998c). Potential sources of contamination at the facility include: permitted air emissions; precipitation runoff from the roofs; releases from previous raw material and waste material handling practices; runoff from residual contamination in soil; releases from the sulfuric acid tanks; and releases from the former soil pile. The primary contaminants of concern at the facility are metals, including lead, cadmium, and zinc.

Groundwater

Groundwater samples collected from monitoring wells at the facility reveal metal concentrations below MCLs. Monitoring well locations are shown on Figure 2 in Attachment 1. Historically, Monitoring Well MW-7 has proved the exception. MW-7 is located directly northwest of and downgradient from the main facility building. In groundwater samples collected from MW-7 since 1998, total cadmium concentrations have reached 0.017 mg/L, exceeding the MCL of 0.005 mg/L. Also since 1998, manganese concentrations in MW-7 have reached 0.23 mg/L, exceeding the Secondary Maximum Contaminant Level (SMCL) of 0.05 mg/L. However, current levels of total cadmium (0.004 mg/L) and total manganese (0.02 mg/L) are below their respective MCL and SMCL (TM 2001) (see Attachment 2). The contaminant plume is limited to the TM property and the migration of contaminated groundwater continues to be stabilized (EPA 2000).

Surface Soil (0 to 2 feet)

In 1990, three soil samples were collected from SWMU 3 at 6, 12, and 18 inches below ground surface (bgs) and were subjected to the Toxicity Characteristic Leaching Procedure (TCLP) (Terracon 1992). TCLP regulatory limits for extracts from soil samples are 1.0 mg/L for cadmium and 5.0 mg/L for lead. In the soil sample collected at 6 inches bgs, analytical results revealed cadmium at a concentration of 5.1 milligrams per liter (mg/L) and lead at a concentration of 15 mg/L. In the soil sample collected at 12 inches, analytical results revealed cadmium at a concentration of 1.5 mg/L and lead at a concentration below the TCLP regulatory limits for extracts from soil samples. In the soil sample collected at 18 inches, analytical results revealed both cadmium and lead at concentrations below the TCLP regulatory limits for extracts from soil samples (Terracon 1992).

Additional surface soil samples were collected from SWMU 3 in September 1997. A composite sample from 0 to 2 inches bgs contained total metals concentrations of 46.3 milligrams per kilogram (mg/kg) cadmium; 1,918 mg/kg lead; and 7,670 mg/kg zinc. Concentrations of cadmium and zinc fell below their respective EPA Region 9 Preliminary Remediation Goals (PRG) for industrial soil of 810 mg/kg and 100,000 mg/kg. Lead was detected above its EPA Region 9 Preliminary Remediation Goal (PRG) of 750 mg/kg, but below its site-specific common tendency (CT) PRG of 1,932 mg/kg for adult receptors (see Attachment 3; HWS 1998c). Metal concentrations decreased with depth. A sample collected from 6 to 12 inches bgs contained the following total metals concentrations: 7.03 mg/kg cadmium, 19.8 mg/kg lead, and 1,786 mg/kg zinc. All of these concentrations fell below their respective PRGs (HWS 1997).

Also in September 1997, four discrete soil samples were collected from SWMU 7 at 0 to 6 inches bgs. Analytical results revealed total cadmium concentrations ranging from 13.6 to 196 mg/kg, total lead concentrations ranging from 281 to 4,310 mg/kg, and total zinc concentrations ranging from 1,989 to 34,488 mg/kg. Again, lead exceeded the site-specific and EPA Region 9 PRGs, while cadmium and zinc did not (HWS 1997).

The figures provided in Attachment 4 show the lead and manganese concentrations detected in surface soil samples (0 to 2 inches bgs) collected from across the facility during the September 1997 investigation. Lead was detected at concentrations up to 7,093 mg/kg in the area of SWMU 8 and manganese was detected at concentrations up to 27,367 mg/kg in the area of SWMU 5. The maximum lead concentration exceeded the EPA Region 9 PRG for industrial soil of 750 mg/kg and the site-specific CT PRG for adult receptors of 1,932 mg/kg for maximum exposure. The maximum manganese concentration fell below the EPA Region 9 PRG for industrial soil of 32,000 mg/kg (HWS 1998b).

