CAPITOL CITY PLUME SUPERFUND SITE CONCEPTUAL SITE MODEL PRESENTATION

March 15, 2012

By The Advertiser Company and State of Alabama

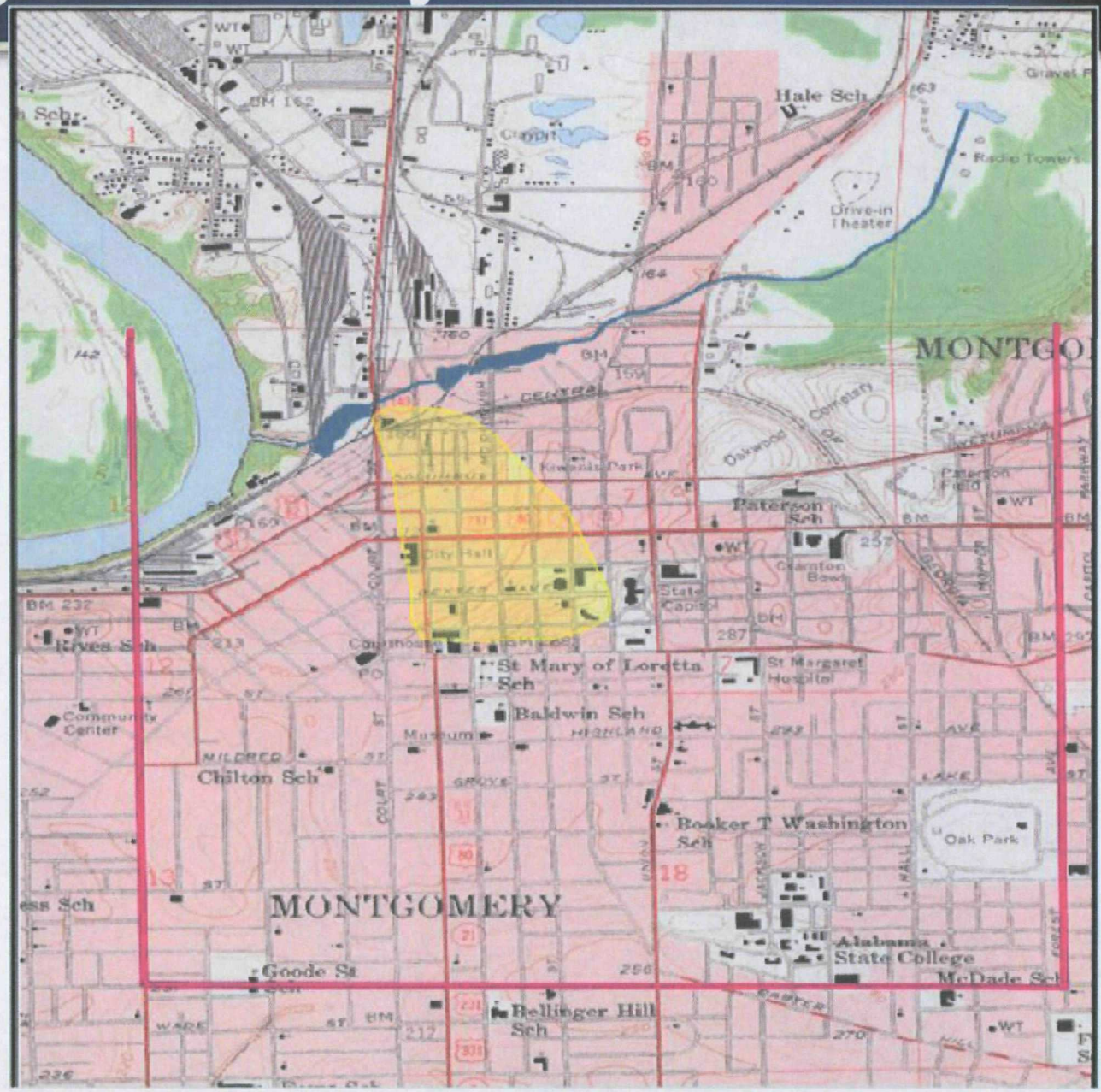
PRP Investigation Goals

- The overall goal of the process is to identify historical users of contaminants of concern ("CoCs") within the groundwater contaminant plumes and develop the nexus between the parties identified and the plumes
- Primary focus on entities that are viable
- Secondary focus on the identification of orphan entities that may have contributed to the contamination
- Build on work done by EPA to maximize results
- As part of its commitment to cooperate with EPA, The Advertiser Company is currently funding the PRP investigation for the benefit of all parties
- The State is not participating in the PRP investigation

PRP Investigation Study Area

USGS Generalized Boundary of the Capital City Plume Site

Study Area Boundary



Base Map:
1958 USGS Topographic Maps, Montgomery North and Montgomery South

Viable Entities with Potential Nexus to PCE

04 – Sabel Steel
05 – Capital Trailways
06 – Colonial Trailways
07 – Bearings & Drives of Alabama
08 – Harper Lee Machine Works
11 – Davis Dry Cleaners, Inc.
20 – Packaging Machinery, Inc.
32 – Quaker Supreme Chemical
33 – Mount Scrap Material Co.
36 – Ed's Electric Motor Service
37 – Kershaw Company
41 – Standard Roofing Inc.
42 – Swift & Company
43 – Allied Mills – Grain & Feed

Viable Entities with Potential Nexus to TCE

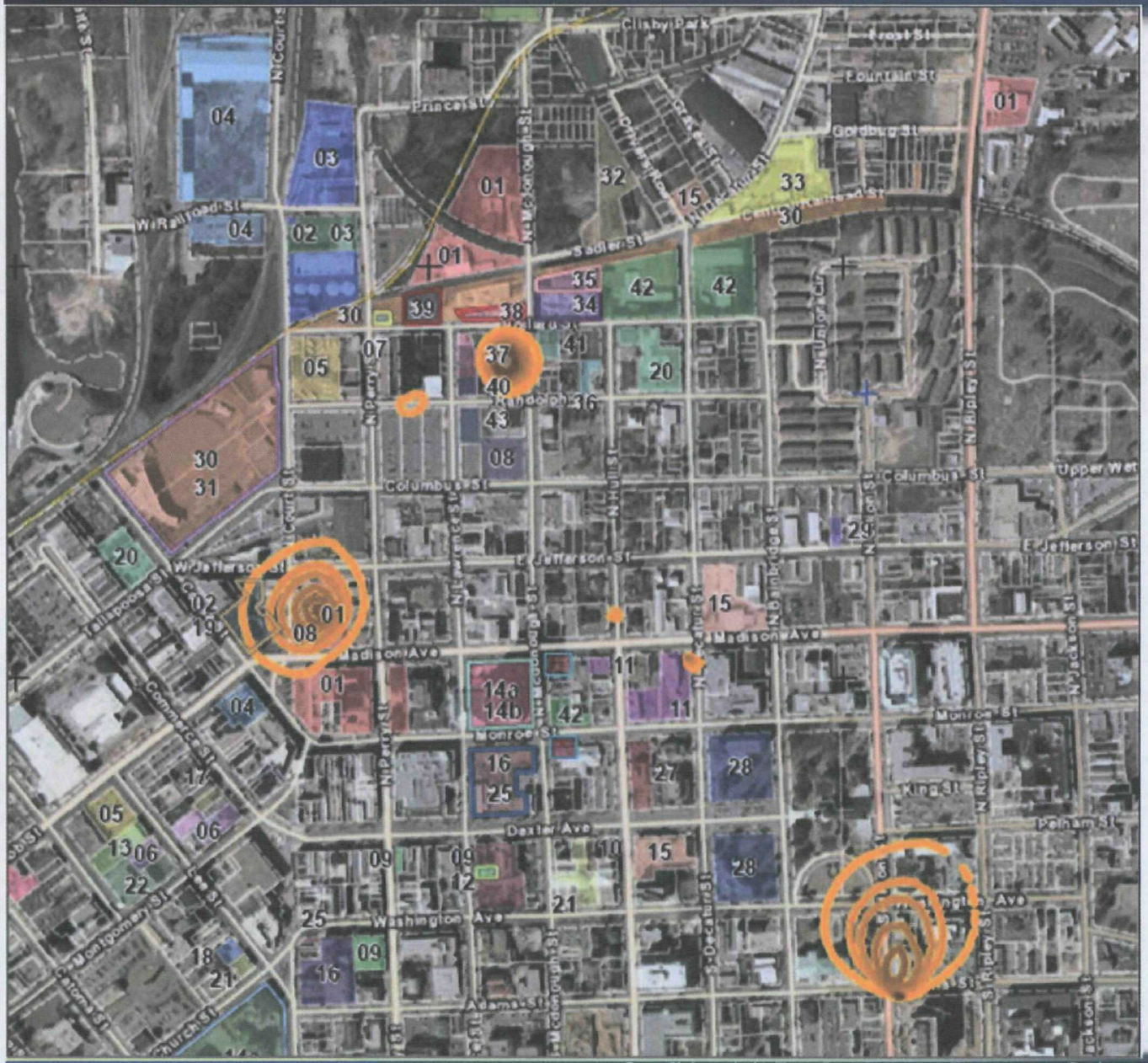
30 – Norfolk Southern RR
31 – CSX RR
09 – National Cash Register
12 – Alabama Power Company

Wells with TCE

Well with TCE

Temporary Well with TCE

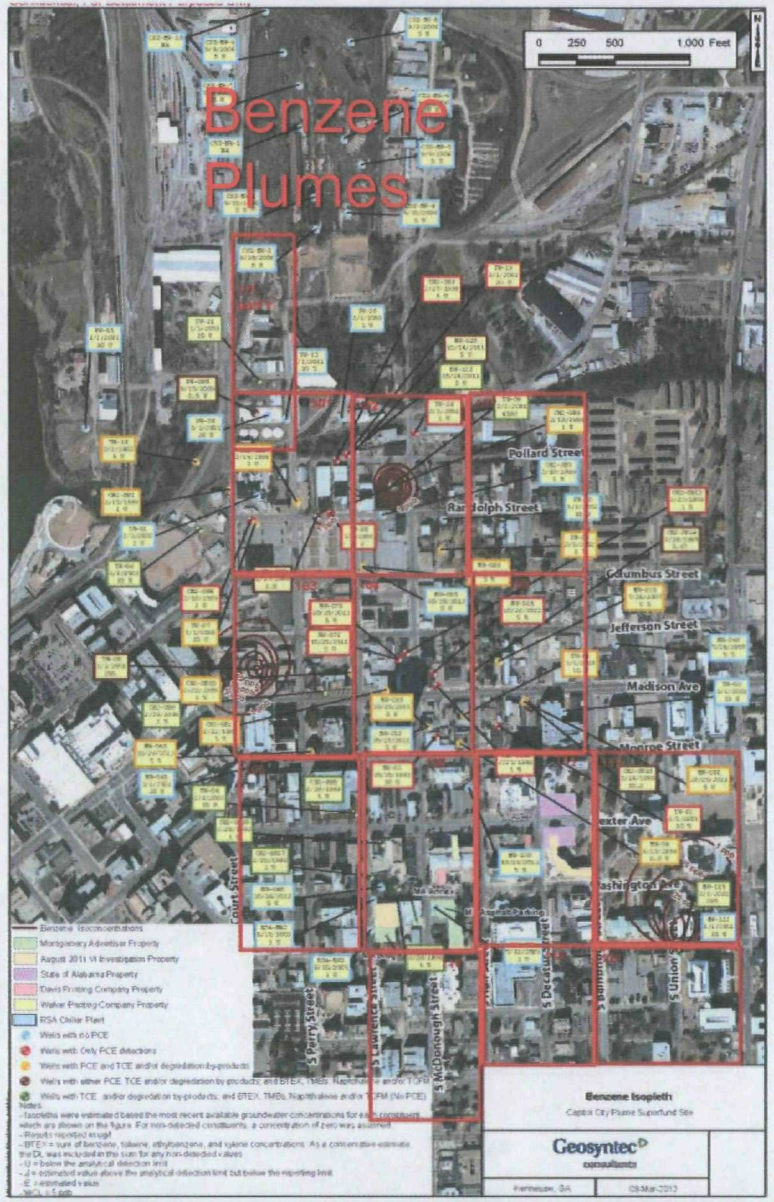
Viable Entities with Potential Nexus to BTEX



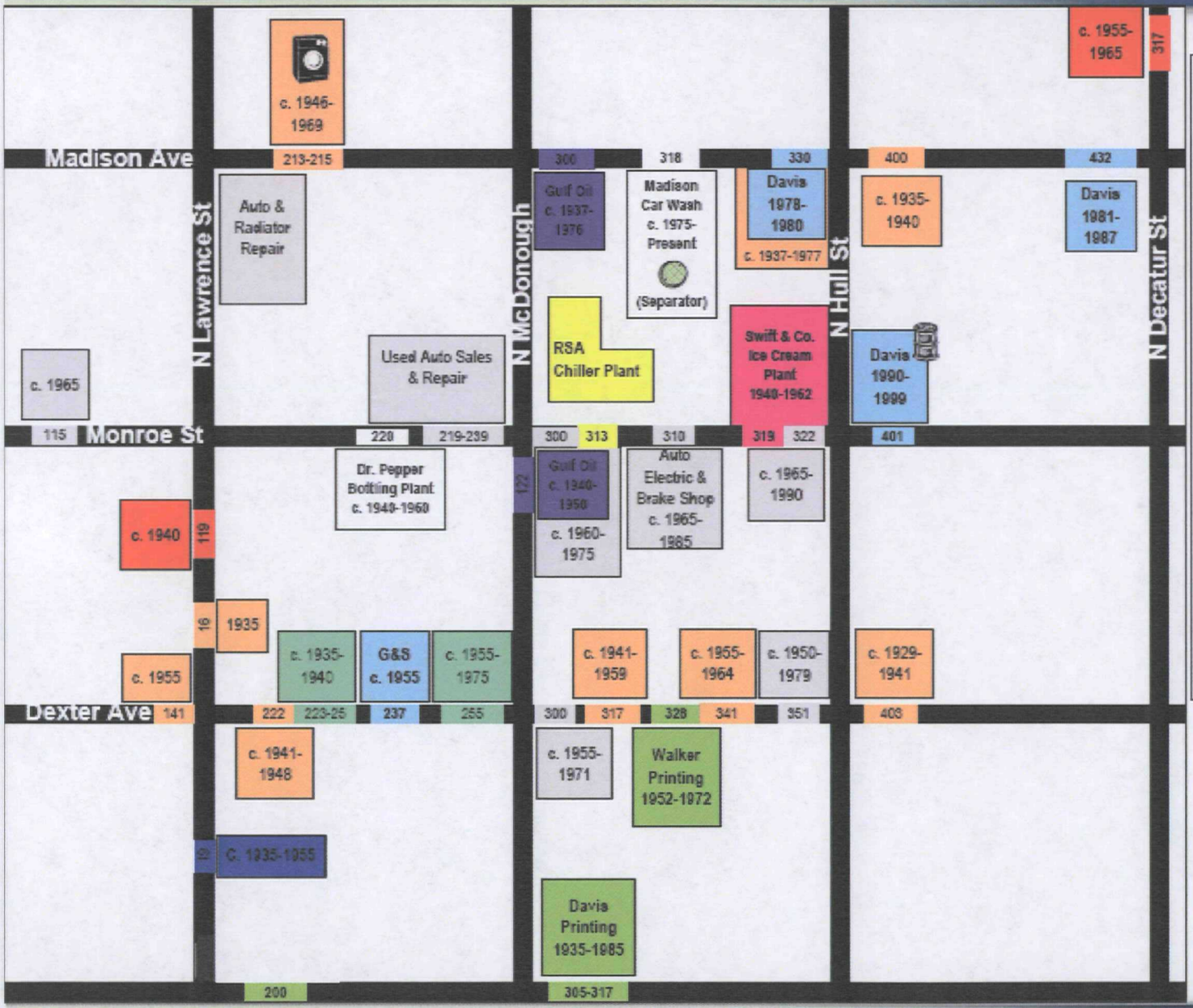
08 – Harper Lee Machine Works
11 – Davis Dry Cleaners, Inc.
14a – Gulf Oil Co.
14b – Texaco Oil Co.
20 – Packaging Machinery, Inc.
32 – Quaker Supreme Chemical
33 – Mount Scrap Material Co.
35 – Wofford Oil
37 – Kershaw Company

Inferred Source Areas

Sanborn Map Pages



RSA Chiller Plant Area



MAP KEY:

Potentially Viable:

- Dry Cleaner
- Gas Station
- Ice Cream
- Printer
- Cash Register

Orphan:

- Dry Cleaner
- Auto Repair or Gas Station
- Electric Motor Repair
- Printer

Nexus Or Viability Not Confirmed:

- Other

RSA Chiller Plant Area

Madison Car Wash – 318 Madison Avenue

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Lolgh Pegues, Director

Mailing Address:
PO BOX 301463
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(205) 353-1713
FAX 340-9359

3204 Perimeter Road
Mobile, AL
36615-1131
(205) 450-3400
FAX 479-2593

October 1, 1993

MEMORANDUM

TO: Steven O. Jenkins, Chief
RCRA Compliance Branch
Land Division

THROUGH: Robert W. Barr, Chief
South Unit
RCRA Compliance Branch
Land Division

FROM: Stephen C. Maurer SCM
South Unit
RCRA Compliance Branch
Land Division

RE: Madison Car Wash, Inc.
318 Madison Ave.
Montgomery, Alabama
Montgomery County/CESQG/Non-Notifier

On September 29, 1993 at 2:15 p.m., Jake Hall of ADEM Special Projects and I arrived at the above referenced address to investigate and sample the liquid in the concrete vault for the oil water seperator for the Madison Car Wash.

Earlier that day, Special Projects personnel had opened the man hole cover on the concrete vault for the seperator and had noted a strong perchloroethylene odor and Hnu readings of 150 ppm in the vault .

The concrete vault is 9'X6'X6' according to the copy of the recent contract for construction of the drain, oil water seperator, and vault system for the car wash. Mr. Hall of Special Projects has a copy of the contract and plans used for this system.

Special Projects had requested a RCRA inspection of the Madison Car Wash as a possible source of the perchloroethylene contamination found at the RSA Utility building construction site behind the Madison Car Wash (see September 16, 1993 trip memo, Montgomery County file concerning the RSA site contamination).

Mr. Hall and I met with Mr. Terry Herman, General Manager of the Madison Car Wash. Mr. Rick Johnson, owner, was not present and was not expected back anytime soon.

Mr. Herman, Mr. Hall, and I toured the detail shop area located at the back area of the Madison Car Wash. Mineral spirits are used in small quantities on rags and brushes to remove tar which sometimes gets on cars. Small quantities of RS10 thinner are used to remove road paint which sometimes gets on cars. The RS10 thinner contains ketones, methanol alcohols, glycol ether, and petroleum distillate according to the label. The RS10 came from Research Solvent & Chemicals, in Birmingham, Alabama. Detergents are used in the main car wash system.

One detergent type commercial washing machine was also in the detail shop area. The detail shop was very clean.

According to Mr. Herman, perchloroethylene is not and has never been used at the Madison Car Wash. Mr. Herman mentioned that Mr. Johnson thought that a dry cleaner had been located directly behind the detail shop many years ago. The plan for the Madison Car Wash drain system and oil water seperator system showed that a building was located along Monroe Street behind the detail shop area. I did not recall such a building noted in the RSA Phase I assessment report which I had received from Jerry Gilbert of CTE. Special Projects now has the copy of this Phase I report.

The oil water seperator and drain system was installed to handle a motor wash down sump area next to the detail shop. The concrete vault was installed to enclose the oil water seperator and to facilitate servicing the seperator. The vault is not a part of the actual sewer system, but did have about a foot of liquid collected in the bottom, perhaps from seepage from the surrounding soil and leakage of the oil water seperator system within the vault.

The waste line from the oil water seperator leads down to S. McDonough Street, where it connects with the main city sanitary sewer line in the middle of the street.

The Madison Car Wash appears to be a conditionally exempt small quantity generator of hazardous waste, much of which is lost to evaporation during the detailing operation.

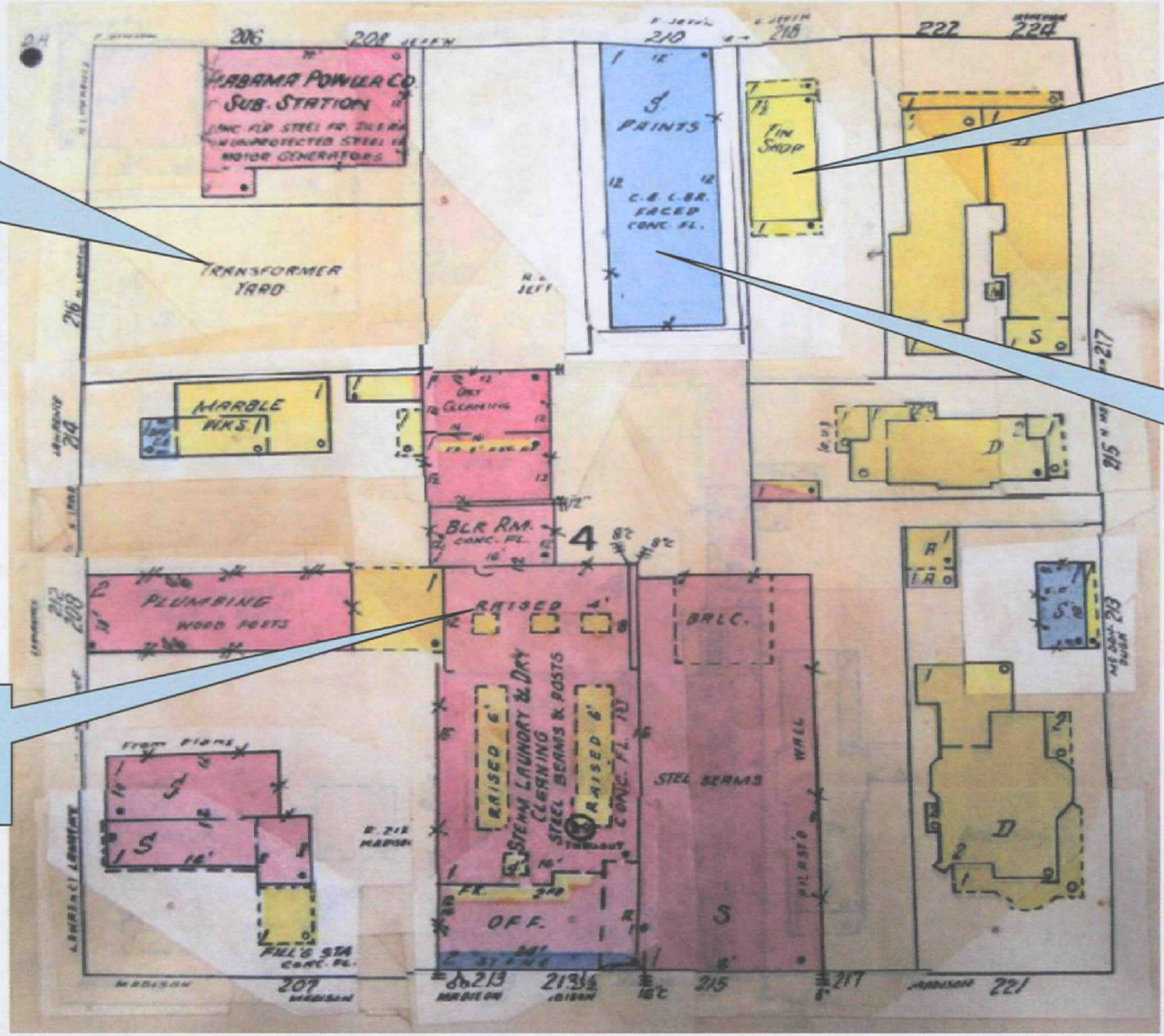
200 Block – Madison – 1950 Sanborn Map

Power Substation with Transformer Yard (Viable)

Tin Shop (Orphan)

Paint Shop (Orphan)

Dry Cleaning Plant (Orphan)



RSA Energy Plant Area

Madison Car Wash – 318 Madison

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Lelgh Pegues, Director

Mailing Address:
PO BOX 301463
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October 1, 1993

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Madison Car Wash Inspection/RSA contamination site
October 1, 1993
Page 2 of 3

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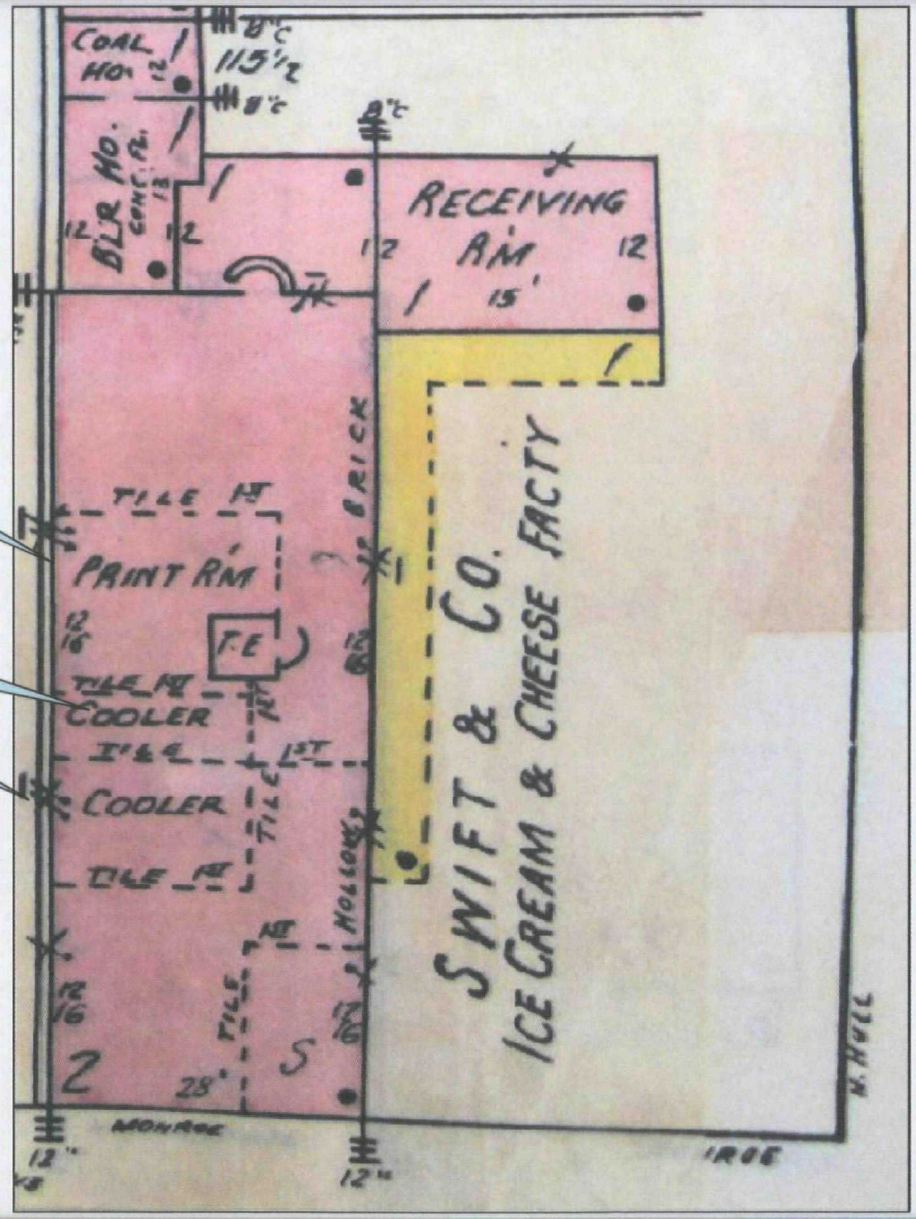
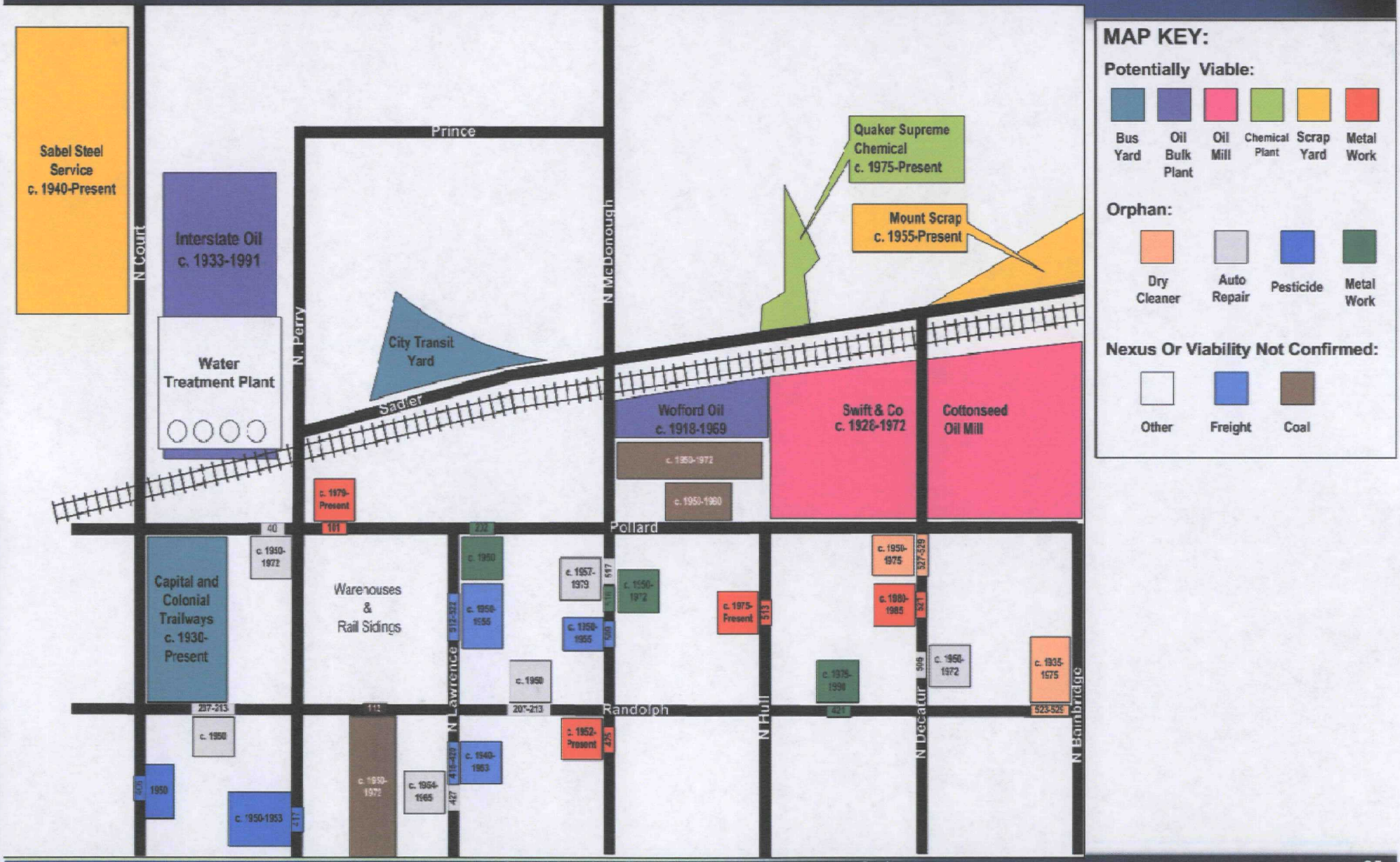
Swift & Company – 319 Monroe – 1950 Sanborn Map



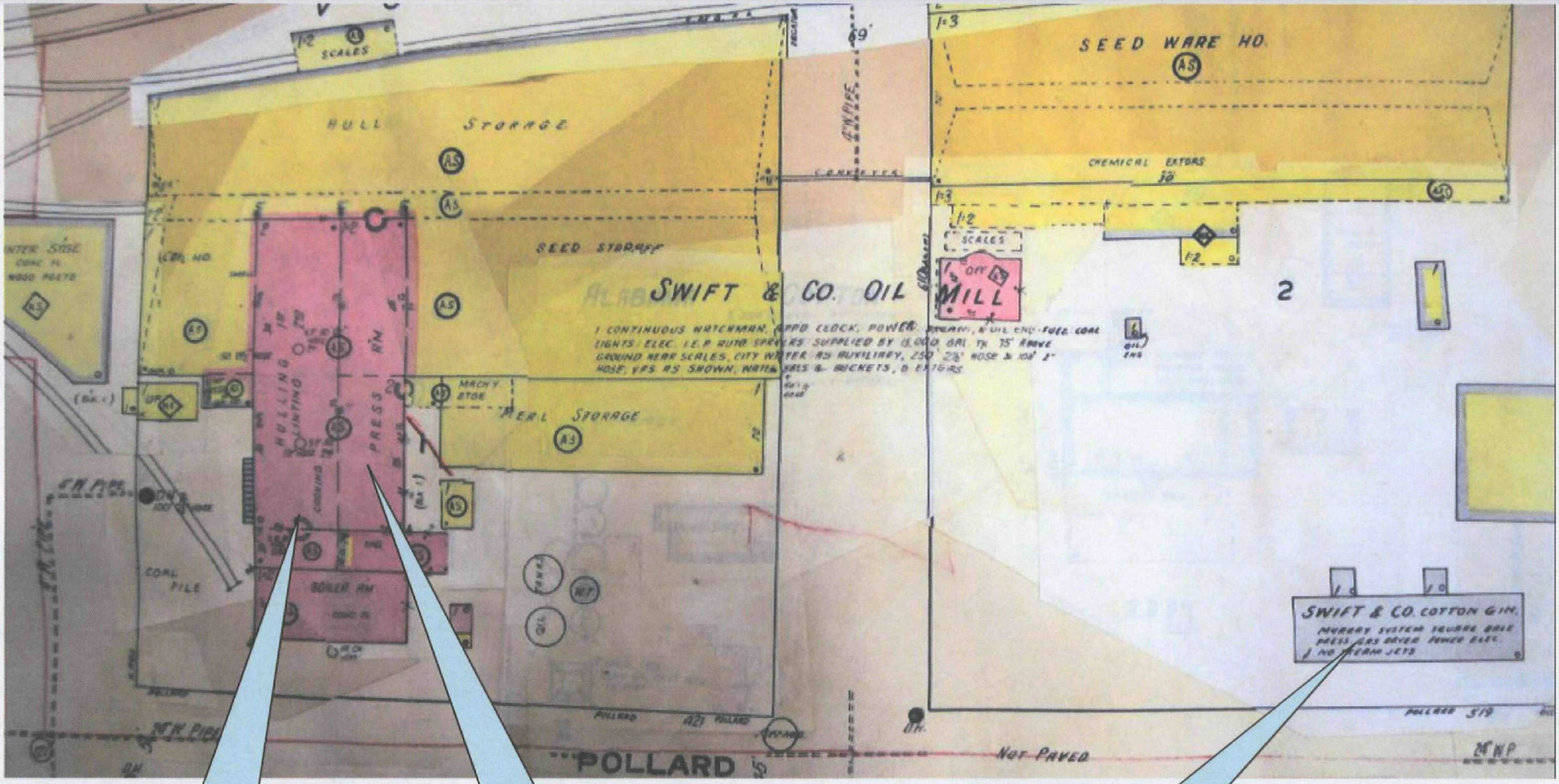
Print Room

Coolers

Northern Area of the Site



Swift & Co. Oil Mill – 610 N Decatur – 1950 Sanborn Map



Hulling & Cooking

Press Room

Cotton Gin

PRP Investigation Path Forward

- Continue filtering process for currently identified PRPs
- Assist EPA to fill data gaps to establish entity-specific liability
- Work with EPA to engage PRPs with nexus to CoCs
- Assist EPA with PRP group expansion

Key Summary Points

- There are multiple source areas; the area of the plumes is large but the concentrations are low
- The contaminants of concern are PCE and BTEX
- There is no drinking water pathway
- Site-specific screening analysis shows no areas with a potential soil vapor risk
- There is no evidence of vapor intrusion occurring at 200 Washington Avenue or the State buildings
- EPA's generic conservative screening analysis shows two areas of the Site where additional soil vapor analysis may be warranted
- The indoor air concentrations found in the County and State building are consistent with typical urban background conditions
- EPA's historic and proposed soil vapor sampling plan is not warranted based on the data, and is inconsistent with guidance and the NCP
- Viable PRPs will be pursued and FTI will provide support to EPA
- The Advertiser Company and the State are not PRPs

Operator	Location	Tenure*	Business Type	Potential Contaminants	Potential Nexus	Succession History	Agent of Service	Recommended EPA Action
Davis Printing Co	103 Lee 305-317 Washington Ave	c. 1928 – 1931 c. 1935 – 1985	Printer – Book and Commercial	Waste inks, photographic chemicals, plate processing solutions, fountain solutions, cleaning solvents, heavy metals	West and south of the plume area EPA 104(e) response May 11, 2010 No records for the period on Washington.	• Formed in Alabama on July 6, 1977 as Davis Printing Company, Inc.(Corp ID# 047-320) • 2005 – Name change to Davis Direct, Inc. • **Active**	Emile Vaughan, President 9713 Ivy Green Dr Montgomery, AL **Corporate Address**: Davis Direct Inc. 1241 Newell Pkwy Montgomery, AL 36110-3212 334-277-0878	
Walker Printing Co., Inc.	310 Dexter Ave 328 Dexter Ave	1942 – 1953 1950 – 1972	Printer – Book and Commercial	Waste inks, photographic chemicals, plate processing solutions, fountain solutions, cleaning solvents, heavy metals	Operated in the plume area Responded to EPA 104(e) on June 1, 2010 Provided almost no information.	• Formed in Alabama on October 25, 1965 as Walker Printing Co., Inc. (Corp ID# 019-564) • 2010 – Name change to Walker 360, Inc. • **Active**	John Taylor Blackwell Walker 360, Inc. 2501 E. 5th St Montgomery, AL 36107-3105 334-832-4975	
Davis Cleaners, Inc. AKA – Davis One Hour Cleaners	330 Madison Ave 432 Madison Ave 401 Monroe St 473 S. Decatur St	c. 1978 – 1980 c. 1981 – 1987 c. 1990 – 1999 c. 1981 – Present	Dry cleaning	Stoddard solvent, tetracholorethylene (PCE), petroleum products to fuel and service delivery trucks	Operated in the plume area. Spent dry cleaning cartridges and empty drums marked PCE were found at 401 Monroe Street by ADEM inspectors in 1993. The 401 Monroe and 473 S. Decatur addresses have current RCRA CESQG permits.	• Formed in Alabama on July 2, 1981 (Corp ID# 083-153) • **Active** Most recent annual report 2002 Donald Davis is identified as the owner/operator of at least four Davis One Hour Cleaner shops in Montgomery in the RCRIS database.	Donald R. Davis, President Davis Cleaners, Inc. 4003 Wallahatchie Rd Pike Road, AL 36064-3517 334-264-7111	Issue a GNL or send a Section 104(e) information request letter asking for details of operations and waste handling practices at all facilities.

