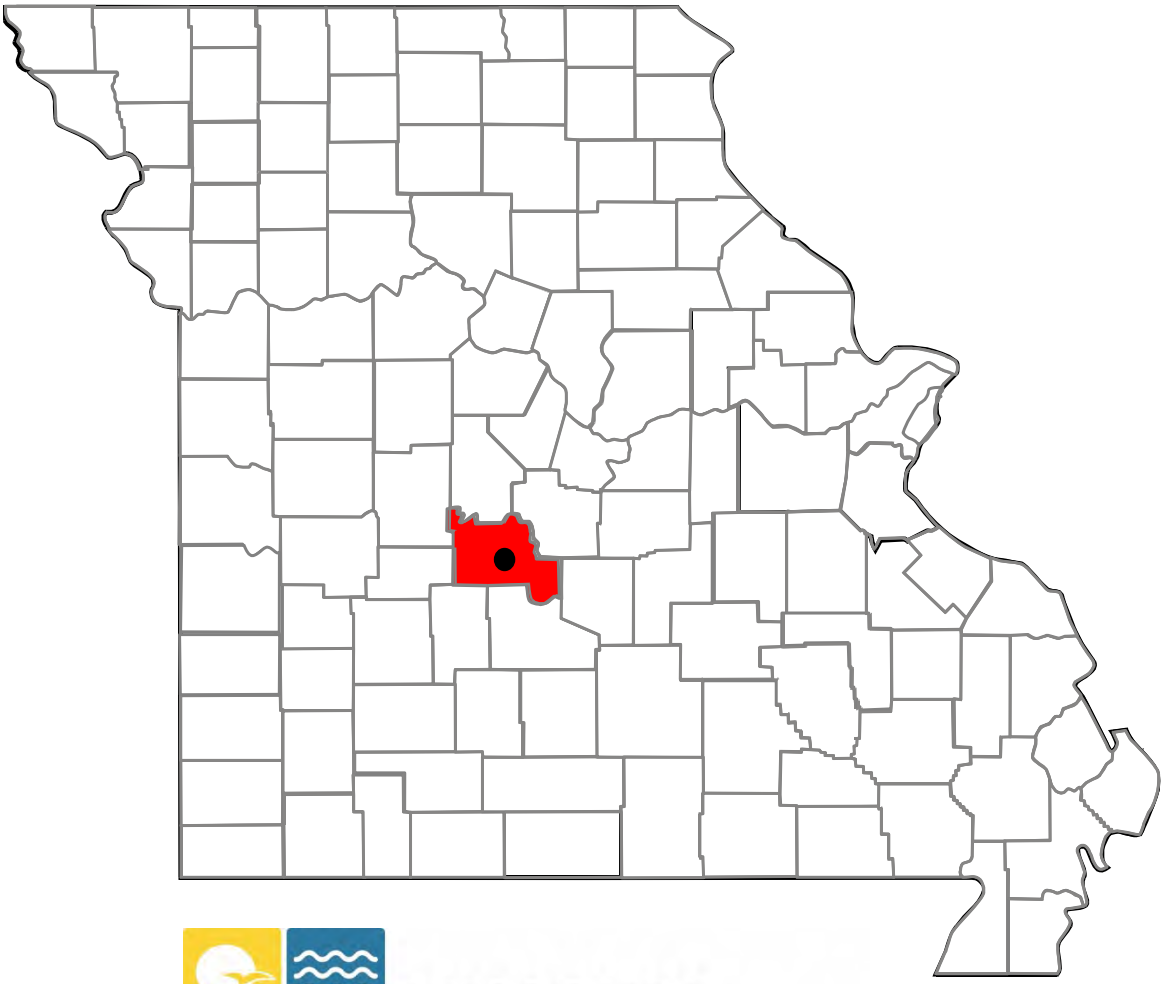
PRE-CERCLA SCREENING REPORT

Camdenton Treatment Plant Lagoon

Camden County, Missouri

August 15, 2018



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DEPARTMENT OF
NATURAL RESOURCES

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I. Pre-CERCLA Screening Narrative

A. Introduction

The Missouri Department of Natural Resources (department), through a Cooperative Agreement (V-99738108) with the U.S. Environmental Protection Agency (EPA), conducted a Pre-Comprehensive Environmental Response, Compensation and Liability Act Screening investigation (Pre-CERCLA Screening or PCS) at the Camdenton Treatment Plant Lagoon (CTPL) site in Camdenton Missouri. The purpose of the investigation was to determine whether there has been a release of a hazardous substance into the environment, or a substantial threat of such a release, which may present a danger to human health or the environment. If such a release has occurred, the site may warrant entry onto EPA's Superfund Enterprise Management System (SEMS) database, and further assessment under CERCLA.

The CTPL site is the former location of a domestic wastewater lagoon located approximately 1.5 miles southwest of the Camdenton city center. The CTPL was identified by the Camdenton Industrial TCE Contamination Advisory Team (CITCAT), a community advisory team convened to provide a forum to present and discuss concerns related to releases of trichloroethene (TCE) in the greater Camdenton community. CITCAT team members expressed concerned to the department in January 2018 that the lagoon may have historically received TCE-contaminated industrial effluent from a now-inactive manufacturing facility at 221 Sunset Drive in Camdenton.

The scope of the PCS was limited to review of existing file materials and collection of additional non-sampling information. The investigation included a site visit to the former lagoon on March 7, 2018.

B. Site Description

The CTPL, also known as the C.P. White Lagoon, was an 8-acre two cell wastewater treatment lagoon built in the early 1960s and operated by the city of Camdenton. The CTPL site is located at 1164 Ha Ha Tonka Court in Camdenton. It was one of several individual treatment lagoons the city maintained prior to opening a centralized treatment plant (Camdenton Wastewater Treatment Plant) in June 1989 (Kuntz, 1989). Figure 1 is a Site Location Map, and the location of the former lagoons is shown in Figure 2. Photographs of the lagoon area are provided in Appendix IV. Based on GoogleEarth® aerial photographs, sometime in early 2012, the northernmost original CTPL lagoon cell appears to have been modified creating two separate cells (Figures 3 and 4). The Camdenton Wastewater Treatment Plant, visible in Figure 2, is located in the same area as the CTPL, and was constructed on top of a portion of the backfilled original southern cell.

The site lies in a narrow wooded valley at the confluence of two unnamed tributaries approximately 0.5 miles upstream of their mouth at the Niangua arm of Lake of the Ozarks (Figure 2 and Photograph 5). Based on topography, the CTPL would have discharged to the

northwest near the confluence of the two unnamed tributaries. The valley floor topography is generally flat and vegetated with grasses and wetland plants (Photographs 1 and 2). The unconsolidated material in the general vicinity consists of up to 20 feet of tight clay interspersed with varying amounts of sand and chert becoming coarser near the bedrock surface (SECOR, 2003). The overburden is underlain by the unconfined Ozark Aquifer. Depth to groundwater in the aquifer is in the range of 100 feet below ground surface (Golder, 2017). The Camdenton Treatment Plant includes an 800 ft^2 office building with 3 full time employees (Jefferies, 2018). The office building is located above a portion of the former CTPL. There are two residences within 0.25 miles of the CTPL; the nearest one is 350 feet to the east on a ridge above the valley (visible in Figure 2). The CTPL site is located at the end of a dead end road and access is restricted with a gate during non-working hours.

C. Site History

The date of construction of the CTPL was not identified, but it was likely in the early-1960s. The lagoon was one of several operated by the city to receive and treat sources of wastewater within the City of Camdenton prior to the opening of the Camdenton Wastewater Treatment Plant in 1989.

One of the other city lagoons, City Lagoon #3 (also known as the Hulett Lagoon), received a mixture of domestic wastewater from nearby residences and industrial wastewater from a refrigeration coil manufacturing facility located at 221 Sunset Drive, located approximately 600 feet southwest of City Lagoon #3 (Figure 1). That facility used TCE as a degreasing agent, and releases of TCE from the facility to City Lagoon #3 in the plant's wastewater discharge resulted in contamination of the sludge, surrounding soils and shallow groundwater beneath the lagoon (Wilder, 1999). Following the initial discovery by the City of Camdenton of TCE contamination in City Lagoon #3 in 1984, the city completed a cleanup at Lagoon #3 in 1989 involving the removal of 2,395 cubic yards of contaminated sludge and soil (Wilder, 1999). The lagoon was subsequently closed by filling with native soil scraped from a nearby slope.

Releases of TCE at the 221 Sunset Drive facility, City Lagoon #3 and potentially other associated locations in the Camdenton area lead to the contamination of one of the city's public wells. The Mulberry Well, located approximately ¼ mile southeast of the facility, was taken offline by the city on February 2, 1999 following discovery of TCE contamination in a sample from the well. Multiple investigations and cleanup actions have been conducted in Camdenton since 1999, continuing to present day. The department maintains a webpage with links to historical and current technical documents related to TCE investigations and cleanup actions for the Camdenton area sites (https://dnr.mo.gov/env/hwp/camdentontce.html). The department is currently negotiating with the responsible parties on an agreement to address TCE contamination in Camdenton associated with the 221 Sunset Drive facility. Responsible parties include the City

of Camdenton, UTC Aerospace Systems (corporate successor to Sundstrand Tubular Products, Inc., who operated the facility at the time of the TCE usage), and the Modine Manufacturing Company (owner of the facility subsequent to 1990 when TCE use was discontinued).

The department held a public meeting on September 28, 2017 to address citizen questions and concerns about TCE contamination in the Camdenton area. Following that meeting, a public citizen concern group was formed. The Camdenton Industrial TCE Contamination Advisory Team (CITCAT) was convened and subsequently met on October 18, 2017. Members of the CITCAT recommended the department investigate other potential areas of TCE release associated with the 221 Sunset Drive facility, including the CTPL (CITCAT, 2017). CITCAT group members expressed concern that the CTPL may have received TCE-contaminated wastewater from the 221 Sunset Drive facility.

Historical records indicate that following disconnection of City Lagoon #3 from the Sunset Drive facility in December 1987, wastewater from 221 Sunset Drive was rerouted to the CTPL (Elder, 1987). The CTPL was closed on June 8, 1989 when the Camdenton Wastewater Treatment Plant became operational (Kuntz, 1989). Therefore, during an 18 month period between December 1987 when City Lagoon #3 ceased operation and June 8, 1989 when the city's wastewater treatment plant began operation, the CTPL received industrial wastewater from the 221 Sunset Drive facility. During this same period, the 221 Sunset Drive facility operated a pre-treatment system designed to remove heavy metals (Webster, 1981, Laux, 1984). TCE concentration data for the facility's effluent is limited, with only 12 sample results available from 1986 (Mans, 1986). The maximum TCE concentration measured was 2,230 µg/l (parts per billion, ppb) in May 1986 (Table 1). The 1989 permit application lists the average discharge from the treatment system at 3,788 gallons per day (Olson, 1989).

D. Discussion

Using the maximum TCE result measured in the manufacturing facility effluent as a conservative value and the average daily discharge volume from the facility's pre-treatment system, the total volume of TCE potentially released to the CTPL over the 18 month period of concern is estimated at 3 gallons (Table 2). Based on the estimated mass of TCE released, and depth to bedrock aquifer surface, it's unlikely to have posed a significant threat through the groundwater/drinking water pathway.

When released to the subsurface, volatile organic compounds may be present as a vapor phase within the soil pore spaces and travel away from the release point vertically and horizontally. Vapor-phase contaminants migrating in the subsurface may enter into building structures resulting in exposure to inhabitants. TCE is a highly volatile organic compound. The Camdenton Wastewater Treatment plant office building, which is inhabited by three employees,

is located directly over a portion of the former CTPL. Therefore, further investigation is warranted to determine whether there has been a release of TCE and to assess the subsurface intrusion pathway.

E. Conclusions

A manufacturing facility at 221 Sunset Drive in Camdenton used TCE as a degreasing agent prior to 1990. Following public concern stemming originally from the discovery of TCE contamination in a Camdenton public well in 1993, a citizen group requested in 2017 that the department investigate potential historic releases from that facility to the Camdenton Treatment Plant Lagoon. Effluent from the facility was historically discharged to City Lagoon #3. The City of Camdenton documented TCE contamination in City Lagoon #3 in 1984, and completed a cleanup of the lagoon in 1989. Following closure of City Lagoon #3, the manufacturing facility effluent was re-routed into the CTPL. The CTPL ceased operation when the Camdenton Wastewater Treatment Plant was brought online June 8, 1989. Records indicate that during the period between December 1987 when City Lagoon #3 was taken offline and June 8, 1989, the CTPL received effluent from the facility at 221 Sunset Drive. Using the maximum TCE result measured in the facility's wastewater effluent during this period as a conservative value and the average daily discharge volume from the facility, the total volume of TCE potentially released to the CTPL over the 18 month period of concern is estimated at 3 gallons (Table 2).

Based on the potential for release of TCE to the CTPL, the site is recommended for entry into SEMS and further investigation under CERCLA. An estimate of the mass of TCE released at the lagoon is low and the depth to the aquifer surface is approximately 100 feet below ground surface. TCE released at the site could pose a threat to nearby building inhabitants through the subsurface intrusion pathway, and there is an occupied office building located directly over a portion of the former CTPL. Therefore, further investigation under CERCLA is warranted.

SIGNATURES

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Hazardous Waste Program

Date: August 15, 2018

II. Pre-CERCLA Checklist/Decision Form

Attachment A: Pre-CERCLA Screening Checklist/Decision Form

This form is used in conjunction with a site map and any additional information required by the EPA Region to document completion of a Pre-CERCLA Screening (PCS). The form includes a decision on whether a site should be added to the Superfund program's active site inventory for further investigation. Select from available dropdown values for fields marked with an asterisk *.

Region: 7 **State/Territory:** MO **Tribe:** _____ _____

Click here for the EPA Tribe Entity Mapping spreadsheet. **EPA ID No. (If Available)**

Site Name: Camdenton Treatment Plant Lagoon

Other Site Name(s): CP White Lagoon

Site Location: 1164 Ha Ha Tonka Court (Street)

3	Camdenton	Camden	MO	65020 + 7604
Congressional District	(City)	(County)	(State / Terr)	(Zip+4)

If no street address is available _____ (Township-Range) _____ (Section)

Checklist Preparer:

Michael Stroh (Name / Title) 08/15/2017 (Date)

Missouri Department of Natural Resources (MoDNR) (Organization) (573) 522-9902 (Phone)

1730 East Elm Street (Street) michael.stroh@dnr.mo.gov (Email)

Jefferson City	Cole	MO	65101 + 4130
(City)	(County)	(State / Terr)	(Zip+4)

Site Contact Info/Mailing Address: City of Camdenton, Missouri

437 W. US Highway 54 Camdenton, MO 65020 (573)346-3600

CERCLA 105d Petition for Preliminary Assessment? No **If Yes, Petition Date (mm/dd/yyyy):** _____

RCRA Subtitle C Site Status: Is site in RCRAInfo? No **If Yes, RCRAInfo Handler ID #:** _____

Ownership Type*: Municipality **Additional RCRAInfo ID #(s):** _____

Site Type*: Waste Management **State ID #(s):** _____

Site Sub-Type*: WWTF which received TCE waste **Other ID #(s):** _____

Federal Facility? No **Federal Facility Owner*:** (Make selection)

Formerly Used Defense Site (FUDS)? No **Federal Facility Operator*:** (Make selection)

Federal Facility Docket? No **If Yes, FF Docket Listing Date (mm/dd/yyyy):** _____

Federal Facility Docket Reporting Mechanism*: (Make selection)

Native American Interest? No **If Yes, list Tribe:** _____

Additional Tribe (s): _____

Attachment A: Pre-CERCLA Screening Checklist/Decision Form

Site Description

Use this section to briefly describe site background and conditions if known or (easily) available, such as: operational history; physical setting and land use; site surface description, soils, geology and hydrogeology; source and waste characteristics; hazardous substances/contaminants of concern; historical releases, previous investigations and cleanup activities; previous regulatory actions, including permitting and enforcement actions; institutional controls; and community interest.

Insert text here (if text exceeds size of text box, view all text on page 5):

The CTPL, also known as the C.P. White Lagoon, was an 8-acre two cell wastewater treatment lagoon built in the early 1960s and operated by the city of Camdenton. The CTPL site is located at 1164 Ha Ha Tonka Court in Camdenton. It was one of several individual treatment lagoons the city maintained prior to opening a centralized treatment plant (Camdenton Wastewater Treatment Plant) in June 1989 (Kuntz, 1989). Figure 1 is a Site Location Map, and the location of the former lagoons is shown in Figure 2. Photographs of the lagoon area are provided in Appendix IV. Based on Google Earth® aerial photographs, sometime in early 2012, the northernmost original CTPL lagoon cell appears to have been modified creating two separate cells (Figure 3 and 4). The Camdenton Wastewater Treatment Plant, visible in Figure 2, is located in the same area as the CTPL, and was constructed on top of a portion of the backfilled original southern cell.

Geospatial Information

Latitude: + 37.990862 Decimal Degree North (e.g., +38.859156)

Longitude: - 92.766473 Decimal Degree West (e.g., -77.036783)

Provide 4 significant digits at a minimum, more if your collection method generates them.

Except for certain territories in the Pacific Ocean, all sites in U.S. states and territories are located within the northern and western hemispheres and will have a positive latitude sign and negative longitude sign. The coordinate signs should be changed as necessary for sites in the southern and/or eastern hemispheres.

Point Description: Select the option below that best represents the site point for future reference and to distinguish it from any nearby sites.

- ☐ Geocoded (address-matched) Site Address
- ☐ Site Entrance (approximate center of curb-cut)
- ☒ Approximate Center of Site
- ☐ Other Distinguishing Site Feature (briefly describe below):

Point Collection Method: Check the method used to collect the coordinates above and enter the date of collection.

- ☒ Online Map Interpolation
- ☐ GPS (handheld, smartphone, other device or technology with accuracy range < 25 meters)
- ☐ GPS Other (accuracy range is ≥ 25 meters or unspecified)
- ☐ Address Matching: Urban
- ☐ Address Matching: Rural
- ☐ Other Method: _____

Collection Date (mm/dd/yyyy): 03/06/2018

POINT-SELECTION CONSIDERATIONS

- Often the best point is a feature associated with the environmental release or that identifies the site visually.
- Use the curb cut of the entrance to the site if there is a clear primary entrance and it is a good identifier for the overall location.
- The approximate center of the site (a guess at the centroid) is useful for large-area sites or where there are no appropriate distinguishing features.
- Use the geocoded address if that is the only or best option available, but if possible use something more representative for sites larger than 50 acres.

Attachment A: Pre-CERCLA Screening Checklist/Decision Form

Complete this checklist to help determine if a site should be added to the Superfund Active site inventory. See Section 3.6 of the PCS guidance for additional information.	YES	NO	Unknown
1. An initial search for the site in EPA's Superfund active, archive and non-site inventories should be performed prior to starting a PCS. Is this a new site that does not already exist in these site inventories?	☒	☐	☐
2. Is there evidence of an actual release or a potential to release?	☒	☐	☐
3. Are there possible targets that could be impacted by a release of contamination at the site?	☒	☐	☐
4. Is there documentation indicating that a target has been exposed to a hazardous substance released from the site?	☐	☒	☐
5. Is the release of a naturally occurring substance in its unaltered form, or is it altered solely through naturally occurring processes or phenomena, from a location where it is naturally found?	☐	☒	☐
6. Is the release from products which are part of the structure of, and result in exposure within, residential buildings or business or community structures?	☐	☒	☐
7. If there has been a release into a public or private drinking water supply, is it due to deterioration of the system through ordinary use?	☐	☒	☐
8. Are the hazardous substances possibly released at the site, or is the release itself, excluded from being addressed under CERCLA?	☐	☒	☐
9. Is the site being addressed under RCRA corrective action or by the Nuclear Regulatory Commission?	☐	☒	☐
10. Is another federal, state, tribe or local government environmental cleanup program other than site assessment actively involved with the site (e.g., state voluntary cleanup program)?	☐	☒	☐
11. Is there sufficient documentation or evidence that demonstrates there is no likelihood of a significant release that could cause adverse environmental or human health impacts?	☐	☒	☐
12. Are there other site-specific situations or factors that warrant further CERCLA remedial/integrated assessment or response?	☐	☒	☐

Attachment A: Pre-CERCLA Screening Checklist/Decision Form

Preparer's Recommendation: ☒ **Add** site to the Superfund active site inventory.

☐ **Do not add** site to the Superfund active site inventory.

Please explain recommendation below:

PCS Summary and Decision Rationale

Use this section to summarize PCS findings and support the decision to add or not add the site to the Superfund active site inventory for further investigation. Information does not need to be specific but, where known, can include key factors such as source and waste characteristics (e.g., drums, contaminated soil); evidence of release or potential release; threatened targets (e.g., drinking water wells); key sampling results (if available); CERCLA eligibility; involvement of other cleanup programs; and other supporting factors.

Insert text here (if text exceeds size of text box, view all text on page 6):

A manufacturing facility at 221 Sunset Drive in Camdenton used TCE as a degreasing agent prior to 1990. Following public concern stemming originally from the discovery of TCE contamination in a Camdenton public well in 1993, a recently-formed citizen group requested the department investigate potential historic releases from that facility to the Camdenton Treatment Plant Lagoon. Effluent from the facility was historically discharged to City Lagoon #3. The City of Camdenton documented TCE contamination in Lagoon #3 in 1984, and completed a cleanup of the lagoon in 1989. Following closure of Lagoon #3, the manufacturing facility effluent was re-routed into the CTPL. The CTPL ceased operation when the wastewater treatment plant was brought online June 8, 1989. Records indicate that during the period between December 1987 when Lagoon #3 was taken offline and June 8, 1989, the CTPL received effluent from the facility at 221 Sunset Drive. Using the maximum TCE result measured in the facility's wastewater effluent during this period as a conservative value and the average daily discharge volume from the facility, the total

Site Assessor: Michael Stroh / _____ 08/15/2018

Print Name/Signature **Date**

EPA Regional Review and Pre-CERCLA Screening Decision

Add site to the Superfund active site inventory for completion of a:

- ☐ Standard/full preliminary assessment (PA)
- ☒ Abbreviated preliminary assessment (APA)
- ☐ Combined preliminary assessment/site inspection (PA/SI)
- ☐ Integrated removal assessment and preliminary assessment
- ☐ Integrated removal assessment and combined PA/SI
- ☐ Other: _____

Do not add site to the Superfund active site inventory. Site is:

- ☐ Not a valid site or incident
- ☐ Being addressed by EPA's removal program
- ☐ Being addressed by a state cleanup program
- ☐ Being addressed by a tribal cleanup program
- ☐ Being addressed under the Resource Conservation and Recovery Act
- ☐ Being addressed by the Nuclear Regulatory Commission
- ☐ Other: _____

EPA Regional Reviewer: _____ _____

Print Name/Signature **Date**

Site Description

(All text as entered on page 2)

The CTPL, also known as the C.P. White Lagoon, was an 8-acre two cell wastewater treatment lagoon built in the early 1960s and operated by the city of Camdenton. The CTPL site is located at 1164 Ha Ha Tonka Court in Camdenton. It was one of several individual treatment lagoons the city maintained prior to opening a centralized treatment plant (Camdenton Wastewater Treatment Plant) in June 1989 (Kuntz, 1989). Figure 1 is a Site Location Map, and the location of the former lagoons is shown in Figure 2. Photographs of the lagoon area are provided in Appendix IV. Based on GoogleEarth® aerial photographs, sometime in early 2012, the northernmost original CTPL lagoon cell appears to have been modified creating two separate cells (Figures 3 and 4). The Camdenton Wastewater Treatment Plant, visible in Figure 2, is located in the same area as the CTPL, and was constructed on top of a portion of the backfilled original southern cell.

The site lies in a narrow wooded valley at the confluence of two unnamed tributaries approximately 0.5 miles upstream of their mouth at the Niangua arm of Lake of the Ozarks (Figure 2 and Photograph 5). Based on topography, the CTPL would have discharged to the northwest near the confluence of the two unnamed tributaries. The valley floor topography is generally flat and vegetated with grasses and wetland plants (Photographs 1 and 2). The unconsolidated material in the general vicinity consists of up to 20 feet of tight clay interspersed with varying amounts of sand and chert becoming coarser near the bedrock surface (SECOR, 2003). The overburden is underlain by the unconfined Ozark Aquifer. Depth to groundwater in the aquifer is in the range of 100 feet below ground surface (Golder, 2017). The Camdenton Treatment Plant includes an 800 ft2 office building with 3 full time employees (Jefferies, 2018). The office building is located above a portion of the former CTPL. There are two residences within 0.25 miles of the CTPL; the nearest one is 350 feet to the east on a ridge above the valley (visible in Figure 2). The CTPL site is located at the end of a dead end road and access is restricted with a gate during non-working hours.

PCS Summary and Decision Rationale

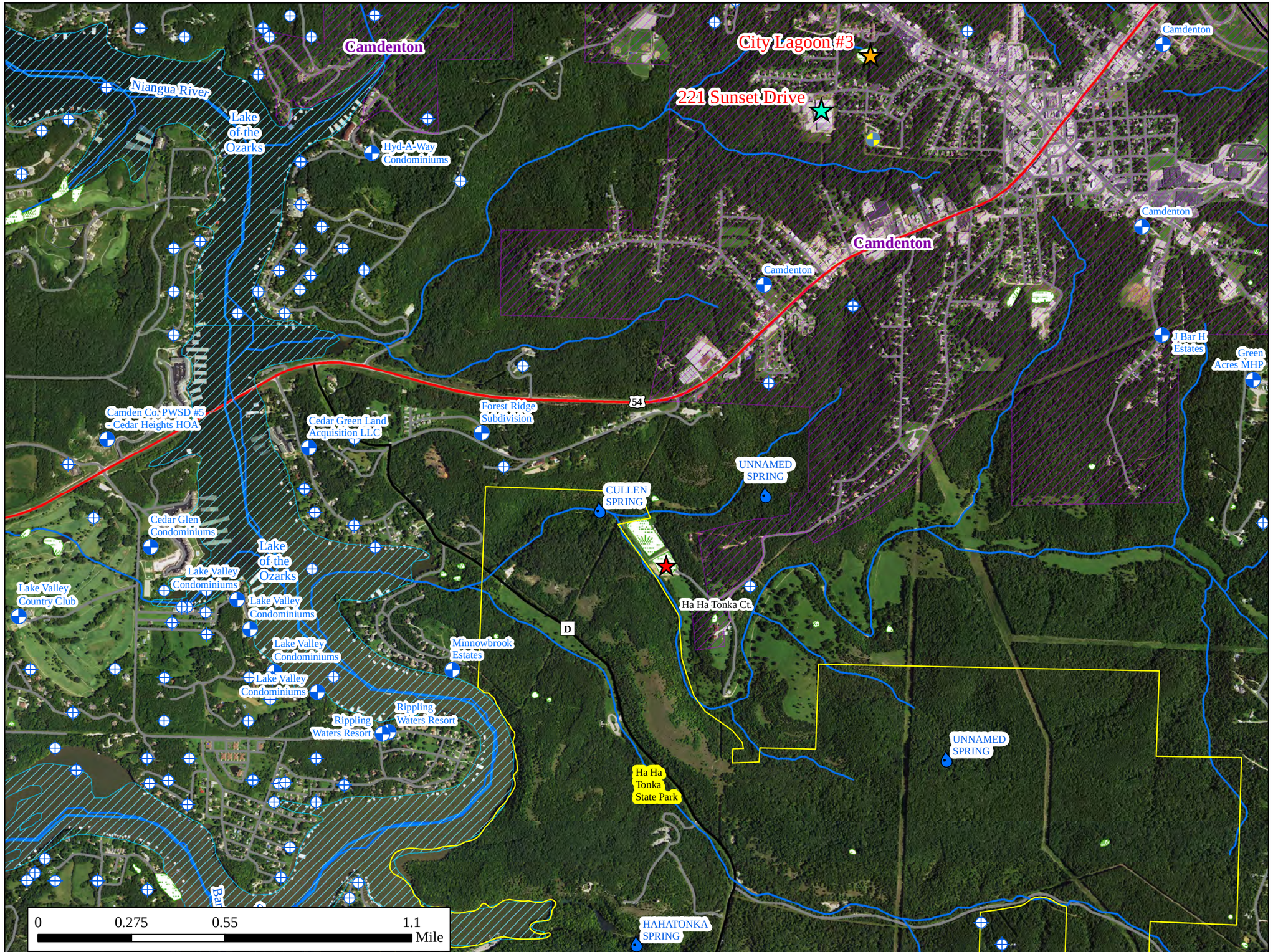
(All text as entered on page 4)

A manufacturing facility at 221 Sunset Drive in Camdenton used TCE as a degreasing agent prior to 1990. Following public concern stemming originally from the discovery of TCE contamination in a Camdenton public well in 1993, a citizen group requested in 2017 that the department investigate potential historic releases from that facility to the Camdenton Treatment Plant Lagoon. Effluent from the facility was historically discharged to City Lagoon #3. The City of Camdenton documented TCE contamination in City Lagoon #3 in 1984, and completed a cleanup of the lagoon in 1989. Following closure of City Lagoon #3, the manufacturing facility effluent was re-routed into the CTPL. The CTPL ceased operation when the Camdenton Wastewater Treatment Plant was brought online June 8, 1989. Records indicate that during the period between December 1987 when City Lagoon #3 was taken offline and June 8, 1989, the CTPL received effluent from the facility at 221 Sunset Drive. Using the maximum TCE result measured in the facility's wastewater effluent during this period as a conservative value and the average daily discharge volume from the facility, the total volume of TCE potentially released to the CTPL over the 18 month period of concern is estimated at 3 gallons (Table 2).

Based on the potential for release of TCE to the CTPL, the site is recommended for entry into SEMS and further investigation under CERCLA. An estimate of the mass of TCE released at the lagoon is low and the depth to the aquifer surface is approximately 100 feet below ground surface. TCE released at the site could pose a threat to nearby building inhabitants through the subsurface intrusion pathway, and there is an occupied office building located directly over a portion of the former CTPL. Therefore, further investigation under CERCLA is warranted.

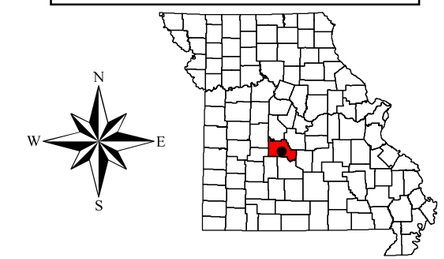
III. Figures

Figure 1: Site Location Map
Camdenton Treatment Plant Lagoon
Camden County, Missouri
August 8, 2018



Legend

- Camdenton Treatment Plant Lagoon
- 221 Sunset Drive Facility
- City Lagoon #3
- Mulberry Well
- Springs
- Private Drinking Water Wells
- Public Wells
- Ha Ha Tonka State Park
- National Wetland Inventory
- Major Lakes
- Rivers and Streams
- Major Rivers
- Municipal Boundary
- Local Roads
- Federal Highway



Created on: August 8, 2018 by Amanda Branson.
This map is located at M/Superfund/Camdenton Treatment Plant Lagoon/Figure1 Site Location Map
Base Map: National Agriculture Imagery Program (NAIP) ortho photography. Flight Date: 2014
Data Sources: US Census 2010;
Missouri Department of Transportation

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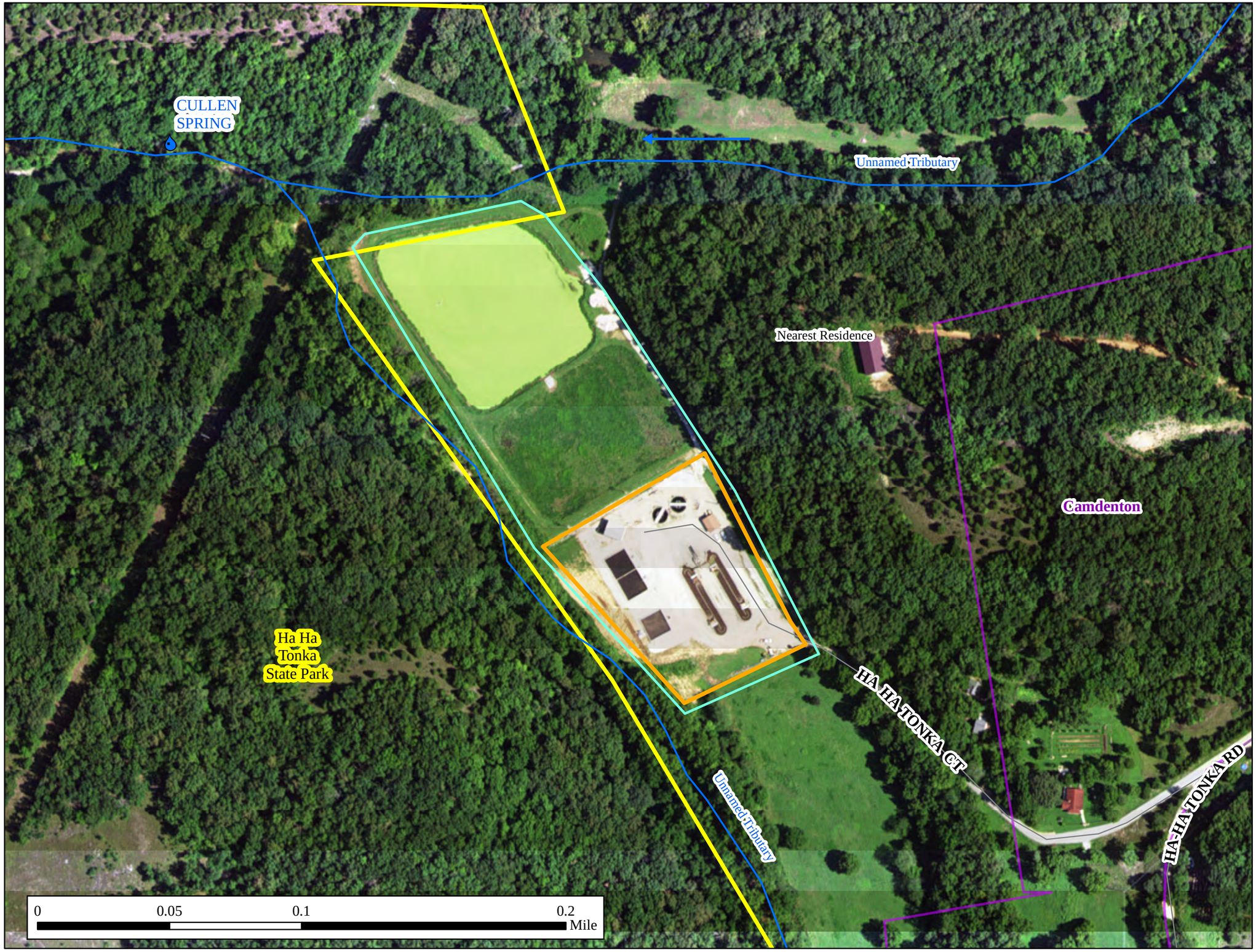
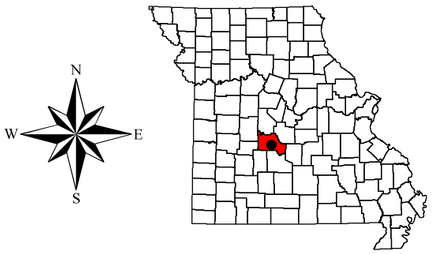
Figure 2
Camdenton Treatment Plant Lagoon (CTPL)
Camden County, Missouri
August 8, 2018



Legend

- Cullen Spring
- Surface Water Drainage Route
- CTPL (former)
- Camdenton Treatment Plant
- Local Roads
- Rivers and Streams
- Ha Ha Tonka State Park
- Municipal Boundary



Created on: August 8, 2018 by Amanda Branson.
This map is located at M/Superfund/Camdenton Treatment Plant Lagoon/Figure2 Treatment Plant Map

Base Map: National Agriculture Imagery Program (NAIP) ortho photography. Flight Date: 2014
Data Sources: US Census 2010;
Missouri Department of Transportation

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Figure 3
Camdenton Treatment Plant Lagoon Site
View of Former Northern Lagoon Cell December 2011

Figure 4
Camdenton Treatment Plant Lagoon Site
View of Former Northern Lagoon Cell May 2012

IV Photographic Log

Photographic Log
Camdenton Treatment Plant Lagoon

Photographs taken on March 7, 2018
by Travis Lyon, Missouri Department
of Natural Resources

Photograph 1.
Northernmost cell of former lagoon used for stormwater detention. View looking northeast.

Photograph 2.
View across a portion of the former lagoon looking southwest. A treatment plant maintenance building is visible.

Photograph 3.
View of the berm separating the two stormwater detention impoundments constructed over the former northern CTPL cell. View looking west.

Photograph 4.
View of the berm separating the two stormwater detention impoundments constructed over the former northern CTPL cell. View looking west.

Photograph 5.
View of unnamed stream channel along the west side of the CTPL cells. View looking west.

Photograph 6.
View of the stormwater detention impoundment along the western edge. View looking north.

Photograph 7.
View from the southeastern portion of the stormwater detention impoundment.
View looking north.

V. Tables

Table 1 221 Sunset Drive Manufacturing Facility Pretreatment Effluent TCE Levels*	
Date	**Result, µg/l (ppb)**
April 24, 1986	<10
May 2, 1986	14
May 7, 1986	<10
May 15, 1986	40
May 15, 1986	150
May 20, 1986	1580
May 20, 1986	2,230
May 21, 1986	380
June 3, 1986	1,100
June 11, 1986	230
June 18, 1986	290
June 25, 1986	240

* reference (Mans, 1986)

Table 2		
Estimate of Total TCE Mass Discharged to the CTPL from 221 Sunset Drive Manufacturing Facility between December 1987 and June 1989		
1	Gallons per day discharged from pre-treatment plant (average)*	3,788
2	Discharge period, days (18 months x 30 days per month)	540
3	Volume discharged, gallons (line 1 x line 2)	2.04×10^{6}
4	Volume discharged, liters (line 3 x 3.8 liters per gallon)	7.77×10^{6}
5	Maximum TCE concentration measured in effluent, µg/l **	2,230
6	Mass of TCE discharged to CTPL, µg (line 4 x line 5)	1.73×10^{10}
8	Mass of TCE discharged to CTPL, lbs (line 6 / 4.536E8 µg/lb)	38
9	Pounds of TCE per gallon of TCE	12
10	Volume of TCE discharged to CTPL, gallons (line 8 / line 9)	3

* reference (Olson, 1989)

** reference (Mans, 1986)

VI. References

VI. References

CITCAT, 2017 — Camdenton Industrial TCE Contamination Advisory Team (CITCAT), Meeting Notes, March 14, 2017.

Elder, 1987 — Elder, Donald Roger, City Administrator, City of Camdenton, letter to Michael Turvey, U.S. Environmental Protection Agency, January 19, 1987.

Golder, 2017 — Golder Associates, Supplemental Remedial Investigation Report Addendum, Former Hulett Lagoon Site, August 10, 2017.

Jefferies, 2018 — Jefferies, Bill, Director of Public Works, Camdenton, Missouri, email to Michael Stroh, Missouri Department of Natural Resources, August 20, 2018.

Kelsey, 1986 — Kelsey, Kathy, Mayor, City of Camdenton, letter to Dave Friese, Missouri Department of Natural Resources, March 12, 1986.

Kuntz, 1989 — Kuntz, Richard, Missouri Department of Natural Resources, letter to Mac Webster, Mayor, City of Camdenton, October 4, 1989.

Laux, 1984 — Laux, Richard, Missouri Department of Natural Resources, memorandum to Dave Friese, Missouri Department of Natural Resources, November 19, 1984.

Mans, 1986 — Mans, Don, Plant Engineer, Sundstrand Tubular Products, Inc., letter to Kathy Kelsey, Mayor, City of Camdenton, December 15, 1986.

Olsen, 1989 — Olson, Gaylord, Plant Manager, Modine Manufacturing Company, Permit Application Form, September 15, 1989.

SECOR, 2003 — SECOR International Inc., Remedial Investigation Summary Report Volume 1 Former Hulett Lagoon, November 24, 2003.

Webster, 1981 — Webster, Mac, Mayor, City of Camdenton, letter to Frank Dolan, Missouri Department of Natural Resources, August 28,

1981.

Wilder, 1999 Wilder, Valerie, Missouri Department of Natural Resources, Combined Preliminary Assessment/Site Inspection Report, Former Hulett Lagoon Site, Camdenton, Missouri, March 30, 1999.

Revision: March 14, 2018 – See Footnote #1

CITCAT Group Meeting Notes
December 12, 2017, 5-7pm
Mid-County Fire Station, Camdenton MO

Group members present were Don Barrett, Dale Bland, Jessica Bockoven, Bryant Burton, Leslie Chamberlin, Larry Coleman, Steve Eden, Danielle Farson, James Gohagan, Greg Hasty, Pam Holley, Jannea Hazama, Shawn Kober, Jerry Rogers, Scott Martin, and Jack Quade.

Agenda (*attached*)

Overview Presentation

Jennifer Lamons, MDNR, opened the Meeting with a presentation overview of CITCAT general procedures and roles. She indicated that the presentation slides will be emailed to the Group. She also referred Group Members to the attachment in our package regarding 'Robert's Rules of Order', a guideline for conducting these type meetings with example dialogue *(attached)*.

The presentation included the Mission Statement determined by the Core Group members. Member question/discussion on the scope or definition of "misuse" in the Statement was had. The Group indicated that "misuse" will, for the purposes of this Group, include both historical processes (that may not have been known, at that time, to be 'misuse' as we think of it today) and the use that was known to be 'misuse' at the time.

Next order of business, during the presentation, was to elect a Chairperson ("Chair") for the Group. Multiple suggestions and affirmatives, and ultimately a majority vote, that James Gohagan be elected Chair. Mr. Gohagan accepted. The Chair's role will be one of leading the meetings, keeping order and courtesy, and promoting the forward movement of the meetings.

Previous to the 5-7 pm meeting, the Core Group had met from 4-5 pm and selected Don Barrett to be Secretary for the Group. The Secretary's role will be to keep notes and written questions from the Meeting and email those notes/questions to MDNR (Jennifer Lamons) within 48 hours of the Meeting.

The Core Group also selected Jerry Rogers to be the Facebook Communicator. His role will be to submit the official notices from the Group to the public Facebook page (*Camdenton County Contamination Board* at https://www.facebook.com/groups/249911762009559/about/).

The Core Group also selected Jannea Hazama to manage the sign-in table for Meetings.

The presentation touched on terms of Roles, such as for the Chair, which serves for one year. Other Group roles or members have no limits of terms. Members in Roles can be voted to be changed with a majority vote of the Group. If a member drops out (other than the Chair), the Core Group has decided, at this time, to leave the position vacant.

Comments and Questions During the Meeting

Following the presentation, Introductions of those at the Group Table were held. Highlights of discussions during and following the Introductions included:

- Larry Coleman stated that more than 2,300 cubic yards of material was dumped at the Airport and TCE was getting into his and Scott Martin's private wells. Mr. Coleman and Mr. Martin indicated that the MDNR sampling of their wells, located near the Airport, showed detected TCE where none had been detected in previous sampling.
- The Group discussed obtaining previous reports and files that the MDNR has at its offices. Mr. Jurgensmeyer, MDNR Hazardous Waste Program Director, indicated that there are reports in paper form on shelves at MDNR. The issue, as with a number of agencies, is getting these older reports digitized. Mr. Jurgensmeyer indicated that reports can be made available to the public with the exception of those involved in legal cases. Group members indicated familiarity with the Sunshine laws and obtaining documents from agencies and this may be a path to be pursued going forward (due to limited time at this Meeting, the purpose of which was to go over the basics for the Group, it was suggested that this idea and subsequent others be briefly discussed but, if needed, be "tabled", meaning to discuss at the end of the Meeting, if time allowed, or at future Meetings).
- Mr. Coleman indicated he was recently at the Modine facility and saw a 3-4 year-old child playing in a ditch at the facility; he observed no signs indicating that the public should not access the facility. The postage of signs at the facility was discussed as an Immediate Need. Suggestion was put forth by Greg Hasty for the Group to compile a list of Immediate Needs that it could recommend to MDNR (suggestion was acknowledged and tabled).
- Discussion on the size and ownership of the lot purchased by Mr. Dawson (historic owner of the facility) was had. Suggestion was to check with the City/County and obtain the information. Leslie Chamberlin and Greg Hasty indicated that they had knowledge of this process and could assist on this.
- Discussion of discharge from the Lagoon was had. Several Group members expressed interest in having the discharge sampled.
- Discussion of the requirements for public notice of Meetings was had as well as the Group being able to post/produce/input into ads with radio, comments, calendar, and newsletter. Two Members indicated that ads in the newspaper and other media can be expensive – MDNR noted that the one-time ad for this Meeting in the newspaper was thought to cost $109, as an example. Group Members indicated it is unclear on what funds are available to the Group and MDNR stated that they would seek information on this for the Group. Ideas regarding free mechanisms to get information out to the public were discussed including free live broadcasting of the Meetings on Facebook. Shawn Kober expressed his knowledge on this subject and volunteered to assist with this effort.