Subsurface Soil (> 2 feet)

During the 1997 site investigation, the facility collected soil samples at depths up to 3 feet bgs in locations where historical data indicated possible releases. Soil samples collected at these depths revealed significant reductions in contaminant concentration with depth. For example, a sample collected near the northwestern corner of the by-products building revealed elevated concentrations of lead in the first 2 inches bgs (788 mg/kg). The lead concentration dropped to 148 mg/kg between 6 and 12 inches, and then again to 16.6 mg/kg between 18 and 24 inches. At 3 feet bgs, the lead concentration had dropped nearly 30 times. Therefore, subsurface soils are not likely to have been significantly impacted by metals contamination (HWS 1998b).

Surface Water and Sediment

Surface water also has been impacted with contaminants. Brawner Creek is an intermittent stream located west of the facility. Historically, downstream surface water samples from Brawner Creek have revealed total lead concentrations up to 0.018 mg/L, exceeding the MCL of 0.015 mg/L. However, samples collected from Brawner Creek since January 2000 have been below the MCL (TM 2001). See Attachment 5 for quarterly surface water sample results for Brawner Creek.

A discrete sediment sample collected from Brawner Creek, near the outlet of the drainage channel, contained total metals concentrations of cadmium at 93.6 mg/kg; lead at 4,631 mg/kg; and zinc at 23,334 mg/kg (HWS 1997). Cadmium and zinc concentrations fell below EPA Region 9 PRGs for industrial soil, but lead concentrations exceeded the EPA Region 9 PRG of 750 mg/kg and the site-specific CT PRG of 1,932 mg/kg.

Brawner Creek flows south into Little Blue River, approximately 0.50 mile downstream of the TM facility. Upstream, midstream, and downstream water quality data indicate that site-related chemicals have not migrated downstream in Brawner Creek, and that the Little Blue River has not been impacted (HWS 1998c).

Air

The Nebraska Department of Environmental Quality (NDEQ) collected outdoor air samples near the northwest boundary of the site from June 1996 through June 1997. Perimeter air samples revealed lead concentrations ranging from nondetect to 0.30 micrograms per cubic meter ($\mu g/m^3$)(HWS 1998b). All concentrations fell below the 1.5 $\mu g/m^3$ lead level determined by EPA to be protective of adult and child health.

The facility collected upwind and downwind outdoor air samples during lead cake stabilization in March and April 1997 and indoor air samples from facility production and non-production buildings in June 1997. For outdoor air, the upper confidence level of the mean detections was 19.8 $\mu g/m^3$ for lead, 0.4

μg/m^3 for cadmium, and 76.5 μg/m^3 for particulates. For indoor air in production areas, the upper confidence level of the mean detections was 11 μg/m^3 for lead, 0.45 μg/m^3 for cadmium, and 2,848 μg/m^3 for particulates. For indoor air in non-production areas, the upper confidence level of the mean detections was 2.27 μg/m^3 for lead, 0.08 μg/m^3 for cadmium, and 456 μg/m^3 for particulates. The UCL values for both outdoor and indoor air samples exceeded the EPA-specified level of 1.5 μg/m^3 for lead and the EPA Region 9 PRG of 0.0011 μg/m^3 for cadmium in ambient air (HWS 1998c).

Footnotes:

[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.

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	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
~~Groundwater~~	—	—	—	—	—	—	—
Air (indoors)	No	Yes	No	No	No	No	No
Soil (surface, e.g.,<2 ft)	No	Yes	No	Yes	No	Yes	No
~~Surface Water~~	—	—	—	—	—	—	—
Sediment	No	Yes	No	Yes	No	Yes	No
~~Soil (subsurface e.g.,>2 ft)~~	—	—	—	—	—	—	—
Air (outdoors)	No	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).