*Based on Currently Available Information

Operator	Location	Tenure*	Business Type	Potential Contaminants	Potential Nexus	Succession History	Agent of Service	Recommended EPA Action
Swift & Company	610-622 N Decatur St. 319 Monroe St	1928 – c. 1972 1939 – 1962	Cottonseed Oil Mill Ice Cream Plant	PCE, TCE Hexane Petroleum hydrocarbons PCE as a heat transfer medium or refrigerant component	One block east of TW-14 where PCE has been detected Located at the RSA Energy Plant site where PCE has been detected. Section 104(e) Request for Information sent to Prentice Hall Corporate Systems who forwarded it to ConAgra. ConAgra responded that they have no records for Swift & Co.	• Swift & Company qualified to conduct business in Alabama on January 5, 1914. (Corp. ID# 710-095) • 1969 – Merged into Delaware Swift & Company (Corp ID# 856-765) • 1982 – Name changed to Swift Independent Packing Company (SIPCO, Inc.) • 1989 – ConAgra acquired Swift and merged it with Monfort Inc to form the Monfort Pork Division • 1994 – ConAgra's Monfort Pork Division renamed Swift & Company • 2002 – ConAgra spun off Swift & Company to Hicks Muse Tate & Furst (a private equity firm) • 2007 – Swift & Company purchased by JBS S.A. a Brazilian company • JBS USA Holdings, Inc. is the US subsidiary of JBS S.A. • **Active**	Wesley Mendonca Batista, CEO JBS USA Corporate Office 1770 Promontory Circle Greeley CO 80634 970-506-8000	Review the status of the existing Section 104(e) information request. Consider issuing a supplemental Section 104(e) request with questions directed at the history of operations and potential use of solvents and petroleum products.

*Based on Currently Available Information

Operator	Location	Tenure*	Business Type	Potential Contaminants	Potential Nexus	Succession History	Agent of Service	Recommended EPA Action
George A. Hormel & Co.	500 N. Lawrence St. 221 Randolph St	1935 – 1953 1953 – 1987	Cold storage and wholesale meat distributor, delivery truck repair and maintenance.	Diesel fuel, solvents used in auto repair.	Located north of and adjacent to wells CH2-SB5 and TW-08 with elevated BTEX. A catch basin was installed in Randolph Street in 1953 as part of a spur track agreement with Central Georgia Railway Company UST files at ADEM 2000-gallon diesel UST owned by Interstate Oil (which see) installed 1980 and removed in July 1987.	• Hormel Foods Corporation, a Delaware corporation, was qualified to operate in Alabama on December 21, 1936 (Corp ID# 852-901) • 2005 – Reorganized as Hormel Food Sales, LLC, a Delaware company. (Corp ID# 608-669) • **Active** • 2011 Net Sales $7.9 Billion	Corporate Headquarters: 1 Hormel Place Austin, MN 55912 Registered Agent: CT Corporation System 2 North Jackson St. Suite 605 Montgomery, AL 36104	Send a Section 104(e) information request letter asking for details of operations and waste handling practices at all facilities.
Harper-Lee Machine Works, Inc.	202 N. Court 5-7 Madison Ave 425 N. McDonough St	1920 – 1929 1928 – 1949 1950 – Present	Machine shop, crankshaft grinding, babbitting of connecting rods, welding, brazing, machinery rebuilding and repair	Chlorinated solvents, heavy metals, oil and grease	Operated within the plume area. No response found to Section 104(e) Request for Information Owner did submit public comments to USEPA alleging conflicts of interest may affect data integrity.	• Formed in Alabama on March 21, 1930 (Corp ID # 752-673) • Dissolved 12-31-1942 • Incorporator: B. W. Harper • Formed in Alabama on December 27, 1985 (Corp ID# 108-011) • **Active** – Annual revenue <$500,000	Blake W. Harper, III, President Harper-Lee Machine Works 425 N. McDonough St Montgomery, AL 36103	Review the status of the existing Section 104(e) information request. Consider issuing a supplemental Section 104(e) request with questions directed at the history of operations and potential use of solvents and petroleum products.
Bearings and Drives of Alabama, Inc.	101 Pollard St	1979 – Present	Industrial equipment repair and rebuilding, gear boxes, conveyor systems	Petroleum lubricants and fuel; chlorinated solvents	Located within 500 feet of wells 9E and 9W	• Formed in Alabama on July 27, 1979 (Corp ID# 057-647) • **Active**	Mark Atwell Bearings and Drives of Alabama, Inc. 101 Pollard St Montgomery, AL 36104 344-263-2011	Send a Section 104(e) Request for Information with detailed and specific questions concerning operational practices and waste handling.

*Based on Currently Available Information

Operator	Location	Tenure*	Business Type	Potential Contaminants	Potential Nexus	Succession History	Agent of Service	Recommended EPA Action
The Kershaw Company, Inc.	210 Pollard St	1940 – 1953	Railroad right-of-way cleaning equipment manufacturer	Chlorinated solvents; diesel fuel; oil and Grease	Operated on the property near wells • CH2-SB-3 that showed elevated levels of PCE in 1999 • TW-13 that showed elevated levels of PCE in 2001 • TW-09 that showed elevated levels of PCE in 2001 Current-day company is a RCRA SQG (ALR000046516) that generates waste solvent and paint as well as used oil.	Royce Kershaw, Sr. formed a number of companies related to railroad contracting and railroad equipment manufacture. . • The Kershaw Company Inc., formed in Alabama on February 29, 1944 (Corp ID# 010-673) • 1952 – Name changed to The Kershaw Manufacturing Company, Inc. • 1983 – Sold out to Knox Kershaw, Inc. • Royce Kershaw Company, Inc. formed in Alabama on April 29, 1946 (Corp ID# 101-674) • 1983 – Name changed to Knox Kershaw, Inc. • **Active**	J. Kershaw, Secretary Knox Kershaw, Inc. 11211 Trackwork Street Montgomery, AL 36117-6501 334-387-5669	Send a Section 104(e) information request letter asking for details of operations and waste handling practices.
Wofford Oil Company	604-618 N. McDonough St	c. 1918 – 1969	Petroleum product bulk distribution plant	• Benzene • BTEX • Heavy metals	Operated a bulk petroleum products terminal with above-ground tanks along the railroad spur track. Wofford Oil was known for mixing benzene with its gasoline to reduce engine knock. This gasoline, known as Woco-Pep was marketed extensively in Alabama and the South in the 1920s. Section 104(e) Request for Information sent to Woco Pep.	• Woco Pep Co. of Montgomery was formed in Alabama on October 2, 1922 (Corp ID# 803-790) • 1924 – Wofford Oil Company took over the lease of the bulk plant. • 1925 – Pure Oil Company acquired Wofford Oil • 1965 – Union Oil Company merged Pure Oil with Union Oil as the survivor. • 1983 – Union Oil reorganized and changed its name to Unocal corporation • 2005 – Chevron Corporation acquired Unocal Corporation • **Active**	Chevron Corporation c/o The Prentice-Hall Corporation System, Inc. 2730 Gateway Oaks Dr, Ste 100 Sacramento, CA 95833 **Corporate Headquarters Address:** R. Hewitt Pate, VP and General Counsel 6001 Bollinger Canyon Rd San Ramon, CA 94583 925-842-1000	Consider issuance of a GNL based on the long operating period and proximity to known groundwater contamination by BTEX Send a supplemental Section 104(e) request for information to Chevron with specific questions concerning the operating history of the Wofford Oil bulk plant.

*Based on Currently Available Information

Operator	Location	Tenure*	Business Type	Potential Contaminants	Potential Nexus	Succession History	Agent of Service	Recommended EPA Action
Standard Roofing Co.	516 N. McDonough St	1945 – Present	Roofing and sheet metal contractor	Chlorinated solvents are constituents of roofing adhesives. Asphalt Tars	Located at the intersection of Randolph and RCRA Permit ALD983170796 UST records from ADEM show evidence of release of gasoline.	• Standard Roofing Company, Inc.(Delaware) qualified to do business in Alabama on June 26, 1959 (Corp ID# 856-603) • 1976 – Name changed to Standard-Taylor Industries • **Active**	W. Taylor 516 N. McDonough St Montgomery, AL 3610-2645 334-265-1262	Consider issuance of a GNL based on the previous UST leak history and the proximity to known BTEX contamination of the groundwater. Send a Section 104(e) information request letter asking for details of operations and waste handling practices at all facilities.

*Based on Currently Available Information

Company	**DAVIS PRINTING COMPANY**
Address:	305, 309, 317 Washington Avenue
Tenure:	c. 1935 to 1985
Operations:	Davis Printing Company engaged in letterpress and commercial lithographic printing.[1] The liquid wastes generated by commercial lithographic printing generally come from the following sources:[2] (1) Photographic operations (*i.e.,* film development, plate development and photoengraving) generate wash and rinse waters from film and printing plate development processes that may contain silver salts.[3] (2) Waste or off-spec inks and ink fountain solutions which are often proprietary blends produced to meet specific printing needs. A wide variety of organic solvents have been used in ink formulation, including: toluene, benzene, turpentine, naphthas, mineral spirits, acetone, isopropanol, trichloroethylene, chlorinated paraffins and methylene chloride.[4] Pigments used in colored printing inks include various heavy metals including lead chromate, cadmium and copper.[5] (3) Blankets used to transfer ink from the printing plate to the paper are generally cleaned once or twice per eight-hour shift to remove dust particles or dried ink. A variety of solvents and specially formulated blanket washes are used. Organic solvents used for blanket washing include methanol, toluene, naphtha, trichloromethane, and methylene chloride.[6] (4) Printing plate and press clean-up operations also utilized organic solvents to remove oils and pigments used in printing.[7] According to USEPA, wastes generated from printing operations were historically discharged to municipal sewer systems.[8]

1 Letter, Emile Vaughn to USEPA, May 11, 2010; "Industrial Alabama," August 1955, p. 76.

2 USEPA, "Economic Analysis of Proposed Effluent Guidelines: Printing Industry," 1974, pp. 4-9.

3 USEPA, "Economic Analysis of Proposed Effluent Guidelines: Printing Industry," 1974, p. 6.

4 Carpenter and Hilliar, "Overview of Printing Processes and Chemicals Used," in Conference on Environmental Aspects of Chemical Use in Printing Operations, September 1975, King of Prussia, PA, USEPA, January 1976, p.30, Appendix C.

5 Kay Kingsley, "Toxicological Evaluation of Chemicals Used in the Printing and Printing Inks Industries," in Conference on Environmental Aspects of Chemical Use in Printing Operations, September 1975, King of Prussia, PA, USEPA, January 1976, pp. 115-118.

6 USEPA, "Guides to Pollution Prevention: The Commercial Printing Industry, August 1990, EPA/625/7-90/008, p. 13.

7 Economic Analysis of Proposed Effluent Guidelines: Printing Industry, 1974, 8.

8 Economic Analysis of Proposed Effluent Guidelines: Printing Industry, 1974, 4.

Company	DAVIS PRINTING COMPANY
Potential Nexus to Groundwater Contaminant Plume:	Davis Printing operated for at least 50 years on the north side of Washington Avenue between S. McDonough and S. Hull Streets approximately 1.5 blocks south of the RSA Chiller Plant where high concentrations of PCE and possibly TCE were detected in soils sampled in September 1993.[9] (See Figure 1) Currently, sewer lines serving the block containing the former Davis Printing site flow south to Washington Avenue then west along Washington to Court Street then north along Court Street toward the Montgomery Water Works and Sanitary Sewer Board treatment plant. There may also have been sewer connections to the sewer in McDonough Street that flowed north to Dexter Avenue then west along Dexter to Court Street.[10] No sewer lines appear to cross Dexter Avenue at McDonough Street. (See Figure 2)
Key Details:	1955 – An Alabama industrial directory indicates that Davis Printing provided "commercial printing, lithographing and rubber stamps" and employed less than 10 people.[11] 1970 – Davis Printing reported in a 1970 industrial directory that it was engaged in commercial and lithographic printing and still employed less than 10 workers.[12] 2010 – In its response to the USEPA's Section 104(e) request for information, Davis Printing indicated that the only person still associated with Davis Direct that had worked at the Washington Avenue site was Bob Akers who was involved mainly with sales and clerical activities.[13]
Corporate Succession:	• Formed in Alabama on July 6, 1977 as Davis Printing Company, Inc.(Corp ID# 047-320) • 2005 – Name change to Davis Direct, Inc. • Active Robert A., Robert W. and Spurgeon H. Akers formed Davis Printing Company in Alabama on July 6, 1977.[14] The company appears to be an active corporation, according to the Alabama Secretary of State's Office database whose current President is Emile Vaughn and whose Secretary is W. Akers.[15]

[9] Landmeyer, Miller, Campbell, Vroblesky, Gill and Clark, "Investigation of the Potential Source Area, Contamination Pathway, and Probable Release History of Chlorinated-Solvent-Contaminated Groundwater at the Capital City Plume Site, Montgomery, Alabama, 2008-2010," U.S.G.S Scientific Investigations Report, 2011-5148, p. 4.

[10] MWW&SSB Sewer map for the SW ¼ of Section 7, Township16N, Range 18E Plate 6807-3,103 (Attached to 104(e) response).

[11] "Industrial Alabama," August 1955, p. 76.

[12] "Industrial Alabama," 1970, p. 91.

[13] Letter, Emile Vaughn to USEPA, May 11, 2010.

[14] Alabama Secretary of State, Business Entity Details, Davis Direct Inc., Corp ID #047-320.

[15] Alabama Secretary of State, Annual Report, Davis Direct, Inc., April 20, 2011.

Company	DAVIS PRINTING COMPANY
	It is likely that the business was a partnership in the mid-1950s formed by Spurgeon and Robert Akers.[16] The relationship among the three Akers men is not known at this time, but it is assumed that they were related.
Agent for Service:	Emile Vaughan, President 9713 Ivy Green Dr Montgomery, AL 36117 **Corporate Address**: Davis Direct Inc. 1241 Newell Pkwy Montgomery, AL 36110-3212 334-277-0878

[16] "Industrial Alabama," 1955, p. 76.

Figure 1 – Site Location

Davis Printing Company

Base Aerial: February 15, 2007, Aerials Express

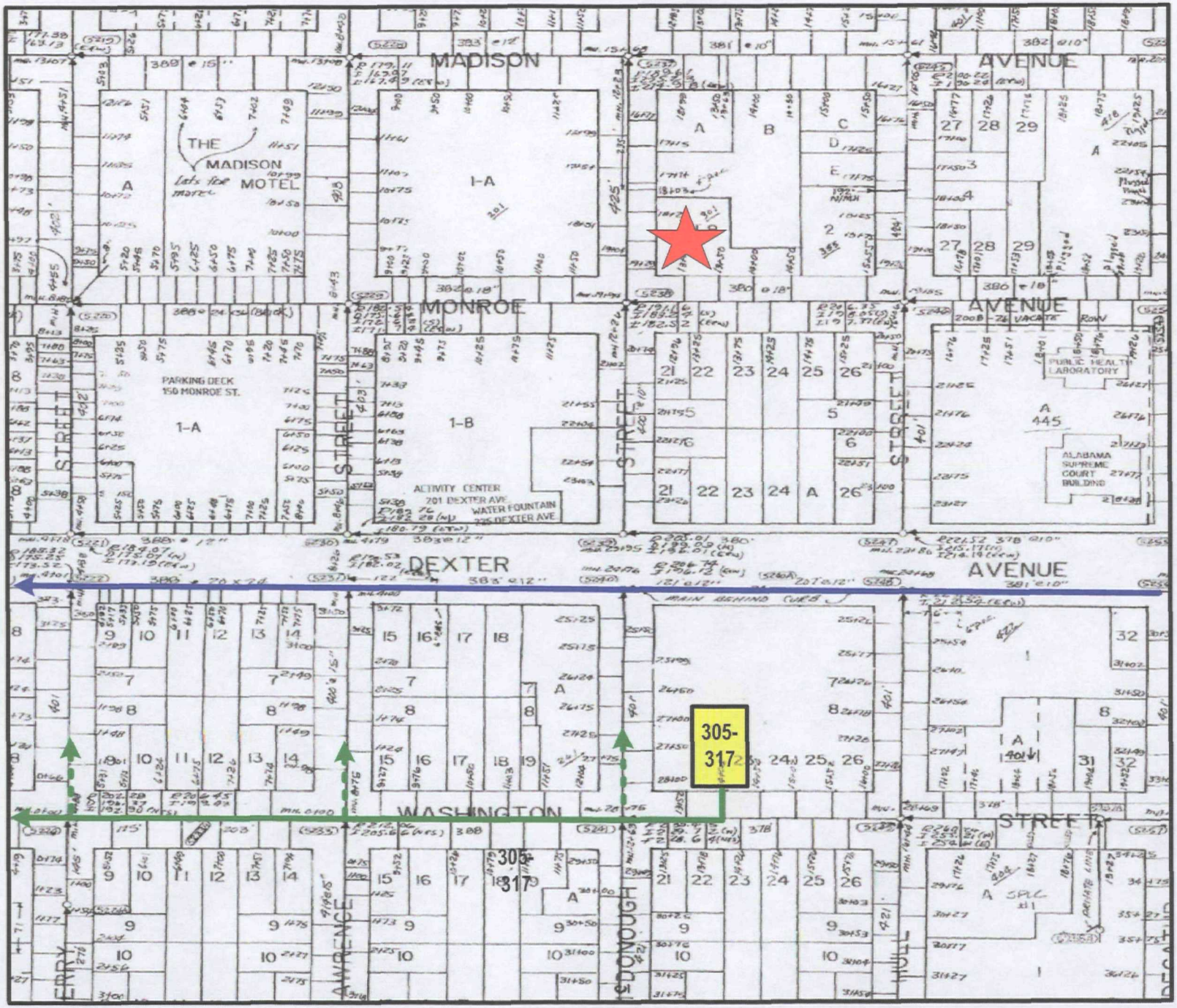
Key to Symbols:

305 Approximate Davis Printing Facility Location with Street Number

RSA Chiller Plant

Capital City Plume Superfund Site

Figure 2 – Sewer Map **Davis Printing Company**



Key to Symbols:

305

Approximate Davis Printing Facility Location with Street Number

RSA Chiller Plant

Sewer line on south side of Dexter Avenue

Sewer lines serving Davis Printing

Sewer Map Plate 6807-3,103 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004

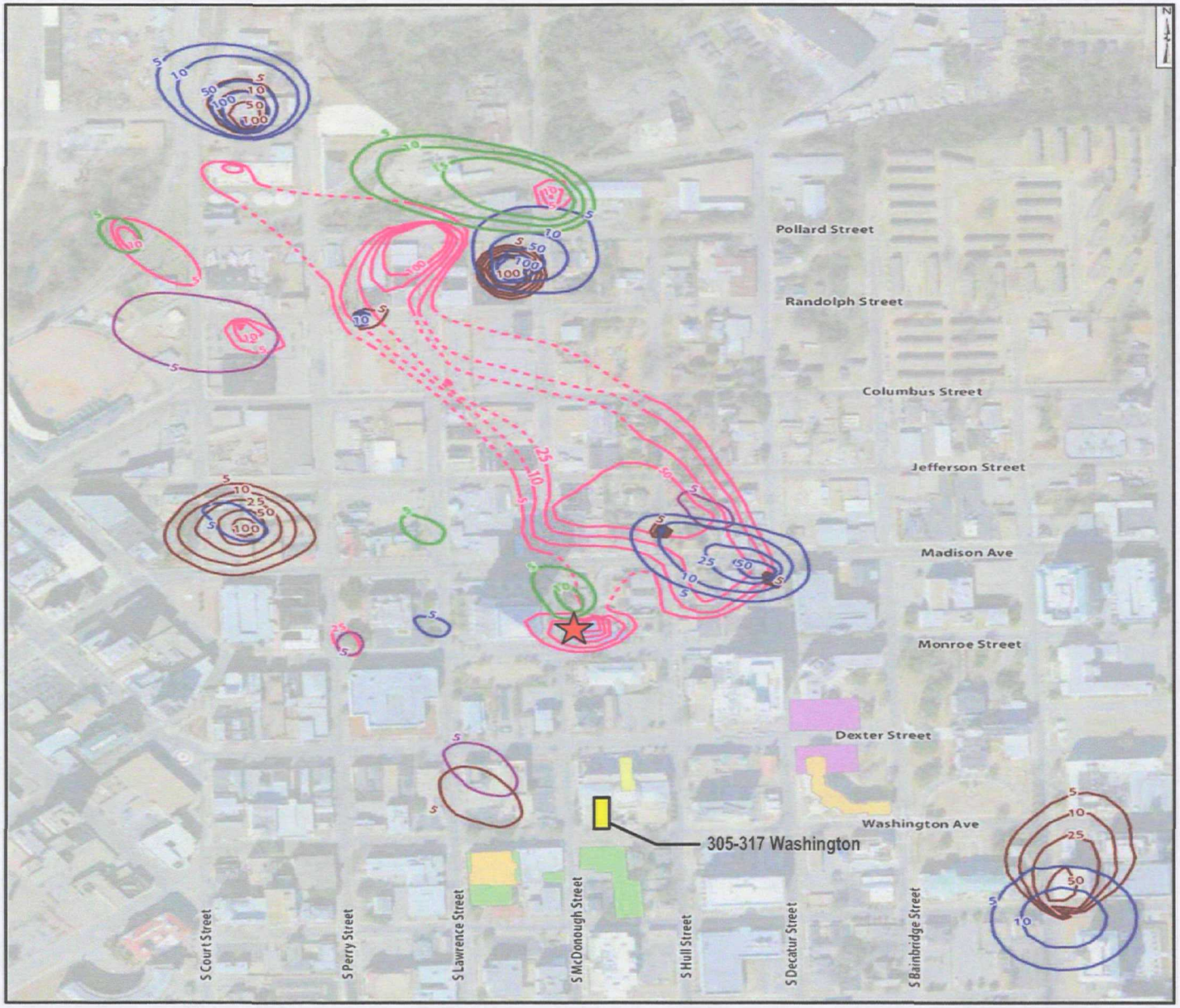


Figure 3 – Site Locations in Relationship to Contaminant Plumes

Davis Printing Company

Capital City Plume Superfund Site

Key to Symbols:

305 Washington

Approximate Davis Printing Facility Locations with Street Number

RSA Chiller Plant

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)

Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Company	WALKER PRINTING COMPANY
Address:	328 Dexter Avenue
Tenure:	1942 to 1971
Operations:	Walker Printing engaged in commercial lithographic printing. The liquid wastes generated by commercial lithographic printing generally come from the following sources:[1] • Photographic operations, *i.e.,* film developing, plate developing and photoengraving • Waste or off-spec inks and ink fountain solutions • Blanket roll cleaning • Press cleaning Photographic operations generate wash and rinse waters from film and printing plate developing processes that may contain silver salts.[2] Lithography inks are often proprietary blends produced to meet specific printing needs. A wide variety of organic solvents have been used in ink formulation including: toluene, benzene, turpentine, naphthas, mineral spirits, acetone, isopropanol, trichloroethylene, chlorinated paraffins and methylene chloride.[3] Pigments used in colored printing inks include various heavy metals including lead chromate, cadmium and copper.[4] Blankets used to transfer ink from the printing plate to the paper are generally cleaned once or twice per eight-hour shift to remove dust particles or dried ink. A variety of solvents and specially formulated blanket washes are used. Organic solvents used for blanket washing include methanol, toluene, naphtha, trichloromethane, and methylene chloride.[5] Press clean-up operations also utilized organic solvents to remove oils and pigments used in printing.[6] According to USEPA, wastes generated from printing operations were historically discharged to municipal sewer systems.[7]

[1] USEPA, "Economic Analysis of Proposed Effluent Guidelines: Printing Industry," 1974, pp. 4-9

[2] USEPA, "Economic Analysis of Proposed Effluent Guidelines: Printing Industry," 1974, p. 6

[3] Carpenter and Hilliar, "Overview of Printing Processes and Chemicals Used," in Conference on Environmental Aspects of Chemical Use in Printing Operations, September 1975, King of Prussia, PA, USEPA, January 1976, p.30, Appendix C.

[4] Kay Kingsley, "Toxicological Evaluation of Chemicals Used in the Printing and Printing Inks Industries," in Conference on Environmental Aspects of Chemical Use in Printing Operations, September 1975, King of Prussia, PA, USEPA, January 1976, pp. 115-118.

[5] USEPA, "Guides to Pollution Prevention: The Commercial Printing Industry, August 1990, EPA/625/7-90/008, p. 13

[6] USEPA, "Economic Analysis of Proposed Effluent Guidelines: Printing Industry," 1974, p. 8.

[7] USEPA, "Economic Analysis of Proposed Effluent Guidelines: Printing Industry," 1974, p. 4.

Company	WALKER PRINTING COMPANY
Potential Nexus to Groundwater Contaminant Plume:	Walker Printing operated for at least 18 years on the south side of Dexter Avenue between South McDonough and South Hull Streets approximately one block south of the RSA Energy Plant where high concentrations of PCE and possibly TCE were detected in soils in September 1993.[8] (See Figure 1) Available sewer maps do not show any connections to the sewer for the former Walker Printing site. Sewer lines serving the eastern side of the block containing the former Walker Printing site flow east to Hull Street then north to Dexter Avenue then west along Dexter to Court Street then north along Court Street toward the Montgomery Water Works and Sanitary Sewer Board Econchate treatment plant.[9] (See Figure 2)
Key Details:	**1952 –** Walker Printing employed between 10 and 25 workers.[10] **1955 –** An industrial directory indicates that Walker Printing was engaged in providing "job printing, booklets, publications, office supplies and equipment."[11] **1965 –** The Declaration of Incorporation, for Walker Printing Company, dated October 25, 1965, states that it was the intent of the company to, "operate and conduct a printing business; to do any and all kinds and types of printing, engraving and other processing necessary to, connected with or related to a printing business including binding, photography reproduction and blueprinting; to buy, sell and merchandise, either at retail or wholesale, office furniture, office machines such as typewriters, adding machines, computers and the like."[12] **1970 –** Walker Printing reported in a 1970 industrial directory that it was engaged in commercial and lithographic printing and still employed 10-25 workers.[13] **2010 –** In its response to the USEPA's Section 104(e) response, Walker 360 referred to its website for a description of the nature of its current day business operations.[14] This website indicates that the business was

[8] Landmeyer, Miller, Campbell, Vroblesky, Gill and Clark, "Investigation of the Potential Source Area, Contamination Pathway, and Probable Release History of Chlorinated-Solvent-Contaminated Groundwater at the Capital City Plume Site, Montgomery, Alabama, 2008-2010," U.S.G.S Scientific Investigations Report, 2011-5148, p. 4

[9] MWW&SSB Sewer map for the SW ¼ of Section 7, Township16N, Range 18E Plate 6807-3,103 (Attached to 104(e) response)

[10] Montgomery Industrial Directory, 1952, p. 23.

[11] "Industrial Alabama," August 1955, p. 80

[12] Walker Printing Company, "Declaration of Incorporation," Book 66, Page 322, State of Alabama, Montgomery County. (Attached to 104(e) response)

[13] "Industrial Alabama," 1970, p. 96

[14] http://www.walker360.com

Company	WALKER PRINTING COMPANY
	established in 1945, but gives no further details about the history of operations.[15]
Corporate Succession:	• Formed in Alabama on October 25, 1965 as Walker Printing Co., Inc. (Corp ID# 019-564) • 2010 – Name change to Walker 360, Inc. • Active Walker Printing Company, Inc. was formed by several members of the Walker family including: Thad O. Walker, Edwina D. Walker, Edward D. Walker, Thad O. Walker, Jr. and Steve T. Walker. The company changed its name to Walker 360, Inc. in February 2010. [16] Walker 360, Inc. is the sole shareholder of Walker Printing Company.[17] As of April 20, 2011, Mr. John Taylor Blackwell was the President of Walker 360, Inc. and its agent for service.[18] According to Mr. Blackwell, Hugh D. Parks acquired Walker Printing in about 1970. Circa 1972, Mr. Parks sold 40 percent of his interest in Walker Printing to Stephen M. Fox. In about 1995, Mr. Parks died and left his 60 percent share of the company to his three children. In about 2000 Mr. Fox acquired the remaining 60 percent share of the business from the Walker heirs. In 2006 Mr. Fox sold 100 percent of the company to Mr. Blackwell.[19]
Agent for Service:	John Taylor Blackwell Walker 360, Inc. 2501 E. 5th St Montgomery, AL 36107-3105 334-832-4975

[15] http://www.walker360.com/aboutUs.html

[16] Alabama Secretary of State, Business Entity Details, Walker 360, Inc. Corp ID #019-564.

