



DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

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

Current Human Exposures Under Control

RCRA RECORDS CENTER
Safety Kleen Systems
CTD
2/11/99

Facility Name: Safety-Kleen Systems, Inc.
Facility Address: 11 Tipping Drive, Branford, CT.
Facility EPA ID #: CTD980667927

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

- √ If yes - check here and continue with #2 below.
- ___ If no - re-evaluate existing data, 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 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).

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 2

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

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	<u>√</u>	_____		<u>See Attachments 1, 2 and 3</u>
Air (indoors)	<u>√</u>	_____		<u>See Attachments 1, 2 and 3</u>
Surface Soil (e.g., <2 ft)	<u>√</u>	_____		<u>See Attachments 1, 2 and 3</u>
Surface Water	_____	<u>√</u>		<u>See Attachments 1, 2 and 3</u>
Sediment	_____	<u>√</u>		<u>See Attachments 1, 2 and 3</u>
Subsurf. Soil (e.g., >2 ft)	<u>√</u>	_____		<u>See Attachments 1, 2 and 3</u>
Air (outdoors)	_____	<u>√</u>		<u>See Attachments 1, 2 and 3</u>

_____ 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.

√ 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) See Attachment 1 for a discussion of the rationale. See the tables and figures in Attachments 2 and 3, respectively, for supporting documentation.

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.

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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	<u>no</u>	<u>no</u>	<u>no</u>	<u>yes</u>		<u>no</u>	<u>no</u>
Air (indoors)	<u>no</u>	<u>no</u>	<u>no</u>				
Surface Soil (e.g., <2 ft)	<u>no</u>	<u>no</u>	<u>no</u>	<u>yes</u>	<u>no</u>	<u>no</u>	<u>no</u>
Surface Water	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Sediment	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Subsurf. Soil (e.g., >2 ft)	<u> </u>	<u> </u>	<u> </u>	<u>yes</u>			<u>no</u>
Air (outdoors)	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Instructions for Summary Exposure Pathway Evaluation Table:

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

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

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

√ If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.

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

Rationale and Reference(s): See Attachment 1.

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

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

YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Safety-Kleen Systems, Inc. facility, EPA ID #CTD980667927, located at 11 Tipping Drive, Branford, CT under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

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

IN - More information is needed to make a determination.

Completed by (signature) *Raphael Cody* Date 10-22-03
(print) Raphael Cody
(title) US EPA Region 1

Supervisor (signature) *Matthew R. Hoagland* Date 10/22/03
(print) Matthew R. Hoagland
(title) Section Chief
(EPA Region or State) Reg I

Locations where References may be found:

See attached text, tables, and figures

Contact telephone and e-mail numbers

(name) Stephen Fleming
(phone #) (513) 956-2172
(e-mail) sfleming@safety-kleen.com

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.

ATTACHMENT 1

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

**Safety-Kleen Systems – Branford, CT
CTD980667927**

Introduction

This attachment provides a discussion and presents the rationale and documentation to support the determination made for each media under Questions 2, 3, and 4 of the CA 725 form. The tables and figures referenced below are provided in Attachments 2 and 3, respectively.

Groundwater

Appropriately protective risk-based levels used in this evaluation include the Connecticut Department of Environmental Protection (CTDEP) Remediation Standard Regulations (RSRs) Surface Water Protection Criteria (SWPC), Groundwater Protection Criteria (GWPC), Residential Volatilization Criteria (Res-VC), and Industrial/Commercial Volatilization Criteria (I/C-VC) for on-site groundwater.

Analytical results for groundwater sampling are provided in Tables 1a through 1f. The locations of the groundwater monitoring wells are shown on Figure 1. As indicated on Figure 1, groundwater flows to the south/southwest across the site.