__X__ 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 and Reference(s):

Because of the rural nature of the facility and surrounding area, residential and daycare receptors were not considered to be viable exposure pathways. Much of the facility perimeter is fenced, which discourages trespassers. Additionally, the facility operates 24 hours a day, 7 days a week. Trespasser receptors were not considered to be a viable exposure pathway. Brawner Creek is a shallow stream and is classified as intermittent on topographic maps. Although there is abundant aquatic life in the creek, no fish of edible size are anticipated to be present. Because no fish are expected to be present on the TM property and because no crops or livestock are produced there, food receptors were not considered to be a viable exposure pathway.

Worker

The surface soil exposure pathway, the sediment exposure pathway, and the indoor and outdoor air exposure pathways are potentially complete for on-site workers. Workers may incidentally ingest or come into dermal contact with contaminated surface soils or sediment while performing outdoor maintenance activities. Workers also may inhale airborne particulate matter containing contaminated surface soil while performing indoor and outdoor activities.

Construction Worker

The surface soil exposure pathway, the sediment exposure pathway, and the outdoor air exposure pathway are potentially complete for on-site construction workers. Construction workers may come into dermal contact with contaminated surface soils or sediment while performing outdoor excavation and construction activities. Construction workers also may inhale or ingest airborne particulate matter containing contaminated surface soil while performing outdoor activities. Construction workers are not expected to participate in indoor activities on site.

Recreational User

The surface soil exposure pathway and the sediment exposure pathway are potentially complete for the recreational user. Recreational users may come into dermal contact with contaminated surface soils or sediment while hiking or wading along Brawner Creek. Brawner Creek forms the western boundary of the site property. NDEQ collected outdoor air samples near the northwestern property boundary in 1996 and 1997 and determined that contaminant levels were below risk-based levels. Therefore, outdoor air does not provide a complete pathway for the recreational user. Recreational users are not expected to participate in indoor activities on site.

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[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (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."

__X__ 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):

Potentially complete pathways exist between the worker and surface soil, sediment, and indoor and outdoor air; between the construction worker and surface soil, sediment, and outdoor air; and between the recreational user and surface soil and sediment.

Worker

On-site workers fall into three categories: (1) those who work indoors without personal protective equipment, such as office and laboratory workers; (2) those who work indoors with personal protective equipment but may work for short periods outdoors without personal protective equipment, such as plant industrial workers; and (3) those who visit the site, such as truck drivers and contractors.

Plant industrial workers are expected to be onsite an average of 10.5 hours a day, 200 days per year, for an average of 4.75 years. The maximum employment time for the facility is 16 years, and the minimum is 0.25 year (HWS 1998c). A risk-based site assessment based on samples collected in 1997 calculated the cumulative risks from all chemicals and pathways for plant industrial workers (hazard index [HI] 7, cancer risk [CR] 7.57×10^{-5}). Contaminants of concern included arsenic, cadmium, copper, lead, manganese, zinc, and iron. Total cumulative risk values were based on the incidental ingestion of soil or dust (HI 0.008, CR 1.13×10^{-7}), inhalation related to environmental releases (HI 0.06, CR 1.02×10^{-7}), and inhalation related to exposure to non-environmental releases (HI 7, CR 7.55×10^{-5}). The cumulative risk

HI and CR values were above the recommended HI of 1 and within the recommended CR of $1x10^{-4}$ to $1x10^{-6}$. Risks based on inhalation related to exposure to non-environmental releases are expected to be significant (see Attachment 6; HWS 1998c).