- Jack Quade indicated that his family's previous plan to relocate to the Jeff City area was on hold due to the inability to sell his home due to the public knowledge and/or disclosure of contamination in the area. Other Members expressed concern over property values.
- Steve Eden was asked about his family and he let the Group know that his wife and daughter had passed away some time ago. Although he stated that he could not say it was from the contamination issues the Group was addressing, regardless, he expressed commitment to help the Group as much as he can and to resolve the issue for the community, not just for himself. Subsequent comments about too many people in the area being sick or dying was expressed by some Members.
- Jerry Rogers indicated that he worked at the facility from 1972 to 2012. He said he was present at the facility the night of the fire and was familiar with the Cox Building site. He indicated he has been to too many funerals and wants to help stop that.
- Scott Martin indicated that it was his sister that reported dumping to MDNR in the 1980s. Mr. Coleman, with Mr. Martin's permission, shared with the Group, a notice of a communication *(attached)* from Ms. Kay Dempsey in August 1986 to David Ramsey of the USEPA in Jefferson City, alleging the plant was discharging metals to a ravine which led to a lake near Normac Estates.
- Brief discussions were held by some Group Members regarding their knowledge of dumping of materials associated with historic operations. Dale Bland indicated that ~~*he was aware of dust generated by operations and stated that*~~[1] when it rained, there would be a sweet, sticky taste to the air. Jerry Rogers indicated that, while working at the facility, during excavations, they could dig a hole and TCE ("or oil", as added by a Member) would seep into the hole.
- Jannea Hazama indicated that her house was one of two houses impacted. She stated that she would like her soil and water tested. She indicated her concerns for herself and her neighborhood.
- Greg Hasty expressed concern of the safety of the current City drinking water supply and suggested independent testing be a recommendation of the Group. Mr. Coleman indicated that he had requested that the Blair well would be sampled; it was unknown if this was conducted.
- Mr. Coleman indicated that he and another City personnel did the City water sampling one time and all the tests came back "bad" except for one sample, which was the Rodeo well. He stated that he did not know what was "bad" in the sample. He also stated that he knew on two occasions that the Mulberry well was used as the Blair well was broke down and he was working on the Rodeo well, so he stated that the Mulberry well was pumping.
- Group discussed that future meetings are to be held monthly; frequency may be increased if needed.

[1] In the March 13, 2018, meeting, Mr. Bland requested that these Minutes be corrected to clarify that he did not mention dust at the facility but had indicated that he was aware of <u>exhaust fumes</u> generated by the degreasing operations at the facility.

- Water testing was further discussed including where to sample (well or tap); questions on possible funding mechanisms (MDNR indicated that Responsible Parties and MDNR may be a source of funding for CITCAT recommendations/requests); costs of samples (some Members indicated their understanding of the pricing of sampling varies); and whether to include lead or not. Lead's natural prevalence in Missouri was discussed by Bryant Burton and Pam Holley.
- The issue of the naming of "Hulett Lagoon" was discussed. Group Members expressed it was unfair to "label" the lagoon after the Hulett family and could be detrimental to their business. The naming of the Lagoon after Hulett was stated by a Group Member to be because the Lagoon was located behind the Hulett property and the community used the name for ease of giving directions to the Lagoon. MDNR indicated that a petition to the City may be needed to change the name. Mr. Martin indicated that the Group should also discuss an upcoming $5 Million grant to the City for an expansion project.
- Mr. Coleman requested a copy of a picture from MDNR showing the Lagoon before it was closed (pre-1987). He stated that he had seen one in a previous training in Jeff City. MDNR indicated they would look for a picture.
- Members discussed the remediation (excavation) of the Lagoon historically.
- Greg Hasty made a Motion to recommend that independent tests of the City water supply be conducted. Pam Holley asked what would satisfy as "independent" testers; Would MDNR sampling be acceptable? Mr. Hasty indicated that anyone but the City would be acceptable. The Motion was seconded and passed by Group majority vote.
- Shawn Kober suggested that the water at the School be tested as a priority.

Time ran out for the Meeting. The next meeting is to be held on January 9, 2018; anticipated to be at the same location – Mid-County Fire Department.

Meeting was concluded by the Chair.

Attachments:
A. Agenda
B. Robert's Rules of Order Handout
C. 1986 Notice of Communication

These notes were compiled by Pam Holley, at the request of the Chair and the Secretary. The Chair and Secretary will review and the Notes will be forwarded to Jennifer Lamons at MDNR for posting. Written questions were obtained by Ms. Lamons at the Meeting.

Attachment A. Meeting Agenda

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Notice of Open Meeting
Camdenton Industrial TCE Contamination
Advisory Team Meeting

People requiring special services at the meeting can make arrangements by calling 800-361-4827 or 573-751-3176. Hearing and speech impaired individuals may contact the department through Relay Missouri, 800-735-2966.

AGENDA

Mid-County Fire Protection District
Camdenton Fire Department
184 North Business Route 5
Camdenton

December 12, 2017

5 to 7 p.m.

1. Call Meeting to Order	CITCAT Core Member
2. Introductions	CITCAT Core Team
3. Old Business	CITCAT Core Team
A. Discuss CITCAT Meeting Procedures	
B. Vote on Mission Statement	
C. Vote on Chairperson and Secretary	
D. Missouri Sunshine Law	
E. Roberts Rules of Order	
4. New Business	CITCAT Chairperson
A. New Member Introductions	
B. Topics for Future Meetings	
5. Announce Next Meeting	CITCAT Chairperson
6. Adjourn	CITCAT Chairperson

If you have any questions regarding this meeting, please contact:

Hazardous Waste Program, PO Box 176, Jefferson City, MO 65102-0176
Phone: 573-751-3176; Email: jennifer.lamons@dnr.mo.gov

Attachment B. Robert's Rules

Roberts Rules of Order

Presiding officers need to plan ahead. With an agenda and knowledge of the business at hand *before* the meeting, a plan (such as the one below) can help a presiding officer stay organized and keep the meeting orderly and on task. The chairperson should fill out a meeting plan with items specific to each meeting to use as a "script" for conducting meetings.

Remember…

- ✓ Voting is by majority vote.
- ✓ Only one person speaks at a time, while others listen politely and wait their turn to speak.
- ✓ Decorum is to be maintained at all times, the Chairperson is in charge of maintaining order. Members should respect the rules of the advisory team and one another.

- **Call to Order** (Chair)
- **Approval or correction of minutes** (Secretary)
  - *"A copy of last month's minutes was emailed to you _____. Please let me know if you found any errors."* (Pause here to let people think.)
  - *Are there any corrections to the minutes?*
  - Take corrections until there are no more.
  - If there are no corrections, say, "*The minutes stand as approved*." If there are corrections, take a vote to allow the changes or to let the minutes stand. Secretary notes any approved changes and sends members revised copy of minutes from last meeting.
- **Old Business** (Chair)*
  - Review old business, take care of unfinished business -- take votes if needed, chairperson announces the result.
- **New Business** (Chair)
  - Chair asks, *"Is there new business?"*
  - Member rises and addresses the chair. "*Mr./Madam Chairman.*"
  - Chair recognizes the member. "*The chair recognizes Ms. Smith*." Comments are heard, questions are asked, votes are taken, debates occur always with the chairperson maintaining order and decorum. The person with the floor should not be interrupted by others in the room, if they are, the chairperson reminds everyone that they may have a turn to comment when the person is finished talking. If it is a debate, the chairperson may allow comments from anyone as long as members take turns.
  - If the member speaking wants to make a motion, they should say, *(for example), "I move to invite site technical staff to present on _____ at the March meeting."*
  - Another member seconds the motion by saying, *"Second."*
  - The chair states the motion. "*It is moved and seconded to invite site technical staff to present on _____ at the March meeting. Are you ready for the question?"*
  - The members debate the motion in an orderly fashion, with the chair presiding. The chair should say, "*The chair recognizes Mr. Jones to speak to the motion."* And so-on, until the debate is heard.
  - The chair puts the question before the advisory team and the members vote. *"Those in favor of inviting site technical staff to present on _____ at the March meeting, raise your hand." "Those not in favor?"* Majority vote.

Attachment B. Robert's Rules

- The chair announces the result of the vote. *"In Favor has it, and the motion carries. We will invite site technical staff to present on _____ at the March meeting."* This is also a good time for the group to decide who is going to be in charge of contacting the site technical staff and arranging for them to come to the March meeting.
- Updates by project technical staff and topic presentations by agency staff, potential responsible parties, other speakers CITCAT members want to invite to meetings.
- Questions and comments from the public are taken during this part of the meeting; chair presides over the exchange of questions and answers and maintains order during this time. The secretary should record all questions and comments and submit them to MoDNR in writing (email to Jennifer Lamons at jennifer.lamons@dnr.mo.gov).

- **Announcements** (Chair)
  - Announce the date, time and location of the next meeting. *"We need to set the date for the next meeting. It looks like the second Tuesday of next month is the usual date. Shall we meet next at 5 p.m. on January 9? Hearing no objection, we'll meet next on January 9 here at the fire station."*
- **Adjourn** (Chair)
  - *"There being no further business to come before the advisory team, the meeting is adjourned."*

Other Procedural Items

- *To change operating procedures, core group votes – majority vote. Chairperson does not vote, unless there is a tie.*
- Only the core votes on administrative items.
- Members and core members vote on everything else.
- Jennifer will send public notice of meeting to chairperson to post on the front door of meeting place. She will receive meeting minutes from secretary, review and send to Amy Poos to post on the site's webpage. Jennifer will receive questions from the secretary and disseminate to the appropriate authority. She will also create public notices for meetings and send to Amy to post on the department's webpage, make copies needed for CITCAT meetings and arrange meeting locations for CITCAT meetings.

*Old Business is (in this order):

- Any item that was pending when the previous meeting adjourned.
- Business items that were on the "old business" list in the previous meeting but were still not taken up before adjourning.
- Any item that was purposefully postponed to the following meeting.

To learn more about Robert's Rules of Order, visit the following webpages:
robertsrules.org/
rulesonline.com/rror-01.htm
afsc.noaa.gov/education/activities/PDFs/SBSS_Lesson6_roberts_rules_of_order.pdf
parlipro.org/

Attachment C. 1986 Notice of Communication

8-4-86
8-11-86
8-11-86

#

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

MEMORANDUM TO THE FILE

File NPC - 3023-87

Date 8/4/86

Field ( )
Telephone ~~X~~

FACILITY Sunstrand Tubular Products, Camdenton, allegedly dumping waste metals into the lake from a plant discharge

PERSONS INVOLVED

Name	Representing
David Ramsey	U.S. EPA, Jefferson City

SUMMARY OF CONVERSATION Mr. Ramsey got a call from Kay Dempsey, I & U Real Estate, 54 West Camdenton, ph # 346-4869 alleging that Sunstrand Tubular Products has a discharge pipe that drains to a ravine, then into a small creek, and into the lake near Normac Estates. The discharging activity allegedly is predominately on weekends.

Mr. Dick Craig is also familar with the problem - he lives in Normac Ests. - He's a postal employee in Springfield & is hard to get in touch with. ph # 346-3851.

~~ACTION TAKEN~~ Some one should call Ms. Dempsey & let her know it will be investigated.

found no evidence of illegal discharge

Signature

Camdenton Treatment Plant Lagoon
Camdenton, Missouri
Pre-CERCLA Screening
Camdenton, 1987

City of Camdenton

112 Court Circle P.O. Box 1048
Camdenton, Mo. 65020
314 - 346 - 3600

January 19, 1987

POTW RCRA Hazardous Waste Project
Attention: Michael Turvey
Water Management Division
U. S. Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Mr. Turvey:

Enclosed is the Hazardous Waste Response form received by the City of Camdenton, Missouri.

Per our telephone conversation, the City of Camdenton has five lagoons in our system. We only have one lagoon that receives any hazardous waste. I have enclosed a print-out that shows the different chemicals.

At the present time, the Factory Lagoon, permit No. MO0048577 receives the sewage from the Sundstrand Tubular Company, who, pretreates before we receive it.

Construction has started on a new collection line which will take the sewage to the C.P. White Lagoon (MO0048569). Upon completion of that line, we will do away with the Factory Lagoon. Our long range plans are to eliminate all lagoons and have a treatment plant at the C.P. White Lagoon.

If you have any questions, please feel free to call me at (314)346-3600.

Sincerely,

Donald Roger Elder
City Administrator

DRE/bc

Encl.

cc: Mayor Kelsey
File

HS01204

.on

J

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The information shown [illegible] associated with the water supply layers. The well/facility number corresponds to the well/facility numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is received. Source: Missouri Department of Natural Resources, Public Drinking Water Program. Production Date: September 20, 1994

review the following information. The most critical items to complete/correct are the System Name, Local Well , Date Drilled, Total Well Depth, Depth of Casing, Current Yield, Date Abandoned (if abandoned), and Chlorination. tionally, please check the well locations on the accompanying map for accuracy. If the well is placed incorrectly, ase correct the location. If the information requested is not available, write "N/A" in the corresponding blank. If ou have any questions about this information request, please call the Public Drinking Water Program at 314-751-5331. After completed, please mail to PDWP, P.O. Box 176, Jefferson City, MO 65102. We appreciate your cooperation.

FOR OFFICIAL USE ONLY

DO NOT ALTER

DNR Well Number	[illegible]	[illegible]	[illegible]
DNR Region	Jefferson City	Jefferson City	Jefferson City
County	Camden	Camden	Camden
USGS 7.5' Quadrangle	Camdenton	Green Bay Terrace	Green Bay Terrace
Latitude	38 0 10.5 N	38 0 5.8 N	38 0 29.6 N
Longitude	92 44 18.8 W	92 45 36.6 W	92 45 17.9 W
System Name	Camdenton	Camdenton	Camdenton
Local Well Name	Rodeo Grnds	Blair hgts	Mulberry lane
DGLS Well #	20180	27877	
Date Drilled (year)	61	74	86
Material (C/L)	C	C	C
Total Depth (ft)	940	1060	900
Casing Depth (ft)	450	400	400
Casing Size (in)	8	10	12
Casing Type	S	S	S
Screen Length (ft)	None	None	None
Screen Size (in)	None	None	None
Static Water Level (ft)	254	315	165
Current Yield (gpm)	380	330	600
Head (ft)	50	100	85
Draw Down Level (ft)	375	395	265
Pump Test Date (year)	1984	1990	1994
Yielding Geologic Layer	Potosi	Potosi	Potosi
Pump Type	Vert. Turbine	Vert Turbine	Turbine
Pump Depth (ft)	420	450	350
Pump Capacity (gpm)	380	330	600
Standby Power (Y/N)	N	N	N
Date Abandoned (year)	N/A		
Date Plugged (year)	N/A		
Chlorination (Y/N)	N	N	N
Filtration (Y/N)	N	N	N

HS01205

MISSOURI CLEAN WATER COMMISSION

3.030 Camden County
Gerbes Camdenton Shopping Center

October 4, 1974

Gerbes Profit Sharing Pension Trust
132 West Moniteau
Tipton, Missouri 65081

Gentlemen:

An investigation was made of the condition and operation of the waste stabilization lagoon serving the Gerbes Shopping Center at Camdenton, Missouri on October 2, 1974. The following unsatisfactory features were observed and recommendations are made for their correction.

UNSATISFACTORY FEATURES:

1. Vegetation on the dikes needed mowing.

COMMENTS:

1. Excessive vegetation on the dikes prevents proper operation and maintenance of the facility. Muskrats or other problems may not be detected due to excessive vegetative growth. Vegetation that falls into the lagoon or grows in the edge of the water provides a breeding place for mosquitos in addition to adding to the organic loading of the facility.

2. The water level in the lagoon appeared to be about 1 foot in depth. The low water level and the fact that this facility has a fairly constant inflow indicated that the lagoon floor may have a very high percolation rate. If this is the case, the lagoon will require sealing. The state geologist will be requested to make an investigation to determine if the lagoon floor is leaking.

3. This inspection was conducted in connection with your application for an operating permit. Issuance of the permit will require monitoring and analyses of the effluent. The parameters to be monitored and reporting schedule will be contained in the new permit. This permit should be read carefully when it is received.

HS01206

Factory Lagoon

Hulett #3

MISSOURI DEPARTMENT OF NATURAL RESOURCES

INSPECTION OF WASTEWATER STABILIZATION LAGOONS

NPDES Permit No. MO-0048577 Type of Facility: Lagoon 1 cell

Name of Permittee: City of Camdenton Telephone No. 346-7293

Person Contacted: Bud Riley Date: June 30, 1980

Inspected by: J. Locke Daily Average Flow: N/A

Population: N/A

ITEMS INSPECTED	CONDITION	COMMENTS
A. Lagoon		
1. Control of Vegetation	S	This lagoon is full of solids at one end and is shortcurcuiting.
2. Control of Erosion	S	
3. Control of Floating Mats	M	
4. Control of Insects	S	
5. Control of Burrowing Animals	S	Industrial waste must be controlled.
6. Fence and Gate	M	
7. Posted	S	
8. Access Road	S	
9. Structure - Inlet	S	
- Outlet	S	
10. Berms		
11. Surface Drainage	S	
12. Operating Depth	S	
B. Additional Units		
1. Submerged Sand Filter		
2. Chlorination Facilities		
3. Flow Measurement	U	
C. Records and Reports		
1. NPDES	U	
2. In-Plant Testing	None	
3. Tests Performed by:	---	
4. Operator Certification	U	
D. Observation of Plant Effluent	U	

Rating Codes: S = Satisfactory; U = Unsatisfactory
M = Marginal; NA = Not applicable

HS01207

Permittee Name Camdenton, Missouri

City/State Camdenton, Missouri

Hazardous Waste Response

1) Is any waste, either non-hazardous or hazardous, discharged directly inside the boundaries of your wastewater treatment plant(s) by truck or rail car or is any waste delivered by a pipeline carrying wastewater only from industry? X yes ____ no.

If the above question is answered "no", please sign below and return this page. No other questions need to be answered.

If question #1 is "yes" please indicate the name and NPDES permit number of each treatment plant receiving waste in the described manner, and answer the following questions.

	Treatment Plant Name	NPDES Permit No.
1.	Factory Lagoon	MO 0048577
2.	C.P. White Lagoon	MO 0048569
3.		

2) Do you have procedures for verifying whether wastes brought directly to the treatment plant by truck, rail, or dedicated pipeline are hazardous as described in Enclosure 1? X yes ____ no.

3) Are any wastes discharged inside the treatment plant boundaries accompanied by a "Uniform Hazardous Waste Manifest" (see Enclosure 2)? ____ yes X no.

4) To your knowledge, have you, do you, or will you receive hazardous waste as described in Enclosure 1 directly at the treatment plant by truck, rail, or dedicated pipe? ____ yes X no. If yes, briefly describe type of waste and method of transport. _____

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 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.

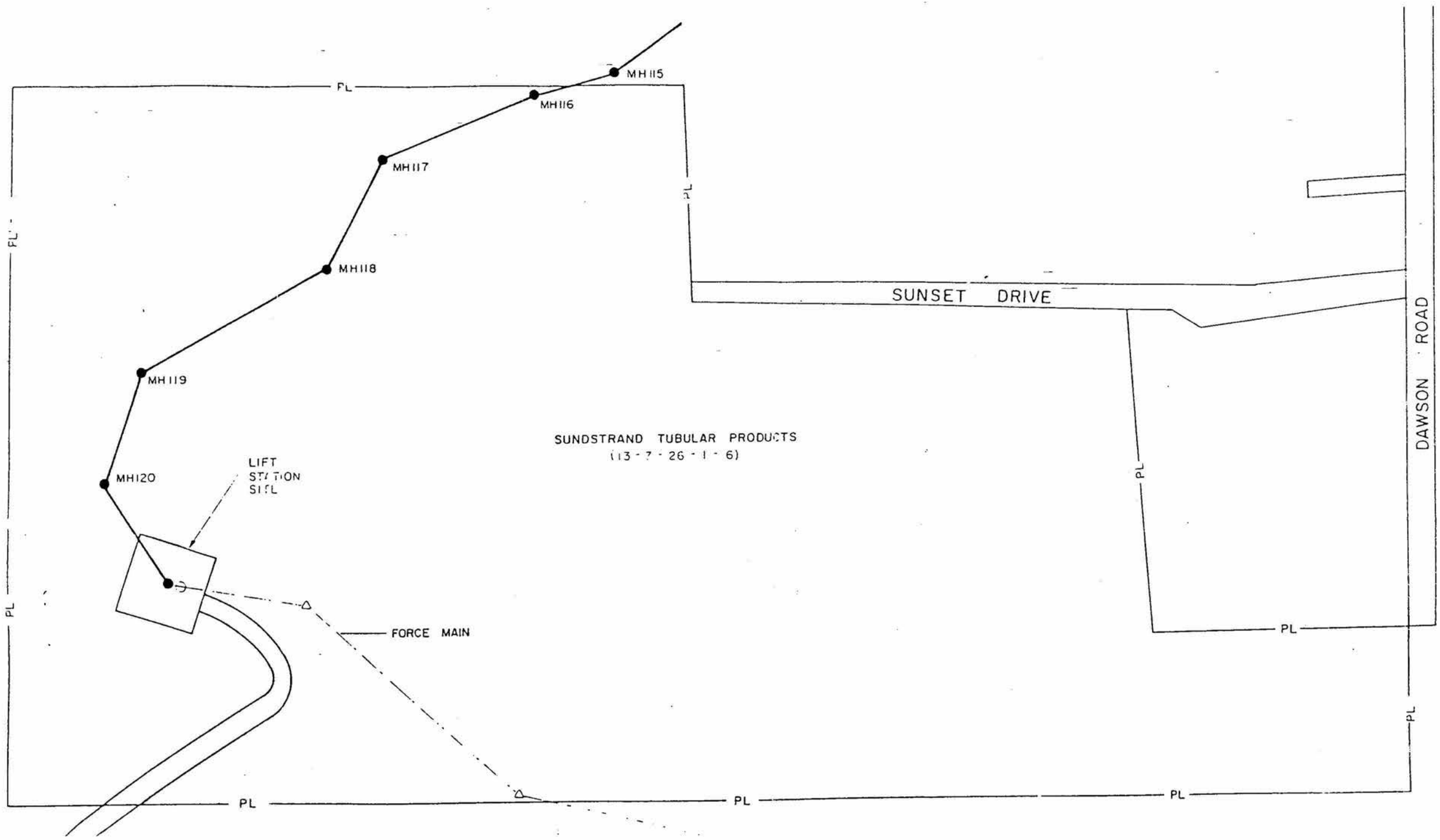
name: Donald Roger Elder
title: City Administrator

Signature of Authorized Official

Telephone No.: (314)346-3600

Date January 19, 1987

HS01208


MH115
MH116
MH117
MH118
MH119
MH120
PL
SUNSET DRIVE
DAWSON ROAD
SUNDSTRAND TUBULAR PRODUCTS
(13 - 7 - 26 - 1 - 6)
LIFT
STATION
SITE
FORCE MAIN

Camdenton Treatment Plant Lagoon
Camdenton, Missouri
Pre-CERCLA Screening
Camdenton, 1986

City of Camdenton
112 Court Circle P.O. Box 399
Camdenton, Mo. 65020
314 - 346 - 3600

March 12, 1986

Mr. Dave Friese
Project Engineer
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

RE: (DG-011-Camdenton

Dear Mr. Friese:

This letter is being provided to you describing the proposed procedures the City will use in abandoning the existing lagoon where Sundstrand Tubular now discharges. This lagoon is to be abandoned when the new trunk line and lift station have been constructed to transfer this flow to the C.P. White lagoon.

As suggested in your letter dated October 23, 1985, we have contacted the industry to see if the testing could be combined. They have informed us that all their testing will be handled by an outside laboratory and that they will not have any facilities themselves to help us. The City will obtain a laboratory to sample and test the lagoon sludge so that it can be disposed of after declassification.

Our present proposed plans are as follows:

1) After the pretreatment unit, trunk sewer, and lift station are in service, the lagoon will be taken out of service and all flows diverted to the new lines.

2) The lagoon will be allowed to settle for a period of approximately 30 days to allow for settlement of the sludge.

3) After this 30-day waiting period, the liquid contents will be pumped into the new sewer line to be transmitted to the C.P. White lagoon.

4) After the liquid has been removed to the lowest possible point, we will obtain a laboratory to sample and test the sludge for classification of the metals settled into the sludge.

5) After this information is made available, we will supply it to your agency. Until that time, we cannot know what requirements there will be for disposition of the sludge. If the levels are low enough, we would hope to just cover the site and leave the sludge where it is. If the levels are too high for this, we will dispose of the sludge in a method approved by you at that time.

I wish to ensure you that the City of Camdenton will work closely with your agency in an effort to abandon this lagoon in an approvable and safe manner.

Sincerely,

Kathy Kelsey

Kathy Kelsey
Mayor

Camdenton Treatment Plant Lagoon
Camdenton, Missouri
Pre-CERCLA Screening
MDNR, 1989A

JOHN ASHCROFT
Governor

G. TRACY MEHAN III
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

October 4, 1989

The Honorable Mac Webster
Mayor of Camdenton
112 Court Circle, P.O. Box 1048
Camdenton, MO 65020

Re: C290825-02 Camdenton, Missouri

Dear Mayor Webster:

We have received notification that June 8, 1989, has been established as the date the above referenced wastewater improvement project has officially gone "on-line" or commenced operation. It is very important that you sign and return the enclosed concurence letter establishing this date. Failure to do so may delay future grant reimbursement payments. You are reminded that one year from this date you are required to submit the "Certification of Performance for Publicly Owned Treatment Works" for this project. This office will make every attempt to remind you of this requirement at least 30 days prior to this one year certification date.

During this initial year of operation, your consulting engineer is to maintain contact with the recently constructed project to direct the initial operation of the facilities and may be required to train operating personnel. The engineering services contract should reflect the scope of these activities.

This contract should also have required the engineer to make periodic visits to the facility to be followed by written reports as to the facility's operating status and recommendations for improving performance. These reports are expected to be a very important tool for you to use in "tracking" the initial operation of your wastewater facilities.

File Foundation IDG-011

MEMORANDUM

DATE: November 19, 1984

TO: Dave Freise

FROM: Richard J. Laux Richard J Laux

SUBJECT: Memo of November 2, 1984

After discussing this project with the Jefferson City Regional Office and Frank Dolan of our staff, I can offer the following comments:

1. Plans and specifications of the proposed pretreatment facilities at Sunstrand have not been received and hence no statement can be made regarding them.

2. The overall concept is agreeable to the JCRO which has primary authority for pretreatment and municipal management under MMS.

3. "Secondary treatment" no later than June 30, 1988 will be required of the city for any of it's facilities.

4. Our "concurrence" with this proposal does not relieve Sunstrand (or the city) of its obligations in meeting deadlines and other aspects of the federal pretreatment requirements.

5. The JCRO is responsible for ensuring that the proposal will not result in the hydraulic or organic capacities of the referenced lagoons from being exceeded unless the proposal is in accordance with the CWC's sewer extension policy.

Attached is a memo from Frank Dolan on the same subject. I would also suggest that you contact Jerry Croy prior to your final decision. If you have any questions please advise.

Attachments

June or July 1985 pretreatment completed

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

1.700 Camdenton

MEMORANDUM

DATE: November 19, 1984

TO: Robert H. Hentges thru Richard J. Laux RJL

FROM: Frank Dolan RJL for FD

SUBJECT: Camdenton Industrial Grant IDG-011

What is best for the city of Camdenton?

1. Preserve and expand the Sunstrand Plant in the city.

2. Eliminate the Factory Lagoon, #3.

3. Modifications should conform to the long range plan to provide sewers in the city.

Regional Office direction from Curtis Ogg was to eliminate all influent line to #3 by installing a pump station to pump-over to the C.P. White Lagoon. This is part of the long range plan as noted by Dave Freise.

The industry will have to pretreat their process wastes to remove heavy metals, especially copper and zinc, and to remove solvent organics, especially trichloroethylene. Residues from pretreatment will be a problem for Jim Wells at JCRO and the Waste Management Program to address.

Sludges in #3 will need to be tested for determining proper disposal. Comprehensive sampling of sediments will be needed as the lagoon is drained and final plans are put into action.

Efforts to correct any lagoon operation problems will be focused on the C.P. White lagoon and other lagoons in Camdenton. The additional hydraulic load on the C.P. White Lagoon is not perceived as a problem by Curtis Ogg. He wants to move Camdenton's attention to consolidating problems and providing long term solutions to them.

FD/gt

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

MEETING RECORD

FILE: Camdenton; Sunset Drive Facility Pre-treatment Process DATE: April 12, 2018

Meeting: At 1730 East Elm

SUBJECT: Speaking with Dale Bland about the operations of the pretreatment plant and disposal of TCE.

PERSONS INVOLVED:	REPRESENTING:
Valerie Wilder	MDNR, HWP, Superfund
Michael Stroh	MDNR, HWP, Superfund
Travis Lyon	MDNR, HWP, Superfund
Dale Bland	Former Pretreatment Operator

SUMMARY OF CONVERSATION:
Mr. Bland traveled to Jefferson City to follow up on the phone discussion that took place on April 6 regarding pretreatment operational history and TCE disposal at the Sunset Drive facility in Camdenton Missouri. Mr. Bland brought hand written notes to the meeting which are scanned and can be found below (note: In Mr. Bland's notes 1984 is listed as the pretreatment system starting date however Mr. Bland informed staff that date should be 1986).

Mr. Bland began working at the facility in production in 1972. Mr. Bland worked on the facility's maintenance crew from 1974 to 1986 for Sundstrand. From 1986 when the pretreatment became operational to 1999 (Modine bought the facility in 1990), Mr. Bland operated the treatment system on the day shift. Mr. Bland explained the distilling process used for cleaning the four (to five) degreasers (the machine numbers were M184, M185, M394, and M460). Waste from cleaning of the degreasing tanks' waste was either stored in storage tanks next to the degreasers for reuse or sent off site and used by a concrete company for kiln fuel. The Degreasing waste that was sent off site usually had a fairly high concentration of oil and was darker in color than most "honeys" (honey is a term to describe used TCE). The company reused the distilled TCE that was usually a very light "honey color" unlike virgin TCE which was clear in color. In the early years, maintenance employees entered the degreasers to clean out the aluminum "fines". In the 1980's a portable air operated vacuum system was used to vacuum the degreasers' fines out, thus ceasing employee entrance into the units being cleaned. The fines were removed to prevent "hot spots" which could turn the TCE acidic and possibly cause a fire similar to the fire in 1972. The waste from cleaning out aluminum fines was disposed on site into the environment. In the late 80s TCE was leaked around the mono rail system but this did not enter the pretreatment system. Mr. Bland referred to an event some time prior to 1984, when TCE waste was neutralized by treatment with soda ash and placed into 18-20 barrels which were stored on-site. He did not know how the barrels were disposed of.

Hex Chrome was treated at the source with lime and, after PH neutralization, was flushed down the drains. This was done until the waste treatment system was put "online" in 1986.In a similar note, Mr. Bland believes the Alkali solutions were neutralized and treated in the same fashion.

DMP Corporation installed the pretreatment system which was operational on April 14, 1986. The pretreatment system processed 30,000 gallons of waste per day but was reduced to 1,500 gallons a day following process changes later in its use. Pretreatment was used for chrome plating line neutralization. Cleaning agents were disposed of in holding tanks once pretreatment was operational. TCE did not enter the pretreatment system except through incidental drippage off of parts onto the factory floor where they may have entered floor drains directed into the system tank number two known as “rinse water accumulation”. Mr. Bland also mentioned that an alternative solvent called Genesolv® which consists of pentafluoropropane and trans-1,2-dichloroethene was used by the company for a short period as the company transitioned from using TCE to 1,1,1-trichloroethane (TCA). The pretreatment was not designed to treat TCE and according to Mr. Bland, there was very little aeration of water processed through the system. Tests of the system’s effluent were conducted one to three times daily, but did not include TCE testing.

The treatment of the tanks was controlled by Ph and ORP sensors. If the system went outside the set parameters, it would go into a "mistreat" mode and all water treatment would stop until the affected treatment tanks were back within set specs. Water would be redirected into an "emergency' holding tank and then would drain back into waste water holding to be treated.

Mr. Bland also pointed out a point he noticed in the Camdenton TCE Timeline (posted on the website) that Modine did not replace the concrete floor in the Sunset Drive Facility, but capped the floor with about 6” of concrete on top of the existing floor. The Timeline mentions a document from Modine to the department that states the facility’s floor was replaced in the mid-90s.

Below are notes Mr. Bland brought to the meeting for staff. The notes go into the details about what cleaning agents were used in the pretreatment system and Mr. Bland provided a diagram of the pretreatment system:

Stem testimony April 14, 1986

Early 1980's

aqueous Parts Cleaning

Am Chem® Products

Ridolene 53 — Long Coil Cleaning Line

Ridolene 27 — Alum cleaning Line

Deoxidizer LNC — Acid Bath

Citric Acid

Oakite® alkali cleaner -

Sulfuric Acid

} Copper cleaning Line

Chromic Acid - — Chrome plating Line (Tooling Dept)

1984 Chrome & then about 1986

Chrome & Copper precipitation

1996 Product change -

Potassium Fluoride For

Furnace aluminum brazing

I operated Waste H_2O on

Day Shift 1986 through 1999

Parts Lubrication

alcohol based w/oil
modine #s
PS-1805
PS-1815
Concentrated use areas in facility
AFTER closure LEFT
"Snowflake" Patterns on Floor

Timeline —
1983 Hex Chrome "treated"
neutralized w/ Lime & Dumped down drain

1/14 - 1984 Waste Neutralized System
Started (To the Best of my memory)

1990 - modine purchased facility
Change d from TCE to "genesolv" for short time
in Conveyor Degreaser & Then all degreasers
to 1,1,1 TCA

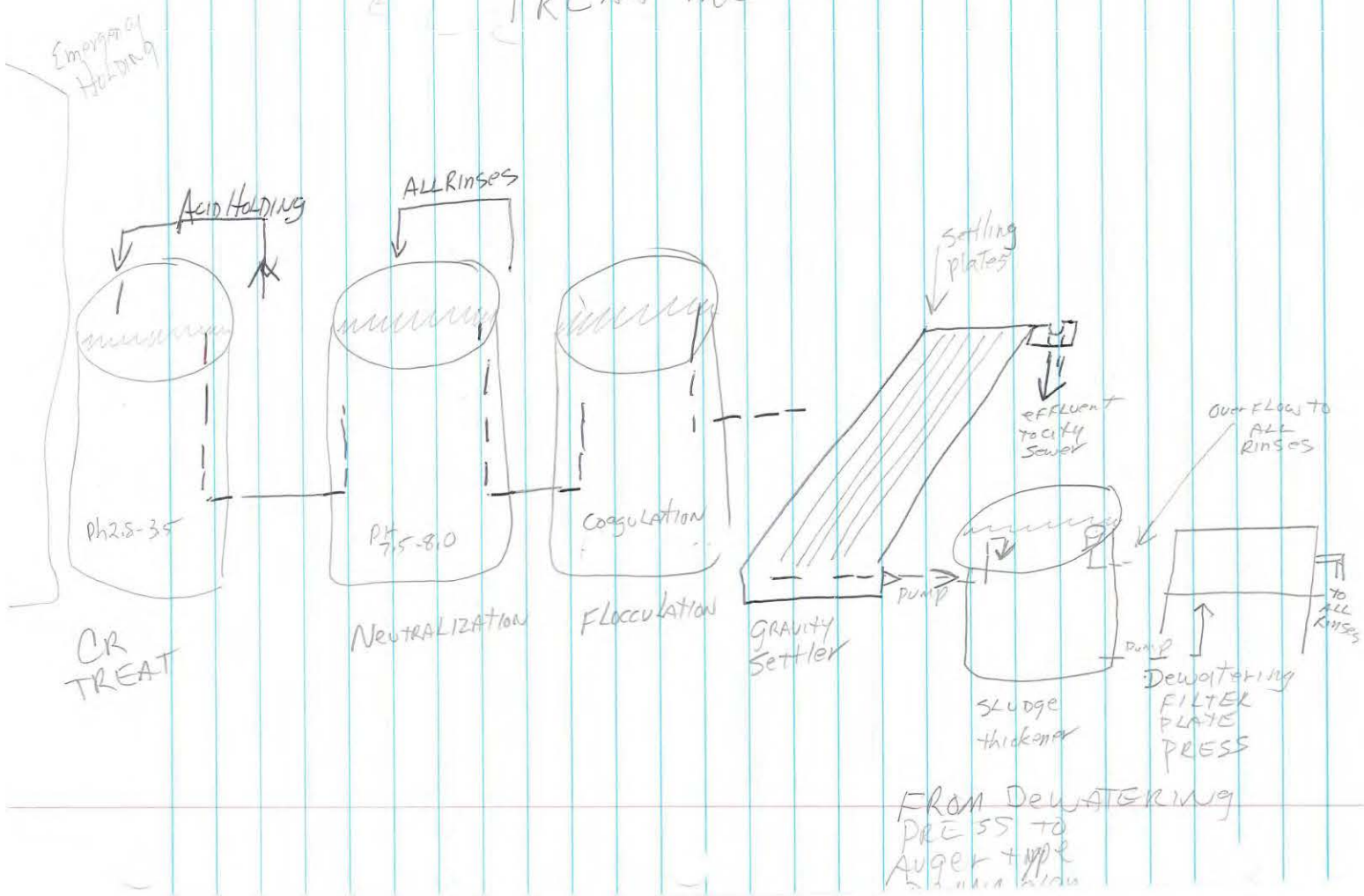
P, T

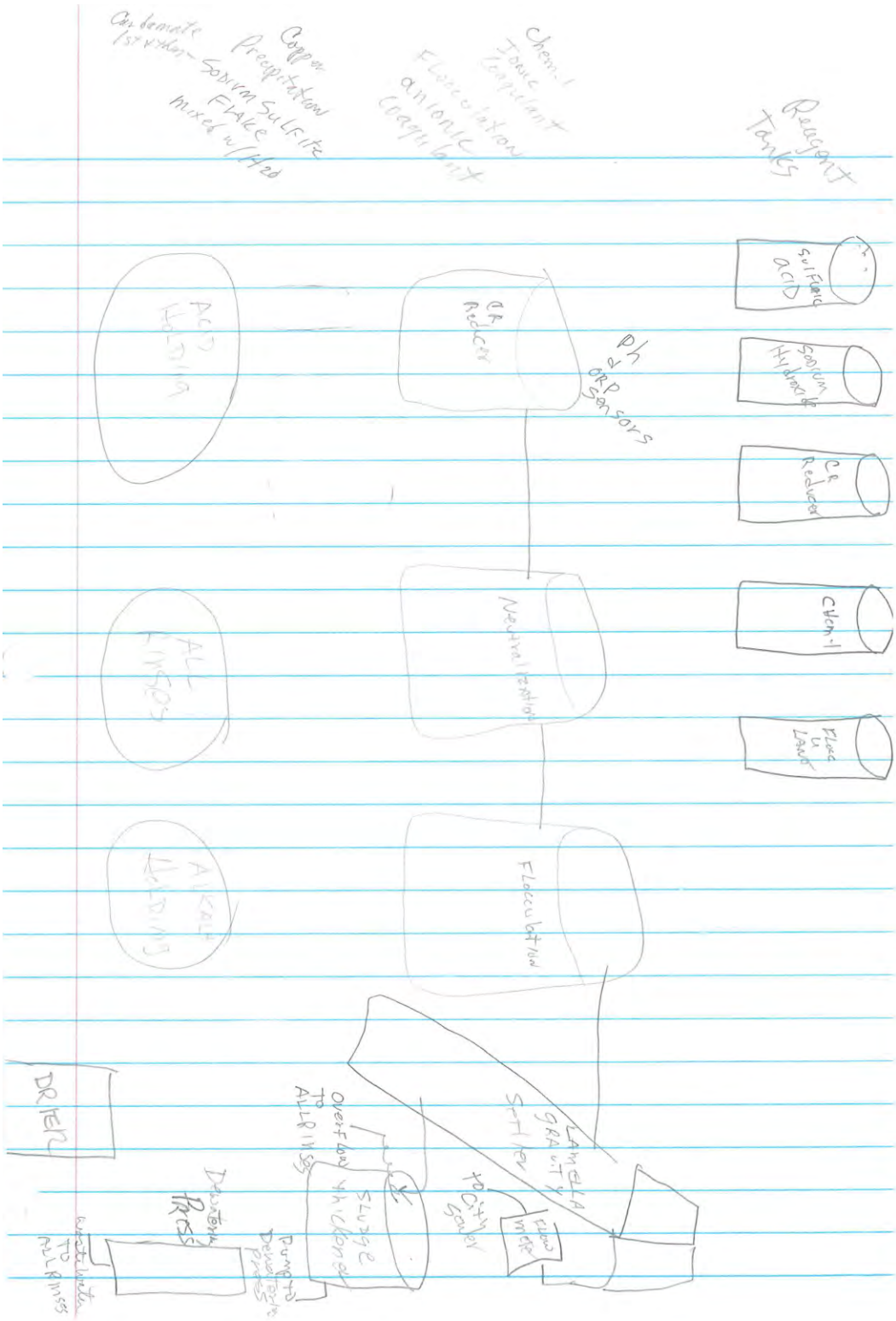
ALKALI HOLDING

ALL RINSES

ACID HOLDING

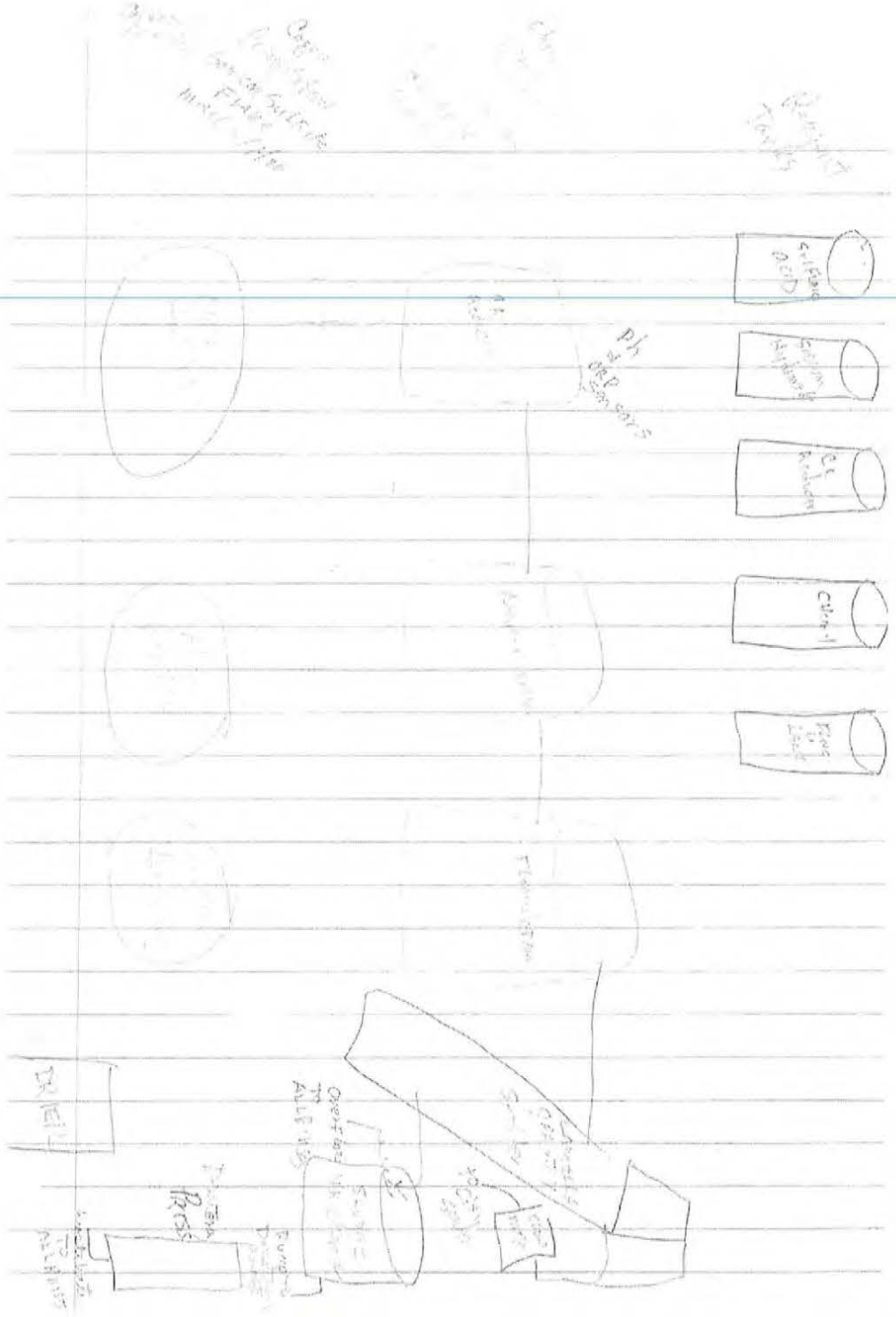
TREATMENT


Emergency Holding
Acid Holding
All Rinses
Settling plates
Effluent to city sewer
Overflows to All Rinses
Ph 2.5-3.5
PH 7.5-8.0
Coagulation
Pump
To All Rinses
Pump
CR TREAT
Neutralization
Flocculation
Gravity Settler
Sludge thickener
Dewatering Filter Plate Press
From Dewatering Press to Auger type



Environmental Specialist

Date of Signature



Travis Lyon

Environmental Specialist

4/6/2018

Date of Signature

Sundstrand Tubular Products, Inc.
subsidiary of Sundstrand Corporation

SUNSET DRIVE • P. O. BOX 636 • CAMDENTON, MISSOURI 65020 • TELEPHONE 314-346-5693

December 15, 1986

The Honorable Kathy Kelsey, Mayor
City of Camdenton
P. O. Box 786
Camdenton, MO 65020

Dear Mayor Kelsey:

This letter is to confirm the operation of our wastewater pretreatment facility. The system was started March 28, 1986 and continually meets Federal PSES discharge limits.