During quarterly groundwater sampling rounds, zinc has been detected in on-site wells at concentrations above the SWPC. However, zinc has been detected in upgradient wells and may be naturally occurring. In addition, based on the distance to the nearest downgradient surface water (Branford River 700 feet to the south/southeast) and the calculated groundwater travel time to the river based on slug tests (165 to 6,422 years) the potential for impact to the Branford River is minimal.

Over the same monitoring period, volatile organic compounds (VOCs), primarily tetrachloroethene (PCE), trichloroethene (TCE) and 1,1-dichloroethene (1,1-DCE), have been detected in some wells. The concentrations of PCE, TCE, and 1,1-DCE have exceeded the GWPC. PCE in concentrations in MW-4 are above the SWPC, however PCE concentrations downgradient are in compliance with the SWPC. VOC concentrations decrease downgradient towards the property boundary and minimal downward vertical migration has been identified. No acid/base/neutral extractable organic compounds, PCBs, alcohols, and glycols were detected above applicable risk-based levels in the monitoring wells during the sampling events.

Even though the groundwater in on-site wells contains metals and VOCs at concentrations above appropriately protective risk-based levels, there are no complete pathways between the contamination and potential human receptors. Based on the findings of a sensitive receptor survey, the nearest private well is located 650 feet northwest (upgradient) of the site. As a result, exposures cannot be reasonably expected under current conditions.

The current quarterly site groundwater monitoring program will continue to be implemented to evaluate seasonal variation and document degradation of chlorinated VOCs.

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Air (indoors)

Appropriately protective risk-based levels used in this evaluation included the CTDEP Residential Target Indoor Air Concentrations (TIACs) and the Occupational Safety and Health Administration Permissible Exposure Limit values divided by 100 (OSHA PEL/100).

The data for VOCs in indoor air is provided in Table 2. The indoor air samples included four sampling locations distributed throughout the building (BRA-1, BRA-2, BRA-3, and BRA-4) as well as one sample location outside the building, (BRA-5), used for background determination. Indoor air sampling locations are provided on Figure 2. All samples were collected from a height of 3 feet above the floor level. 6-liter pre-evacuated steel Summa® canisters were used to collect samples over an approximately 8-hour period using a flow regulator calibrated to sample at 9 ml/minute, which provided an approximately linear flow over the sampling period.

The indoor air sampling was conducted on June 28, 2001. Prior to the air sampling, the areas to be sampled were cleaned. PCE was detected in all indoor air samples. The Res. TIAC for PCE was exceeded while the OSHA PEL/100 was not.

For indoor air, no complete pathway between the contamination and potential human receptors exists under current conditions as the site is vacant. Because the concentrations of PCE detected in indoor air following cleaning of the sampling areas were well below one percent of the OSHA PEL the potential future exposures from this pathway are not reasonably expected to be significant given the site's industrial use.

Surface (e.g., <2ft) and Subsurface (e.g., >2ft) Soil

Appropriately protective risk-based levels used in this evaluation included the Connecticut Department of Environmental Protection (CTDEP) Remediation Standard Regulations (RSRs) Residential Direct Exposure Criteria (RDEC), Industrial/Commercial Direct Exposure Criteria (I/C-DEC) and Pollutant Mobility Criteria for a GA groundwater area (GA PMC).

The data for soil samples is provided in Tables 3, 4 and 5. Two rounds of soil samples were collected and analyzed in March 2000 (Table 3) and October 2000 (Table 4). Confirmatory soil samples (Table 5) were collected following the removal of approximately 270 cubic yards of contaminated soil in May 2001. Soil sampling locations are provided on Figures 3 and 4.

Total metals detected in the surface soil samples included antimony, barium, cadmium, cobalt, chromium, copper, lead, mercury, nickel, and zinc. Only barium was detected using the synthetic precipitation leaching procedure (SPLP). All levels detected in surface soil samples were below the RDEC, the I/C DEC, and the GA PMC limits established by the CTDEP.