Office and laboratory workers are expected to be onsite an average of 8.5 hours a day, 250 days per year, for 25 years. A risk-based site assessment based on 1997 sample data calculated the cumulative risks from all chemicals and pathways for office and laboratory workers (HI 0.09, CR $1.1x10^{-7}$). Contaminants of concern included aluminum, arsenic, barium, cadmium, chromium, copper, lead, manganese, zinc, nickel, and iron. Total cumulative risk values were based on the incidental ingestion of soil or dust (HI 0.04, CR not applicable) and inhalation related to environmental releases (HI 0.05, CR $1.1x10^{-7}$). The cumulative risk HI and CR values were below the recommended HI of 1 and CR of $1x10^{-4}$ to $1x10^{-6}$ and are not expected to be significant (see Attachment 6; HWS 1998c).

Site visitors are expected to come into contact with contaminated surface soil, sediment, or air no more than 8 hours a day, 40 days a year, for 1 year (HWS 1998c). A risk-based site assessment based on 1997 sample data calculated the cumulative risks from all chemicals and pathways for site visitors (HI 0.11, CR $3.88x10^{-7}$). Contaminants of concern included arsenic, cadmium, copper, lead, manganese, zinc, and iron. Total cumulative risk values were based on the incidental ingestion of soil or dust (HI 0.02, CR 2.25×10^{-7}) and inhalation related to environmental releases (HI 0.09, CR $1.63x10^{-7}$). The cumulative risk HI and CR values were below the recommended HI of 1 and CR of $1x10^{-4}$ to $1x10^{-6}$ and are not expected to be significant (see Attachment 6; HWS 1998c).

Construction Worker

Construction workers are expected to come into contact with contaminated surface soil, sediment, or air no more than 8 hours a day, 24 days a year, for 1 year. Risk to construction workers was not evaluated separately in the risk-based site assessment; however, the construction worker exposure parameters are significantly lower than those used to determine PRGs for industrial soil (8 hours a day, 250 days a year, for 25 years) and those used to calculate the risk to plant industrial workers (10.5 hours a day, 200 days per year, for 4.75 years) (HWS 1998c). Additionally, no construction is currently taking place on the site. Risks from these pathways are not expected to be significant.

Recreational User

Recreational users are expected to come into contact with contaminated surface soil or sediment in the vicinity of Brawner Creek no more than 4 hours a day, 52 days a year, for half a year (HWS 1998c). A risk-based site assessment based on 1997 sample data calculated the cumulative risks from all chemicals and pathways for adult recreational users (HI 0.006, CR $2.42x10^{-7}$). Adult and child recreational users were considered separately. Contaminants of concern included aluminum, arsenic, barium, cadmium, chromium, copper, lead, manganese, nickel, zinc, and iron. Total cumulative risk values were based on the incidental ingestion of sediment (HI 0.002, CR 9.90×10^{-8}) and dermal contact (HI 0.004, CR $1.43x10^{-7}$). The cumulative risk HI and CR values for adult recreational users were below the recommended HI of 1 and CR of $1x10^{-4}$ to $1x10^{-6}$ and are not expected to be significant (see Attachment 6; HWS 1998c).

Cumulative risks from all chemicals and pathways for child recreational users (HI 0.009, CR $9.91x10^{-8}$) were also calculated in the risk-based site assessment. Contaminants considered included aluminum, arsenic, barium, cadmium, chromium, copper, lead, manganese, nickel, zinc, and iron. Total cumulative risk values were based on the incidental ingestion of soil or dust (HI 0.006, CR $6.71x10^{-8}$) and dermal contact (HI 0.003, CR $3.20x10^{-8}$). The cumulative risk HI and CR values for adult recreational users were below the recommended HI of 1 and CR of $1x10^{-4}$ to $1x10^{-6}$ and are not expected to be significant (see Attachment 6; HWS 1998c).

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[4] 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.

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

__X__ 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):

The inhalation risk to industrial plant workers is expected to be significant (HWS 1998c). However, the significance of this exposure pathway may be show to be within acceptable limits based on the information outlined below.