As agreed to at the pretreatment meeting of September 5, 1984, attended by Bud Riley, Jim Jackson, Curtis Ogg, Thomas Phillip, Tom Misiak and myself, Sundstrand designed and installed a system capable of meeting the PSES Metal Finishing Regulations of July 15, 1983 and the Total Toxics Organics limits of February 15, 1986.

Sundstrand requests a wastewater discharge permit if required by city ordinance. In the interim, we will continue to operate the pretreatment system and voluntarily monitor the effluent for Total Chromium, Hexvalent Chromium, Copper, Lead, Zinc, Total Suspended Solids, Grease & Oil, Trichloroethylene and p.H. on a monthly basis. In the past we had also tested for Cadmium, Nickel, Silver and Cyanide, but consistently have been below detection levels with these metals. We will test for all parameters if we have any process changes.

Attached is a copy of our monitoring data to show the integrity of this process. Let me know what permit forms are required and any fees that might be required.

Sincerely yours,

Don Mans

Don Mans
Plant Engineer

DM/jcg
Attach.

PRETREATMENT TESTS

DATE	LAB	CD(T)	CR(T)	CU(T)	PB(T)	NI(T)	AG(T)	ZN	CR(6)	TSS	GRO	CN(T)	TCE	PH	NOTES
(PSES)	LIMITS	.69	2.77	3.38	1.69	3.98	.43	2.61				1.2		6 TO 9	
4-24-86	MMTL	<.01	.13	.20	<.05	<.02	.01	.07	<.02	15	3.6	.03	<10	8.6	ALUMINUM SULPHATE AS CHEM 1
5-2-86	MMTL	<.01	.76	1.1	<.05	<.02	<.01	.10	.51	10	16	.06	14	8.6	CALCIUM CHLORIDE AS CHEM 1
5-7-86	MMTL	.01	.12	1.5	<.05	<.02	<.01	.21	<.02	4	26	<.01	<10	8.6	
5-15-86	MMTL	<.01	.03	.37	<.05	<.02	<.01	.09	<.02	8	13	.02	40	8.6	
5-15-86	MMTL	<.01	.05	.83	<.05	<.02	<.01	.05	<.02	13	38	<.01	150	8.6	CHEM 1 ADDED TO CR TREAT
5-15-86	DMP	.02	.14	.4	.11	.3		.06			6				FE .29
5-20-86	MMTL												1580		10:17 AM (TCE TEST)
5-20-86	MMTL												2230		13:10 PM (TCE TEST)
5-21-86	MMTL	<.01	.04	.39	<.05	<.02	<.01	.07	<.02	13	11	<.01	380	8.6	
6-3-86	MMTL	<.01	.14	.64	<.05	<.02	<.01	.04	<.02	2	6.1	.02	1100		REDUCED CHEM 1 55 TO 50
6-11-86	MMTL	<.01	<.02	.17	<.05	<.02	<.01	.10	<.02	6	5.8	<.01	230	8.5	REDUCED FLOC 55 TO 50
6-18-86	MMTL	<.01	.29	.14	<.05	<.02	<.01	.07	<.02	8	14	<.01	290	8.5	REDUCED CHEM 1 50 TO 45
6-25-86	MMTL	<.01	.42	.12	<.05	<.02	<.01	.03	.07	20	9.1	<.01	240		
8-27-86	MMTL	.03	4.3	56	1.7	.10	<.01	6.1	.03	3350	200				

ALL READINGS MG/L EXCEPT TCE IS IN UG/L

Pretreatment Compliance Audit
City of Camdenton
NPDES Permit Numbers
C.P. White - MO-0048569
Dump - MO-0048585
Hulett - MO-0048577
Wilkerson-Clint - MO-0048607
Parish - MO-0048593

June 20, 1986

On April 15, 1986 an audit was conducted of the Industrial Pretreatment Program as implemented by the City of Camdenton, Ms. Trudy Marco and Mr. D. Roger Elder represented the city and Ms. Leora M. Reising represented the Missouri Department of Natural Resources.

The City of Camdenton received approval to implement the Industrial Pretreatment Program on September 26, 1983 by the Missouri Department of Natural Resources. The City of Camdenton operates five lagoons. However, only one lagoon is of interest to the Industrial Pretreatment Program, that is the Hulett (a.k.a. Factory) lagoon.

FINDINGS:

The City of Camdenton has jurisdiction over their entire collection and treatment system. They operate five lagoons, only one receives an industrial waste. The Hulett lagoon receives the waste from Sunstrand Tubular Products, Inc.

Sunstrand Tubular Products, Inc. is a manufacturer of aluminum and copper components and heat transfer coils for air conditioners, used in homes, automobiles, and various industries. The manufacturing process consists of aluminum and copper cutting and brazing, aluminum etching, and a small amount of chromium electroplating They have installed a pretreatment system to remove heavy metal components from their wastewater primarily from the aluminum etching process. The system was finished prior to the pretreatment audit but the reagent tanks were still being filled so it was not in operation.

The City of Camdenton has not developed their sampling, inspection, and permitting procedures. They need to address a variety of topics in their pretreatment program. An increase in personnel familiar with pretreatment and/or sampling and tracking procedures would be helpful. Parts of the program could be contracted to consultants.

The city personnel involved have been very conscientious but they are working with a handicap of not enough time and resources.

RECOMMENDATIONS:

1. Establish, document, and implement formal sampling procedures.

2. Pursue enforcement actions as specified by the federal pretreatment regulations.

3. Establish local limits with regards to production rates, method of waste treatment, method of sludge disposal, and NPDES discharge limits.

4. Have adequate personnel available or on contract for sampling, analyzing, monitoring, tracking, and enforcing the pretreatment program.

5. Up-date city ordinances and policies with any changes in the federal pretreatment program.

6. Submit all changes of your sewer use ordinance and pretreatment program to the Department of Natural Resources for approval.

Should you have any questions please call the Jefferson City Regional Office at (314) 751-2729.

Submitted By:

Leora M. Reising
Environmental Specialist

Approved By:

B.R. Kesler
Regional Administrator

LR/ko

Enclosure

SEWER PLANT
Meeting with Rick Helms-Helms Environmental Services, Inc.
April 26, 1990

Present:
Rick Helms
Tom Emry
Kent Hixson
Brenda Colter

Referring to letter of March 26, 1990, from DNR regarding sewer plant operation inspection, Helms stressed that annual report on sewer plant operations should be in to state by March 31, of each year.

Very crucial that response to letter be sent to DNR by May deadline.

Sundstrand was discussed. Helms advised at least two reports per year on performance are required. Helms recommended monthly or quarterly reports at this time. Hixson advised will be requiring frequent reports turned in at first.

Regarding annual pretreatment report, Helms advised although requirement for annual report was omitted from pretreatment permit issued to city the requirement is a federal law and must be followed.

Helms advised head work calculations need to be approved by Helms to move ahead. Calculations must be in by September 30, 1990. Helms will need the equivalent of one week of work to finish calculations.

Hixson reported he had met with Sundstrand 3/27/90 regarding pretreatment permit and city's concern that too much copper is going through treatment plant.

After notification if high copper content continues Helms advised city will need to publish letter of noncompliance in newspaper. Section 3.3 and 3.4 of Public EPA Pretreatment Compliance Code and Chapter 68 of City Code sets out procedures to follows and fines involved.

Pre-certification of sewer plant is set for May 4, 1990, 10:30 a.m. Hixson requested Helms to attend. Helms agreed.

Minutes by Brenda Colter

Modine Heat Transfer Inc.,
Box 636
Camdenton, Mo. 65020

January 22, 1991

Mr. Kent L. Hixson
City Administrator
112 Court Circle
Camdenton Missouri 65020

Dear Mr. Hixson:

Enclosed for your information is a copy of the analytical results for the composite sample taken from our Pretreatment system during the 4th quarter of 1990.

Please contact me if you need any additional information.

Sincerely Yours,

Don Mans

Don Mans
Plant Engineer

cc: Tom Sanicola, Modine Corporation
Bob King

ENGINEERING SURVEYS AND SERVICES
TESTING LABORATORY
1113 Fay Street • Columbia, Missouri 65201 • (314) 449-2646
802 El Dorado Drive • Jefferson City, Missouri 65101 • (314) 636-3303

Date 20 December 1990

Lab No. 2201

Project: Sunstrand Tubular Products, Inc. - P.O. #17369

Location: Camdenton, Missouri

Date Received: 14 December 1990

Sample No./ Description: 4660/ Pretreat Sample

TEST RESULTS

PARAMETER	SAMPLE NUMBER
	4660
Cadmium, mg/l	<0.01
Chromium, mg/l	0.18
Copper, mg/l	2.02
Lead, mg/l	0.09
Nickel, mg/l	0.03
Silver, mg/l	<0.01
Zinc, mg/l	0.43
Chromium, Hexavalent, mg/l	<0.02
Total Suspended Solids, mg/l	4
Grease & Oil, gravimetric, mg/l	4.5
Cyanide, mg/l	<0.01
1,1,1 Trichloroethane, ug/l	40.1

CC: 1 A/C P
1 Manns

ENGINEERING SURVEYS AND SERVICES
BY: David A. Bennett
David A. Bennett, P.E.

City of Camdenton
112 Court Circle P.O. Box 1048
Camdenton, MO. 65020
314-346-3600

Richard Kuntz, P.E.
Pretreatment Coordinator
Dept. of Natural Resources
P.O. Box 176
Jefferson City, Mo. 65102

April 23, 1991

RE: 1990 Annual Pretreatment Report

Dear Rick,

As per our phone conversation, please find enclosed the 1990 Annual pretreatment report.

After your review, should you have any questions or require further information, please feel free to contact me. We are looking forward to your annual visit.

Sincerely,

Kent L. Hixson

Kent L. Hixson
City Administrator

encl:

1990 ANNUAL PRETREATMENT SUMMARY
Narrative

During 1990, the City of Camdenton revised and amended the existing pretreatment ordinance to better reflect EPA and DNR changes in the pretreatment regulations.

The City adopted the pretreatment compliance program, "The EPA Pretreatment Compliance Monitoring and Enforcement Guidance Manual".

The City's only significant industrial user (SIU) formerly Sundstrand Tubular Products, now Modine Heat Transfer, submitted a pretreatment application based upon the new EPA/DNR guidelines.

After careful review of the pretreatment application, the Board of Aldermen issued a pretreatment permit.

Due to better communications and a renewed effort to control the chemical content of the effluent, there has been no disruptions at the municipal sewage treatment plant for over a year.

As city staff becomes more familiar with the pretreatment process and what kinds of chemicals can cause problems, we are venturing out into other areas of the community to better educate businesses not to pollute our system.

1990 was a year of education and growth for the city staff in terms of understanding the pretreatment process and DNR requirements. We continue to work well with our only SIU to insure compliance. The City will continue with our outreach program to better inform the community of the DNR guidelines as it relates to pretreatment.

1990
ANNUAL
PRETREATMENT PERFORMANCE SUMMARY

SAMPLE

I. General Information

Control Authority Name City of Camdenton
Address P.O. Box 1048
City Camdenton, Mo. State/Zip 65020
Contact Person Kent Hixson
Contact Telephone Number 314-346-3600
NPDES Nos.
Reporting Period 1990 Annual Summary
Total Categorical IUs One (1)
Total Significant Noncategorical IUs none

I certify that the information contained is complete and accurate to the best of my knowledge.

Kent L. Hixson 4/23/91
Authorized Representative Date
Kent L. Hixson
City Administrator

II. Significant Industrial User Compliance

	SIGNIFICANT INDUSTRIAL USERS	
	Categorical	Noncategorical
1) No. of SIUs Submitting BMRs/No. Required	1/1	NA
2) No. of SIUs Submitting 90-Day Compliance Reports/No. Required	1/1	NA
3) No. of SIUs Submitting Semiannual Report/No. Required	1/1	/
4) No. of SIUs Meeting Compliance Schedule/No. Required to Meet Schedule	1/1	/
5) No. of SIUs in Significant Noncompliance/Total No. of SIUs	1/1	/
6) Rate of Significant Noncompliance for all SIUs (categorical and noncategorical)	0/0	

III. Compliance Monitoring Program

1) No. of Control Documents Issued/No. Required	2/2	/
2) No. of Nonsampling Inspections Conducted	2	
3) No. of Sampling Visits Conducted	4	
4) No. of Facilities Inspected (nonsampling)	1	
5) No. of Facilities Sampled	1	

IV. Enforcement Actions

1) Compliance Schedules Issued/Schedules Required	1	
2) Notices of Violations Issued to SIUs	0	
3) Administrative Orders Issued to SIUs	0	
4) Civil Suits Filed	0	
5) Criminal Suits Filed	0	
6) Significant Violators (attach newspaper list)	1	
7) Amount of Penalties Collected (total dollars/IUs assessed)	0	
8) Other Actions (sewer bans, etc.)	0	

APPENDIX E

SAMPLE PERMIT APPLICATION FORM

Note: Please read all attached instructions prior to completing this application.

SECTION A - GENERAL INFORMATION

1. Facility Name: MODINE HEAT TRANSFER, INC.

   a. Operator Name: MODINE MANUFACTURING COMPANY

   b. Is the operator identified in 1.a., the owner of the facility?
   Yes [X] No [ ]

   If no, provide the name and address of the operator and submit a copy of the contract and/or other documents indicating the operator's scope of responsibility for the facility. _____

2. Facility Address:
   Street: SUNSET DRIVE
   City: CAMDENTON State: MO Zip: 65020

3. Business Mailing Address:
   Street or P.O. Box: P.O. BOX 636
   City: CAMDENTON State: MO Zip: 65020

4. Designated signatory authority of the facility:
   [Attach similar information for each authorized representative]

   Name: GAYLORD OLSON
   Title: PLANT MANAGER
   Address: P.O. BOX 636
   City: CAMDENTON State: MO Zip: 65020
   Phone #: 314-346-5693

5. Designated facility contact:

   Name: DONAVON MANS
   Title: PLANT ENGINEER
   Phone #: 314-346-5696

SECTION B - BUSINESS ACTIVITY

1. If your facility employs or will be employing processes in any of the industrial categories or business activities listed below (regardless of whether they generate wastewater, waste sludge, or hazardous wastes), place a check beside the category of business activity (check all that apply).

Industrial Categories*

[X] Aluminum Forming
[ ] Asbestos Manufacturing
[ ] Battery Manufacturing
[ ] Can Making
[ ] Carbon Black
[ ] Coal Mining
[ ] Coil Coating
[X] Copper Forming
[ ] Electric and Electronic Components Manufacturing
[ ] Electroplating
[ ] Feedlots
[ ] Fertilizer Manufacturing
[ ] Foundries (Metal Molding and Casting)
[ ] Glass Manufacturing
[ ] Grain Mills
[ ] Inorganic Chemicals
[X] Iron and Steel
[ ] Leather Tanning and Finishing
[X] Metal Finishing
[X] Nonferrous Metals Forming
[ ] Nonferrous Metals Manufacturing
[ ] Organic Chemicals Manufacturing
[ ] Paint and Ink Formulating
[ ] Paving and Roofing Manufacturing
[ ] Pesticides Manufacturing
[ ] Petroleum Refining
[ ] Pharmaceutical
[ ] Plastic and Synthetic Materials Manufacturing
[ ] Plastics Processing Manufacturing
[ ] Porcelain Enamel
[ ] Pulp, Paper, and Fiberboard Manufacturing
[ ] Rubber
[ ] Soap and Detergent Manufacturing
[ ] Steam Electric
[ ] Sugar Processing
[ ] Textile Mills
[ ] Timber Products

NOTE: Although we do several of the above operations, it has been determined that we are required to operate under the Metal Finishing EPA catagorical standards. All chemical wastewaters are a result of chemical cleaning and etching of aluminum and copper material.

A facility with processes inclusive in these business areas may be covered by Environmental Protection Agency's (EPA) categorical pretreatment standards. These facilities are termed "categorical users".

2. Give a brief description of all operations at this facility including primary products or services (attach additional sheets if necessary):
Modine Heat Transfer, Inc. manufacturers fin-and-tube coils, and feeder parts for original equipment manufacturers of heating, air conditioning and refrigeration equipment.

3. Indicate applicable Standard Industrial Classification (SIC) for all processes (If more than one applies, list in descending order of importance.):

a. 3585
b.
c.
d.
e.

4. PRODUCT VOLUME:

PRODUCT (Brandname) (levels with others (and no u.l)	PAST CALENDAR YEAR Amounts Per Day (Daily Units)		ESTIMATE THIS CALENDAR YEAR Amounts Per Day (Daily Units)	
	Average	Maximum	Average	Maximum
COILS	750	1000	1000	1500

SECTION C - WATER SUPPLY

1. Water Sources: (Check as many as are applicable)

[ ] Private Well
[ ] Surface Water
[X] Municipal Water Utility (Specify City): CAMDENTON, MO.
[ ] Other (Specify): _____

2. Name on the water bill: MODINE HEAT TRANSFER, INC.

Name: MODINE HEAT TRANSFER, INC.
Street: SUNSET DRIVE
City: CAMDENTON State: MO Zip: 65020

3. Water service account number: Meter # 2-166

4. List average water usage on premises:
[New facilities may estimate]

Type	Average Water Usage (GPD)	Indicate Estimated (E) or Measured (M)
a. Contact cooling water	1902	(E)
b. Non-contact cooling water	2451	(E)
c. Boiler feed	7	(M)
d. Process	5612	(E)
e. Sanitary	1747	(E)
f. Air pollution control	93	(E)
g. Contained in product		
h. Plant and equipment washdown		
i. Irrigation and lawn watering	565	(E)
j. Other		
PRETREATMENT REAGENT DILUTION	544	(E)
k. TOTAL OF A-J	12921	(E)

SECTION D - SEWER INFORMATION

1. a. For an existing business:

Is the building presently connected to the public sanitary sewer system?

[X] Yes: Sanitary sewer account number Based On Meter # 2-166

[ ] No: Have you applied for a sanitary sewer hookup? [ ] Yes [ ] No

b. For a new business:

(i). Will you be occupying an existing vacant building (such as in an industrial park)? [ ] Yes [ ] No

(ii). Have you applied for a building permit if a new facility will be constructed? [ ] Yes [ ] No

(iii). Will you be connected to the public sanitary sewer system? [ ] Yes [ ] No

2. List size, descriptive location, and flow of each facility sewer which connects to the City's sewer system. (If more than three, attach additional information on another sheet.)

	Sewer Size	Descriptive Location of Sewer Connection or Discharge Point	Average Flow (GPD)
SW1	6"	Manhole in front of maint Plant entrance.	4374
PW9	6"	Manhole in front of Main entrance	13597
SW2	6"	Connected to line East of plant	4374

NOTE: 8747 GPD sanitary water estimated in Section C4e is divided evenly for the two sanitary waste lines.

SECTION E - WASTEWATER DISCHARGE INFORMATION

1. Does (or will) this facility discharge any wastewater other than from restrooms to the City sewer?

   [X] Yes If the answer to this question is "yes", complete the remainder of the application.

   [ ] No If the answer to this question is "no", skip to Section I.

2. Provide the following information on wastewater flow rate. [New facilities may estimate]

   a. Hours/Day Discharged (e.g., 8 hours/day):

   M 17 T 17 W 17 TH 17 F 17 SAT 8½ SUN 0

   b. Hours of Discharge (e.g., 9 a.m. to 5 p.m.):

   M 7-12 T 7-12 W 7-12 TH 7-12 F 7-12 SAT 7-3:30 SUN ____

   c. Peak hourly flow rate (GPD) NA

   d. Maximum daily flow rate (GPD) 18653 *

   e. Annual daily average (GPD) 3788

3. If batch discharge occurs or will occur, indicate: [New facilities may estimate]

   a. Number of batch discharges _____ per day

   b. Average discharge per batch _____ (GPD)

   c. Time of batch discharges _____ at _____
   (days of week) (hours of day)

   d. Flow rate _____ gallons/minute

   e. Percent of total discharge _____

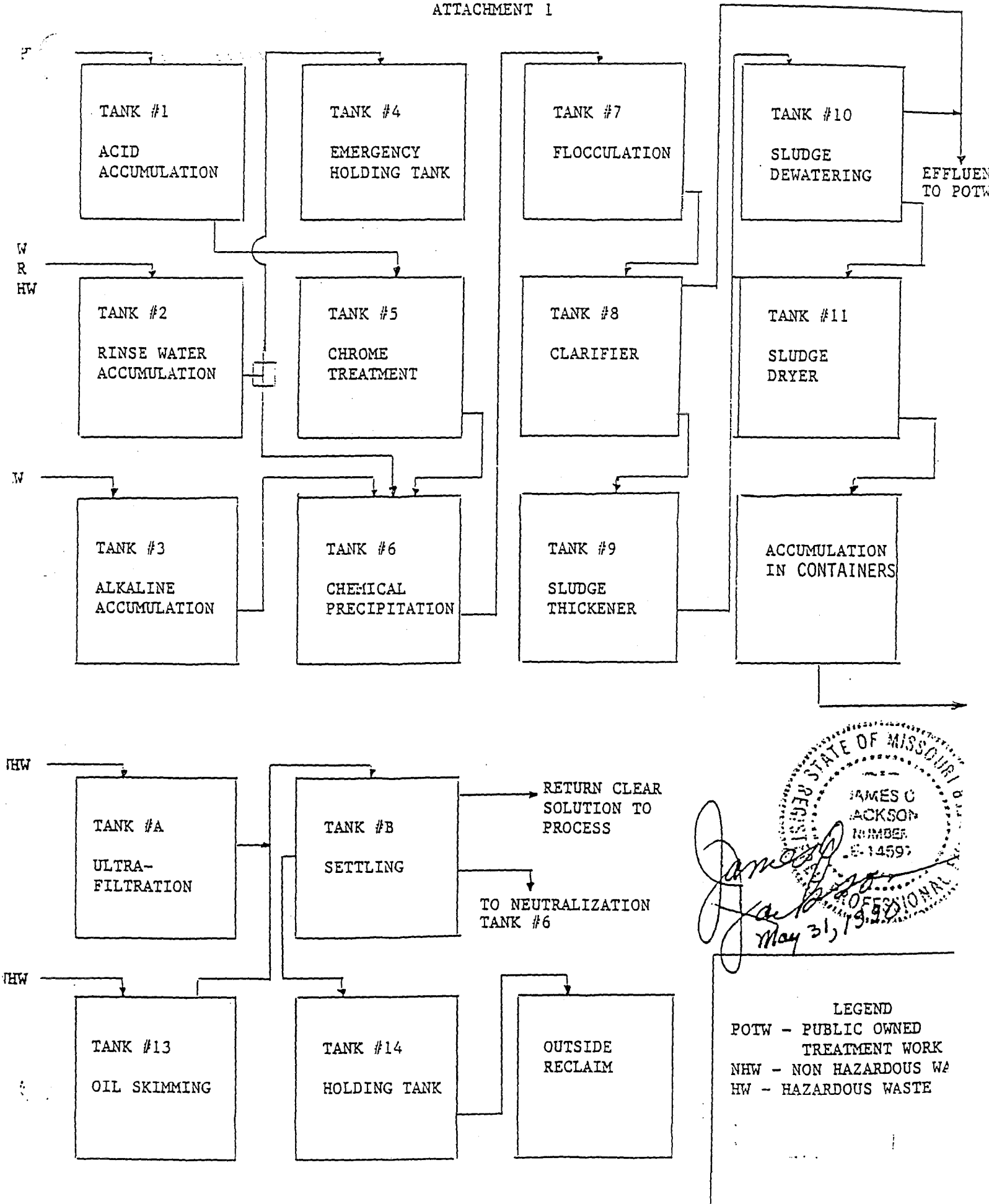
* One day maximum flow rate taken from daily flow in pretreatment operating log and estimated sanitary.

4. Schematic Flow Diagram - For each major activity in which wastewater is or will be generated, draw a diagram of the flow of materials, products, water, and wastewater from the start of the activity to its completion, showing all unit processes. Indicate which processes use water and which generate wastestreams. Include the average daily volume and maximum daily volume of each wastestream [new facilities may estimate]. If estimates are used for flow data this must be indicated. Number each unit process having wastewater discharges to the community sewer. Use these numbers when showing this unit processes in the building layout in Section H. This drawing must be certified by a State Registered Professional Engineer.

See Attachment 1

PRETREATMENT PERMIT APPLICATION

ATTACHMENT 1



Facilities that checked activities in question 1 of Section B are considered Categorical Industrial Users and should skip to question 6.

5. For Non-Categorical Users Only: List average wastewater discharge, maximum discharge, and type of discharge (batch, continuous, or both), for each plant process. Include the reference number from the process schematic that corresponds to each process. [New facilities should provide estimates for each discharge].

No.	Process Description	Average Flow (GPD)	Maximum Flow (GPD)	Type of Discharge (batch,continuous,none)

ANSWER QUESTIONS 6 & 7 ONLY IF YOU ARE SUBJECT TO CATEGORICAL PRETREATMENT STANDARDS

6. For Categorical Users: Provide the wastewater discharge flows for each of your processes or proposed processes. Include the reference number from the process schematic that corresponds to each process. [New facilities should provide estimates for each discharge].

No.	Regualted Process	Average Flow (GPD)	Maximum Flow (GPD)	Type of Discharge (batch,continuous,none)
1	Aluminum Cleaning Line	400	2,880	Intermittent
2	Copper Cleaning Line	1,849	5,270	Intermittent

No.	Unregulated Process	Average Flow (GPD)	Maximum Flow (GPD)	Type of Discharge (batch,continuous,none)
3	Long Coil Cleaning Line	520	7,200	Intermittent

No.	Dilution	Average Flow (GPD)	Maximum Flow (GPD)	Type of Discharge (batch,continuous,none)

7. For Categorical Users Subject To Total Toxic Organic (TTO) Requirements:

Provide the following (TTO) information.

a. Does (or will) this facility use any of the toxic organics that are listed under the TTO standard of the applicable categorical pretreatment standards published by EPA?

[X] Yes
[ ] No

b. Has a baseline monitoring report (BMR) been submitted which contains TTO information?

[X] Yes
[ ] No

c. Has a toxic organics management plan (TOMP) been developed?

[ ] Yes, (Please attach a copy)
[X] No

8. Do you have, or plan to have, automatic sampling equipment or continuous wastewater flow metering equipment at this facility?

Current:	Flow Metering	[X] Yes	[ ] No	[ ] N/A
	Sampling Equipment	[X] Yes	[ ] No	[ ] N/A
Planned:	Flow Metering	[ ] Yes	[ ] No	[ ] N/A
	Sampling Equipment	[ ] Yes	[ ] No	[ ] N/A

If so, please indicate the present or future location of this equipment on the sewer schematic and describe the equipment below:

Flowmetering - Red Lion Control No. IMP 23101
STI Sensor No. 303-5

Sampling equipment. DMP - Supplied with system - 24 hr. composite

9. Are any process changes or expansions planned during the next three years that could alter wastewater volumes or characteristics? Consider production processes as well as air or water pollution treatment processes that may affect the discharge.

[X] Yes
[ ] No, (skip question 10)

10. Briefly describe these changes and their effects on the wastewater volume and characteristics: (Attach additional sheets if needed.)
Volume and toxicity will continue to be reduced by waste minimization and water conservation programs.
1.) Eliminate or reduce use of contact cooling water.
2.) Modifications to copper cleaning line will increase volume with no change to characteristics.

11. Are any materials or water reclamation systems in use or planned?

[ ] Yes
[X] No, (skip question 12)

12. Briefly describe recovery process, substance recovered, percent recovered, and the concentration in the spent solution. Submit a flow diagram for each process: (Attach additional sheets if needed.)

SECTION F - CHARACTERISTICS OF DISCHARGE

All current industrial users are required to submit monitoring data on all pollutants that are regulated specific to each process. Use the tables provided in this section to report the analytical results. **DO NOT LEAVE BLANKS**. For all other (nonregulated) pollutants, indicate whether the pollutant is known to be present (P), suspected to be present (S), or known not to be present (O), by placing the appropriate letter in the column for average reported values. Indicate on either the top of each table, or on a separate sheet, if necessary, the sample location and type of analysis used. Be sure methods conform to 40 CFR Part 136; if they do not, indicate what method was used.

New dischargers should use the table to indicate what pollutants will be present or are suspected to be present in proposed wastestreams by placing a P (expected to be present), S (may be present), or O (will not be present) under the average reported values.

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	Acenaphthene								
B	Acrolein								
B	Acrylonitrile								
B	Benzene								
B	Benzidine								
B	Carbon tetrachloride								
B	Chlorobenzene								
B	1,2,4-Trichlorobenzene								
B	Hexachlorobenzene								
B	1,2-Dichloroethane								
P	1,1,1-Trichloroethane				89.25		2	ppb	
B	Hexachloroethane								
B	1,1-Dichloroethane								
B	1,1,2-Trichloroethane								
B	1,1,2,2-Tetrachloroethane								
B	Chloroethane								
B	Bis(2-chloroethyl) ether								
B	17 Bis (chloro methyl) ether								
B	2-Chloroethyl vinyl ether								
B	2-Chloronaphthalene								
B	2,4,6-Trichlorophenol								
B	Parachlorometa cresol								
B	Chloroform								
B	2-Chlorophenol								
B	1,2-Dichlorobenzene								
B	1,3-Dichlorobenzene								
B	1,4-Dichlorobenzene								
B	3,3-Dichlorobenzidine								
B	1,1-Dichloroethylene								
B	1,2-Trans-dichloroethylene								
B	2,4-Dichlorophenol								
B	1,2-Dichloropropane								
B	1,2-Dichloropropylene								
B	1,3-Dichloropropylene								

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	2,4-Dimethylphenol								
B	2,4-Dinitrotoluene								
B	2,6-Dinitrotoluene								
B	1,2-Diphenylhydrazine								
B	Ethylbenzene								
B	Fluoranthene								
B	4-Chlorophenyl phenyl ether								
B	4-Bromophenyl phenyl ether								
B	Bis(2-chlorisopropyl) ether								
B	Bis(2-chloroethoxy) methane								
P	Methylene chloride				31.4		2	ppb	
B	Methyl chloride								
B	Methyl bromide								
B	Bromoform								
B	Dichlorobromomethane								
B	Chlorodibromomethane								
B	Hexachlorobutadiene								
B	Hexachlorocyclopentadiene								
B	Isophorone								
B	Naphthalene								
B	Nitrobenzene								
B	Nitrophenol								
B	2-Nitrophenol								
B	4-Nitrophenol								
B	2,4-Dinitrophenol								
B	4,6-Dinitro-o-cresol								
B	N-nitrosodimethylamine								
B	N-nitrosodiphenylamine								
B	N-nitrosodi-n-propylamine								
B	Pentachlorophenol								
B	Phenol								
B	Bis(2-ethylhexyl) phthalate								
B	Butyl benzyl phthalate								
B	Di-n-butyl phthalate								

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	Di-n-octyl phthalate								
B	Diethyl phthalate								
B	Dimethyl phthalate								
B	Benzo(a)anthracene								
B	Benzo(a)pyrene								
B	3,4-benzofluoranthene								
B	Benzo(k) fluoranthane								
B	Chrysene								
B	Acenaphthylene								
B	Anthracene								
B	Benzo(ghi)perylene								
B	Fluorene								
B	Phenanthrene								
B	Dibenzo(a,h)anthracene								
B	Indeno(1,2,3-cd)pyrene								
B	Pyrene								
B	Tetrachloroethylene								
S	Toluene								
B	Trichloroethylene								
B	Vinyl chloride								
B	Aldrin								
B	Dieldrin								
B	Chlordane								
B	4,4'-DDT								
B	4,4'-DDE								
B	4,4'-DDD								
B	Alpha-endosulfan								
B	Beta-endosulfan								
B	Endosulfan sulfate								
B	Endrin								
B	Endrin aldehyde								
B	Heptachlor								

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	Heptachlor epoxide								
B	Alpha-BHC								
B	Beta-BHC								
B	Gamma-BHC								
B	Delta-BHC								
B	PCB-1242								
B	PCB-1254								
B	PCB-1221								
B	PCB-1232								
B	PCB-1248								
B	PCB-1260								
B	PCB-1016								
B	Toxaphene								
B	(TCDD)								
B	Asbestos								
B	Acidity								
B	Alkalinity								
B	Bacteria								
B	BOD_5								
B	COD								
S	Chloride								
B	Chlorine								
S	Flouride								
B	Hardness								
B	Magnesium								
B	NH_3-N								
P	Oil and Grease				15.7		2	mg/l	
P	TSS				46.5		2	mg/l	
B	TOC								
B	Kjeldahl N								
B	Nitrate N								
B	Nitrite N								
B	Organic N								
S	Orthophosphate P								
S	Phosphorous								

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	Sodium								
B	Specific Conductivity								
S	Sulfate (SO_4)								
S	Sulfide (S)								
S	Sulfite (SO_3)								
B	Antimony								
B	Arsenic								
B	Barium								
B	Beryllium								
P	Cadmium	.05			<.05		2	mg/l	
P	Chromium	.02			.10		12	mg/l	
P	Copper	.01			.38		12	mg/l	
P	Cyanide	.01			<.01		12	mg/l	
P	Lead	.1			<.1		2	mg/l	
B	Mercury								
P	Nickel	.01			<.10		2	mg/l	
B	Selenium								
P	Silver	.01			<.10		2	mg/l	
B	Thallium								
P	Zinc	NK			.645		2	mg/l	

SECTION G - TREATMENT

1. Is any form of wastewater treatment (see list below) practiced at this facility?

   [X] Yes
   [ ] No

2. Is any form of wastewater treatment (or changes to a existing wastewater treatment) planned for this facility within the next three years?

   [ ] Yes, describe: _____
   [X] No

3. Treatment devices or processes used or proposed for treating wastewater or sludge (check as many as appropriate).

   [ ] Air flotation
   [ ] Centrifuge
   [X] Chemical precipitation (Tank 6)
   [ ] Chlorination
   [ ] Cyclone
   [X] Filtration (Tank 10)
   [ ] Flow equalization
   [X] Grease or oil separation, type: Gravity (Tank B)
   [ ] Grease trap
   [ ] Grinding filter
   [ ] Grit removal
   [ ] Ion exchange
   [X] Neutralization, pH correction (Tank 6)
   [ ] Ozonation
   [ ] Reverse osmosis
   [ ] Screen
   [X] Sedimentation (Tank 7, 8, & 9)
   [ ] Septic tank
   [ ] Solvent separation
   [X] Spill protection
   [ ] Sump
   [ ] Biological treatment, type: _____
   [ ] Rainwater diversion or storage
   [X] Other chemical treatment, type: Chrome Reduction (Tank 5)
   [ ] Other physical treatment, type: _____
   [ ] Other, type: _____

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 6 is a Fiberglass tank. The maximum capacity is 734 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year.

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
None

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 10 is a Carbon Steel Tank. The maximum capacity is 22 gallons.
The design capacity is 60 gpm., with a flow rate of 1382620 gallons/year.
(See Attachment 1, Tank 10)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank B is a Polyethylene tank with a liner. The maximum capacity is 612 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons/year. (See Attachment 1, Tank B)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 5 is a Fiberglass tank. The maximum capacity is 734 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year. (See Attachment 1, Tank 5)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 7 is a Fiberglass tank. The maximum capacity is 264 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year.
(See Attachment 1 Tank 7)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 8 is a Carbon Steel Tank. The maximum capacity is 1080 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year. (See Attachment 1, Tank 8)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 9 is a Fiberglass tank. The maximum capacity is 1269 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year. (See Attachment 1, Tank 9)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

SECTION H - FACILITY OPERATIONAL CHARACTERISTICS

1. Shift Information

Work Days		[X] Mon.	[X] Tues.	[X] Wed.	[X] Thur.	[X] Fri.	[ ] Sat.	[ ] Sun.
Shifts per work day:		2	2	2	2	2		
Empl's per shift:	1st	130	130	130	130	130		
	2nd	55	55	55	55	55		
	3rd	0	0	0	0	0		
Shift start and end times:	1st	7:30 to 3:30	7:30 to 3:30	7:30 to 3:30	7:30 to 3:30	7:30 to 3:30		
	2nd	3:30 to 12:00	3:30 to 12:00	3:30 to 12:00	3:30 to 12:00	3:30 to 12:00		
	3rd							

2. Indicate whether the business activity is:

[X] Continuous through the year, or
[ ] Seasonal - Circle the months of the year during which the business activity occurs:

J F M A M J J A S O N D

COMMENTS: _____

3. Indicate whether the facility discharge is:

[X] Continuous through the year, or
[ ] Seasonal - Circle the months of the year during which the business activity occurs:

J F M A M J J A S O N D

COMMENTS: _____

4. Does operation shut down for vacation, maintenance, or other reasons?

[ ] Yes, indicate reasons and period when shutdown occurs:

[X] No

5. List types and amounts (mass or volume per day) of raw materials used or planned for use (attach list if needed):

Copper Tubing	(2,000,000 lbs annual)	8333/day
Aluminum	(1,000,000 lbs annual)	4167/day
Galvanized Steel	(300,000 lbs annual)	1250/day

6. List types and quantity of chemicals used or planned for use (attach list if needed). Include copies of Manufacturer's Safety Data Sheets (if available) for all chemicals identified:

Chemical	Quantity
See Chemical List - Attachment 2	

7. Building Layout - Draw to scale the location of each building on the premises. Show map orientation and location of all water meters, storm drains, numbered unit processes (from schematic flow diagram), public sewers, and each facility sewer line connected to the public sewers. Number each sewer and show existing and proposed sampling locations. This drawing must be certified by a State Registered Professional Engineer.

A blueprint or drawing of the facilities showing the above items may be attached in lieu of submitting a drawing on this sheet.

See Attachment 3

SECTION I - SPILL PREVENTION

1. Do you have chemical storage containers, bins, or ponds at your facility? [X] Yes [ ] No

   If yes, please give a description of their location, contents, size, type, and frequency and method of cleaning. Also indicate in a diagram or comment on the proximity of these containers to a sewer or storm drain. Indicate if buried metal containers have cathodic protection.
   See Attachment 6

2. Do you have floor drains in your manufacturing or chemical storage area(s)? [X] Yes [ ] No If yes; Where do they discharge to?
   Waste Water Treatment System

3. If you have chemical storage containers, bins, or ponds in manufacturing area, could an accidental spill lead to a discharge to: (check all that apply).

   [X] an onsite disposal system
   [ ] public sanitary sewer system (e.g. through a floor drain)
   [ ] storm drain
   [X] to ground
   [ ] other, specify:
   [ ] not applicable, no possible discharge to any of the above routes

4. Do you have an accidental spill prevention plan (ASPP) to prevent spills of chemicals or slug discharges from entering the Control Authority's collection systems?

   [X] Yes - **[Please enclose a copy with the application]** See Attachment 4
   [ ] No
   [ ] N/A, Not applicable since there are no floor drains and/or the facility discharge(s) only domestic wastes.

5. Please describe below any previous spill events and remedial measures taken to prevent their reoccurrence.

_____

_____

_____

_____

SECTION K - AUTHORIZED SIGNATURES

Compliance certification:

1. Are all applicable Federal, State, or local pretreatment standards and requirements being met on a consistent basis?

   Yes [X] No [ ] Not yet discharging [ ]

2. If No:

   a. What additional operations and maintenance procedures are being considered to bring the facility into compliance? Also, list additional treatment technology or practice being considered in order to bring the facility into compliance.

   b. Provide a schedule for bringing the facility into compliance. Specify major events planned along with reasonable completion dates. Note that if the Control Authority issues a permit to the applicant, it may establish a schedule for compliance different from the one submitted by the facility.

Milestone Activity	Completion Date

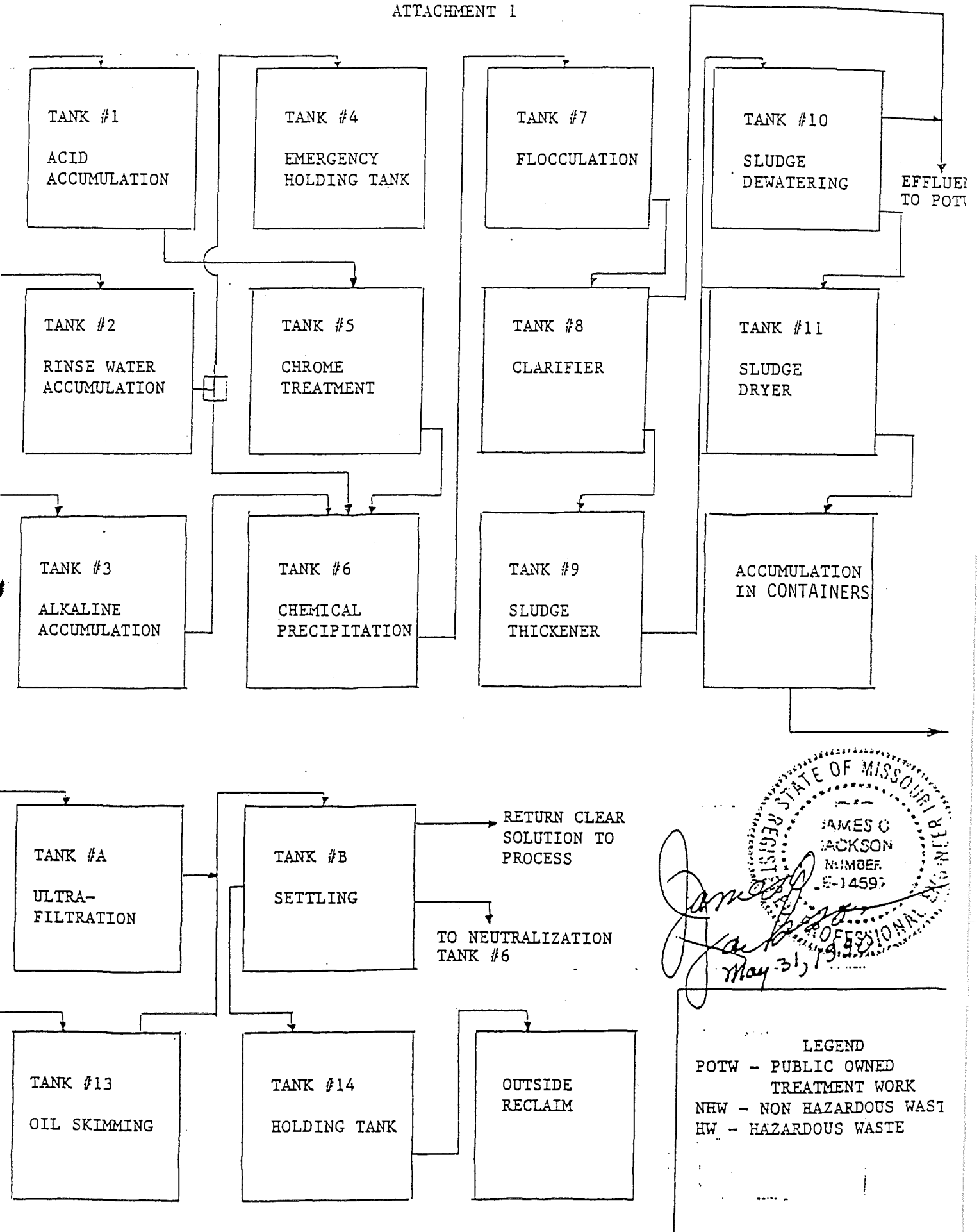
Authorized Representative Statement:

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.