Total metals detected in the subsurface soil samples included antimony, barium, cobalt, chromium, copper, lead, mercury, nickel, and zinc. Antimony was the only metal detected above the RDEC. Barium and lead were detected using the SPLP. Lead was detected above the GA PMC in three of the post-excavation confirmatory soil samples.

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VOCs were detected in the investigation phase above RSR standards. With the exception of one soil boring location (SB-6), these areas were excavated during the interim soil remediation activities in May 2001. VOCs were detected above RSR standards at the limits of the excavations, and additional remediation is being planned prior to reuse of the site.

No alcohols, glycols, or base/neutral extractable compounds were detected in the soil samples. Acid extractable compounds and PCBs have been detected at levels well below all established limits.

Due to the lack of groundwater use on-site or downgradient of the site, the GA PMC exceedences do not constitute a potentially complete pathway for the purpose of this Environmental Indicator Determination. Antimony was detected at concentrations above the RDEC, but below the I/C DEC, therefore is no complete pathway for construction workers. This area of the site is part of an ongoing investigation and remediation program. As such, any construction work in this area would be conducted by properly trained and protected workers.

Surface Water

As indicated in the discussion on groundwater, the SWPC for total zinc was exceeded. However, based on the distance to the nearest downgradient surface water (Branford River 700 feet to the south/southeast) and the calculated groundwater travel time to the river based on slug tests (165 to 6,422 years), the potential for impact to the Branford River is minimal.

Sediment

Samples collected from two stormwater catch basins southwest of the site showed levels of contamination below the Residential Direct Exposure Criteria as well as the Industrial/Commercial Direct Exposure Criteria and GA PMC for all contaminants of concern. Metals analysis showed the presence of total barium, cobalt, chromium, copper, lead, nickel, and zinc at levels well below the protective risk-based levels. The only metal detected using SPLP was barium, which was well below the GA PMC. Two VOCs (cis-1,2-DCE and PCE) were detected at concentrations well below the risk-based levels set forth by CTDEP. No acid/base/neutral extractable organic compounds, PCBs, glycols, or alcohols were detected in the catchbasin samples. As indicated in the discussion on groundwater, no acid/base/neutral extractable organic compounds, PCBs, glycols, or alcohols were detected in monitoring wells above the SWPC. VOC concentrations in groundwater are below the SWPC at the downgradient property line. As such, sediment is not reasonably suspected to be contaminated above appropriately protective risk-based levels.

Air (outdoors)

Appropriately protective risk-based levels used in this evaluation included the CTDEP RSRs Residential TIACs and the OSHA PEL/100.