Existing air quality data for the facility was collected in 1997, during the two month period when stabilization of lead cake was being performed on site. This activity likely generated higher particulate and contaminant concentrations, causing the data to have a high bias. Additionally, indoor air quality in most areas of the plant improved after the 1997 air monitoring event. The open auger that delivered zinc oxide to the tank house was replaced with a covered auger, reducing dust emissions and releases in the tank house. The lead sulfate storage building was emptied of all dry lead sulfate and was thoroughly cleaned to remove residual lead sulfate, reducing dust emissions and improving air quality. In the zinc oxide storage area, a pneumatic super sack emptying system was installed to eliminate the generation of zinc oxide dust during the sack emptying process. Offices and laboratories are cleaned twice a day to minimize accumulation of chemical-laden dust to which workers may be exposed. In all areas, a daily inspection schedule is in place to ensure good housekeeping practices. Facility management is aware of chemical contamination in soil at the facility, and facility operations and maintenance are used to minimize the potential exposure. Dust generated is minimized through the vegetation of contaminated areas that keeps soil in place and minimizes dust generation. In light of these improvements, the data collected during the 1997 monitoring event represent a maximum exposure for the facility (HWS 1998c).

The facility requires industrial plant workers wear full-face respirators to limit their exposure to site-related chemicals while in the plant (ENTACT 1997). These respirators have a protection factor of 50 (ENTAC 1997). Industrial plant workers also are supplied with clean uniforms daily and are instructed to shower and change into street clothes before leaving the plant, reducing the potential for dermal contact or contaminant dispersion outside of the facility (ENTACT 1997). Attachment 7 contains the TM HASP.

Workers that would be subject to unacceptable levels of indoor air quality participate in semi-annual blood-lead monitoring. Blood-lead data do not indicate that concentrations of lead in blood have increased (HWS 1998c).

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):

__X__ 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 Tetra Micronutrients (formerly American MicroTrace Corporation) facility, EPA ID # NED000610550, located at 71025 569th Avenue, Fairbury, Nebraska 68352 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 ___Original signed by____________________ Date __9/12/02___
(signature)
Robert Aston
Project Manager, RCRA Corrective Action & Permits Branch
EPA Region 7

Supervisor __Original signed by____________________________ Date __9/12/02_____
(signature)
John Smith
Branch Chief, RCRA Corrective Action & Permits Branch
EPA Region 7

Locations where References may be found:

EPA Region 7 Headquarters
RCRA Files
901 North 5th Street
Kansas City, Kansas 66101

Contact telephone and e-mail numbers

John Delashmit
(913) 551-7821
delashmit.john@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.

REFERENCES

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HWS. 1998b. "Report on Site Investigation [SI] and Risk-based Site Assessment [RASA] at AMT, Fairbury, Nebraska, Volume 1, Site Characterization Report". April.

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Tetra Technologies Inc. 1998. Letter Commenting on Background Information Document. From Veau Animal, Tetra Technologies, Inc. To Ken Herstowski, EPA. April 13.

Tetra Tech EM Inc. 1998. Revised Background Information Document, AMT, Fairbury, Nebraska. Prepared for EPA. May 1.

ATTACHMENT 1

FIGURES FOR TETRA MICRONUTRIENTS, INC., FACILITY

ATTACHMENT 2

ANALYSIS OF MONITORING WELLS, THIRD QUARTER 2001

ATTACHMENT 3

RISK OF INGESTION AND INHALATION TABLES

ATTACHMENT 4

MAPS OF LEAD AND MANGANESE CONTAMINATION IN SITE SURFACE SOILS

ATTACHMENT 5

ANALYSIS OF BRAWNER CREEK, THIRD QUARTER 2001

ATTACHMENT 6

RISK ASSESSMENT TABLES

ATTACHMENT 7

AMERICAN MICROTRACE FACILITY, FAIRBURY, NEBRASKA, HEALTH AND SAFETY PLAN