TR-18 Storm Sewer Line Cleaning Summary
Carrier Corporation
Thompson Road Facility
Syracuse, New York

EnSafe Project No.
3133-057

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1.0 Introduction

The voluntary Corrective Action activities at Carrier Corporation, Thompson Road facility in Syracuse, New York, included the investigation of potential sources of PCBs. These investigations were performed in response to PCB detections in Sanders Creek sediments in samples collected by the NYSDEC. In a RCRA Facility Investigation report dated September 20, 2002 and subsequent Corrective Measures Study report dated May 21, 2003, Carrier outlined investigations and corrective measures taken to address the Transformer Yard, via the Thompson Road line (western-most storm sewer line), as a potential source of PCBs to Sanders Creek.

2.0 Cleaning and Washing of Storm Sewer Line

Carrier undertook source-control measures to remove sediments in affected storm water lines and manholes along the western-most portion of the Carrier Thompson Road Facility in December 2002. These lines and manholes are shown on the attached Figure 2-1. As outlined in Appendix B of the CMS Report, these lines were cleaned using a high-pressure, hot-water washer and commercially available concrete cleaner. The lines were first cleaned using a high-pressure water without a detergent. After the initial pass through the affected storm water lines, a second pass was made using commercially available, biodegradeable cleaner.

In the summer of 2002, Carrier sampled several manholes (MH 142, 151, and 196) along its TR-18 storm sewer line. The composite sediment samples showed elevated PCB concentrations at 4.8 ppm. In a continuing effort to eliminate PCBs in its storm water, Carrier undertook additional storm sewer cleaning activities in its TR-18 line. As with the Thompson Road line, this line was first cleaned using a high-pressure water followed by a second pass using a biodegradeable cleaner.

A summary of each section of the TR-18 storm sewer piping cleaned and a description of findings is presented Table 2-1.

Table 2-1
2003 Storm Sewer and PCB Cleanout Summary
Carrier Facility, Thompson Road, Syracuse New York

Portion of line cleaned	Date Cleaned	Washwater & Sediments Generated (gal/drums)	Comments
MH-97 to MH-259:	11/17/03	Approx. 2,200 g to Baker Tank (TK2060L).	The first section identified for cleaning was from MH-97 to MH-259. The first lines cleaned were those eastward from MH-97, pulling captured sediment back while evacuating material captured into the enclosed vacuum truck (vac truck). All sediment and debris from all catch basins in the run were captured by the vac truck. All water returned was contained for transfer into a 10,000-gallon Baker tank sampled by UpState Laboratories of Syracuse, NY prior to transfer offsite and subsequent disposal by Carrier contractor personnel. All sediment generated was contained in DOT approved 55-gallon steel drums by Environmental Products and Services personnel. Other manholes in this run include MH-256 and MH-102. Line also trending northeast from MH-97 to two other unnumbered manholes located on north side of southern plant road to building TR-12, cleaned. Two previously unknown storm lines run south from MH-256 and MH-259 – run approximately 95 and 93 feet respectively to south (beyond facility fence toward public road south of facility). Carrier personnel cut cover from MH-259 to allow access. Petroleum odor and product generated in cleaning line from MH-259 to MH-102.
MH-259 to MH-259C	11/17/03	Approx. 3,000 g to Baker Tank (TK2060L).	From MH-259 a northern run was made to MH-259C at the southeast corner of building TR-23. A bend is present in line between these two manholes which did not allow jet to run entire length between MHs. The line was cleaned as two separate sections from MH-259 toward MH-259C and back from MH-259C toward MH-259. All sediment from the MH-259 to MH-259C section was captured similar to that of the MH-97 to MH-259 section. Bricks in bottom of MH-259C catch basin removed as loose from brick bottom. Bottom needs rehabilitating.
MH-138 to MH-259C:	11/17/03	See Below	Set up on MH-138 in gravel storage area west of TR-8 and jet to south to MH-259C. Line is straight here, runs beneath portion of extension of building TR-8 into TR-23. Hydrocarbon odors were noted during cleaning of the catch basin. Several bricks in bottom of MH-138 catch basin removed as loose. Brick bottom needs rehabilitating.
MH-243 to MH-138	11/17/03	Approx. 1,100 g to Baker Tank (TK2060L).	Set up on MH-243 and clean south to MH-138. Abundant sediment and debris in MH-243 located north of MH-138 along west side of TR-8 in gravel storage area. Several bricks in bottom of MH-243 catch basin removed as loose (not as many as in MH-259C or 138). Brick bottom needs rehabilitating.
MH-277 to MH-138	11/18/03		This west to east flowing line was cleaned to MH-138 and from MH-138 to MH-277. The catch basin of MH-277 was filled with approximately 4 feet of sediment and debris. Cleaned westward to unnumbered manhole in Totaline Ave. south of scales. Cleaned line several times trying to remove all gravel and sediment but more infiltrating with each pass of jet. Apparently there is a break in line between MH-277 and unnumbered MH, beneath the paved portion east of the scale access road.
MH-277 to Unnumbered MH	11/18/03		Cleaned westward to unnumbered manhole in street south of scales on southeast side of TR-10. Unnumbered MH has minimum 8-inch pipe running through it above inlets for storm lines.
Unnumbered MH to MH-101:	11/18/03		Jetted from 101 to unnumbered MH south of scales. Unnumbered MH has minimum 8-inch pipe running through it above the inlets for the storm lines into the catch basin. MH-101 contains abundant (approx 2.5 feet) sediment in catch basin. No other unusual observations were noted during this cleaning.
MH-137 to MH-243:	11/18/03	2,600 gals on removed from vac truck to Baker	MH-137 has brick-lined bottom - several loose bricks removed from bottom. Good water flow. Jet back to MH-243, jet through side line which enters Building TR-8. Jet north to MH-272 beneath TR-7.