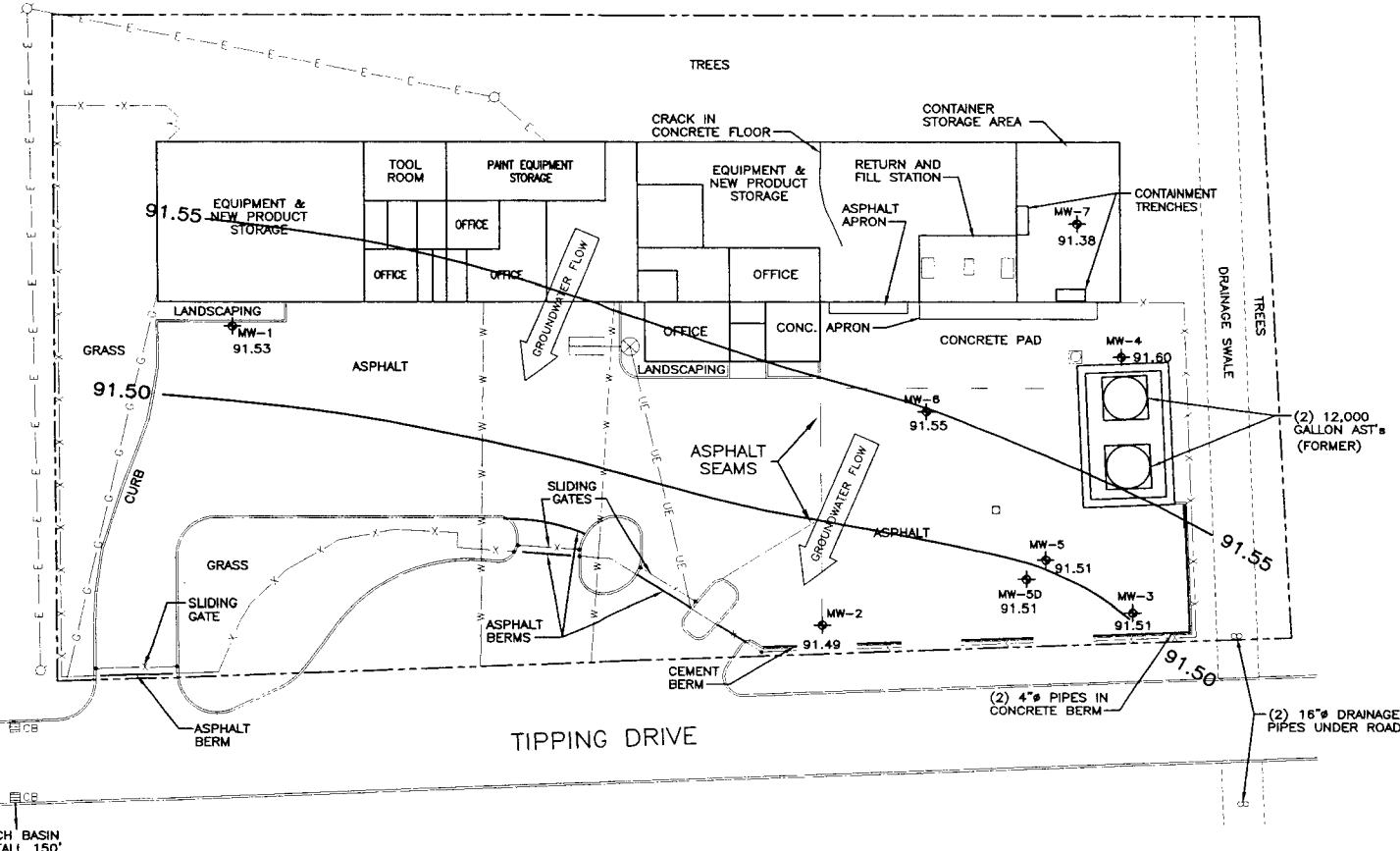
The data for VOCs in outdoor (background) air is provided in Table 2. The outdoor air sampling location is provided on Figure 2. One outdoor air sample (BRA-5) was collected from outside and upwind of the site building during the indoor air sampling event. As shown in Table 2, the

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**Safety-Kleen Systems – Branford, CT
CTD980667927**

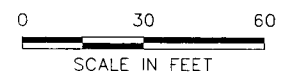
concentrations of compounds detected in the outdoor air sample were below both the Residential TIACs and the OSHA PEL/100.

ATTACHMENT 2



- LEGEND**
- PROPERTY LINE
 - X-X- FENCE
 - W-W- WATER LINE
 - G-G- GAS LINE
 - E-E- OVERHEAD ELECTRIC LINES
 - UE- UNDERGROUND ELECTRIC LINES
 - ☉ LIGHT STAND
 - AST FORMER ABOVEGROUND STORAGE TANK
 - U UTILITY POLE
 - ☐ REMOTE FILL FOR AST's
 - CB CATCH BASIN
 - MW-1 MONITORING WELL
 - 91.57 RELATIVE GROUNDWATER ELEVATIONS
 - ☐ BENCHMARK (100 FT.)

NOTE:
1. LOCATIONS ARE APPROXIMATE
ELEVATIONS ARE FROM TOP OF
WELL.



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203-271-0379
CHESHIRE, CT.