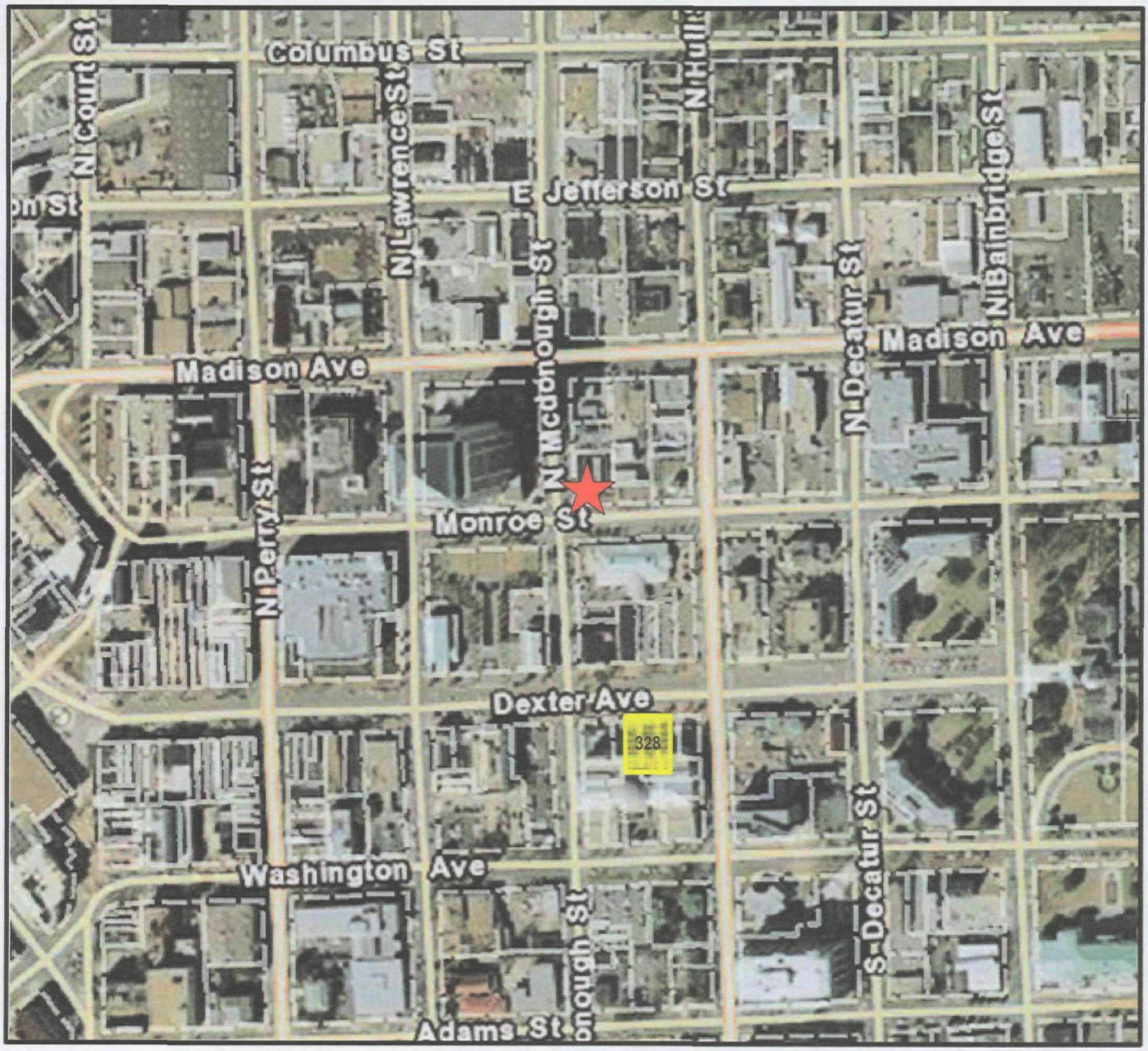
[17] Balch & Bingham, LLP, "104(e) Response Letter," June 1, 2010, p. 1

[18] Alabama Secretary of State, Annual Report, Walker 360, Inc., April 20, 2011

[19] Balch & Bingham, LLP, "104(e) Response Letter," June 1, 2010, p. 10

Figure 1 – Site Location

Walker Printing Company



Base Aerial: February 15, 2007, Aerials Express

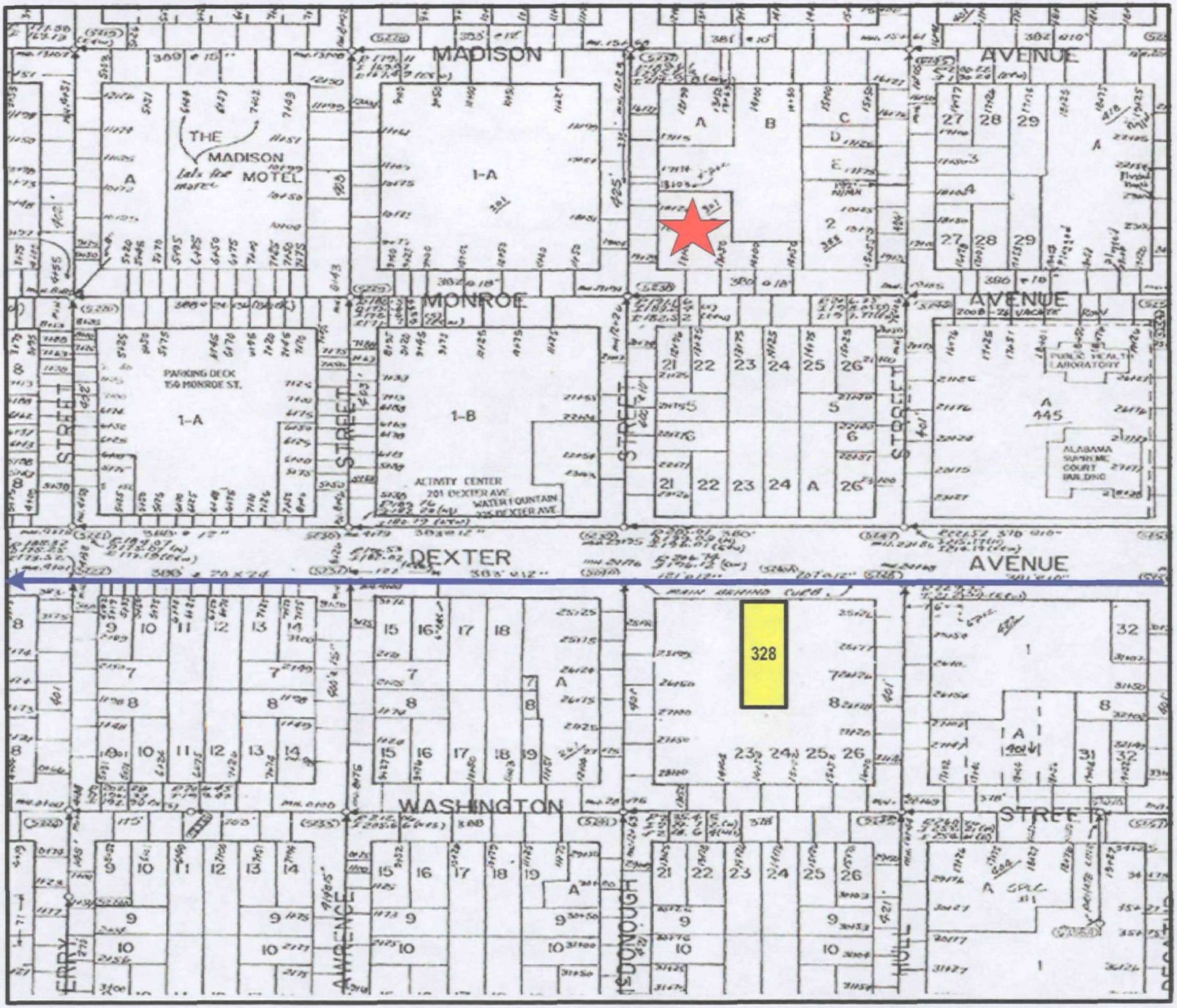
Key to Symbols:

328 — Approximate Walker Printing Facility Location with Street Number

★ — RSA Chiller Plant

Capital City Plume Superfund Site

Figure 2 – Sewer Map **Walker Printing Company**



Key to Symbols:

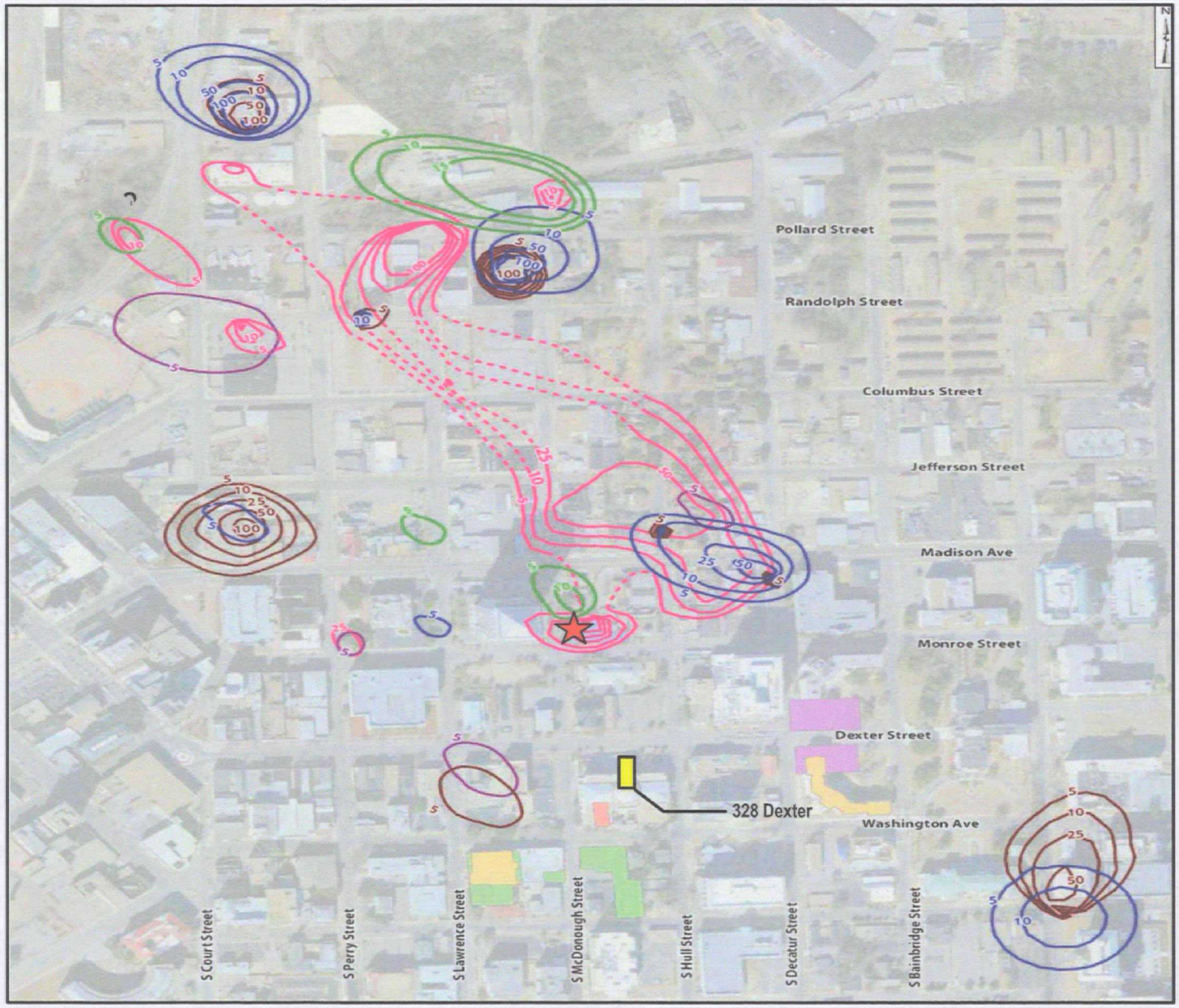
328

Approximate Walker Printing Facility Location with Street Number

RSA Chiller Plant

Sewer line on south side of Dexter Avenue

Sewer Map Plate 6807-3,103 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 3 – Site Locations in Relationship to Contaminant Plumes

Walker Printing Company

Capital City Plume Superfund Site

Key to Symbols:

328 Dexter

Approximate Walker Printing Facility Locations with Street Numbers

RSA Chiller Plant

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)

Company	DAVIS CLEANERS, INC.
Addresses:	330 Madison Ave. 432 Madison Ave. 401 Monroe St – Davis One Hour Cleaners 473 S. Decatur St
Tenure:	330 Madison Ave. c. 1978-1980 432 Madison Ave. c. 1981-1987 401 Monroe St c. 1990-1999 473 S. Decatur St c. 1981-Present
Operations:	Davis Cleaners Inc. operated a chain of dry cleaning businesses under the name Davis One Hour Cleaners and as Davis Cleaners, Inc. Davis Cleaners is currently operating at 473 Monroe Avenue in the southern portion of the study area. Beginning in the mid-1930s,[1] chlorinated solvents, primarily PCE, began to be used in the dry cleaning industry, gradually replacing petroleum naphthas and Stoddard solvent as the cleaning agent of choice by the late 1940s.[2] Use of PCE in dry cleaning peaked in 1980 and continued through the early 1990s when it began to be regulated by most states under air pollution laws.[3] The types of dry cleaning machines in common use in the United States during the period of operations of Davis Cleaners included transfer machines where clothing was physically transferred from the washer (containing solvents) to the tumbler for drying; and closed loop "dry to dry" machines where washing in solvent and drying occurred in the same machine. It is estimated that transfer machines used 172 to 200 pounds of PCE for every 2205 pounds of clothing cleaned. Third generation closed loop dry to dry machines, introduced in the late 1970s used 44 to 88 pounds of PCE for every 2205 pounds of clothing.[4] Wastes generated by dry cleaning operations include contact water, solvent still bottoms, spent filter cartridges and spent solvent. A survey conducted in 1988 found that over 70 percent of dry cleaning operators discharged contact water (containing some concentration of dissolved solvent) to sanitary sewers or septic tanks.[5]

[1] D. H. Killeffer, "Chlorinated Solvents in Dry Cleaning," *Industrial and Engineering Chemistry*, v. 28, No. 6, June 1936, pp. 640-643.

[2] Richard E. Doherty, "A History of the Production and Use of Carbon Tetrachloride, Tetrachloroethylene, Trichlorotheylene and 1,1,1-Trichloroethane in the United States: Part 1 – Historical Background; Carbon Tetrachloride and Tetrachloroethylene," *Journal of Environmental Forensics*, v. 1, 2000, pp. 69-81, at 78.

[3] Ibid.. p. 79

[4] State Coalition for Remediation of Drycleaners, "Conducting Contamination Assessment Work at Drycleaning Sites," Revised October 2010, pp. 4-5.

[5] Ibid., p. 18

Company	DAVIS CLEANERS, INC.
	Contact water, free-phase solvent and solvent vapors can leak from sewer lines through cracks, joints or breaks. Contact water and free-phase solvent can also leach through sewer piping.[6] Spent dry cleaning cartridges contain PCE in amounts ranging from 0.5 to 4 gallons of PCE per cartridge, depending on the size of the filter cartridge.[7]
Potential Nexus to Groundwater Contaminant Plume:	Davis Dry Cleaning has operated at three locations within a block or less of the RSA Chiller Plant where high concentrations of PCE and possibly TCE were detected in soils in September 1993.[8] (See Figure 1) 401 Monroe Avenue: Currently, sewer lines serving the 401 Monroe Avenue location flow south to Monroe Avenue then west along Monroe to Court Street then north along Court Street toward the Montgomery Water Works and Sanitary Sewer Board's ("MWWSSB"), Econchate treatment plant. According to sewer inspection data from April 2006 along Monroe Avenue from the MWWSSB, the sewer line in the 300 block of Monroe Avenue showed indications of infiltration, separated joints and a longitudinal crack. This segment of the sewer line is just downstream from the PCE "hotspot" at the RSA Chiller Plant and is also downstream from the Davis Cleaner facility at 401 Monroe Avenue.[9] (See Figure 2) 330 and 432 Madison Ave: These facilities are located within the PCE plume area and may have conducted dry cleaning operations using PCE. The sewer serving these two facilities is located in Madison Avenue and flows west to Court Street then north to the Econchate treatment plant.[10] To date, no sanitary sewer inspection records were found for Madison Avenue sewers.
Key Details:	401 Monroe Avenue: September 1993 – An ADEM Inspector found eleven 55-gallon drums marked "perchloroethylene" that appeared to be empty and two additional 55-gallon drums with open lids, one of which contained used dry cleaning cartridges. The inspector noted that he saw no evidence of dry cleaning

[6] Ibid., pp. 28-29

[7] "Method of Extracting Perchloroethylene from Dry Cleaner Filter Cartridges," U.S. Patent 4,500,363 issued to Ernest O. Roehl, February 19, 1985.

[8] Landmeyer, Miller, Campbell, Vroblesky, Gill and Clark, "Investigation of the Potential Source Area, Contamination Pathway, and Probable Release History of Chlorinated-Solvent-Contaminated Groundwater at the Capital City Plume Site, Montgomery, Alabama, 2008-2010," U.S.G.S Scientific Investigations Report, 2011-5148, p. 4

[9] MWW&SSB Sewer Inspection Report, 300 Block of Madison Avenue, April 2, 2006. [MWWSSB 001838-1839]

[10] MWW&SSB Sewer map for the SW ¼ of Section 7, Township16N, Range 18E Plate 6807-3,103 (Attached to 104(e) response)

Company	DAVIS CLEANERS, INC.
	machine hookups or other evidence that dry cleaning had ever been done at 401 Monroe. The inspector indicated that perchloroethylene wastes were not generated from this site, but that wastes were stored there which were generated by other Davis Cleaner locations. The Monroe Street site did not have an EPA ID Number in 1993. When contacted by the ADEM inspector the owner, Mr. Davis, stated that dry cleaning had never been performed at 401 Monroe.[11] In 2008 this location had a RCRA CESQG permit (AL0000024109). The RCRIS database handler report indicated that information for this permit was first received in 1979 and last updated in 1993, which suggests that this permit may have been transferred from other Davis operations at 330 Madison Ave. and 432 Madison Ave.[12] <u>473 S. Decatur Avenue</u>: The available information suggests that this was the location of Davis Cleaners' main dry cleaning plant and company headquarters. This plant has an active RCRA CESQG permit (ALD055158877).[13] This site is located at the northeast corner of High Street and S. Decatur Avenue, about five blocks south of Monroe Street and the RSA Chiller Tower hot spot. Available sewer maps indicate that sewers running north along Decatur Avenue do not cross Dexter Avenue.
Corporate Succession:	• Davis Cleaners, Inc. was formed in Alabama on July 2, 1981 (Corp ID# 083-153) • Active Most recent annual report to the Alabama Secretary of State was filed in 2002. Donald Davis is identified as the owner/operator of at least four Davis One Hour Cleaner shops in Montgomery in the 2008 RCRIS database.
Agent for Service:	Donald R. Davis, President Davis Cleaners, Inc. 4003 Wallahatchie Rd Pike Road, AL 36064-3517 334-264-7111

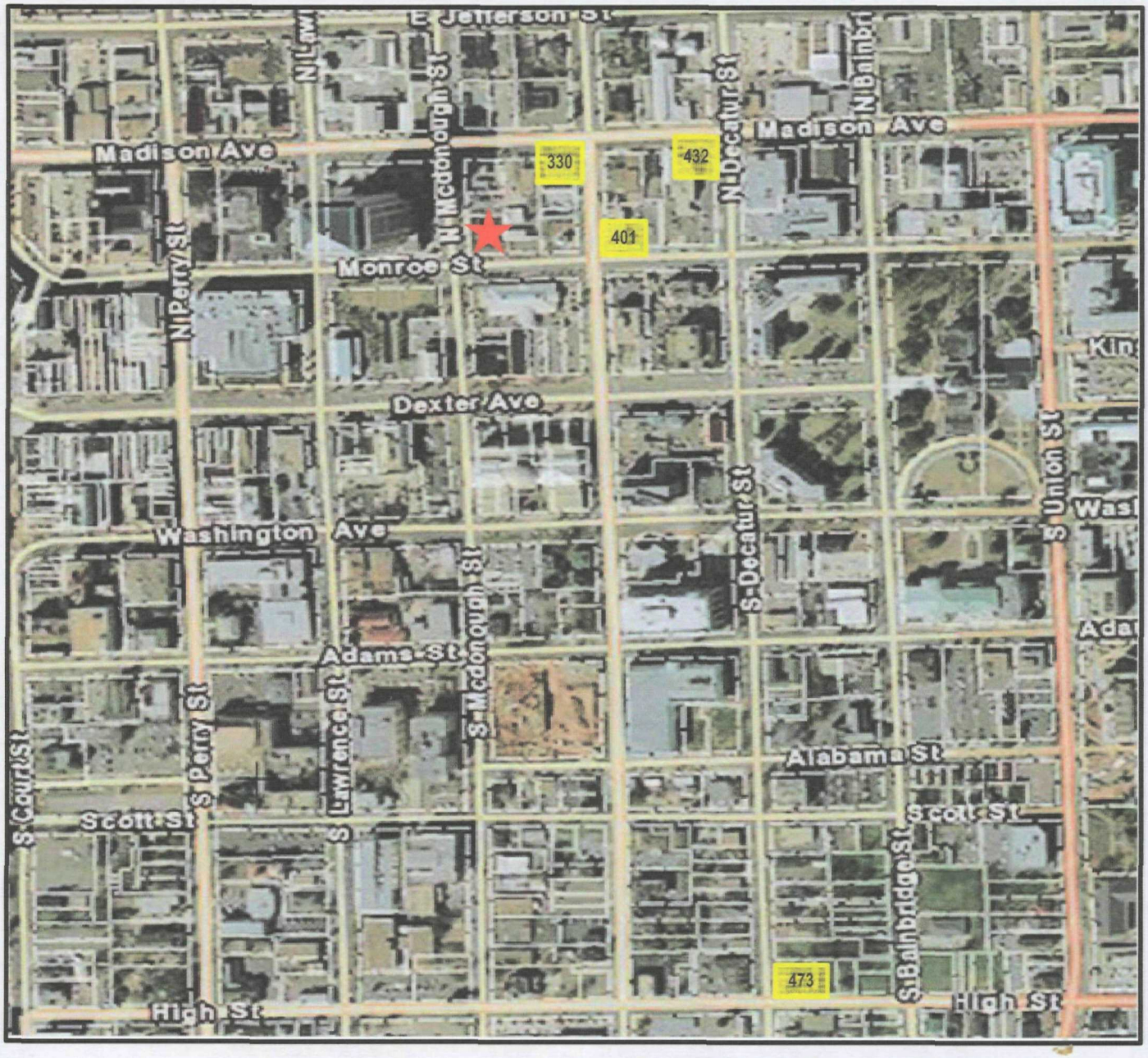
[11] ADEM Inspection Report 401 Monroe, Memorandum from Steven Maurer to Steven Jenkins Re: Contamination Investigation RSA utility building construction site, September 16, 1993.

[12] RCRIS Handler Report, AL0000024109 (2008 dataset).

[13] EPA FRS Report, Davis Cleaners Inc., 473 S. Decatur Street.

Figure 1 – Site Locations

Davis Cleaners, Inc.



Base Aerial: February 15, 2007, Aerials Express

Key to Symbols:

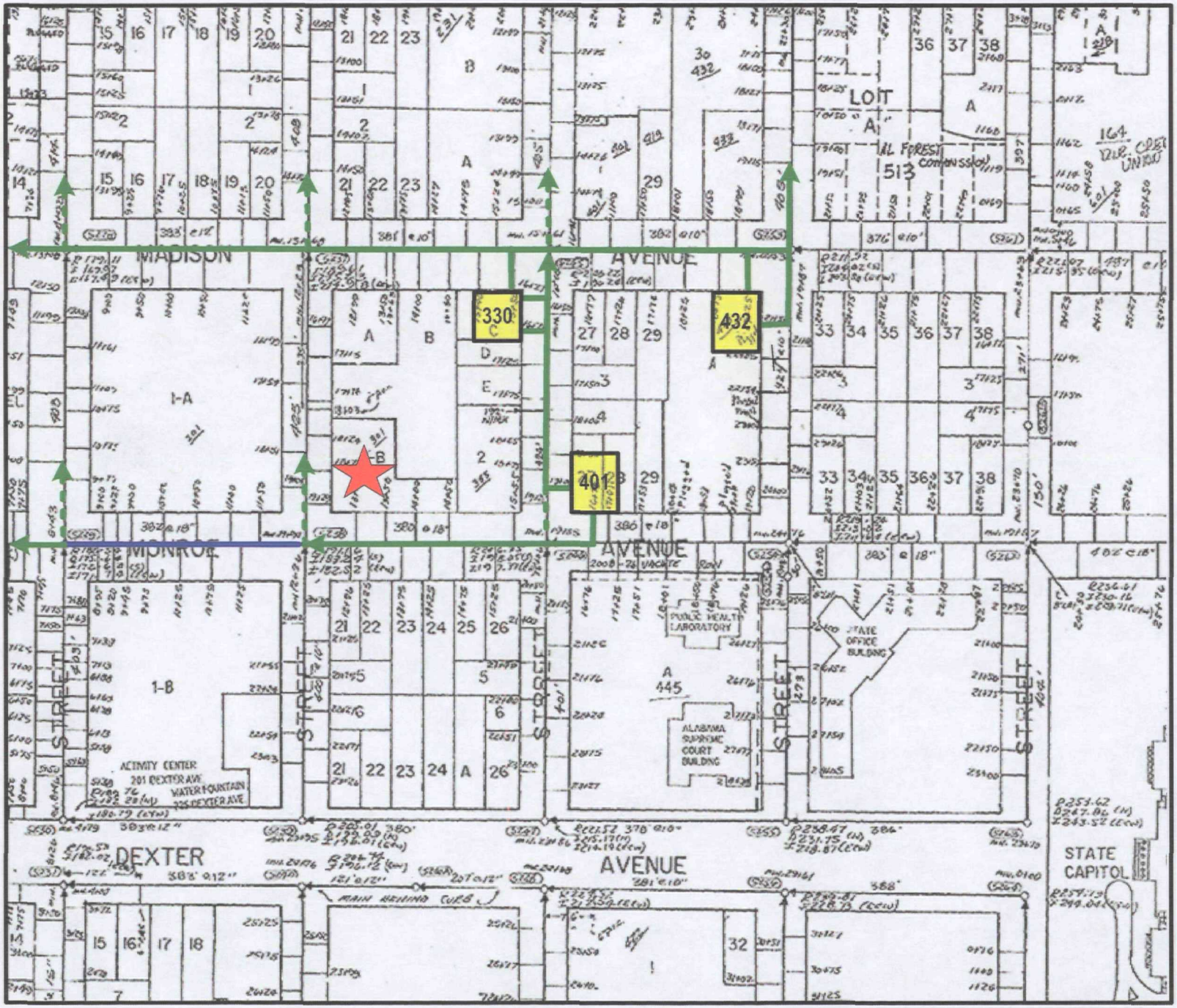
401 — Approximate Davis Cleaners Facility Locations with Street Numbers

★ — RSA Chiller Plant

Capital City Plume Superfund Site

Figure 2 – Sewer Map

Davis Cleaners, Inc.



Key to Symbols:

401

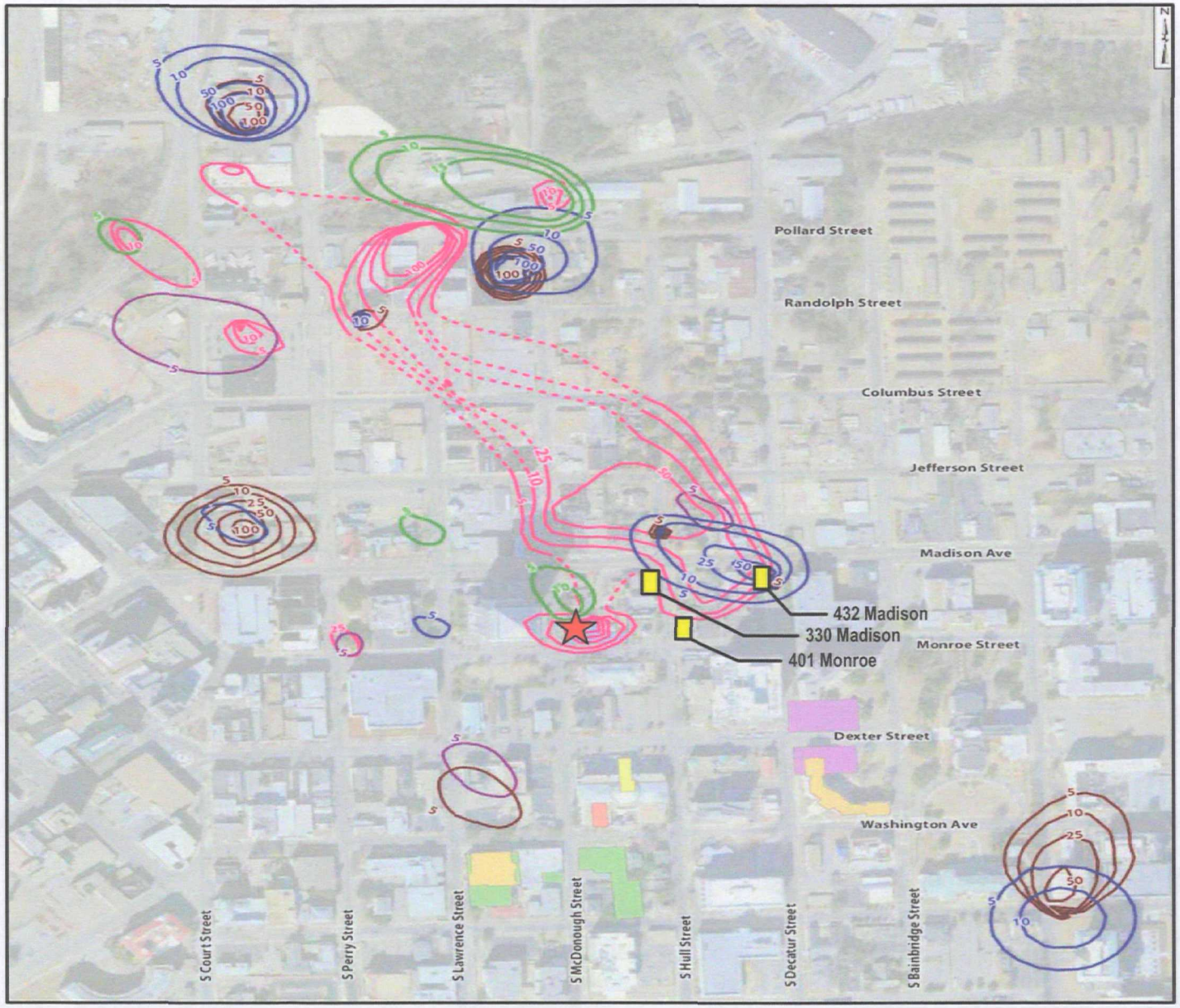
Approximate Davis Cleaners Facility Locations with Street Numbers

RSA Chiller Plant

Sewer line segment surveyed

Sewer lines serving Davis Cleaners

Sewer Map Plate 6807-3,103 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 3 – Site Locations in Relationship to Contaminant Plumes

Davis Cleaners, Inc.

Capital City Plume Superfund Site

Key to Symbols:

401 Monroe

Approximate Davis Cleaners Facility Locations with Street Numbers

RSA Chiller Plant

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)

Company	SWIFT & COMPANY
Address:	610-622 North Decatur Street – Oil Mill 319 Monroe Street – Ice Cream Plant
Tenure:	Oil Mill: • 1928 to 1958 Ice Cream Plant: • 1939 to 1962
Operations:	Oil Mill: Swift entered the cottonseed oil business in about 1925. Cotton seeds were purchased from gins and processed in oil mills located in the southern states.[1] In 1928, Swift & Company ("Swift") purchased an existing cottonseed oil mill in Montgomery located on a tract of land north of Pollard Street between Hull and Bainbridge streets. The land was owned by the Central of Georgia Railway Company (now Norfolk Southern).[2] (See Figure 1) The Swift & Company Yearbook for 1929 indicates that Swift acquired and operated cotton oil mills in order to have a consistent source of vegetable oils for use in shortening manufacture.[3] In its 1945 annual report Swift described its methods for cottonseed oil extraction which consisted of grinding the seed to meal, then flaking and cooking the meal. Oil was extracted from the cooked meal by expellers or hydraulic pressure. Solvents were sometimes used to extract the oil from the flaked seed.[4] Trade literature from the 1940s indicates that petroleum solvents such as hexane and chlorinated solvents such as trichloroethylene were used to extract oil from cottonseed in order to completely remove gossypol (a toxic substance) from the cottonseed leaving the cottonseed meal ready for sale or use as animal feed.[5] A 1950 Sanborn map depicting the oil mill provides additional information on the industrial processes used at Swift's Montgomery oil mill. These processes included hulling the seed and grinding it into

[1] *The Swift & Company Year Book covering the activities of the year 1925*, January 6, 1926, p. 25 and 39-40.

[2] Memorandum of Agreement between Central of Georgia Railway Company, Swift & Company dated December 29, 1928 for use and ownership of certain railroad spur tracks. [From Norfolk Southern Corporation Section 104(e) Response, EPA barcode 10789859 page 214 of 519]. American Cotton Oil Company and later Alabama Cotton Oil Company appear to have operated the mill between 1920 and 1928.

[3] *Swift & Company 1929 Year Book*, pp. 44-45

[4] *The Swift & Company Year Book covering the activities of the year 1945*, December 17, 1945, p.21.

[5] H. S. Olcott, "Solvent Extraction of Cottonseed Oil: Effect of Cooking on Yield," *Engineering & Industrial Chemistry*, v. 33, No. 5, May 1941, p. 612

Company	SWIFT & COMPANY
	"linters" or meal. Cooking and pressing the linters. Storage warehouses were provided for seed, hulls, meal and aboveground storage tanks for oil storage. A cotton gin also operated on the southeastern corner of the property. In March 1957, Swift conveyed the portion of its leasehold between North Decatur and North Hull streets to Montgomery Seed & Supply.[6] In April 1958, Swift conveyed the portion of its leasehold between North Decatur and Bainbridge streets to J. T. Dorminey.[7] Sanborn maps dated 1964 indicate that by that date the oil mill was no longer in operation and the site was occupied by a wholesale seed and insecticide warehouse (likely run by Montgomery Seed & Supply) and by J.T. Dorminey Milling Company.[8] Swift appears to have retained use of the railroad spur tracks between North Hull and North Decatur streets until at least 1972, according to railroad records.[9] <u>Ice Cream Plant</u>: Swift operated an ice cream plant in downtown Montgomery from 1939 to 1962 on the same block as the future RSA Chiller Plant. (See Figure 1) This facility produced ice cream for commercial sale. Information collected to date suggests that Swift had its own line of ice cream equipment installed in restaurants and other retail outlets, as well as refrigerated delivery trucks to deliver ice cream to the area.[10] A 1953 Sanborn map depicting the ice cream plant indicates that the facility included two cooler rooms, a print room, a boiler house and a coal room. A receiving area and parking space for delivery trucks was also shown on the property.[11] This arrangement is consistent with descriptions of ice cream plants from the late 1940s where two refrigeration steps were needed to make ice cream: 1) cooling of the mixture after pasteurizing, and 2) hardening of the ice cream in a freezer.[12]

[6] Memorandum of Agreement between Central of Georgia Railway Company, Swift & Company and Montgomery Seed & Supply dated April 9, 1947 for use and ownership of certain railroad spur tracks. [From Norfolk Southern Corporation Section 104(e) Response, EPA barcode 10789859 page 77 of 519]

[7] Memorandum of Agreement between Central of Georgia Railway Company, Swift & Company and J. T. Dorminey dated July 14, 1958 for use and ownership of certain railroad spur tracks. [From Norfolk Southern Corporation Section 104(e) Response, EPA barcode 10789859 page 77 of 519]

[8] Sanborn Map, Montgomery, Sheet 107, 1964.

[9] Internal Memorandum, "Re: Merger of Swift & Company," March 10, 1972. [From Norfolk Southern Corporation Section 104(e) Response, EPA barcode 10789859 page 73 of 519] Swift also operated a meat packing and storage center in Montgomery northeast and across the railroad tracks from the oil mill.

[10] See *Markwell v Swift & Co* 126 Cal. App. 2d 245 (1954); Swift Ice Cream Co. Photographs, September 7, 1955 at http://www.flickr.com/photos/library_of_virginia/2898498427/

[11] Sanborn Map, Montgomery, Sheet 104, 1953.

[12] Chester J. Bell, "Manufacture of Ice Cream," *Refrigerating Engineering,* January 1948, p. 2.

Company	SWIFT & COMPANY
	Historic patents show that by at least 1946, PCE was used as a solvent and heat transfer medium in absorption refrigeration equipment with one of the following four refrigerants: Freon 114, Freon 11, Freon 21, and ethyl chloride. PCE was useful in this application because it was chemically stable, relatively inert in its actions on metals, of high density, and had high solvent power for the refrigerants listed above.[13]
Potential Nexus to Groundwater Contaminant Plume:	Oil Mill: Swift operated for over 30 years at a large plant on North Decatur Street, located about one block east of well TW-14, which showed elevated levels of PCE in 2002.[14] Swift may have used chlorinated solvents in the extraction of cottonseed oil as part of its operations from at least the 1940s through 1958. The sewer line serving the Swift oil mill runs east to west along Pollard Street and may have served as a pathway for contaminants to reach the area of the PCE hotspot near the intersection of Pollard and Lawrence streets near wells CH2-SB2 and TW-13. (See Figures 2 and 4) Ice Cream Plant: Swift operated an ice cream plant for over 20 years at 313 Monroe Street less than a block east of the RSA Chiller Plant where high concentrations of PCE and possibly TCE were detected in soils in September 1993.[15] Sewer lines serving the former Swift Ice Cream Plant site flow south to Monroe Street and east to North Hull Street. The lines connecting to Monroe Street flow west along Monroe and pass in front of the RSA Chiller Plant. According to sewer inspection data from April 2006, the sewer line starting at the 300 block of Monroe Street showed indications of infiltration, separated joints and a longitudinal crack. This segment of the sewer adjoins the PCE "hotspot" at the RSA Chiller Plant.[16] (See Figure 3) The sewer lines connecting the site to North Hull Street flow north along Hull Street.[17] The general direction of flow in the sewers in this area is west and north to Court Street then north along Court Street toward the

[13] U.S. Patent 2,534,789 Application October 5, 1946, Issued December 19, 1950.

[14] Geosyntec DRAFT PCE Isopleth, February 3, 2012.

[15] Landmeyer, Miller, Campbell, Vroblesky, Gill and Clark, "Investigation of the Potential Source Area, Contamination Pathway, and Probable Release History of Chlorinated-Solvent-Contaminated Groundwater at the Capital City Plume Site, Montgomery, Alabama, 2008-2010," U.S.G.S Scientific Investigations Report, 2011-5148, p. 4.

[16] MWW&SSB Sewer Inspection Report, 300 Block of Madison Avenue, April 2, 2006. [MWWSSB 001838-1839]

[17] MWW&SSB Sewer map for the SW ¼ of Section 7, Township16N, Range 18E Plate 6807-3,103 (Attached to 104(e) response

Company	SWIFT & COMPANY
	Montgomery Water Works and Sanitary Sewer Board's ("MWWSSB") Econchate treatment plant.[18] If the ice cream plant used PCE in its refrigeration system then it is possible that any releases of PCE could have entered floor drains in the plant and reached the sewer system. Free-phase solvent and solvent vapors can leak from sewer lines through cracks, joints or breaks such as those observed in the sewer line in the 300 block of Madison Street. Contact water and free-phase solvent can also leach through sewer piping.[19]
Key Details:	Oil Mill: **1945** – Swift reported that it sometimes used solvents for extraction of oil from flaked seed.[20] Trade literature from the 1940s indicates that petroleum solvents such as hexane and chlorinated solvents such as trichloroethylene were used to extract oil from cottonseed in order to completely remove gossypol (a toxic substance) from the cottonseed leaving the cottonseed meal ready for sale or use as animal feed.[21] **1952** – A Montgomery industrial directory indicates that Swift operated an oil mill producing cottonseed oil, peanut oil, soybean oil, animal and poultry feed, cottonseed products, peanut products, and soybean products.[22] **1955** – An Alabama industrial directory indicates that Swift's oil mill produced cottonseed meal, soybean meal and oil, peanut meal and oil, hulls and oil, and employed between 50 and 100 people.[23] Ice Cream Plant: **1952** – A Montgomery industrial directory indicates that Swift operated an ice cream plant producing dairy products, food products, ice cream, and ice cream mix.[24] **1955** – An Alabama industrial directory indicates that Swift's Montgomery ice cream plant produced ice cream and ice cream mix and employed between 10 and 25 people.[25]

[18] MWW&SSB Sewer map for the SW ¼ of Section 7, Township16N, Range 18E Plate 6807-3,103 (Attached to 104(e) response).

[19] State Coalition for Remediation of Drycleaners, "Conducting Contamination Assessment Work at Drycleaning Sites," Revised October 2010, pp. 28-29.

[20] *The Swift & Company Year Book covering the activities of the year 1945*, December 17, 1945, p.21.

[21] H. S. Olcott, "Solvent Extraction of Cottonseed Oil: Effect of Cooking on Yield," *Engineering & Industrial Chemistry*, v. 33, No. 5, May 1941, p. 612

[22] *Montgomery Industrial Directory*, 1952, p. 22.

