DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRA Info code (CA725)
Current Human Exposures Under Control

Facility Name: Clean Harbors Kansas, LLC
Facility Address: 2549 New York Avenue, Wichita, Kansas
Facility EPA ID #: KSD007246846

DETERMINATION RESULT: YE

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.

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

Facility Information

The Clean Harbors Kansas (CHK) facility is located on approximately six acres of land in an industrialized portion of Wichita, Kansas, on the east central side of Sedgewick County. CHK is bordered by the El Paso Corporation (formerly Coastal Derby) refinery to the south and west, a Union Pacific Railroad (UPRR) rail yard to the north, and New York Avenue and Interstate 135 to the east. The East Fork of Chisholm Creek is also located approximately 150 feet east of the site. The site lies within the North Industrial Corridor (NIC), which encompasses most of the industrial use property (over 4,000 acres) in the Wichita area.

The CHK site has been owned and operated by a variety of companies over the past 60 years. Between the 1940s and 1970, the site was used for paint manufacturing by Enmar Paints. In 1979, Reid Supply Company bought the property and began operations to recover and reclaim hazardous wastes generated off-site (including spent solvents, electroplating wastes, and sludges). Site ownership changed several times after 1985, with Safety-Kleen (S-K) being the most notable occupant of the site. In 2002, the site and equipment was purchased by CHK. The facility is currently permitted to conduct regulated activities including hazardous and nonhazardous waste storage, treatment, and recovery for recycling. Wastes handled at the CHK facility include paints, batteries, fluorescent bulbs, incinerable hazardous solids, lab packs, mercury, household hazardous wastes, off-specification and production wastes from industry, chlorinated and non-chlorinated petroleum-based waste solvents, plating wastes, and corrosives. Wastes left over after recovery/reclamation operations are shipped to another facility for treatment or disposal (Ref. 4).

A RCRA Facility Assessment (RFA) was completed at CHK in 1990. Results of the RFA are presented in a draft document dated September 24, 1990. The RFA identified numerous Solid Waste Management Areas (SWMUs) and Areas of Concern (AOCs) at the site. These areas were identified based on a review of historical file material including site maps, aerial photographs, inspection reports, release reports, and miscellaneous environmental documentation. The Hazardous and Solid Waste Amendments (HSWA) permit for the facility, issued on December 23, 1994, required investigation and corrective action (if necessary) for most of the SWMUs and AOCs to determine if hazardous material handling and waste management practices had resulted in environmental contamination. CHK completed several phases of RCRA Facility Investigation (RFI) between November 1999 and November 2002. Attachment 1 lists the SWMUs, AOCs, and "other areas" (OAs) included in the RFI effort to date. The permit deferred investigation and corrective action for SWMUs 2, 3, 10, 11, 13, and 14, pending demolition of associated buildings or final closure of the facility (Ref. 4).

Chlorinated hydrocarbons are the primary contaminants released to soil and groundwater at CHK. According to the RFI, soil contamination at 10 SWMUs and one OA warrants further evaluation. Soil contamination correlates well with groundwater impacts; however, some of the observed groundwater contamination appears to originate upgradient of the CHK property. The Kansas Department of Health and Environment (KDHE) is presently conducting an independent environmental investigation of chlorinated volatile organic compounds (VOCs) in groundwater beneath the NIC. Several potentially responsible parties have been identified as part of the NIC investigation (Ref. 4). Surface water in the East Fork of Chisholm Creek (the closest surface water body to the site; Figure 1, Attachment 2) did not indicate detectable levels of site-related contamination during the most recent round of sampling (Ref. 4).

According to the RFI Report, future activity for CHK includes: annual monitoring of all on-site monitoring wells for the next three years; completion of a formal human health risk assessment; development of Remedial Action Objectives for long-term remediation of soil and groundwater; supplemental investigation of soil and/or groundwater at the UPRR and El Paso properties once pertinent access agreements are finalized; and implementation of a Corrective Measures Study if necessary based on risk assessment results. Additional surface water and/or sediment investigation will be requested in KDHE's comments on the draft RFI Report.

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)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			VOCs; see discussion below.
Air (indoors)[2]	X			VOCs; see discussion below.
Surface Soil (e.g., <2 ft)	X			Arsenic and lead; see discussion below.
Surface Water		X		
Sediment		X		
Subsurf. Soil (e.g., >2 ft)	X			Arsenic and lead; see discussion below.
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:

[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.

Groundwater

Shallow subsurface soil typically consists of seven to 17 feet of gravelly clay and silt, situated over a layer of sand (with occasional clay lenses) approximately nine to 17 feet thick. A clay layer between two and four feet thick appears to be present across most of the CHK site (pinching out to the southwest); however, the data do not support a determination that the clay is acting as a confining layer to downward contaminant migration. Beneath the intermittent clay layer is another interval of sand approximately eight to nine feet thick. Weathered and competent bedrock of the Wellington Shale Formation is encountered below the deep sand at depths ranging from 35 to 42 feet below the ground surface (bgs). This bedrock is estimated to be over 200 feet thick in the vicinity of the CHK site (Refs. 2 and 4). Groundwater is encountered under water table conditions from 12 to 16 feet bgs in the upper sand layer, and under possible semi-confined conditions in the lower sand layer. A slightly upward vertical flow gradient has also been measured in some CHK wells; however, the data do not support confining conditions. Most likely, the intermittent clay layer acts to retard contaminant migration to groundwater at depth. Horizontal groundwater flow in both the upper and lower sand layers is generally to the southeast.

Groundwater samples were most recently collected from CHK monitoring wells in August 2002. These samples were analyzed for VOCs, total iron and manganese, and general chemistry parameters. Several VOCs were detected during this sampling event at concentrations above EPA's maximum contaminant levels (MCLs) and/or EPA Region 9 preliminary remediation goals (PRGs) for tap water (where MCLs were unavailable). Table 1 presents the highest concentrations measured in on-site monitoring wells in August 2002 (Ref. 4). Figure 2 (Attachment 3) shows the location of monitoring wells on-site and in the immediately surrounding area.