Gaylord S. Olson	Plant Manager	
Name(s)	Title	
Gaylord S. Olson	9/28/95	314-346-5693
Signature	Date	Phone

PRETREATMENT PERMIT APPLICATION

ATTACHMENT 1



REGISTERED STATE OF MISSOURI PROFESSIONAL ENGINEER
JAMES C JACKSON
NUMBER E-14597

May 31, 1990

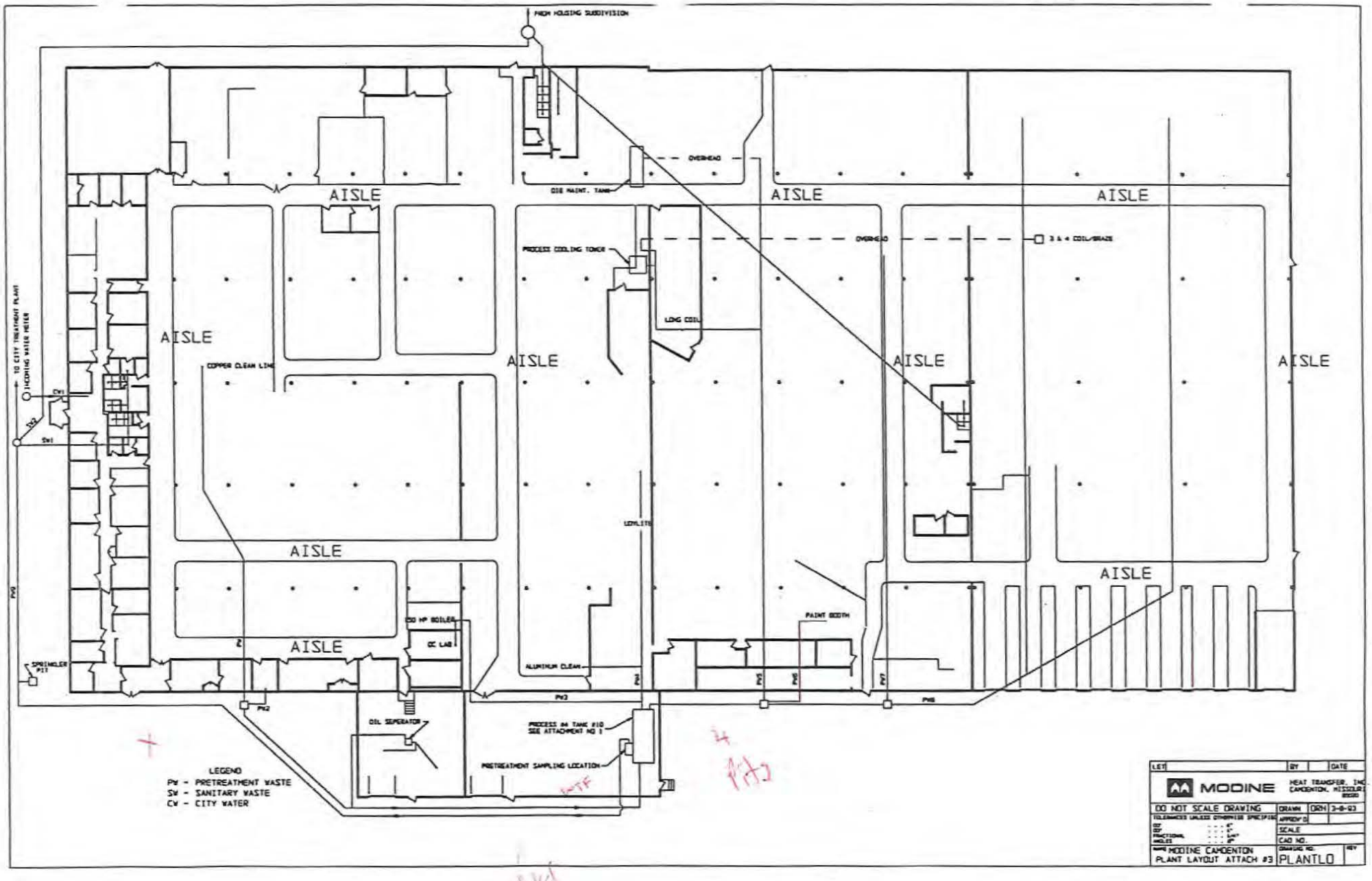
TTY94 MAINTENANCE STORES CODE NUMBER REPORT 09/28/95
FOR CHEMICALS USED IN 1994 16:52.09

CODE NUMBER	DESCRIPTION	PART NUMBER	ISSUE QUANTITY	UOM
700005	PROPANE		48,422	GAL
700010	FREON BULK	R-22	3,666	LB
700050	FREON 30LB BOTTLE	R-500	12	LB
700111	1 1 1-TRICHLOROETHANE		49,750	LB
700112	1 1 1-TRICHLOROETHANE		288	LB
700510	THINNER ACETONE		6	GAL
700515	THINNER PAINT XYLENE		4	DRM
700607	OIL HI VIS ADDITIVE 55GAL	A-1453	23	GAL
700608	OIL MOTOR MM	10W	3	EA
700705	SODIUM SULFIDE FLAKE 400#	TECH. NICK.	830	LB
701005	CLEANER ALKALINE	RIDOLINE 27	325	LB
701055	ACID MURIATIC 20 BE	HCL	1	DRM
701060	ACID SULFURIC LIQUID 66BE	H2SO4 REGULAR	8,991	LB
701075	ACID CITRIC		500	LB
701086	PAINT BLACK (345 TOTE)	5372	17,645	GAL
701088	PAINT BLK, WATER/RED, S/G	5441 ENAMEL	-110	GAL
701095	ACID MURIATIC INHIB. 5GAL	CL-631	4	GAL
701100	SOLVENT ISOPARAFFINIC	SOLTROL 170	648	GAL
701105	OIL MAGNUS 150 (5GAL)	ISO VG32	23	DRM
701110	CLEANER ALKALINE 475 LBS	RIDOLINE 53	8,550	LB
1120	ACID NITRIC (55GAL)	H2N03	12	DRM
701124	FLOCULANT 465LB PR DRUM	9137A	275	LB
701145	SODIUM HYDROXIDE LIQUID	NAOH RAYON	10,004	LB
701160	FLUX TORCH BRAZING 5GAL	#33	17	DRM
701165	ACID CLEANER COPPER	CU-BRITE 1143	4	DRM
701193	FREON 100LB DRUM	42F1830/R11	100	LBS
701256	FLUX GAS (5 GAL)	TYPE W	33	DRM
701288	OIL 300 VIS FIN STAMPING	T1288	152	GAL
701730	OIL MAGNUS MAG 465 55GAL	ISO VG 100	55	GAL
701750	OIL HYDRAULIC (MAG 315)	ISO 68	1,617	GAL
701826	TREATMENT H20 CLARIFYING	50232	525	LBS
701836	OIL MAGNUS HYD	A-ISO-46	225	GAL
701837	FLUID H/D SYN. PUNCHING	LM58080	2	GAL
701930	OIL MOTOR AP 1 SC	SAE-30	418	QT
701980	OIL GEAR	90WT	55	GAL
702010	OIL GEAR PHILUBE (5GAL)	SMP SAE 85W-140	2	DRM
02050	OIL RECLAIMED PROCESS		330	GAL
02051	OIL RECLAIMED FIN	T-1287	2,442	GAL
02090	OIL WAYTAC 220	220	70	GAL
02091	OIL MOTOR TYPE MM	SAE 40	15	QT
02095	OIL MOTOR TYPE MM	SAE 30	4	EA
02100	OIL MOTOR	20W-20	2	QT
02505	AUTO TRANSMISSION FLUID	ATF	13	GA
02525	OIL WAYTAC 68	VACTRA #2	55	GAL
03120	SODIUM BISULFITE		920	LB
03185	OIL (54 GAL DRUM)	CINDOL 3102	864	GAL
03190	OIL VANISHING	CINDOL 3411	62	GAL
04351	INHIBITER CORROSION (C.T.	CW4351	530	LB
05535	SOLVENT FLORINATED	GENESOLV 5535	4,432	LB

CCITY94 MAINTENANCE STORES CODE NUMBER REPORT 09/28/95
FOR CHEMICALS USED IN 1994 11:05.35

CODE NUMBER	DESCRIPTION	PART NUMBER	ISSUE QUANTITY	UOM
700005	PROPANE		131,770	GAL
700010	FREON BULK	R-22	27,086	LB
700111	1,1,1-TRICHLOROETHANE		49,840	LB
700113	METHYLENE CHLORIDE	1021712/1040003	30,367	LB
701090	OIL FIN STAMPING	T-1094	1,391	GAL
702020	OIL FIN	T1287	2,769	GAL

Attachment 3



added later

Memorandum

July 18, 1996

TO: Elmer Meyer
Brenda Colter
Tom Emry

FROM: Tim Basler

RE: Pre-treatment Meeting with Richard Kuntz (DNR)

As previously discussed, I contacted Richard Kuntz and arranged a meeting with him regarding the City's pre-treatment program. Please mark your calendar. The meeting will be at 10:00 am, Wednesday, July 24.

MEETING REGARDING PRETREATMENT REQUIREMENTS
JULY 24, 1996

Present:

Richard Kuntz, DNR
City Administrator Elmer Meyer
City Clerk Brenda Colter
Time Basler, ED/Planning Spec.
Tom Emry, Sewer Plant Operator
Don Manns, Modine Heat Transfer
Bob King, Modine Heat Transfer

Mr. Kuntz opened the meeting by stating that the same amount of compliance reports are required if a city that has one industry or 100 industries.

With the frequency of changes of City Administrators in Camdenton it has been hard to find all the required reports when Mr. Kuntz has conducted his annual audit.

For Modine to meet Federal standards a minimum of two sampling must be taken each year. There are requirements of eight (8) metals and total toxic organics. City should review.

The City needs to check for required pollutants one time per year and conduct a walk thru once per year.

Emry asked who is responsible for testing for toxic organics. Kuntz stated both Modine and the City.

If the City accepts a plan with a certified statement filed by Modine that they have tested for toxic organics, then there does not need to be a test for toxic organics by both the City and Modine. It was determined that the cost for a full scan is approximately $1,000 so it would be prudent if only the City or Modine perform the test, if this is possible.

Must do: Eight (8) required heavy metals testings must be conducted even though not all are present. *Both industry and City.

Regarding the updating of the pretreatment ordinance, Kuntz advised he will take Camdenton's present Ordinance back with him to his office and pinpoint what needs to be updated so the entire Ordinance doesn't have to be rewritten.

Regarding the composite sampling. Emry advised this sample is taken from Modine's conposite sample. Kuntz advised this is okay.

Kuntz advised the cyanide and grab samples must be conducted at least once per year. There is nothing to say that it can't be done more. Emry advised because of expense it is prudent to do only once if that is the minimum requirement.

Consider adopting TTO Management Plan. What would be needed is a paragraph from Modine stating Modine doesn't have TTO's. City must be willing to accept the statement. In semi-annual report there should be a sentence that states City accepts Modine's statement.

It was determined from the audit report that the City should review the permit issued to Modine and amend to conform to DNR's requirements for content.

Modine's represenatives stated that pretreatment reports come directly to the City of Camdenton from the Modine corporate office

Regarding the local limits - enact specific limitations from permit issued to City -- what can the City plant handle. Local limits are required as part of reapplication to DNR.

Kuntz advised influent needs to be sampled for the ten (10) pollutants in the manual one time in the life of the permit (Three year permit period currently). This is found in the "Guidance Manual Discharge Limitations for Pretreatment" booklet.

Kuntz advised he will work with Emry so he can get a clear understanding of what needs to done.

It was determined that Emry will do testing, Colter will keep the records.

Kuntz advised that documentation is the biggest problem. Paperwork on what has been done, visits, etc.

Kuntz suggested Modine sample early in the month in case the lab reports are not in by the end of the time and the sample is in violation, there is no time to resample. Then Modine is in violation.

Modine will outline what they can eliminate to sample for and what they use as far as metals.

**At this time the Modine representatives and Basler left the meeting.

Regarding the annual inspection, Kuntz advised a walk thru of the plant should be done, not just the pretreatment inspection. This way Emry can check if there has been any changes or potentials for spills into City system.

City should make sure they document what you do. Kuntz referred to Page 14, #72 for the minimums he will look at during his inspection.

Kuntz offered to review the check list with the City and eliminate what the City doesn't have to deal with.

City should have in their files a report from the EPA (it is about two months old). The report was addressed to Richard Phillips

Ordinance 1305-90 was provided to Kuntz.

Regarding the permit requirements, the permit must say what must be done. (Blue manual has example of a permit).

When asked what he will look for when he comes for the annual audit, Kuntz stated:

1. Updated Pretreatment Ordinance.
2. Permit with required information
3. Once yearly inspection
4. Documentation on the walk thru, also a yearly requirement
5. Reports from Modine
6. Any correspondence relating to Pretreatment. (Example, If there is additional sampling beyond the two times per year, a report to the City must be in the file. This is done during the walk thru when Emry should ask for any test results.)
7. Complete the check list.

Kuntz added if the City has all these listed items, he'll also have other things he'll check for--therefore documenting is the key.

Minutes by Brenda Colter

approved
Elmer Meyer
8-7-96

City of Camdenton

112 Court Circle • P.O. Box 1048
Camdenton, Missouri 65020
573-346-3600 • Fax 573-346-2926

PRETREATMENT REGULATIONS

As approved by

ORDINANCE NO. 1648-97

FEBRUARY 18, 1997

Incorporated May 29, 1931

SECTION 1 - GENERAL PROVISIONS

1.1 Purpose and Policy

1.2 Administration

1.3 Abbreviations

1.4 Definitions

SECTION 2 - GENERAL SEWER USE REQUIREMENTS

2. I Prohibited Discharge Standards

2.2 National Categorical Pretreatment Standards

2.3 State Pretreatment Standards

2.4 Local Limits

2.5 Camdenton's Right of Revision

2.6 Dilution

SECTION 3 - PRETREATMENT OF WASTEWATER

3.1 Pretreatment Facilities

3.2 Additional Pretreatment Measures

3.3 Accidental Discharge/Slug Control Plans

3.4 Hauled Wastewater

SECTION 4 - WASTEWATER DISCHARGE PERMIT APPLICATION

4.I Wastewater Analysis

4.2 Wastewater Discharge Permit Requirement

6.5 Reports of Changed Conditions

6.6 Reports of Potential Problems

6.7 Reports from Unpermitted Users

6.8 Notice of Violation/Repeat Sampling and Reporting

6.9 Notification of the Discharge of Hazardous Waste

6.10 Analytical Requirements

6.11 Sample Collection

6.12 Timing

6.13 Record Keeping

SECTION 7 - COMPLIANCE MONITORING

7.1 Right of Entry: Inspection and Sampling

7.2 Search Warrants

ELECTION 8 - CONFIDENTIAL INFORMATION

SECTION 9 - PUBLICATION OF USERS IN SIGNIFICANT NONCOMPLIANCE

SECTION 10 - ADMINISTRATIVE ENFORCEMENT REMEDIES

10.1 Notification of Violation

10.2 Consent Orders

10.3 Show Cause Hearing

10.4 COMPLIANCE ORDERS

15.2 Severability

SECTION 16 - EFFECTIVE DATE

MEMORANDUM

DATE: September 23, 1997

TO: File

FROM: City Clerk Brenda Colter

SUBJECT: Audit of Pretreatment Compliance

This date Sewer Treatment Plant Supervisor Tom Emry and I met with Paul T. Marshall, EPA, regarding Camdenton's compliance with the pretreatment regulations. Modine Manufacturing is the only pretreatment permit holder in Camdenton.

The following are comments and observations made by Mr. Marshall. A full report from Mr. Marshall will follows:

1. Technically based local limits need to be established. The analysis may indicate that numbers may not have to be established but the analysis still needs to be done.

Mr. Marshall will list all pollutants in his report and provide to Emry for the effluent. Testing—3-4 in short order and take average.

An analysis needs to be done once every 5 years or when another plant comes in or there is a significant change in the present plant. (There is a program available that can be used on Excel and Mr. Marshall will provide the report for our use.)

2. Semi-annual self monitoring reports could not be located (1996 report) Only one for 1996 in the file.

3. Filing - Marshall will make recommendations. Suggested categories:

Permit	General Correspondence
Sampling	Ordinance
Inspection Forms	

4. Reports - From Modine 2 x per year. Marshall will clarify what is not complete in the Modine reports.

Modine is not sampling for TTO (2 x a year) and this is not acceptable unless Modine files a Solvent Management Plan. This will release them from the TTO sampling requirement. It is the City's decision whether to waive the requirement.

Contact persons for help us verify compliance with reports:

Paul T. Marshall, EPA
Rick Kunz, DNR

City needs to tighten the TTO regulations.

5. City needs to use the checklist provided (Emry has the copy)

6. Local limits and TTO mainly was not addressed.

7. Permit deficiencies:
   The PH has the following discrepancies:
   (f) 6-10 one place
   13.(f) 5-11 stated in another
   Ordinance stated 5-9

*Amend Ordinance to state 5-10 for PH level but check with our attorney first.

Part 2:

A. List of pollutants

Mercury can be deleted unless there is some reason City wants to see Mercury levels.

This list can be longer than Part 1, B list.

Frequency should be once per month or once per week.

In Marshall's report he will provide recommendations for grab frequency (Some discussion that the PH may be a continuous grab, flow daily.

Part 3 - Report.

A. Permit says they will send reports monthly, change to once every 6 months.

Report sent 30 days following the period ending 6/30 and 12/31 containing data for those six months periods.

Sampling should evolve around calendar year instead of just 2 x per year at random.

Hand carry to Modine and show them what they have to do.

No more bi-annual with 5 months of data.

9. Change attention to: From Elmer Meyer if needed to pertinent person. The person can be different than the person listed in the Ordinance

10. Annual publication - change requirements. Th permit is more restrictive

Industrial user in Significant Non-compliance will be published in the largest newspaper in accordance with Section 9 of the ordinance.

11. TTO's - Modine is in significant non-compliance for reporting type for not sampling TTO's.

When Modine is approached point out

1. They did not certify their reports as being accurate. (See Page 9 of Standard Conditions.)
2. The City decides whether they want Modine to sample for TTO's. If so, make Modine fully aware they have to sample and haven't done so.

Develop management Plan, then it is okay and certify in Plan they have complied.

In Permit:
Part 2 - Monitoring Regulations - Item C (New - wording will be provided by Marshall)

12. Modine will need to:
    1. Develop a Solvent Management Plan
    2. Send reports the City requires each 6 months to correspond to calendar year
    3. Certify statement for data and TTO's. Put in significant non-compliance for reporting violations.

13. Sampling for too may pollutants. (Emry knows what to do here)

14. Must reply to violations in sampling reports. Contact Modine and tell them of violations.

In conclusion:
The City has made changes to set up a structure but needs to be fine tuned. TTO's and reporting by permit.

(Note to file: These are the notes from the meeting with Mr. Marshall. Mr. Marshall indicated he will send a detailed report setting out what changes the City needs to make and what he has found in deficiencies.)

City of Camdenton

112 Court Circle • P.O. Box 1048
Camdenton, Missouri 65020
573-346-3600 • Fax 573-346-2926

June 16, 1999

Mr. Richard D. Kuntz, P E
Missouri Department of Natural Resources
Environmental Engineers
Water Pollution Control Program
P O Box 176
Jefferson City, Mo. 65102-0176

Dear Mr. Kuntz:

Attached you will find a letter dated June 11, 1999, from Mr. Paul T. Marshall, P.E., Pretreatment Coordinator for the United States Environmental Protection Agency (EPA). Based on the release granted by EPA from the requirements to maintain an approved Pretreatment Program, we are by this letter requesting consideration from the Missouri Department of Natural Resources to place the City of Camdenton's Pretreatment Program on an inactive basis.

We are also attaching a copy of the Annual Operating and Pretreatment Permit due for renewal by July 28, 1999. As you discussed with City Clerk Brenda Colter on this date, please review the Permit with Fee Specialist Candy Schuster for amendment to eliminate the fees that are associated with maintaining an active Pretreatment Program.

Thank you for your consideration in this matter. If you need additional information, please do not hesitate to contact me.

Sincerely,

Kerry Shannon
Mayor

KS/bc

Encl. 2

cc: City Administrator Elmer Meyer
Sewer Treatment Plant Supervisor Tom Emry
City Clerk Brenda Colter
Modine Manufacturing Company
File

Per tele. Hunty 5/10/01
Permit still exists
Good idea to document
from modine stating a
product is same.
DNR has no requirement
to do so. BC

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

June 11, 1999

Ms. Brenda Coulter
City of Camdenton
112 Court Circle
Camdenton, Missouri 65020

Dear Ms. Coulter:

I have used the data submitted by Tom Emry of the City to determine if the city has a significant metals pollutant load now that Modine has terminated its Categorically regulated process. Of the testing done by the city, only copper and zinc were found at levels above the method detection limit used for analysis. Therefore, the other pollutants should be present at levels that are insignificant. I confirmed this by evaluating the level of the metals found in the treatment plant sludge and found them to be very low.

I performed a treatment plant headworks analysis for both copper and zinc and found that the plant is loaded at 23% and 19%, respectively (see enclosure). This is not a level that would require a local limit for either pollutant. Consequently, the City is free to request that MDNR no longer require it to maintain an approved Pretreatment Program in the absence of a Categorical industry.

If you have any questions please call me at 913-551-7419.

Sincerely,

Paul T. Marshall

Paul T. Marshall, P.E.
Pretreatment Coordinator

Enclosure

cc. Rick Kuntz

RECYCLE
PAPER CONTAINS RECYCLED FIBERS

Camdenton, Missouri 06/11/99

COPPER

			Non SIU Flow, MGD:	*0.661771*	*SLDG To Disp,MGD:* *0.0025*
		source	*TTL Flow, MGD:*	*0.669249*	*SLDG Disp %Solids:* *2.2*
Domestic Backgrnd:	0.048667		*7Q10, MGD:*	*1*	*SITE Use, Yrs:* *10*
Instream Backgrnd:	0		*Flow To Digsr: MGD:*	*0.00857*	*SITE Size, Acres:* *100*
Plant Removal Eff.:	86%	*literature*			
Primary Rmvl Eff.:	22%	*literature*			
WQS:	0.012	*Goldbook*			
Ratio: Dslvd/Tot:	1				
Inhibition 2nd Trtmt:	1	*literature*			
SLDG Digstn Inhib.:	40	*literature*			
NPDES Limit, mg/l:	NA				
SLUDGE DISPOSAL					
Lbs/Acre/Life, limit:	1338	*Regulation*			
Disp Limit, mg/kg:	79866.3	*calculated*			
SLDG Qual mg/kg:	4300	*Regulation*			
Grwth/Safety factor:	0%				

LOCAL LIMITS

UNIFORM CONCENTRATION, mg/l		
Water Quality	14.82646	*Limiting*
Digstn Inhib:	48.99685	
SLDG Dispsl:	32.46775	
Secndry Inhib.:	110.4313	
NPDES #:	NA	

ALLOWABLE lbs/day, TOTAL from ALL SIUs		
Water Quality	0.924675	*Limiting*
Digstn Inhib:	3.055763	
SLDG Dispsl:	2.0249	
Secndry Inhib.:	6.887217	
NPDES #:	NA	

Current Loading as a % of Limi 23%

Camdenton, Missouri 06/11/99

ZINC

			Non SIU Flow, MGD:	*0.661771*	*SLDG To Disp,MGD:* *0.0025*
		source	*TTL Flow, MGD:*	*0.669249*	*SLDG Disp %Solids:* *2.2*
Domestic Backgrnd:	0.148333		*7Q10, MGD:*	*1*	*SITE Use, Yrs:* *10*
Instream Backgrnd:	0		*Flow To Digsr: MGD:*	*0.00857*	*SITE Size, Acres:* *100*
Plant Removal Eff.:	79%	*literature*			
Primary Rmvl Eff.:	27%	*literature*			
WQS:	0.11	*Goldbook*			
Ratio: Dslvd/Tot:	1				
Inhibition 2nd Trtmt:	1	*literature*			
SLDG Digstn Inhib.:	400	*literature*			
NPDES Limit, mg/l:	NA				
SLUDGE DISPOSAL					
Lbs/Acre/Life, limit:	2498	*Regulation*			
Disp Limit, mg/kg:	149107.6	*calculated*			
SLDG Qual mg/kg:	7500	*Regulation*			
Grwth/Safety factor:	0%				

LOCAL LIMITS

UNIFORM CONCENTRATION, mg/l		
Water Quality	103.7986	
Digstn Inhib:	567.1407	
SLDG Dispsl:	56.69821	*Limiting*
Secndry Inhib.:	109.47	
NPDES #:	NA	

ALLOWABLE lbs/day, TOTAL from ALL SIUs		
Water Quality	6.473557	
Digstn Inhib:	35.37059	
SLDG Dispsl:	3.53607	*Limiting*
Secndry Inhib.:	6.827264	
NPDES #:	NA	

Current Loading as a % of Limi 19%

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
WATER POLLUTION CONTROL PROGRAM

May 24, 1999

ANNUAL OPERATING AND PRETREATMENT PERMIT

INVOICE

TO: CAMDENTON
PO BOX 1048

CAMDENTON , MO 65020 -

Dear Permittee:

Our records show that you are the owner or operating authority for the state operating permit MO-0106399 for CAMDENTON OXIDATION DITCH.

The Missouri Clean Water Law, Section 644.052, effective October 1, 1990 requires paying an annual operating fee for discharges from water contaminant sources. The fee for permit number MO-0106399 is calculated to be $638.10. In addition to the fees required to operate a wastewater treatment device, a city, or publicly owned treatment works, or privately owned treatment works, or a sewer district which operates an approved pretreatment program shall annually collect and pay a pretreatment fee. The annual pretreatment program fee for CAMDENTON OXIDATION DITCH is calculated to be $3,000.00.

These fees are due on the anniversary date of your permit, JULY 28. The fees cannot be prorated, and are due in full on the due date. Please make your payment payable to the "State of Missouri". To ensure the proper credit to your account, return the attached remittance form with your payment. Payment should be made within 30 days to avoid paying penalty charges.

If the fees are not paid within the required 30 days, they shall be subject to a penalty of the amount of interest accrued on the unpaid fees. That rate is two percent for each month that the fee is delinquent.

The total fee for permit number MO-0106399 , including pretreatment costs, is calculated to be $3,638.10 . This is the amount that is due.

If you have any questions about this fee, please contact me at 573-751-2386.

Sincerely,
WATER POLLUTION CONTROL PROGRAM
Candy Schuster

Candy Schuster
Fee Specialist

Enclosure

cc: JCR

WATER POLLUTION CONTROL PROGRAM ANNUAL OPERATING AND PRETREATMENT FEE

(This Form Must Be Returned With Your Payment)

Date: May 24, 1999

Permit No.: MO-0106399 County: CAMDEN Fee Date: 890728
Facility Name: CAMDENTON OXIDATION DITCH

TOTAL FEE DUE = $3,638.10
(56801-1135-10)

Billing Name : CAMDENTON
Address 1 : PO BOX 1048
Address 2 :
City, State, Zip: CAMDENTON , MO , 65020 -

Please make your payment payable to the "State of Missouri" and mail to:

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MANAGEMENT SERVICES
RECEIPTS AND REPORTING
P.O. BOX 477
JEFFERSON CITY, MISSOURI 65102

(If address shown is incorrect, please correct and return.)

FOR AGENCY USE ONLY

Permit No.: MO-0106399 County: CAMDEN Fee Date: 890728
Facility Name: CAMDENTON OXIDATION DITCH

Fee amount (56801-1135-10) = $3,638.10

Penalty Charge (56801-1645) _____

Total Fee Due = $3,638.10

Date Received _____

Received By _____

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER POLLUTION CONTROL PROGRAM

WASTEWATER FEE CALCULATION SHEET

Permit No.: MO-0106399 County: CAMDEN Fee Date: 890728

Facility Name : CAMDENTON OXIDATION DITCH
Billing Name : CAMDENTON
Address 1 : PO BOX 1048
Address 2 :
City, State, Zip: CAMDENTON , MO , 65020 -

Design Flow: 0.64

Discharge	Domestic Fees *
A. under 5,000 gpd	$ 15
5,000 gpd to 249,999 gpd	$ 50
250,000 to 499,999 gpd	$ 500
500,000 to 749,999 gpd	$ 1,000
750,000 to 999,999 gpd	$ 1,500
1 mgd to under 5 mgd	$ 2,500
5 mgd or more	$ 3,000
Item A Fee	$1,000.00

PE = 6381

B.* multiply $0.015
times design PE = $95.72

C.* multiply $0.10
times design PE = $638.10

D. Facility Fee = $638.10 *

E. PRETREATMENT FEE
total flows under 5 mgd $ 3,000
total flows 5 mgd or more $ 6,000

* Municipal and publicly-owned sewer districts total charge shall be item A amount, unless it is less than the amount in item B or more than the amount in Item C. If less than item B, item B charges apply; if greater than item C, item C charges will apply. The minimum fee, by regulation, is $ 15.00.

TOTAL FEES (including pretreatment) = $3,638.10

This calculation sheet is provided to you for your review and planning purposes. Fees to operate wastewater treatment facilities were authorized in 1990, under section 644.052, RSMo. If you have any questions please contact me.

Candy Schuster

Candy Schuster
Fee Specialist

05/24/99
Date

COMBINED PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT

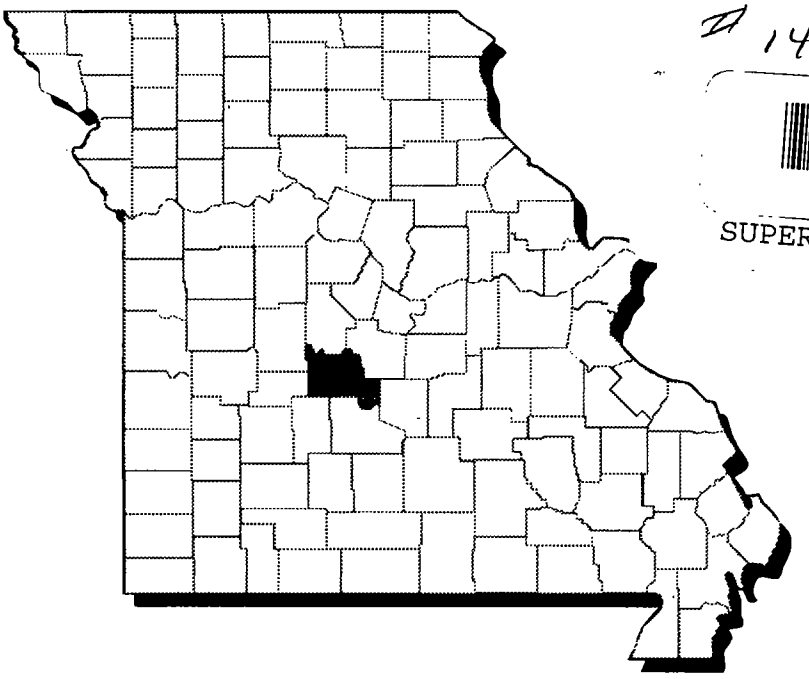
Former Hulett Lagoon Site
Camdenton, Missouri

March 30, 1999

Site: Former Hulett Lagoon
ID #: MOSFN0703530
Break: 1.5
Other:
3-30-99

143106

143106
SUPERFUND RECORDS



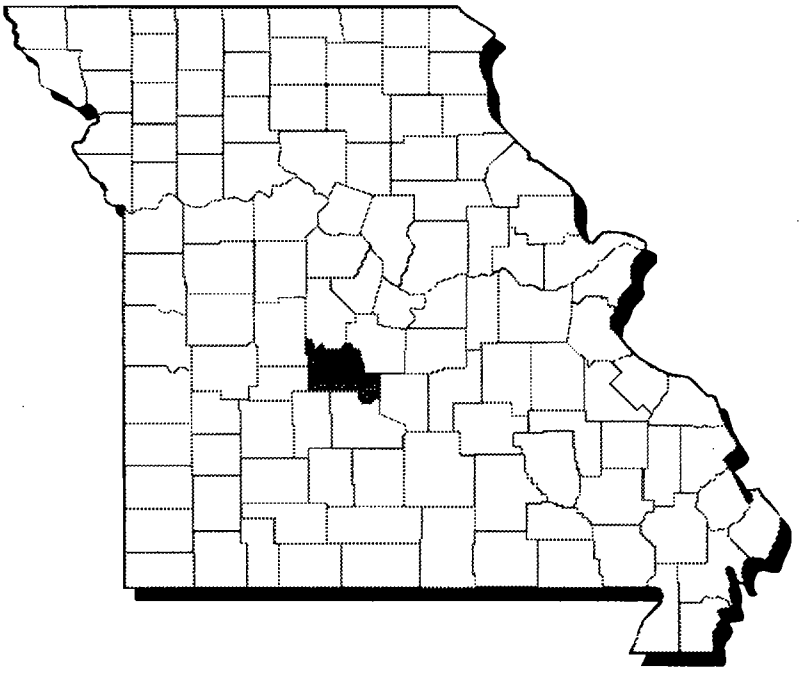
Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

NARRATIVE

COMBINED PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT

Former Hulett Lagoon Site
Camdenton, Missouri

March 30, 1999



Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

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DATE:	**March 30, 1999**
PREPARED BY:	**Valerie H. Wilder** **Missouri Department of Natural Resources**
SITE:	**Former Hulett Lagoon** **Camden County**
C.A. NUMBER:	**V997381-98-0**
EPA ID. NUMBER:	**N/A**

1.0 INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Missouri Department of Natural Resources (DNR), through a cooperative agreement with the U.S. Environmental Protection Agency (EPA), conducted a combined Preliminary Assessment/Site Inspection (PA/SI) at the Former Hulett Lagoon site in Camden County, Missouri. The purpose of this investigation was to collect sufficient information concerning conditions at the site to assess the threat posed to human health and the environment, to determine the need for additional investigation under CERCLA/SARA or other authority, and if appropriate, support ranking the site using the Hazard Ranking System (HRS) for proposal to the National Priorities List (NPL). The scope of the investigation included review of previous file information, sampling of waste and environmental media to evaluate and document HRS factors, and collecting additional non-sampling information. Investigations included site visits on December 1, 16, 1998 and site sampling on January 6-7, 21,1999. The PA/SI was initiated on October 27, 1998.

2.0 SITE DESCRIPTION

2.1 Location

The Former Hulett Lagoon site is the location of a closed wastewater lagoon. The lagoon is located in the City of Camdenton, 500 feet northeast of the intersection of Dawson Road and Sunset Drive (Reference 3). Geographic coordinates for the site are 38°00'41.1" north latitude and 92°45'17.0" west longitude, as measured using the Garmin 12LX Global Positioning System (Reference 4). The lagoon is in the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of Section 24, Township 38 North, Range 17 West in Camden County. Figure 1 is a site location map (Reference (Reference 3).

The site can be accessed from the intersection of U.S. Highway 54 and State Route 5 in Camdenton by taking State Route 5 northwest for 0.3 of a mile to East Mulberry; take a left onto East Mulberry and the first right onto West Mulberry. When the paved portion of West Mulberry curves to the left, continue straight onto a gravel driveway that leads behind the Ron Hulett Chev-Olds-Buick Jeep/Eagle Automobile Dealership. Stay to the left on a gravel road that leads down to the lagoon. This road is not regularly maintained; there are several severe ruts caused from washouts (Reference 5).

The Camdenton area receives an average of 42.32 inches of precipitation annually, and an average of 19 inches of snowfall annually (Reference 6, p. 2). The 2-year 24-hour rainfall estimated at 3.5 inches (Reference 7). The average daily temperature during the summer months is 77° F, and the average winter temperature is 35° F (Reference 6, p. 2). The average wind speed and direction is approximately 10 miles per hour from the south (Reference 8, p. 74).

2.2 Site Description

The former Hulett lagoon is a closed wastewater sewage lagoon operated by the City of Camdenton from 1961 to 1988. The lagoon was approximately one acre in size (Reference 9, p. 12). Photos 1 and 2 were taken in October 1974 when the lagoon was operating. Photo 1 shows the north side of the lagoon where an influent pipe from a city sewer line entered the lagoon. Photo 2 shows the south side of the lagoon where an influent pipe from an industrial facility entered the lagoon. The wooden catwalk, also shown in photo 2, extended into the lagoon and supported the outlet pipe, which ran under the catwalk, and could be raised and lowered with a crank handle (the red apparatus on the end of the catwalk railing). More detailed operating conditions are discussed in the next section. A dirt road ran along the berm and surrounded the lagoon, as shown in photos 1 and 2.

In 1989, the lagoon was closed; the water was drained and the sludge was removed (Reference 9, p. 12). Photo 3 was taken during the dewatering process. The site is currently an open field area with grassy vegetation (Photos 4, 6-8). Remnants of the former berm and the road that surrounded the lagoon are still visible. The lagoon area is generally flat with surface runoff flowing to the northwest and entering an intermittent drainage that travels to the west. There is a monitoring well (MW), installed in July 1998, located just outside what would have been the southwest edge of the berm of the lagoon. This is known as MW-5 (Reference 5).

The lagoon is located in a mixed residential/commercial area of Camdenton. It is bordered on the north by an apartment complex (Photo 8); on the west by a strip of woods about 500 feet wide with Dawson Road on the other side; on the east by woods (Photo 7); and on the south by a strip of woods (Photo 6) and then residents. Access to the lagoon area is not restricted. There is no fencing or gates. The Ron Hulett car dealership personnel have

reported unauthorized dumping in the wooded area behind their facility that borders the road leading down to the lagoon (Reference 5).

2.3 Operational History

General Overview of Hulett Lagoon

The City of Camdenton, Missouri has owned the former Hulett lagoon property since at least 1961 and retains ownership today. The lagoon was constructed in 1961 under the State of Missouri Grants Program. The lagoon was constructed of clay, and its berms were approximately 25 feet wide and 15 feet high (Reference 9, p. 12). The lagoon was named and most commonly referred to as the Hulett Lagoon due to its proximity to the Ron Hulett automobile dealership that is located at 249 N. Highway 5 (Reference 5). The lagoon was also referred to as the Factory Lagoon and Camdenton Lagoon #3 (Reference 10).

The Hulett lagoon was in operation from 1961 until its closure in late 1989. It was one of five municipal lagoons that serviced the City of Camdenton, however, it was the only lagoon that received industrial effluent in addition to domestic sewage. From 1967 through 1986 a nearby manufacturing facility released untreated wastewater and storm water into the lagoon through a series of "mudpits", or sumps, via a storm sewer. In 1986, the facility installed a pretreatment wastewater system that replaced the mudpits and lagoon system (References 9, p. 12; 11, p. 1).

The facility is located approximately 1,000 feet southeast of the lagoon at 179 Sunset Drive. Heat transfer components for commercial and automotive industries are manufactured at the facility. The untreated wastewater was known to have contained several hazardous waste streams including corrosive waste, wastewater treatment sludges from electroplating operations, and waste oil. In addition, residual contaminants associated with degreasing operations, including TCE, was discharged into the mud pits and ultimately into the Hulett lagoon (References 9, p. 12; 11, p. 1; 16, p. 8).

Ownership History of Facility at 179 Sunset Drive

The 179 Sunset Drive property was originally held by Dawson Metal Products, Inc., a Kansas Corporation ("Dawson-Kansas"), pursuant to a lease dated November 28, 1966 between Dawson-Kansas and the Camdenton Industrial Development Corporation. The lease had a term of ten years, which is believed to have commenced July 1, 1967, with an option for Dawson-Kansas to purchase (Reference 12, p. 3).

On June 12, 1972, Dawson Metal Products, Inc. was issued a Certificate of Incorporation in the State of Delaware (Reference 13). In 1972 Sundstrand Corporation incorporated Dawson Metal Products, Inc., a Delaware Corporation ("Dawson-Delaware"), as a wholly owned subsidiary of Sundstrand Corporation. On June 29, 1972, Dawson-Delaware acquired the business and assets of Dawson-Kansas. In connection with the acquisition Dawson-Delaware, by way of assignment, acquired a leasehold interest in the 179 Sunset Drive property (Reference 12, p. 3). On September 25, 1972, Dawson Metal Products, Inc.

(the Delaware Corporation) was authorized as a Foreign Corporation in the State of Missouri to carry on the business of sale and distribution of air conditioning equipment and related parts (Reference 14).

On May 25, 1977 Dawson Metal Products, Inc. (the Delaware Corporation) changed its corporate name in the State of Missouri to Sundstrand Tubular Products, Inc. (Reference 15).

On August 24, 1990, Sundstrand agreed to sell the business and assets of Sundstrand Tubular Products, Inc. to Modine Heat Transfer, Inc., a wholly owned subsidiary of Modine Manufacturing Company, a Wisconsin based corporation that operates and conducts business in the state of Missouri. This transaction was closed on October 18, 1990 (References 16, pp. 3, 4; 12, p. 3).

On November 27, 1990, Sundstrand Tubular Products, Inc. changed its name to Sundstrand Camdenton, Inc (Reference 12, p. 3). On April 18, 1991, Sundstrand Tubular Products, Inc., a Foreign Corporation, was formally withdrawn from the State of Missouri (Reference 17). On March 15, 1994 Sundstrand Camdenton, Inc. was liquidated (Reference 12, p. 3).

On April 1, 1997, Modine Heat Transfer, Inc. merged with Modine Manufacturing Company; thus, changing its name to Modine Manufacturing Company. Modine is the current owner/operator of the facility (Reference 16, pp. 3, 4).

Operational History of 179 Sunset Drive Facility

The facility at 179 Sunset Drive has always been used to manufacture air-conditioning coils and feeder parts from aluminum and copper tubing. According to Sundstrand personnel, the manufacturing process flowed as follows:

- copper and aluminum tubing were fed from rolls to benders to form U shapes and then cut off;
- parts were then immersed in alkaline cleaning lines to remove oil and chips;
- parts were degreased to remove any remaining oil;
- clean parts were assembled and small U shaped copper tubing and aluminum tubing ends were brazed to assembled cores using manual and automatic brazing systems;
- the assembled heat transfer components were degreased and/or alkaline cleaned and then tightness tested using refrigerant; and
- finally, the components were then painted if required by the customer and packaged for shipment (Reference 12, p. 4)

The manufacturing process consisted of aluminum etching, and a small amount of chromium electroplating (Reference 11, p. 2). According to an Environmental Site

Assessment conducted in November 1991 for Modine Manufacturing Company, the facility generated TCE waste during degreasing operations from the early 1970's to December 1990. In December 1990, they began using 1,1,1-trichloroethane (TCA) for degreasing operations (Reference 18, p. 1).

Four mudpits (sumps) were utilized by the facility from 1967 to 1986. The mudpits were connected by a six-inch steel line that delivered storm water (from 1979 to 1983, eliminated in 1983), boiler water and cleaning line waste to the Hulett lagoon. The mudpits were located adjacent to the manufacturing building on the west side. Each mudpit consisted of a 4' x 4' x 4' cement sump. Each sump received the previous sumps' wastes until discharged into the sewer. The southern most mudpit, #4, was an open pit that collected boiler water and storm water. Mudpit #3 collected aluminum cleaning line waste and storm water from mudpit #4. Mudpit #1 collected copper cleaning line waste in addition to aluminum cleaning line waste and storm water from the first two mudpits. Hulett lagoon potentially received hazardous waste from the facility's four mudpits and associated piping, identified by the following hazardous waste codes: F006 (wastewater treatment sludges from electroplating), D002 (corrosive waste) and D098 (waste oil). In addition, residual contaminants associated with degreasing operations, including TCE, did go through collection lines into the mud pits and ultimately into the Hulett lagoon (References 9, p. 13; 16, p. 8).

Operational History/Regulatory Compliance of Hulett Lagoon

The Hulett Lagoon operated with a National Pollutant Discharge Elimination System (NPDES) Permit (MO-0048577) issued under the Clean Water Act by the DNR's Water Pollution Control Program (WPCP) (Reference 10). The WPCP database shows the permit issued July 1985, although it is likely the permit was actually issued earlier. The permit was terminated February 29, 1988.

DNR Inspection - September 7, 1978

In September 1978, DNR personnel conducted an inspection of the operation and condition of the wastewater treatment facilities serving the City of Camdenton. The inspector noted that the Hulett Lagoon had a large problem with its industrial influent. The sewage from Sundstrand was entering the lagoon at the south end, which was the same end that the lagoon's discharge pipe was located. The retention time for the industrial waste was far too short a period to treat the waste. To correct the problem, it was recommended that the location of the influent pipe from Sundstrand be moved to the north end of the lagoon, or the sewage line be tied in to the other influent line already at the north end. The inspector also noted that the strength of the Sundstrand industrial sewage entering the Hulett Lagoon was apparently too great for the facility to handle. It was recommended to the city that they enforce their sewer use ordinance to prevent misuse of the sewers and sewage treatment facilities (Reference 19).