[23] *Industrial Alabama*, 1955, p. 78.

[24] *Montgomery Industrial Directory*, 1952, p. 22.

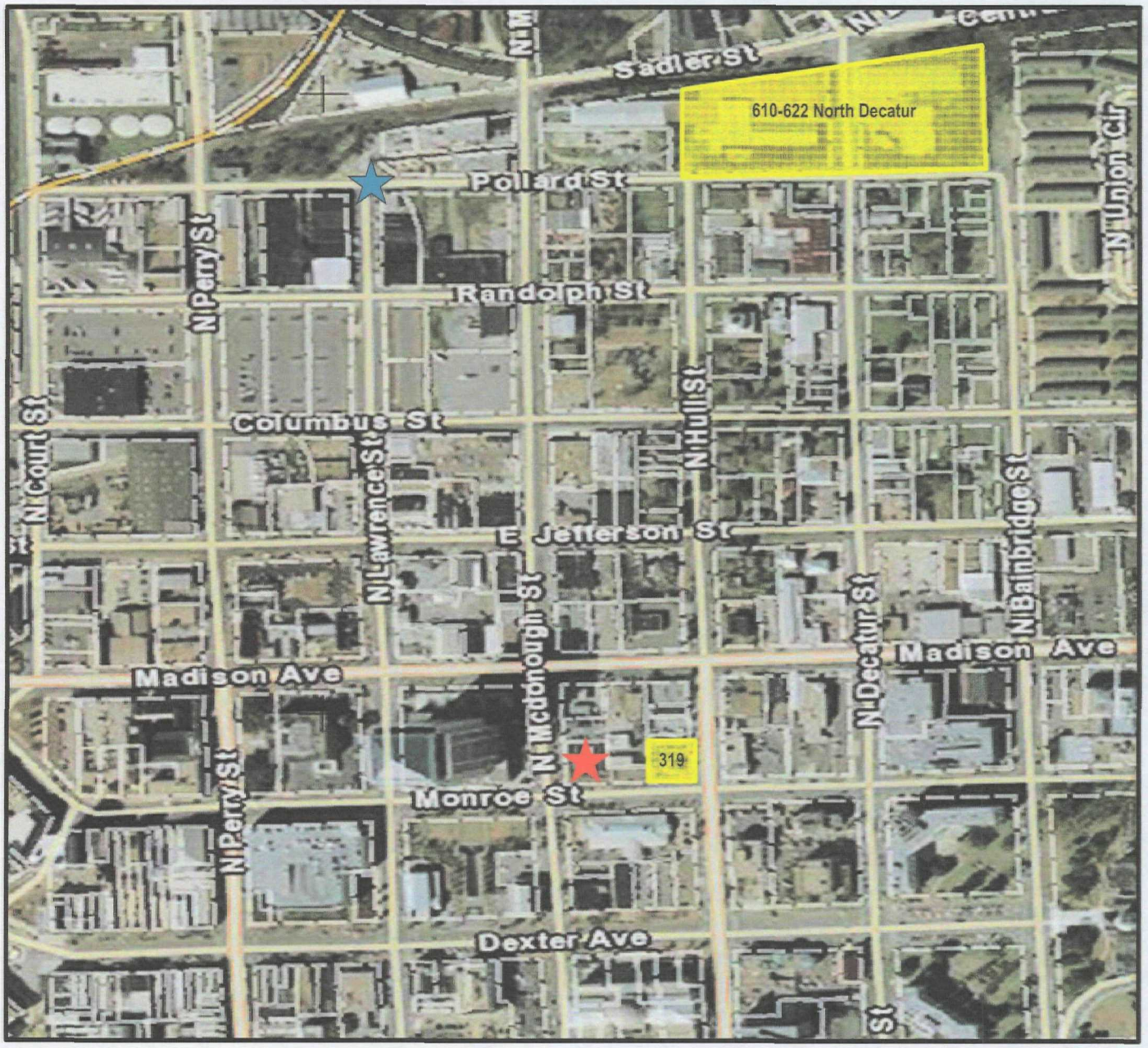
[25] "Industrial Alabama," August 1955, p. 78.

Company	SWIFT & COMPANY
	1962 – An Alabama industrial directory indicates that Swift's Montgomery ice cream plant produced ice cream, dairy products, and food products with a staff between 10 and 25 people.[26]
Corporate Succession:	Swift & Company qualified to conduct business in Alabama on January 5, 1914. (Corp. ID# 710-095) • 1969 – Merged into Delaware Swift & Company (Corp ID# 856-765) • 1982 – Name changed to Swift Independent Packing Company (SIPCO, Inc.) • 1989 – ConAgra acquired Swift and merged it with Monfort, Inc. to form the Monfort Pork Division • 1994 – ConAgra's Monfort Pork Division renamed Swift & Company • 2002 – ConAgra spun off Swift & Company to form Hicks Muse Tate & Furst (a private equity firm) • 2007 – Swift purchased by JBS S.A., a Brazilian company JBS USA Holdings, Inc. is the US subsidiary of JBS S.A.
Agent for Service:	Wesley Mendonca Batista, CEO JBS USA Corporate Office 1770 Promontory Circle Greeley, CO 80634 970-506-8000

[26] "Industrial Alabama," March 1962, p. 86.

Figure 1 – Site Locations

Swift & Company



Base Aerial: February 15, 2007, Aerials Express

Key to Symbols:

319 — Approximate Swift & Company Facility Locations with Street Numbers

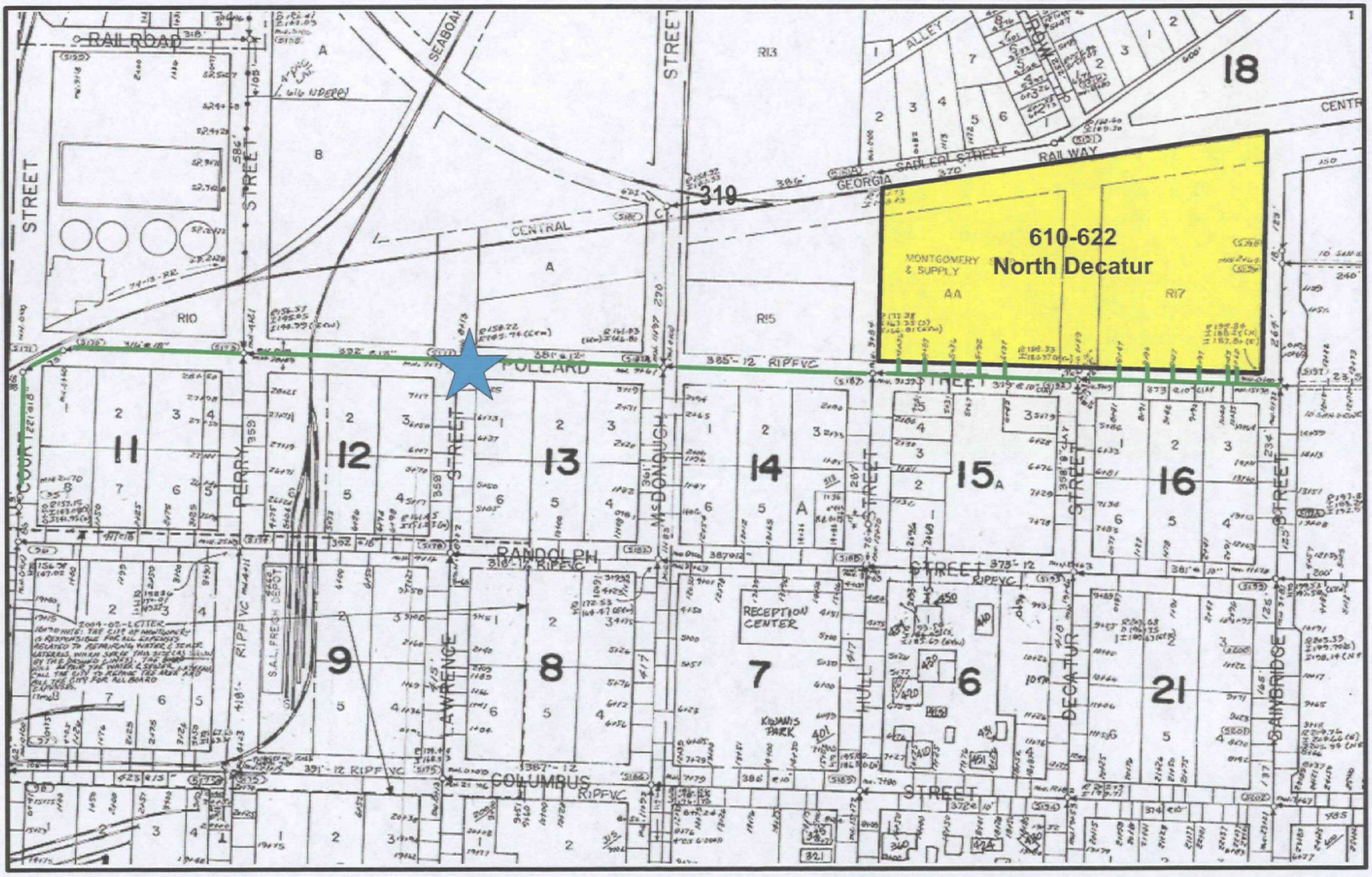
RSA Chiller Plant

Northern PCE Hotspot

Capital City Plume Superfund Site

Figure 2 – Sewer Map

Swift & Company



Sewer Map Plate 6807-2,102 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004

Key to Symbols:

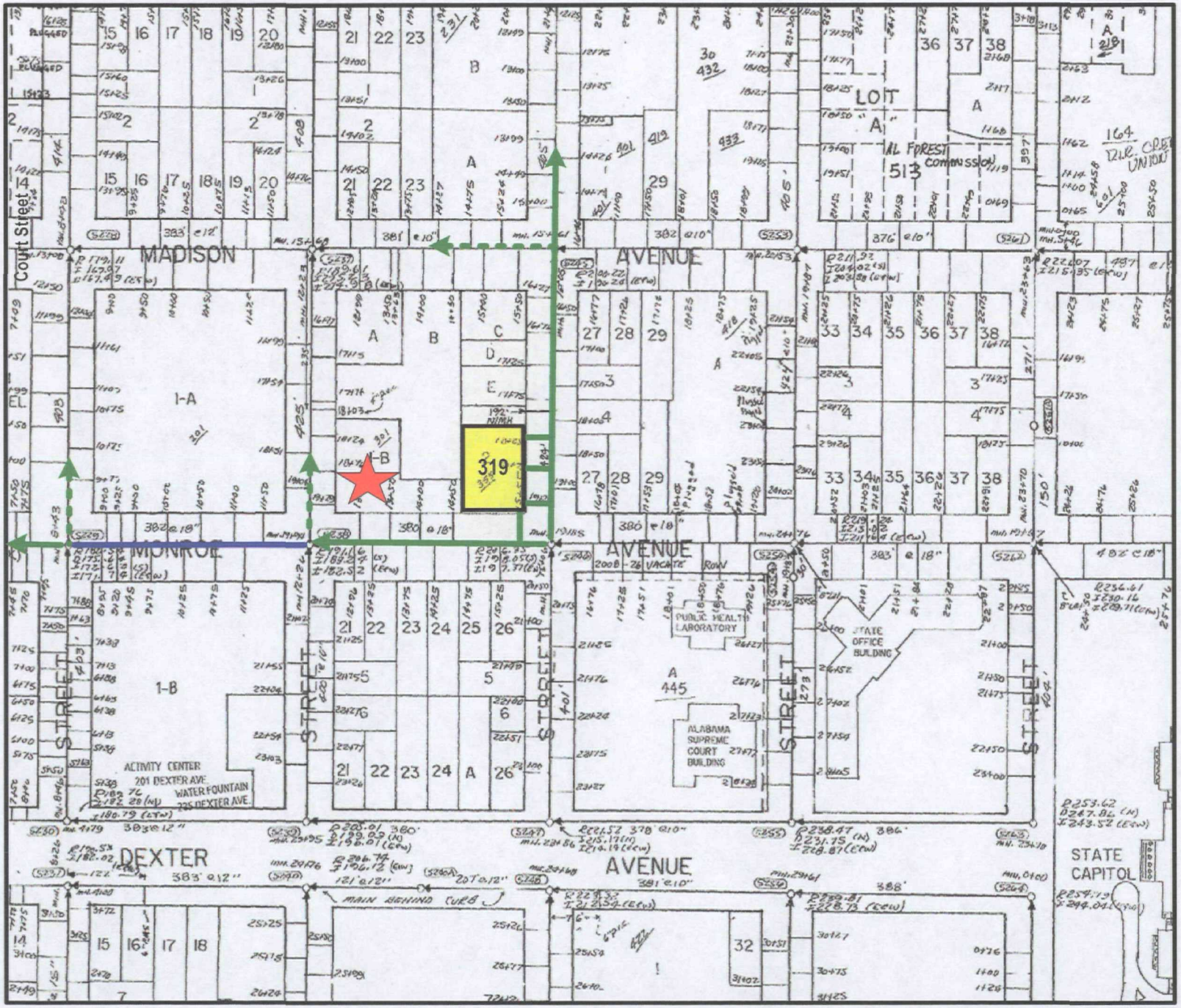
622 — Approximate Swift Facility Location with Street Numbers

★ — Northern PCE Hot Spot

Sewer line in Pollard Street

Figure 3 – Sewer Map

Swift & Company



Key to Symbols:

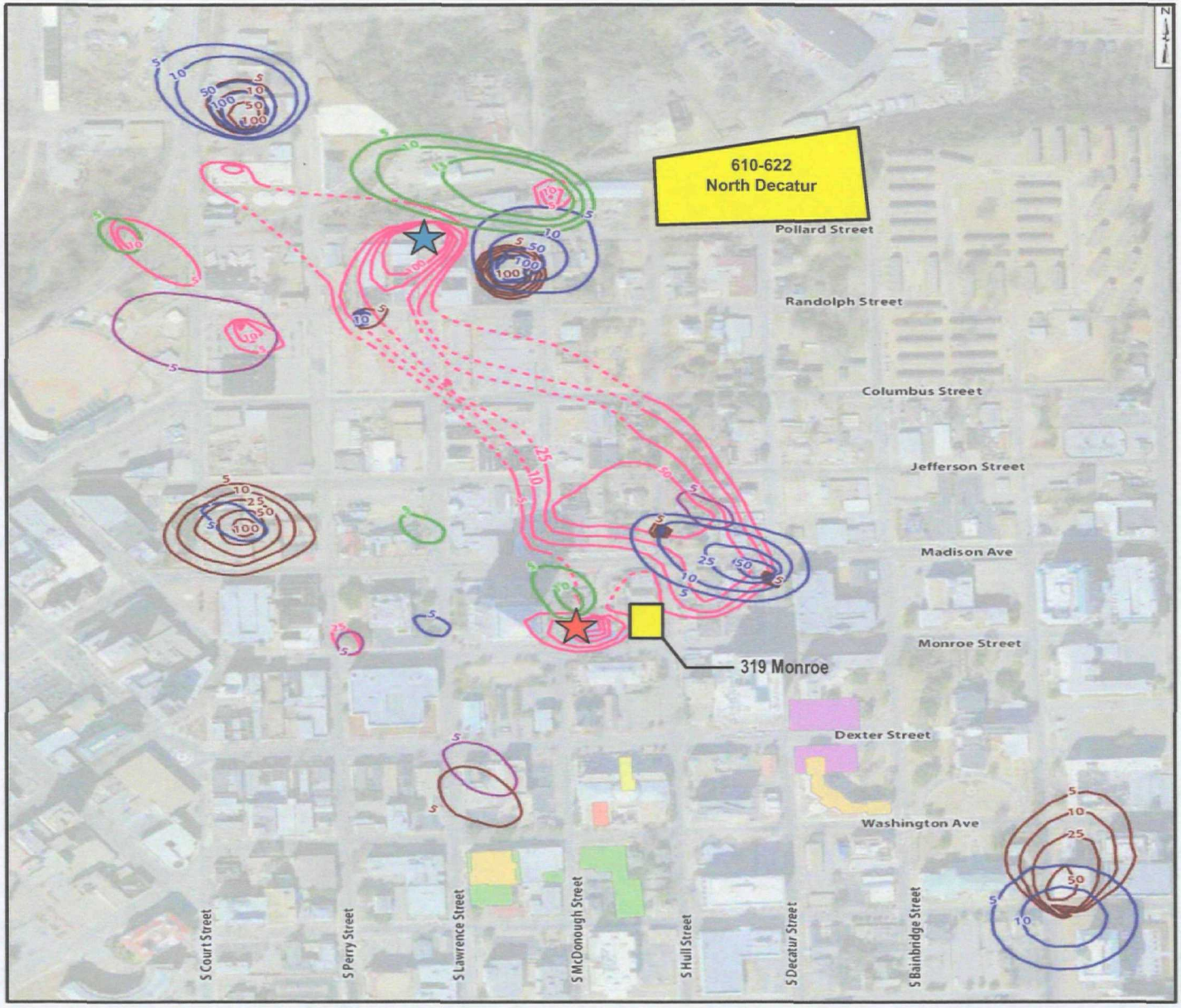
319 — Approximate Swift Facility Locations with Street Numbers

★ — RSA Chiller Plant

Sewer lines surveyed

Sewer lines serving Swift

Sewer Map Plate 6807-3,103 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 4 – Site Locations in Relationship to Contaminant Plumes

Swift & Company

Capital City Plume Superfund Site

Key to Symbols:

319 Monroe

Approximate Swift Facility Locations with Street Numbers

RSA Chiller Plant

Northern PCE Hotspot

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)

Patented Dec. 19, 1950 2,534,789

UNITED STATES PATENT OFFICE

2,534,789

ABSORPTION REFRIGERATION

Glen W. Miller, Covina, Edward L. Kells, Alhambra, and Delmar H. Larsen, West Hollywood, Calif.

No Drawing. Application October 5, 1946, Serial No. 701,402

12 Claims. (Cl. 62—179)

1

This invention relates to improvements in absorption refrigeration, and more particularly to new and useful refrigerant-solvent combinations for use in absorption refrigeration. This application is a continuation-in-part as to common subject matter of our copending application Serial Number 313,858, filed January 15, 1940, now Patent No. 2,408,802.

One of the principal objects of this invention is to provide new and useful refrigerant-solvent combinations for use in absorption refrigeration machines.

Another object of the invention is to provide such refrigerant-solvent combinations of enhanced usefulness as compared to those now in use or heretofore proposed.

Another object of the invention is to provide refrigerants and a solvent of high chemical stability and freedom from corrosive effects.

Another object of the invention is to provide an absorption refrigeration solvent of high density.

Other objects of the invention will become apparent as the description thereof proceeds.

In absorption refrigeration systems, the refrigerating effect is produced by the evaporation of a liquid refrigerant by allowing it to expand from a pressure greater than its vapor pressure at cooling water temperature to a pressure less than its vapor pressure at the refrigerating temperature. In order to re-cycle the refrigerant, it is absorbed into a liquid of high solvent power; thus dissolved, it is pumped to the higher pressure and driven from the solvent by heat. The function of the solvent is thus to reduce to a minimum the mechanical work necessary in bridging the low and high pressure sides of this system, since the volume of the refrigerant as pumped is reduced. The remainder of the necessary energy used to drive the refrigerant from this solution can then be supplied by heat. Such systems are, of course, well-known and may be found described in full

2

detail in various books on refrigeration engineering.

An improved method of operation of such systems, employing fractionation of refrigerant and solvent, is disclosed in our hereinabove cited Patent No. 2,408,802, and while the refrigerant-solvent combinations of this invention can be used in a machine embodying this method, it should be understood that the refrigerant-solvent combinations described and claimed herein may also be used in conventional machines of types already in use, in some cases with slight mechanical adjustments to meet changed operating conditions, as will be apparent to one skilled in the art of refrigeration engineering. Such machines include types having externally operated pumps for effecting transfer of the fluids contained therein, as well as those types depending upon pressures balanced out by means of an inert gas, flow being induced by differences in specific gravity of the fluids in different parts of the system.

In accordance with the present invention, perchloroethylene (C_2Cl_4; 1,1,2,2 tetrachloroethylene) is used as a solvent, in one of four combinations with the following as refrigerants:

(a) "Freon 114," $C_2Cl_2F_4$, dichlorotetrafluoroethane.
(b) "Freon 21," $CHCl_2F$, dichlorofluoromethane.
(c) Ethyl chloride, C_2H_5Cl, monochloroethane.
(d) "Freon 11," CCl_3F, trichlorofluoromethane.

The following table gives for each such combination the refrigerant boiling point, the solvent boiling point (both at one atmosphere), the difference in these boiling points, the maximum boiler temperature for a 100° F. condenser temperature, and the theoretical minimum energy ratio (ratio of total heat input to total useful refrigerating effect, both in heat units, allowing a 20% stack loss in heat input to boiler):

Table 1

Refrigerant	Solvent	Refrig. B. P. @ 1 atm.	Solvent B. P. @ 1 atm.	Difference in B. P.	Max. Boiler Temp. for 100° F. cond.	Energy Ratio
		° F.	° F.	° F.	° F.	
Freon 114 ($C_2Cl_2F_4$)	Perchloroethylene (C_2Cl_4)	42	276	234	385	1.95
Freon 21 ($CHCl_2F$)	do	48	276	228	370	1.70
Ethyl chloride (C_2H_5Cl)	do	54	276	222	352	2.37
Freon 11 (CCl_3F)	do	74.7	276	201.3	320	1.75

Further in accordance with the invention it is contemplated that other halogenated hydrocarbons besides those given above can be used as refrigerants (with perchloroethylene as the solvent) particularly chloro, fluoro, and chlorofluoro derivatives of simple aliphatic hydrocarbons, such as the following:

Table 2

Name	Formula	B. P., 1 atm., °F.
Dichlorodifluoromethane; Freon 12	CCl_2F_2	−21.7
Methyl chloride	CH_3Cl	−11
Chlorotrifluoromethane	$CClF_3$	−112
Chlorodifluoromethane	$CHClF_2$	−41
Fluoroform	CHF_3	−116
Difluoromethane	CH_2F_2	−60
Methyl fluoride	CH_3F	−109
Chloropentafluoroethane	C_2ClF_5	−36
1,1-dichloro-1,2,2,2 tetrafluoroethane	$C_2Cl_2F_4$	+28
1,2-dichloro-1,1,2,2 tetrafluoroethane	do	+39
Perfluoroethane	C_2F_6	−110
1,1 dichloroethylene	$C_2H_2Cl_2$	+99
1,1,1-trifluoroethane	$C_2H_3F_3$	−52
1,1 difluoroethane	$C_2H_4F_2$	−13
1,2 difluoroethane	do	+51
Ethyl fluoride	C_2H_5F	−36
Propenyl chloride	C_3H_5Cl	+96
Isopropenyl chloride	do	[1] +73
Allyl fluoride	C_3H_5F	+14
2,2-difluoromethane	$C_3H_6F_2$	+31
Isopropyl fluoride	C_3H_7F	+14
Propyl fluoride	do	+27

[1] At 738 mm. Hg.

Perchloroethylene is of great functional usefulness as a solvent because of its chemical stability, inertness towards metals, high density (which results in small volumes of solvent to be pumped and easy separation of the liquid droplets from the vapor in the analyzer) and particularly because of its high solvent power for the refrigerants listed in Table 1, and for the refrigerants listed in Table 2, and for the general class of refrigerants exemplified by Tables 1 and 2. It is cheap and readily available in a quite pure form.

Fluorochloro derivatives of simple aliphatic hydrocarbons and of boiling points similar to that of perchloroethylene have been suggested as absorption refrigeration solvents. However, they suffer from lower density and much higher cost.

It should be noted that in the case of the refrigerants of very low boiling point, high boiler-side pressures will be needed to effect liquefaction. Such refrigerants will be particularly adapted to multi-stage machines, keeping in mind, however, the freezing point of perchloroethylene of −8° F.

In the claims which follow, "lower aliphatic hydrocarbons" refers to aliphatic hydrocarbons of one, two, and three carbon atoms.

Having described the invention, we claim:

1. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and a refrigerant in substantial concentration chosen from the group of aliphatic hydrocarbons of fewer than four carbon atoms and having at least one hydrogen atom substituted by a halogen of atomic weight less than 50.

2. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and a refrigerant in substantial concentration chosen from the group of aliphatic hydrocarbons of fewer than four carbon atoms and having at least one hydrogen atom substituted by a halogen of atomic weight less than 50 and having a boiling point between the approximate limits of −116° F. and 99° F.

3. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and the dichlorotetrafluoroethane (Freon 114) in substantial concentration as the refrigerant.

4. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and dichlorofluoromethane (Freon 21) in substantial concentration as the refrigerant.

5. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and trichlorofluoromethane (Freon 11) in substantial concentration as the refrigerant.

6. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and ethyl chloride in substantial concentration as the refrigerant.

7. The process of absorption refrigeration comprising circulating a refrigerant chosen from the group of lower aliphatic hydrocarbons having at least one hydrogen atom substituted by a halogen of atomic weight less than 50 through an evaporator and to an absorber, absorbing the vaporized refrigerant in a solvent consisting essentially of perchloroethylene, transferring the solution to a still, and therein separating the refrigerant from the solvent.

8. The process according to claim 7 wherein the refrigerant has a boiling point between the approximate limits of −118° F. and 99° F.

9. The process according to claim 7 wherein the refrigerant is dichlorotetrafluoroethane (Freon 114).

10. The process according to claim 7 wherein the refrigerant is dichlorofluoromethane (Freon 21).

11. The process according to claim 7 wherein the refrigerant is trichlorofluoromethane (Freon 11).

12. The process according to claim 7 wherein the refrigerant is ethyl chloride.

GLEN W. MILLER.
EDWARD L. KELLS.
DELMAR H. LARSEN.

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2,163,899	Walker et al.	June 27, 1939
2,255,584	Hubacker	Sept. 9, 1941

OTHER REFERENCES

Gregory: Uses and Applications of Chemicals and Related Materials, vol. I, Reinhold Publishing Corp., N. Y. C. (1939), page 450.

Solvent Extraction of Cottonseed Oil

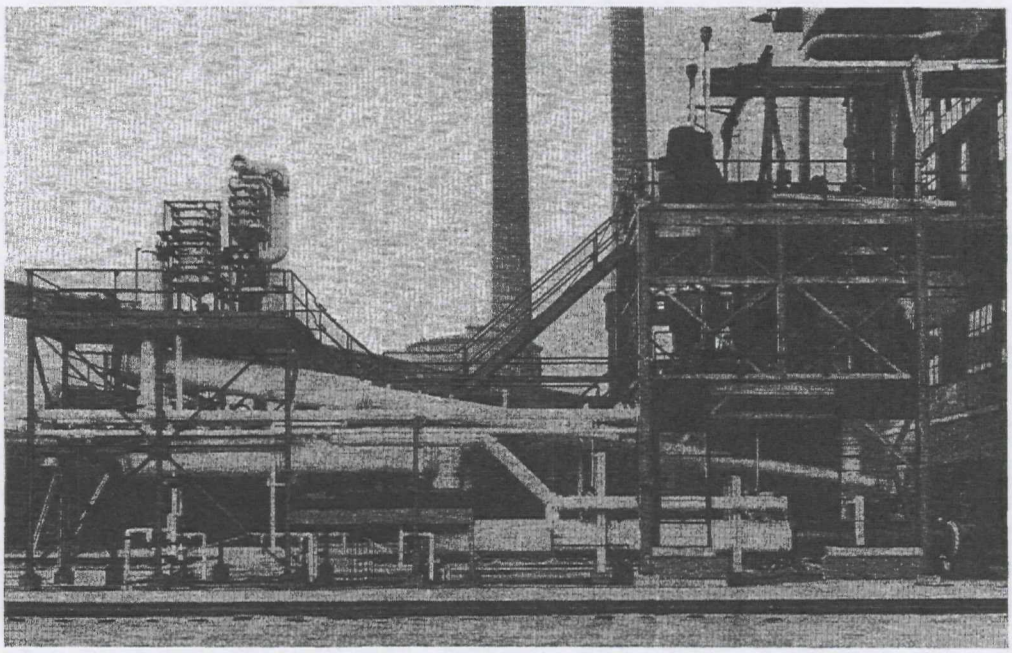
Effect of Cooking on Yield

H. S. OLCOTT
Mellon Institute, Pittsburgh, Penna.

Problems involved in the introduction of solvent-extraction methods into the cottonseed oil industry are reviewed. Although there is a slightly higher refining loss, the hexane extraction of rolled and cooked cottonseed meats yields a refined oil directly comparable to that obtained by pressing methods. Except that larger yields of oil are obtained, no changes in the existing methods of treatment and disposal of oil and meal are required. It appears that serious consideration of the adoption of such a procedure would be a logical and progressive step.

THE recovery of oil from oil-bearing seeds by solvent extraction has been practiced for almost a century. According to Lewkowitsch (*12*), Jesse Fisher introduced the method in 1843. The first patent was issued thirteen years later to Diess, whose process was used successfully in France and Italy for the extraction of olive oil. Carbon disulfide was the solvent recommended. In 1863 Richardson, Lundy, and Irvine patented the use of petroleum ether as an oil-extraction solvent. The techniques of the industry were for the most part developed in Europe where the lack of fats and oils, still apparent today, stimulated interest in methods for their more economical recovery. Each successful innovation has depended upon the increasing availability of large amounts of solvents with the required characteristics. Since 1918 most of the vegetable oil prepared in Europe has been obtained by solvent-extraction methods. It has even been found practical at times to import press cake, including cottonseed cake, and to extract the residual oil.

In the United States the use of solvents has assumed major importance only during the past ten years with the rapid development of soybean agriculture. Concurrently, continuous methods, as opposed to batch procedures, have been introduced from Europe. The economy and efficiency of continuous solvent-extraction plants have stimulated a rapid increase in the use of the process. At present equipment for extracting 25–30 per cent of the soybean crop (1,049,365 tons processed for oil in 1938) is available although, according to estimates made by the United States Regional Soybean Industrial Products Laboratory, only 16 to 17 per cent of the



Courtesy, Ford Motor Company

SOLVENT EXTRACTION PLANT FOR SOYBEANS

1938 crop and 17 to 18 per cent of the 1939 crop was actually processed in this manner. The advantages of solvent-extraction methods have been described (*2*, *4*, *9*, *14*, *19*), and the apparent success of modern installations indicates that the chief obstacles to the use of the procedure, at least with soybeans, have been overcome. Corn and linseed oils are also being obtained on a small scale by solvent extraction in this country.

The possibility of employing solvents for the extraction of cottonseed oil commercially has been discussed for many years. Wesson, an enthusiastic advocate of the method (*22*), reviewed some early experiments in the field, most of them unsuccessful (*23*). Other investigators have recorded the results of laboratory experiments (*20*, *21*), and one pilot plant was in use for a short time. However, the process has never been adopted, and the entire annual yield of 1,400,000,000 pounds of oil (average for 1935–39) is obtained by pressing methods. The cottonseed cake remaining (2,047,000 tons) contains an average of approximately 6 per cent oil, more than two thirds of which would be recoverable if solvent-extraction methods were employed. The excess oil thus available (164,000,000 pounds) could have replaced most of the 194,000,000 pounds of cottonseed oil imported in 1937, and more than taken care of the entire importation of 77,500,000 pounds in 1938. At 6 cents a pound, the larger yield would represent an annual increased gross return of $10,000,000 to the producers and millers. It is obviously germane to examine critically the circumstances under which the introduction of solvent extraction into cottonseed technology would be feasible.

Gossypol Removal

Cottonseed contains a toxic yellow substance, gossypol, which is detoxified by the cooking treatment used universally to increase the yield and quality of the expressed oil. The residual cake and meal find use as a stock feed for which they are particularly suited by reason of their high protein content. Although other outlets are being sought (*15*, *16*), the tremendous supply of the meal ensures that its major market will not be changed for a number of years. Any solvent-extraction procedure to be used must therefore include means of removing or detoxifying gossypol. The presence of this compound differentiates cottonseed from other sources of edible fats and introduces a factor which requires modifications of what might otherwise be a simple procedure.

A number of investigators have studied the physical and chemical properties of gossypol (*5*), and a provisional structure has lately been suggested (*1*). The compound is soluble in practically all organic solvents except the aliphatic hydrocarbons. Thus, if ground cottonseed meats are extracted with hexane (petroleum ether), some gossypol is removed with the oil, but the major portion remains behind and a highly toxic meal is obtained (Figure 1). On the other hand, gossypol can be completely extracted with the oil by ethyl ether or by aromatic or chlorinated solvents. The resulting meal appears to be an excellent food. As a third possibility, hexane-extracted meal may be re-extracted with a different organic solvent in order to obtain the gossypol relatively free from oil. This method, devised by Carruth (*6*), was adopted by Adams and his co-workers in the laboratory-scale preparation of gossypol for their investigations (*5*). Possible industrial outlets for gossypol are being investigated (*3*). If a market for gossypol could be developed, the third procedure (hexane extraction followed by extraction with a different organic solvent) would become of commercial significance.

The red color of the oil obtained by solvent extraction of ground cottonseed meats is attributable only in part to free gossypol, and care must be taken during the removal of the solvent to avoid high temperatures which cause fixation of the color. Although soap stock formation is said to benefit by the presence of gossypol (*18*), the refining methods now used for hydraulic press oil would undoubtedly have to be modified. No insurmountable difficulty in devising a method for successful refining is foreseen.

Ether extraction leaves a meal which is almost white; that obtained after hexane extraction has a distinct yellow color. Inasmuch as no severe heat treatment has been imposed, both meals contain the proteins and enzymes present in the native seed, and would be source materials for these potentially valuable by-products not available in hot-pressed or expeller meal. Gossypol interferes with the activity of trypsin (*11*) and pancreatic lipase (*7*), and also would be likely to color protein products; hence it is probable that meal extracted with solvents other than hexane would be most desirable for these purposes.

However, in view of the modifications of known procedures which would be required in order to use different solvents, and also because petroleum solvents are by far the cheapest of any available, primary consideration has been given to the latter possibility. Animal experiments indicate that hexane-extracted meal can be detoxified by autoclaving, but after such processing it does not have the high biological value of unheated gossypol-free meal because the heat itself is detrimental (Figure 1).