In November 2001 and August 2002, groundwater samples were also collected from Geoprobe borings across the site as shown on Figure 2 (Attachment 3). These samples were analyzed only for VOCs. As shown in Table 1, VOC results from the Geoprobe samples are similar to those reported in monitoring wells, and generally confirm the presence of low level chlorinated hydrocarbon contamination in groundwater at CHK. Nevertheless, it should be noted that Geoprobe samples are not filtered during the collection process to remove fine soil particles, and constituents adsorbed to these particles tend to artificially increase the "dissolved" result for groundwater. Thus, the monitoring well data presented in Table 1 are considered more reliable and representative of the actual groundwater quality beneath the site (Ref. 4).

Table 1. Maximum Concentrations Exceeding Screening Criteria in CHK Groundwater

Compound	MCL or PRG	Maximum Well Concentration	Well ID	Maximum Geoprobe Concentration	Probe ID
Organic Constituents (μg/L)					
Carbon Tetrachloride (CT)	5	31	SK-B92	21	B-105 (19)
Chloroform (CF)	5	38	SK-B92	30	B-105 (19)
cis-1,2-Dichloroethene (cis-1,2-DCE)	70	1,500	SK-2S	1,700	B-50 (18)
1,1-Dichloroethene (1,1-DCE)	7	7.4	SK-B68	No exceedances	
Tetrachloroethene (PCE)	5	1,100	SK-2S	1,700	B-50 (18)
1,1,1-Trichloroethane (TCA)	200	300	SK-2S	340	B-50 (18)
Trichloroethene (TCE)	5	570	SK-2S	960	B-50 (18)
1,2,4-Trimethylbenzene (1,2,4-TMB)	12	28	SK-3S	23	B-60 (18)
Vinyl Chloride (VC)	2	28	SK-10S	260	B-78 (20)
Inorganic Constituents (mg/L)					
Iron	11	140	SK-10S	NA	NA
Manganese	0.88	6.4	SK-10S	NA	NA

MCLs from EPA's Safe Drinking Water Act Regulations and Health Advisories.

PRGs from EPA Region 9 PRGs table for compounds with no established MCL.
Monitoring well samples collected in August 2002; Geoprobe samples collected in November 2001 and August 2002.
NA - Geoprobe samples not analyzed for this constituent.

A review of the combined groundwater data set from the RFI shows that the most significant groundwater contamination at CHK is found in three locations:

- The main processing area –– with the highest concentrations of PCE, TCE, TCA, and cis-1,2-DCE reported in wells SK-B68 and SK-2S, and Geoprobe location B-50.
- The northwestern portion of the site near SWMUs 17 and 24 –– with the highest concentrations of CT and CF detected at well SK-B92 and Geoprobe location B-105.
- The eastern end of the site –– with the highest concentrations of VC reported in Geoprobe boring B-78, downgradient Geoprobe boring B-79, and off-site monitoring well SK-10S.

Similar contamination is reported downgradient of these areas, but generally at much lower concentrations. The horizontal extent of these impacts appears to be limited to on-site areas, and off-site areas between the site and the East Fork of Chisholm Creek.

The data also show low levels of contamination at the southern edge of the CHK property. VOCs consistent with paint wastes were reported above screening criteria in well SK-3S at the downgradient edge of SWMU 20. Chlorinated VOCs were also detected above screening criteria in wells SK-4S and HRI-03 at the southwestern corner of the site. However, as shown on Figure 5-9 of the RFI (Ref. 4), none of these constituents exceeded screening criteria in immediately downgradient groundwater beneath the El Paso refinery property (in well MW-3 and Geoprobe sampling locations GP10F-04 and GP10F-05). Thus, the extent of these groundwater impacts appears to be roughly delineated within 200 feet of the southern CHK property line. It should also be noted that additional investigation is planned to more closely define the horizontal off-site extent of site-related impacts (Ref. 4).

Vertically, site-related VOC contamination appears to be largely limited to shallow groundwater. The clay layer discussed above appears to retard contaminant migration from upper groundwater to lower groundwater across most of the CHK property (Ref. 4). As a result, RFI data show fewer exceedances and lower contaminant concentrations in deep groundwater. TCE was the only VOC detected above screening criteria in deep groundwater during the August 2002 sampling round. TCE exceedances are also reported in deep groundwater beneath the El Paso refinery property. The fact that these exceedances are observed across the width of the El Paso property (in areas downgradient of CHK and downgradient of other properties) suggests that deep TCE impacts may be regional in nature, and not solely attributable to CHK. As such, deep groundwater impacts are being addressed as a component of NIC corrective action (both upgradient and downgradient of the site) and will not be further evaluated in this EI determination.

Iron and manganese have also been reported above their respective PRGs. These exceedances are limited to the shallow groundwater with only one exception (the detection of manganese only marginally above its PRG in deep well SK-4D). As discussed in the RFI, these results (along with other general chemistry data for CHK groundwater) are reflective of natural biogenic activities. Relatively low levels of dissolved oxygen and other electron acceptors have been detected in monitoring well samples, suggesting that chlorinated VOCs in shallow groundwater are being metabolized by anaerobic microorganisms. As a result, shallow groundwater becomes more reducing, iron and manganese become more soluble, and their concentrations increase in the shallow zone. Based on this assessment, these constituents are not believed to be associated with on-site releases. Furthermore, neither of these inorganics is considered a RCRA hazardous constituent pursuant to 40 CFR Part 261. Consequently, iron and manganese exceedances in groundwater will not be further addressed in this EI determination.

Air (Indoor)

VOC constituents are present in both soil and groundwater at CHK. As a result, it is possible that organic vapors may migrate up through the ground surface and into cracks in on-site building foundations and floors. The contribution of VOCs from sources below ground surface, however, are expected to be insignificant compared with the amount of VOCs in indoor due to normal facility operations. The indoor air media is carried forward for further evaluation in this EI.

Indoor air concerns do not apply to the open space areas around the site, the open-air processing area east of Building D, or the highway corridor and open space area between the eastern CHK boundary and the East Fork of Chisholm Creek. Furthermore, indoor air issues do not appear to be a concern immediately downgradient of the CHK site in the extreme northern portion of the El Paso refinery, as facility maps show only open space and open-air tanks farms in the potential plume area (i.e., north of off-site well MW-3 and Geoprobe sampling locations GP10F-04 and GP10F-05).