GROUNDWATER ELEVATION MAP
JULY 2003

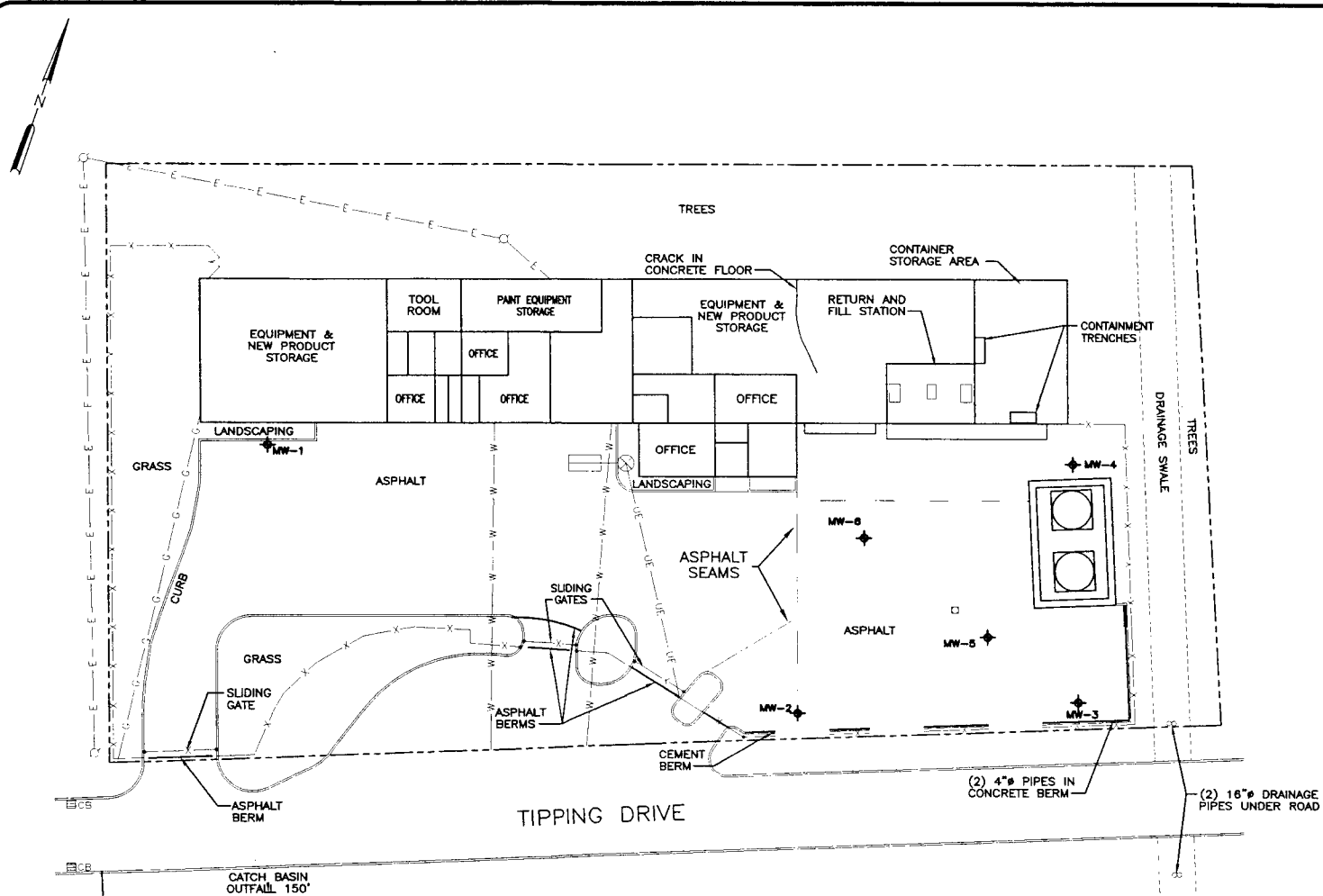
DESIGNED BY: G.F. PFF
DRAWN BY: G.F. PFF
CHECKED BY: MGP
FILE: 20662203-1001-RPT