Extraction with Petroleum Solvents

If hexane is to be used, the most satisfactory procedure from the point of view of quality of oil and nutritive value of the meal involves the detoxification of gossypol prior to the extraction. This treatment can be accomplished by cooking with steam according to the method now in use in all oil mills. If the cooked meats are then extracted with hexane, the resulting oil may be handled exactly as is the hydraulic-press

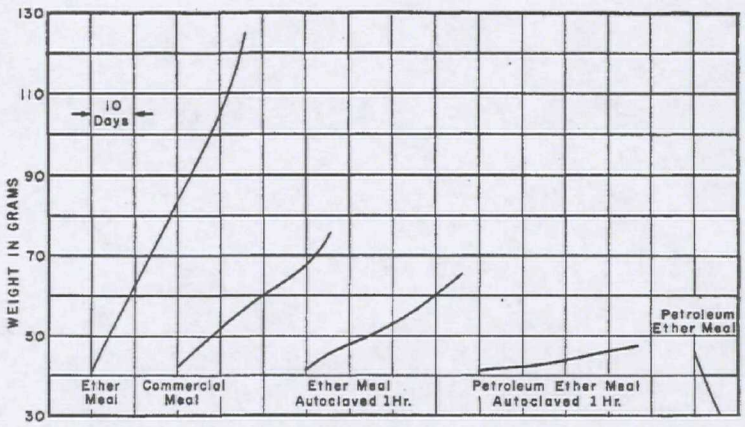
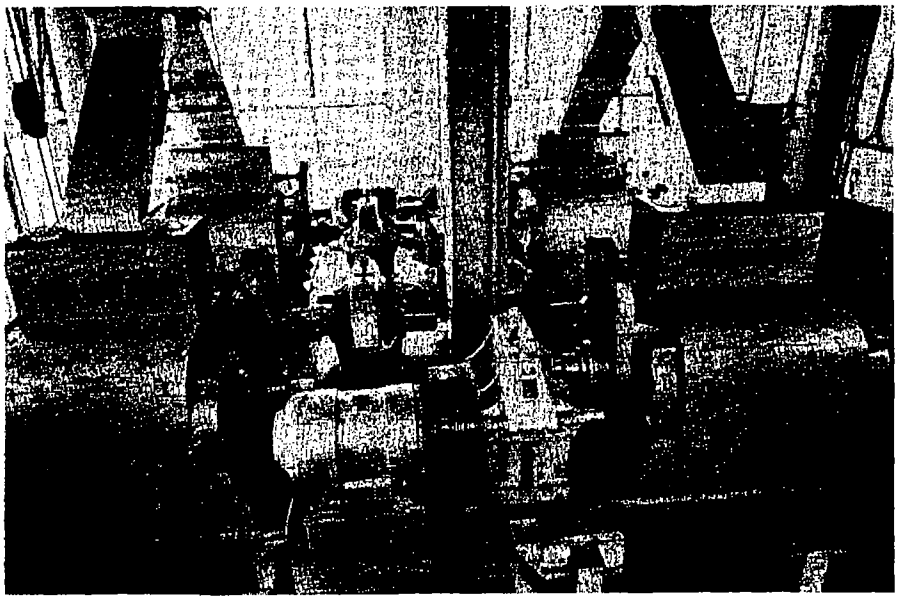


FIGURE 1. AVERAGE GROWTH CURVES OF MALE RATS ON DIETS CONTAINING COTTONSEED MEATS AS THE SOLE SOURCE OF PROTEIN (PROTEIN LEVEL, 12 PER CENT)

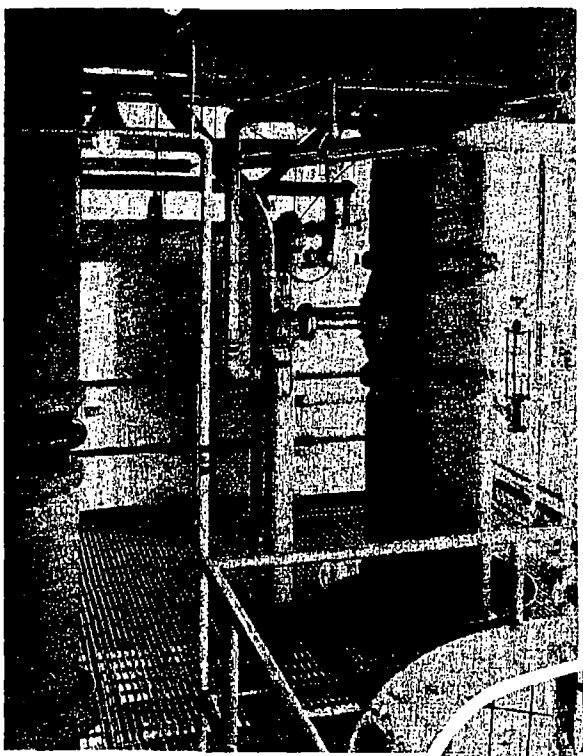
Ground meats were exhaustively extracted with the solvents indicated prior to the heat treatment.



Views in the Corn Oil Extraction Plant of Hiram Walker and Sons, Inc.

(*Left*) **Flaking rolls**

(*Below*) **Base of extraction column showing discharge conveyor**



(*Above*) **Partial view of solvent-recovery apparatus**

(*Right*) **Discharge end of dryers**

Courtesy, Allis-Chalmers Manufacturing Company

TABLE I. COMPOSITION OF COTTONSEED MEATS DURING COOKING

	Raw Meats	Cookers 1	2	3	4	5	6
Run 1							
Temp., ° F.	..	188	220	228	233	228	232
Water, %	8.4	10.0	9.8	7.9	6.5	5.5	5.4
Oil[a], %	32.4	32.0	32.1	32.4	32.6	32.7	32.2
Run 2							
Temp., ° F.	..	182	220	228	233	228	232
Water, %	8.5	8.3	7.3	5.6	4.8	3.9	4.0
Oil[a], %	34.7	33.4	33.3	33.5	33.3	33.5	33.2
Run 3							
Temp., ° F.	..	178	214	225	231	228	230
Water, %	8.1	9.6	8.7	7.4	5.8	4.8	4.6
Oil[a], %	35.2	34.2	34.5	34.6	34.8	34.6	34.5
Run 4							
Temp., ° F.	..	184	217	227	233	231	232
Water, %	7.6	8.7	8.0	6.5	5.6	4.9	4.9
Oil[a], %	35.2	34.1	33.9	34.3	34.3	33.9	33.7

[a] Moisture-free basis.

product. As Table I shows, there is little loss of hexane-extractable oil during the cooking process.

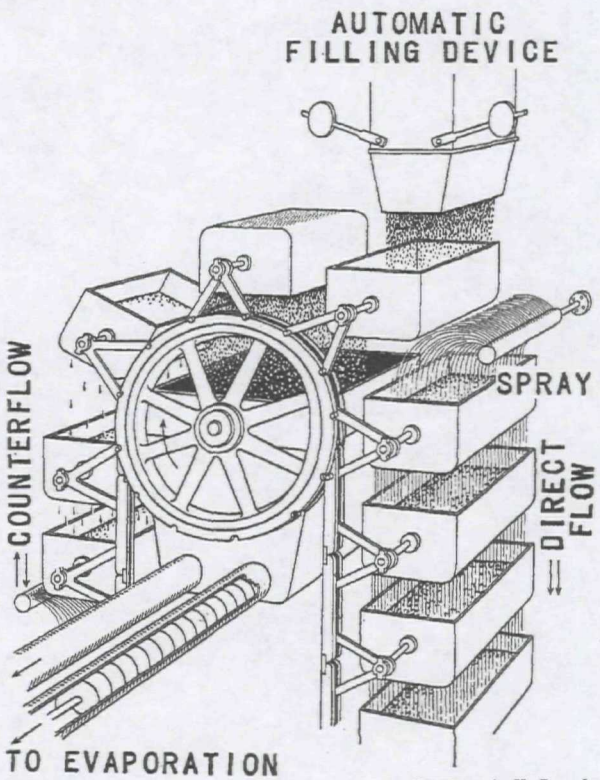
The data in Table II give the characteristics of two oils, one obtained by petroleum ether extraction (Skellysolve A) of rolled and cooked meats, the other by expression with the hydraulic press of meats from the same batch. Samples of ground meats taken after they had been through the cookers were extracted by grinding in the solvent and filtering. The oil was recovered from its solution in the petroleum ether by evaporation on a steam bath. The last portions were removed *in vacuo*, care being taken not to raise the temperature over 50° C. The official methods of the National Cottonseed Producers' Association were used in the refining tests. The results indicate that the refined product from the solvent-extracted oil is equal in color, free fatty acid, and bleach to that obtained from the pressed oil. The traces of solvent left in the oil refined in the laboratory would undoubtedly have been removed by the methods used in modern solvent-extraction plants.

In view of these results, the ultimate installation of solvent-extraction equipment might justifiably be considered by the larger crushers. If a successful extractor can be devised, the investment necessary will be amortized by the increased oil yield. As new uses for cottonseed products develop, the oil miller so equipped will be in a position to take advantage of the possibilities of manufacturing valuable by-products from solvent-extracted meal.

In this paper, no attempt has been made to evaluate the problems in solvent extraction which depend upon the purely physical characteristics of the cottonseed kernel.

TABLE II. COMPARISON OF REFINING PROPERTIES OF SOLVENT-EXTRACTED AND PRESSED COTTONSEED OIL

	Test 1 Solvent-extd. oil	Test 1 Pressed oil	Test 2 Solvent-extd. oil	Test 2 Pressed oil
Crude oil				
Volatiles, %	3.33	0.26	4.09	0.12
Free fatty acid, %	0.5	0.5	0.5	0.5
Refining loss, %	6.06	3.16	6.48	2.76
Refining loss calcd. for dry oil, %	3.48	2.90	3.67	2.64
Color: Yellow	35	35	35	35
Red	4.9	4.6	4.8	4.9
Refined oil				
Volatiles, %	0.8	0.19	1.37	0.10
Free fatty acids, %	0.05	0.05	0.05	0.05
Bleach: Yellow	20	20	20	20
Red	0.6	0.6	0.9	0.8
Refractive index	1.4626	1.4626	1.4617	1.4627
Iodine number	104.6	103.2	105.1	104.6



Courtesy, A. H. Bruecke

DETAIL OF THE HANSA-MÜHLE SOLVENT EXTRACTOR

Supplementary Information

The largest soybean solvent-extraction unit now in operation in this country has a capacity of 440 tons daily. The plant uses the Hansa-Mühle process of continuous extraction, which accounts for about two thirds of the total solvent-extraction capacity of the country. The Hildebrandt system is also widely used. Hildebrandt (*10*) reported that 700,000 tons of oil seeds are extracted annually (all countries) by his method.

New methods for solvent extraction are continually being devised. Apparatus for solvent extracting oil seeds and similar materials has been the subject of a constant stream of patent applications for the past twenty years.

MacGee (*13*) discussed the history and composition of the extraction naphthas. Petroleum fractions and especially hexane are used almost exclusively in this country. In Europe, chlorine-containing solvents such as trichloroethylene have been used to some extent.

The properties of butane as a general solvent were outlined by Garner (*8*). Its high volatility (boiling point, 0° C.) and its extremely low cost (2.5 cents per gallon in the mid-continent region) are particularly advantageous. Rosenthal and Trevithick (*17*) described some experimental extractions of cottonseed with this solvent.

Acknowledgment

Allen Smith of the Perkins Oil Company determined the quantitative data given in the tables, and a number of individuals kindly furnished helpful information concerning present-day solvent extraction practice.

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CONTRIBUTION from the Multiple Fellowship of the Cotton Research Foundation at Mellon Institute.

Purification of Glycerol by Crystallization

Synthetic glycerol, produced by hydrogenolysis processes, is highly impure and the isolation of C. P. or even U. S. P. grades has heretofore proved extremely difficult. A new approach to the problem—namely, crystallization in the presence of suitable solvents—readily yields glycerol of any degree of purity required. As a result of this process it is now possible to produce by a simple one-step treatment with hydrogen any desired quantity of high-quality glycerol from such abundant carbohydrate materials as starch and dextrose.

H. B. HASS AND J. A. PATTERSON

Purdue University and Purdue Research Foundation, Lafayette, Ind.

THE production of glycerol from carbohydrate sources by fermentation has been extensively investigated and is reported (*6*) to have been responsible for the production of 4,000,000 pounds per month of this material in Germany during the war of 1914–18. More recently the hydrogenolysis of carbohydrates has been found (*2*, *4*, *5*) to furnish a ready source of this compound. The conversion of the abundant cornstarch of the Middle West into glycerol via the hydrogenolysis of dextrose is of potential importance from the standpoint of national military preparedness.

Glycerol produced by hydrogenolysis upon an experimental scale in the laboratories of the Commercial Solvents Corporation was somewhat impure and failed to meet U. S. P. specification in four respects: It was slightly colored, it had a disagreeable odor not due to acrolein, it tasted bitter, and a black color was produced when it was treated with an equal volume of sulfuric acid. In order to pass U. S. P. specifications, glycerol must not develop more than a slight color under these conditions. Since conventional purification methods had proved inadequate, an investigation of the applicability of crystallization to the problem was undertaken. Glycerol melts at 18° C. but is rarely seen in solid form because of the ease with which it supercools. Apparently the most recently reported attempt to develop a process for the commercial purification of glycerol by crystallization was by Kraut (*1*) who stated in 1871:

For producing crystals of glycerine in the first instance, distilled glycerine of 30° Beaumé is kept in closed vessels for a week or more at a temperature of from 32° to 43° F., when crystals of pure glycerine will have formed themselves out of the mother liquor.

For manufacturing perfectly pure glycerine from the ordinary glycerine of commerce, such glycerine of 30° Beaumé is first cooled down under exclusion of moisture from 32° to 43° F., after which a small quantity of the before-mentioned crystallized glycerine is introduced and the glycerine is allowed to stand at a low temperature, such as above described for some days, whereupon the crystallization of the glycerine will ensue. When the crystallization is found to proceed no farther the crystals are separated from the remaining mother liquor, first by decantation, and then by a centrifugal drying machine. Should it be desired to carry the process of purification still further the crystals may be melted down and then recrystallized by the above-described process.

So far as we know, the foregoing process invented by Karl Kraut and patented by C. D. Abel was never used commercially.

One of the obstacles in working with such a process is the difficulty in obtaining seed crystals. Gibson and Giauque reported (*3*) in 1923 that after "the artifices ordinarily used for starting crystallization in the absence of seed crystals were all tried without success", crystals were produced at will by prolonged cooling of pure glycerol with liquid air and subsequently bringing the sample gradually to 0° C. Oblad and Newton (*8*) found that cooling by solid carbon dioxide can be substituted for the lower temperatures of liquid air with equally good results. Glycerol seed crystals are most conveniently obtained by keeping pure, anhydrous glycerol overnight in a test tube immersed in a Dewar flask cooled by solid carbon dioxide. Upon removing the test tube, the glassy glycerol appears unchanged because the seed crystals are so small as to be invisible. After standing for a few hours at 0° C., the crystals have grown enough to resemble sucrose in general appearance. After 2 days at 10° C. the crystallization is complete.

Even assuming that seed crystals of glycerol are obtainable, the process of Kraut is impractical when applied to glycerol containing even relatively small concentrations of im-

Patented Dec. 19, 1950 2,534,789

UNITED STATES PATENT OFFICE

2,534,789

ABSORPTION REFRIGERATION

Glen W. Miller, Covina, Edward L. Kells, Alhambra, and Delmar H. Larsen, West Hollywood, Calif.

No Drawing. Application October 5, 1946, Serial No. 701,402

12 Claims. (Cl. 62—179)

1

This invention relates to improvements in absorption refrigeration, and more particularly to new and useful refrigerant-solvent combinations for use in absorption refrigeration. This application is a continuation-in-part as to common subject matter of our copending application Serial Number 313,858, filed January 15, 1940, now Patent No. 2,408,802.

One of the principal objects of this invention is to provide new and useful refrigerant-solvent combinations for use in absorption refrigeration machines.

Another object of the invention is to provide such refrigerant-solvent combinations of enhanced usefulness as compared to those now in use or heretofore proposed.

Another object of the invention is to provide refrigerants and a solvent of high chemical stability and freedom from corrosive effects.

Another object of the invention is to provide an absorption refrigeration solvent of high density.

Other objects of the invention will become apparent as the description thereof proceeds.

In absorption refrigeration systems, the refrigerating effect is produced by the evaporation of a liquid refrigerant by allowing it to expand from a pressure greater than its vapor pressure at cooling water temperature to a pressure less than its vapor pressure at the refrigerating temperature. In order to re-cycle the refrigerant, it is absorbed into a liquid of high solvent power; thus dissolved, it is pumped to the higher pressure and driven from the solvent by heat. The function of the solvent is thus to reduce to a minimum the mechanical work necessary in bridging the low and high pressure sides of this system, since the volume of the refrigerant as pumped is reduced. The remainder of the necessary energy used to drive the refrigerant from this solution can then be supplied by heat. Such systems are, of course, well-known and may be found described in full

2

detail in various books on refrigeration engineering.

An improved method of operation of such systems, employing fractionation of refrigerant and solvent, is disclosed in our hereinabove cited Patent No. 2,408,802, and while the refrigerant-solvent combinations of this invention can be used in a machine embodying this method, it should be understood that the refrigerant-solvent combinations described and claimed herein may also be used in conventional machines of types already in use, in some cases with slight mechanical adjustments to meet changed operating conditions, as will be apparent to one skilled in the art of refrigeration engineering. Such machines include types having externally operated pumps for effecting transfer of the fluids contained therein, as well as those types depending upon pressures balanced out by means of an inert gas, flow being induced by differences in specific gravity of the fluids in different parts of the system.

In accordance with the present invention, perchloroethylene (C_2Cl_4; 1,1,2,2 tetrachloroethylene) is used as a solvent, in one of four combinations with the following as refrigerants:

(a) "Freon 114," $C_2Cl_2F_4$, dichlorotetrafluoroethane.
(b) "Freon 21," $CHCl_2F$, dichlorofluoromethane.
(c) Ethyl chloride, C_2H_5Cl, monochloroethane.
(d) "Freon 11," CCl_3F, trichlorofluoromethane.

The following table gives for each such combination the refrigerant boiling point, the solvent boiling point (both at one atmosphere), the difference in these boiling points, the maximum boiler temperature for a 100° F. condenser temperature, and the theoretical minimum energy ratio (ratio of total heat input to total useful refrigerating effect, both in heat units, allowing a 20% stack loss in heat input to boiler):

Table 1

Refrigerant	Solvent	Refrig. B. P. @ 1 atm.	Solvent B. P. @ 1 atm.	Difference in B. P.	Max. Boiler Temp. for 100° F. cond.	Energy Ratio
		° F.	° F.	° F.	° F.	
Freon 114 ($C_2Cl_2F_4$)	Perchloroethylene (C_2Cl_4)	42	276	234	385	1.95
Freon 21 ($CHCl_2F$)	do	48	276	228	370	1.70
Ethyl chloride (C_2H_5Cl)	do	54	276	222	352	2.37
Freon 11 (CCl_3F)	do	74.7	276	201.3	320	1.75

Further in accordance with the invention it is contemplated that other halogenated hydrocarbons besides those given above can be used as refrigerants (with perchloroethylene as the solvent) particularly chloro, fluoro, and chlorofluoro derivatives of simple aliphatic hydrocarbons, such as the following:

Table 2

Name	Formula	B. P., 1 atm., °F.
Dichlorodifluoromethane; Freon 12	CCl_2F_2	−21.7
Methyl chloride	CH_3Cl	−11
Chlorotrifluoromethane	$CClF_3$	−112
Chlorodifluoromethane	$CHClF_2$	−41
Fluoroform	CHF_3	−116
Difluoromethane	CH_2F_2	−60
Methyl fluoride	CH_3F	−109
Chloropentafluoroethane	C_2ClF_5	−36
1,1-dichloro-1,2,2,2 tetrafluoroethane	$C_2Cl_2F_4$	+28
1,2-dichloro-1,1,2,2 tetrafluoroethane	do	+39
Perfluoroethane	C_2F_6	−110
1,1 dichloroethylene	$C_2H_2Cl_2$	+99
1,1,1-trifluoroethane	$C_2H_3F_3$	−52
1,1 difluoroethane	$C_2H_4F_2$	−13
1,2 difluoroethane	do	+61
Ethyl fluoride	C_2H_5F	−36
Propenyl chloride	C_3H_5Cl	+96
Isopropenyl chloride	do	[1] +73
Allyl fluoride	C_3H_5F	+14
2,2-difluoromethane	$C_3H_6F_2$	+31
Isopropyl fluoride	C_3H_7F	+14
Propyl fluoride	do	+27

[1] At 738 mm. Hg.

Perchloroethylene is of great functional usefulness as a solvent because of its chemical stability, inertness towards metals, high density (which results in small volumes of solvent to be pumped and easy separation of the liquid droplets from the vapor in the analyzer) and particularly because of its high solvent power for the refrigerants listed in Table 1, and for the refrigerants listed in Table 2, and for the general class of refrigerants exemplified by Tables 1 and 2. It is cheap and readily available in a quite pure form.

Fluorochloro derivatives of simple aliphatic hydrocarbons and of boiling points similar to that of perchloroethylene have been suggested as absorption refrigeration solvents. However, they suffer from lower density and much higher cost.

It should be noted that in the case of the refrigerants of very low boiling point, high boiler-side pressures will be needed to effect liquefaction. Such refrigerants will be particularly adapted to multi-stage machines, keeping in mind, however, the freezing point of perchloroethylene of −8° F.

In the claims which follow, "lower aliphatic hydrocarbons" refers to aliphatic hydrocarbons of one, two, and three carbon atoms.

Having described the invention, we claim:

1. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and a refrigerant in substantial concentration chosen from the group of aliphatic hydrocarbons of fewer than four carbon atoms and having at least one hydrogen atom substituted by a halogen of atomic weight less than 50.

2. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and a refrigerant in substantial concentration chosen from the group of aliphatic hydrocarbons of fewer than four carbon atoms and having at least one hydrogen atom substituted by a halogen of atomic weight less than 50 and having a boiling point between the approximate limits of −116° F. and 99° F.

3. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and the dichlorotetrafluoroethane (Freon 114) in substantial concentration as the refrigerant.

4. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and dichlorofluoromethane (Freon 21) in substantial concentration as the refrigerant.

5. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and trichlorofluoromethane (Freon 11) in substantial concentration as the refrigerant.

6. A refrigerant-solvent combination for use in absorption refrigeration machines consisting essentially of perchloroethylene in substantial concentration as the solvent and ethyl chloride in substantial concentration as the refrigerant.

7. The process of absorption refrigeration comprising circulating a refrigerant chosen from the group of lower aliphatic hydrocarbons having at least one hydrogen atom substituted by a halogen of atomic weight less than 50 through an evaporator and to an absorber, absorbing the vaporized refrigerant in a solvent consisting essentially of perchloroethylene, transferring the solution to a still, and therein separating the refrigerant from the solvent.

8. The process according to claim 7 wherein the refrigerant has a boiling point between the approximate limits of −118° F. and 99° F.

9. The process according to claim 7 wherein the refrigerant is dichlorotetrafluoroethane (Freon 114).

10. The process according to claim 7 wherein the refrigerant is dichlorofluoromethane (Freon 21).

11. The process according to claim 7 wherein the refrigerant is trichlorofluoromethane (Freon 11).

12. The process according to claim 7 wherein the refrigerant is ethyl chloride.

GLEN W. MILLER.
EDWARD L. KELLS.
DELMAR H. LARSEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,120,559	Jennings	June 14, 1938
2,163,899	Walker et al.	June 27, 1939
2,255,584	Hubacker	Sept. 9, 1941

OTHER REFERENCES

Gregory: Uses and Applications of Chemicals and Related Materials, vol. I, Reinhold Publishing Corp., N. Y. C. (1939), page 450.

Company	GEORGE A. HORMEL & COMPANY
Address:	500 N. Lawrence 221 Randolph Street
Tenure:	500 N. Lawrence 1935 to 1953 221 Randolph Street 1953 to 1987
Operations:	George A. Hormel & Company ("Hormel") operated a wholesale meat packing, processing and cold storage plant in Montgomery from about 1935 to 1987 at two adjoining properties near the intersection of Randolph and North Lawrence streets. (See Figure 1) A 1950 Sanborn map depicts the facility at 500 North Lawrence which contained ammonia tanks, likely for refrigeration purposes.[1] By 1953 Hormel was operating at both 500 North Lawrence and at 221 Randolph in a newly constructed building.[2] As part of the construction, a new catch basin was added in Randolph Street along the railroad spur track which was being raised to accommodate the new building. Hormel used the Central of Georgia Railway Company spur track that lay between 500 North Lawrence and 221 Randolph streets for shipment of carloads of meat products under a May 1953 agreement.[3] By 1955 only the facility at 221 Randolph was in operation with 50 to 100 employees. In 1955 Hormel was distributing brand-name bacon and sausage.[4] By 1964, Hormel had added an area for truck repair and storage to its facility at 221 Randolph Street.[5] By 1972 an additional cold storage building was added to the rear of the building.[6] In September 1987 the spur track agreement was cancelled which likely marked the end of Hormel operations at 221 Randolph Street.[7]
Potential Nexus to Groundwater Contaminant Plume:	Hormel's operations were located north of and adjacent to wells CH2-SB5 and TW-08 in which elevated levels of BTEX have been detected. The available information indicates that Hormel fueled and maintained delivery trucks at its facility at 221 Randolph since at least 1964. The size and location of any fuel tanks serving the facility prior to 1980 is not known. A 2,000-gallon underground diesel fuel storage tank was

1 Sanborn map, Sheet 102, 1950.

2 Sanborn map, Sheet 102, 1953.

3 Agreement between Central of Georgia Railroad and George A. Hormel & Company, May 22, 1953, [From Norfolk Southern Corporation Section 104(e) Response, EPA barcode 10789859 page 47 of 519 and map following.]

4 *Industrial Alabama,* 1955, p. 77.

5 Sanborn map, Sheet 102, 1964.

6 Sanborn map, Sheet 102, 1972.

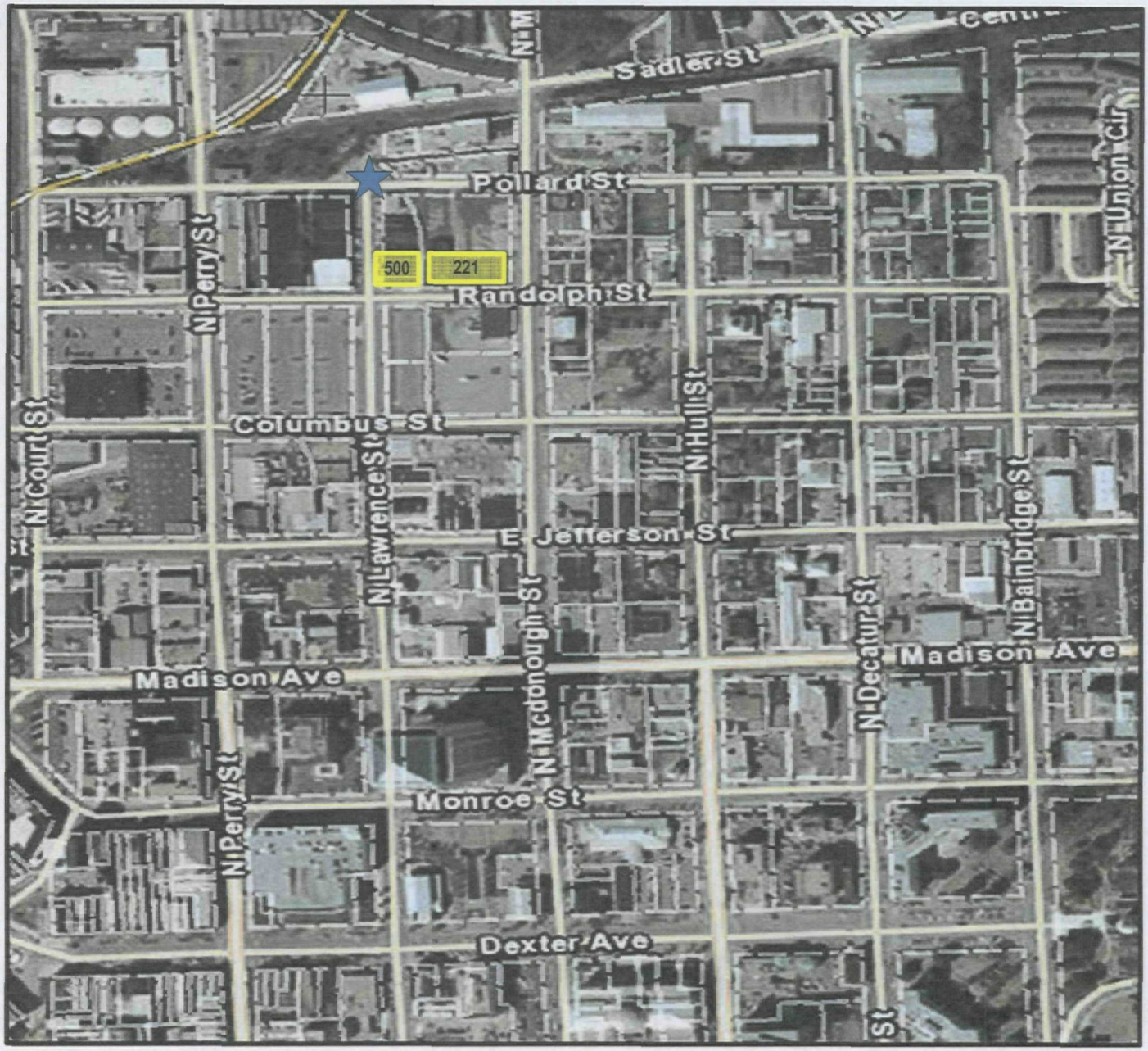
7 Agreement between Central of Georgia Railroad and George A. Hormel & Company, September 4, 1990, effective September 29, 1987, [From Norfolk Southern Corporation Section 104(e) Response, EPA barcode 10789859 page 38 of 519]

Company	GEORGE A. HORMEL & COMPANY
	installed on the property in about 1980, but this may not have been the first or the only tank on the property. Truck repair and maintenance activities may have involved the use of chlorinated solvents for parts, brake and carburetor cleaning. The Hormel facilities were located within a block of the northern PCE hotspot near the intersection of North Lawrence and Pollard streets. The sewer line serving 500 North Lawrence runs north along Lawrence to Pollard then west along Pollard Street. The sewer line serving 221 Randolph Street runs west along Randolph to Court Street. (See Figure 2)
Key Details:	From at least 1964 through 1987, the facility at 221 Randolph repaired delivery trucks on the property. A 2000-gallon galvanized steel underground storage tank ("UST"), owned by jobber Interstate Oil, was installed at 221 Randolph in about 1980 and removed in July 1987. The tank held diesel fuel and was last used in May 1987. When the tank was removed there were no odors and no visual evidence of leaks.[8]
Corporate Succession:	• Hormel Foods Corporation, a Delaware corporation, was qualified to operate in Alabama on December 21, 1936 (Corp ID# 852-901) • 2005 – Reorganized as Hormel Food Sales, LLC, a Delaware company. (Corp ID# 608-669) • Active 2011 Net Sales $7.9 Billion
Agent for Service:	Corporate Headquarters: 1 Hormel Place Austin, MN 55912 Registered Agent: CT Corporation System 2 North Jackson St. Suite 605 Montgomery, AL 36104

[8] Notification for Underground Storage Tanks, ADEM file 12530-101-004400, August 24, 1987.

Figure 1 – Site Locations

George A. Hormel & Company



Base Aerial: February 15, 2007, Aerials Express

Key to Symbols:

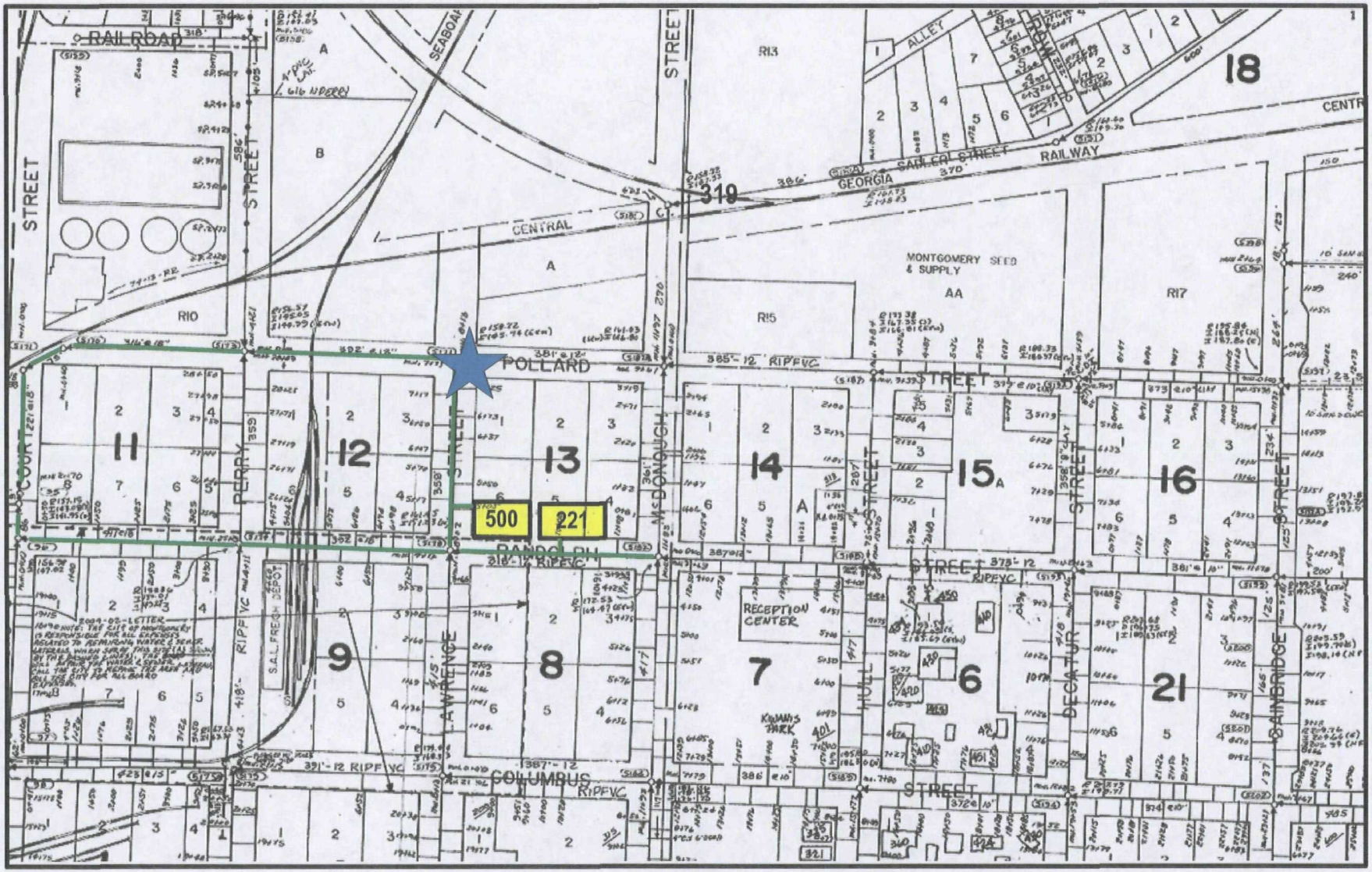
500 — Approximate Hormel Facility Locations with Street Numbers

★ — Northern PCE Hotspot

Capital City Plume Superfund Site

Figure 2 – Sewer Map

George A. Hormel & Company



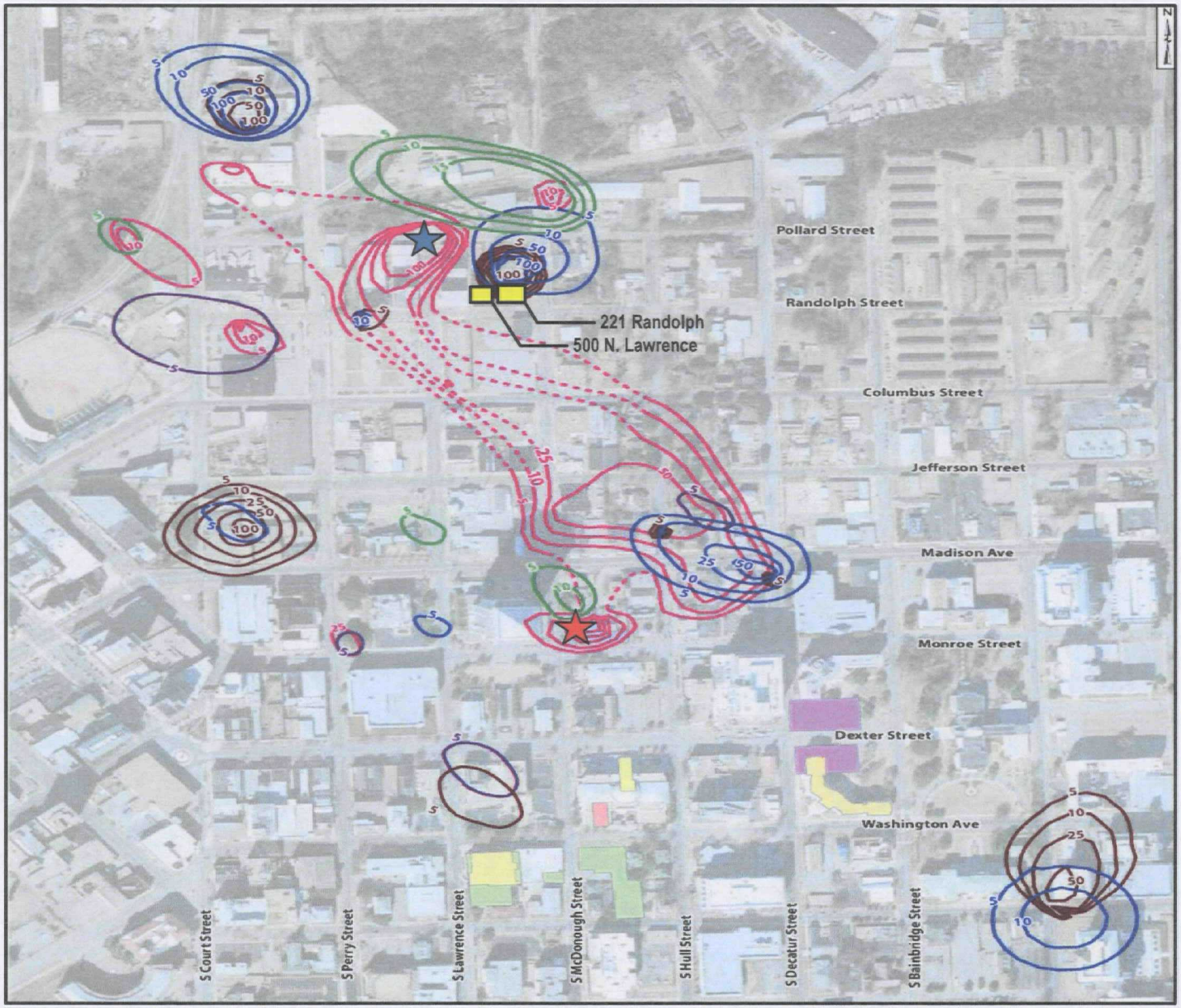
Sewer Map Plate 6807-2,102 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004