Surface Soil (0 to 2 feet) and Subsurface Soil (> 2 feet)

Surface and subsurface soil samples were collected at CHK between 1999 and 2002 as a component of each phase of the RFI. Samples from the various study areas (shown on Figure 3, Attachment 4) were individually targeted for laboratory testing based on historical usage and release information. Analytical parameters for soil included VOCs, semivolatile organic compounds (SVOCs), metals, pesticides, diesel range organics (DRO), and/or petroleum constituents (benzene, toluene, ethylbenzene, and xylene [BTEX]).

RFI results show that surface and subsurface soils at CHK have been impacted by VOCs, metals, and isolated low levels of SVOCs, DRO, and pesticides (Ref. 4). RFI soil data were compared to KDHE Tier 2 Screening Criteria for Non-Residential Soil and EPA Region 9 PRGs for Industrial Soil, with the higher screening value being used as the final indicator of significant contamination for purposes of this EI determination. Of all the constituents analyzed, only arsenic and lead exceeded the final screening criteria as shown in Table 2 (Ref. 4). Both surface and shallow subsurface soils have been affected in the vicinity of OA 6, at the southern edge of SWMU 22, and on-site along the northern CHK property line. Of the three lead exceedances reported in soil during the RFI, only the surface soil sample from boring B-40 is higher than the acceptable adult exposure range of 710 to 1,712 mg/kg identified by the EPA Technical Review Work Group (Ref. 1).

Table 2. Metals Concentrations Exceeding Final Screening Criteria in CHK Soil (mg/kg)

Compound	Screening Criteria *	Reported Concentration	Sample Location	Sample Depth (bgs)	Site Area	Date
Surface Soil (< 2 feet)						
Arsenic	38	92.3	B-66	0.5 feet	Northern Property Line	2001
Lead	1,000	7,800	B-40	4 inches	OA 6	1999
		1,020	B-63	0.5 feet	OA 6	2001
Subsurface Soil (> 2 feet)						
Arsenic	38	49.2	B-24	3 feet	SWMU 22	1999
		39.6	B-54	4 feet	OA 6	2001
Lead	1,000	1,560	B-16	3 feet	Northern Property Line	1999

* The higher value between KDHE Tier 2 Non-Residential Soil Criteria and the EPA Region 9 PRGs for industrial soil. The KDHE screening value is higher than the relevant PRG for both arsenic and lead. Thus, the KDHE criteria are listed in this table.

Surface Water

The East Fork of Chisholm Creek is located approximately 150 feet east of CHK (Refs. 2 and 4). Site-related contamination and associated degradation products (PCE, TCE, VC, and cis-1,2-DCE) have been detected in well and Geoprobe samples adjacent to the East Fork — most notably in well SK-10S and probe location B-74, both approximately forty feet upgradient of the surface water body (Ref. 4). Water table and surface water elevation measurements collected during the RFI and the independent NIC investigation suggest that shallow groundwater migrating from CHK discharges into the East Fork (Ref. 4). Thus, there is the potential for site-related contamination to negatively impact surface water quality.

During the RFI, surface water samples were collected in the East Fork to assess water quality and identify any site-related impacts. As shown on Figure 4 (Attachment 5), samples were collected from five locations –– one upstream of the site, three within the area expected to receive groundwater from the CHK area (representative of any site-related impacts), and one downstream of the site. The most recent round of surface water sampling was conducted in November 2002. Analytical results show all constituents below laboratory detection limits in the upstream sample and in each sample located adjacent to the CHK facility (Ref. 4). Although some contaminants were reported in the downstream sample, these impacts are not believed to be site-related based on (1) the fact that this sample was collected over 1,500 feet downstream of where groundwater from the CHK site is expected to discharge into surface water, (2) the contaminants detected in the surface water sample differ from those reported at CHK (with the exception of cis-1,2-DCE), and (3) the surface water contaminants have been reported in groundwater samples collected on the El Paso Refinery property and are more likely related to that or other sites to the south.

Based on these results, and despite VOC exceedances reported in wells SK-10S and SK-11S (and nearby Geoprobe sampling locations), it appears that actual surface water impacts associated with CHK are negligible. Consequently, surface water will not be further evaluated in this EI.

Sediment

No sediment samples were collected from the East Fork of Chisholm Creek during or subsequent to the RFI to date. However, based on the lack of significant surface water contamination, and the volatile nature of contamination at CHK, sediment is not expected to be impacted and will not be addressed further in this EI.

Air (Outdoors)

There are VOC constituents in both soil and groundwater at CHK. Either medium can generate VOCs in soil gas vapors that can migrate up through the ground surface to outdoor air. However, vapors from contaminated soil are not likely to accumulate in outdoor air in the absence of a confining structure. The natural mixing that occurs during normal air flow would be expected to disperse any contaminants. Consequently, outdoor air at the CHK facility does not warrant further consideration in this EI determination.

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	No	No	No	Yes	No	-	-
Indoor Air	-	Yes	-	-	-	-	-
Surface soil (<2 ft)	No	Yes	No	Yes	Yes		
~~Surface Water~~	-	-	-	-	-	-	-
~~Sediment~~	-	-	-	-	-	-	-
Subsurface soil (>2 ft)	No	No	No	Yes	No		
~~Air (outdoors)~~	-	-	-	-	-	-	-

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).

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

__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:

For this EI determination, potential risks to both on-site and off-site receptors have been evaluated. Pathways between CHK contamination and receptors might include contact with contaminated surface soil, subsurface soil, and groundwater. As discussed in Question 2, air (indoor and outdoor), surface water, and sediment do not contain concentrations of contaminants above appropriately protective risk-based screening levels and will not be carried through this evaluation.

In addition, several potential pathways and receptors have been excluded from further consideration in this EI determination. Because CHK and the surrounding area is industrial, the potential for human exposure via food pathways is considered negligible. Because CHK is an active industrial hazardous waste facility, recreational usage at the property is also improbable. Other potential pathways and receptors (i.e., residents, facility workers, day care occupants, construction workers, and trespassers) are discussed in greater detail below.