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Portion of line cleaned	Date Cleaned	Washwater & Sediments Generated (gal/drums)	Comments
		Tank (TK2060L).	
MH-123 to MH-124 MH-123 to MH-126	11/18/03		Jet from MH-123 in main line to east to MH-124. Returns consisted of abundant organic material (leaves). Jet to short stubs to southeast and southwest from MH-123 and long run to MH-126.
MH-123 to MH-272	11/18/03	1,800 g to second Baker Tank (TK2034L)	Jet from 123 to northernmost MH-272 beneath TR-7. Note sheen here – PID is mainly 0.0 with 0.4 maximum.
MH-118 to MH-117, MH-119, and new MH northeast of MH-118	11/18/03		Clean catch basin of MH-117 - Bottom of MH-117 catch basin is just soil - no hard or concrete bottom. Soil falling in as remove material from bottom of basin. Jet lines from MH-117 to MH-119, and new manhole northeast of MH-117 at southwest corner of TR-4. Clean all catch basins.
MH-129 to MH-122, MH-140	11/18/03		Bricks are lain in raceway approximately 6-inches high where all three lines empty into MH-129 catch basin, forming platform in bottom of basin. MH-129 to MH-122: strong petroleum odor, up to 3.7 ppm. MH-129 to MH-140: strong petroleum odor, up to 15.3 ppm. Remove material from catch basin of MH-140. Clean material from catch basin of MH-133 and jet to line short distance.
MH-126 to MH-129, MH-123	11/18/03	2,600 g to Baker Tank (TK2034L).	Jet from MH-126 to MH-129: strong petroleum odor and abundant muck. PID up to 15.6 ppm. MH-126 to MH-123: large asphalt-like accumulation that we try to break up. Could not break all up. Less petroleum odor at this location.
MH-129 to MH-126 MH-139 to line near MH-122	11/19/03		Rerun line to clean out second time. Sheen on return water. Run line from catch basin MH-139 immediately east of TR-1 to line near MH-122. Strong petroleum odor and line partially blocked initially - lots of mucky water/sediment returned. PID up to 3.4 ppm
MH-131 to MH-129, unnumbered MH to west at TR-1, MH-130, MH-134	11/19/03	Approx. 2,600 g to Baker Tank (TK2034L)	MH-131 to MH-129 fully plugged so unplug this run. MH-131 to unnumbered MH on immediate east side of TR-1: strong petroleum odor, up to 56.2 ppm at MH, jet MH repeatedly (6 times) to clean. MH-131 to MH-134: MH-134 is very deep, sludge and strong petroleum odor, PID to 1.7 ppm.
MH-134 to MH-136 and MH-135	11/19/03	Approx 2,000 g to Baker Tank (TK2034L)	MH-134 is very deep as is MH-136 (approx 6 feet deep). Lines into MH are in first 2 feet of catch basin. Water noted flowing from south to MH-131. MH-136 line totally clogged. When water reaches height of MH-136 pipe in MH-134 it flows back to MH-136 – water does not exit this area. Strong petroleum odor (up to 57.4 ppm on PID). Abundant sediment in MH-135.
MH-125 to MH-127, and 132	11/19/03		MH-125 and jet west to MH-127: Both MH-125 and MH-127 catch basins have 3-inches of sediment. MH-125 also has asphalt layer in bottom - clean out this material. Sheen and petroleum odor emanating from MH-127 line. PID up to 0.4 ppm. Made 3 passes through this line. Line from MH-125 to MH-132 open and cleaned (not obsolete as stated on drawing).
MH-132 to MH-128	11/19/03	Approx 2,600g (Baker Tank TK2034L) - fills 2nd tank	Sheen on return water. 5-inches of sediment within catch basin.
MH-121, MH-120	11/19/03		Clean these two MHs to main N-S line.
MH-149 to MH -145	11/19/03	800g(Baker Tank TK2067L)	Line from MH-149 to MH-145 is not straight, slight bend in line.
MH-142 to MH-145, MH-144, MH-144 to MH-144A	11/20/03		Clean lines. No notable observations.
MH-142 to MH-141	11/20/03		Try jet to MH-141 but line stuck. Line goes to unnumbered square catch basin beneath crane track on east side of TR-1. Move to MH-141 catch basin – brick, metal, asphalt, and sediment removed from basin.