Key to Symbols:

500 — Approximate Hormel Facility Locations with Street Numbers

★ — Northern PCE Hot Spot

Sewer lines serving Hormel



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 3 – Site Locations in Relationship to Contaminant Plumes

George A. Hormel & Company

Capital City Plume Superfund Site

Key to Symbols:

221 Randolph

Approximate Hormel Facility Locations with Street Numbers

RSA Chiller Plant

Northern PCE Hotspot

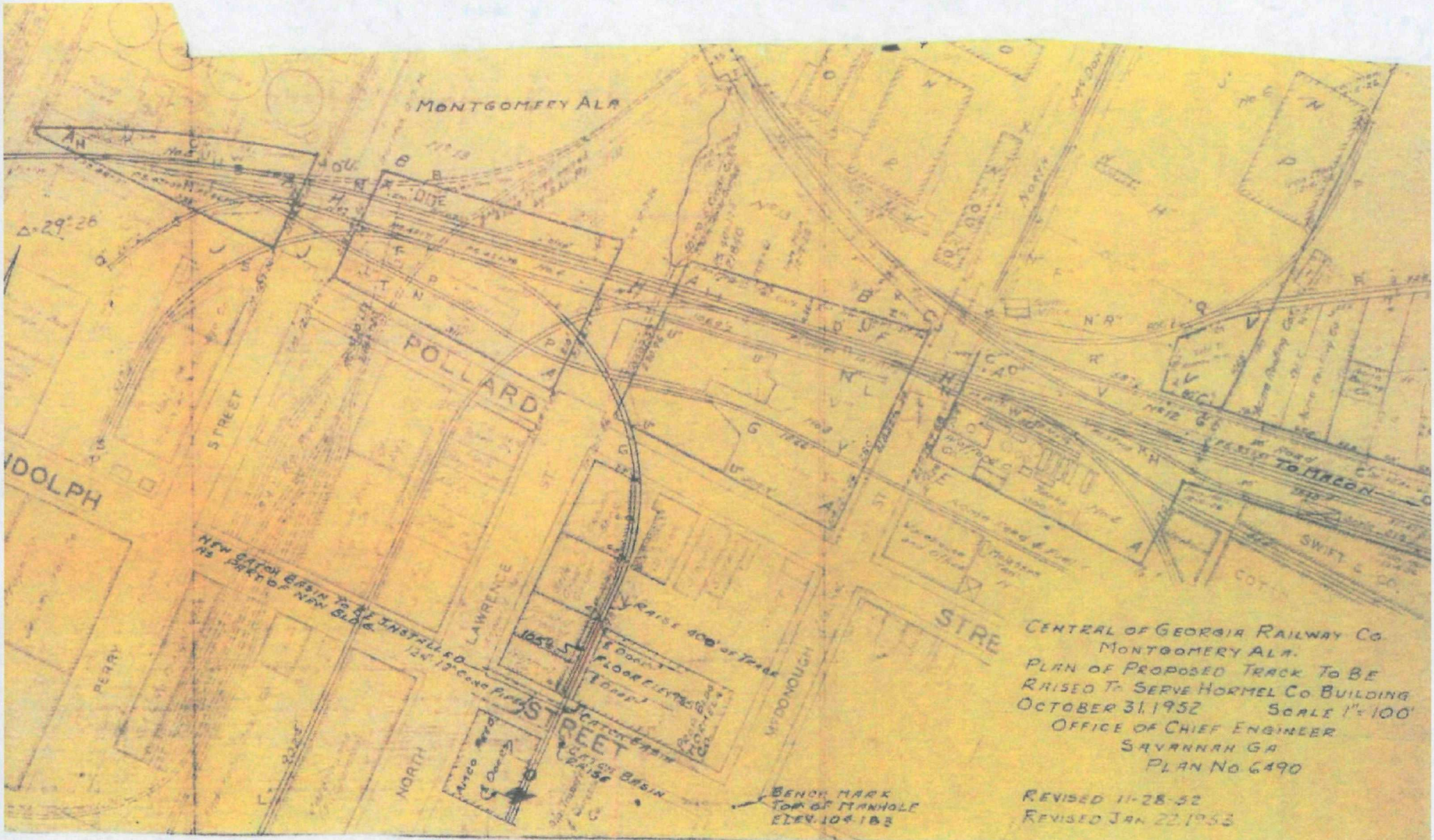
PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)


MONTGOMERY ALA
POLLARD
STREET
LAWRENCE
McDONOUGH
STREET
TO MACON
SWIFT & CO.
NEW CATCH BASIN TO BE INSTALLED
CATCH BASIN
BENCH MARK
TOP OF MANHOLE
ELEV. 104.183
CENTRAL OF GEORGIA RAILWAY CO.
MONTGOMERY ALA.
PLAN OF PROPOSED TRACK TO BE
RAISED TO SERVE HORMEL CO BUILDING
OCTOBER 31, 1952 SCALE 1" = 100'
OFFICE OF CHIEF ENGINEER
SAVANNAH GA
PLAN NO. 6490
REVISED 11-28-52
REVISED JAN. 22, 1953

Company	HARPER-LEE MACHINE WORKS	
Address:	425 N. McDonough St.	
Tenure:	202 N. Court St.	1920 – 1929
	5-7 Madison Ave.	1928 – 1949
	425 N. McDonough St.	1950 – Present
Operations:	202 N. Court Street and 5-7 Madison Avenue Early city directories indicate that Harper-Lee Machine Works ("Harper-Lee") repaired and rebuilt all types of machinery using industrial processes including oxy-acetylene welding, valve facing, cylinder grinding and rod babbitting at its premises near the corner of Court Street and Madison Avenue.[1] This facility appears to have used two addresses, 202 North Court Street from 1920 to 1929, and 5-7 Madison Avenue from 1928-1949, but appears to have been a single facility. (See Figure 1) 425 N. McDonough Street In 1950, Harper-Lee moved its operations to 425 North McDonough Street. During the 1950s and 1960s Harper-Lee continued to provide a variety of machining services including machine grinding; crankshaft grinding, welding, cylinder boring, valve reseating or restoring, machine maintenance and general machine shop work and employed fewer than 10 workers.[2] The company continues to operate at this address. Machine shop operations often involve the use of chlorinated solvents, such as TCE and PCE for metal cleaning prior to welding; to remove debris from metal grinding and boring operations; and in the cleaning and maintenance of machinery and shop equipment. According to USEPA, solvents are commonly used to strip oil and contaminants from metals before welding and repairs, and after grinding, boring and shaping operations.[3] Cold solvent cleaning of metals can be done by several methods including: 1) wipe cleaning using a rag soaked in solvents to physically wipe down a part, 2) soak cleaning by dunking a part in a tank containing solvents, 3) Ultrasonic cleaning is identical to soak cleaning but with an ultrasonic unit attached to the tank to provide a more vigorous cleaning cycle, and 4) steam gun cleaning where solvents are mixed with steam and are shot out of a nozzle, usually to strip paint.[4] Solvents are also used in vapor cleaning, where a tank of solvents is heated to its boiling point and the part is placed above the tank so the	

[1] *Montgomery City Directory*, 1928, p. 392; *Montgomery City Directory*, 1931, advertisement

[2] *Industrial Directory of Montgomery*, 1952, p. 11; *Industrial Alabama*, 1959, p. 77; *Industrial Alabama*, 1962, p. 83.

[3] USEPA, "Guides to Pollution Prevention: The Fabricated Metal Products Industry," July 1990, p. 7.

[4] American Society for Testing and Materials, "Cold Cleaning with Halogenated Solvents," 1966, pp.15-17.

Company	HARPER-LEE MACHINE WORKS
	solvent vapors condense on the cool metal to remove oil, grease, and debris.[5] Machine shops also use petroleum-based products such as cutting and lubricating oils. Commonly known as metal working fluids, these materials may contain hazardous substances as part of their formulation, but they may also become contaminated with hazardous substances such as heavy metals (chromium, cadmium, lead, etc.) as they are used.[6] Machine shops must also clean their machine tools to remove metal chips, tramp oil accumulations and to flush out metal working fluid sumps and reservoirs. Wash waters from shop cleanup may contain solvents, oils, grease and metal chips or swarf (*i.e.,* grinding wheel particles).[7] It is a fairly common practice for machine shops to discharge wastewaters to municipal sewers.[8]
Potential Nexus to Groundwater Contaminant Plume:	Harper-Lee currently operates at 425 N. McDonough Street a block east of well TW-08 where elevated levels of PCE were detected in 2001.[9] (See Figure 4) The sewer connections from this site flow east to McDonough Street and north to Randolph Street. The direction of flow in the sewer in McDonough Street is north to Pollard then west along Pollard to Court Street. The direction of flow of the sewer line in Randolph Street is west to Court Street. Both the Randolph Street and Pollard Street sewers meet in Court Street and their combined flow runs west across the rail lines and then north along the line of Lafayette Street toward the Montgomery Water Works and Sanitary Sewer Board Econchate treatment plant.[10] (See Figure 2) From about 1920 to 1949, Harper-Lee operated at 202 N. Court Street and 5-7 Madison Avenue which is located on the northeast corner of N. Court and Madison streets, in close proximity to Well TW-05 where elevated levels of BTEX and PCE were detected in 2001. (See Figure 3)
Key Details:	USEPA sent Harper-Lee Machine Works a Request for Information letter under Section 104(e) of CERCLA on May 3, 2010.

[5] American Society for Testing and Materials, "Handbook of Vapor Degreasing," 1962, pp. 2-5.

[6] Institute of Advanced Manufacturing Sciences, "Shop Guide to Reduce the Waste of Metal Working Fluids," n.d., p. 2.

[7] Institute of Advanced Manufacturing Sciences, "Shop Guide to Reduce the Waste of Metal Working Fluids," n.d., pp. 17-24.

[8] Solid & Hazardous Waste Education System, "Pollution Prevention for Machining, Cleaning, Degreasing, Finishing Operations for Metal Products," February 6, 2008, p. 1.

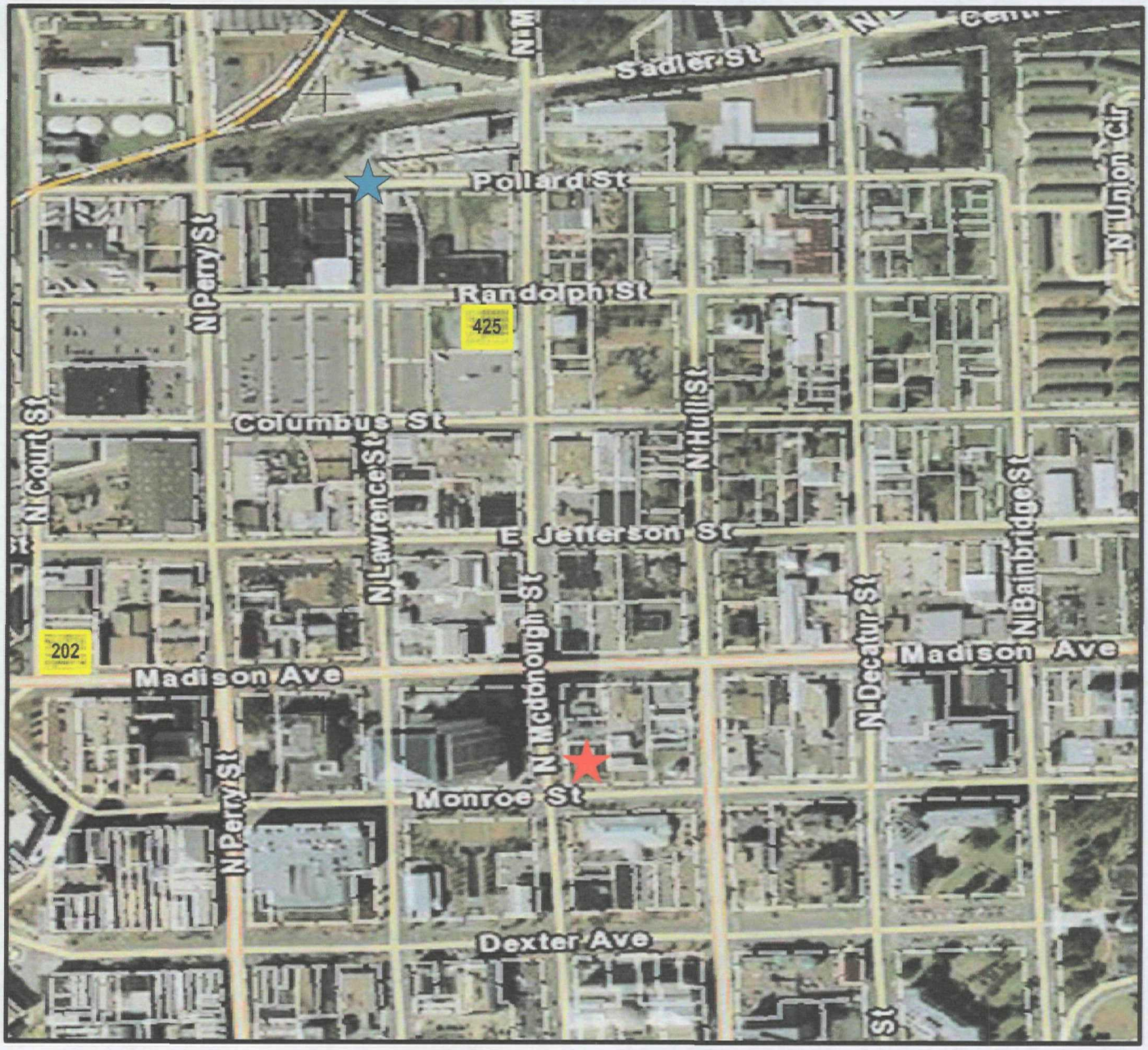
[9] Geosyntec Draft PCE Isopleth, February 3, 2012

[10] MWW&SSB Sewer map for the NW ¼ of Section 7, Township16N, Range 18E Plate 6807-2,102 (Attached to 104(e) response)

Company	HARPER-LEE MACHINE WORKS
	No response was found to the Section 104(e) Request for Information. • Harper-Lee Machine Works has operated for a total of more than 90 years at two locations within the plume area. • USEPA has documented that machine shops such as Harper-Lee are likely to have used and released chlorinated solvents in their operations. Given the long period of operations in the plume area, Harper-Lee Machine Works is likely to have contributed to solvent and/or petroleum-related contamination of the groundwater.
Corporate Succession:	Harper-Lee Machine Works, Inc. • Formed in Alabama on March 21, 1930 (Corp ID # 752-673) • Dissolved 12-31-1942 • Incorporator: B. W. Harper Between 1942 and 1985, Harper Lee Machine Works may have operated as a partnership, as indicated in the historical city and industrial directories. Harper-Lee Machine Works, Inc. again incorporated in Alabama on December 27, 1985 (Corp ID# 108-011) • Incorporator: Blake W. Harper, III Active – Annual revenue is less than $500,000.
Agent for Service:	Harper, Blake W III 425 N McDonough St Montgomery, AL 36104-2642 334-269-2363

Figure 1 – Site Locations

Harper-Lee Machine Works



Base Aerial: February 15, 2007, Aerials Express

Key to Symbols:

425 — Approximate Harper-Lee Facility Locations with Street Numbers

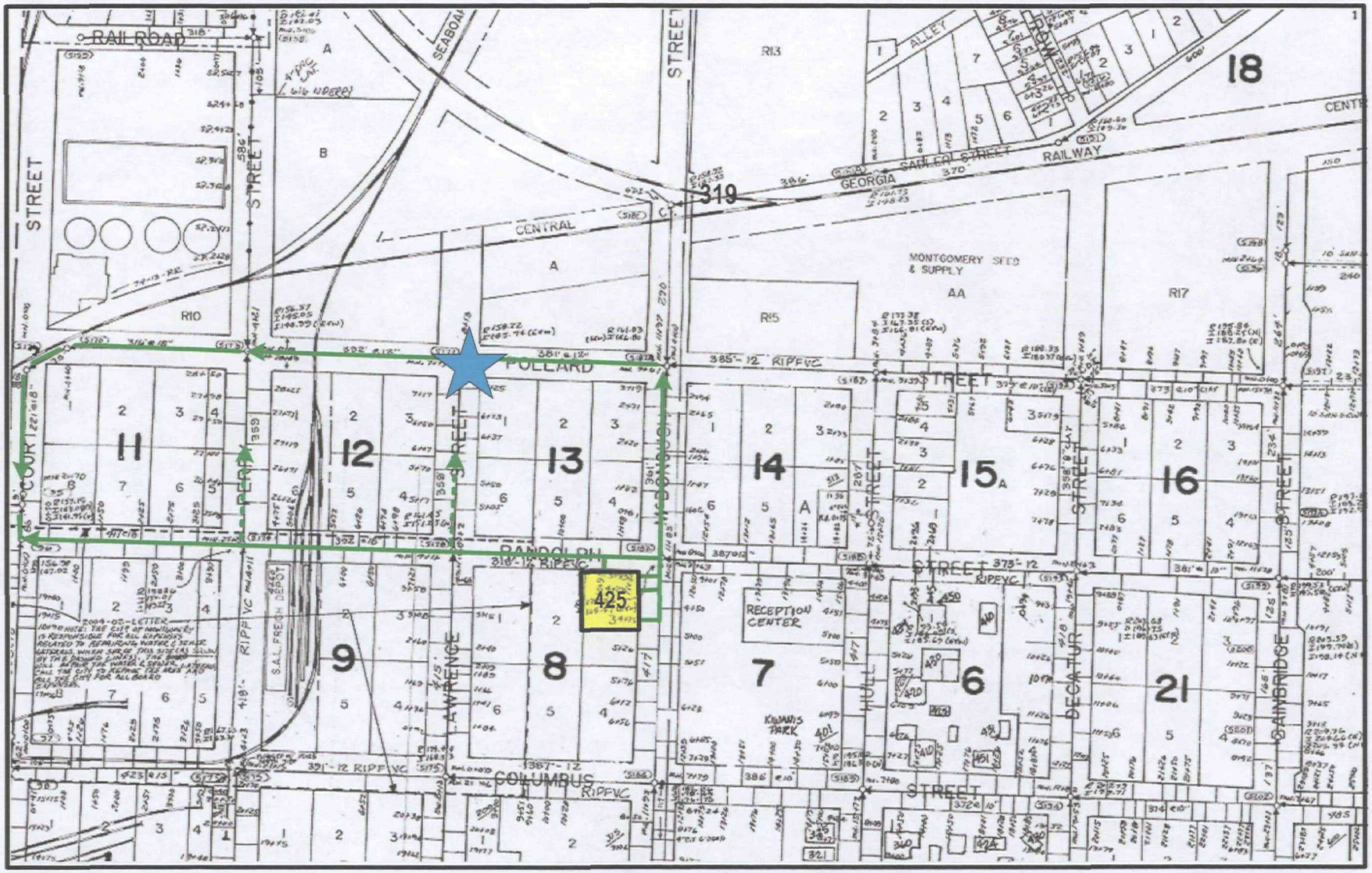
RSA Chiller Plant

Northern PCE Hotspot

Capital City Plume Superfund Site

Figure 2 – Sewer Map

Harper-Lee Machine Works



Sewer Map Plate 6807-2,102 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004

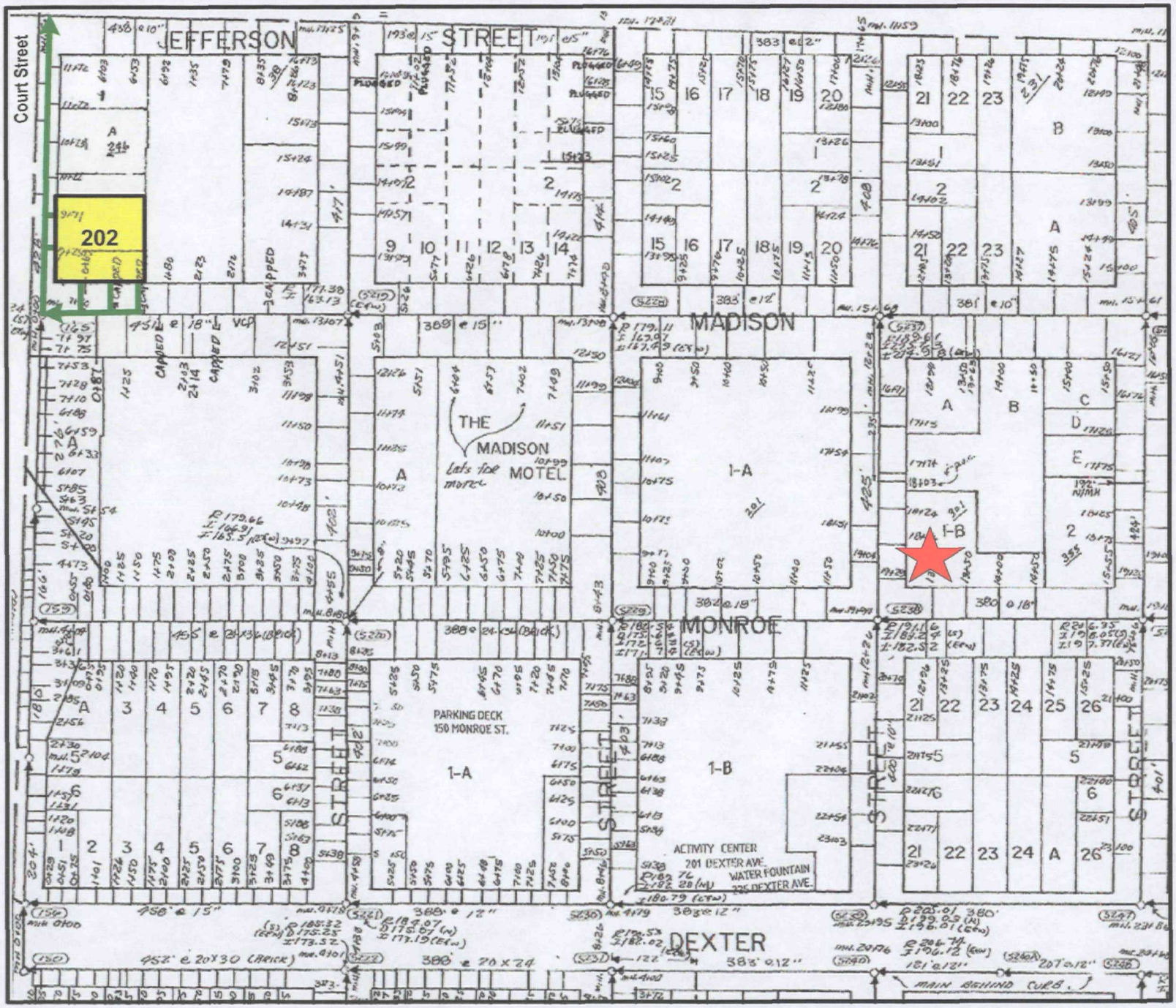
Key to Symbols:

425 — Approximate Harper-Lee Facility Locations with Street Numbers

★ — Northern PCE Hot Spot

— Sewer lines serving Harper-Lee Machine Works

Figure 9 – Sewer Map **Harper-Lee Machine Works**



Key to Symbols:

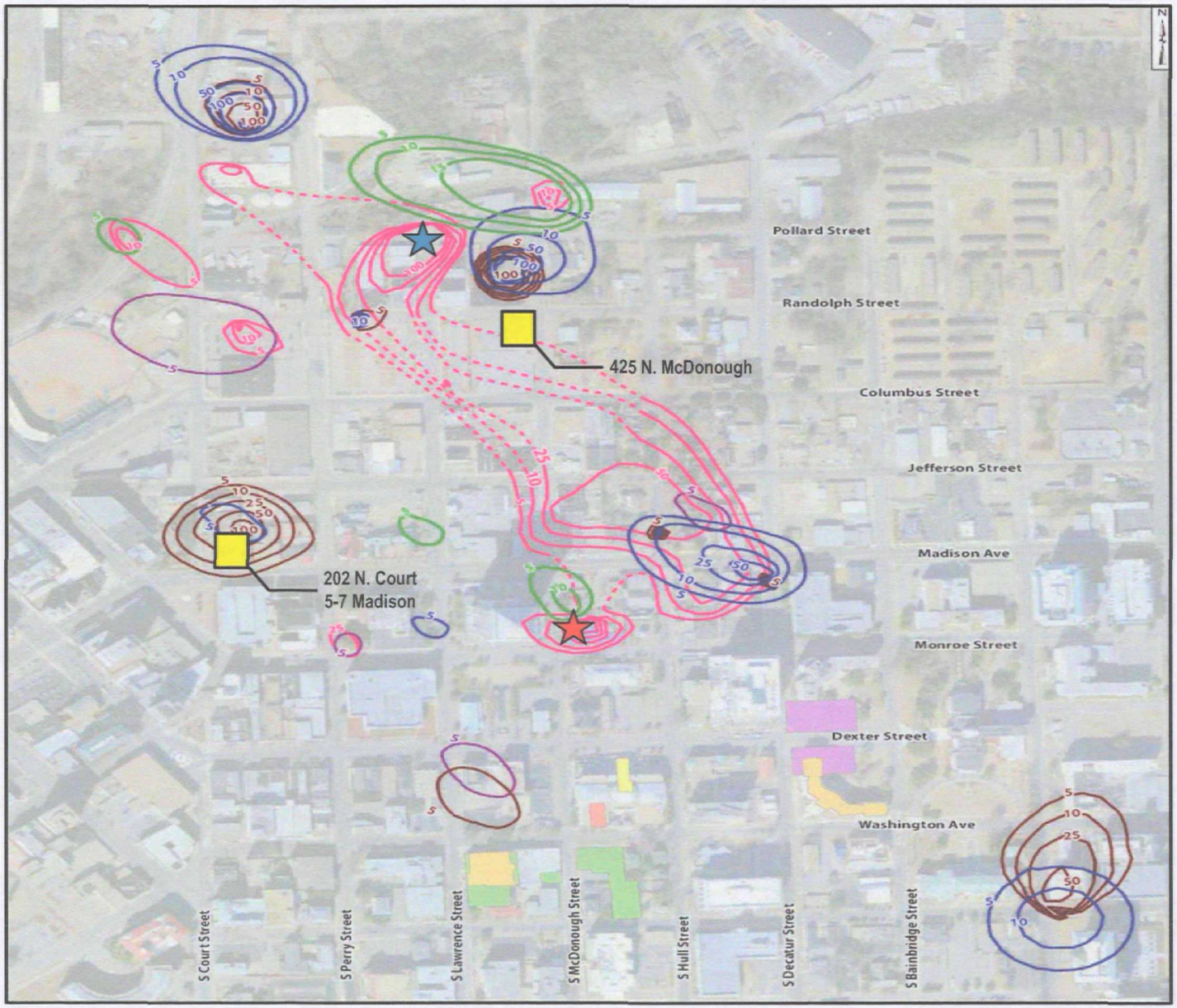
202

Approximate Harper-Lee Facility Locations with Street Numbers

RSA Chiller Plant

Sewer lines serving Harper-Lee Facility

Sewer Map Plate 6807-3,103 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 4 – Site Locations in Relationship to Contaminant Plumes

Harper-Lee Machine Works

Capital City Plume Superfund Site

Key to Symbols:

425 N. McDonough

Approximate Harper-Lee Facility Locations with Street Numbers

RSA Chiller Plant

Northern PCE Hotspot

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)

Company	BEARINGS & DRIVES OF ALABAMA, INC.
Address:	101 Pollard Street
Tenure:	1979 – Present
Operations:	Bearing & Drives of Alabama, Inc. ("Bearings & Drives") operates as a general industrial equipment service and repair shop. Bearing & Drives handles and repairs power equipment while also repairing and rebuilding industrial equipment, gear boxes and conveyor systems. In its Certificate of Incorporation, Bearings & Drives stated that part of its purpose was to engage in "repairing and reconditioning automobiles, automotive and mechanical products." [1] Bearing & Drives likely used chlorinated solvents and petroleum products such as lubricating oils and greases as part of their rebuild and repair operations. If automobiles are repaired on-site it is also likely that the company handles used crankcase oils and other automotive fluids such as brake fluid or antifreeze. Equipment and automotive repair and rebuild work frequently involves the use of chlorinated solvents to clean parts, prepare metals for welding or painting.[2] Cold cleaning, the more common method of using chlorinated solvents, involves wiping the part with a rag soaked in solvent (wipe cleaning), immersing the part in a tank filled with solvent solution (soak cleaning), or mixing the solvent with steam and spraying a part to strip away paint (steam gun cleaning).[3] Vapor degreasing, also used in preparing metal parts for machining and repairs, involves heating chlorinated solvents until they vaporize and placing the cool part within the vapor bath.[4] The vapors condense on the cooler part and remove the grease, oil, or contaminant from the metal surfaces.[5] Automotive repair shops are known to generate hazardous wastes including chlorinated solvents from cold solvent cleaning of parts such as carburetors; spray cleaning of brakes with aerosols containing PCE which can contaminate brake fluid; and waste crankcase oils.[6]

[1] Bearings & Drives Of Alabama, Inc., Certificate of Incorporation, July 27, 1979.

[2] Washington Department of Ecology, "Managing Hazardous Waste: A Guide for Automotive Repair Shops," May 2003.

[3] Cold Cleaning with Halogenated Solvents," American Society for Testing and Materials, 1966, pgs15-17.

[4] "Handbook of Vapor Degreasing," American Society for Testing and Materials, 1962, pgs 2-5.

[5] *Ibid.*

[6] Washington Department of Ecology, "Managing Hazardous Waste: A Guide for Automotive Repair Shops," May 2003.

Company	BEARINGS & DRIVES OF ALABAMA, INC.
Potential Nexus to Groundwater Contaminant Plume:	Located just west of wells CH2-SB3 and TW-13 which contained elevated levels of PCE when sampled in 1999 and 2001, respectively.[7] Given the duration of operations and the proximity to wells where PCE contaminated groundwater has been detected, it appears likely that Bearings and Drives may have contributed to this contamination.
Key Details:	No Section 104(e) Request for Information was sent to Bearings & Drives.
Corporate Succession:	• Formed in Alabama on July 27, 1979 (Corp ID# 057-647) • Active
Agent for Service:	Mark Atwell Bearings and Drives of Alabama, Inc. 101 Pollard St Montgomery, AL 36104 344-263-2011

[7] Geosyntec Draft PCE Isopleth, February 3, 2012.

Figure 1 – Site Locations

Bearings & Drives of Alabama, Inc.

Base Aerial: February 15, 2007, Aerials Express

Key to Symbols:

101 — Approximate Bearings & Drives Location with Street Number

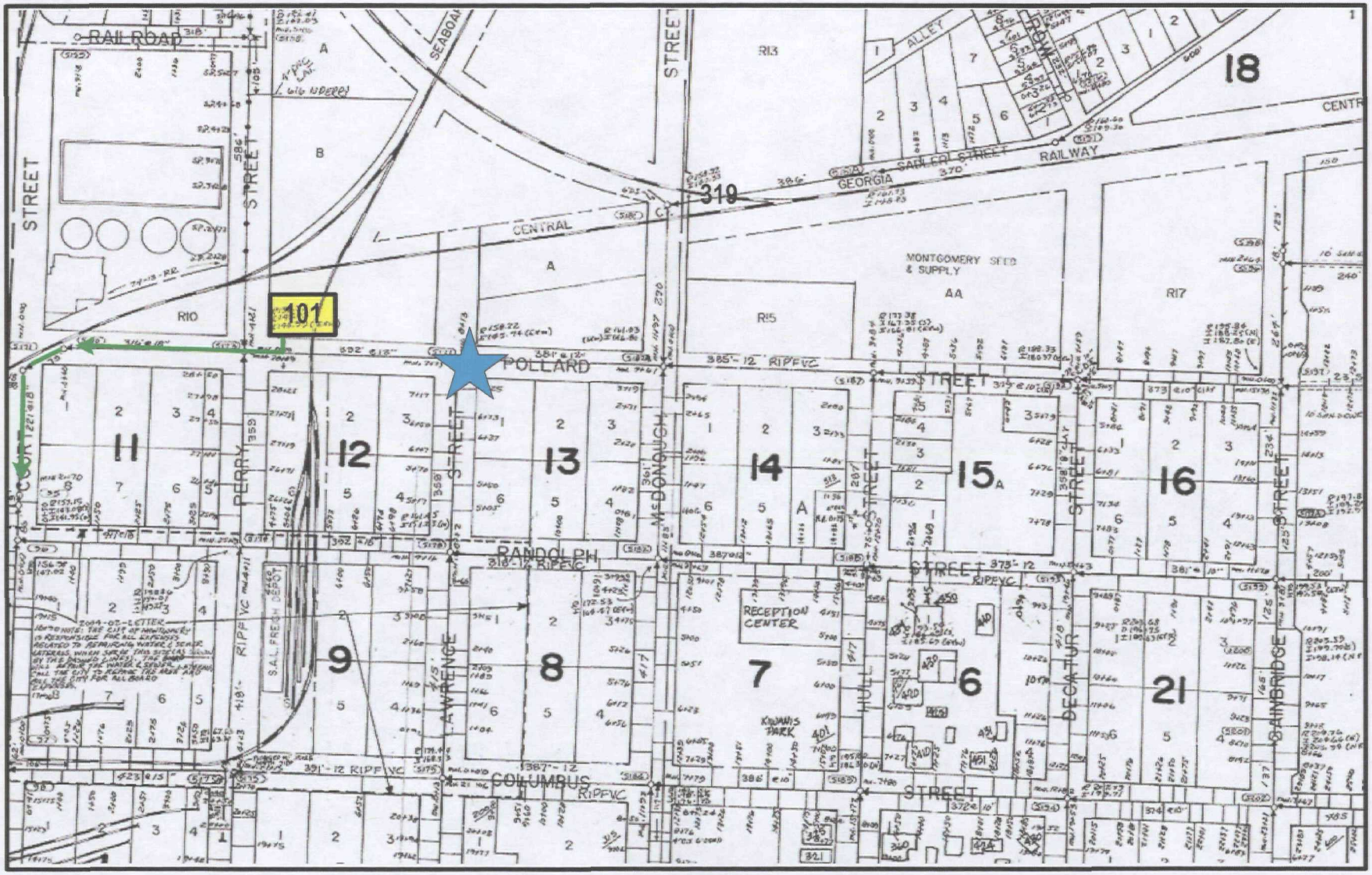
RSA Chiller Plant

Northern PCE Hotspot

Capital City Plume Superfund Site

Figure 2 – Sewer Map

Bearings & Drives Of Alabama, Inc.