Residents and Day Care

There are no complete exposure pathways for residents or day care occupants in neighborhoods around CHK. As discussed in the RFI Report (Ref. 4), local land usage focuses on industry and transportation. Within the NIC, the closest residential properties to the CHK site are located over a mile south of the site (Ref. 4). As discussed in the response to Question 2, site-related shallow groundwater impacts have been delineated within roughly 200 feet of the southern (downgradient) site boundary and would not be expected to reach residential neighborhoods to the south. Furthermore, residents and day care facilities (if any) within the NIC are serviced by municipal water and do not use shallow groundwater for household or domestic uses (pursuant to City of Wichita Ordinance No. 43-156 S 2). The City of Wichita is in the process of investigating areas of possible groundwater use in conflict with the ordinance in order to terminate ongoing groundwater withdrawal for such purposes, but no such usage has been documented to date (Ref. 4).

Outside the NIC, the closest residential properties are situated approximately a quarter mile east of the site on the opposite side of Interstate 35 and the East Fork of Chisholm Creek (Ref. 4). As stated in the response to Question 2, shallow groundwater appears to discharge into the creek rather than flow under it, preventing migration of shallow groundwater contamination into downgradient residential neighborhoods to the east. Furthermore, off-site residents and any day care occupant exposure via contaminated groundwater is unlikely.

Complete pathways do not exist between residents and contaminated soil at CHK. No residents or day care facilities are present in or near areas of identified surface and subsurface soil contamination above risk-based screening levels. While it is possible that wind blown dust from contaminated soil could travel off-site, the potential for residential or day care occupant exposure via this pathway is considered minimal. This assessment is based on the distance between CHK and the nearest residential/day care receptors, and the fact that the most active areas on site are surfaced to minimize the generation of dust (Ref. 2).

Facility Workers

Although shallow groundwater at CHK is contaminated by VOCs at concentrations above risk-based screening levels, facility employees are not likely to be exposed via this pathway. No groundwater pumping wells are present at the CHK site, and monitoring wells are sampled by contract employees (who have had OSHA training and who take reasonable precautions to avoid contact with hazardous constituents). Moreover, although groundwater concentrations exceeded MCLs, these criteria establish maximum permissible levels of contaminants in potable water supplies, with exposure occurring primarily via oral ingestion. Because the site is situated within the NIC, drinking water for CHK is provided by the City of Wichita, in accordance with the ordinance discussed above.

The potential exists for facility workers to be exposed to VOC-contaminated vapors which may seep through cracks in building foundations. While the contribution of VOC contaminated vapors from sources below ground surface are expected to be significantly less than the concentrations of VOCs in indoor air from normal facility operations, without quantitative air sampling data, this potential exposure pathway has been carried forward for further consideration.

The potential exists for facility workers to be exposed to contaminated surface soil at CHK. As discussed in the response to Question 2, arsenic and lead exceedances have been reported in surface soil at OA 6 and along the northern property line. Although some paving may be present, boring logs in Appendix C of the RFI (Ref. 4) indicate areas of bare soil. Thus, it is possible that ongoing operations or new activity at CHK might require facility workers to come in contact with impacted and exposed surface soil in these areas.

Facility workers are not expected to come into contact with impacted subsurface soils in these same locations and in the vicinity of SWMU 22. Excavation tasks, necessary to expose contaminated soil above risk-based screening criteria, would likely be performed by contracted construction workers.

Contract Construction Workers

Contract construction workers may be exposed to contaminated surface and subsurface soil during excavation activity. Consequently, there is a complete pathway for possible contamination from contact with soils. The chance for contract construction workers to encounter groundwater is unlikely, due to the fact that the water table is encountered at depths of at least 12 feet bgs. However, if excavations do go that deep, contract construction workers could be exposed to contaminated groundwater. Ingestion of contaminated groundwater is unlikely, given the fact that drinking water for the CHK property is provided by the City of Wichita.

Trespassers

Trespassers may be exposed to contaminated surface soil. However, trespassers in operational areas of the CHK facility (including the OA 6 area) are unlikely because these areas are surrounded by a six-foot chain-link fence (Ref. 2). Areas of the facility not enclosed by fencing (including the northern property boundary) are patrolled by security personnel, and all employees are instructed to question and direct unauthorized site visitors to the CHK office (Ref. 2). Nevertheless, it is possible that trespassers could enter CHK property and potentially disturb soil from foot traffic. Trespassers are not expected to come into contact with subsurface soils, as the digging or excavation activities necessary to expose impacted subsurface soil would likely be interrupted by security personnel or other CHK employees. Trespassers are also unlikely to be exposed to contaminated groundwater, as environmental monitoring wells are equipped with a locked protective metal covering. Removal of this covering is difficult and would likely be interrupted by security personnel or other CHK employees.

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)?

   _X_ 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."

   _____ 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:

Exposure pathways are complete for several media-receptor combinations at CHK. Specifically, facility workers and trespassers have the potential to be exposed via contact with surface soil, and contract construction workers may be exposed through contact with groundwater, surface soil, or subsurface soil. However, these exposures are insignificant for purposes of this EI determination.

Facility Workers

Risks related to employee contact with contaminated surface soil are expected to be minor at CHK. Surface soil contamination above risk-based screening levels is limited to two areas of the site, neither of which is routinely used for current CHK operations. Current activity in the vicinity of OA 6 is limited to mechanical equipment storage in Building K, over 50 feet to the west. Routine usage of the northernmost corner of the site for bulk storage was last documented on the 1983 aerial photograph (Ref. 4). The other area of surface soil exceedances (at boring B-66, where arsenic was detected in surface soil above screening criteria) is situated on the CHK property, approximately 75 feet north of Building C (used for drum storage). No historical facility functions have been identified in this area on available aerial photographs. It is unclear whether doors are present on the northern side of the building to allow egress to the impacted area at boring B-66, but the northern fence prevents access from other on-site locations. Given the lack of equipment access and the distance from any doors that may be present on the north side of Building C, it is unlikely that routine vicinity operations exist or will be initiated in the vicinity of boring B-66. Consequently, facility worker exposure to surface soil contamination is expected to be of shorter duration than the assumptions used in development of EPA Region 9 industrial PRGs (e.g., 25 years of exposure at 250 days per year). It also should be noted that due to the nature of operations at CHK (i.e., management and handling of hazardous wastes), mandatory health and safety training, enhanced building ventilation, training for and use of personal protective equipment (PPE), and medical monitoring to comply with OSHA requirements are required of all

[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.

personnel. Excessive exposure would be monitored and mitigated presumable by the on-site health and safety monitoring required by OSHA. As a result, facility worker exposures to impacted surface soil at CHK are not expected to be significant.