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			Possible broken VCP from MH-141 to unnumbered square catch basin. Clean unnumbered square catch basin.
Unnumbered MH east side TR-1 north of MH-141, north of exit/entrance point to bldg.-	11/20/03	Approx 2,000 g to Baker Tank (TK2067L)	Organic odor emanating from catch basin - PID to 9.2 ppm. Also possible break in line from this catch basin back toward MH-142. Jet to other unnumbered manhole in line in Totaline Ave. on line to MH-142. Clean this catch basin.
Area of catch basins east of grass, north of TR-7 on west side of Research Ave.	11/20/03		Begin with southern-most catch basin as line goes north to MH-124. Most all have accumulation of organic matter (leaves, twigs, along with sediment). Line of 5 north to south – 4th one connects by 6 ft lateral to MH-124. 4th catch basin also has line trending to TR-4 which we clean for approx 75 ft to beneath bldg. Good flow from this line (estimate 2-3 gpm). Line may go beneath TR-4 to east side of TR-4 (?). Unknown.
MH-222, MH-222A, MH-222B to MH-144	11/20/03		No notable observations in these manholes on the east side of TR-18S in Research Ave. Abundant organic matter (leaves, twigs).
MH-153 to MH-224, MH-151	11/20/03	Approx 2,200 g to Baker Tank (TK2067L)	Clean lines. No notable observations.
MH-143 to MH-151	11/20/03		MH-151 is very deep MH. Line to east – we run minimum of 100 ft in line which goes beneath TR-4 – may connect to MHs on west side of TR-4 (?)
Unnumbered catch basin north of TR-6, SE of MW 3S/3D in parking area	11/20/03		Clean this catch basin and line that runs to main North – South line south of MH-143 and north of MH-123..
Unnumbered MH east side of TR-1 to MH-220.	11/20/03		Clean catch basin of 3-inches of gravel and sediment and broken bricks and note sheen on water. Also moderate solvent odor in line to MH-220. Flush line 5 times – PID max of 7.2 ppm.
MH-220 to MH-151 and to unnumbered MH east of TR-1	11/20/03	Approx 1,900 g to Baker Tank (TK2067L) – 4-inches space remaining in tank.	No notable observations in MH-220 or 151. Line as shown on drawing from MH-220 to MH-152 has been grouted up and no longer serviceable.
MH-148 to MH-219	11/21/03		Can't jet from 148 to 219 as baffle over outlet of line in 219. Move to MH-219. Clean catch basin.
MH-219 to MH-148, MH-150, MH-151	11/21/03		Clean these 3 lines and catch basins as all contain minimum of 3-inches of sediment. All are relatively shallow catch basins. Also clean approx 50 to 75 feet into line trending beneath TR-1 to west.
MH-145, MH-146	11/21/03		Evacuate these catch basins. Line from MH-145 extends to line from MH-218 to MH-196. MHs don't drain well.
MH-218 to MH-196	11/21/03		2 lines formerly entered MH-218 but these are grouted. Clean line to MH-196.
MH-147 to MH 194	11/21/03	Approx 2,200 g to Baker Tank (TK2161L)	Line plugged with sediment and debris before jetting out. Line runs approximately 80 feet but does not enter MH-196.
Offload vac truck	11/21/03	17 drums (55g) solids 3 drums solids and liqs 3 drums plastic and solids 1 drum vac truck rinse water	Stored in AA-Bay of TR-1 (south end) awaiting analysis and disposal. BREAK for Thanksgiving Holiday week. To resume 12-01-03.
MH-147 to MH-194	12/01/03	Approx 1000 g to Baker	Jet nozzle and hose become lodged near end of line from MH-147 to MH-194. Unable to retrieve 80 ft of