SAFETY KLEEN SYSTEMS INC.
11 TIPPING DRIVE
BRANFORD, CONNECTICUT

JOB NO: 206622.02
DATE: JULY 2003
SCALE: AS NOTED

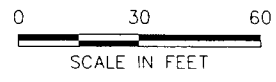
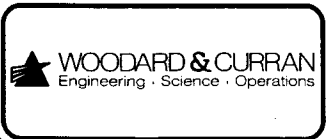
FIGURE 1

1" 1/2" 0"
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 XREF Files CHSKB-01.dwg, CHSKB001.dwg
 Systems Inc - Branford\wp\Drawings\CHSKF-01.dwg
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 PlotScale: 1:1
 PlotDate: 8/1/2001 10:00:00 AM
 PlotName: 111111.dwg



- LEGEND**
- PROPERTY LINE
 - X- FENCE
 - W WATER LINE
 - G GAS LINE
 - E OVERHEAD ELECTRIC LINES
 - UE UNDERGROUND ELECTRIC LINES
 - ☉ LIGHT STAND
 - UTILITY POLE
 - REMOTE FILL FOR AST
 - CB CATCH BASIN
 - MW-1 MONITORING WELL
 - BRA-1 (3') AIR SAMPLING LOCATIONS AND CANISTER ELEVATIONS