As discussed above, the potential exists for VOCs from below ground surface sources to migrate through cracks in building foundations; however, the contribution of VOCs migrating from contaminated soils or groundwater below ground surface is expected to be insignificant compared with the amount of VOCs already present in indoor air due to normal hazardous waste handling operations at the facility. Although no formal indoor air study or sampling has been conducted, the RFI Report included a preliminary assessment of the potential for vapor intrusion at CHK consistent with EPA's *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (Ref. 3). According to the RFI Report, the highest VOC concentrations in shallow soil occur in open space areas or in association with buildings used for waste handling and storage. The most significant VOC impacts in groundwater (as noted in Table 1 above) have also been reported in wells in open areas or adjacent to Buildings B, D, and J. These buildings are used exclusively for hazardous waste management operations and have been constructed on concrete pads which are routinely maintained and inspected. Such foundations would be expected to reduce vapor intrusion from the subsurface at least in part. In addition, due to the nature of operations at CHK (i.e., management and handling of hazardous wastes), the potential for exposure to contaminant vapors in indoor air at Buildings B, D, and J is mitigated by mandatory health and safety training, enhanced building ventilation, training for and use of personal protective equipment (PPE), and medical monitoring to comply with OSHA requirements. Consequently, indoor air concerns at the CHK facility do not appear to be significant.

Contract Construction Workers

Complete pathways exist for contract construction workers to be exposed to contaminated surface soil, subsurface soil, and groundwater with concentrations of contaminants that exceed EPA Region 9 PRGs for industrial exposure. However, because they are not full-time employees on site, their exposure is limited in duration and far less than the assumptions used in development of EPA Region 9 industrial PRGs. Also, due to the nature operations at CHK (i.e., management and handling of hazardous wastes), all intrusive work is monitored according to OSHA requirements. As a result of limited exposure, contract excavators' exposure to contaminated media is not likely to be significant.

Trespassers

Trespassers could potentially be exposed to contaminated surface soil. However, trespassers' access to the impacted areas is limited by fencing, security patrols, and/or employee awareness/intervention. Therefore, their exposure is expected to be limited in duration. Consequently, trespasser exposure at CHK is not likely to be significant.

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

Question not applicable. See response to Question 4.

6. Check the appropriate RCRA Info 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 **Clean Harbors Kansas** facility, EPA ID #**KSD007246846**, located in **Wichita, Kansas** 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: _____ Date:_10/5/04_____
Stephanie Doolan
Project Manager

Supervisor: _____ Date: _10/5/04_____
Jody Hudson
Associate Director of RCRA

Locations where references may be found:

U. S. Environmental Protection Agency
Region 7
901 N. 5th Street
Kansas City, Kansas 66101

Contact telephone number and email address:

Stephanie Doolan
US EPA Region 7
(913) 551-7719
doolan.stephanie@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

1. Recommendations of the Technical Review Work Group for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. Prepared by EPA. 1996.

2. RCRA Permit Application for CHK, Revision No. 7. August 14, 1998.

3. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. Prepared by EPA. November 29, 2002.

4. RFI Report for CHK (formerly S-K Wichita). Prepared by Cameron-Cole, LLC. January 20, 2003.

Attachment 1
SWMUs, AOCs, and OAs Currently Being Investigated at CHK

Area	Name	Description
SWM U 1	Process Area Storage Tanks	Eight aboveground storage tanks (ASTs) used for storage of chlorinated solvents and non-chlorinated petroleum-based solvents awaiting on-site management, recycling, or off-site transport. Located in a diked portion of the processing area. Installed in June 1988. The RFI confirmed historical releases to soil and groundwater in the process area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 4	Process Area Truck Bay	Truck bay used for transferring waste between tanker trucks and process area storage tanks (SWMU #1). Constructed with bermed curbs and a blind trench sump. The RFI confirmed historical releases to soil and groundwater in the process area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 5	Sparging Area	Three steam-heated spargers used between 1984 and 1986 for stripping tetrachloroethylene (PCE) from dry cleaning canisters and filters. The RFI confirmed historical releases to soil and groundwater in the process area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 6	Hot Rooms	Two enclosed rooms heated to lower the viscosity of certain wastes (e.g., waxes, greases) prior to waste blending. No floor drains are present. Not currently in use. The RFI confirmed historical releases to soil and groundwater in the process area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 7	Elevated Tank Storage Area	Tanks elevated approximately fifteen feet above floor level in a containment area with a collection sump. Formerly used to store recycled PCE, chlorinated solvents wastewater, oils, diesel fuel, and nonhazardous waste oil. Currently out of service, emptied, and cleaned. The RFI confirmed historical releases to soil and groundwater in the process area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 8	Regulated Waste Storage Area	Diked and permitted hazardous waste container storage area. The RFA uncovered no documentation on historical releases in this area, but stained concrete was observed in the north-central portion of SWMU. Insignificant soil impacts identified during the RFI. No further action is proposed for this SWMU.
SWM U 9	Solids Dryer	Unit formerly used to recover solvents from shredded dry cleaning filters. The RFA uncovered no documentation on historical releases in this area. The RFI concluded that soil impacts in this area are insignificant. No further action is proposed for this SWMU.
SWM U 12	Warm Room	Used during winter months to thaw iced drums prior to waste processing. The RFA uncovered no documentation on historical releases in this area. The RFI concluded that soil impacts in this area are insignificant. No further action is proposed for this SWMU.