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		Tank (TK2067L) 1 drum sediment and wash water from vac truck.	hose line and nozzle so perform confined space entry into MH-147 to cut hose and leave in line. Evidently pipe from MH-147 is grouted off within MH-194 – no entrance to MH-194 catch basin for line.
MH-196 to MH-196A beneath TR-2/3, MH-151	12/02/03		Advance jet washing beneath TR-2/3 approximately 175 ft. Run second time and extend greater than approx 200 ft. Water return was muddy. Jet to MH-151 from MH-196.
MH-194 to MH-195	12/02/03	Approx 1,200 g to Baker Tank (TK2067L)	Clean lines and catch basins. No notable observations.
MHs on south side of TR-2 MH-199 MH-201 MH-202 MH-204 MH-205	12/02/03		 Clean line. No notable observations. Jet line from MH-201 to MH-198. No notable observations. Jet line from MH-201 south beneath TR-1 for approximately 75 ft. Muddy water returned – jet line twice. Jet to north from MH-202 beneath TR-2 to MH-202A. Strong odor here – PID to 534 ppm. Jet line from MH-202 to MH-204 but line makes sharp turn and only able to do what can – can't get around turn. No line to west from this MH but jet line to east from MH-205 which runs approximately 75 ft. Did not enter another MH.
MH-8 to MH-12, North of TR-2	12/02/03	Approx 1,200 g to Baker Tank (TK2067L)	Clean line from MW-8 west to MH-12. No notable observations. Cannot physically move truck to other MHs needing jetting north of TR-2 due to truck getting stuck because of soft ground conditions (wet, previously rutted areas).
MH-259 to south, to MH-102	12/03/03	Approx 600 g to Baker Tank (TK2067L) 2 drums solids from truck	Cleaned line after Carrier facilities personnel removed cover, and water sampling. Line to south extends 93 ft and ends. This line partially blocked some distance in. Jet to north, MH-259B, and west to MH-102
Detergent Washing of Line MH-259 to MH-97	12/03/03	Approx 1,000 g to Baker Tank (TK2060L)	Section cleaned using detergent 1245 to 1540. Notable observations include oil odor from 256 to 102 and 259 to 102.
Detergent washing MH-259 to MH-138	12/04/03		MH-259C to MH-138 PID reading max of 21.3 ppm
Detergent washing MH-138 to MH-101	12/04/03	Approx 2,200 g to Baker Tank (TK2060L)	Broken pipe possible in line from MH-277 to MH-101 as continue to get abundant sediment returns after repeated detergent rinsing. Also obstruction in line from MH-101 to MH-277 not apparent 2 weeks ago. Try numerous times to break through, but not successful.
Detergent washing MH-118, MH-117, MH-119	12/04/03		Remove accumulated water and sediment since cleaned two weeks ago and detergent wash lines.
Detergent washing MH-137 to MH-123	12/04/03	Approx 2,600 g to Baker Tank (TK2060L)	Detergent wash this main. Line beneath TR-7 could not access line from MH-273 to MH-272 due to jet not being able to be advanced further. No notable observations.
Detergent washing MH-123 to	12/04/03	Approx 1,800 g to TK2060L	Detergent wash line – abundant sediment returned and will rinse more on 12/05/03. Detergent wash on