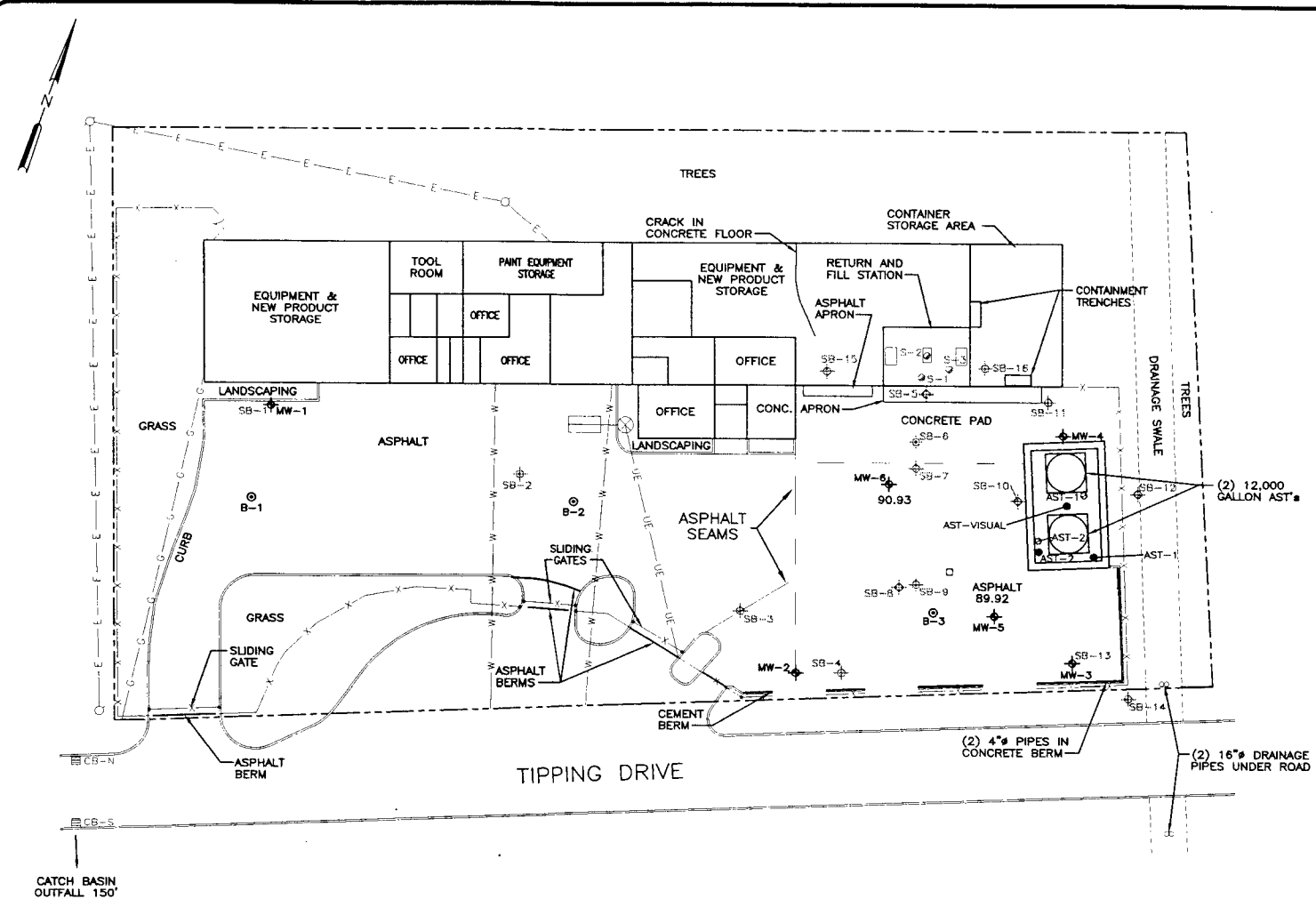
NOTE:
 LOCATIONS ARE APPROXIMATE
 ELEVATIONS ARE FROM TOP OF WELL



AUGUST 2001
 DATE
 ECN
 CWN
 APP
 REV
 PROJECT NO.
 206622.01

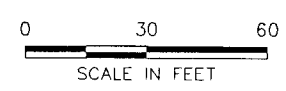
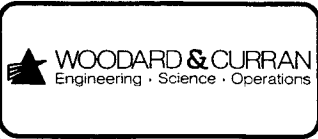
FIGURE 2
 SAFETY KLEEN SYSTEMS INC.
 11 TIPPING DRIVE
 BRANFORD, CONNECTICUT
 AIR SAMPLING LOCATIONS

1" 1/2" 0"
 IMAGE Files <No Images>
 XREF Files CHS(KB-01.dwg, CHS(KB001.dwg)
 systems inc = dnnr\dwg\p\0\Berl-megad03.dwg
 Dnnr\p\0\Berl-megad03.dwg
 Project: <Name>
 Scale: 1" = 30' Scale 1"



- LEGEND**
- PROPERTY LINE
 - X- FENCE
 - W- WATER LINE
 - G- GAS LINE
 - E- OVERHEAD ELECTRIC LINES
 - JE- UNDERGROUND ELECTRIC LINES
 - ⊗ LIGHT STAND
 - AST ABOVEGROUND STORAGE TANK
 - U UTILITY POLE
 - REMOTE FILL FOR AST'S
 - CB CATCH BASIN
 - MW-1 MONITORING WELL LOCATIONS
 - SB-1 SOIL BORING LOCATIONS MARCH 2000
 - B-1 CONFIRMATORY DEPTH TO GROUNDWATER BORING NOVEMBER 1999
 - S-1 GEOPROBE BORING LOCATIONS OCTOBER 2000
 - AST-1 SOIL SAMPLING LOCATIONS