Attachment 1
SWMUs, AOCs, and OAs Currently Being Investigated at CHK

Area	Name	Description
SWM U 15	Building J	Large warehouse formerly used for drum storage of virgin flammable and chlorinated solvents, chemical product distribution, storage of household and paint wastes, and administrative functions. Currently used for lab pack/repack operations. Building elevated above ground surface. The RFA uncovered no documentation on historical releases in this area. The RFI concluded that soil and groundwater impacts in this area are minor and insignificant. No further action is proposed for this SWMU.
SWM U 16	Corrosive Waste Storage Area	One building divided into four container management units for storage of corrosive and nonignitable hazardous wastes destined for off-site management. The RFI concluded that soil impacts in this area are insignificant. No further action is proposed for this SWMU.
SWM U 17	Dry Solids Gondola	Closed-top roll-off box used by a previous owner for temporary storage of dry solids. Wastes held for subsequent landfilling included soil and debris impacted with metals, nonflammable dry paint solids, and nonblendable characteristically hazardous solids. The RFA uncovered no documentation on historical releases in this area. The RFI confirmed historical releases to soil and groundwater in this area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 18	Open Area -- Southwest Corner	Open, undeveloped space not historically used for waste handling or processing. Drummed waste, mounded tires, and an inoperable distillation unit observed in this location during various inspections. The RFA uncovered no documentation on historical releases in this area. The RFI confirmed historical releases to soil and groundwater in this area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 19	Open Area -- North of Building I	Open area formerly used for bulk storage of virgin non-chlorinated solvents and sulfuric and nitric acids. Also formerly used for storage of drummed waste including paint wastes, waste thinner, and liquid caustic. Many drums reported as open and deteriorating. Surface staining noted on gravel and earthen cover along fence line. Potential surface water runoff to nearby ditch. The RFI concluded that soil and groundwater impacts in this area are insignificant. No further action is proposed for this SWMU.
SWM U 20	Paint Can Burial Pit	Buried paint cans and paint-related wastes discovered in 1992 over an area of approximately twenty square feet. Area has been excavated. Confirmation soil samples indicated successful removal, but documentation was incomplete. The RFI confirmed historical releases to soil and groundwater in this area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 21	Cyclone	Equipment formerly used to recover solid material from the shredder/granulator. Formerly located in Building D within well-maintained secondary containment area. Equipment has been removed. The RFI confirmed historical releases to soil and groundwater in the process area; therefore, this SWMU is retained for further evaluation and risk assessment.
SWM U 22	Old Still Area West of Building I	Concrete-covered area used in connection with solvent distillation and reclamation operations conducted by a previous owner. The RFI concluded that soil and groundwater impacts in this area are insignificant. No further action is proposed for this SWMU.

Attachment 1
SWMUs, AOCs, and OAs Currently Being Investigated at CHK

Area	Name	Description
SWM U 23	Area East of Building I	Open space that may have been used for bulk storage of solvents and drummed waste. The RFI concluded that soil and groundwater impacts in this area are insignificant. No further action is proposed for this SWMU.
SWM U 24	Area South of Building C	Open, undeveloped space not otherwise addressed, but identified as a potential concern during a review of aerial photographs of the site. The RFI confirmed historical releases to soil and groundwater in this area; therefore, this SWMU is retained for further evaluation and risk assessment.
AOC 1	Laboratory Sample Storage Area	Small closet-like room on the south side of Building A that was formerly used for storage of client samples awaiting analysis. The RFA uncovered no documentation on historical releases in this area. The RFI concluded that soil and groundwater impacts in this area are insignificant. No further action is proposed for this AOC.
AOC 2	Former Aboveground Fuel Tank	Two former elevated 500-gallon tanks used for fuel storage. Underlain by gravel. The RFA uncovered no documentation on historical releases in this area. The RFI concluded that soil and groundwater impacts in this area are insignificant. No further action is proposed for this AOC.
AOC 3	Building I	Area formerly used for solvent distillation processing and acid repackaging. Chlorinated and non-chlorinated solvents handled in this area, along with virgin acids (sulfuric, nitric, and hydrochloric). The RFA uncovered no documentation on historical releases in this area. The RFI concluded that soil and groundwater impacts in this area are insignificant. No further action is proposed for this AOC.
AOC 4	Concrete Vault	Concrete vault formerly used as a discharge basin for cooling water in the solvent distillation process (chlorinated and non-chlorinated solvents). Currently appears to be filled with gravel. The RFA uncovered no documentation on historical releases in this area. The RFI concluded that soil impacts in this area are insignificant. No further action is proposed for this AOC.
OA 1	Lagoon Area	Topographic depression or lagoon shown on 1960 and 1970 aerial photos. The RFI concluded that soil impacts in this area are insignificant. No further action is proposed for this OA.
OA 2	Former ASTs	Area of former ASTs shown on 1960 aerial photo. The RFI concluded that soil and groundwater impacts in this area are insignificant. No further action is proposed for this OA.
OA 3	Possible AST Area	Area of tall structures, possibly ASTs, seen on 1970 aerial photo. The RFI concluded that impacts in this area are insignificant. No further action is proposed for this OA.
OA 4	Possible Former Drum Storage Area	Area of possible drum storage at the location currently occupied by Building A. The RFI concluded that impacts in this area are insignificant. No further action is proposed for this OA.
OA 5	Trench Leading to Ditch	Area in the northeastern part of the site where wastes were observed draining north to the east-west ditch that discharges to the East Fork of Chisholm Creek. The RFI concluded that impacts in this area are insignificant. No further action is proposed for this OA.

Attachment 1
SWMUs, AOCs, and OAs Currently Being Investigated at CHK

Area	Name	Description
OA 6	Northeastern Corner	Area of possible bulk materials storage, waste solvent tanks, and waste handling noted on 1983 aerial photo and in KDHE file review. The RFI confirmed historical releases to soil and groundwater in this area; therefore, this OA is retained for further evaluation and risk assessment.