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Portion of line cleaned	Date Cleaned	Washwater & Sediments Generated (gal/drums)	Comments
MH-126			12/5/03 – line possibly blocked off from MH-123 to MH-126 - water not flowing to 123.
Detergent washing all lines: MH-123 to MH-135	12/05/03	Approx. 2,000 g to FADW4800L Approx. 900 g to FADW4800L 8 drums solids Rinse water drum from 12/1/03	Strong solvent and hydrocarbon odor from MH-129 to MH-126 when pull detergent back. MH-129 to MH-131: Oily sludge pulled back – shoot line twice – strong hydrocarbon odor (PID to 6.3 in MH). Hydrocarbon odor in MH-140 to MH-129 – odor not as strong. MH-139 to N-S line: detergent wash twice as oily residue retuned first wash. MH-134 is approx. 10-feet deep and line to MH-131 is approx 2-feet below ground surface, while line to MH-135 is approx. 6-feet below ground surface – All water flow is to MH-135, no outlet. MH-134 to MH-135 oily residue and sludge.
Detergent washing lines: Catch basins along Research Ave. (between TR-4 and TR-6)	12/08/03		No notable observations
Detergent washing of Main N-S line north of TR-18S	12/08/03	Approx. 2,200 g to FADW4800L	No notable observations
Detergent washing of lines from catch basins MH-127, MH-128, MH-141, unnumbered, and 220B to main line	12/08/03		No notable observations
Detergent washing of MH-145 and MH-146	12/08/03	Approx. 1,000 g to FADW4800L	Line washing hose stuck in line from MH-145 – unstuck after jetting more.
Detergent washing of MH-148, MH-219, MH-150, MH-147	12/09/03		Lines running off MH-147 to SE and MH-150 that runs east go nowhere. Abundant mud from line from MH-150. Unable to retrieve hose and jet head from MH-147.
Detergent washing of MH-196, MH-197	12/09/03	Approx 1,500 g to FADW4800L	No MH or catch basin for MH-197 but cleaned line trending in that direction. No other observations.
Detergent washing of MH-142 and MH-143	12/09/03		Cleaned these lines and catch basins today due to vehicles/trailers parked over them on 12/08. No notable observations.
Detergent washing of MH-194, MH-195	12/09/03	Approx 2,600 g to FADW4800L	No notable observations.
Detergent washing of MHs along south side of TR-2 (MH-198, MH-199, MH-200, MH-201, MH-202, MH-203, MH-204, MH-205	12/10/03		Several pieces of broken piping in MH-199 catch basin. MH-203 contains abundant mud/rock due to half of bottom broken away. Mainly no notable observations.
Detergent Washing of MH-12 to MH-8	12/10/03	2,200 g to FADW4800L 4 drums sediment from clean out of vac truck (41 drums total)	No notable observations