DNR Geologic Investigation - September 12, 1978
On September 12, 1978 DNR personnel from the Division of Geology and Land Survey (DGLS) conducted an investigation for an Engineering Geologic Report on the Collapse Potential of Camdenton Lagoons. The inspector noted that the problems at the Hulett lagoon appeared to be design related and not geologic. Like the previous inspectors, DGLS personnel noted the short circuiting problem. They observed effluent from the metal fabricating plant bubbling up approximately 40 feet from the discharge pipe. There was an area of thick floating effluent. An open channel existed directly from the inlet pipe to the discharge pipe. Discharge from the lagoon was dark green in color with thick white foam floating on the surface (similar to that in Photo 2) (Reference 20).

Lagoon Sampling in 1984
On May 22, 1984 the City of Camdenton collected samples of the Hulett lagoon water, Sundstrand's influent to the lagoon, housing influent to the lagoon, effluent from the lagoon, and water near Lake of the Ozarks. Results showed 41 parts per billion (ppb) TCE in the Sundstrand influent and 28 ppb TCE in the effluent from the lagoon (Reference 21).

On July 19, 1984 additional samples of Sundstrand's effluent and lagoon water were collected. This Sundstrand effluent sample showed 4,900 ppb TCE in addition to 7,600 ppb, total chromium, 29,000 ppb total copper, and 1,400 ppb total zinc. The sample from the lagoon showed 500 ppb TCE, 500 pbb total chromium, 200 ppb hexavalent chromium, 4100 ppb total copper and 230 ppb total zinc (Reference 22).

Construction of Sundstrand's Pretreament Plant in 1986
Sundstrand and the City of Camdenton joined efforts in 1986 to obtain a Community Development Betterment Grant (CDBG) from the state to construct a pretreatment plant at the Sundstrand facility. The plant was completed and on line as of April 14, 1986. The plant still operates today (Reference 23).

Construction Permit for Lagoon to Replace Hulett Lagoon
On September 23, 1986, DNR issued the City of Camdenton a Construction Permit for sewers, force mains and lift stations for transport of waste to the C.P. White Lagoon. The construction permit stated that these facilities were designed to allow for elimination of the existing factory lagoon (Hulett Lagoon) (Reference 24).

Pretreatment Monitoring Report - April 30, 1987
At the request of DNR's WPCP, a pretreatment monitoring survey was conducted of the industrial wastewater discharge of the Sundstrand Tubular Products factory. On April 30, 1987, DNR's Environmental Services Program (ESP) collected a grab sample of the effluent from the treatment system discharge weir. The sample was analyzed for cyanide, total metals (silver, cadmium, chromium, copper, hexavalent chromium, nickel, lead, zinc). The sample was also supposed to be analyzed for volatile organic compounds (VOCs), however, there were no results for VOCs due to analytical error. Results showed

chromium at 2,700 ppb, copper at 890 ppb, hexavalent chromium at 180 ppb, nickel at 50 ppb, and zinc at 110 ppb (Reference 25).

Hulett Lagoon Closure

In 1988, the City of Camdenton began closure of the Hulett Lagoon pursuant to an Industrial Development Grant overseen by DNR's WPCP. As per DNR guidelines for closing out municipal lagoons, sampling and analysis of the sludge in the lagoon was limited to metals and other parameters such as total solids. High levels of chromium, lead, and nickel were detected (Reference 26). DNR offered the City officials several options to consider in completing the closure of the lagoon (Reference 27). The option chosen and implemented by the city was subsurface application of the sludge from the lagoon to a sludge disposal site owned by the city. DNR approved the sludge disposal plan on February 22, 1989 (Reference 28).

The city's engineering consultant, Missouri Engineering Corporation, supervised the lagoon closure project. In June 1989, McCormick Gravel & Excavating of Versailles, Missouri was awarded the contract for the removal, stockpiling and disposal of sludge from the lagoon. The contract included lagoon dewatering, preparation, transportation, and stockpiling of the sludge, as well as disposal by land application at chosen site at the Camdenton Memorial Airport (CMA), four miles southeast of Camdenton (References 29; 30).

The specifications called for the contractor to pump the water from the lagoon and discharge it into the existing sewer manhole approximately 100 feet away (Reference 29). The process of removing the sludge at the lagoon began on July 11, 1989 and was completed sometime in late September 1989. Lime was added to the sludge at the lagoon to raise the pH and immobilize the metals. The project contract was originally written with an estimate of 1,500 cubic yards of sludge to be removed. However, due in part to an unusually high amount of rain during the removal process, the sludge did not dry out and shrink, as it should have. In addition, each time it would rain, the rain would cause the sludge to be spread across the lagoon contaminating more soil. The lagoon had to be pumped again and the sludge allowed to dry. A small amount of soil then had to be removed along with the sludge. When that portion of the project was completed, an estimated 2,395 cubic yards of sludge had been removed (References 31; 32; 33). The berms of the lagoon were turned in and mixed with a 1 to 1 ratio (Reference 34). No soil was brought in for the mixing. Some soil from the hillside southeast of the lagoon was scraped in to fill the void (Reference 5).

The sludge was deposited at the CMA from July through December 1989. The area at the CMA where the sludge was disposed of is being investigated as a separate site - the Camdenton Sludge Disposal Area. A Combined Preliminary Assessment/Site Inspection is being conducted at the site, and will be completed by April 1999.

2.4 Site History and Previous Investigations

Preliminary Assessment/Site Inspection at 179 Sunset Drive Facility
In 1992, DNR conducted a PA and an SI of the facility at 179 Sunset Drive under the name Sundstrand site (MOD062439351). The investigations were initiated due to a complaint filed with DNR alleging that 4,500 gallons of TCE had been spilled at the facility. Neither the PA nor the SI included any off-site investigations of the former lagoon or sludge disposal area (References 35; 36).

In addition to the PA and SI conducted by DNR, there were several other investigations conducted at the Modine facility during that time period by EPA contractors and Modine consultants. In general, all of the investigations documented and/or confirmed the presence of chlorinated solvents, including TCE, in the soils and groundwater at the facility. At that time, the DNR determined that oversight authority of the facility was most appropriate under the Resource Conservation and Recovery Act (RCRA).

RCRA Corrective Action at 179 Sunset Drive Facility
Modine Manufacturing Company is currently negotiating a Corrective Action Abatement Order on Consent (AOC) through the Permits Section of DNR's Hazardous Waste Program (HWP). The objectives of the AOC include investigation to determine the nature and extent of any release of hazardous waste at the facility and to remediate any releases in order to protect human health and the environment (Reference 16). There have already been several investigations and a certain amount of remedial activities conducted by Modine at the facility and in the surrounding area. Detailed information regarding a subsurface investigation conducted at the Hulett lagoon in 1996 is included in Section 3.1 Previous Waste/Source Sampling. More information regarding groundwater sampling conducted in the area is included in Section 4.2 Previous Groundwater Sampling.

Referral of Former Hulett Lagoon to Superfund Section
On September 8, 1998 the Permits Section of the HWP formally referred investigation of the former Hulett Lagoon to the Superfund Section of the HWP. Investigation of the Hulett Lagoon is not included in the AOC with Modine due to the fact that, in addition to receiving wastewater from the facility at 179 Sunset Drive, the lagoon also received domestic sewage from the surrounding residences. A dye trace study of the City of Camdenton's sewer system performed by DNR's DGLS on August 5, 1998, verified that facility wastewater mixes with domestic sewage prior to entering city property (Reference 37).

According to 40 CFR 261.4(a)(1), domestic sewage and any mixture of domestic sewage and other wastes that pass through a sewer system to a publicly owned treatment works (POTW) are not considered solid wastes, and thus would not be considered hazardous wastes. The facility that disposes of such wastes is excluded from RCRA permitting requirements, which is why the Hulett Lagoon site was referred to Superfund to be addressed under CERCLA. CERCLA has no such exemption.

2.5 Waste Characteristics

The primary contaminant of concern at the Former Hulett Lagoon site is the volatile organic compound (VOC) trichloroethene (TCE). Analytical results from soil and groundwater sampling show TCE at concentrations above Superfund Chemical Data Matrix (SCDM) health-based benchmarks as well as the Maximum Contaminant Level (MCL) for drinking water (Reference 38).

Trichloroethene

TCE is a nonflammable, colorless liquid at room temperature with a somewhat sweet odor and sweet, burning taste. The manmade chemical does not occur naturally in the environment. TCE is now mainly used as a solvent to remove grease from metal parts. It is also used as a solvent in other ways and is used to make other chemicals. TCE evaporates easily into the air but can persist in the soil and groundwater. Once TCE is in surface water, much of it will evaporate into the air. It will take days to weeks to break down in surface water; in groundwater, the breakdown is much slower because of the slower evaporation rate. Very little TCE breaks down in the soil, and it can pass through the soil into underground water (Reference 39, pp. 1, 2).

TCE can enter the body from breathing air or drinking water containing TCE. It can also enter through the skin, but not as easily as by breathing or drinking. If the chemical is inhaled, about half will enter the bloodstream and organs; the remaining is exhaled. If TCE is swallowed, most will be absorbed into the blood. The liver changes most of the TCE to other chemicals and the majority of these breakdown products leave the body in the urine within a day. Some of the common symptoms to TCE exposure (usually at high levels) are headaches, dizziness, and rashes. Laboratory animals that were exposed to moderate levels of TCE had enlarged livers, and high-level exposure caused liver and kidney damage. However, it is not known if these changes would occur in humans. TCE is considered an animal carcinogen (Reference 39, pp. 1-4).

TCE is known as a Dense Nonaqueous Phase Liquid (DNAPL). DNAPLs are separate-phase hydrocarbon liquids that are denser than water. DNAPLs can exist in the soil/aquifer matrix in free-phase form or in residual form. When released on the ground's surface, free-phase DNAPLs move downward through the soil matrix under the force of gravity or laterally along the surface of sloping fine-grained stratigraphic units. As free-phase DNAPLs move, residual amounts are trapped in pores and/or fractures by capillary forces. Trapped DNAPLs are known as residual saturation. This residual saturation is a function of the physical property of the DNAPL and the hydrogeologic characteristics of the soil/aquifer medium, which typically ranges from 5-50% of total pore volume (Reference 40).

Most DNAPLs undergo only limited degradation in the subsurface and persist for long periods of time, while slowly releasing soluble organic constituents to groundwater through

dissolution. Dissolution may continue for hundreds of years under natural conditions before the DNAPL is dissipated (Reference 40).

3.0 WASTE/SOURCE SAMPLING

3.1 Previous Sampling (Reference 41)

On October 11, 1996, on behalf of Modine Manufacturing Company, Dames & Moore conducted a subsurface investigation at the former Hulett lagoon. The purpose of the investigation was to determine the presence or absence of VOCs, in particular TCE, in soil at the former Hulett lagoon.

Four hydraulically driven probes were advanced in the area of the lagoon where the inlet pipe from the former Sundstrand facility and the outlet or discharge pipe from the lagoon were previously located. The soil within the probe cores was continuously sampled and field screened using a photoionization detector (PID). The soil sample exhibiting the highest indication of VOC content from each probe core was submitted for analysis. The samples were analyzed for VOCs only. The following table presents results for those samples.

TABLE 1: SELECTED ANALYTICAL RESULTS FROM SOIL SAMPLES COLLECTED BY DAMES & MOORE IN HULETT LAGOON ON OCTOBER 11, 1996

Sample ID	Depth	Analyte Detected	Concentration (in ppm)
GP-1	4' - 6'	chloroform	0.20
		TCE	9.17
GP-2	4' - 5.5'	TCE	1.94
GP-3	4' - 5'	chloroform	0.0094
		cis-1,2-dichloroethene	0.0914
		TCE	not detected
GP-4	4' - 6'	TCE	not detected

Although the majority of sludge from the lagoon was supposedly removed during closure, these sampling results indicated that TCE contamination was still present in the lagoon area. Dames & Moore and Modine have concluded that the TCE concentrations encountered in the soil at the lagoon supports their previous position that the former lagoon is the off-site source of the observed TCE impact to groundwater at the Modine facility. DNR RCRA Permits personnel hold the position that the nature, extent and source of the TCE groundwater contamination in the area has not been fully determined yet. That is one of the objectives of the AOC currently being negotiated. At least four waste management units on the 179 Sunset Drive property have been identified as potential contributors to TCE soil and groundwater contamination (Reference 16).

3.2 PA/SI Sampling (Reference 38)

PA/SI soil sampling in the lagoon area was conducted on January 21, 1999. Figure 2 is a site map that shows collection location of all soil samples in the lagoon area. A membrane interface probe (MIP), equipped with a PID and a flame ionization detector (FID), was employed to generate soil gas data of the subsurface within and surrounding the boundaries of the former lagoon area.

Ten soil borings (Hulett-01 through Hulett-10) were drilled utilizing a track-mounted hydraulic soil probe. Eight soil grab samples were collected from the lagoon area and one background sample was collected from outside the lagoon. Based upon this sampling, the lagoon is estimated to have been approximately six feet deep. Previous sampling documented refusal, meaning bedrock was encountered, in drilling from a range of five to six feet below ground surface, depending on the boring location. The PA/SI background boring was drilled approximately 25 feet south of the lagoon's edge. The background sample was collected from a 10.5' to 11' depth, which was a similar depth zone as the majority of the source samples from the lagoon, correcting for the rise in elevation at the background sampling point.

3.3 PA/SI Analytical Results (Reference 38)

Reference 38, Appendix B contains the MIP data logs generated for each boring. The logs indicate detections noted on the MIP's PID (identified as "Detector 1") and the FID ("Detector 2"). There were not any significant detections with the MIP for any of the borings.

Table 2, on page 13, presents the analytical results for all soil samples collected by DNR as part of the PA/SI. All soil samples were analyzed for total metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and silver) and VOCs. If any sample's total analyte levels exceeded 80% of 20 times the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit for a particular analyte, TCLP analysis was performed on that sample.

The last column in Table 2 lists the Missouri Cleanup Action Level (CALM) C_{LEACH} level for each chemical. These values were listed for additional comparison. The Superfund Chemical Data Matrix (SCDM) benchmarks and MO Any-Use Soil Levels (ASLs) for chemicals only take into account human health effects related to exposure to the chemicals in the soil. They do not take into account the effect the chemicals have when they leach into the groundwater. The C_{LEACH} value was calculated to approximate the physical processes involved in a soil contaminant leaching to the groundwater. The C_{LEACH} value may be interpreted as a soil contaminant concentration, which (within the limitations of the formulas and assumptions used for calculation) if allowed to remain, would leach to the saturated zone and result in a groundwater concentration at or below the MCLs.

Three soil samples contained TCE at a detectable level. TCE was not detected in the background soil sample. The concentrations of TCE detected in the three samples from the lagoon exceed the C_{LEACH} value for TCE, which would indicate the potential exists for TCE to leach into the saturated zone and result in groundwater contamination above the MCL. This is, in fact, the situation at this site, as documented from groundwater samples collected from the monitoring well on-site (discussed in Section 4.5) (Reference 42).

The only sample that contained any metals significantly above background was 991471 from soil boring 4. Barium and cadmium were over three times the background levels, however neither metal was present above the SCDM benchmarks or MO ASLs.

3.4 Conclusions

Although over 2,000 cubic yards of sludge were removed from the lagoon during closure in 1989, PA/SI sampling, as well as previous sampling, document that TCE contaminated soil still remains in the lagoon area. Three samples, collected for the PA/SI near the previous location of the outfall pipe, contained TCE at 9.5 ppm, 0.24 ppm and 0.12 ppm. These TCE concentrations are below health-based benchmarks protective of human exposure to the soil. However, the concentrations exceed the Missouri CALM C_{LEACH} value, which was calculated as a value at which TCE would leach to the saturated zone and result in a groundwater concentration at or below the MCLs. The C_{LEACH} value for TCE was calculated using specific formulas and assumptions that may not necessarily model site conditions at the Hulett lagoon.

One way of testing whether the TCE present in the soil at the lagoon has the potential to leach into groundwater at a level above the MCL would be to perform the Synthetic Precipitation Leaching Procedure on the soil samples. This may be necessary in future investigations.

TABLE 2: ANALYTICAL RESULTS FROM SOIL SAMPLES COLLECTED IN/NEAR THE HULETT LAGOON

All results in parts per million (ppm) * soil saturation level substituted for ASL NA - not analyzed NL - not listed
Underlined results are those that are three times above background or above the detection limit if the background concentration is below the detection limit

	Hulett-01 4.5' - 5'	Hulett-02 6.5' - 7'	Hulett-03 3' - 4'	Hulett-03 4.5' - 5.5'	Hulett-04 7.5' - 8'	Hulett-07 5.5' - 6'	Hulett-09 6' - 7'		Hulett-10 10.5' - 11'	SCDM Bnchmrk	MO ASL	MO CALM C_{LEACH}
	991469	991470	991467	991468	991471	991472	991473	991474 (replicate)	991475 (backgrnd)			
METALS												
Arsenic, total	16.1	3.58	13.6	12.5	19.7	17.2	9.68	4.6	10.7	0.0043	11	NL
Barium, total	150	62.4	244	519	750	257	103	132	203	5500	3900	1650
Barium, TCLP	NA	NA	NA	0.442	0.628	NA	NA	NA	NA			
Cadmium, total	0.453	0.254	0.304	0.386	4.52	0.304	<0.2	0.204	0.651	39	28	11
Chromium, total	74.9	31.9	55.5	61.3	68.9	73.3	58.2	39.8	62.7	390	5600	38
Copper, total	39.9	15.7	33.6	37.5	64.3	38.8	6.47	8.56	36.8	NL	NL	NL
Lead, total	116	38.1	118	951	325	80.1	39.1	61.8	94.2	NL	240	NL
Lead, TCLP	<0.025	NA	0.0772	0.143	<0.025	<0.025	NA	NA	<0.025			NL
Mercury, total	0.102	<0.04	0.107	0.139	0.195	0.141	<0.04	<0.04	0.0947	23	17	3.23
Nickel, total	43.3	12.5	49.4	69.6	90.1	36.2	9.76	12.4	32.5	1600	1100	170
Selenium, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	390	280	4.37
Silver, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	390	280	255
VOCs												
Cis-1,2-dichloroethene	0.19	0.14	<0.025	<0.025	<0.025	0.11	<0.025	<0.025	<0.025	780	490*	0.51
Trichloroethene	9.5	0.24	<0.025	<0.025	<0.025	0.12	<0.025	<0.025	<0.025	58	340	0.097

4.0 GROUNDWATER PATHWAY

4.1 Hydrogeologic Setting (Reference 43)

Stratigraphic Units

A stratigraphic column (Table 3 on page 18) has been tabulated based upon the stratigraphy of nearby wells. The youngest bedrock formations beneath the site are expected to be Ordovician-age sediments assigned to the Canadian Series. The Roubidoux Formation consists of dolomite, sandy dolomite, and sandstone. In the Camdenton area, soluble portions of the Roubidoux have generally been removed by dissolution. Nearby well logs indicate that the Roubidoux Formation may have been completely removed by erosion in the vicinity of the site.

Underlying the Roubidoux Formation, the Gasconade Dolomite consists of cherty dolomite and is estimated to be approximately 300 feet thick in the vicinity of the site. A basal unit of the Gasconade Dolomite, known as the Gunter Sandstone Member, commonly separates the Ordovician and Cambrian-age strata. The Gunter Sandstone is approximately 25 feet thick in the Camdenton area.

Cambrian rocks in the Camdenton area were deposited in a complex depositional environment. Camdenton is located near the western margin of a Cambrian-age intrashelf sedimentary basin known as the Central Missouri Basin. To the west lies the north-south trending Lebanon Arch, which consists of carbonate platform rocks, that in some areas, thin over Precambrian highlands. Dramatically different lithologies and abrupt facies changes are depicted in area well logs. In general, more shaly, basinal rocks to the east pinch-out against the Lebanon Arch.

Because of the tectonic setting, Cambrian beds in the Camdenton area are difficult to categorize, and "layer-cake" stratigraphy should not be assumed. The following descriptions are simplified. The upper-most Cambrian unit in the area is the Eminence Dolomite, which consists of approximately 300 – 635 feet of dolomite with minor amounts of chert. The Eminence Dolomite is underlain by about 25 - 230 feet of Potosi Dolomite, which consists of dolomite, chert, and drusy quartz. Beneath the Potosi Dolomite, in descending order, are the Derby-Doerun Dolomite, the shaly Davis Formation, the Bonneterre Formation, and the Lamotte Sandstone. The entire Cambrian section is estimated to be over 1,150 feet thick.

Aquifers

The Ozark Aquifer, which includes all bedrock units above the Cambrian-age Derby-Doerun Dolomite, is the shallowest aquifer beneath site. The Ozark Aquifer is considered exposed at the surface at the Former Hulett Lagoon site. The total thickness of the aquifer is approximately 950 feet. Each of the units which comprise the Ozark Aquifer have individual characteristics that control their water-bearing capabilities; however, in general, the Ozark Aquifer produces good-quality water, with production rates generally proportional

to well depth. Extensive pumping of groundwater in the Camdenton area has created a downward vertical gradient, and the site is located in a groundwater recharge zone.

Because detailed hydrogeologic studies have not been conducted at the site, groundwater flow directions within the bedrock can only be approximated. Prior to pumping of the aquifer, groundwater beneath the site probably flowed westward or northward to discharge areas in the Niangua River valley. Pumping rates at the Camdenton municipal wells are high enough to engulf the site within the cones of depression that surround the municipal wells. The radius of influence of nearby production wells should be determined.

Groundwater flow in the saturated zone is controlled by gradient. According to DGLS geologists, assertions made by Modine's consultants that preferential pathways in the Ozark Aquifer substantially influence flow direction in the saturated zone are incorrect. Water flows downhill; fractures or solution-enlarged channels cannot make water flow uphill. Monitoring well nests are needed to accurately determine the magnitude of the downward vertical gradient. The upper Gasconade Dolomite *may* inhibit the downward migration of contamination. However, fracturing and karst development may have resulted in a local increase in permeability within the otherwise relatively tight upper Gasconade Dolomite.

The Gunter Sandstone is generally highly porous and permeable and is an important source of domestic groundwater supplies in the area. Because the Gunter Sandstone generally yields adequate domestic water supplies, few private wells in the area penetrate the underlying Cambrian Formations. However, municipal wells in the Lake of the Ozarks area are generally cased through the Gunter Sandstone, in order to avoid possible bacterial contamination.

The Eminence and Potosi Dolomites are a major source of municipal drinking water throughout the Ozark area, including the City of Camdenton. The Eminence Dolomite is differentiated from the underlying Potosi Dolomite by the lack of druse. A druse is a rock cavity encrusted with finely crystalline quartz. The druse-rich Potosi Dolomite is the most permeable geologic unit within the Ozark Aquifer and generally has an extensive network of karstic channels.

The shallowest reliable aquitard beneath the site is the St. Francois Confining Unit, approximately 1,200 feet below the surface. The St. Francois Confining Unit separates the Ozark Aquifer from the deeper St. Francois Aquifer. The St. Francois Aquifer includes the Cambrian-age Bonneterre Formation and Lamotte Sandstone. The St. Francois Aquifer is not used as a water source in Camden County. Water losses in the Lamotte Sandstone are common in some parts of the Ozark Region, although the phenomenon is poorly understood. Outside the Cambrian outcrop area, few water wells penetrate the Lamotte Sandstone, since yields may actually be reduced. Groundwater flow directions in the deeper St. Francois Aquifer are generally unknown and may be complicated.

Baseline water-level and pumping rate data needs to be collected before informed decisions about groundwater movement in the Camdenton subsurface can be made. Static water levels should be measured at least monthly at any inactive wells. Detailed records of active wells should include volume of water pumped, length of pumping cycles, and drawdown measurements. The Mulberry City Well (which was shut down on January 26, 1999 because of TCE contamination) produced approximately three times the volume of the other two city wells, suggesting the aquifer is highly heterogeneous. The Mulberry Well probably intercepted more solution-enlarged cavities than the other city wells, although lithologic differences can also explain differences in well yield. Wide variations in aquifer parameters are common in carbonate areas.

The three Camdenton city wells produced a total of 232,458,000 gallons in 1997. An estimate of the cone of depression produced by this pumping can be made by comparing Camdenton to the city of Rolla, which is located in a similar ridge-top geologic setting approximately 50 miles east of Camdenton. In 1960, four Rolla city wells produced approximately 290,250,000 gallons of water from the Ozark Aquifer. The resulting cone of depression was over five miles wide. By 1960, pumping of the Ozark Aquifer in the Rolla area had dropped water levels up to 150 feet compared to the predevelopment potentiometric surface. The relatively deep depth to groundwater in the Camdenton area suggests a similar radius of effect can be expected. Any potential site-related contaminants reaching the water table are expected to move toward the nearest Camdenton City well. Until recently, hydraulic control beneath the Former Hulett Lagoon and Modine sites has been maintained by pumping at the Mulberry well. Now that the Mulberry well has been shut off, TCE contamination is expected to move toward another city well.

Monitoring wells at the Modine site are open to different depth intervals. Therefore, data from these wells cannot be used to create a potentiometric map. The fact that two of the four wells have gone dry in the past suggests that the vertical flow component is significant. Water levels in area wells tend to decrease with depth, supporting the statement that the vertical flow is downward. As previously mentioned, a downward gradient is to be expected in an active municipal well field, particularly if it is located on a ridge top. Static water levels measured during the construction of the newest Camdenton City well (Hickory Street or well # 7) also verify the downward gradient. The Hickory Street well is 1,100 feet deep with 462 feet of casing. The static water level before pressure-grout sealing of the well casing was 222 feet below ground surface. Static water level after sealing was 260 feet below ground surface, indicating a downward vertical gradient. A large upland area that might provide recharge to the Camdenton City wells does not exist. Groundwater monitored by the monitoring wells is essentially moving downward to recharge the pumping wells. Conclusions about lateral flow directions cannot be made based on water levels from the existing monitoring well network.

It has been suggested that contaminants reaching the saturated zone beneath Camdenton will follow "regional groundwater flow" and discharge at the Lake of the Ozarks. However,

groundwater withdrawals averaging over 500,000 gallons per day will create a large cone of depression and obliterate "regional groundwater flow" in any Ozark ridge top setting. A 2-hour pump test of the new Hickory St. well at 550 gallons per minute (gpm) caused a 176-foot drawdown in water level. There is no evidence to suggest that potential contaminants reaching the water table from either the Former Hulett Lagoon or the Modine site can somehow escape the Camdenton well field.

Aquifer Discontinuities
Minor folds and faults in the area cannot be considered aquifer discontinuities. However, it should be noted that the Cambrian-age formations that form the most productive portions of the Ozark Aquifer beneath the site are highly variable in lithology. The aquifer cannot be considered isotropic, nor does it possess radial symmetry. Aquifer parameters may be so variable as to render groundwater modeling useless.

Wellhead Protection Area
Camdenton is located in Area 1, as designated by the DGLS Wellhead Protection Section. Since September 1987, Area 1 bedrock wells have been required to have 80 feet of casing and penetrate at least 30 feet of bedrock. Wells within ¼ mile of the Lake of the Ozarks are located in Sensitive Area B and subject to additional requirements.

Karst Features
The Camdenton area is considered karst. Significant karst features are present within a four-mile radius of the site. When MW-5 was drilled at the site, numerous fractures and small voids were encountered. Over 5,000 gallons of water was lost during the drilling of the monitoring well.

4.2 Groundwater Targets

Groundwater use within four miles of the site is extensive. At least 3,420 people are served by public wells in the area and an estimated 409 people are served by private wells. A detailed description of the well use follows.

Public Drinking Water Wells
The City of Camdenton currently utilizes three wells to supply drinking water to city residents: the Rodeo Grounds well, the Blair Heights well, and the Hickory well. The city also has a fourth well, the Mulberry well, that was taken off line on February 2, 1999 due to TCE contamination. The Mulberry well is currently used only as a standby well when any of the other three wells are not operating. Since February 2, 1999, the Mulberry well has been on-line twice. Due to electrical problems at the Blair well, Mulberry well was pumped from February 2 to the 9th, for a total of about 400,000 gallons. Due to problems with the water controls, Mulberry well was pumped from February 12 - 16th, for a total of 1,314 gallons (References 44; 45).

Table 3: Stratigraphic Column for Former Hulett Lagoon, Camden County (after Harvey et. al.,1983)

System	Aquifer Group	Approximate Site – Specific Thickness (ft)	Formation	Hydraulic Conductivity (cm/sec)	Regional Thickness (ft)	Dominant Lithology	Water-bearing Character
Quaternary		8	Colluvium and residuum		0-90	Regolith of residual clay, sand, chert pebbles and cobbles	May contain small amounts of perched water.
Ordovician	Ozark Aquifer	0?	Roubidoux Formation	10^{-3}	0-90	Clayey residuum, sandstone and sandy dolomite	Not present in sufficient thickness in the Camdenton area to produce usable quantities of water.
		300	Gasconade Dolomite	10^{-6}	300-385	Cherty dolomite, minor sandstone, and shale	Yields moderate to large quantities of water to wells. Yields range from 20 to 75 gpm. Less-permeable Upper Gasconade may act as a leaky confining unit.
		25	Gunter Sandstone Member	10^{-4}	10-45	Sandstone	Contributes moderate to large quantities of water. Most wells open to other formations.
Cambrian		500?	Eminence Dolomite	10^{-5}	240-600?	Cherty dolomite	Yields 6-100 gpm, the average being about 20 gpm
		150?	Potosi Dolomite	10^{-4}	30-330	Dolomite; contains abundant quartz druse	Yields large quantities of water to wells. Yields range from 100 to 750 gpm.
	St. Francois Confining Unit	180	Derby-Doerun Dolomite	10^{-7}	80?-215	Shaley dolomites and shale	Reliable aquitard.
		80	Davis Formation	10^{-7}	50-380?		
	St. Francois Aquifer	160	Bonneterre Formation	10^{-5}	85-200	Dolomite and limestone	Generally used only in outcrop areas. May contribute additional 100-200 gpm to wells open to other formations.
		240	Lamotte Sandstone	10^{-5}	140-300	Sandstone and arkosic conglomerate	
Precambrian	Basement Confining Unit					Igneous and metamorphic rocks	Does not yield water to wells in this area

The Rodeo well is located on Rodeo Road, just over one mile southeast of the site. The Rodeo well was drilled in 1961 to a total depth of 940 feet with 450 feet of eight-inch steel casing. The pump is set at 420 feet. The yielding strata is the Potosi Dolomite of the Ozark Aquifer. Records show the well yields 380 gpm (Reference 44).

The Blair Heights well is located on Lakeview Drive, 0.7 of a mile south-southwest of the site. The Blair well was drilled in 1974 to a total depth of 1060 feet with 400 feet of ten-inch diameter steel casing. The pump is set at 450 feet. The yielding strata is the Potosi Dolomite of the Ozark Aquifer. Records show the well yields 100 gpm (Reference 44).

The Hickory well is located at the southwest end of Hickory Street, 0.8 of a mile east of the site. The Hickory well was drilled in 1998 to replace the Mulberry well. The Hickory well was drilled to a total depth of 1100 feet with 450 feet of eight-inch diameter steel casing. The pump is set at 500 feet. The yielding strata is the Potosi Dolomite of the Ozark Aquifer (Reference 44).

The Mulberry well is located south of Mulberry Lane, 0.25 of a mile south of the site. The Mulberry well was drilled in 1986 to a total depth of 900 feet with 400 feet of twelve-inch diameter steel casing. The pump is set at 350 feet. The yielding strata is the Potosi Dolomite of the Ozark Aquifer. Records show the well yields 600 gpm (Reference 44).

When in use, the Mulberry well was blended with the other two wells, with the Mulberry well being the largest producer. The City of Camdenton's Public Works Director reported that the Mulberry well was the lead well until July 1998. Before July 1998 the controls on the wells were set such that Mulberry well was always the first to run; the Blair and Rodeo wells only ran when the Mulberry well was not able to handle the demand. During that time, the Mulberry well supplied about 70% of the water to the system. New controls were installed in July 1998, and the city was able to set the time the wells came on. In response to the TCE contamination showing up in the well, the Mulberry well was set as the third well to come on. With the new controls the Mulberry well was cut back to supply only about 40% of the water to the system (Reference 45). The City of Camdenton's water supplies a total of 3,010 people (Reference 46, p. 14).

The Windsor Estate Nursing Home well is located on Highway 5, approximately 1.4 miles northwest of the site. The well was drilled in 1969 to a total depth of 600 feet with 400 feet of six inch casing (Reference 61). This well serves 70 people (Reference 32, p. 131).

The Linn Creek well is located on Highway 5, approximately 2.9 miles northeast of the site. The well was drilled in 1984 to a total depth of 860 feet with 528 feet of six inch steel casing (Reference 62). This well serves 260 people (Reference 32, p. 33).

The Southway Terrace Mobile Home Park well is located on Highway 5, 2.3 miles northwest of the site. The well was drilled in 1970 to a total depth of 550 feet with 350 feet of six inch steel casing (Reference 63). This well serves 85 people (Reference 32, p. 120).

TABLE 4: PUBLIC WELLS WITHIN A 4-MILE RADIUS OF THE FORMER HULETT LAGOON SITE		
Distance from Site	Name of Well	No. of People Served*
0 - 1/4	City of Camdenton's Mulberry Well	2,107†
1/2 - 1	City of Camdenton's Blair Well	1,003‡
	City of Camdenton's Hickory Well	1,003‡
1-2	City of Camdenton's Rodeo Well	1,003‡
	Windsor Estate Nursing Home	70
2-3	Linn Creek	260
	Southway Terrace MHP	85
TOTAL		3,425

* Reference 46, pp. 14, 33, 120, 131
† This represents the number of people apportioned to this well when it was in peak operation during the initial time period when TCE was detected in the well
‡ This represents the current situation in Camdenton without the Mulberry well operating

There are several drinking water wells within a four-mile radius of the site that are classified as transient, non-community water systems. They include mostly resorts and restaurants in the Lake of the Ozarks area. These wells, by definition, serve at least 25 different people at least 60 days out of the year (Reference 47). However, the number of people served by these wells will not be included in a count of potential targets due to the transient nature of the population.

Private Drinking Water Wells

Within four miles of the site, there are over 485 wells recorded in the DGLS databases. The LOGMAIN database contains information on older wells. The DGLS Well Wellhead Protection Section's Water Well Information System (W.I.M.S) database contains information on wells drilled since 1987. The vast majority of the wells on record are domestic supply wells. Some wells may no longer be active, and many active wells may not be recorded in DGLS databases. Table 5 illustrates the breakdown of private wells within four miles of the site (Reference 43). The population served by private wells was calculated using the estimated average persons per household in Camden County - 2.41 (Reference 48).

TABLE 5: PRIVATE WELLS REGISTERED WITH DNR WITHIN A 4-MILE RADIUS OF THE FORMER HULETT LAGOON SITE		
Distance From Site	Number of Private Wells	Estimated Population Served
0 - 1/4	1	2
1/4 - 1/2	-	-
1/2 - 1	2	5
1-2	27	65
2-3	59	142
3-4	81	195
TOTAL	170	409

4.3 Previous Sampling

Monitoring Wells

Modine Manufacturing Company has performed quarterly sampling of the monitoring wells on their site. The TCE concentrations in the monitoring wells are detailed in the table below (Reference 49).

TABLE 6: TCE CONCENTRATIONS IN MODINE GROUNDWATER MONITORING WELLS 1 - 5
All results in parts per billion
NT - Not tested ND - Not detected at or above 5 ppb NS - Not sampled due to insufficient volume

Date of Sampling	MW-1	MW-2	MW-3	MW-4	MW-5
09/02/92	ND	ND	These wells were not drilled until 1995.		This well was not drilled until 1998.
12/07/94	6.9	5.1			
08/16,22/95	11.8	ND	8	88.9	
11/16/95	9.4	ND	ND	142	
02/15,16/96	ND (duplicate 5.4)	ND	6.6	173	
05/16/96	ND	ND	ND	10	
08/20/96	ND	NT	ND	NS	
12/12/96	ND	NT	NS	NS	
02/28/96, 03/0397	NT	NT	ND	34	
06/04/97	NT	NT	NT	120	
07/16/98	These wells were not sampled at this time. This was during the installation of MW-5.				484.1

Public Drinking Water

Table 7, on the following page, shows the history of TCE detections in the City of Camdenton's public drinking water wells. The first time TCE showed up in the Mulberry well was in March of 1993. The sample was collected by the Missouri Department of Health and analyzed at Continental Analytical Services, Inc. (Reference 50).

The DNR requires public drinking water wells be tested for volatile organic compounds every three years. DNR mails sampling containers to the public water supply office, and then a designee, in the City of Camdenton's case, the Public Works Director, collects the sample and sends it to DNR for analysis. When a contaminant is detected, sampling frequency is then increased to quarterly and sometimes monthly. If the running annual average concentration of the contaminant exceeds the MCL, the public system is in violation of the drinking water standard.

The first sample analyzed by DNR in which TCE was detected at the Mulberry well was in January 1997. During sampling in 1997, there was only one sample that exceeded the MCL (February's sample was 5.2 ppb), but the running annual average for that year was below the MCL. In 1998, the levels of TCE began to increase (Reference 50). At that time, the city began looking at options to replace the Mulberry Well. In May 1998, the city

announced they were in the process of planning for a new well to be drilled on Hickory Street to replace the Mulberry Well (Reference 51). In addition, in July 1998, the City of Camdenton installed new regulating controls on their drinking water wells that allowed them to cut back the usage of the Mulberry Well. It went from supplying about 70% of the water when blended with the other two wells, to supplying about 40%. In February 1999, the new Hickory well went on line and the Mulberry well was shut off (Reference 45).

TABLE 7: TCE RESULTS FROM SAMPLING AT CITY OF CAMDENTON'S PUBLIC DRINKING WATER WELLS
Results in parts per billion

Date of Sampling	Mulberry Well	Rodeo Well	Blair Well
03/16/93	2.1	<0.5	<0.5
04/27/94	<0.5	<0.5	<0.5
01/29/97	3.8	3.9*	<0.5
02/17/97	5.2	<0.5	<0.5
03/12/97	3.8	<0.5	<0.5
06/03/97	4.5	<0.5	<0.5
08/26/97	4.3	<0.5	<0.5
12/01/97	4.4	<0.5	<0.5
02/02/98	6.3	<0.5	<0.5
02/17/98	5.2	<0.5	<0.5
03/25/98	3.6	<0.5	<0.5
04/23/98	4.1	<0.5	<0.5
05/21/98	11.8	<0.5	<0.5
06/08/98	5.1	<0.5	<0.5
08/25/98	4.2	<0.5	<0.5
12/02/98	4.4	<0.5	<0.5
01/13/99	26.2	<0.5	<0.5

* The Rodeo well is over one mile from the Hulett lagoon. It is unknown whether this TCE detection was a valid result, especially since all subsequent samples were non-detect for TCE.

Private Wells

On April 23, 1998, DNR collected a groundwater grab from a private well at 178 Sunset Drive. The sample was analyzed for VOCs. Cis-1,2-dichlorethene was detected at 12 ppb and TCE was detected at 210 ppb. At that time, the owner was using the well only for lawn watering; the home was hooked up to the city water line for drinking water (Reference 52).

In July 1992, as part of the SI conducted at the 179 Sunset Drive facility, three samples were collected from private wells located near the Lake of the Ozarks. Two of the wells were located in Normac Estates, 1.8 miles west-southwest of the site. The third well was located 1.3 miles southwest of the site. No VOCs were detected in any samples (Reference 36).

4.4 Sampling Locations

Groundwater samples for the PA/SI were collected on January 6-7, 1999. Five monitoring wells, two public water supply wells, and two private drinking water wells were sampled. Figure 3 shows sample locations for all groundwater samples collected as part of the Hulett Lagoon PA/SI (Reference 38).

Monitoring Wells 1 & 2
Layne-Western Company, Inc., was subcontracted by DNR for the installation of Monitoring Wells #1 and #2 on the Modine Manufacturing Company property (then known as Modine Heat Transfer). The wells were installed in July 1992 during the SI performed at the 179 Sunset Drive facility. MW-1 is located on the west side of the facility. MW-2 is located northeast of the facility. Total well depth of MW-1 was 178 feet and MW-2 was 197 feet. The wells were constructed with two-inch diameter, polyvinyl chloride (PVC) inner well casing, with steel outer well casing. Both wells have 40 feet of screen at the bottom of the well (References 36; 53).

On January 7, 1999, sample 991464 was collected from MW-1 and sample 991463 was collected from MW-2. Depth to water recorded at 153.2 feet from the top of the casing in MW-1. Depth to water recorded at 165.7 feet from the top of the casing in MW-2 (Reference 38).

Monitoring Wells 3 & 4
Layne-Western Company, Inc. of St. Louis was subcontracted by Dames & Moore, consultant for Modine Manufacturing Company, for the installation of Monitoring Wells #3 and #4. Drilling took place from August 8-14, 1995. MW-3 was installed on August 8, 1995, south of the Modine facility. MW-4 was installed on August 11, 1995, just northwest of the facility. MW-3 is 167 feet deep with 64 feet of five-inch diameter steel surface casing. MW-4 is 158 feet deep with 44 feet of five-inch diameter steel surface casing. Both wells are open hole below their casing (Reference 54, p. 35).

On January 7, 1999, sample 991460 was collected from MW-3 and samples 991461 and 991462 were collected from MW-4. Sample 991461 was collected via a submersible pump and 991462 was collected via dedicated bailer. The two different methods for collection were used for comparison purposes. All other groundwater samples from monitoring wells were collected with a dedicated bailer. Depth to water recorded at 153.1 feet from the top of the casing in MW-3. Depth to water recorded at 158.5 feet from the top of the casing in MW-4 (Reference 38).

Monitoring Well 5
Layne-Western Company, Inc. of St. Louis was subcontracted by Dames & Moore, consultant for Modine Manufacturing Company, for the installation of Monitoring Well #5. The well was installed just outside what would have been the southwest edge of berm of the Hulett lagoon. Drilling took place from July 7-10, 1998. The well was installed to

determine the presence or absence of volatile organic compounds, in particular, TCE, in the groundwater underlying the former Hulett lagoon. The well was drilled to a total depth of 118 feet below ground surface (bgs). Permanent surface casing was installed in bedrock to a depth of 37 feet bgs. This was done to case off several void spaces that had been encountered during drilling, most notably a void space from 35.0 to 36.5 feet bgs. The well was constructed with schedule 80, two-inch diameter, PVC casing with 30 feet of a 0.01 inch slotted screen. Water was encountered at a depth of 105 feet bgs (Reference 55).

On January 7, 1999, samples 991465 and 991466 (duplicate) were collected from MW-5. Depth to water recorded at 102.7 feet from the top of the casing in MW-5 (Reference 38).

Public Wells
Sample #991458 was collected from the City of Camdenton Blair well. The Blair well was considered a background well for PA/SI purposes since previous sampling has shown this well not to be contaminated. However, groundwater flow direction has not been definitively determined; the cones of depression created by the city's wells could significantly affect groundwater flow in the area. Sample #991459 was collected from the City of Camdenton Mulberry well, known to be contaminated with TCE (Reference 38).

Private Wells
Sample 991452 and 991453 (a duplicate) were collected from a residential well, located at 178 Sunset Drive, approximately 790 feet southwest of the site. This well is currently not used for any purpose. When the well was sampled in April 1998 and found to be contaminated with TCE, the owner discontinued use, which at that time was only for watering his lawn. No information is known about the well (Reference 38).

Sample 991457 was collected from a residence in Normac Estates, located 1.8 miles west-southwest of the site on the lakefront of the Lake of the Ozarks. No information is known about the well (Reference 38).

4.5 Analytical Results (Reference 38)

All groundwater samples for the PA/SI were analyzed for total and/or dissolved metals (arsenic, barium, cadmium, chromium, copper, mercury, nickel, lead, selenium, silver), and VOCs. The analytical results for all groundwater samples are detailed in the tables on the following page.

Monitoring Wells

TABLE 8: SELECTED GROUNDWATER RESULTS FROM PA/SI SAMPLING AT MODINE MONITORING WELLS 1 - 5

All results in parts per billion NA - not analyzed
* 991461 was collected via submersible pump, 991462 was collected via dedicated bailer
Bolded results are those above the EPA MCL.