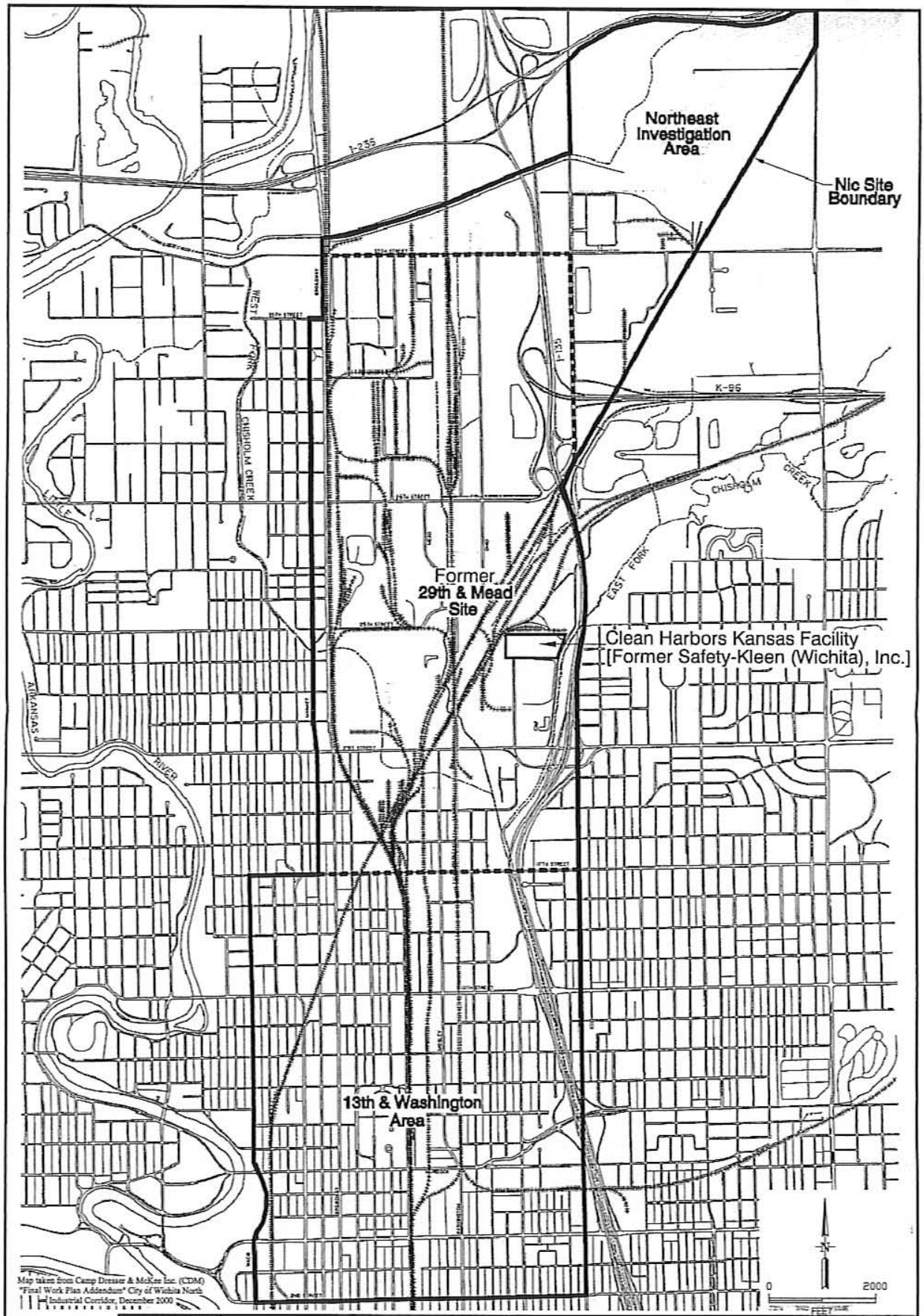
Note: The permit deferred investigation and corrective action for SWMUs 2, 3, 10, 11, 13, and 14, pending demolition of associated buildings or final closure of the facility.
However, portions of these SWMUs have been addressed as part of the recent RFI effort for the SWMUs, AOCs, and OAs listed above.

This table was compiled based on areas of investigation outlined in the RFA and HSWA permit, and summarized in the RFI Report (Ref. 4).

Attachment 2

Figure 1: Site Location Map

Resource: RCRA Facility Investigation for Clean Harbors Kansas, LLC. Prepared by Cameron Cole, LLC. January 20, 2003.



Map taken from Camp Dresser & McKee Inc. (CDM) "Final Work Plan Addendum" City of Wichita North Industrial Corridor, December 2000

	BY	DATE
DRAWN	WRB	1/7/03
CHECKED		
APPROVED		
APPROVED		
APPROVED		

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FIGURE 1-3

NIC SITE MAP

WICHITA, KANSAS

SCALE: SEE BAR SCALE

DWG. NO.: 1808-31-RFI

Attachment 3

Figure 2: Groundwater Analytical Results for VOCs Monitoring Well Samples Map

Resource: RCRA Facility Investigation for Clean Harbors Kansas, LLC. Prepared by Cameron Cole, LLC. January 20, 2003.