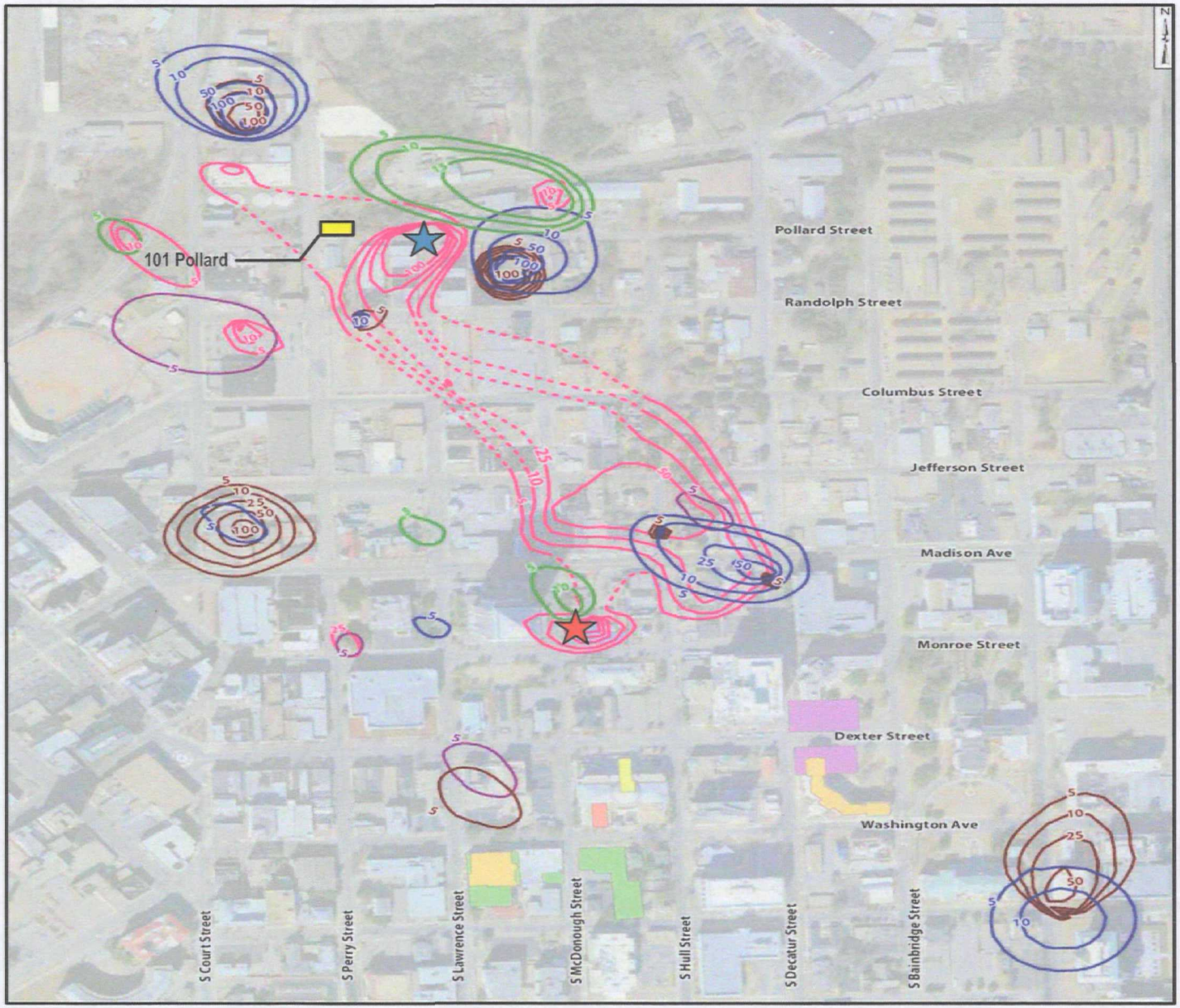
Sewer Map Plate 6807-2,102 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004

Key to Symbols:

101 — Approximate Bearings & Drives Facility Location with Street Number

★ — Northern PCE Hot Spot

Sewer lines serving Bearings & Drives



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 3 – Site Locations in Relationship to Contaminant Plumes

Bearings & Drives of Alabama, Inc.

Capital City Plume Superfund Site

Key to Symbols:

101 Pollard

Approximate Bearings & Drives Facility Locations with Street Number

RSA Chiller Plant

Northern PCE Hotspot

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)

Company	THE KERSHAW COMPANY, INC.
Address:	210 Pollard Street
Tenure:	210 Pollard Street 1940 to 1953
Operations:	The Kershaw Company, Inc. ("Kershaw") manufactured railroad track maintenance equipment at 210 Pollard Street. (See Figure 1) The company began manufacturing railroad equipment in 1940 in a small shop on Pollard Street and after rapid growth, it moved to a new plant and office on Fairview Avenue in 1953. The types of railroad equipment made included the Kershaw Ballast Regulator, Scarifier and Plow; the Kershaw Track Broom; the Kershaw Jack-all; the Kershaw Kribber; and the Kershaw Track Crane among others.[1] In April 1945, Kershaw entered into an agreement with the trustee of the Central of Georgia Railway for use of the spur tracks south of Pollard Street and east of Lawrence Street.[2] A 1950 Sanborn map depicts a small structure adjoining the railroad right of way as 210 Pollard.[3] A 1952 Montgomery industrial directory indicates that Kershaw Manufacturing Company manufactured railroad machinery at 210 Pollard with 10 to 25 employees.[4] Manufacture of heavy machinery such as that made by Kershaw involves metal fabricating including metal cutting and forming, metal cleaning and metal finishing or painting. All of these industrial processes may involve the use of chlorinated solvents. It is also likely that the company used petroleum lubricants and fuels in its operations.[5]
Potential Nexus to Groundwater Contaminant Plume:	Kershaw operated near wells: • CH2-SB-3 that showed elevated levels of PCE in 1999 • TW-13 that showed elevated levels of PCE in 2001 • TW-09 that showed elevated levels of PCE in 2001 The available sewer maps do not show a present day connection from the property formerly known as 210 Pollard Street, but adjacent properties are tied into the sewer line in North Lawrence Street that flows north to Pollard Street then west along Pollard to Court Street. Given the close proximity of this property to the PCE hotspot at the intersection of North Lawrence and Pollard streets, it appears likely that Kershaw may have contributed to the groundwater contamination in the area.

1 "Kershaw Manufacturing Co. Turns Out Maintenance Equipment for Railroads," *Montgomery Advertiser,* April 29, 1956.

2 Agreement between Central of Georgia Railroad and The Kershaw Company, April 30, 1945. [From Norfolk Southern Corporation Section 104(e) Response, EPA barcode 10789859 page 107 of 519 and map following.]

3 Sanborn map, Sheet 102, 1950.

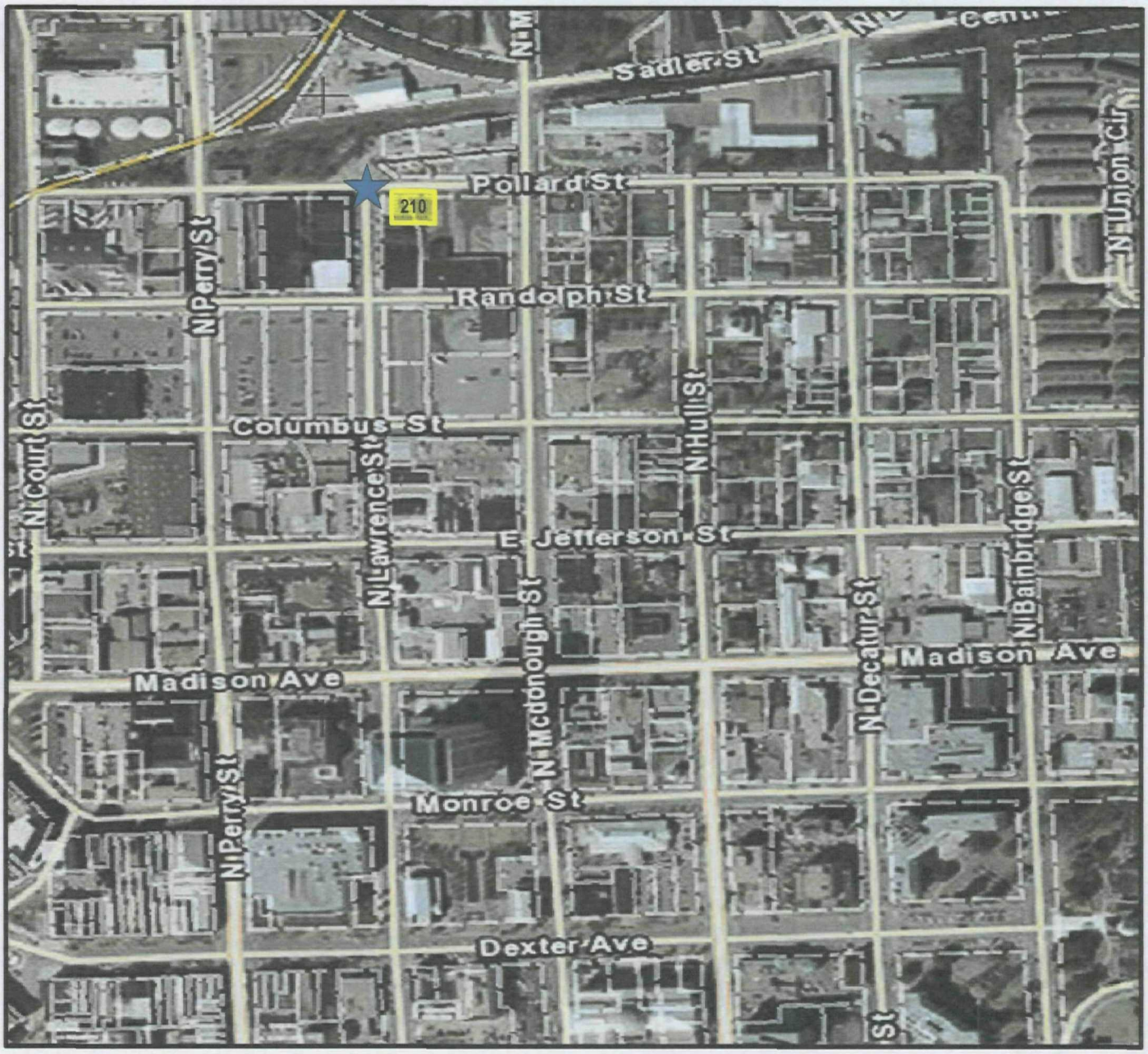
4 *Industrial Directory of Montgomery,* 1952, p. 14.

5 USEPA, "Profile of the Fabricated Metal Products Industry," September 1995, p. 24.

Company	THE KERSHAW COMPANY, INC.
Key Details:	• **1940-1953** – Railroad maintenance equipment manufacture at Pollard Street facility. • **2009** – The current day company plant in Montgomery still manufactures railroad maintenance equipment and is a RCRA small quantity generator (ALR000046516). Wastes generated at the current plant include: spent solvents and paint waste (2,500 lbs per year); used oil generated on-site (2,000 lbs per year).[6] It is likely that the former plant in the study area also generated hazardous wastes that may have been released to the soil and/or groundwater.
Corporate Succession:	Royce Kershaw, Sr. formed a number of companies related to railroad contracting and railroad equipment manufacture. All of the companies appear to be closely held private companies. • The Kershaw Company Inc., formed in Alabama on February 29, 1944 (Corp ID# 010-673) • 1952 – Name changed to The Kershaw Manufacturing Company, Inc. • 1983 – Sold out to Knox Kershaw, Inc. • Royce Kershaw Company, Inc. formed in Alabama on April 29, 1946 (Corp ID# 101-674) • 1983 – Name changed to Knox Kershaw, Inc. • Active
Agent for Service:	J. Kershaw, Secretary Knox Kershaw, Inc. 11211 Trackwork Street Montgomery, AL 36117-6501 334-387-5669

[6] Notification of Regulated Waste Activity, September 4, 2009 (ADEM Master ID# 38098)

Figure 1 – Site Locations **The Kershaw Company, Inc.**



Base Aerial: February 15, 2007, Aerials Express

Key to Symbols:

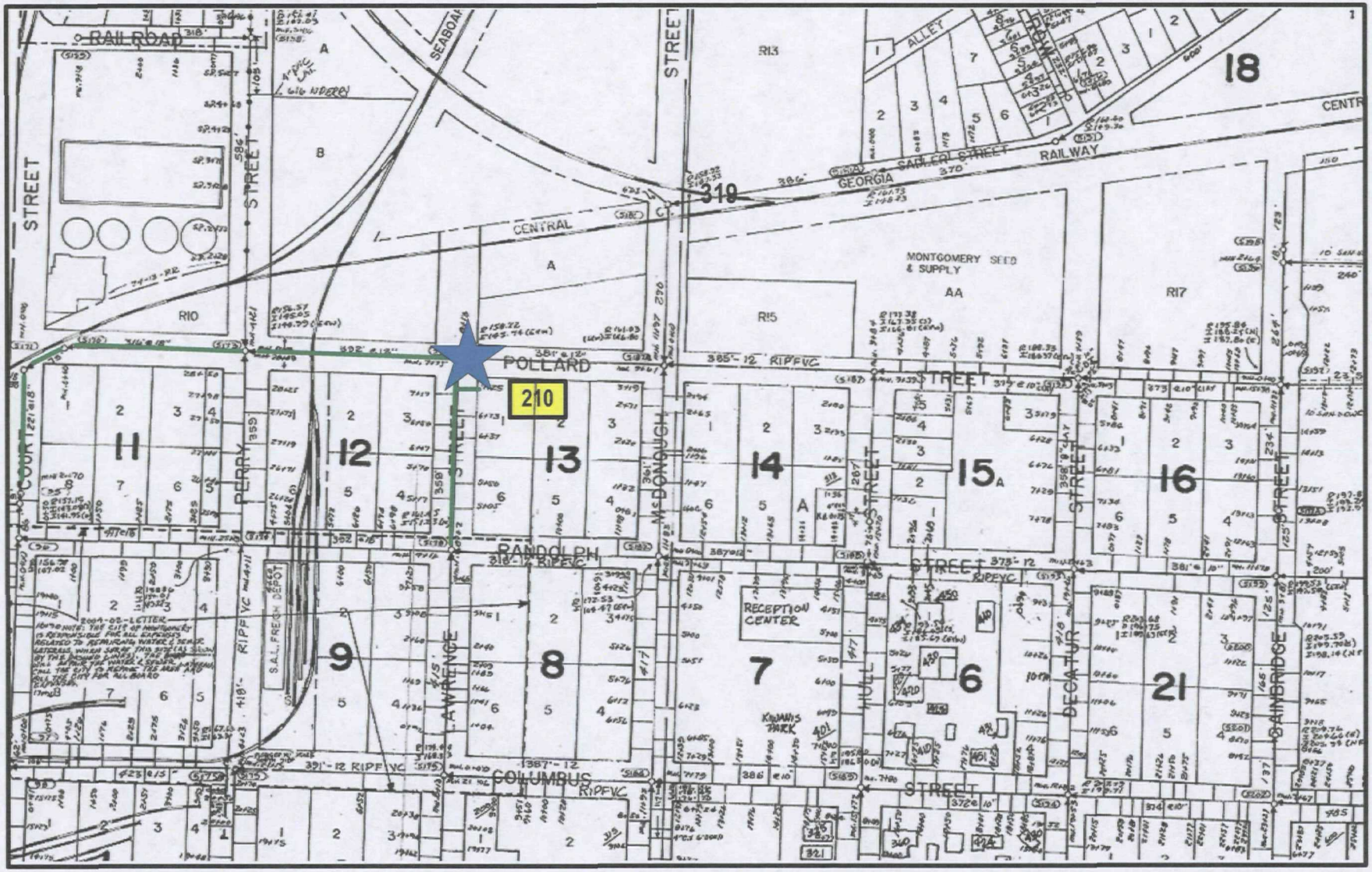
210 — Approximate Kershaw Facility Locations with Street Number

★ — Northern PCE Hotspot

Capital City Plume Superfund Site

Figure 2 – Sewer Map

The Kershaw Company, Inc.



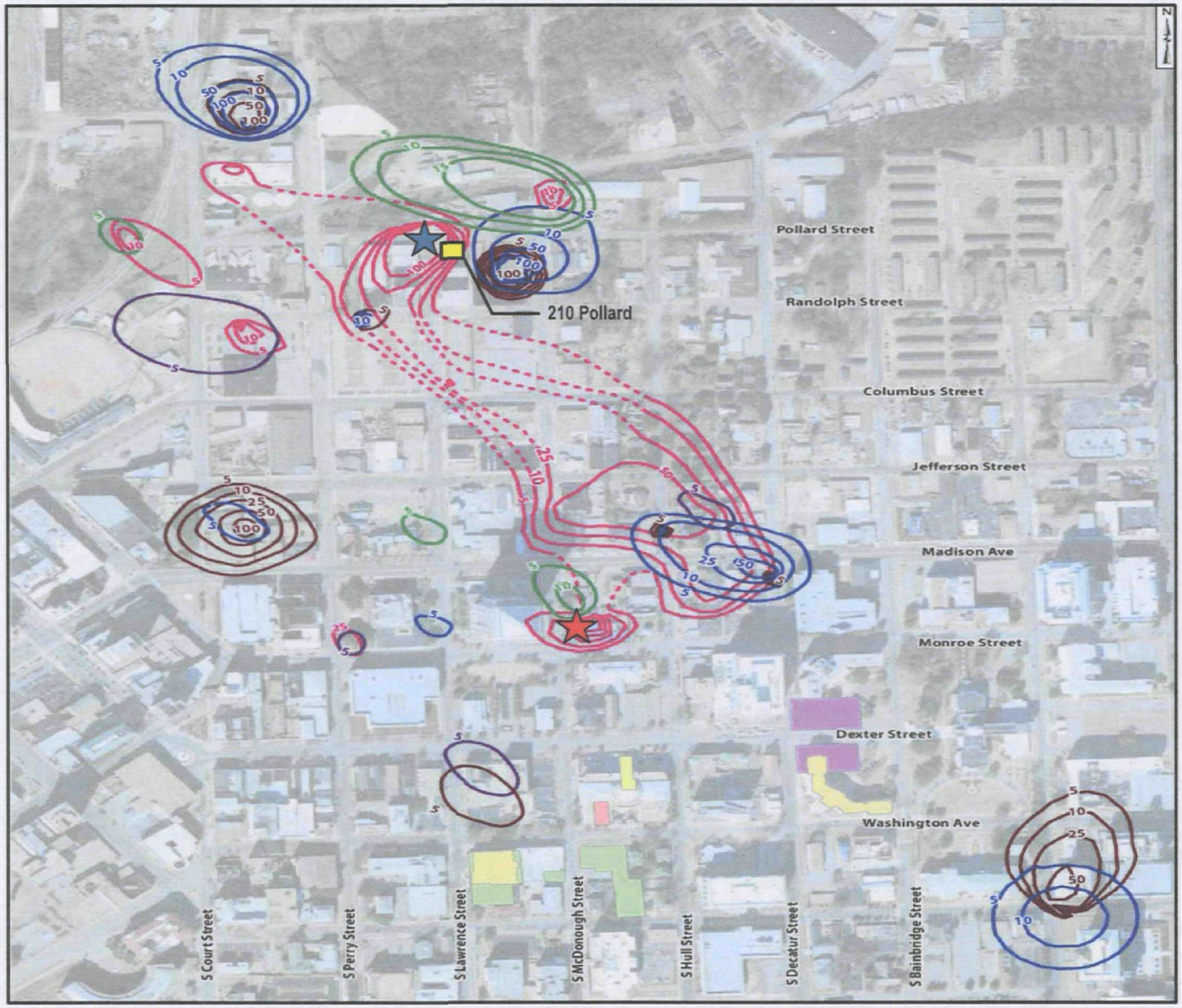
Sewer Map Plate 6807-2,102 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004

Key to Symbols:

500 — Approximate Kershaw Facility Locations with Street Number

★ — Northern PCE Hot Spot

Sewer lines serving Kershaw



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 3 – Site Locations in Relationship to Contaminant Plumes

The Kershaw Company, Inc.

Capital City Plume Superfund Site

Key to Symbols:

210 Pollard

Approximate Kershaw Facility Location with Street Number

RSA Chiller Plant

Northern PCE Hotspot

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)

SUBSIDIARY SUPPLIES OTHER ITEMS

Kershaw Manufacturing Co. Turns Out Maintenance Equipment For Railroads

Track maintenance equipment for the world's railroads and power lawn mowers and attic fans for homes are the products manufactured by Kershaw Manufacturing Co. of Montgomery and its subsidiary, Jackson Manufacturing Co.

Kershaw equipment currently is in use on railroads throughout the world. The revolutionary new machines perform track maintenance jobs formerly done by hand labor, and do them better, faster and more economically.

The Kershaw Ballast Regulator, Scarifier And Plow; the Kershaw Track Broom the Kershaw Jackall, the Kershaw Kribber, the Kershaw Track Crane and many other Kershaw maintenance machines are manufactured exclusively in Montgomery for use throughout the world.

Jackson Manufacturing Co., controlling interest of which is owned by Kershaw Manufacturing Co., makes and distributes electric and gasoline powered lawn mowers and attic fans.

These high-quality fans and power mowers are retailed in many parts of the United States and are manufactured at the Jackson plant in Montgomery.

Royce Kershaw, president of both Kershaw and Jackson Manufacturing Co., has been in the railroad contracting business since 1924 and still operates The Royce Kershaw Company, railroad contractors. His father, the late C. G. Kershaw, was one of the real pioneers in the railroad contracting business, having started in 1904.

During World War II, when the Royce Kershaw Co. was building and reconditioning track, a shortage of labor severely handicapped operations. Kershaw then invented and developed several machines to do the work of the non-existant labor.

When railroad men saw the fantastic operations of these machines, they expressed interest in obtaining them, and Kershaw Manufacturing Company was born.

The company first went into the manufacturing business in 1940, operating in a small shop located on Pollard Street. Sales rapidly multiplied until it became necesary for a major plant expansion.

Kershaw Manufacturing Co. moved into its modernistic office and plant on Fairview Avenue in 1953. Since then, two expansions to the building have been necessary to keep up with the production schedule.

Kershaw Manufacturing Co. purchased controlling interest in Jackson Manufacturing Co. in 1955. The Jackson plant, located only a stones throw from the Kershaw plant on West Fairview, also manufactures the Kershaw Track Broom, one of the 16 machines in the Kershaw Line of track maintenance equipment.

CAPSULE VIEW

Rapid Expansion Under Way In Power, Coal, Petroleum

'Sounding Boar Originating In M

The fourth in a series of coast-to-coast radio programs originating in Montgomery in the Ball Room of the Jefferson Davis Hotel will be taped for distribution by the Mutual network Monday at 8 p.m.

Christopher King's "Sounding Board," an audience participation show which is offered to Mutual's 565 stations throughout the nation, gives Montgomery, Ala., and the South in general subtle, but thoroughly effective, plugs.

The half-hour program will originate in Montgomery for eight weeks and is tape-recorded each Monday for national distribution. Local listeners can hear the forum-type, audience participation show at 6:30 p.m. each Saturday.

Sponsored jointly by the Montgomery Chamber of Commerce and the Alabama State Publicity Department, King's "Sounding Board" features two national or state-wide personalities taking opposite views on a given topic. These two persons get three minutes each at the beginning of the program to express their views on the subject and they then serve

Knox Kershaw Inc.

Alabama Governor
Bob Riley (left) and
Knox Kershaw (right)

Kershaw Family Tradition

Based in Montgomery, Alabama Knox Kershaw Inc. was started in 1924 by Royce Kershaw, Sr. as the Royce Kershaw Company. The name was changed in 1983 when his son, Knox Kershaw, bought it in a sell out agreement with Kershaw Manufacturing.

When the company was started, Royce Kershaw, Sr. specialized in railroad track construction. By 1956 the company had built, reconditioned, or removed over four thousand miles of track throughout the United States.

During WWII, Royce Kershaw Sr. invented the ballast regulator and cribbing machine as a solution to the labor shortages. In 1946 he diverted part of his energies from the Royce Kershaw Company to the design and development of railway trackwork machinery.

In this venture he organized Kershaw Manufacturing Company, Inc. and devoted most of his efforts to manufacturing, using the Royce Kershaw Company to provide service to those railroads that preferred to contract this work, rather than buy and operate the equipment themselves. It wasn't until 1983, when it became Knox Kershaw Inc. that the company began developing and manufacturing equipment under its own name.

In 1993, Knox Kershaw Inc. introduced the first KBR 900 Ballast Regulator. The introduction of this revolutionary machine put Knox Kershaw Inc. on the map, earning the company the reputation of being an innovative manufacturer of quality railroad equipment.

Today, Knox Kershaw Inc. is in the business of manufacturing and remanufacturing railway track maintenance machines and spare parts for both domestic and international customers all over the world. Operating in a state of the art facility, Knox Kershaw Inc. employees use their extensive experience in the industry to manufacture cutting edge, high quality equipment with emphasis on customer service and efficiency.

The company is not only a leader in the railroad maintenance equipment industry, but also a pillar of the local community, supporting causes that improve the city of Montgomery and provide jobs to over 100 citizens of Alabama. Knox Kershaw Inc. was recognized for its important role in the state when the company received the award of Alabama Manufacturer of the Year in 2008 by the Business Council of Alabama.

In 2011, the company secured its future as a family business when two of Mr. Kershaw's children came to work for Knox Kershaw Inc. in the Sales and Marketing departments.

The business of Knox Kershaw Inc. consists of the following:

Manufacturing the following equipment, designed by Knox Kershaw Inc.
KBR-850 Ballast Regulator
KBR-875 Ballast Regulator and/or Snow Fighter
KBR-885 Ballast Regulator and/or Snow Fighter
KBR-925 Ballast Regulator and/or Snow Fighter
KTC-1200 Tie Handling Crane
KYC-500 Yard Cleaner
KDB-600 Double Broom
KPB-200 Plate Broom
KSU-300 Switch Undercutter
KKA-1000 Kribber Adzer
KAT-800 Material Transporter
KUV-750 Rail Utility Vehicle & Personnel Carrier
KTR-400

Parts and Kits:

Manufacturing of improved performance kits for Kershaw (Progress Rail) machines.
Replacement parts for Knox Kershaw and Progress Rail/Kershaw Mfg. Co. machinery.
Replacement parts for Plasser and Kershaw Undercutting machines.

Remanufacturing of:

All Knox Kershaw Inc. equipment
Kershaw Ballast Regulators
Double Brooms
Kershaw Yard Cleaners
Kershaw Switch Undercutters
Kershaw Undercutter Ballast Cleaners
Plasser RM76 & RM80 Undercutter Ballast Cleaner

Our current customers are:

Norfolk Southern

CSX
Burlington Northern Santa Fe
Florida East Coast
Union Pacific
Canadian Pacific
Canadian National
Kansas City Southern
Amtrak
and many shortlines and contractors.

The Knox Kershaw Inc managers.

51 - 000038098

Please print or type in the *unshaded* areas only

ADEM Form 8700-12 (8/04m2)

Please refer to the *ADEM Form 8700-12 Notification Form Instructions* before completing this form. Information requested here is required by law (§ 3010 of the *Resource Conservation and Recovery Act*).

ADEM Notification of Regulated Waste Activity

Alabama Department of Environmental Management

(for ADEM Use Only)

9/4/2009

I. Notification Class *(Check appropriate box and enter ID number, if known.)*

[X] Initial Notification [ ] Annual Notification

Facility's EPA ID Number: ALR000046516

II. Operating Name of Facility *(Include company and specific site name)*

Knox Kershaw Inc

Operating Name of Facility *(Continued)*

III. Change of Facility Name? [X] No Yes [ ] *(If Yes, enter previous name of Facility below.)*

IV. Location of Facility *(Physical address not P. O. Box or Route Number)*

Street

11211 Trackwork Street

City or Town | **State** | **Zip Code**

Montgomery | AL | 36117-

V. Geographic Location *(See Instructions)*

Method | **Latitude** | **Longitude**

COS | 32 39 69.030 N | 086 10 34.150 W

County Name

Montgomery

VI. Facility Contact *(Person to be contacted regarding waste activities at site)*

Name *(First)* Michael | *(Last)* McKee

Job Title Supervisor | **Phone Number** *(Area Code and Number)* 334-387-5669 Ext. 219

Contact Email Address *(Optional)*

mmckee @ Knox Kershaw.com

VII. Facility Mailing Address *(See Instructions)*

Street or P. O. Box

Same

City or Town | **State** | **Zip Code**

VIII. Description of Facility Processes *(See instructions for NAICS Code listings)*

A. Facility Process In the space provided below, describe each of the processes at your facility that produce Regulated Wastes.

1. Railroad Maint Equip Mfg
2. Painting of Mfg R.R. Equipment
3.
4.
5.

RECEIVED SEP 2009 ADEM ENVIRONMENTAL DATA SECTION

3. NAICS Codes: Enter the six-digit North American Industry Classification System (NAICS) Code of the overall production, distribution, or service activity of your site. Also, provide any additional NAICS Codes that describe the specific industrial processes that are used.

Primary	2	3	4	5
336510				

Continued on Next Page

Please print or type in the unshaded areas only

ADEM Form 8700-12 (10/03)

IX. Ownership (See Instructions)

A. Legal Name of Facility

Knox Kershaw Inc

B. Name of Facility's Legal Owner

Knox Kershaw

Street, P. O. Box or Route Number

4501 Taylor Road

City or Town | State | Zip Code

Montgomery | AL | 36117-

Phone Number (Area Code and Number) | C. Land Type | D. Owner Type | E. Operator Type | Change of Owner Indicator | Date Changed Month Day Year

334-387-5669 | P | P | P | Yes [X] No [ ] | [ ] [ ] [ ] [ ] [ ] [ ]

F. Name of Facility's On-Site Operator

SAME

Street, P. O. Box or Route Number

City or Town | State | Zip Code

Phone Number (Area Code and Number)

[ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] [ ] Ext.

G. Name of Facility's Parent Company

SAME

Street, P. O. Box or Route Number

City or Town | State | Zip Code

Phone Number (Area Code and Number) | Change of Owner Indicator | Date Changed Month Day Year

[ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] [ ] Ext. | Yes [ ] No [ ] | [ ] [ ] [ ] [ ] [ ] [ ]

H. Name of Facility's Property Owner

SAME

Street, P. O. Box or Route Number

City or Town | State | Zip Code

Phone Number (Area Code and Number) | Change of Owner Indicator | Date Changed Month Day Year

[ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] [ ] Ext. | Yes [ ] No [ ] | [ ] [ ] [ ] [ ] [ ] [ ]

Facility's EPA ID Number

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

(Continued on Next Page)

X. Certification Status

Note: Pursuant to Rules 335-1-6 of the ADEM Administrative Code, all Notification Forms submitted to the Department must include the appropriate certification fee in order to be complete.

During at least 1 month of the year, this facility will operate and/or maintain: *(Check all that apply)*

A. Hazardous Waste Activities *(Attach Schedule A)*

1. ☐ Large Quantity Generator ≥ 2,200 lbs/month (≥ 1,000 kg/month)
2. ☒ Small Quantity Generator between 221 and 2,199 lbs/month (between 101 and 999 kg/month)
3. ☐ Conditionally Exempt Generator ≤ 220 lbs/month (≤ 100 kg/month)

(Note: Household generation is exempt under 335-14-2-.01(4)(b)1.)

4. ☐ Transporter/Transfer Facility
5. ☐ Treatment Facility – Combustion
6. ☐ Treatment Facility – Other than Combustion
7. ☐ Storage Facility
8. ☐ Disposal Facility

B. Used Oil Activities *(Attach Schedule B)*

1. ☒ Generator (≥ 25 gallons/month)
2. ☐ Transporter/Transfer Facility
3. ☐ Processor/Re-refiner
4. ☐ Fuel Marketer
5. ☐ Burner

C. Universal Waste Activities *(Attach Schedule C)*

1. ☐ Universal Waste Transporter
2. ☐ Large Quantity Handler ≥ 11,020 lbs (≥ 5,000 kg)
3. ☐ Small Quantity Handler <11,020 lbs (< 5,000 kg)

Any ADEM Form 8700-12 submitted without all appropriate waste schedules and certification fees will not be processed.

XI. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature	Name and Official Title *(Type or Print)*	Date Signed
Michael McCue	Production Supervisor	8-31-09

XII. Comments

	Date Processed (for Official Use Only)

Mail completed form, a check or money order for all appropriate certification fees, and all necessary schedules and attachments to:

Alabama Department of Environmental Management
Permits & Services Division
P. O. Box 301463
Montgomery, AL 36130-1463

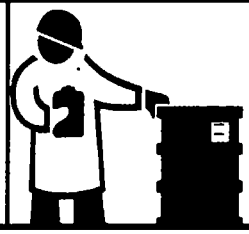
Facility's EPA ID Number

Please print or type in the unshaded areas only

ADEM Form 8700-12 A(8/04)

(for ADEM Use Only)

Please refer to the *ADEM Form 8700-12 Notification Form Instructions* before completing this form. Information requested here is required by law (§ 3010 of the *Resource Conservation and Recovery Act*).



ADEM Form 8700-12

Schedule A

Certification of Hazardous Waste Management

I. Type of Hazardous Waste Activity *(Mark 'X' in the appropriate boxes; See Instructions)*

[x] **A. Hazardous Waste Generator**
- [ ] 1. 2,200 lbs *(1,000 kg)* per month or more *(LQG)*
- [X] 2. 221 to 2,199 lbs *(101 - 999 kg)* per month *(SQG)*
- [ ] 3. 220 lbs *(100 kg)* per month or less *(CESQG)*
- [ ] 4. United States Importer of Hazardous Waste

[ ] **B. Hazardous Waste Transporter/Transfer Facility** ††
- [ ] 1. Commercial Transporter *(received wastes from others)*
  - [ ] a. Air
  - [ ] b. Rail
  - [ ] c. Highway
  - [ ] d. Water
  - [ ] e. Other *(Specify)* _____
- [ ] 2. Self Transporter *(Own Waste Only)*
- [ ] 3. Transfer Facility
  - [ ] a. Loaded trucks
  - [ ] b. Off-loaded containers
  - [ ] c. Bulk Transfer between vehicles

[ ] **C. Treatment, Storage, Disposal Facility** (at Facility) ††
- [ ] 1. Facilities subject to Permit
  - [ ] a. Operating Units
  - [ ] b. SWMU CA
  - [ ] c. Post Closure Care
  - [ ] d. Other *(Specify)* _____
- [ ] 2. Permit Exempt Treatment *(subject to ADEM verification)*
  - [ ] a. WWTU/ENU
  - [ ] b. Recycling Unit
  - [ ] c. TETF
  - [ ] d. Generator Evaporation
  - [ ] e. Generator Physical Processing
  - [ ] f. Other *(Specify)* _____

[ ] **D. Hazardous Waste Fuel Activity** ††
- [ ] 1. Blender Marketing to Burner
- [ ] 2. Other Marketers
- [ ] 3. Boiler and/or Industrial Furnace
  - [ ] a. Smelter Deferral
  - [ ] b. Small Quantity Exemption

[ ] **E. Recycling Activities** *(Specify)* _____

†† **NOTE:** *A permit may be required for this activity. Contact (334) 271-7730 for more information.*

II. Hazardous Waste Generation

A. Waste Description *In the space provided, list the types of regulated waste typically generated or handled by your Facility.* Attach additional sheets as necessary.

	Types of Waste Generated	Estimated Yearly Generation *in lbs.*
1.	Waste Paint Related Materiel (Spent Solvents and Paint Waste)	2,500
2.		
3.		
4.		

B. Characteristics of Nonlisted Hazardous Wastes. *[Mark 'X' in the boxes corresponding to the characteristics of nonlisted hazardous wastes your Facility handles; See 335-14-2-.03(1) - (5). Additional spaces are available on the Supplemental page if you need to list more hazardous waste numbers.]*

1. Ignitable (D001)	2. Corrosive (D002)	3. Reactive (D003)	4. Toxicity Characteristic	(List specific EPA hazardous waste number(s) for the Toxicity characteristic contaminant(s))			
X				D001	D035	D	D
D	D	D	D	D	D	D	D
D	D	D	D	D	D	D	D
D	D	D	D	D	D	D	D

C. Listed Hazardous Wastes. *[See 335-14-2-.04(2) - (4)]; Attach the Supplemental page if you need to list more hazardous waste numbers.*

1	2	3	4	5	6
F003	F005				
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24

(Continued on Next Page)

Facility's EPA ID Number

II. Hazardous Waste Generation *(continued)*

25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66

III. Hazardous Waste Transporter/Transfer Facility

During a typical year, this facility transports/transfers 0 *(quantity in pounds)* of Hazardous Waste.

IV. Treatment, Storage, Disposal Facility *(at Facility)*

During a typical year, this facility treats 0 *(quantity in pounds)* of Hazardous Waste.

During a typical year, this facility stores 0 *(quantity in pounds)* of Hazardous Waste.

During a typical year, this facility disposes 0 *(quantity in pounds)* of Hazardous Waste.

V. Hazardous Waste Fuel Activity

During a typical year, this facility markets 0 *(quantity in pounds)* of Hazardous Waste.

During a typical year, this facility combusts 0 *(quantity in pounds)* of Hazardous Waste.

VI. Recycling Activity

During a typical year, this facility recycles 0 *(quantity in pounds)* of Hazardous Waste.