ANALYTICAL RESULTS
TR-18 STORM LINE CLEANING

PARAMETER	MEDIA	RESULT	ORIGIN
TCE	Water	<30 µg/L	Tank 2060 (1st use)
Aroclor 1260	Water	3.1 µg/L	
Aroclor 1260	Solid	140 mg/kg	Tank 2034 & 2067 composite
TCLP TCE	Solid	0.07 mg/L	
Aroclor 1260	Solid	7.9 mg/kg	Tank 2060 & 2061 composite
TCE	Water	5 µg/L	Tank 2061
Aroclor 1260	Water	2.0 µg/L	
TCE	Water	200 µg/L	Tank 2034 & 2067 composite
TCE	Water	<30 µg/L	Tank 2060
Aroclor 1260	Water	5.8 µg/L	(2nd use, Detergent Wash)
TCE	Water	80 µg/L	Tank FADWH800L (detergent wash)
Aroclor 1260	Water	3.7 µg/L	

NOTES:
TCE – Trichloroethene
All solid results are reported in milligrams per kilograms (mg/kg).
All water results are reported in micrograms per liter (µg/L).
All samples analyzed by UpState Laboratories Inc., Syracuse, NY.

ANALYTICAL RESULTS
DRUM SEDIMENT AND WATER

PARAMETER	MEDIA	RESULT	ORIGIN
TCE	Solid	0.07 mg/L	Composite Drums 1-12
Aroclor 1254	·	180 mg/kg	
TCE	Solid	0.3 mg/L	Composite Drums
Aroclor 1254	·	36 mg/kg	
TCLP TCE	Water	<0.03 mg/L	
TCE	Water	<15 µg/L	Composite Drums 1A-2A
Aroclor 1260	·	13 µg/L	
TCE	Water	<34 µg/kg	Composite Drums 3A-9A
Aroclor 1260	·	3.1 mg/kg	
TCE	Solid	200 µg/kg	Composite Drums
Aroclor 1260	·	2.9 mg/kg	

NOTES:
TCE – Trichloroethene
All samples analyzed by UpState Laboratories Inc., Syracuse, NY.
milligrams per kilogram (mg/kg).
micrograms per kilogram (µg/kg)
milligrams per liter (mg/L)
micrograms per liter (µg/L).

LEGEND

TR-2	BUILDING
NS	MANHOLE NOT SAMPLED DUE TO LACK OF SEDIMENT/ EQUIPMENT OVER LOCATION
NA	MANHOLE NOT SAMPLED (COULD NOT LOCATE)
ND	CONCENTRATIONS OF PCBs WAS BELOW METHOD DETECTION LIMITS
MH○	MANHOLE
MH103○	MANHOLE SAMPLE (mg/kg) 2001
MH84○	COMPOSITE MANHOLE SAMPLE LOCATION 2002
●	SEDIMENT SAMPLE LOCATION (mg/kg)
●	NYSDEC SEDIMENT SAMPLE LOCATION
	TANK TK 2060L (1st use, 2nd use for detergent wash)
	TANK TK 2034L
	TANK TK 2067L
	TANK TK 2161L

240 0 240
GRAPHIC SCALE IN FEET

SOURCE:
PHILLIPS & ASSOCIATES
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(FILE 2700.001)

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MEMPHIS, TENNESSEE
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VIRGINIA SLOVAKIA

FIGURE 1
CENTRAL STORM SEWER SECTION CLEANED
FOR PCB ABATEMENT NOV/DEC 2003
CARRIER CORPORATION
SYRACUSE, NEW YORK

DWG DATE: 05FEB04 | DWG NAME:3133049R013