Attachment 4

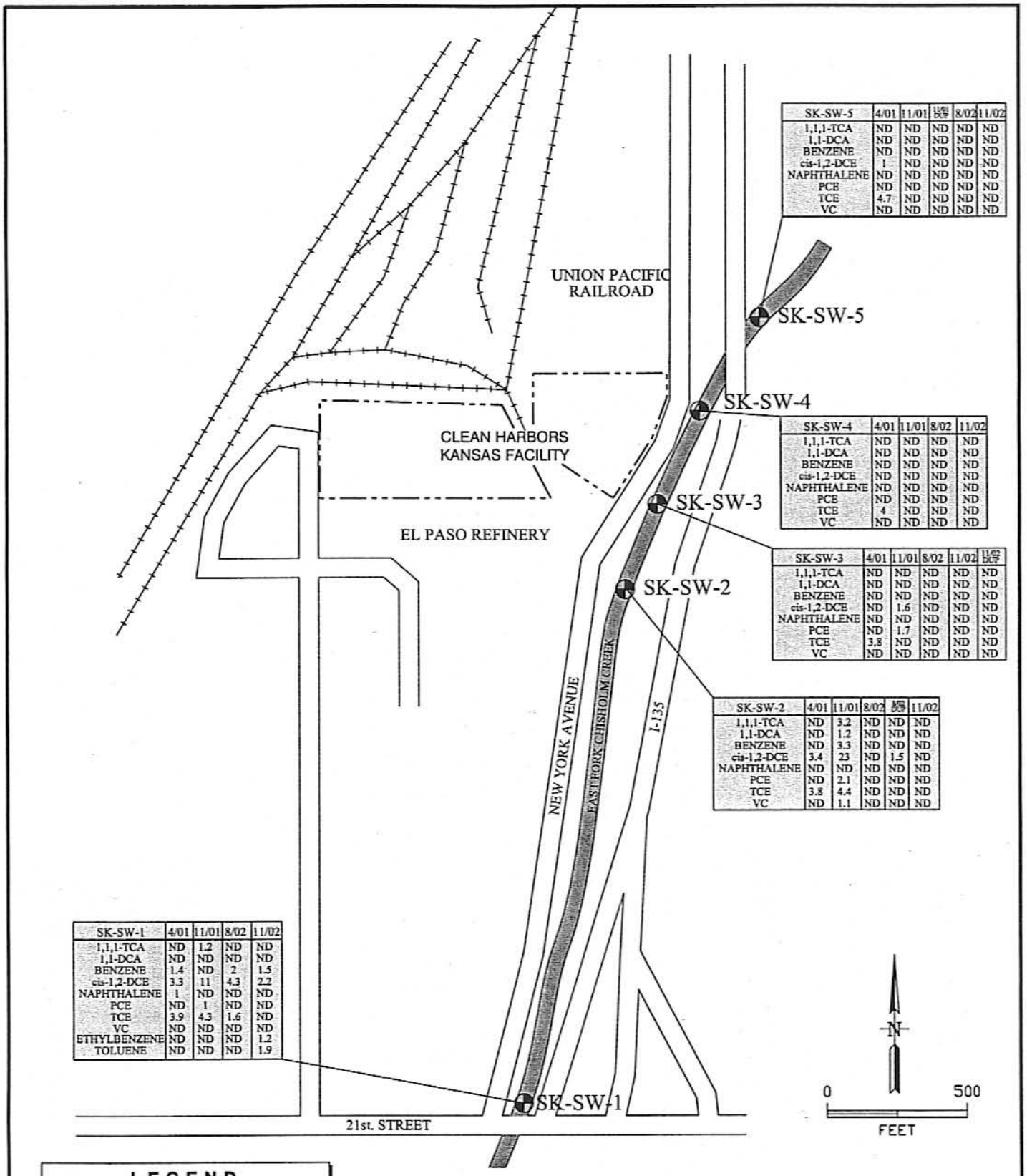
Figure 3: Soil Boring Location Map

Resource: RCRA Facility Investigation for Clean Harbors Kansas, LLC. Prepared by Cameron Cole, LLC. January 20, 2003.

Attachment 5

Figure 4: Surface Water Sample Location Map

Resource: RCRA Facility Investigation for Clean Harbors Kansas, LLC. Prepared by Cameron Cole, LLC. January 20, 2003.



SK-SW-5	4/01	11/01	µg/L DUP	8/02	11/02
1,1,1-TCA	ND	ND	ND	ND	ND
1,1-DCA	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND
cis-1,2-DCE	1	ND	ND	ND	ND
NAPHTHALENE	ND	ND	ND	ND	ND
PCE	ND	ND	ND	ND	ND
TCE	4.7	ND	ND	ND	ND
VC	ND	ND	ND	ND	ND

SK-SW-4	4/01	11/01	8/02	11/02
1,1,1-TCA	ND	ND	ND	ND
1,1-DCA	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND
cis-1,2-DCE	ND	ND	ND	ND
NAPHTHALENE	ND	ND	ND	ND
PCE	ND	ND	ND	ND
TCE	4	ND	ND	ND
VC	ND	ND	ND	ND

SK-SW-3	4/01	11/01	8/02	11/02	11/02 DUP
1,1,1-TCA	ND	ND	ND	ND	ND
1,1-DCA	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND
cis-1,2-DCE	ND	1.6	ND	ND	ND
NAPHTHALENE	ND	ND	ND	ND	ND
PCE	ND	1.7	ND	ND	ND
TCE	3.8	ND	ND	ND	ND
VC	ND	ND	ND	ND	ND

SK-SW-2	4/01	11/01	8/02	µg/L DUP	11/02
1,1,1-TCA	ND	3.2	ND	ND	ND
1,1-DCA	ND	1.2	ND	ND	ND
BENZENE	ND	3.3	ND	ND	ND
cis-1,2-DCE	3.4	23	ND	1.5	ND
NAPHTHALENE	ND	ND	ND	ND	ND
PCE	ND	2.1	ND	ND	ND
TCE	3.8	4.4	ND	ND	ND
VC	ND	1.1	ND	ND	ND

SK-SW-1	4/01	11/01	8/02	11/02
1,1,1-TCA	ND	1.2	ND	ND
1,1-DCA	ND	ND	ND	ND
BENZENE	1.4	ND	2	1.5
cis-1,2-DCE	3.3	11	4.3	2.2
NAPHTHALENE	1	ND	ND	ND
PCE	ND	1	ND	ND
TCE	3.9	4.3	1.6	ND
VC	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	1.2
TOLUENE	ND	ND	ND	1.9

LEGEND

- SURFACE WATER SAMPLE LOCATION
- APPROXIMATE CLEAN HARBORS KANSAS FACILITY LOCATION
- ND NOT DETECTED

NOTE: ALL ANALYTICAL RESULTS REPORTED IN µg/L)

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FIGURE 5-10

SURFACE WATER SAMPLE ANALYTICAL RESULTS
CLEAN HARBORS KANSAS, LLC

SCALE:	DATE:	DWG NO.
1" = 500'	1-13-03	1808-15-RFI