Note: In order for this schedule to be accepted by ADEM, it must be attached to a completed Notification of Regulated Waste Activity, ADEM Form 8700-12, and must include the appropriate certification fees, as required by 335-1-6.

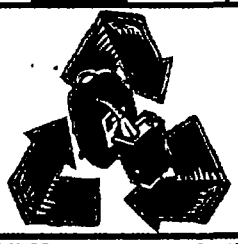
Comments:

Please print or type in the unshaded areas only

ADEM Form 8700-12 B(8/04)

(for ADEM Use Only)

Please refer to the *ADEM Form 8700-12 Notification Form Instructions* before completing this form. Information requested here is required by law (§ 3010 of the *Resource Conservation and Recovery Act*).



ADEM Form 8700-12

Schedule B

Certification of Used Oil Management

I. Type of Used Oil Management Activity *(See Instructions)*

- [X] **A. Used Oil Generator/Collector**
  - [X] 1. On-site Generation Only
  - [ ] 2. Do-it-yourself Collection Center (i.e., from off-site source)
  - [ ] 3. Collection Center (i.e., from off-site source)
  - [ ] 4. Aggregation Point (i.e., from off-site source)
- [ ] **B. Used Oil Fuel Marketer**
  - [ ] 1. Directs Shipment of Used Oil to Off-Specification Burner
  - [ ] 2. First Claims Used Oil Meets Specifications
  - [ ] 3. Burns Only Used Oil Generated On-site as On-Specification Fuel
- [ ] **C. Off-Specification Used Oil Fuel Burner**
  - [ ] 1. Burns Only Off-Specification Used Oil Generated On-Site
  - 2. Indicate Type(s) of Devices
    - [ ] a. Utility Boiler
    - [ ] b. Industrial Boiler
    - [ ] c. Industrial Furnace
- [ ] **D. Used Oil Transporter ††**
  - [ ] 1. Only For Used Oil Generated On-site
  - [ ] 2. Operates a Transfer Facility
- [ ] **E. Used Oil Processor/Re-refiner**

†† **NOTE:** *A permit is required for this activity. Contact (334) 271-7758 for more information*

II. Used Oil Generation

During a typical year, this facility collects/generates 2000 *(quantity in pounds)* **of Used Oil.**

III. Used Oil Fuel Marketer

During a typical year, this facility markets 0 *(quantity in pounds)* **of Used Oil.**

IV. Used Oil Burner

During a typical year, this facility burns 0 *(quantity in pounds)* **of Used Oil.**

V. Used Oil Transporter

During a typical year, this facility transports 0 *(quantity in pounds)* **of Used Oil.**

VI. Used Oil Processor/Re-refiner

During a typical year, this facility processes/re-refines 0 *(quantity in pounds)* **of Used Oil.**

Note: In order for this schedule to be accepted by ADEM, it must be attached to a completed Notification of Regulated Waste Activity, ADEM Form 8700-12, and must include the appropriate certification fees, as required by 335-1-6.

Comments:

Facility's EPA ID Number

ONIS "TREY" GLENN, III
DIRECTOR

BOB RILEY
GOVERNOR

Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2059 • Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700
FAX (334) 271-7950

September 4, 2009

Mr. Michael McKee
Supervisor
Knox Kershaw Inc.
11211 Trackwork Street
Montgomery, Alabama 36117

Dear Mr. McKee,

The purpose of this letter is to acknowledge receipt of your "Notification of Regulated Waste Activity-ADEM form 8700-12" for Knox Kershaw Inc., located at 11211 Trackwork Street, Montgomery, Alabama.

The EPA ID number assigned to this location is **ALR000046516**.

Please note that all facilities in Montgomery County are required to file an annual notification form and fee no later than August 15 of each calendar year. Consequently, the annual notification form and fee will be due again no later than August 15, 2010.

Sincerely,

Stephen C. Maurer
ADEM
Permits and Services Division
(334) 271-7940
scm@adem.state.al.us

File: ALR000046516
Knox Kershaw Inc.
Montgomery County

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (Fax)

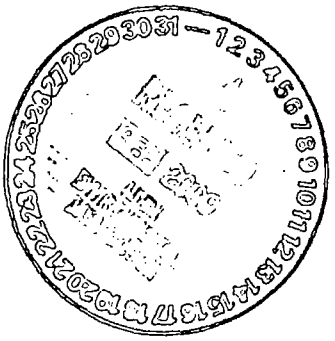
Decatur Branch
2715 Sandlin Road, S.W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (Fax)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (Fax)

Mobile - Coastal
4171 Commanders Drive
Mobile, AL 36615-1421
(251) 432-6533
(251) 432-6598 (Fax)

Vendor: V007174

909-85.00	09/02/2009	2009-CD-004621	85.00	0.00	85.00



No: 3512	9/2/2009 ADEM PERMITS AND SERVICES	Amount:	85.00

Company	WOFFORD OIL COMPANY
Address:	604-618 N. McDonough St
Tenure:	c. 1918 – 1969
Operations:	Wofford Oil Company ("Wofford") operated a petroleum product bulk distribution station from about 1918 to about 1969 according to information produced by Norfolk Southern in response to a Section 104(e) response in July 9, 2010.[1] (See Figure 1) The land on which the bulk plant operated was owned by Central of Georgia Railway Company (now Norfolk Southern) and was leased by Woco Gasoline and Oil Company (later known as Wofford Oil Company).[2] Wofford was known for mixing benzol with its gasoline to reduce engine knock. This gasoline, known as Woco-Pep, was marketed extensively in Alabama and the South in the 1920s and 1930s.[3] Historical maps indicate that the Wofford facility contained at least six above-ground storage tanks ("ASTs") but at present the types of products stored in the tanks over time is not known.[4] According to USEPA, bulk station operations often include tank cleaning, vehicle and equipment washing and maintenance, product heating, and blending operations (*i.e.,* combining additives with petroleum products).[5] Products are stored in ASTs until loaded into trucks, railcars or underground pipelines.[6] When the products are transferred, contaminants including benzene and toluene may be present and dispersed to the distribution stations and into the environment via air emissions and potential spills.[7] Another potential source of contamination comes from tank bottom wastewater. Created when stormwater mixes with other substances and settles in the tank, this substance contains diverse elements including oil, grease, total petroleum hydrocarbons, and aromatics: benzene, toluene, ethyl benzene, and xylene (BTEX).[8] While the volume of tank bottom wastewater depends on several factors, including the types of

[1] Norfolk Southern to USEPA, Response to Section 104(e) Letter, July 9, 2010 (FOIA Doc 540)

[2] Lease Agreement between Central of Georgia Railway Company and Woco Gasoline and Oil Company, October 16, 1918 (FOIA Doc 540)

[3] Earl M. Welty and Frank J. Taylor, *The 76 Bonanza,* Menlo Park, CA, 1966, p. 297.

[4] Map attached to Lease Agreement between Central of Georgia Railway Company and Wofford Oil Company, December 1, 1924. (FOIA Doc 540)

[5] "Technical Support Document for 2004 Effluent Guidelines Program Plan, Section 7:Petroleum," United States EPA, August 2004, pg 90.

[6] *Ibid.*

[7] EPCRA Section 313 Industry Guidance, "Petroleum Terminals and Bulk Storage Facilities," February 2000, pg 37.

[8] Technical Support Document for 2004 Effluent Guidelines Program Plan, Section 7:Petroleum," United States EPA, August 2004, pg 92.

Company	WOFFORD OIL COMPANY
	storage tanks used and the size of the facility, in a 1988 study the American Petroleum Institute determined that a moderate-sized petroleum storage facility produces 655 cubic feet, or 5000 gallons, of tank bottom wastewater per year.[9]
Potential Nexus to Groundwater Contaminant Plume:	Wofford operated proximate to well TW-09 which showed elevated levels of BTEX in 2001. Currently, sewer lines serving this location flow south to Pollard Street then west along Pollard to Court Street then south along Court Street to Randolph Street then west across the rail lines and then north along the line of Lafayette Street toward the Montgomery Water Works and Sanitary Sewer Board treatment plant.[10] (See Figure 2) Based on its long operating period and the nature of Wofford's operations, it is likely that petroleum products and contaminants would have leached through soils and/or sewers at the site contributing to groundwater contamination.
Key Details:	**1918** – Woco Gasoline and Oil Company leased space in the railway right of way north of Pollard Street for a bulk oil storage plant from Central of Georgia Railway in Montgomery.[11] **1922** – Woco Pep Company announced the construction of an oil storage and distributing plant in Montgomery with an initial capacity of about 65,000 gallons.[12] **1924** – Wofford Oil Company took over the lease for the bulk plant in Montgomery.[13] **1938** – The lease for the bulk plant property was transferred to the Wofford Division of Pure Oil Company.[14] **1965** – Union Oil Company of California, successor by merger to the Pure Oil Company took over the lease for the bulk oil storage plant in Montgomery.[15]

[9] *Ibid.*

[10] MWW&SSB Sewer map for the NW ¼ of Section 7, Township16N, Range 18E Plate 6807-2,102 (Attached to 104(e) response)

[11] Lease Agreement between Central of Georgia Railway Company and Woco Gasoline and Oil Company, October 16, 1918 (FOIA Doc 540)

[12] "Construction and Operation," *Chemical and Metallurgical Engineering,* v. 27, No. 18, November 1, 1922, p. 908

[13] Lease Agreement between Central of Georgia Railway Company and Wofford Oil Company, December 1, 1924 (FOIA Doc 540)

[14] Lease Agreement between Central of Georgia Railway Company and Wofford Oil Division of Pure Oil Company, April 30, 1938 (FOIA Doc 540)

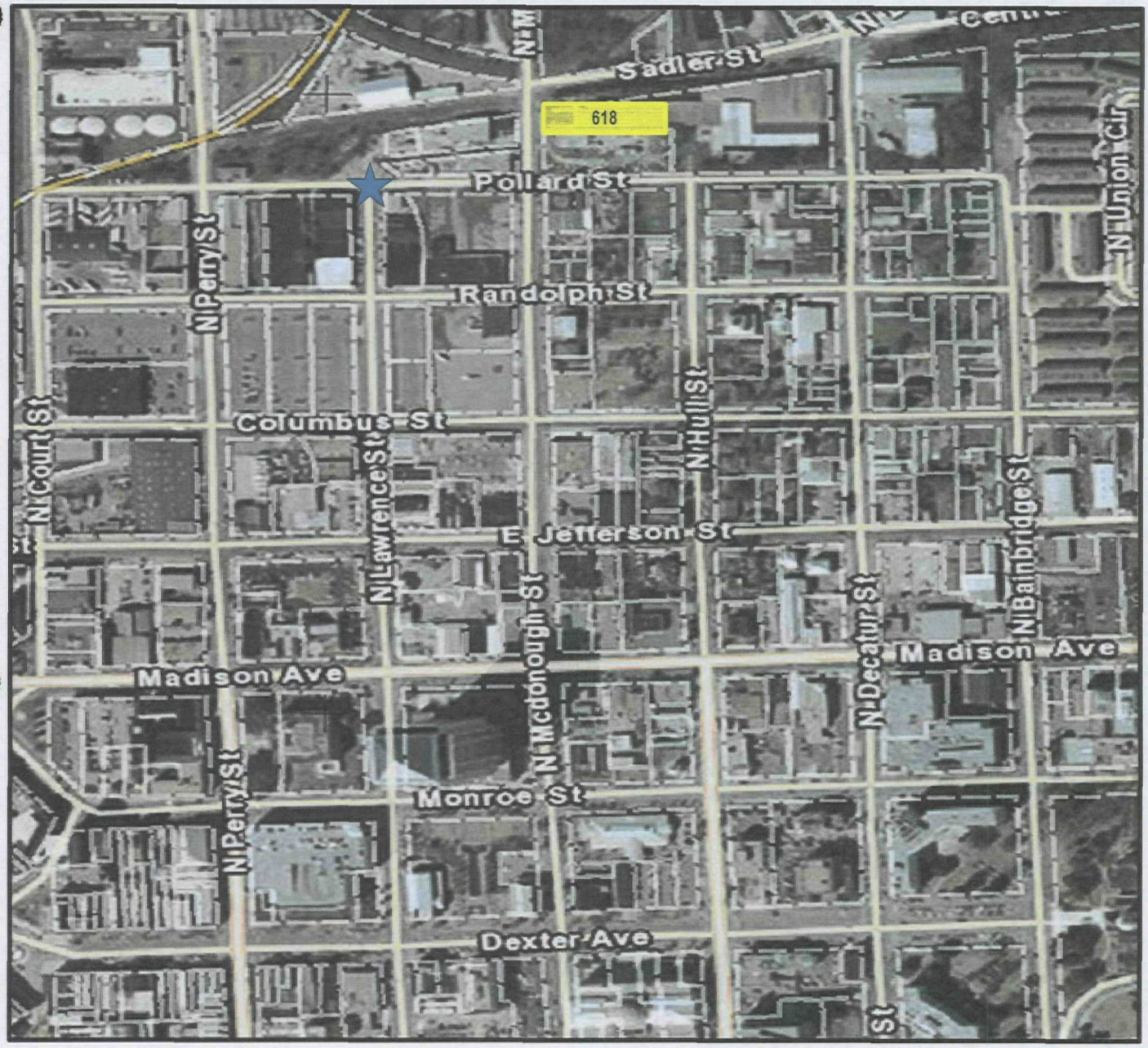
[15] Memorandum to File, July 10, 1969 (FOIA Doc 540)

Company	**WOFFORD OIL COMPANY**
	1969 – Unocal canceled the lease for the bulk plant property effective April 1969.[16]
Corporate Succession:	• Woco Pep Co. of Montgomery was formed in Alabama on October 2, 1922 (Corp ID# 803-790) • 1924 – Wofford Oil Company took over the lease of the bulk plant. • 1925 – Pure Oil Company acquired Wofford Oil • 1965 – Union Oil Company merged Pure Oil with Union Oil as the survivor. • 1983 – Union Oil reorganized and changed its name to Unocal corporation • 2005 – Chevron Corporation acquired Unocal Corporation • Active
Agent for Service:	Chevron Corporation c/o The Prentice-Hall Corporation System, Inc. 2730 Gateway Oaks Dr, Ste 100 Sacramento, CA 95833 **Corporate Headquarters:** R. Hewitt Pate, VP and General Counsel 6001 Bollinger Canyon Rd San Ramon, CA 94583 925-842-1000

[16] Memorandum to File, July 10, 1969 (FOIA Doc 540)

Figure 1 – Site Locations

Wofford Oil Company



Base Aerial: February 15, 2007, Aerials Express

Key to Symbols:

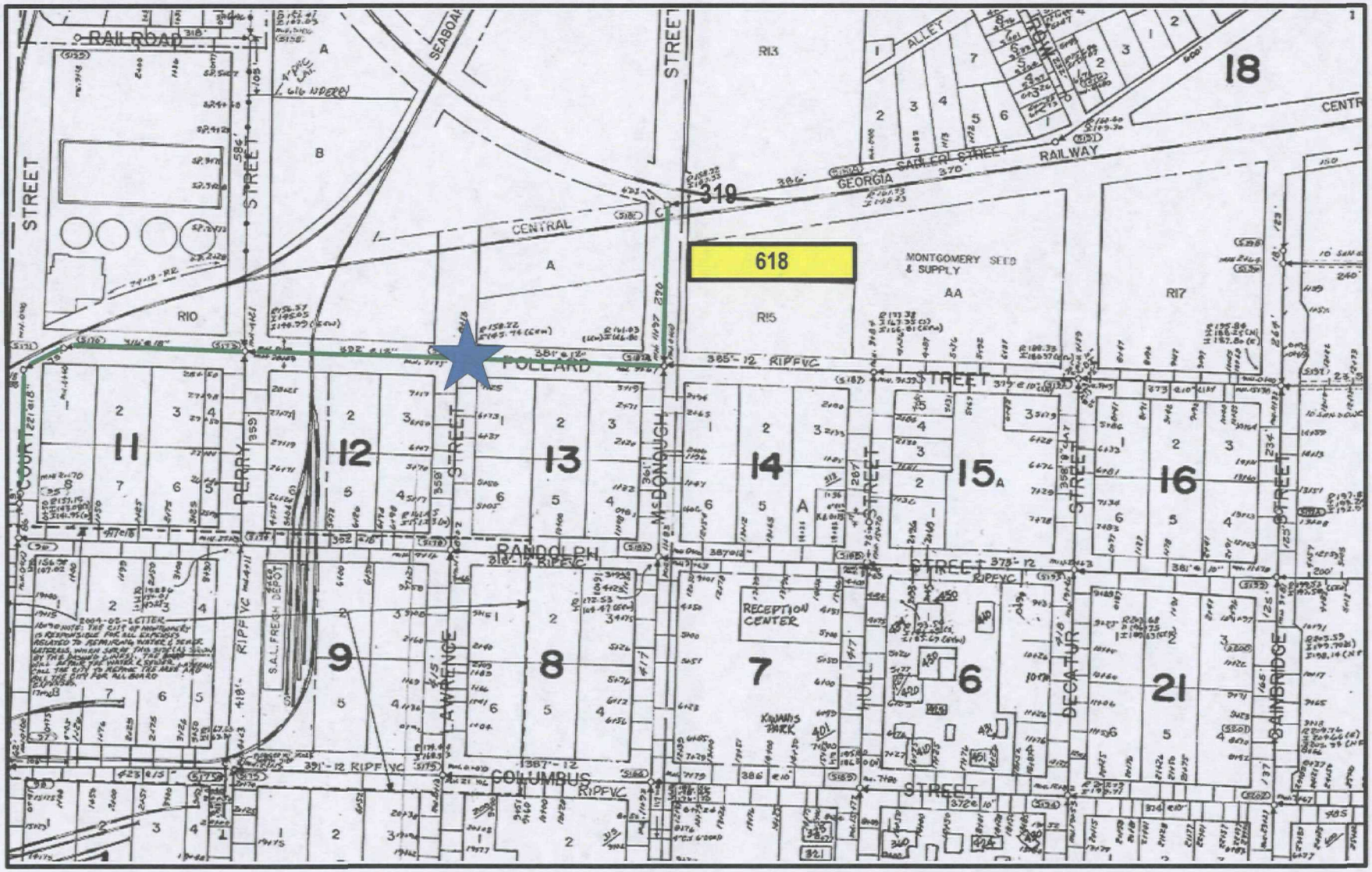
618 — Approximate Wofford Facility Locations with Street Number

★ — Northern PCE Hotspot

Capital City Plume Superfund Site

Figure 2 – Sewer Map

Wofford Oil Company



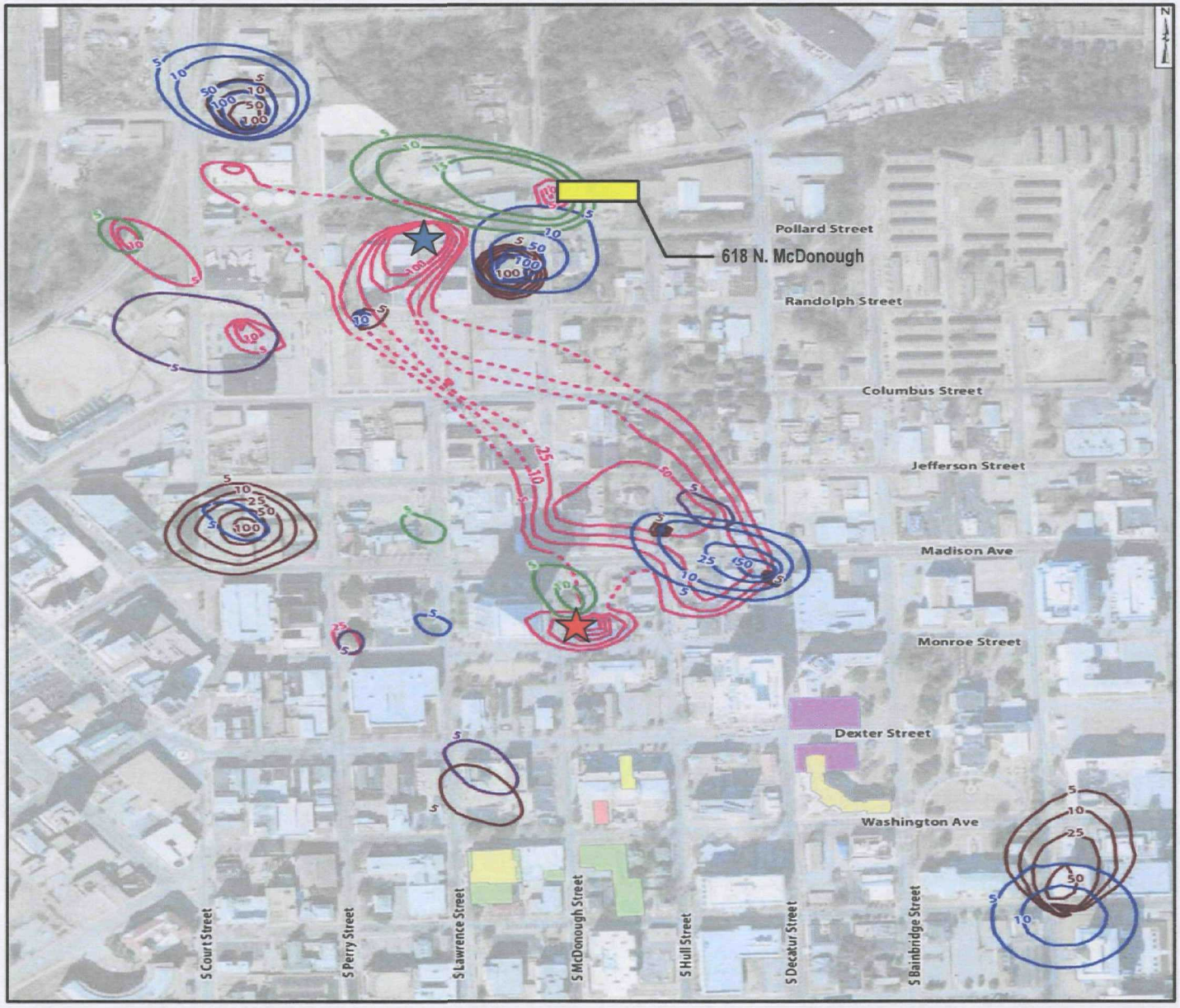
Sewer Map Plate 6807-2,102 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004

Key to Symbols:

500 — Approximate Kershaw Facility Locations with Street Number

★ — Northern PCE Hot Spot

Sewer lines serving Wofford



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 3 – Site Locations in Relationship to Contaminant Plumes

Wofford Oil Company

Capital City Plume Superfund Site

Key to Symbols:

618 N. McDonough

Approximate McDonough Facility Location with Street Number

RSA Chiller Plant

Northern PCE Hotspot

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)

Company	**STANDARD ROOFING COMPANY**
Address:	215 Randolph St. 516 N. McDonough St.
Tenure:	215 Randolph St 1945 – 1948 516 N. McDonough St. 1949 – Present
Operations:	Standard Roofing Company ("Standard") began operations at 215 Randolph Street under the ownership of William and Novelle Murse.[1] After moving to 516 North McDonough Street in 1949, the Murses sold the company and its property to H. W. Taylor, W. L. Taylor and W. F. Dean, the managing partners, on August 26, 1949.[2] Standard provides roofing services for industrial, commercial and institutional clients and installs, repairs and maintains roofs of the following types:[3] • Built up and modified bitumen (asphalt) • Single-ply • Metal • Metal coatings • Shingles, tile and slate • Re-saturants Chlorinated solvents have been used in the roofing industry as a component of adhesives, sealants, mastics and coatings.[4] Chlorinated solvents such as TCE, TCA and PCE are also associated with testing of asphalt binders as part of quality control programs.[5] Asphalt roofing compounds, roofing tars contain petroleum hydrocarbons and petroleum solvents including petroleum naphthas.
Potential Nexus to Groundwater Contaminant Plume:	Standard operates one block east of well TW-9 where elevated levels of TCE and BTEX were detected in 2001.[6] Sewer lines serving the 516 North McDonough Street location flow east to North McDonough Street then north to Pollard Street then west along Pollard to Court Street then south along Court Street to Randolph Street then west across the rail lines and then north along the line of Lafayette

1 Deed to Standard Roofing Company 1949-08-26.

2 Polk's Montgomery City Directory 1946, 1947-48 and 1949; Deed to Standard Roofing Company 1949-08-26.

3 http://www.standardtaylor.com/products.htm

4 For example, Duo Perm Adhesive, a Asphalt/Chlorinated Solvent Cutback adhesive contains 10-30 % PCE and 10-30% methylene chloride according to an MSDS dated September 2000.

5 Holly Collins-Garcia, "An evaluation of an Alternative Solvent for Extraction of Asphalt to Reduce Health and Environmental Hazards," January 2000, p. 3; Press Release, Asphalt Roofing Manufacturers Association, "EPA Approves Alternate Solvent for Method 5A Testing," no date replacing TCA with 1-bromopropane.

6 Geosyntec DRAFT PCE Isopleth, February 3, 2012

Company	STANDARD ROOFING COMPANY
	Street toward the Montgomery Water Works and Sanitary Sewer Board treatment plant.[7] Sewer lines serving the 215 Randolph Street location flow south to Randolph Street then west along Randolph to Court Street then north along Court Street then west across the rail lines and then north along the line of Lafayette Street toward the Montgomery Water Works and Sanitary Sewer Board treatment plant.[8] One 560-gallon steel gasoline underground storage tank ("UST") was removed from the 516 North McDonough property on June 29, 1998. The tank was approximately 35 years old at the time of its removal and was owned by Tom Jones, Inc. (likely a petroleum jobber.) Soil samples were collected from the UST excavation and tested for total petroleum hydrocarbons ("TPH"). TPH in the soil samples ranged from 20 to 44 ppm with the highest concentrations found in the south wall of the UST pit. No soil samples were collected from the piping trench because the piping serving the UST was less than 10 feet long. The fuel dispenser had been located on top of the UST. No groundwater was encountered during the excavation and no groundwater samples were obtained because depth to groundwater was greater than five feet below the base of the UST pit. The excavation was filled with clean soil.[9] ADEM issued a no further action letter for the UST on August 28, 1998.[10] However, the UST disposal certificate indicates that one 550-gallon and one 60-gallon tank from Standard Roofing were sent to Rayco, Inc. and sold for scrap. There was no mention of the 60-gallon tank in the UST closure assessment.[11] Based on its long operating period and the leaking UST, it is likely that Standard Roofing released petroleum products and contaminants that would have leached through soils and/or sewers at the site contributing to groundwater contamination.
Key Details:	Standard Roofing is a RCRA SQG and has had a RCRA permit (ALD983170796) for the Montgomery plant since at least 1990 for disposal of benzene-containing wastes.[12]

[7] MWW&SSB Sewer map for the NW ¼ of Section 7, Township16N, Range 18E Plate 6807-2,102 (Attached to 104(e) response)

[8] MWW&SSB Sewer map for the NW ¼ of Section 7, Township16N, Range 18E Plate 6807-2,102 (Attached to 104(e) response)

[9] TTL, Inc., "UST Closure Assessment, 516 North McDonough Street,", July 30, 1998 (ADEM Facility ID No. 14932-101-005008)

[10] Ibid.

[11] Certificate of Proper Disposal from Southern Tank Salvage to Standard Roofing, August 3, 1998.

[12] RCRIS Database Report ALD983170796

Company	**STANDARD ROOFING COMPANY**
Corporate Succession:	• Standard Roofing Company, Inc.(Delaware) qualified to do business in Alabama on June 26, 1959 (Corp ID# 856-603) • 1976 – Name changed to Standard-Taylor Industries • Active
Agent for Service:	W. Taylor Standard-Taylor Industries, Inc. 516 N. McDonough St Montgomery, AL 3610-2645 334-265-1262

Figure 1 – Site Locations

Standard Roofing Company

Base Aerial: February 15, 2007, Aerials Express

Key to Symbols:

516 — Approximate Standard Roofing Facility Locations with Street Numbers

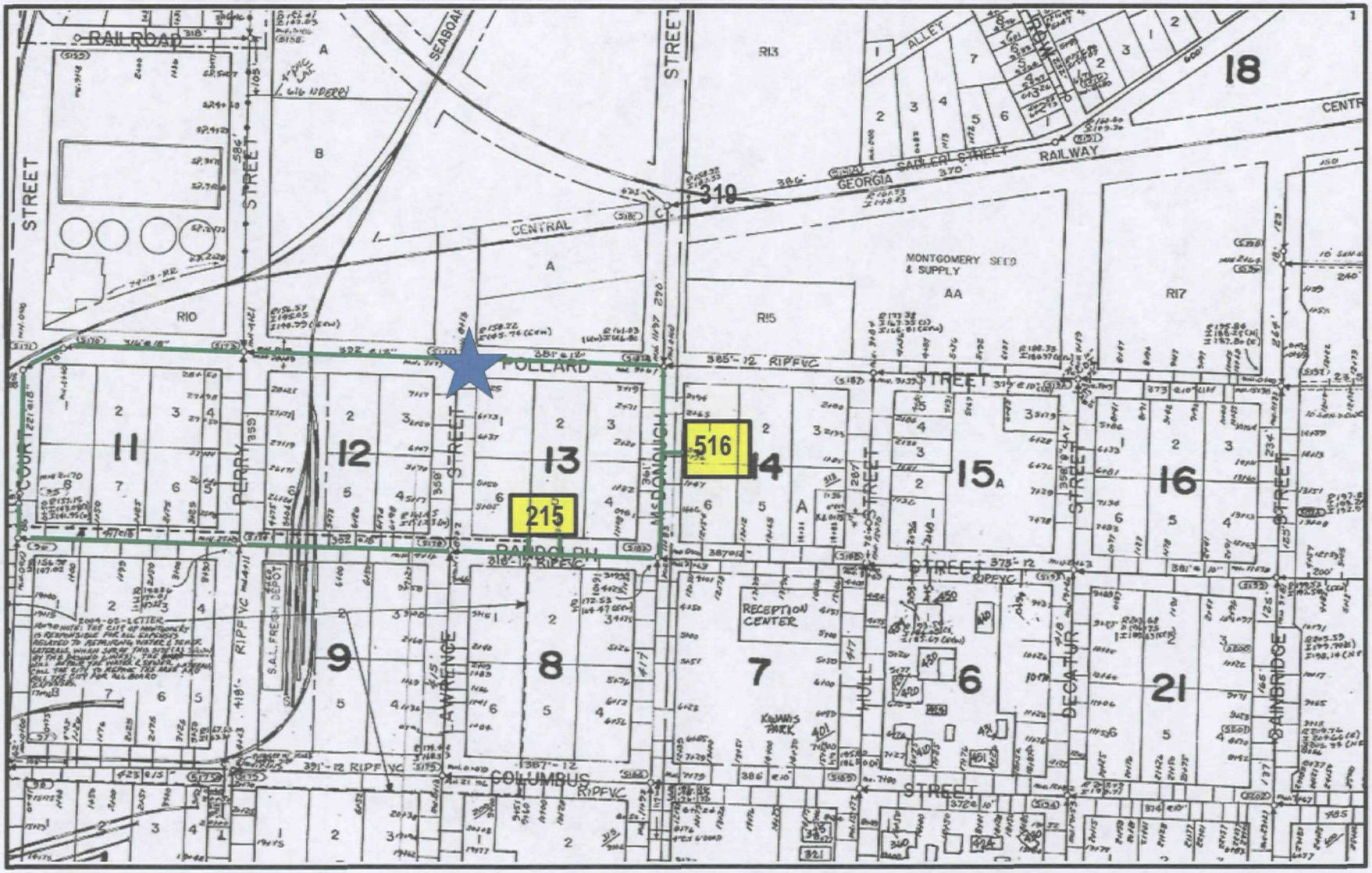
RSA Chiller Plant

Northern PCE Hotspot

Capital City Plume Superfund Site

Figure 2 – Sewer Map

Standard Roofing Company



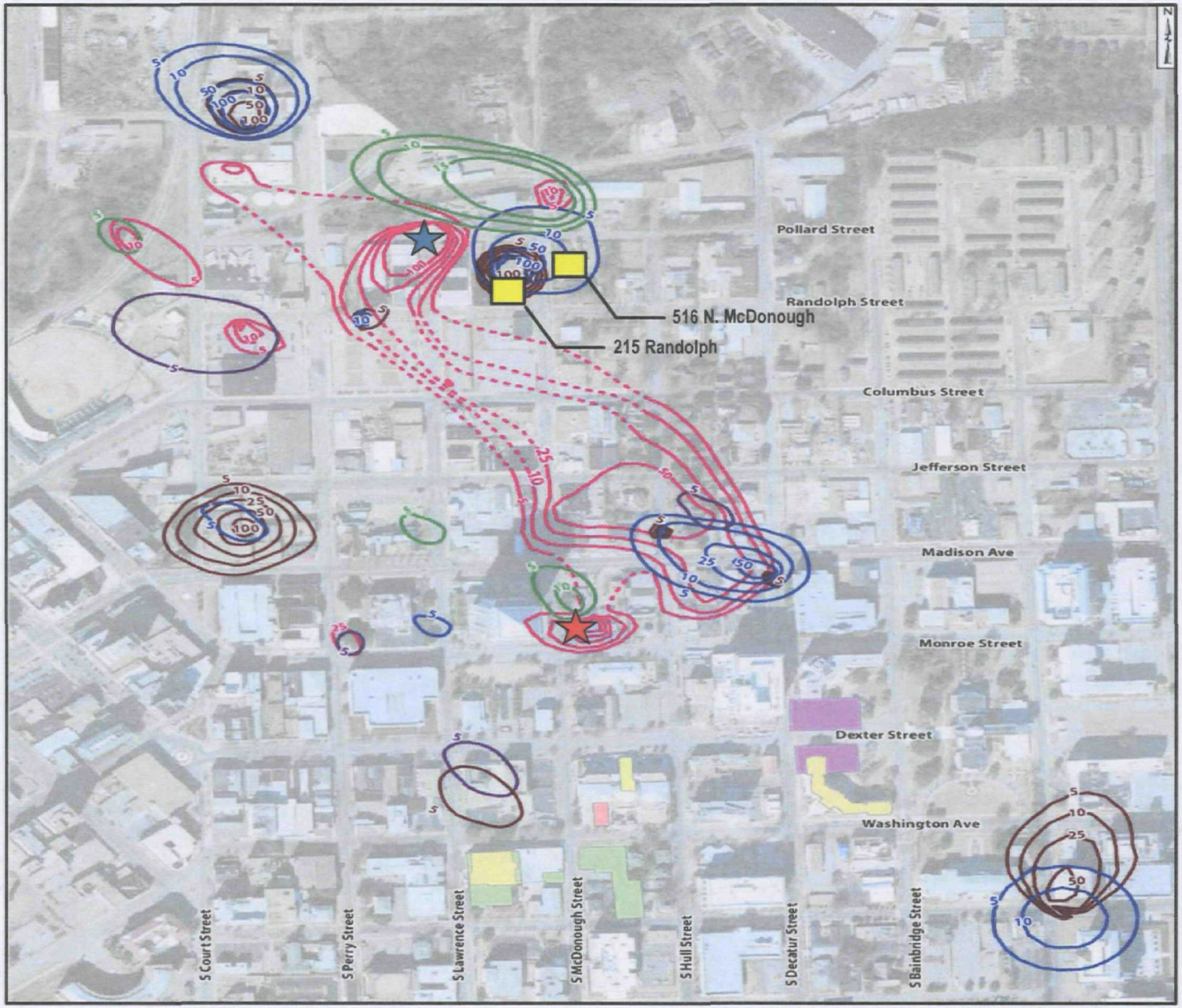
Sewer Map Plate 6807-2,102 from Montgomery Water Works & Sanitary Sewer Board files, c. 2004

Key to Symbols:

516 — Approximate Standard Roofing Facility Locations with Street Numbers

★ — Northern PCE Hot Spot

Sewer lines serving Standard Roofing



Comparison of PCE, TCE, BTEX , TMB and Chloroform Plumes at the Site, Geosyntec, June 8, 2012

Figure 3 – Site Locations in Relationship to Contaminant Plumes

Standard Roofing Company

Capital City Plume Superfund Site

Key to Symbols:

516 N. McDonough

Approximate Standard Roofing Facility Locations with Street Numbers

RSA Chiller Plant

Northern PCE Hotspot

PCE Isoconcentrations (ppb)

TCE Isoconcentrations (ppb)

BTEX Isoconcentrations (ppb)

TMB Isoconcenrations (ppb)

Chloroform Isoconcentrations (ppb)