CHEMICAL	MW-1	MW-2	MW-3	MW-4		MW-5		EPA
	991464	991463	991460	991461*	991462*	991465	991466	MCL
METALS								
Arsenic, total	<1.2	<1.2	6	<1.2	NA	<1.2	<1.2	50
Barium, dissolved	49.7	91	69.6	81.6	NA	55.7	51.6	2000
Barium, total	58.2	112	151	88.3	NA	67.9	71.3	
Cadmium, total	<1.0	<1.0	2.26	<1.0	NA	1.25	1.97	5
Chromium, total	3.84	14.3	45.7	5.52	NA	9.39	13.3	100
Copper, total	6.94	7.85	51.2	<5.0	NA	7.52	8.97	1300
Nickel, total	<3.0	8.45	29.7	7.61	NA	5.16	4.26	100
Lead, total	14.1	**37.2**	**97.6**	**38.7**	NA	12.7	**15.3**	15
VOCs								
Cis-1,2-dichloroethene	<0.5	<0.5	<0.5	2.1	2.3	35	23	70
Trichloroethene	**10.1**	2.5	<0.5	**64.1**	**76.5**	**1400**	**1500**	5

For purposes of the PA/SI and according to HRS guidelines, any of MW's 1 through 4 could be considered background for the MW-5. Although previous and current sampling has shown that MW's 1 through 4 have been, or presently are, within the boundaries of the TCE plume, the TCE contamination in MW-5 exceeds three times the TCE concentration in any of the other monitoring wells. Additionally, however, all five monitoring wells are not entirely similar in construction. MW's 3 and 4 are open hole borings below their casing, while MW's 1, 2 are screened for 40 feet; MW-5 is screened for 30 feet. MW-1 is 60 feet deeper than MW-5; and MW-2 is 79 feet deeper than MW-5. Although the intervals from which water is drawn in the monitoring wells is not entirely similar, all five wells draw water from the Gasconade Dolomite formation of the Ozark Aquifer.

Public and Private Drinking Water Wells

TABLE 9: SELECTED GROUNDWATER RESULTS FROM PA/SI SAMPLING AT PUBLIC AND PRIVATE GROUNDWATER WELLS

All results in parts per billion

CHEMICAL	Camdenton Blair Well (Background)	Camdenton Mulberry Well	Sunset Drive Private Well		Normac Estates Private Well	EPA MCL
	991458	991459	991452	991453	991457	
METALS						
Barium, total	45.3	45.3	67.5	66.6	62.8	2000
Copper, total	21.7	31.7	27.5	16.3	44.7	1300
Nickel, total	<3.0	<3.0	11.2	60.4	<3.0	100
Lead, total	4.4	**15.7**	<2.5	<2.5	<2.5	15
VOCs						
Cis-1,2-dichloroethene	<0.5	<0.5	13	13	<0.5	70
Trichloroethene	<0.5	**5.3**	**240**	**230**	<0.5	5

For purposes of the PA/SI, the Camdenton Blair well was chosen as a background well for the contaminated Mulberry well. The two wells are similar in total depth and both draw from the Potosi Dolomite formation of the Ozark Aquifer. The Mulberry well could in fact serve as its own background since the well was regularly monitored as a public well under Missouri regulations, and was non-detect for TCE until 1997 (except for one sample in 1993 collected by the Missouri Department of Health).

4.6 Conclusions

PA/SI sampling has documented an observed release of TCE to the Ozark Aquifer in the area of the Former Hulett Lagoon site. MW-5, located immediately near the lagoon, contained TCE at 1,400 ppb. The City of Camdenton's Mulberry well, located less than 0.25 of a mile south of the lagoon showed 5.3 ppb TCE during PA/SI sampling on January 6, 1999.

The City of Camdenton officially took the Mulberry Well off line on February 2, 1999 due to the TCE contamination. When in use during the initial time period when TCE was detected, the Mulberry Well was the highest producing well of Camdenton's system, supplying an apportioned 2,107 people. The well is now a reserve well, to be used only when power is down at any other Camdenton Wells. There are three wells currently serving the city within two miles of the site. The City of Camdenton's drinking water wells supply an estimated 3,010 people.

There are two sources of TCE that could be attributed to the contamination present in the City of Camdenton's Mulberry Well. PA/SI sampling has shown the former Hulett lagoon contains TCE contaminated soil, as well as groundwater, at the lagoon site. The lagoon is located approximately 1100 feet north of the Mulberry well. The manufacturing facility at 179 Sunset Drive has also been shown to contain TCE contaminated soil as well as TCE contaminated groundwater. The facility is located approximately 500 feet northwest of the Mulberry Well. It is unknown at this time whether the Mulberry Well contamination is due in whole or in part to the lagoon contamination. Information on groundwater flow direction is inconclusive. DNR's DGLS geologists suggest that the cone of depression created by the Mulberry well, when in operation, influenced groundwater flow in that direction. Now that the Mulberry well has been shut off, groundwater flow is expected to move toward another city well, most likely the Blair well.

5.0 SURFACE WATER PATHWAY

5.1 Hydrologic Setting

The site is situated within the Salem Plateau region of the Ozark Plateau physiographic province. The topography of the Salem Plateau is characterized by a rolling upland surface with rugged hills dissected by entrenched, narrow stream valleys. Karst features,

such as springs, sinkholes, and losing streams, are characteristic of the Salem Plateau (Reference 43).

The Former Hulett Lagoon site is situated near the headwaters of a small unnamed stream which drains southwest to the Niangua Arm of the Lake of the Ozarks. During operation, the Hulett lagoon's receiving stream was identified as a tributary to Jarvis Hollow. The site of the former lagoon has been leveled, while the surrounding terrain exhibits moderate natural relief (5% to 9% slopes). East of the site lies the City of Camdenton. West of the site, the landscape is more rugged, and forests extend down to the Lake of the Ozarks. The natural landforms and drainage patterns at the site have been obscured by lagoon construction and, later, by soil removal actions (Reference 43).

Below the site, the receiving stream is fairly steep and the bedload consists mostly of cobbles and gravel. In 1992, a DGLS geologist with the Water Resources Program examined area streams as part of oversight for an investigation at the 179 Sunset Drive facility. He reported that the Former Hulett Lagoon site is located on the valley floor of the "northeast branch" of an unnamed tributary to Jarvis Hollow. The "southeast branch" of the tributary drains the facility at 179 Sunset Drive. The northeast and southeast branches join near the western corporate boundary of the City of Camdenton, approximately 0.6 miles downstream of the Former Hulett Lagoon site. The lagoon was constructed near the headwaters of the northeast branch, just west of the ridge top where most of Camdenton is located. Water runs onto the site from the upper section of the northeast branch. This channel has been diverted around the northern edge of the former lagoon (Reference 43).

Run-off from the site, entering the northeast branch, flows toward the west for ¼ mile. Runoff then flows southwest approximately 1.6 miles and enters Jarvis Hollow in the NE ¼, NE ¼, SE1/4 of Section 34, Township 38 North, Range 17 West. According to the 7.5 minute HaHaTonka topographic map, the 0.15-mile-long stream segment below this confluence appears to be perennial. Thus, the confluence of the unnamed tributary and the stream in Jarvis Hollow is considered the probable point of entry (PPE) to surface water. Runoff from the Former Hulett Lagoon reaches the Lake of the Ozarks 1.97 miles downstream of the site (Reference 43).

The DGLS geologist noted that the unnamed tributary lost flow in some locations, especially when encountering the Gunter Sandstone. However, it was anticipated that any flow lost in the streambed would stay in the valley. Very little rainfall is necessary to generate surface flow throughout the reach of the stream. The receiving stream for the Former Hulett Lagoon Site has not been officially classified by DGLS, but based on available reports, the stream should be considered losing. The Gasconade Dolomite that forms much of the streambed is not particularly karst. Many nearby streams have been classified as losing (Reference 43).

The 15-mile downstream limit ends near Shepard Cove on the Osage River Arm of the Lake of the Ozarks, approximately 29.5 miles above Bagnell Dam. This point is located

on the Camdenton, MO 7.5-minute quadrangle; SE ¼, Section 24, T. 39 N., R. 17 W. The Osage River flows in a northeasterly direction, toward the Missouri River (References 43; 3).

The site is most likely not located in a flood plain, as it is located at an elevation of approximately 285 meters above mean sea level, while Lake of the Ozarks is at 198 meters above sea level (Reference 3).

5.2 Surface Water Targets

The Lake of the Ozarks is a 59,520 acre lake classified as a major reservoir. The lake is designated for use as livestock and wildlife watering, protection of warm water aquatic life and human health/fish consumption, whole body contact recreation, and boating and canoeing (Reference 56, pp. 11, 35). There are no drinking water intakes on the Lake of the Ozarks (Reference 46, p. 200).

The federally-listed Endangered gray bat is known to occur on the Lake of the Ozarks in Section 2 of T 38 N, R 18 W. The bats forage over streams, rivers, and reservoirs in this part of Missouri (Reference 57).

The federally-listed threatened Bald Eagle winters at the Lake of the Ozarks. Bald eagles generally forage on fish, dead and dying waterfowl, and carrion. Eagles can be adversely affected by heavy metals, bacteria, and other contaminants. Due to the scavenger behaviors of the eagle, they often feed on dead or dying prey that may have been poisoned in some way or may have elevated bacterial levels. In such cases, eagles can be affected through a secondary pathway in the food chain which could harm or kill individuals (Reference 58).

According to National Wetlands Inventory maps prepared by the U.S. Department of the Interior/Fish and Wildlife Service (aerial photography from 1984), the first 0.6 of a mile of the creek bordering the lagoon is a wetland. The remaining portion of the creek leading to the Lake of the Ozarks may be considered a wetland if emergent hydrophytes are present. There are numerous wetlands in and bordering the Lake of the Ozarks (Reference 59).

5.3 Surface Water Conclusions

All surface runoff from the lagoon area enters the tributary to Jarvis Hollow stream that borders the west side of the lagoon. This stream received overflow from the lagoon during operation; thus TCE was historically released to the creek. However, the stream bed near the site is gravel, making sampling impractical. It has been ten years since the lagoon was closed; it is unlikely any TCE would be left in any surface material, soil or sediment, present in other parts of the stream. Since TCE is a DNAPL, the majority of what entered the stream would have infiltrated into the subsurface by now. Current site conditions

indicate the risk from any site surface runoff would be low since the TCE found in the soil at the lagoon was from the four to seven foot depth.

6.0 SOIL EXPOSURE AND AIR PATHWAYS

6.1 Physical Conditions

The native soil in the vicinity of the Former Hulett Lagoon site was the Clarksville-Gepp very cherty silt loam. The Clarksville-Gepp soils are deep, well-drained soils typical of sloping uplands. Permeability is moderate. The content of organic material is moderately low. The shrink-swell potential is moderate. Grass at the site limits wind erosion (Reference 43).

The one acre former lagoon area is an open field area with grassy vegetation. The only structure on-site is Monitoring Well #5, located on the southwest corner of the lagoon's former berm. The lagoon area is relatively flat. During closure, the majority of the sludge was removed and the berms were turned into the middle. Apparently, some of the material from the hill bordering the southeast and east side of the lagoon was scraped in toward the lagoon during closure, but no fill was brought in (Reference 5).

Access is not restricted to the site; there is no fencing. The gravel access road from West Mulberry is not maintained; there are several severe ruts caused from washouts. There have been reports that illegal dumping is occurring on Ron Hulett property along the north and south side of the access road. There were a few pieces of trash in the lagoon area (Reference 5).

6.2 Soil and Air Targets

Residential areas are located immediately north and south of the site. North of the site is an apartment complex; south of the site is one apartment building and several homes. At least two of the apartment buildings in the complex north of the site are within 200 feet of the site, as well as the apartment building and one home south of the site (Reference 5).

The City of Camdenton has an estimated population of 2,544 people (Reference 48, p. 144). Table 10, on the following page, illustrates the breakdown of the number of people estimated to be within a four-mile radius of the site (Reference 60).

TABLE 10: ESTIMATED POPULATION WITHIN A 4-MILE RADIUS	
RADIUS	POPULATION
ON-SITE	0
0 - 1/4	180
1/4 - 1/2	696
1/2 - 1	1,267
1 - 2	1,100
2 - 3	1,280
3 - 4	1,405
TOTAL	5,928

The federally-listed Endangered gray bat is known to occur in Section 2 of T37N, R17W, which is between 2 and 3 miles from the site (Reference 57).

6.3 Soil and Air Conclusions

All soil samples collected as part of the PA/SI were waste/source samples. The TCE contamination in the lagoon is documented in the four to seven foot depth zone. There were no surface soil samples collected from the lagoon area because the majority of the sludge in the lagoon was removed and the majority of TCE near the surface would have volatilized or moved down through the soil profile in the ten years since closure of the lagoon. The potential for possible trespasser exposure to any of the TCE contaminated soil on the site is considered minimal. There are no people living on site, although there are three apartment buildings and one home that are within 200 feet of the site. Access to the site is not restricted. The reports of unauthorized dumping in the area near the lagoon indicate site security may be warranted.

7.0 SUMMARY AND CONCLUSIONS

The Former Hulett Lagoon site is located in the City of Camdenton, 500 feet northeast of the intersection of Dawson Road and Sunset Drive. The site is a closed wastewater lagoon owned and operated by the City of Camdenton. The Hulett lagoon, approximately one acre in size, was one of five municipal lagoons that serviced the City of Camdenton. It was the only lagoon that received industrial effluent in addition to domestic sewage. The lagoon was in operation from 1961 until its closure in late 1989.

From 1967 through 1986, Dawson Metal Products (1967 to 1972) and Sundstrand Tubular Products (1972 to 1986) operated a manufacturing facility that released untreated wastewater into the lagoon. The facility is located approximately 1000 feet southeast of the lagoon at 179 Sunset Drive. The untreated wastewater was known to have contained

several hazardous waste streams, most notably TCE. During closure in 1989, over 2,000 pounds of sludge was removed from the lagoon.

Environmental investigations of the manufacturing facility at 179 Sunset Drive started in 1990 when Modine Manufacturing Company was considering buying the property. About that time DNR received a complaint alleging that 4,500 gallons of TCE had been spilled at the facility. Since that time, there have been numerous investigations conducted at the 179 Sunset Drive facility, including a PA and SI conducted by DNR. The current owner, Modine Manufacturing Company, is presently negotiating a Resource Conservation and Recovery Act (RCRA) Corrective Action Abatement Order on Consent (AOC) through the Permits Section of DNR's HWP. The AOC calls for investigation to determine the nature and extent of contamination on the facility property. However, investigation of the Hulett Lagoon could not be included in the AOC due to a RCRA domestic sewage exemption. Thus, the Former Hulett Lagoon site was referred to Superfund to be addressed under CERCLA.

Waste/Source Sampling

Although over 2,000 cubic yards of sludge were removed from the lagoon during closure in 1989, PA/SI sampling, as well as previous sampling, document that TCE contaminated soil still remains in the lagoon area. Three samples, collected for the PA/SI near the previous location of the outfall pipe, contained TCE at 9.5 ppm, 0.24 ppm and 0.12 ppm. With such high levels of TCE documented in groundwater at the site (1,400 ppb), it is presumed that the majority of TCE, once deposited in the lagoon, has infiltrated into the bedrock. However, the TCE contaminated soil that remains in the lagoon may be a continuing source of contamination.

Groundwater

PA/SI sampling has documented an observed release of TCE to the Ozark Aquifer in the area of the Former Hulett Lagoon site. MW-5, located immediately near the lagoon, contained TCE at 1,400 ppb. The City of Camdenton's Mulberry well, located less than 0.25 of a mile south of the lagoon showed 5.3 ppb TCE during PA/SI sampling. The Mulberry well was taken off line on February 2, 1999 due to the TCE contamination. When in use during the initial time period when TCE was detected, the Mulberry Well was the highest producing well of Camdenton's system, supplying an apportioned 2,107 people. There are three wells currently serving the city within two miles of the site. It is estimated that the TCE groundwater plume will begin moving toward the city's Blair well now that the Mulberry well has been shut off. The cone of depression created by pumping the Blair well, located 0.7 of a mile south-southwest, may influence the migration of the plume. The City of Camdenton's drinking water wells supply an estimated 3,010 people.

In addition to the Hulett lagoon, there is another source of TCE contamination that could be contributing to the groundwater plume that affected the City of Camdenton's Mulberry well. The manufacturing facility at 179 Sunset Drive has also been shown to contain TCE contaminated soil as well as TCE contaminated groundwater. The facility is located

approximately 500 feet northwest of the Mulberry Well. It is unknown at this time whether the Mulberry Well contamination is due in whole or in part to the lagoon contamination.

Surface Water
All surface runoff from the lagoon area enters the tributary to Jarvis Hollow stream that borders the west side of the lagoon. This stream received overflow from the lagoon during operation; thus TCE was historically released to the creek. However, the streambed near the site is gravel, making sampling impractical. It has been ten years since the lagoon was closed; it is unlikely any TCE would be left in any surface material, soil or sediment, present in other parts of the stream. Current site conditions indicate the risk from any site surface runoff would be low since the TCE found in the soil at the lagoon was from the four to seven foot depth.

Soil and Air
The potential for possible trespasser exposure to any of the TCE contaminated soil on the site is considered minimal. There are no people living on site, although there are three apartment buildings and one home that are within 200 feet of the site. Access to the site is not restricted. The reports of unauthorized dumping in the area near the lagoon indicate site security may be warranted.

8.0 RECOMMENDATIONS

The TCE groundwater contamination at the Former Hulett Lagoon site warrants remedial action. The contamination has already caused the closure of the one of the city's public drinking water wells, and the remaining wells are now at risk. Hydraulic control will need to be achieved at the source of the plume to prevent the migration of TCE to the other nearby wells, specifically the Blair well. Current investigation and remedial actions are ongoing at the 179 Sunset Drive facility, however, these activities do not include and will not address the Hulett lagoon contamination.

Although the majority of the sludge from the lagoon was removed, TCE contaminated soil remains. This contaminated soil may warrant removal. At a minimum, access to the site should be restricted.

Using the Hazard Ranking System (HRS) to evaluate site conditions, the Former Hulett Lagoon site scores above 28.5 and qualifies for proposal to the National Priorities List (NPL). The closing of a public drinking water supply well due to contamination from the site is a significant factor in this site evaluation.

Former Hulett Lagoon
Combined PA/SI
March 30, 1999

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63. CARES, University of Missouri - Columbia and Missouri Department of Natural Resources, Public Drinking Water Program. Public Drinking Water Map - Southway Terrace MHP, 3048141, 1 Well, 0 Chemical Sites, 0 Dealerships, Camden County. October, 2, 1996. 2 pages.

APPENDIX A
FIGURES

Figure 1: Site Location Map
Former Hulett Lagoon Site
Camden County, Missouri

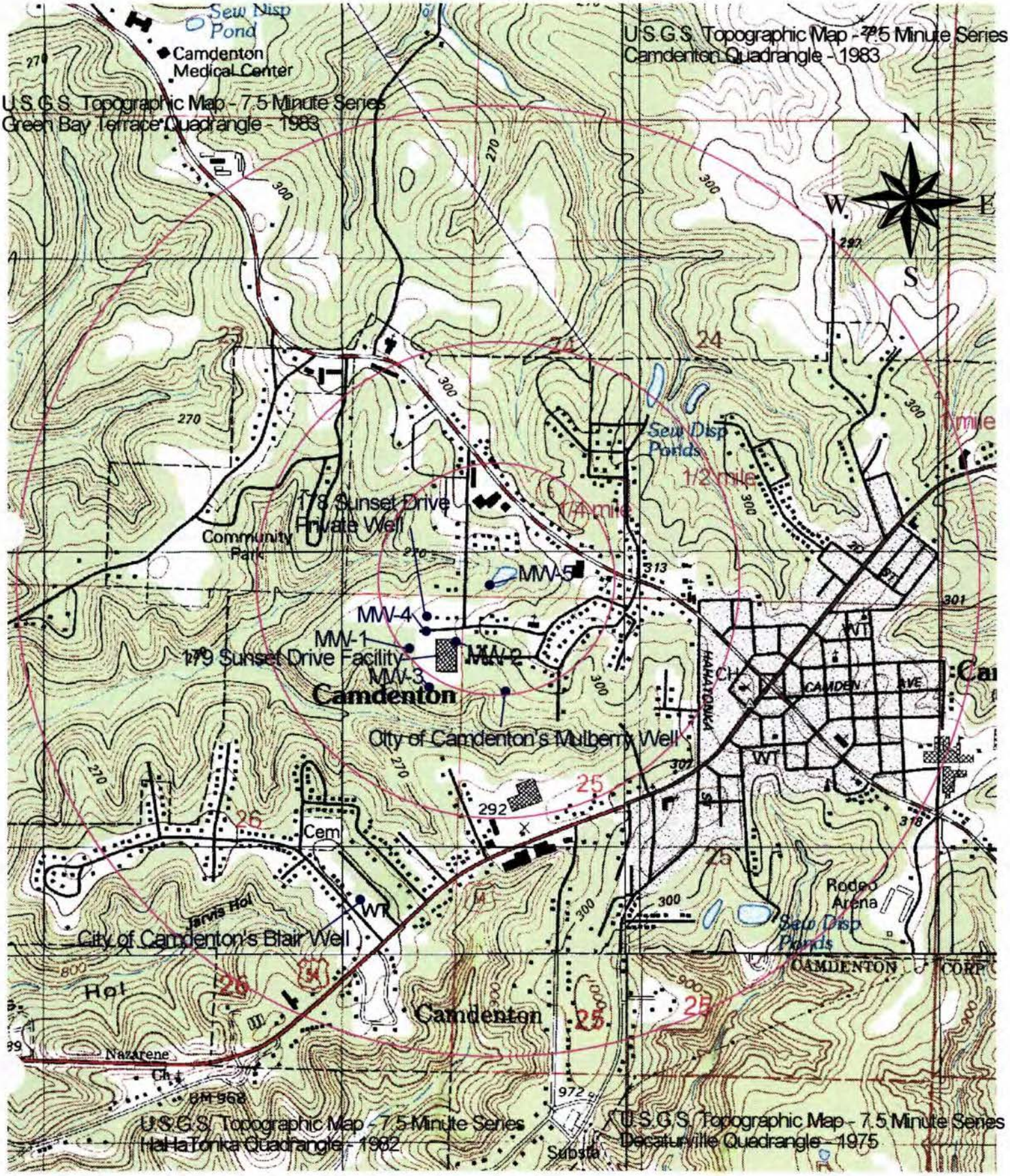


Figure 2: Hulett Lagoon Site Soil Sampling Locations

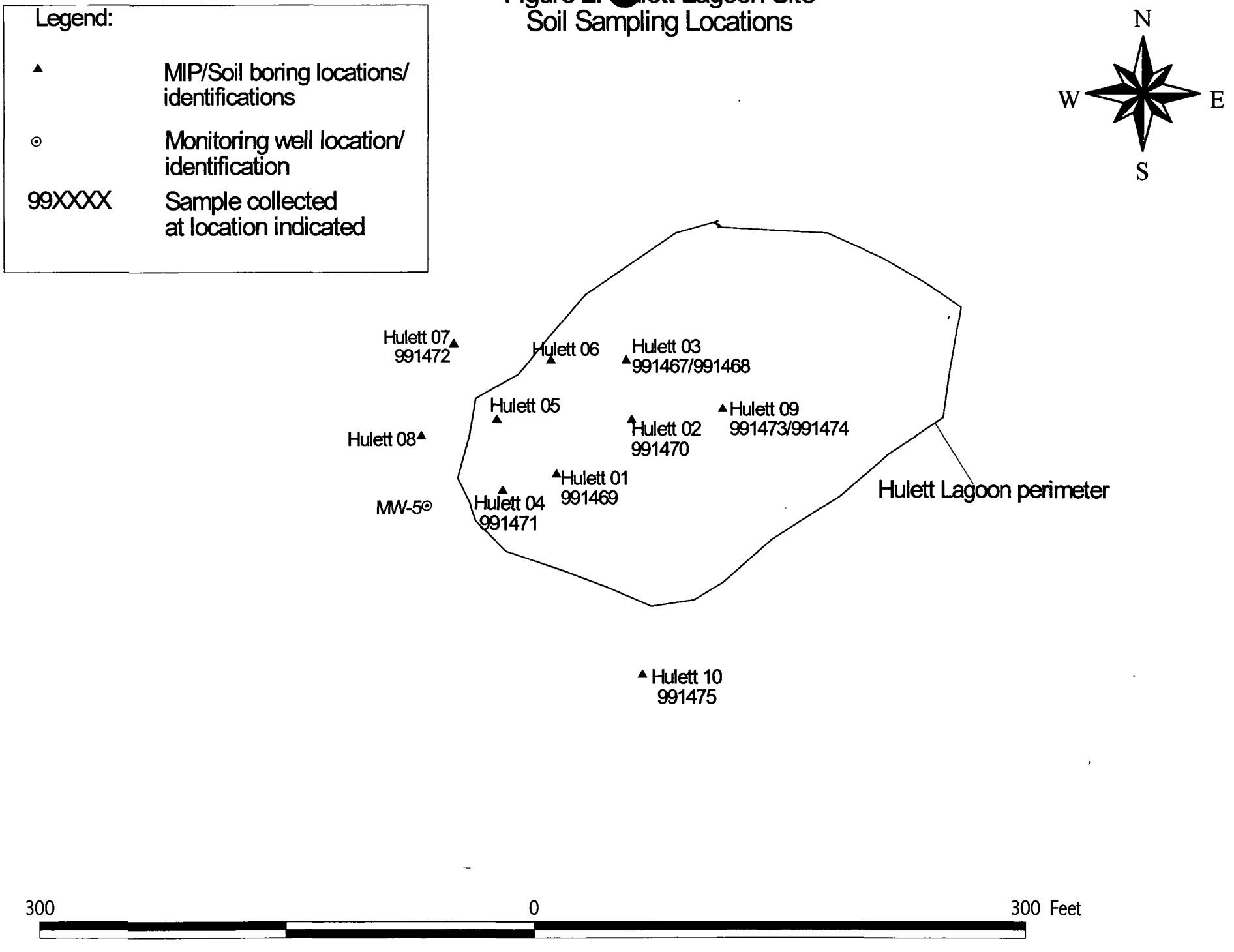
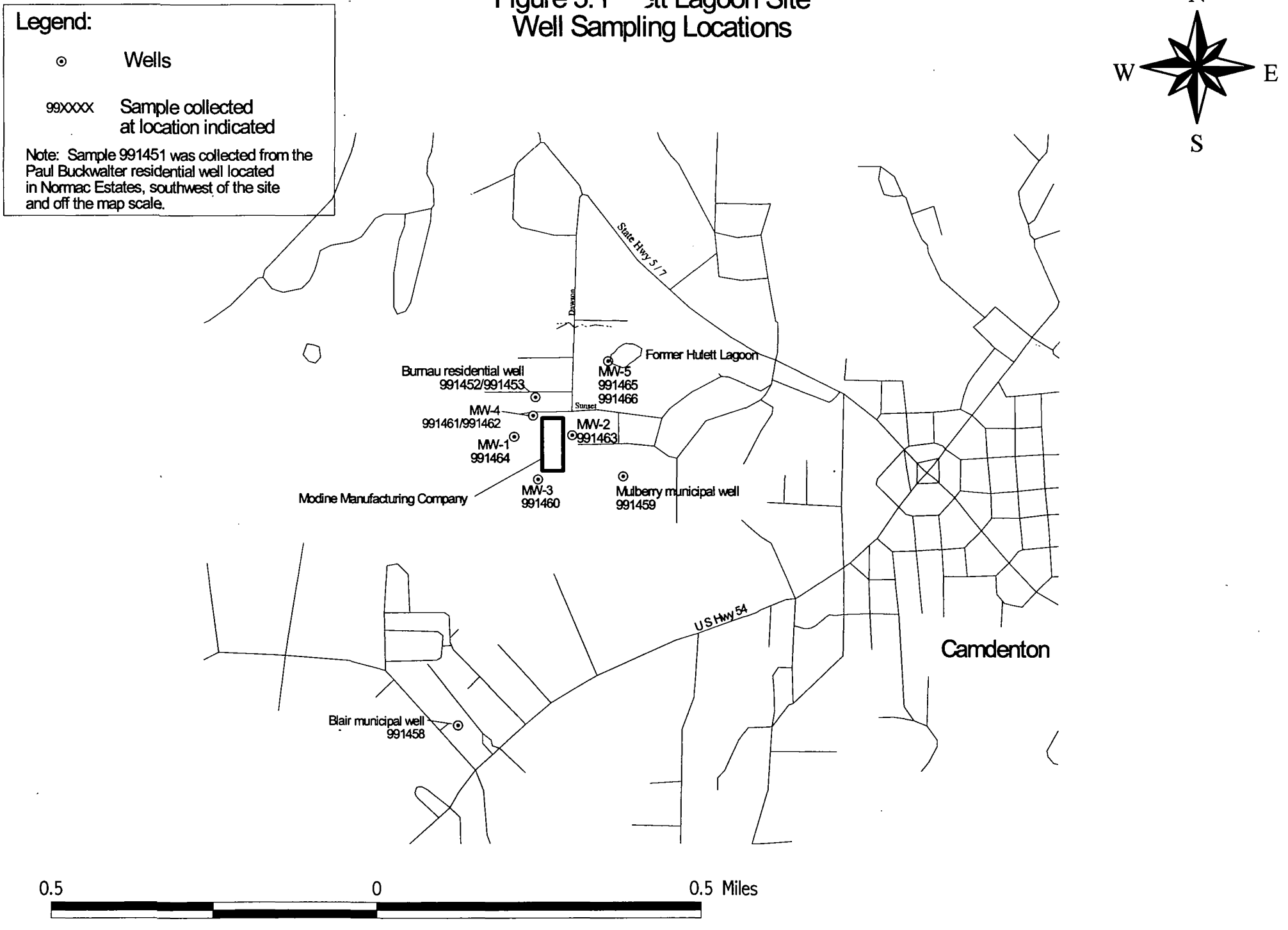


Figure 3: H[illegible]tt Lagoon Site
Well Sampling Locations



PHOTOGRAPHS

PHOTO 1

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 10/1/74 by Ronnie Testerman, MDNR, JCRO. View looking northeast at the Hulett lagoon during operation. The northern portion of the lagoon shown in the photo was where influent from domestic sewage entered the lagoon. A small amount of the sludge from the Sundstrand influent, which came in on the south portion of the lagoon can be seen in the foreground of the photo near the wooden catwalk.

PHOTO 2

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 10/1/74 by Ronnie Testerman, MDNR, JCRO. View looking east at the Hulett lagoon during operation. The picture was taken to show the sludge settling around the influent pipe area from Sundstrand.

PHOTO 3

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken sometime in June or July 1989 by Ronnie Testerman, MDNR, JCRO. View looking northeast at the Hulett lagoon during the beginning of the closure process. The dewatering had begun, but no sludge had been removed.

PHOTO 4

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 12/1/98 by Valerie Wilder, MDNR, Superfund. View looking northeast at the former lagoon. Remnants of the road that was around the lagoon on its berm can be seen in the foreground.

PHOTO 5

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 12/1/98 by Valerie Wilder, MDNR, Superfund. Photo taken looking north at the hillside west of the lagoon. The apartment complex buildings north of the lagoon can be seen through the trees.

PHOTO 6

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 12/1/98 by Valerie Wilder, MDNR, Superfund. Photo taken looking south-southeast. The road surrounding the lagoon on the berm is seen in the right-hand side of the photo. The former lagoon was in the area in the left-hand side of the photo.

PHOTO 7

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 1/21/99 by Valerie Wilder, MDNR, Superfund. Photo taken looking northeast at Geoprobe work during PA/SI sampling.

PHOTO 8

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 1/21/99 by Valerie Wilder, MDNR, Superfund. Photo taken looking north-northeast at Geoprobe work during PA/SI sampling. The apartment complex north of the lagoon can be seen through the trees.

PRESCORE

NPL Characteristics Data Collection Form

Record Information

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

Site Description

1. Setting: Urban

2. Current Owner: Municipal

3. Current Site Status: Inactive

4. Years of Operation: Inactive Site,from and to dates: 1961-1989

5. How Initially Identified: RCRA Notification

6. Entity Responsible for Waste Generation:

   - Manufacturing
   - Fabr. Struc. Metal Prod.

7. Site Activities/Waste Deposition:

   - Surface Impoundment
   - Discharge to Sewer/Surface Water

Waste Description

8. Wastes Deposited or Detected Onsite:

   - Solvents

Response Actions

9. Response/Removal Actions:

   - Drinking Water Well Has Been Closed

RCRA Information

10. For All Active Facilities, RCRA Site Status:

    - Not Applicable

Demographic Information

11. Workers Present Onsite: No

12. Distance to Nearest Non-Worker Individual: > 10 Feet - 1/4 Mile

13. Residential Population Within 1 Mile: 2143.0

14. Residential Population Within 4 Miles: 5928.0

Water Use Information

15. Local Drinking Water Supply Source:

    - Ground Water (within 4 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: 3010.0

17. Drinking Water Supply System Type for Local Drinking Water Supply Sources:

HRS DOCUMENTATION RECORD

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

	Score
Ground Water Migration Pathway Score (Sgw)	100.00
Surface Water Migration Pathway Score (Ssw)	0.00
Soil Exposure Pathway Score (Ss)	0.00
Air Migration Pathway Score (Sa)	0.00
Site Score	50.00

NOTE

Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

- Municipal (Services over 25 People)

18. Surface Water Adjacent to/Draining Site:

    - Stream

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Lagoon

a. Wastestream ID	
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Lagoon
b. Source Type	Surface Impoundment
c. Secondary Source Type	N.A.
d. Source Vol.(yd3/gal)	0.00
Source Area (ft2)	5445.00
e. Source Volume/Area Value	4.19E+02
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00
g. Data Complete?	NO
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00
i. Data Complete?	NO
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	4.19E+02

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Trichloroethylene	> 2	YES	1.2E-01	ppm

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Lagoon	GW-SW-SE-A	4.19E+02	0.00E+00	4.19E+02

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	1.00E+01	100	6
SW: Overland Flow, DW	Tox./Persistence	4.00E+00	100	3
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	2.00E+02	100	10
SW: Overland Flow, Env	Etox./Persis./Bioacc.	2.00E+03	100	18
SW: GW to SW, DW	Tox./Persistence	4.00E+00	100	3
SW: GW to SW, HFC	Tox./Persis./Bioacc.	2.00E+02	100	10
SW: GW to SW, Env	Etox./Persis./Bioacc.	2.00E+03	100	18
Soil Exposure:Resident	Toxicity	0.00E+00	0	0
Soil Exposure: Nearby	Toxicity	0.00E+00	0	0
Air	Toxicity/Mobility	1.00E+01	100	6

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

HRS DOCUMENTATION RECORD

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

	Score
Ground Water Migration Pathway Score (Sgw)	100.00
Surface Water Migration Pathway Score (Ssw)	0.00
Soil Exposure Pathway Score (Ss)	0.00
Air Migration Pathway Score (Sa)	0.00

Site Score	50.00

NOTE

Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

WASTE QUANTITY

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Lagoon

a. Wastestream ID	
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Lagoon
b. Source Type	Surface Impoundment
c. Secondary Source Type	N.A.
d. Source Vol.(yd3/gal)	0.00
Source Area (ft2)	5445.00
e. Source Volume/Area Value	4.19E+02
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00
g. Data Complete?	NO
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00
i. Data Complete?	NO
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	4.19E+02

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Trichloroethylene	> 2	YES	1.2E-01	ppm

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Lagoon	GW-SW-SE-A	4.19E+02	0.00E+00	4.19E+02

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	1.00E+01	100	6
SW: Overland Flow, DW	Tox./Persistence	4.00E+00	100	3
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	2.00E+02	100	10
SW: Overland Flow, Env	Etox./Persis./Bioacc.	2.00E+03	100	18
SW: GW to SW, DW	Tox./Persistence	4.00E+00	100	3
SW: GW to SW, HFC	Tox./Persis./Bioacc.	2.00E+02	100	10
SW: GW to SW, Env	Etox./Persis./Bioacc.	2.00E+03	100	18
Soil Exposure:Resident	Toxicity	0.00E+00	0	0
Soil Exposure: Nearby	Toxicity	0.00E+00	0	0
Air	Toxicity/Mobility	1.00E+01	100	6

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

HRS DOCUMENTATION RECORD

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

	Score
Ground Water Migration Pathway Score (Sgw)	100.00
Surface Water Migration Pathway Score (Ssw)	0.00
Soil Exposure Pathway Score (Ss)	0.00
Air Migration Pathway Score (Sa)	0.00
Site Score	50.00

NOTE

Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

WASTE QUANTITY

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Lagoon

a. Wastestream ID	
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Lagoon
b. Source Type	Surface Impoundment
c. Secondary Source Type	N.A.
d. Source Vol.(yd3/gal)	0.00
Source Area (ft2)	5445.00
e. Source Volume/Area Value	4.19E+02
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00
g. Data Complete?	NO
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00
i. Data Complete?	NO
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	4.19E+02

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Trichloroethylene	> 2	YES	1.2E-01	ppm

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Lagoon	GW-SW-SE-A	4.19E+02	0.00E+00	4.19E+02

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	1.00E+01	100	6
SW: Overland Flow, DW	Tox./Persistence	4.00E+00	100	3
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	2.00E+02	100	10
SW: Overland Flow, Env	Etox./Persis./Bioacc.	2.00E+03	100	18
SW: GW to SW, DW	Tox./Persistence	4.00E+00	100	3
SW: GW to SW, HFC	Tox./Persis./Bioacc.	2.00E+02	100	10
SW: GW to SW, Env	Etox./Persis./Bioacc.	2.00E+03	100	18
Soil Exposure:Resident	Toxicity	0.00E+00	0	0
Soil Exposure: Nearby	Toxicity	0.00E+00	0	0
Air	Toxicity/Mobility	1.00E+01	100	6

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

HRS DOCUMENTATION RECORD

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

	Score
Ground Water Migration Pathway Score (Sgw)	100.00
Surface Water Migration Pathway Score (Ssw)	0.00
Soil Exposure Pathway Score (Ss)	0.00
Air Migration Pathway Score (Sa)	0.00

Site Score	50.00

NOTE

Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

WASTE QUANTITY

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Lagoon

a. Wastestream ID	
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Lagoon		
b. Source Type	Surface Impoundment		
c. Secondary Source Type	N.A.		
d. Source Vol.(yd3/gal)	Source Area (ft2)	0.00	5445.00
e. Source Volume/Area Value	4.19E+02		
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00		
g. Data Complete?	NO		
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00		
i. Data Complete?	NO		
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	4.19E+02		

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Trichloroethylene	> 2	YES	1.2E-01	ppm

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Lagoon	GW-SW-SE-A	4.19E+02	0.00E+00	4.19E+02

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	1.00E+01	100	6
SW: Overland Flow, DW	Tox./Persistence	4.00E+00	100	3
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	2.00E+02	100	10
SW: Overland Flow, Env	Etox./Persis./Bioacc.	2.00E+03	100	18
SW: GW to SW, DW	Tox./Persistence	4.00E+00	100	3
SW: GW to SW, HFC	Tox./Persis./Bioacc.	2.00E+02	100	10
SW: GW to SW, Env	Etox./Persis./Bioacc.	2.00E+03	100	18
Soil Exposure:Resident	Toxicity	0.00E+00	0	0
Soil Exposure: Nearby	Toxicity	0.00E+00	0	0
Air	Toxicity/Mobility	1.00E+01	100	6

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

DISPOSITION

EPA	POTENTIAL HAZARDOUS WASTE SITE TENTATIVE DISPOSITION	REGION VII	SITE NUMBER

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency, Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, D.C. 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET	
Former Hulett Lagoon	Dawson Road	
C. CITY	D. STATE	E. ZIP CODE
Camdenton	MO	65020

II. TENTATIVE DISPOSITION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	Mark 'X'	EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED - NO HAZARD					
B. INVESTIGATIVE ACTION(S) NEEDED (If yes, complete Section III.)					
C. REMEDIAL ACTION (If yes, complete Section IV.)	X				
D. ENFORCEMENT ACTION (If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)			X		

E. RATIONALE FOR DISPOSITION

Using the Hazard Ranking System (HRS) to evaluate site conditions, the Former Hulett Lagoon site scores above 28.5 and qualifies for proposal to the National Priorities List (NPL). The closing of a public drinking water supply well due to contamination from the site is a significant factor in this site evaluation.

F. INDICATE THE ESTIMATED DATE OF FINAL DISPOSITION (mo,day,yr)	G. IF A CASE DEVELOPMENT PLAN IS NECESSARY, INDICATE THE ESTIMATED DATE ON WHICH THE PLAN WILL DEVELOPED (mo,day,yr)
September 1999	

H. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Valerie Wilder	(573) 751-8629	March 30, 1999

III. INVESTIGATIVE ACTIVITY NEEDED

A. IDENTIFY ADDITIONAL INFORMATION NEEDED TO ACHIEVE A FINAL DISPOSITION.

The state will attempt to negotiate an agreement for site cleanup with the PRPs. If negotiations are not successful, the site will be recommended for listing on the NPL.

B. PROPOSED INVESTIGATIVE ACTIVITY (Detailed Information)

1. METHOD FOR OBTAINING NEEDED ADDITIONAL INFO.	2. SCHEDULED DATE OF ACTION (mo,day,& yr)	3. TO BE PERFORMED BY (EPA, Contractor, State, Etc.)	4. ESTIMATED MANHOURS	5. REMARKS
a. TYPE OF INSPECTION (1) (2)				
b. TYPE OF MONITORING (1)				
(2)				
c. TYPE OF SAMPLING (1) (2)				

Continued From Front

(1)				
(2)				
(1) (2)				

C. ELABORATE ON ANY OF THE INFORMATION PROVIDED IN PART B(on front and above)AS NEEDED TO IDENTIFY ADDITIONAL INVESTIGATIVE WORK.

D. ESTIMATE MANHOURS BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES	1. ACTION AGENCY	2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES
a. EPA		b. STATE	
c. EPA CONTRACTOR		d. OTHER (specify)	

IV. REMEDIAL ACTIONS

A. SHORT TERM/EMERGENCY ACTIONS (On Site and Off-Site): List all emergency actions needed to bring site under immediate control, e.g., restrict access, provide alternate water supply, etc. See instructions for a list of the actions to be used in the space below.

1. ACTION	2. EST. START DATE mo, day, yr	3. EST. END DATE mo, day, yr	4. ACTION AGENCY EPA, State, Private Party	5. ESTIMATED COST	6. SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED.
Excavation of TCE contaminated soil may be necessary				$	
				$	
				$	
				$	
				$	
				$	

B. LONG TERM STRATEGY (On Site and Off-Site): List all long term solutions, e.g., excavation, removal, ground water monitoring wells, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

1. ACTION	2. EST. START DATE mo, day, yr	3. EST. END DATE mo, day, yr	4. ACTION AGENCY EPA, State, Private Party	5. ESTIMATED COST	6.SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED.
Groundwater cleanup of TCE plume				$	
				$	
				$	
				$	
				$	
				$	

C. ESTIMATED MANHOURS AND COST BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL EST. MAN-HOURS FOR REMEDIAL ACTIVITIES	3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES	1. ACTION AGENCY	2. TOTAL EST. MAN-HOURS FOR REMEDIAL ACTIVITIES	3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES
a. EPA			b. STATE		
c. PRIVATE PARTIES			d. OTHER (specify)		

Former Hulett Lagoon Site
U.S.G.S. Topographic Maps
Reference 3

Camden County, Missouri

Former Hulett Lagoon Site
Combined PA/SI
Reference 47

See Osage Beach Map

Miller Co. PWSD #2

Camden Co. PWSD #1

Camden Co. PWSD #2

Inset A: Hurricane Deck, Sherry's Dock End, Adam's Deli, Alamo Restaurant, Alamo Resort, Deepwater Inn

Inset B: Standing Rock Campground, Standing Rock Cafe, American Holidays Resort, The Wharf Restaurant, Captain's Galley, Hale Haven Resort, Holiday Beach Resort

Inset C: Old Trail House, El Kay Lakeview Motel, Coyote's Cantina, 5-81 Motel & Camp Ground

Inset D: The Flame Resort, Blue Dolphin Beach Resort, Wilson's Resort, Knotty Pine Resort, Digger O'Bella, Point View Resort, Wal-Eye Resort, Kon-Tiki Resort, Sportsman's Resort

Inset E: Camdenton, Camdenton Ferry & Dock

Inset F: Empire Resort, Adam's Ale Resort Inc., Tonka Villa Resort, Cedar Green Resort, Lake Valley Country Club, Lake Valley Condos, Rippling Waters Resort

Inset Maps

Center for Agricultural, Resource and Environmental Systems University of Missouri - Columbia

Missouri Department of Natural Resources Public Drinking Water Program

Sources:
Dealerships, chemical sites, U.S.G.S. quadrangle grid, public water supply drainage basins, reservoirs, wellheads, intakes and water districts - Center for Agricultural, Resource and Environmental Systems and Missouri Department of Natural Resources - Public Drinking Water Program.
Public Lands Survey System - Missouri Department of Natural Resources - Division of Geology and Land Survey.
Highways - Missouri Highway and Transportation Department.
Roads, streets, railroads, incorporated areas, villages, streams, lakes and county boundaries - Department of the Interior, U. S. Geological Survey.
Map Produced by CARES, January 1996.