NOTE:
 LOCATIONS ARE APPROXIMATE

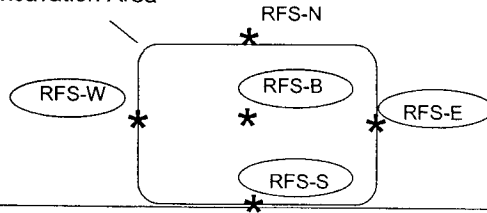


DATE 1/8/02
 DWN EVR
 APP
 REV
 PROJECT NO. 206622.01

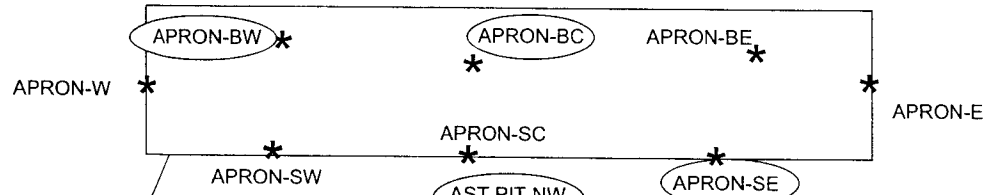
FIGURE 3
 SAFETY KLEEN SYSTEMS INC.
 11 TIPPING DRIVE
 BRANFORD, CONNECTICUT
SOIL SAMPLING LOCATION MAP



Approximate limits of Return and Fill Excavation Area

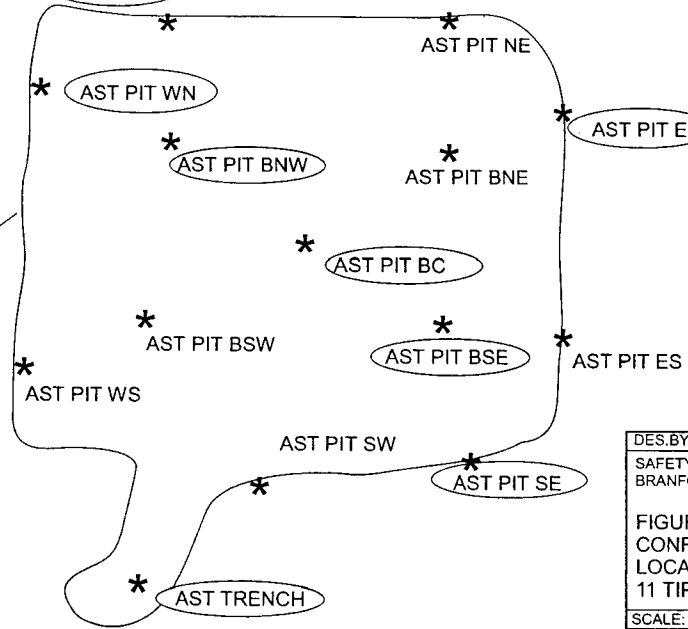


SITE BUILDING



Approximate Limits of Concrete Apron Excavation Area

Approximate Limits of Former AST Area Excavation

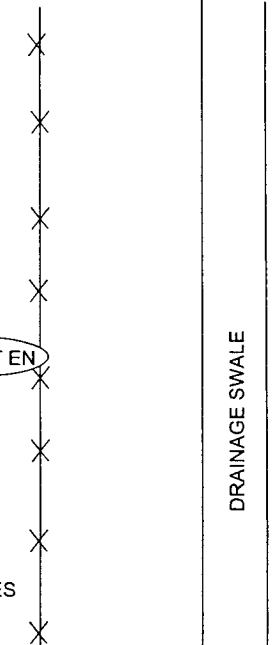


ASPHALT

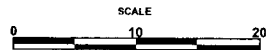
LEGEND


- * FENCE LINE
- * SOIL SAMPLE LOCATIONS
- (S) LOCATIONS SHOWING EXCEEDENCES OF RSR CRITERIA

NOTES:
1) LOCATIONS ARE APPROXIMATE
2) MAP SCALE IS APPROXIMATE



DRAINAGE SWALE



DES.BY: ECS	DR.BY: ECS	CK.BY: MP
SAFETY-KLEEN INDUSTRIAL SYSTEMS, INC., BRANFORD, CT		
FIGURE 4 CONFIRMATORY SOIL SAMPLING LOCATIONS 11 TIPPING DRIVE		
SCALE: AS SHOWN	JOB NO.: 205191.09	
DATE: July 2001	FILE:soilremovalsamples	
 WOODARD & CURRAN Engineering • Science • Operations		