Incorporated Areas
Water
Intake Drainage Basin
Water District
Chemical/Dealership Area

Wellhead
River Intake
Impoundment Intake
Dealership Location
Chemical Site

Railroad
Intermittent/Perennial Streams
County Boundary
USGS Quadrangle Grid
Public Lands Survey System

Interstate Highway
U.S. Highway
State Highway
State Lettered Route
Street or Road

Miles
Kilometers

Appendix A
Department of Natural Resources
Division of Environmental Quality
Locational Data Collection Sheet

This sheet is used to record required locational data. Attach the ***Optional Locational Data Collection Sheet*** if you need to record additional information.

1. Facility or Site (Name and Address) Former Hulett Lagoon Site - 0.1 mile NE of intersection of Dawson Rd & Sunset Drive Camdenton, MO 65020

2. Facility ID, Permit Number or Other Identifier

3. Data Owner (1) DEQ/ADM (2) APCP (3) ESP (4) HWP (5) LRP (6) PDWP (7) SWCP (8) SWMP (9) TAP (10) WPCP Other:

4. Locational Data (Leave blank for area features, such as roads, streams or site boundaries.)

5. Unit of Measurement (1) Degrees, Minutes, Seconds or (2) Decimal Degrees

Latitude	Longitude
38.01143	92.75471

6. Method of Determining Location (Indicate the method used to determine the latitude and longitude coordinates.)

Address Matching (Geocoding)	**Code**			
Block/Group	A2		Differential Post Processing	G3
Digitization	A6		Precise Positioning Service	G4
Nearest Street Intersection	A4		Signal Averaging	G5
Other Address Matching	AO		Real Time Differential Processing	G6
Primary Street Name	A5		**Interpolation**	
Street Centerline	A3		Aerial Photograph	I2
Zip Code Centroid (Center)	Z1		Map	I1
Census – 1990			Satellite Imagery	I3
Block Centroid (Center)	C1		Other Interpolation	IO
Block/Group Centroid	C2		**Other**	
Block/Track Centroid	C3		Classic Survey	S1
Other Centroid	CO		Land Survey	P1
Global Positioning System			Loran C Code	L1
Static Mode	G1		Quarter Section Description	S2
Kinematic Mode (Dynamic)	G2		Unknown	UN

7. Locational Data Accuracy (+/- meters) 38.1 ft

8. Type of Locational Data Represented (P) Single Point (L) Line (A) Area

9. Horizontal Datum (Indicate the horizontal datum used to locate the collection site feature.)

(1) NAD27, (2) NAD83, (3) WGS84, (U) Unknown Other:

Appendix A
Department of Natural Resources
Division of Environmental Quality
Locational Data Collection Sheet
Continued

10. Collection Site Feature (Mark the feature where the locational data was collected. If needed, use **11. Descriptive Comments** to provide more detail. Provide enough information so someone could return to the collection site feature.)

Collection Site Feature	Code		
Bridge	BR	Northeast Corner of the Facility or Site	NE
Building	BL	Northwest Corner of the Facility or Site	NW
Center of Facility or Site	CF	Pile	PL
Described by Descriptive Comment Field	DC	Pipe (Outfall, Intake, Point of Connection, Break, etc.)	OP
Described by Site Name	DS	Rail Road	RR
Equipment Point of Use	EU	Road	RD
Intersection (Road, Pipe, Street, etc.)	IN	Southeast Corner of the Facility or Site	SE
Lagoon or Pond	LS	Southwest Corner of the Facility or Site	SW
Loading Facility or Dock	LD	Stack	AS
Main Access Point (Entrance, Gate, etc.)	MG	Tank, Standpipe, Tower	TK
Main Office	MA	Vent	AV
Missouri Land Survey Monument	MM	Well	WL
Monitoring Station	AM	Unknown	UN
		Other (use Collection Site Descriptive Comments below)	OT

Collection Site Descriptive Comments: (If needed, further describe the feature represented by the **Collection Site Feature**. For example, an outfa the east end of pipe 12; or started at the NW corner, went clockwise around the site, recorded 27 points and ended back at the starting point.)

Reading was collected in the center of the former lagoon

11. Source of Locational Data

Description	Code						
		SWRO	D3	LRP	N1	EPA Headquarters	HQ
Citizen	CT	KCRO	D4	PDWP	N2	Private Sector	PV
Contractor	CR	NERO	D5	SWCP	N3	Regulated Entity	RE
Dun & Bradstreet	DB	SLRO	D6	SWMP	N4	Tribe	TR
EPA, Region 7	R7	APCP	D7	TAP	N5	Unknown	UN
JCRO	D1	ESP	D8	WPCP	N6		
SERO	D2	HWP	D9	DEQ/Adm	N7	Other_____	

12. Source Scale Used to Determine the Latitude and Longitude

Scale	(U) Unknown	

12. Your Name (Please Print)	Valerie Wilder	**Your Phone**	(573) 522-3351	**Date Collected**	1/21/99

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

MEMORANDUM

DATE: February 1, 1999

TO: Former Hulett Lagoon and Camdenton Sludge Disposal Technical Files

FROM: Valerie H. Wilder, Environmental Specialist VW
Site Evaluation Unit, Superfund Section
Hazardous Waste Program

SUBJECT: Site Visits/Sampling Events on
December 1, 16, 1998 and January 21-22, 29, 1999

December 1, 1998, Site Visits

On December 1, 1998, I traveled to Camdenton, Missouri, to review city files on the former Hulett Lagoon. I went to City Hall and spoke with the mayor, Mr. Elmer Meyer. I made copies of the pertinent information on the operation and closure of the Hulett Lagoon. Mr. Tom Emry, Camdenton's Sewer Treatment Plant Manager, stopped by the city hall to answer some of my questions and help interpret maps. After reviewing the files, Mr. Vince Costa, Public Works Director, drove me around and showed me the former Hulett Lagoon, the sludge disposal area out near the airport, and all of the city's drinking water wells.

Directions to the Former Hulett Lagoon site: from the intersection of U.S. Highway 54 and State Route 5 in Camdenton, take State Route 5 northwest for 0.3 of a mile to East Mulberry; take a left onto East Mulberry and the first right onto West Mulberry. When the paved portion of West Mulberry curves to the left, continue straight onto a gravel driveway that leads behind the Ron Hulett Chevrolet-Olds-Buick Jeep/Eagle automobile dealership. Stay to the left on a gravel road that leads down to the lagoon. This road is not regularly maintained; there are several severe ruts caused from washouts.

The lagoon was named and most commonly referred to as the Hulett Lagoon, apparently due to its proximity to the Ron Hulett automobile dealership that is located at 249 N. Highway 5. The former Hulett Lagoon is currently an open field area with grassy vegetation. Remnants of the former berm and the road that surrounded the lagoon are still visible. The lagoon area is generally flat, with surface runoff flowing to the northwest and entering an intermittent drainage that travels to the west. There is a

monitoring well, installed by Modine Manufacturing's consultant, located just outside what would have been the southwest edge of the berm of the lagoon. This is known as MW-5. During the closure of the lagoon, apparently, no soil was brought in for the mixing. Some soil from the hillside southeast of the lagoon was scraped in to fill the void.

The lagoon is located in a mixed residential/commercial area of Camdenton. It is bordered on the north by an apartment complex; on the west by a strip of woods about 500 feet wide with Dawson Road on the other side; on the east by woods; and on the south by a strip of woods and then residences. At least two of the apartment buildings in the complex north of the site are within 200 feet of the site, as well as the apartment building and one home south of the site. Access to the lagoon area is not restricted. There is no fencing or gates.

Directions to the Camdenton Sludge Disposal Area site: from the intersection of U.S. Highway 54 and State Route 5 in Camdenton, take State Route 5 southeast for 4.4 miles to County Road 5-120; take a left onto CR 5-120, a gravel road, and travel east. The disposal area is 0.3 of a mile down the road on the north side.

The outline of the stockpiling area is faintly discernable today. The spreader used during the sludge disposal operation was left on-site and is situated approximately 100 yards northwest of the stockpiling area. There are no other structures in the area. Most drainage for the site flows into a low ditch that runs west to east across the southern portion of the site.

The sludge disposal area is bordered on the south by County Road 5-120; on the north by the Camdenton Memorial Airport; on the west by a residence; and on the east by a wooded area. The residence at 3499 RR3 is within 400 feet of the western edge of the site. Access to the site is not restricted. There is no fencing or gates

<u>December 16, 1998, Site Visits</u>
On December 16, 1998, Brian Allen, of the Environmental Services Program, and I traveled to Camdenton to visit the two sites and begin planning for the Combined PA/SI sampling events that were scheduled for January 1999. We met Mr. Larry Coleman, a city employee at the Sewer Treatment Plant, at the sludge disposal site near the airport. Mr. Coleman lives just down County Road 5-120 from the sludge disposal site.
Mr. Coleman told us about the sludge disposal operations that occurred during the closure of the Hulett Lagoon in 1989 and 1990. Since Mr. Coleman lived just down the road, he saw activity at the sludge disposal area almost daily. He said that the sludge was more difficult to spread evenly than the contractors originally anticipated. It didn't

dry out completely and would stick together in clumps. Near the end of the process, he said the contractor took the last several piles of sludge material and simply dumped them into the ditch located about 50 feet north of the circular storage area. It was not spread, mixed or disced.

The following information regarding the sampling events are details that are not documented in the Environmental Services Program Sampling Reports.

January 21, 1999, Sampling Event
Sampling at the Hulett Lagoon commenced on January 21, 1999. That day, Ron Hulett car dealership personnel reported that people often dump trash and junk in the wooded area behind their facility that borders the road leading down to the lagoon. There were also a few pieces of trash in the lagoon area.

January 22, 1999, Sampling Event
Sampling at the Camdenton Sludge Disposal Area site commenced on January 22, 1999. Green sludge material was encountered in borings Hulett 12 and Hulett 19, from the ditch area.

January 29, 1999, Sampling Event
Camden County PWSD #2 personnel reported that Well #2 is the primary well that supplies 99 percent of the water for the district.

VHW:ln

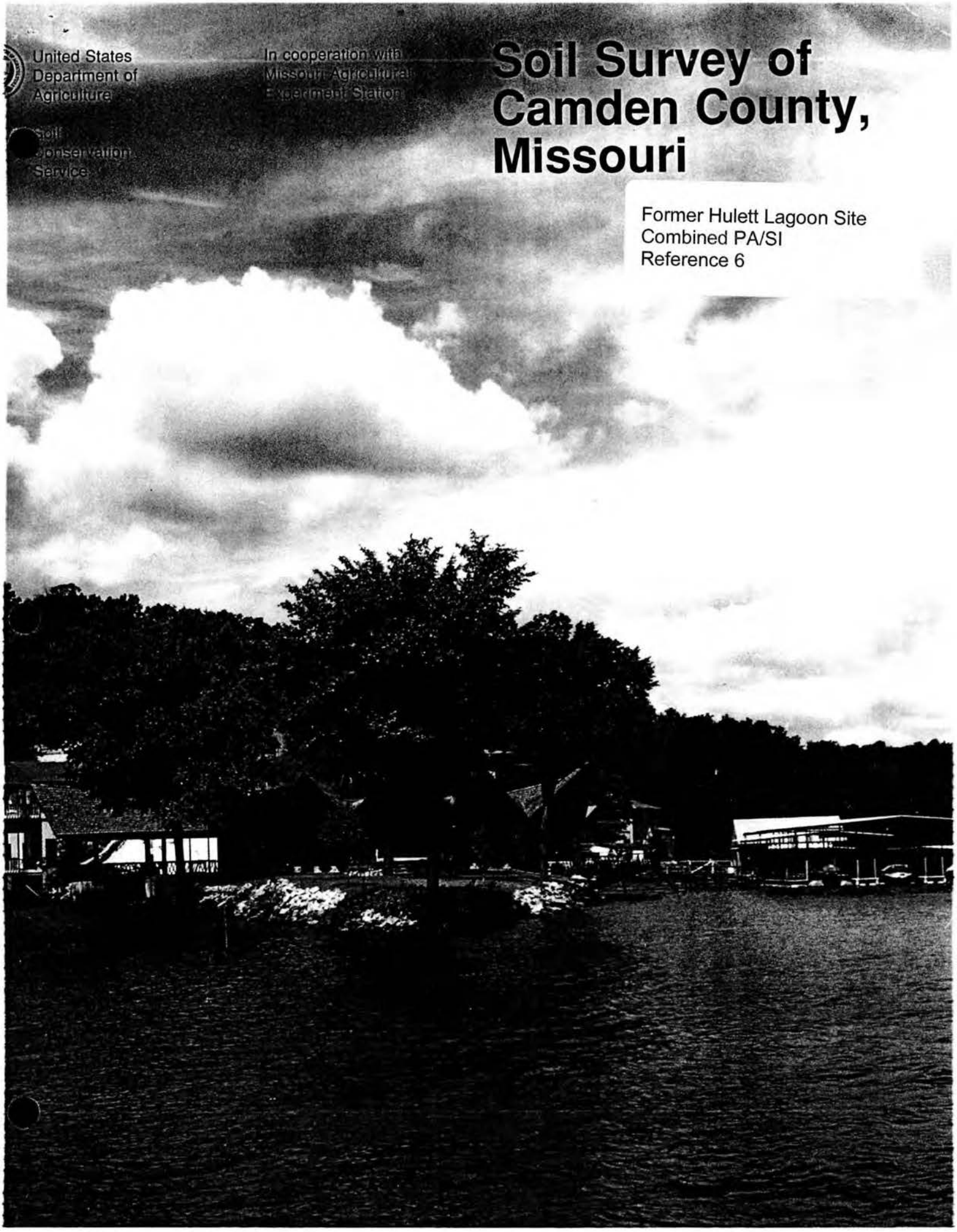
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Missouri Agricultural
Experiment Station

Soil Survey of Camden County, Missouri

Former Hulett Lagoon Site
Combined PA/SI
Reference 6



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Issued March 1994

General Nature of the County

This section provides general information about Camden County. It describes climate and history and development.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Camdenton in the period 1951 to 1987. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 35 degrees F and the average daily minimum temperature is 24 degrees. The lowest temperature on record, which occurred at Camdenton on December 25, 1983, is -20 degrees. In summer, the average temperature is 77 degrees and the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred on July 14, 1954, is 115 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 42.32 inches. Of this, 25 inches, or about 59 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 4.67 inches at Camdenton on October 13, 1968. Thunderstorms occur on about 53 days each year.

The average seasonal snowfall is about 19 inches. The greatest snow depth at any one time during the period of record was 16 inches. On the average, 12 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south-southwest. Average windspeed is highest, 12 miles per hour, in spring.

Tornadoes and severe thunderstorms occur occasionally, but they are local in extent and of short duration. They may cause damage in scattered areas. The amount of damage varies. Hailstorms sometimes occur in scattered small areas during the warmer part of the year.

History and Development

Osage and Delaware Indians once inhabited the territory now known as Camden County. They built their villages on the terraces along major streams, where they hunted, fished, and raised corn, beans, and pumpkins. In 1827, white settlers began moving into the area after the Indians signed a treaty ceding the land to the U.S. Government *(3)*. For many years after the treaty was signed, the Indians continued to hunt in the area. They camped at various places and hunted deer, bears, turkeys, and raccoons and other small game. They preserved the meat by drying it on scaffolds over fires. After 1846, they no longer returned to the area as a group *(3)*.

Ruben Berry and William Pogue were among the earliest permanent white settlers in the survey area. When they arrived in 1827, they discovered the hull of a keelboat submerged in the Osage River *(3)*. Also, a wooden fur press was found at the mouth of Linn Creek. These artifacts were evidence that French or Spanish explorers, hunters, and trappers had also been in the area. Other settlers later came to the area from Kentucky, Tennessee, and Virginia *(8)*.

Kinderhook County, which is now known as Camden County, was organized in accordance with an act of the Legislature and approved by Governor Thomas Reynolds on January 20, 1841 *(3)*. A site was selected for the county seat on April 12, 1841, in the town of Oregon. The county name was changed to Camden County by an act of the General Assembly of Missouri on February 23, 1843, and the name of the county seat was changed from Oregon to Erie. In 1850, the county seat was moved from Erie to Linn Creek *(3)*. When Linn Creek was inundated by the creation of the Lake of the Ozarks, the county seat was moved to its present location at Camdenton.

Because of the cherty soils, limited transportation facilities, distant markets, and hilly, forested topography, the agricultural enterprises of the area were generally limited to part-time livestock farming. Timber was harvested mostly for railroad ties, fuel, and building material. Other occupations centered around hunting and fishing and the handcrafting of necessities for subsistence. Some row crops were grown in small areas on the stream terraces and flood plains and were used as livestock feed. After World War II, the livestock economy was based on the production of unfinished feeder cattle *(5)*. Higher cattle prices in the 1960's and 1970's made the conversion of timberland to pasture profitable.

Former Hulett Lagoon Site
Combined PA/SI
Reference 7

National Weather Service Office
for State Climatology
P. O. Box 941
Columbia, Missouri 65201

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MISSOURI DEPARTMENT OF
NATURAL RESOURCES

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National Weather Service Office
for State Climatology
P. O. Box 941
Columbia, Missouri 65201

ENT OF COMMERCE

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STAT

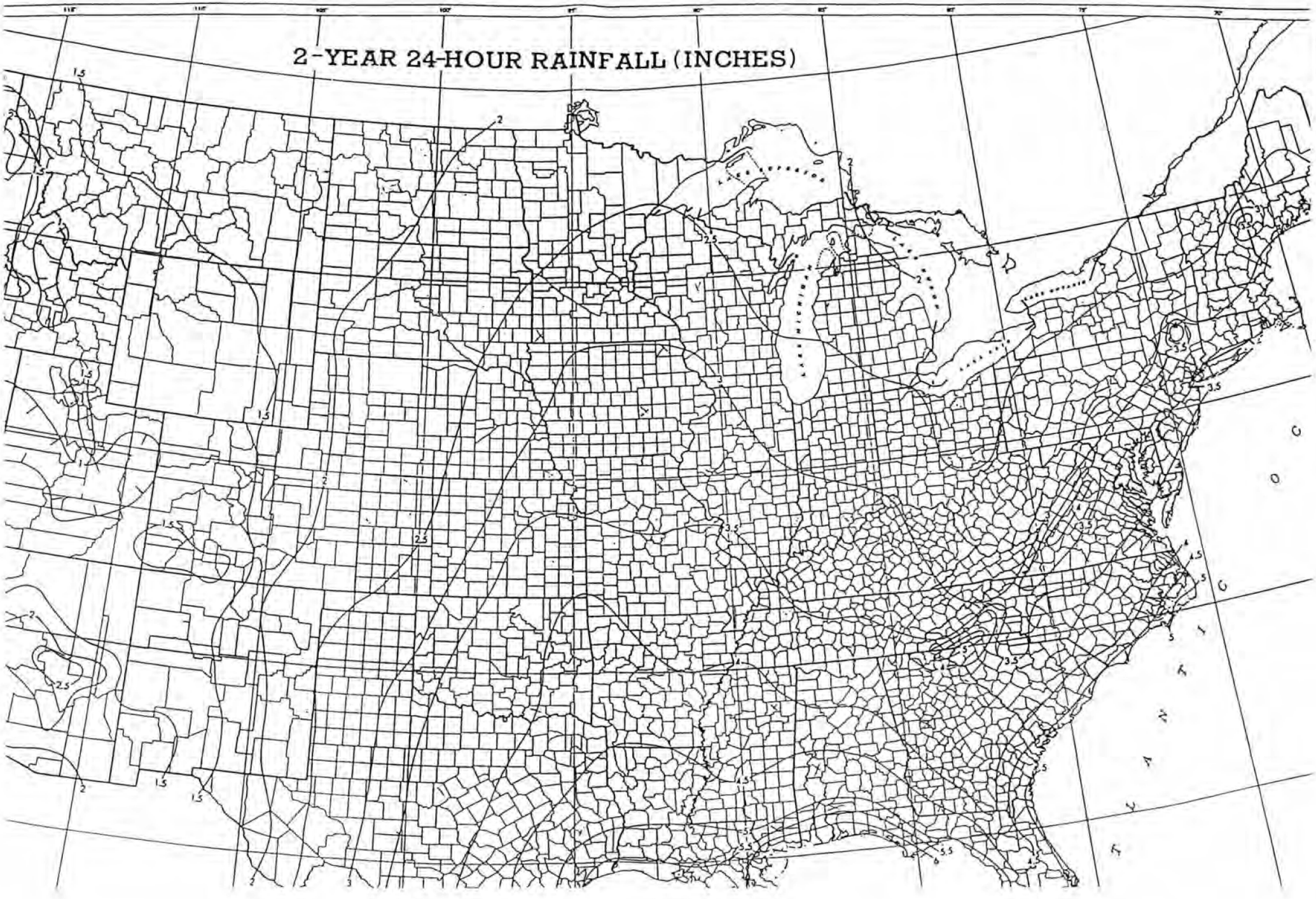
for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

National Weather Service Office
for State Climatology
P. O. Box 941
Columbia, Missouri 65201

1961

National Weath
for State Climat

2-YEAR 24-HOUR RAINFALL (INCHES)



Former Hulett Lagoon Site
Combined PA/SI
Reference 8

CLIMATIC ATLAS OF THE UNITED STATES

U.S. DEPARTMENT OF COMMERCE
C. R. Smith, Secretary

ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
Robert M. White, Administrator

ENVIRONMENTAL DATA SERVICE
Woodrow C. Jacobs, Director

JUNE 1968

REPRINTED BY THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
1983

MEAN SPEED (m.p.h.), AND FASTEST MILE OF WIND, MONTHLY AND ANNUAL - Contin

Former Hulett Lagoon Site
Combined PA/SI
Reference 9

U.S. ENVIRONMENTAL PROTECTION AGENCY

ALTERNATIVE REMEDIAL CONTRACTING STRATEGY

REGIONS VI, VII, VIII

VOLUME I

FINAL
ENVIRONMENTAL PRIORITIES INITIATIVE/ PRELIMINARY ASSESSMENT
MODINE HEAT TRANSFER, INC.
(FORMERLY SUNDSTRAND TUBULAR PRODUCTS)
BOX 636 SUNSET DRIVE
CAMDENTON, CAMDEN COUNTY, MISSOURI
EPA ID NO. MOD062439351

U.S. EPA CONTRACT NO. 68-W8-0122
U.S. EPA WORK ASSIGNMENT NO. 47-7JZZ
U.S. EPA REGION VII

PREPARED BY

JACOBS ENGINEERING GROUP, INC.
10901 WEST 84TH TERRACE, SUITE 210
LENEXA, KANSAS 66214
(913) 492-9218
JACOBS PROJECT NUMBER 12-D247-22

RECEIVED
HAZARDOUS WASTE PROGRAM
NATURAL RESOURCES

SEPTEMBER 1992

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Figure 3 Historical Building Additions
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Figure 5 Four-Mile Radius Map
Figure 6 15-Mile Surface Water Migration Pathway
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OHIO DEPARTMENT OF
NATURAL RESOURCES

TABLES

Table 1 SWMU/AOC Identification Summary
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Appendix J Closure Plan Analytical Results
Appendix K Present Waste Disposal Method

EXECUTIVE SUMMARY

A Visual Site Inspection (VSI) and a Preliminary Assessment (PA) were conducted by Jacobs Engineering Group Inc. (Jacobs), on behalf of the U.S. Environmental Protection Agency (EPA) Region VII, at Modine Heat Transfer, Inc. (MHT) on March 4, 1992. The Modine facility is on Sunset Drive in Camdenton, Missouri, in Camden County. MHT is a manufacturing facility that produces air conditioning coils and feeder parts from aluminum and copper tubing. The manufacturing process consists of aluminum and copper cutting and brazing, aluminum etching, and, previously, a limited amount of chromium electroplating.

The facility began production in 1967. During the history of the facility, the ownership has changed three times. Previous owners include Dawson Metal Products, Inc. (1967 to 1974) and Sundstrand Tubular Products (1974 to 1990). MHT is the current owner/operator. Various types of hazardous waste are generated during the manufacturing process including: 1,1,1-trichloroethane (TCA); paint waste; wastewater pretreatment sludge; solvents; and waste oil. Non-hazardous wastes generated by the facility include: paper; cardboard; scrap metal; and general refuse. All wastes are either drummed in 55-gallon barrels, stored in high-capacity storage tanks, shipped to recycling centers, processed by the pretreatment wastewater unit, and released to the city publically-owned treatment works (POTW), or stored for reclamation or disposal by contracted services. From 1967 until 1986, wastes were disposed through mudpits to the Hulett Lagoon, which was owned by the city of Camdenton. In 1986, a pretreatment wastewater system was placed on-line, which remains in service.

Thirty-four Solid Waste Management Units (SWMUs) and four Areas of Concern (AOCs) have been identified at this facility. The SWMUs and AOCs identified are:

SWMU Number 1	Hulett Lagoon
SWMU Number 2	Mudpits
SWMU Number 3	Pretreatment Wastewater System/Filter Press
SWMU Number 4	Tank and Drum Storage Area Number 1
SWMU Number 5	Drum Storage Area Number 2
SWMU Number 6	Waste FIN Oil Storage Tank Number 1
SWMU Number 7	TCA Waste Storage Tank Number 6
SWMU Number 8	Copper Cleaning Line
SWMU Number 9	Copper Cleaning Line Scrubber
SWMU Number 10	Aluminum Cleaning Line
SWMU Number 11	Large Aluminum Brazing Furnace
SWMU Number 12	Large Aluminum Brazing Furnace Scrubber
SWMU Number 13	Small Aluminum Brazing Furnace
SWMU Number 14	Small Aluminum Brazing Furnace Scrubber

SWMU Number 15	Chrome Cleaning Line
SWMU Number 16	Chrome Cleaning Line Scrubber
SWMU Number 17	Aqueous Cleaning Bath
SWMU Number 18	Vapor Degreaser and Still M184
SWMU Number 19	Vapor Degreaser and Still M185 (Former)
SWMU Number 20	Vapor Degreaser and Still M185 (New-Location 1)
SWMU Number 21	Vapor Degreaser and Still M185 (New-Location 2)
SWMU Number 22	Vapor Degreaser and Still M487 (Former)
SWMU Number 23	Vapor Degreaser and Still M487 (New)
SWMU Number 24	Vapor Degreaser and Still M460 (Former-Location 1)
SWMU Number 25	Vapor Degreaser and Still M460 (Former-Location 2)
SWMU Number 26	Vapor Degreaser and Still M567
SWMU Number 27	Vapor Degreaser and Still M394 (Former-Location 1)
SWMU Number 28	Vapor Degreaser and Still M394 (Former-Location 2)
SWMU Number 29	Vapor Degreaser and Still M394 (Former-Location 3)
SWMU Number 30	Two 2,000-Gallon Storage Tanks
SWMU Number 31	Drum Storage Area Number 3
SWMU Number 32	Pretreatment/Drum Storage Area
SWMU Number 33	Non-Hazardous Waste Receptacle
SWMU Number 34	Scrap Metal Storage Bins
SWMU Number 35	Fire Training Area
AOC A	Raw Materials Storage Area
AOC B	Pallet Storage Area
AOC C	Tool Crib/Maintenance Area
AOC D	Paintline

The above-listed SWMUs remain active with the exception of SWMU Numbers 1, 2, 4, 5, 11, 12, 13, 15, 16, 19, 20, 22, 24, 25, 27, 28, 29, and 31. These SWMUs are no longer in operation and, except for a portion of SWMU Number 2, have been dismantled or removed from the site.

Two potential release areas were identified in 1991 by LAW Environmental during an Environmental Site Assessment conducted on behalf of the MHT facility. The areas investigated include two former drum storage areas (SWMU Numbers 4 and 31) where soil borings revealed elevated levels of hazardous substances. LAW recommended further investigation to determine the nature and extent of the contamination.

The facility holds interim status as a treatment, storage, and disposal (TSD) facility. In March 1992, MHT submitted a Revised Closure Plan to the Missouri Department of Natural Resources (MDNR) in order to terminate its interim status.

The gray bat (myotis griesecens) is the only federal and state-threatened species known to exist within a 15-mile downstream distance from the facility. No critical habitats or sensitive environments exist at the facility or are within one-half mile. No aquatic critical habitats or sensitive environments exist within 15-miles downstream from the facility.

SWMU NUMBER: 1

SWMU NAME: Hulett Lagoon

SWMU DESCRIPTION: The Hulett Lagoon is 1/4 mile northeast of the Modine facility on the east side of Dawson Road. The lagoon is owned by the City of Camdenton, Missouri. The lagoon was constructed in 1961 under the State of Missouri Grants Program and is approximately one acre in size. The lagoon was constructed of clay, and its berms were approximately 25 feet wide and 15 feet high. The location of the Hulett Lagoon is depicted on Figure 1 as SWMU Number 1 (Reference 15).

Modine began utilizing the lagoon in 1967. The facility would release its untreated wastewater and stormwater into the lagoon through a series of "mudpits" (SWMU Number 2) via a storm sewer.

DATES OF OPERATION: The Hulett lagoon was in operation from 1961 until its closure in late 1989. The Modine facility utilized the lagoon for its waste disposal system from 1967 through 1986, when the facility installed its pretreatment wastewater system.

In 1988, the City of Camdenton began RCRA closure of the Hulett Lagoon. The sludge was sampled for metals, and analytical results are presented in Appendix H. High levels of chromium, lead, and nickel were detected. City officials were given several options by MDNR to consider in completing the abandonment and closure of the Lagoon within the MDNR Water Resources Program (Appendix I). The option chosen and implemented by the city was the subsurface application of sludge from the lagoon by spreading it in place and discing and plowing it into the subsurface soils. The berms were then turned in and mixed to a 1:1 ratio with surrounding soils. The sludge was then taken by truck to the municipal airport and land-applied at a field near the runway in accordance with the terms of the MDNR correspondence contained in Appendix I. No confirmation samples were collected following removal of the sludge. The city is in the process of leveling the site of the former lagoon and opening it up for a neighborhood park (Reference 15). It should be mentioned that using this area for purposes other than sewage sludge disposal is contrary to the terms agreed upon between MDNR and the City of Camdenton.

WASTES MANAGED: Wastes managed by the Hulett Lagoon included all wastewater, stormwater, and aluminum and copper cleaning line wastes from the MHT facility. Information regarding the type and quantity of waste distributed and accumulated at the Hulett Lagoon is not available. Potential wastes handled include: F001, F006, D001, and D098.

RELEASE CONTROLS: Release controls at the Hulett Lagoon include clay lining and berms.

RELEASE HISTORY: The Hulett Lagoon was the site for release of all untreated process wastes from the MHT facility. As stated previously, elevated levels of chromium, lead, and nickel were detected in the sludge analysis recorded during closure of the lagoon.

MIGRATION PATHWAYS: The primary migration pathways for contaminants in order of decreasing likelihood would be soil, surface water, and groundwater.

PHOTOGRAPH NO.: 1 and 2

SWMU NUMBER: 2

SWMU NAME: Mudpits

SWMU DESCRIPTION: Four "mudpits" (sumps) were located approximately 10 feet west of the manufacturing building. The mudpits were approximately 15 feet apart, running from the scrap-metal bins to the pretreatment/drum storage area (SWMU Number 32). Each mudpit consisted of a 4-foot by 4-foot cement sump approximately 4 feet in depth. Two of the four mudpits no longer exist and are beneath the pretreatment/drum storage area. The location of the mudpits is depicted on Figure 3 as SWMU Number 2.

The mudpits were connected by a 6-inch steel line that delivered stormwater, boiler water, chrome, copper, and aluminum cleaning line waste from the manufacturing process. Each sump received the previous sump's wastes until wastewater was discharged into the sewer. The southern-most mudpit was an open pit which collected boiler water and stormwater. The second mudpit directly collected aluminum cleaning line waste and stormwater from the first. The third and fourth mudpits collected copper cleaning line waste in addition to the aluminum cleaning line waste and the stormwater runoff. These four mudpits collectively discharged wastewater into a storm sewer line which led directly to the Hulett Lagoon (SWMU Number 1)(Reference 12).

DATES OF OPERATION: The mudpits were in operation from 1967 to 1986. Two of the four mudpits were removed to construct the pretreatment/drum storage area. The two remaining mudpits, which are no longer in service, are covered by plywood sheets.

WASTES MANAGED: Wastes managed by the mudpits included wastewater, stormwater, and aluminum and copper cleaning line wastes. Information on the type and quantity of waste accumulated and distributed through the mudpits is unavailable. Potential wastes handled by these units include: F001, F006, D001, and D098.

RELEASE CONTROLS: Release controls for the mudpits included the 4-foot by 4-foot concrete sump walls which were 6 inches in width. The sumps were covered on the surface by a wooden ply-board which prevented precipitation from entering the sumps. The southern-most sump was not covered, however, and did receive run-on from the manufacturing building. No other release controls or secondary containment were utilized at this SWMU.

RELEASE HISTORY: There is no record or documentation of any release of materials associated with the mudpits during the operation lifetime.

MIGRATION PATHWAYS: If a release were to occur from the mudpits, the primary migration pathways would be soil, surface water, groundwater, and air, in decreasing order of likelihood.

PHOTOGRAPH NO.: 3

Former Hulett Lagoon Site
Combined PA/SI
Reference 10

MISSOURI WATER QUALITY BASIN PLANS

VOLUME 4

Osage and Gasconade Rivers (Including ake of the Ozarks, Truman Reservoir, South irand, Little Osage, Marmaton, Marais des ygnes, Sac and Pomme de Terre Rivers, ebo Creek and Big Piney River).

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INTRODUCTION

Missouri's Water Quality Basin Plans are a guide to managing the quality of the aquatic resources of the state In their simplest form they are a set of water quality problems and a corresponding set of actions which will correct these problems

There are only a few basic kinds of water quality problems such as organic enrichment from domestic and industrial discharges and from livestock, discharges of toxic materials which come from domestic and industrial sources, acid runoff or seepage from coal mined lands, highly mineralized water (a naturally occurring problem in certain ground-waters), and lastly, sediment from erosion of soil or mine tailings

At any given location, the apparent simplicity of our water problems is complicated by such specifics as the volume of the pollutant discharge and its variability, the concentration of specific pollutants and their variability, and the volume of the receiving stream and its variability The proximity of other pollutant sources or areas of water use (water based recreation areas, drinking water withdrawal points) tends to make a problem in a particular location, if not unique, at least discernably more or less severe than a similar problem in another location These plans should note which problems are of the highest priority

In recognizing the need to write management plans for specific problem areas, this document divides the state into eight major drainages (corresponding to the eight volumes of this document). It then divides the eight drainages into 77 basins and presents a specific list of water quality problem areas and recommended solutions for each basin

The first part of each basin plan is a description of the basin in terms of geography, geology, hydrology, and aquatic use potential This description is followed by a detailed inventory of all known actual or potential sources of water pollutants The final part of the basin plan is a discussion of water quality problems and how they affect our water quality goals for the basin, and the basin plan itself in the form of tables listing specific water quality problems, their sources, and recommended solutions

Each basin plan consists of the following sections

BASIN NUMBER

BASIN NAME

DRAINAGE AREA

COUNTIES: (Included partially or wholly within the basin)

BASIN DESCRIPTION: Geographic limits of the basin and major streams within the basin

LAND USE: Percentage of basin in forest, pasture or cropland urban lands, or mined lands

CLASSIFIED STREAMS: Missouri's water quality standards (CSR 1981) recognize three kinds of surface waters

P1 Reservoirs, Lakes, Sloughs, Backwaters, and other impounded waters

P Permanently flowing streams

C Streams which may cease flow during prolonged dry weather but maintain permanent pools which act as refuges for aquatic life and provide drinking water for livestock and wildlife

HYDROGEOLOGY: A description of the surficial and underlying geologic strata and how they influence water movement within the basin

GEOLOGIC CROSS SECTION DIAGRAM: This diagram shows the geologic strata from the surface to a depth of at least 500 feet, indicates how deeply stream valleys incise these strata, and indicates how much water is discharged by known springs from each of these strata

STREAM FLOW: Stream flow data are taken from USGS records There are several flow statistics or descriptions used in water management Those included in the stream flow table which may require explanation are

Mean flow The arithmetic average flow That is, the sum of all flows divided by the number of flow measurements.

Median flow The flow which is exceeded exactly 50% of the time.

7 day-Q10 flow The lowest average flow for a seven consecutive day period with a recurrence interval of ten years.

7 day-Q2 flow. The lowest average flow for a seven consecutive day period with a recurrence interval of two years

STREAM USES (CSR, 1981): Missouri recognizes nine beneficial uses of the state's waters. Based on numerous public meetings, user surveys and other studies, each classified stream in the state (Class P1 P, or C), or segment thereof, has a list of uses appropriate to that stream The Mississippi and Missouri Rivers and Shoal Creek (Jasper and Newton Counties) have the most recognized uses (seven), a few streams which are badly polluted, like Turkey Creek (Jasper County), have none.

The nine beneficial uses are: (1) Irrigation of croplands. (2) Livestock and wildlife watering, (3) Protection of aquatic life and fishing, (4) Coldwater sport fishery (trout fishing), (5) Whole body contact recreation (swimming, water skiing, skin diving), (6) Drinking water supply, (7) Industrial process and cooling water; (8) Commercial fishing, (9) Limited water contact recreation (canoeing, boating)

LAKE USES (CSR, 1981): All classified lakes and reservoirs (P1) are identified and their beneficial uses listed A list of all lakes and reservoirs (including unclassified ones) greater than 50 acres is given, showing location, size, and major use(s)

This section also gives the total number of lakes and reservoirs inventoried by the dam safety program (generally those reservoirs greater than 2 acres in area), the range in size, and the mean and median lake area

WITHDRAWALS: This section indicates whether or not there are public drinking water withdrawals from surface waters in this basin and which streams or reservoirs these withdrawals are taken from

POPULATION: 1980 population data are given as is the population change from 1970 to 1980 This section also makes projections of future population trends

WATER QUALITY DATA: Important sources of water quality information for the basin are listed Other information referenced within the basin plans but not listed here appear in a bibliography at the end of each of the eight volumes

ENDANGERED SPECIES: Any animal species which should be noted by an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) are included Either an EIS or a FONSI is required for any construction activity that uses federal funds

BASIN MAPS: There are two basin maps The first shows the classified stream network, those unclassified streams having an NPDES or Non-NPDES facility, and the unclassified headwaters of classified streams It also shows stream names, county lines, the location and sizes of all NPDES discharges and other potentially significant sources of water pollution. Solid stream lines are classified "P", dashed stream lines are classified "C", and dot-dashed stream lines are unclassified The letter-number code is explained in Table 1

The second map shows the drainage network and the location of towns, petroleum and ammonia pipelines, and active railroads. It also shows losing stream segments as heavy dotted lines (Where there is contradictory information on stream names, the names appearing on USGS 7 5- or 15-minute topographic maps are used)

OTHER MAPS: A few basins have additional maps which give more detailed information on location, size, and condition of lead-zinc and barite tailings areas.

LOW FLOW DIAGRAM: This diagram is a schematic map of the basin which shows all classified streams and all potentially significant discharges

All streams are shown as vertical lines and are drawn to scale for actual stream length Solid lines are Class P streams, dashed lines are Class C streams, and alternating dots and dashes are unclassified streams The width of the vertical lines of Class P streams are drawn to scale for volume of flow at the 7 day-Q10

Horizontal lines are not stream segments, but they mark the location of inflow of discharges or tributaries to a stream Volume of tributary inflows or discharges are also estimated flows for the 7 day-Q10, and these numbers follow the name of the tributary or the discharge on the horizontal line Numbers appearing on the vertical stream lines are calculated 7 day-Q10 values

Stream segments known or believed to be affected by discharges are indicated

Lakes and reservoirs are drawn to their approximate shape The length of the impoundment can be found by scaling the distance along the center line of the impoundment The outlines of reservoirs have two lines The inner line indicates the boundaries of the normal use pool and the outer line the flood pool.

INVENTORY TABLE: This table lists all NPDES permitted discharges in the basin, other potential waste or wastewater sources, and surface withdrawals for public drinking water supplies "S" "T" "R" refers to "Section", "Township", and "Range" If there is no direction after the range, it is assumed to be "West".

WATER QUALITY PROBLEMS, POINT SOURCE: Point source problems have been identified through physical and chemical water quality monitoring by the Department of Natural Resources and several other organizations, and by visual surveys and surveys of the benthic plant and animal communities of streams These latter surveys are conducted primarily by the Departments of Conservation and Natural Resources

WATER QUALITY PROBLEMS, NON-POINT SOURCE: Non-point source water quality problems have been quantified, where possible, by Section 208 planning activities which took place between 1978 and 1982 Soil erosion and sediment delivery studies were made by SCS and USGS Lead-zinc mining related impacts were studied by USGS, the Departments of Conservation and Natural Resources, and the University of Missouri, Rolla Inventories of lead-zinc, coal, and barite mining areas and their reclamation states were made by the Department of Natural Resources

BENEFICIAL USE ATTAINMENT: This section evaluates existing in-stream water quality and whether or not it meets the standards required for the beneficial uses identified in that basin

SUMMARY TABLE OF POINT SOURCE PROBLEMS AND MANAGEMENT NEEDS: All municipal facilities are listed as are any non-municipal NPDES permitted discharges that are, or are suspected of causing water quality problems in receiving streams. Length of affected segment, classification of affected segment (permanent flow (P), permanent pools and intermittant flow (C), and completely dry stream bed during dry periods (U)), a recent permit compliance record and recommended DNR action to alleviate the problem are all included in this table The severity of impacts were described as affected (aff) or polluted (poll) A polluted length had a partially or totally impaired use An affected length had a noticeable affect but uses were not impaired

SUMMARY TABLE OF OTHER PROBLEMS AND MANAGEMENT NEEDS: This table lists all known or suspected water quality problems arising from sources that do not hold NPDES permits Soil erosion, stream channelization, drainage from abandoned mined lands or animal confinement areas are common non-NPDES source problems The problem, the stream segment affected, cause, and the recommended DNR action to alleviate the problem are included in the table

Volume 4 contains Basins 30-46 which include all streams in the Osage and Gasconade River System

The streams of the western part of the Osage River basin rise in Kansas or extreme western Missouri and flow through a flat prairie land of row crops and pastures Although most of the area has not been glaciated, it is underlain by Pennsylvanian rock which retards downward movement of water to the groundwater Thus most rainfall runs off the surface of the land rather than soaking in. There are short periods of high stream flow during and immediately after rains, and streams have low or no flow during dry periods Groundwaters are recharged very slowly, groundwater movement is slow, and wells generally yield small amounts of water which are usually very mineralized

The streams further east are in unglaciated terrain underlain by older limestones and dolomites There is more movement of water to the subsurface, thus baseflows of streams are greater and wells usually have good yields of potable water

The Osage system contains four large reservoirs which are a major focal point for fishing, camping, boating, and swimming in the state The Gasconade River is totally unimpounded and is an excellent river for canoeing and float fishing for smallmouth bass. The four large reservoirs have reduced stream habitat in the basin but have replaced it with lake habitat Thus the potential fishery has been increased but the presence and operation of the reservoirs, particularly Truman Reservoir, threatens to reduce this fishery

Except in western Missouri where soil erosion causes instream turbidity and some loss of aquatic habitat, nonpoint pollution sources are not significant factors in aquatic habitat degradation

TABLE 31-1—LAKE OF THE OZARKS

NPDES Inventory

FACILITY	Location S T R	Receiving Stream	County	Facility Type or Waste Char.	Design P.E.	Flow (MGD)	NPDES Permit No.
Municipal Discharges							
W1 Camdenton Lgn #1 CP White	NW SE 35,38,17	Racetrack Hollow	Camden	2-c lagoon	1,765	176	0048569
W2 Camdenton Lgn #2 Cedar Str	NW SE 25,38,17	Trib to Lake of the Ozarks	Camden	2-c lagoon	742	074	0048585
W3 Camdenton Lgn #3 Factory Rd	SW SW 24,38,17	Trib to Jarvis Hollow	Camden	1-c lagoon	265	027	0048577
W4 Camdenton Lgn #5 Clint Ave/Wilkerson Ave	Ctr E W 24,38,17	Possum Hollow Ck	Camden	2-c lagoon	716	071	0048607
W5 Camdenton Lgn. #6 Parish Subd	Ctr. N S 19,38,16	Trib. to S Fk Linn Ck	Camden	1-c lagoon	850	085	0048593
W6 Cole Camp STP	NE SE 34,43,21	Cole Camp Creek	Benton	Oxidation Ditch	2,225	222	0056626
W7 Lincoln Lgn (E)	NE NW 26,42,22	Trib to Cole Camp Creek	Benton	1-c lagoon	870	087	0044199
W8 Linn Creek STP	SE SW 8,38,16	Linn Creek	Camden	1-c lagoon	45	004	0054712
W9 Warsaw STP	NE SE 16,40,22	Lake of the Ozarks	Benton	3-c lagoon	2,200	220	0049239
Non-Municipal Discharges							
W17 Skyline Motel	NW 6,39,15	Lake of the Ozarks	Camden	1-c lagoon	35	001	0083470
W18 Shoreline Motel	SW 19,40,15	Lake of the Ozarks	Miller	Septic tank/s f	35	001	0083488
W19 Alhonna Resort	SE NE 25,40,17	Lake of the Ozarks	Camden	septic tank/s.f	35	002	0083399
W20 Gold Nugget Junction	NE 28,39,16	Trib to Lake Ozarks	Camden	1-c lagoon	32	002	0083313
W21 Camdenton Med Center	SW 14,38,17	Possum Hollow	Camden	1-c lagoon (Hg, Ba, Ag limits)	73	005	0083305
W22							
W23 Point Breeze Resort	NE 11,39,16	Lake of the Ozarks	Camden	septic tank/s f	57	003	0083267
W24 Osage Beach Elem School	S 6,39,15	Trib to Lake of the Ozarks	Camden	septic tank/s f	165	002	0082988
W25							
W26 Lodge of the Four Seasons	SW SW 27,40,16	Lake of the Ozarks	Camden	activ sludge	3,268	376	0082171
W27 Tan-Tar-A Resort	SE SE 7,39,16	Lake of the Ozarks	Camden	Rotating Bio-Media	1,700	170	0081937
W28 Tan-Tar-A Estates	SW SE 7,39,16	Lake of the Ozarks	Camden	extended aeration	500	050	0081965
W29 Lake Osage Apartments	SW SW 1,39,16	Lake of the Ozarks	Camden	extended aeration	90	009	0081931
W30 Camp Sabra	NE SW 7,40,16	Lake of the Ozarks	Morgan	1-cell lagoon	50	005	0056324
				septic tank/s f	30	003	
W31 Waters Edge Condo	NW NW 34,40,16	Lake of the Ozarks	Camden	extended aeration	1,272	084	0054348
W32 Fawn Valley Commun	NE NE 5,39,18	Lake of the Ozarks	Camden	extended aeration	500	050	0054071
W33 Kirkwood Lodge	S 6,39,15	Trib to Lake of the Ozarks	Camden	septic tank/s f	60	006	0044768
W34 Hawk Nest Lodge	NW SE 11,39,16	Lake of the Ozarks	Camden	extended aeration	436	044	0101168
W35 Headwaters Motel	SW 22,40,22	Trib to Lake of the Ozarks	Benton	1-c lagoon	36	003	0043982
W36 Harbor Houses Condo	SE NE 33,41,17	Soap Ck	Morgan	1-c lagoon	74	007	0034151
W37 Mariner's Cove Subd	SW 11,39,16	Lake of the Ozarks	Camden	extended aeration	321	032	0034004
W38 Ft Leonard Wood Rec Area (S)	NW NW 32,39,15	Lake of the Ozarks	Camden	2-c lagoon	50	002	0029777
W39 Ft Leonard Wood Rec Area (N)	NE NE 30,39,15	Lake of the Ozarks	Camden	3-c lagoon	161	011	0029769
W40 Windjammer Condo	NE NE 21,40,16	Lake of the Ozarks	Camden	extended aeration	130	013	0100471
W41 Town and Country Motel	SE SE 10,39,16	Trib to Lake of the Ozarks	Camden	extended aeration	113	004	0100889
W42 Osage Beach Skelly	SW SE 16,39,16	Lake of the Ozarks	Camden	extended aeration	13	002	0101443
W43 Fifty-eight Facets Spa Resort	SW SE 19,40,16	Lake of the Ozarks	Camden	extended aeration	183	019	0099988
W44 Eagle Point Condo	28,40,16	Lake of the Ozarks	Camden	extended aeration	30	003	0099805

TABLE 31-2—SUMMARY OF POINT SOURCE IMPACTS AND MANAGEMENT NEEDS

Waste Trt. Mgnt. Area	Type Sewerage Facility	Receiving Water Impacts					Freq. Non-Com-pliance	Management Needs/ Priority	Expected Beneficial Use Improvement	Future DNR Monitoring Needs	Recommended Action
		Estimated		Observed							
		Impact	Miles	Impact	Miles	Severity					
Camdenton	2-c lagoon #1 (C P White)			No impact 82				Eliminate, regional facility/Low	Public health benefit	Low-flow survey after upgrade	Refer to Grants Admin Sect.
	2-c lagoon #2 (Cedar St)			No impact 82				Eliminate, regional facility/Low	Public health benefit	Low-flow survey after upgrade	Refer to Grants Admin. Sect.
	1-c lagoon #3 (Factory Rd.)			No impact 82				Eliminate, regional facility		Effluent analyses for toxic metals and organics	Refer to Grants Admin. Sect.
	1-c lagoon #4 (Wilkerson Ave)			No impact 82				Eliminate regional facility/Low	Public health benefit	Low-flow survery after upgrade	Refer to Grants Admin Sect
	1-c lagoon #5 (Clint Ave.)			No impact 82				Eliminate, regional facility/Low	Public health benefit	Low-flow survey after upgrade	Refer to Grants Admin. Sect.
	1-c lagoon #6 (Parish Subd.)			No impact 82				Eliminate, regional facility/Low	Public health benefit	Low-flow survey after upgrade	Refer to Grants Admin. Sect.
Cole Camp	Oxidation ditch			Reduced benthos, discoloration 83	2.0 C	Aff		Proper O&M/Low	Minor aesihetic improvement, improved aq habitat	Low-flow survey 84	Continued observation by R.O.
Lincoln (E) (1-c lagoon in Basin 34)	1-c lagoon			Aesthetic problems 82, 83	0-1 0 U 0 5-1 0 U	Poll Aff	X/12	Eliminate and replace with 3-c lagoon/Low	Minor aesthetic improvement	Low-flow survey after upgrade	Refer to Compliance and Grants Admin. Sects.
Linn Ck	1-c lagoon			Unknown due to gravel dredging operation			X/12	Upgrade or replace/Low	None	Low-flow survey after upgrade	Refer to Compliance Sect.
Warsaw	3-c lagoon			Green water, reduced benthos 83	0 1 P	Aff				Low-flow survery after upgrade	Continued observation by R O

Former Hulett Lagoon Site
Combined PA/SI
Reference 11

JOHN ASHCROFT
Governor

FREDERICK A. BRUNNER
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks and
Historic Preservation

DIVISION OF ENVIRONMENTAL QUALITY
Jefferson City Regional Office
1001A Southwest Boulevard
P.O. Box 176
Jefferson City, MO 65102
314-751-2729

June 20, 1986

1.720 Camdenton

Ms. Trudy Marco
Grants Coordinator
City Hall
P.O. Box 399
Camdenton, MO 65020

Dear Ms. Marco:

Enclosed is the report and checklist from the audit of your approved Pretreatment Program implementation, as conducted by Leora M. Reising of my staff. If you have any questions concerning this report please call Leora M. Reising or Jerry Croy at (314) 751-2729.

Sincerely,

JEFFERSON CITY REGIONAL OFFICE

B.R. Kesler
Regional Administrator

BRK/LR/ko

Enclosure

cc: Water Pollution Control Program, Attn: Rich Kuntz

Pretreatment Compliance Audit
City of Camdenton
NPDES Permit Numbers
C.P. White - MO-0048569
Dump - MO-0048585
Hulett - MO-0048577
Wilkerson-Clint - MO-0048607
Parish - MO-0048593

June 20, 1986

On April 15, 1986 an audit was conducted of the Industrial Pretreatment Program as implemented by the City of Camdenton, Ms. Trudy Marco and Mr. D. Roger Elder represented the city and Ms. Leora M. Reising represented the Missouri Department of Natural Resources.

The City of Camdenton received approval to implement the Industrial Pretreatment Program on September 26, 1983 by the Missouri Department of Natural Resources. The City of Camdenton operates five lagoons. However, only one lagoon is of interest to the Industrial Pretreatment Program, that is the Hulett (a.k.a. Factory) lagoon.

FINDINGS:

The City of Camdenton has jurisdiction over their entire collection and treatment system. They operate five lagoons, only one receives an industrial waste. The Hulett lagoon receives the waste from Sunstrand Tubular Products, Inc.

Sunstrand Tubular Products, Inc. is a manufacturer of aluminum and copper components and heat transfer coils for air conditioners, used in homes, automobiles, and various industries. The manufacturing process consists of aluminum and copper cutting and brazing, aluminum etching, and a small amount of chromium electroplating They have installed a pretreatment system to remove heavy metal components from their wastewater primarily from the aluminum etching process. The system was finished prior to the pretreatment audit but the reagent tanks were still being filled so it was not in operation.

The City of Camdenton has not developed their sampling, inspection, and permitting procedures. They need to address a variety of topics in their pretreatment program. An increase in personnel familiar with pretreatment and/or sampling and tracking procedures would be helpful. Parts of the program could be contracted to consultants.

The city personnel involved have been very conscientious but they are working with a handicap of not enough time and resources.

RECOMMENDATIONS:

1. Establish, document, and implement formal sampling procedures.

2. Pursue enforcement actions as specified by the federal pretreatment regulations.

3. Establish local limits with regards to production rates, method of waste treatment, method of sludge disposal, and NPDES discharge limits.

4. Have adequate personnel available or on contract for sampling, analyzing, monitoring, tracking, and enforcing the pretreatment program.

5. Up-date city ordinances and policies with any changes in the federal pretreatment program.

6. Submit all changes of your sewer use ordinance and pretreatment program to the Department of Natural Resources for approval.

Should you have any questions please call the Jefferson City Regional Office at (314) 751-2729.

Submitted By:

Leora M. Reising
Environmental Specialist

Approved By:

B.R. Kesler
Regional Administrator

LR/ko

Enclosure

INSPECTED BY Leona M. Reising DATE OF AUDIT 9/16/86

POTW PRETREATMENT PROGRAM AUDIT

1. General Information
   (A) NAME OF PERMITTEE: CITY OF CAMDENTON (B) NPDES # MO-0049577
   (C) MAILING ADDRESS: CITY HALL
   P.O. BOX 399
   CAMDENTON MO 65020
   HULETT (AKA. FACTORY)
   (D) POTW ADDRESS: NONE
   (E) POTW REPRESENTATIVE: D. ROGER ELDER
   (F) TITLE: CITY ADMINISTRATOR
   (G) TELEPHONE NO: (314) 346-3600
   (H) PRETREATMENT PROGRAM APPROVAL DATE: 9/26/83
   PREVIOUS PRETREATMENT AUDIT: ___/___/___ NONE

2. POTW Information
   (A) DESIGN DRY WEATHER FLOW 26,500 GD ~~(mgd)~~
   (B) AVERAGE ANNUAL FLOW _____ (mgd)
   (C) PERCENT INDUSTRIAL FLOW UNKNOWN %
   (D) SEWER SYSTEM: SEPARATE X COMBINED ____
   (E) LEVEL OF TREATMENT: Primary..... ___ TYPE:
   Secondary..... X LAGOON
   Advanced Secondary..... ___
   Tertiary..... ___
   (F) METHOD OF SLUDGE DISPOSAL: NOT APPL.

3. Summary of Program Evaluation

	(S)	(U)	(R)	N/A
(A) Legal Authority	X			
(B) Local Limits			X	
(C) Inspection and Monitoring Procedures			X	
(D) Control Mechanism and Enforcement			X	
(E) POTW Records and Public Participation			X	
(F) Program Resources			X	

(S) - Satisfactory (U) - Unsatisfactory

(R) - Revisions to Program Needed

LEGAL AUTHORITY

1. POTW Jurisdiction	Yes	No	N/A
(A) Are all industrial contributions within the POTW's jurisdiction.....	X		
(B) Is this jurisdictional situation as documented in the approved pretreatment program.....	X		
If not, have legal agreements/contacts been entered into with new jurisdictions.....			X
(C) Are exiting pretreatment agreements with contributing jurisdictions proving to be effective for regulating IUs in those jurisdictions.....			X

COMMENTS:

2. Sewer Use Ordinance (SUO)

(A) Is the current SUO identical to that in the approved pretreatment program.....	X		
If not, were revisions approved by the State			

If not, did unapproved changes occur to sections on:

- o General Prohibitions..... ___
- o Specific Prohibitions..... ___
- o Local Limits..... ___
- o Categorical Standards..... ___
- o Control Mechanisms..... ___
- o Inspection, Surveillance & Monitoring..... ___
- o Compliance & Enforcement..... ___
- o Confidentiality Requirements..... ___
- o Special Agreements/Waivers..... ___

COMMENTS:
A new SUO is being prepared.

3. Summary Evaluation of Legal Authority	(S)	(U)	(R)
COMMENTS:	X		

LOCAL LIMITS

1. Status

	Yes	No
(A) Does the POTW have local limits	X	
If yes, are local limits technically based		X
(B) Do local limits exist for:		
BOD	X	
TSS	X	
Ammonia		
Cadmium		
Chromium (T)	X	
Chromium (VI)	X	
Copper	X	
Cyanide		
Mercury		
Nickel		
Silver		
Zinc	X	
Phenols		
Chlorinated Hydrocarbons (T)	X	
Other		
If yes specify oil & grease		
(C) Are removal credits employed		X
(D) If there is more than one POTW treatment plant, are the local limits established specifically for each plant		X

only for Hazlett

COMMENTS:

2. Categorical Industries

(A) Number of industries affected by Categorical Standards	1	
(B) Number of industries using the combined waste stream formula	0	
(C) Number of industries with production based limits	0	
(D) Are there categorical industries in the system for which the categorical standard is more stringent than the locally established limits		X
If yes: Is the more stringent limit in the control mechanism		

COMMENTS:

3. Effectiveness of Local Limits

(A) Is POTW consistently meeting NPDES limits.... ___ X

(B) Has the POTW been free from industrial inhibition/upsets..... ___ X

(C) Are water quality standards being met..... unknown

(D) Has the POTW been free of sludge contamination problems..... ___ X

(E) Has toxicant sampling of POTW influent, effluent and sludge been conducted during the last year..... ___ X

(F) Does the POTW conduct biomonitoring analyses of the effluent..... unknown

COMMENTS:

4. Summary Evaluations of Local Limits

(S)	(U)	(R)
___	X	___

COMMENTS:

Sunstrand installed its pretreatment equipment and had it operating this spring (April & May)

INSPECTION AND MONITORING PROCEDURES

1. General

(A) How many facilities were inspected in the last year..... 1 100%

(B) How many facilities were sampled in the last year..... 0 0 %

(C) What percentage of inspections were announced..... 0 %

(D) What percentage of sampling visits were announced..... N/A %

COMMENTS:

2. Procedures

	Yes	No
(A) Are formal sampling and inspection procedures established.....		X
(B) Are inspectors provided with safety equipment	X	
(C) Are samples split with industry personnel....	N/A	
(D) Are all samples properly preserved.....	N/A	
(E) Are chain-of-custody procedures employed.....	N/A	
(F) Do all analyses conform to EPA methodologies.	N/A	
(G) Is there a QA/QC program for sample analyses.	N/A	

COMMENTS: The city has not taken samples at Sunstrand.

3. Summary Inspection and Monitoring Evaluation

	(S)	(U)	(R)
COMMENTS:			X

CONTROL MECHANISM AND ENFORCEMENT

Indicate the type(s) of control mechanism employed:

Permit System..... ____
Contracts..... ____
Sewer Use Ordinance..... X
Other..... ____ Specify: _____

1. Control Mechanism

	Yes	No	N/A
(A) Is the control mechanism as described in the approved program.....	X		
(B) Are all significant industrial users regulated through the control mechanism.....			X
(C) Are permits/contracts:			
o For a limited duration.....			X
o Non-transferrable.....			X
o Revocable.....			X
o Able to be modified.....			X
(D) Do permits/contracts:			
o Contain local limits.....			X
o Contain categorical standards.....			X
o Contain compliance schedules.....			X

COMMENTS:

2. Noncompliance and Enforcement

(A) How many categorical industrial users (CIUs) were found to be out of compliance with local or categorical discharge limits (whichever is more stringent) during the past year.....	1		
How many of these CIUs regained compliance during the same period of time.....	0		
(B) How many significant industrial users (SIUs) were found to be out of compliance with local discharge limits during the past year.....			N/A
How many of these SIUs regained compliance during the same period of time.....			N/A

(C) List enforcement actions taken to bring violators into compliance.

Administrative	Yes	No	How many times
o Verbal warning	X		
o Written warning	X		
o Notice of violation letter		X	
o Compliance schedule		X	
o Revoke permit		X	
o Termination of service		X	
o Other (specify) _____		X	

Legal			
o Consent decree		X	
o Civil penalties		X	
o Criminal penalties		X	
o Injunctive relief		X	
o Other (specify) _____		X	

(D) How many IUs are currently operating under a compliance shcedule to correct discharge violations..... 1

(E) What percentage of all IUs regulated under the POTW pretreatment program are in compliance with pretreatment standards at the present time 0

COMMENTS:

3. Summary Control Mechanism & Enforcement Evaluation (S) (U) (R)

COMMENTS: ___ ___ X

POTW RECORDS AND PUBLIC PARTICIPATION

1. Industrial Waste Survey (IWS)

	Yes	No
(A) Is the IWS periodically updated.....		X
(B) Have all new industrial discharges been adequately characterized.....	X	
(C) Have any industries been removed from the list of significant dischargers.....		X

COMMENTS:

2. Report Review & Analysis

(A) Are inspection and sampling records well organized and readily retrievable.....	X	
(B) Are sampling results checked against discharge standards.....	N/A	
(C) Are appropriate actions taken in response to problem monitoring reports.....	N/A	
(D) Are all records maintained for 3 years.....	X	

COMMENTS: no sampling has been done

3. Industrial Reporting

(A) Has the POTW required self-monitoring reports from industrial users in accordance with categorical standards.....	X	
(B) Has the POTW required submission of baseline monitoring reports.....	X	
(C) Are self-monitoring reports and BMR verified by field inspections.....	X	

COMMENTS:

4. Public Participation

	Yes	No	N/A
(A) Did the POTW publish an annual notice of violators in local newspapers.....		X	
(B) Are all program records available to the public..	X		
(C) Has public comment been solicited during revisions to the SUO and or local limits.....	X		

COMMENTS:

5. Summary POTW Records and Public Participation Evaluation

	(S)	(U)	(R)
COMMENTS:			X

PROGRAM RESOURCES

1. Manpower

	Yes	No
(A) Are adequate personnel provided in the following areas:		
o Sampling		X
o Sample analyses	N/A	
o Inspection		X
o Administration	X	
o Legal	X	
o Technical Review		
(B) Do available personnel have appropriate training		X
(C) Is a commercial lab used		

If yes, for what analyses: _____

COMMENTS:

2. Equipment

(A) Is adequate sampling equipment available		
(B) Is adequate safety equipment available		
(C) Are an adequate number of vehicles available		
(D) Is the analytical lab adequately equipped		

COMMENTS:

3. Funding

(A) Is the program adequately funded		
(B) Is funding expected to continue at an adequate level		

COMMENTS:

4. Summary Evaluation of Resources

(S)	(U)	(R)
		X

COMMENTS:

Former Hulett Lagoon Site
Combined PA/SI
Reference 12

SUNDSTRAND

Victoria M. Haines
Environmental, Health & Safety Counsel

Direct Dial: 815-226-6136
Law Dept. Fax: 815-226-3202
e-mail: ccglath@snds.com

February 5, 1999

RECEIVED
FEB 8 1999
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Valerie Wilder
Environmental Specialist
Hazardous Waste Program
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

RE: Missouri Department of Natural Resources' December 18, 1998 Letter Preliminary Assessment/Site Inspection - Former Hulett Lagoon

Dear Ms. Wilder:

This letter and attachments are voluntarily submitted on behalf of Sundstrand Corporation ("Sundstrand") in response to the Missouri Department of Natural Resources' ("MDNR") December 18, 1998 letter to Sundstrand requesting written responses to specific questions set forth in the letter. It is Sundstrand's understanding that this is not a "notification and request for information" pursuant to 104(e) of the Comprehensive, Environmental Response, Compensation & Liability Act of 1980, as amended, ("CERCLA"), given the MDNR does not have the authority to issue such a request. Rather this request is made as part of MDNR's Preliminary Assessment /Site Inspection under CERCLA at the former Hulett Lagoon, a closed lagoon which was part of the City of Camdenton's publicly owned wastewater treatment facility ("POTW") permitted under the Clean Water Act. Nevertheless, Sundstrand is voluntarily providing responses and documents to this request as well as identifying appropriate references to the Modine Manufacturing Company ("Modine") and MDNR files.

By cooperating with the MDNR, Sundstrand does not waive any rights or defenses that it may have to this or subsequent requests or actions. The responses to any of the questions in the attachment should not be construed as an admission of any liability on the part of Sundstrand. Further, none of the material or responses supplied

4949 Harrison Avenue, Post Office Box 7003, Rockford, Illinois 61125-7003
Telephone 815.226.6000 • Fax 815.226.2699

herein should be construed as an admission of wrong-doing or evidence of any violation of federal, state, or local statutes or ordinances.

In summary, Sundstrand's understanding is that the former Sundstrand Tubular Products facility ("Facility"), located in Camdenton, Missouri, and operated from 1972 to 1990, did discharge wastewater into the City of Camdenton's sewer system as authorized by the Missouri Clean Water Act and pursuant to a pretreatment permit. Sundstrand is currently unaware of any waste containing TCE which was disposed of by Sundstrand at or near the Hulett Lagoon other than through the sewer system. It is our understanding that Modine, the current owner of the Facility is undergoing RCRA closure and is testing and remediating the soils and groundwater pursuant to RCRA regulations. Historical documents regarding the use and disposal of hazardous substances were left at the site when the Facility was sold to Modine. Any spills or other releases at the Facility may be documented in Modine's records.

Attached is the information requested in the letter and the documents which support the responses. Although a number of the questions were unclear in certain areas, Sundstrand has provided the information it interpreted the questions to be requesting, instead of objecting to the questions. This was done to facilitate MDNR's inspection time frame. If the MDNR believes that the question was not interpreted properly, Sundstrand will try to be responsive once notified of the discrepancy.

Finally, when Sundstrand sold Sundstrand Tubular Products, Inc. to Modine, a viable corporation continued to exist and operate out of the facility. It therefore seems more efficient, productive and appropriate for the MDNR to seek further information or any remedial actions from the current owner/operator of the Facility, Modine, rather that Sundstrand.

If you have any questions concerning this response, please do not hesitate to call me at 815-226-6136.

Very truly yours,

SUNDSTRAND CORPORATION

Victoria M. Haines

Victoria M. Haines

VMH:cmm

652186.1

Sundstrand Corporation's Response to the MDNR's December 18, 1998 Letter
Former Hulett Lagoon, Camdenton, Missouri
Combined Preliminary Assessment/Site Inspection

1. State when Sundstrand Corporation or Sundstrand Tubular Products acquired any interest in or ownership in the site located at 179 Sunset Drive, Camdenton, Missouri, or portion thereof. Provide copies of all documents evidencing or relating to such ownership or interest, including, but not limited to purchase agreements, deeds, or leases, etc.

In 1972 Sundstrand Corporation incorporated Dawson Metal Products, Inc. ("Products"), a Delaware Corporation, as a wholly owned subsidiary of Sundstrand Corporation ("Sundstrand"). On June 29, 1972, Products acquired the business and assets of Dawson Metal Products, Inc. ("Dawson"), a Kansas Corporation. In connection with the acquisition Products, the Delaware corporation, by way of assignment, acquired a leasehold interest in the Sunset Drive property. See Attachment 1. After the acquisition was complete, Dawson, the Kansas corporation, continued in existence.

Sundstrand believes the Sunset Drive property was held by Dawson, the Kansas corporation, pursuant to a lease dated November 28, 1966 between Dawson and the Camdenton Industrial Development Corporation. See Attachment 2. The lease had a term of ten years (which is believed to have commenced July 1, 1967) with an option to Dawson to purchase.

Products, the Delaware corporation, changed its name to Sundstrand Tubular Products, Inc. ("Sundstrand Tubular") on May 25, 1977.

By agreement dated August 24, 1990 Sundstrand agreed to sell the business and assets of Sundstrand Tubular to Modine Manufacturing Company ("Modine"). This transaction was closed on October 18, 1990 and the Sunset Drive property of Products was transferred to Modine by deed dated around October 18, 1990.

On November 27, 1990, Products changed its name to Sundstrand Camdenton, Inc. and on March 15, 1994 Sundstrand Camdenton, Inc. was liquidated.

2. State how long Sundstrand Corporation or Sundstrand Tubular Products held interest or ownership in the site at 179 Sunset Drive, Camdenton, Missouri. State the current status of the Sundstrand Tubular Products Corporation. Provide copies of all documents evidencing or relating to the sale, dissolution, or termination of Sundstrand Tubular Products.

See Response #1.

3. Identify the physical characteristics of the facility during Sundstrand's operations. Provide a facility map showing the location of surface and subsurface features. Include the following in your description:

a. Surface structures (e.g., buildings, tanks, etc.);

b. Underground tanks, pits, and/or vats;

c. Subsurface pipelines, utility lines, sewage and drainage systems; and

d. All construction, alterations, renovations, and/or demolition of the items in 4.a. through 4.c. above.

The Sundstrand Tubular facility ("Facility") was a metal-sided manufacturing facility of approximately 100,000 sq. ft. It was originally constructed by Dawson in 1968 with additions in 1971, 1973, 1977 and 1983. There were no underground storage tanks located at the Facility. The Facility had four small concrete mud pits used to settle solids along the west exterior wall. See Attachment 3. See also MDNR's RCRA files.

4. Describe all processes performed at the facility.

Sundstrand Tubular manufactured heat transfer components for commercial and automotive industries at the Facility. The manufacturing process flowed as follows:

a. Copper and aluminum tubing were fed from rolls to benders to form U shapes and then cut off;

b. Parts were then immersed in alkaline cleaning lines to remove oil and chips;

c. Parts were degreased to remove any remaining oil;

d. Clean parts were assembled and small U shaped copper tubing and aluminum tubing ends were brazed to assembled cores using manual and automatic brazing systems;

e. The assembled heat transfer components were degreased and/or alkaline cleaned and then tightness tested using refrigerant; and

f. Finally, the components were then painted if required by the customer and packaged for shipment. See Attachment 4.

5. Did Sundstrand ever transport to the facility or use, purchase, generate, store, treat, dispose or otherwise handle any hazardous materials at the facility? If the answer to this question is anything but an unqualified a "no," identify:

a. The chemical composition, characteristics, physical state (e.g., solid, liquid) of each hazardous materials transported, used, purchased, generated, stored, treated, disposed or otherwise handled;

b. For each such hazardous material used, state how, when, where and in what quantities the hazardous material was purchased, used, generated, stored, treated, transported, disposed or otherwise handled;

c. Any analyses conducted of the hazardous material so transported, used, purchased, generated, stored, treated, disposed, or otherwise handled, and provide copies of such analyses.

Sundstrand is interpreting the term facility used in this question to mean the manufacturing facility and not the Hulett Lagoon. Purchase and consumption records of materials were maintained solely by Sundstrand Tubular during its operation of the business at the time of Sundstrand Tubular's sale to Modine. Sundstrand believes that Sundstrand Tubular submitted a SARA Tier 2 submittal to the USEPA and State of Missouri in 1989. If the documents still exist, they would be on site and maintained by Modine. (Sundstrand did not take possession of these documents at the time of Sundstrand Tubular's sale to Modine.) See also the MDNR's RCRA files.

6. Did Sundstrand arrange for transportation, disposal or treatment of waste materials, including hazardous substances to the facility? If the answer to this question is anything but an unqualified "no," identify:

a. The persons with whom you made such arrangements;

b. The type of arrangements made;

c. Every date on which such arrangements or shipments took place;

d. The total quantity of waste materials or hazardous substances transported to the site;

e. The amount paid or collected in connection with each transaction, the method of payment, and the identity of the person from whom payment was given or received;

f. The names and addresses of any persons who transported waste materials or

hazardous substances to the site;

g. All documents containing information responsive to subparts a. through f. of this question.

No. Sundstrand Tubular was not a commercial transport, storage and disposal facility and did not bring hazardous wastes onto the Facility for any purpose.

7. Identify to the best of your ability whether any leaks, spills, releases or threats of releases of any kind into the environment of any hazardous materials have or may have occurred at the Sundstrand facility. If yes, please provide the following:

a. When such releases occurred,

b. How the releases occurred,

c. What hazardous substances were released,

d. What amount of each such hazardous substance was so released,

e. Where such releases occurred,

f. Any and all activities undertaken in response to each such release; and

Sundstrand is aware of two potential releases at the Facility. Pursuant to former Dawson employees, a fire broke out at the Facility in the 1960's. In fighting the fire, a washdown occurred in an area where trichloroethylene ("TCE") was utilized. A second alleged release of 4500 gallons of TCE was anonymously reported to the MDNR August 9, 1990. Sundstrand has investigated both situations and concluded that neither release had occurred. Subsequent investigations by Modine in November 1991 and by MDNR in March 1993 also could not confirm that the releases had occurred. See Attachment 5. See also MDNR's RCRA files.

8. State whether, at the time Sundstrand acquired the facility, there was any reason to know or suspect that any hazardous substances were disposed or spilled on, in or at the site.

No.

9. Please submit information on all persons and how they may be contacted (include current work and home addresses and phone numbers) with information relating to any of the above questions.

Mark Chiado, Sundstrand Corporation, Manager, Environmental Planning & Auditing, 815-226-6351

Victoria Haines, Sundstrand Corporation, Environmental, Health & Safety Counsel, 815-226-6136

William R. Coole, Sundstrand Corporation, Associate General Counsel, 815-226-6303

Tom Misiak, The Falk Corporation, President, 414-937-4777

Robert Miller, Sundstrand Corporation, Director, Environmental, Health & Safety, 815-226-2755

William Johnson, Sundstrand Corporation, Risk Manager, 815-226-7820

10. Please indicate whether any of the following individuals are currently employed with Sundstrand Corporation or any subsidiary thereof (include current position/title, work and home addresses and phone numbers):

William R. Coole*
Paul Donovan*
James W. Ethington
Kenelm Groff
Lloyd E. Larson
LeMoyne G. Loseke
Charles E. Martin
Frank G. Malewitz
Thomas F. Otto
Philip W. Polgreen
Ted L. Ross
Richard M. Schilling
Neil D. Traubenberg*
Berger G. ("Bud") Wallin
Donald M. Wills

individuals still employed.

statements therein contained are true.

Genevieve Moroske
Notary Public

My Commission expires: May 31, 1974

Former Hulett Lagoon Site
Combined PA/SI
Reference 13

State of Delaware

Office of Secretary of State.

I, Walton H. Simpson, *Secretary of State of the State of Delaware,*

do hereby certify that the Certificate of Incorporation of the "DAWSON METAL PRODUCTS, INC.", was received and filed in this office the twelfth day of June, A.D. 1972, at 10 o'clock A.M.;

And I do hereby further certify that the aforesaid Corporation is duly incorporated under the laws of the State of Delaware and is in good standing and has a legal corporate existence so far as the records of this office show and is duly authorized to transact business.

In Testimony Whereof, *I have hereunto set my hand* and official seal at Dover this thirteenth day of June in the year of our Lord one thousand nine hundred and seventy-two.

Walton H Simpson
Secretary of State

R N Caldwell
Ass't Secretary of State

Former Hulett Lagoon Site
Combined PA/SI
Reference 14

No. F-157085

STATE

JAMES C. KIRKPATRICK, Secretary of State

CORPORATION DIVISION

Certificate of Authority

WHEREAS, DAWSON METAL PRODUCTS, INC.

(using in Missouri the name DAWSON METAL PRODUCTS, INC.)

incorporated under the Laws of the State of DELAWARE for a term

of perpetual years and now in existence and in good standing in said State has filed in the office of the Secretary of State, duly authenticated evidence of its incorporation, as provided by law, and has, in all respects, complied with the requirements of General and Business Corporation Law governing Foreign Corporations;

NOW, THEREFORE, I, JAMES C. KIRKPATRICK, Secretary of State of the State of Missouri, by virtue of the authority vested in me, do hereby certify that said corporation is from the date hereof duly authorized to carry on the business of

Sale and distribution of air conditioning equipment and related parts.

in the State of Missouri,

and is entitled to all rights and privileges granted to Foreign Corporations under The General and Business Corporation Law; that the entire amount of its stated capital and surplus is

$654,558.00 and $1,000.00 of the amount of stated capital of said corporation is

represented by 1,000 shares of common @ $1.00

that the proportion of stated capital and surplus represented in Missouri is $ 647,716.00

and that its registered office in Missouri is located at 314 North Broadway, St. Louis

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the GREAT SEAL of the State of Missouri, at the City of Jefferson, this 25th day of September, 19 72.

James C. Kirkpatrick
Secretary of State

RECEIVED OF: DAWSON METAL PRODUCTS, INC.

Seven hundred sixty-eight and no/00---------- Dollars, $ 768.00

For Credit of General Revenue Fund, on Account of Incorporation Tax and Fee.

No. F-157085

Dorothymae Miller
Deputy Collector of Revenue

CORP #14

State of Missouri · · · Office c

Former Hulett Lagoon Site
Combined PA/SI
Reference 15

APPLICATION FOR AN AMENDED CE
FOR A FOREIGN COR

(To be submitted in duplicate by an attorney)

HONORABLE JAMES C. KIRKPATRICK
SECRETARY OF STATE
STATE OF MISSOURI
JEFFERSON CITY, MO. 65102

SUNDSTRAND TUBULAR PRODUCTS, INC., formerly Dawson Metal / Products, Inc., a corporation, pursuant to the provisions of "The General and Business Corporation Law of Missouri" relating to amended certificate of authority of Foreign Corporation, does hereby state,

(1) Its name is Sundstrand Tubular Products, Inc.;

it was incorporated in the State of Delaware; and it was qualified in the State of Missouri on September 25, 1972.

(2) The name it will use in Missouri is Sundstrand Tubular Products, Inc.

(3) The address of its principal office in the state or country of organization is Sunset Drive, Camdenton, Missouri 65020
(Include street and number, if any.)

(4) The address of its registered agent in Missouri is 314 North Broadway, St. Louis, Missouri 63102.
(Include street and number, if any.)

and the name of registered agent in Missouri at such address is C T Corporation System

(5) The corporation is qualified under the following states and countries other than Missouri:

NONE

FILED
AND AMENDED CERTIFICATE OF
AUTHORITY ISSUED
AUG 29 1977
James C. Kirkpatrick
Corporation Dept. SECRETARY OF STATE

(6) By appropriate corporate action on May 25, 1977, the corporation:

1. Changed its corporate name to Sundstrand Tubular Products, Inc.

2. ~~Changed its period of duration to~~

(MO. - 276 - 11/20/68)

[redacted] (restate purposes if changed)

(8) There is attached hereto a Certificate of the Secretary of State of the State of Delaware relating to the amendment(s), set forth in item 6 above and showing that the Corporation is in existence and in good standing in said State.

IN WITNESS WHEREOF, the undersigned corporation has caused this application to be executed in its name by its President ~~or Vice President~~ attested by its Secretary ~~or Assistant Secretary~~, this 15th day of July, 19 77.

SUNDSTRAND TUBULAR PRODUCTS, INC.
(Exact Corporate Name)

(CORPORATE SEAL)

By LeMoyne G. Loseke
President ~~ASSISTANT~~
LeMoyne G. Loseke

ATTEST:

Richard M. Schilling
Secretary ~~ASSISTANT~~
Richard M. Schilling

STATE OF ILLINOIS
COUNTY OF WINNEBAGO } ss

I, Suzanne L. Lowe, a notary public, do hereby certify that on this 15th day of July, 19 77, personally appeared before me LeMoyne G. Loseke, who, being by me first duly sworn, declared that he is the President of Sundstrand Tubular Products, Inc., that he signed the foregoing document as President of the corporation, and that the statements therein contained are true.

PLACE NOTARY SEAL HERE

Suzanne L. Lowe
Notary Public

My Commission expires: September 29, 1980

FILED
AND AMENDED CERTIFICATE OF AUTHORITY ISSUED
AUG 29 1977
James Fairpatrick
Corporation Dept. SECRETARY OF STATE

Former Hulett Lagoon Site
Combined PA/SI
Reference 17

No. F00157085

STATE OF MISSOURI

ROY D. BLUNT, Secretary of State

CORPORATION DIVISION

Certificate of Withdrawal

WHEREAS, an Application for Withdrawal of

SUNDSTRAND TUBULAR PRODUCTS, INC.

a DELAWARE corporation, has been received, found to conform to law, and filed;

NOW, THEREFORE, I, ROY D. BLUNT, Secretary of State of the State of Missouri, issue this Certificate of Withdrawal, certifying that the afornamed corporation is withdrawn from this state.

IN TESTIMONY WHEREOF, I hereunto set my hand and affix the GREAT SEAL of the State of Missouri. Done at the City of Jefferson, this 18th day of APRIL, 19 91.

Roy D. Blunt
Secretary of State

Corp #27 (1-85)

Former Hulett Lagoon Site
Combined PA/SI
Reference 18

ENVIRONMENTAL SITE ASSESSMENT

MODINE HEAT TRANSFER, INC.
POST OFFICE BOX 636 SUNSET DRIVE
CAMDENTON, MISSOURI

PREPARED FOR:

MODINE MANUFACTURING COMPANY
1500 DEKOVEN AVENUE
RACINE, WISCONSIN

RECEIVED
DEC 23 1991
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

PREPARED BY:

LAW ENVIRONMENTAL, INC.
911 WASHINGTON AVENUE, SUITE 160
ST. LOUIS, MISSOURI

LAW ENVIRONMENTAL PROJECT NO. 53-1543

NOVEMBER 1991

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TABLES

Table 1 Summary of Field Organic Vapor Analyses of Soil Samples
Table 2 Summary of Soil Laboratory Analyses

FIGURES

Figure 1 Site Location Map
Figure 2 Generalized Site Plan Showing Manufacturing Plant Premises
Figure 3 Area #1 Detail Map with Hand Auger Boring Locations and Analytical Results of Soil Samples
Figure 4 Area #2 Detail Map with Soil Boring Locations and Analytical Results of Soil Samples

APPENDICES

Appendix A Soil Boring Logs
Appendix B Laboratory Data Sheets

1.0 BACKGROUND INFORMATION

The project site is a manufacturing plant located in Camdenton, Missouri (Figure 1). The plant formerly operated as the Sundstrand Tubular Product, Inc. facility, a subsidiary of the Sundstrand Corporation, prior to the October 19, 1990 acquisition by Modine Heat Transfer, Inc., a subsidiary of the Modine Manufacturing Company. The plant is currently operating as the Modine Heat Transfer, Inc. facility producing heat transfer products, and is a RCRA generator. It is our understanding that the facility has submitted a Part B operating permit application and is currently operating under interim status.

The plant has used 1,1,1-trichloroethane (TCA) for degreasing operations since December, 1990. The plant generated trichloroethylene (TCE) waste during degreasing operations from the early 1970's to December 1990. According to information obtained from Modine Manufacturing Company, the TCE waste was containerized in 55 gallon drums and stored outside the plant in two separate locations from the early 1970's to 1983. One area of storage was located along the south outer wall of the plant where the drums were placed on a concrete pad (Area 1). The Missouri Department of Natural Resources suggested to Modine that an alleged 4,500 gallon release of spent solvent occurred at the plant. It is our understanding that a building addition was erected over the spill area in 1983. Another storage area was located along the outer west wall of the plant building (Area 2). Information pertaining to the exact location and leak history of this storage area is not readily available to Law Environmental at this time. Figure 2 is a generalized site plan showing locations of Areas 1 and 2.

2.0 PURPOSE

The purpose of this project was to assess site soil in Areas 1 and 2 for the presence of TCE. The tasks performed include drilling soil borings for the purpose of collecting soil samples for laboratory analyses and preparation of this summary report.

3.0 WORK COMPLETED

Five soil borings were drilled in an area where Don Mans of Modine believed the leakage of the TCE from the fifteen 55-gallon drums occurred (Area 1). Three of these borings (HA-1, HA-2, and HA-3) were drilled from the plant floor surface and two of these borings (HA-4 and HA-5) were drilled from the floor of the degreasing machine pit. The floor of the degreasing machine pit is approximately 5.5 feet below the plant floor surface. See Figure 2 for location of Area 1 and Figure 3 for a detail map of Area 1 showing boring locations. The concrete floor of the plant was cored by the use of an electric core drill. Borings were drilled and soil samples collected by the use of a hand auger. Soil samples were collected at two foot intervals to a depth at which the hand auger refused to advance.

Former Hulett Lagoon Site
Combined PA/SI
Reference 19

1.200 Camdenton
MO-0048577; MO-0048593
MO-0048569; MO-0048585
MO-0048607

September 13, 1978

Honorable Ken Mensendiek, Mayor
City of Camdenton
112 Court Circle
Camdenton, Missouri 65020

recorded
5 outfalls

Dear Mayor Mensendiek:

An inspection was conducted of the operation and condition of the wastewater treatment facilities serving the City of Camdenton, Missouri on September 7, 1978. The following unsatisfactory features were observed and recommendations are hereby made for their correction.

UNSATISFACTORY FEATURES:

1. The Hulett Lagoon (#3) is short circuiting the industrial waste.

2. The industrial waste entering the Hulett lagoon appears to kill off the south end of lagoon reducing the facility's effective size.

3. The Clint Lagoon needs its own NPDES permit.

COMMENTS:

The sewage lagoons serving Camdenton seemed for the most part to be well maintained. The Hulett Lagoon, however has a large problem with its industrial influent. The sewage from Sunstrand enters the lagoon at the south end, which is the same end that the discharge pipe is on. The detention time for the industrial waste could not be more than a few hours, far too short a period to treat the waste.

To correct the short circuiting problem, the location of the influent pipe from Sunstrand should be moved to the north end of the lagoon, or the sewage line could be tied in to the other influent line already at the north end.

The strength of the industrial sewage entering Hulett Lagoon is apparently too great for the facility to handle. The City should enforce its sewer use ordinance, if it has one, to prevent misuse of the sewers and sewage treatment facilities.

Our records show no response by the City toward obtaining a permit for the discharge from the Clint Lagoon. It currently is listed in the NPDES Permit #MO-0048607 as the first cell of a two cell lagoon. It has, however, its own discharge point and therefore needs its own permit. Either the effluent pipe in Clint Lagoon shall be capped or a permit shall be applied for from this department. The appropriate forms are enclosed.

RECOMMENDATIONS:

1. Correct the short circuiting in Hulett Lagoon.

2. Enforce or create sewer use ordinances.

3. Apply for discharge permits for Clint and Wilkerson Lagoons.

Sincerely,

Todd Crawford
Environmental Engineer

TC/bc

Enclosures

CC: Jeff Hancock, City Administrator

78-82

Former Hulett Lagoon Site
Combined PA/SI
Reference 20

ENGINEERING GEOLOGIC REPORT ON COLLAPSE POTENTIAL OF CA

CAMDEN COUNTY, MISSOURI

LOCATION: White Lagoons, SW¼, SW¼, NE¼, Sec. 35, T. 38 N., R. 17 W., Macks Creek Quad.
Hulett Lagoon, SW¼, SW¼, SW¼, Sec. 24, T. 38 N., R. 17 W., Macks Creek Quad.
Clint Lagoons, NE¼, NE¼, SW¼, Sec. 24, T. 38 N., R. 17 W., Camdenton Quad.
Parish Lagoon, SE¼, SW¼, NE¼, Sec. 19, T. 38 N., R. 16 W., Camdenton Quad.
Dump Lagoons, NW¼, SW¼, SE¼, Sec. 25, T. 38 N., R. 17 W., Stoutland Quad.

RESULTS:

Investigation of lagoons for the City of Camdenton occurred on September 12, 1978 by Gary St. Ivany and John W. Whitfield. The Camdenton area is underlain by the Gasconade dolomite formation. Layers of chert (one exposed bed was 12 feet thick) and Gunter sandstone were present in the stream beds. Streams were intermittent, with isolated pools and discharge effluent composing most of the flow. Possibilities exist for localized groundwater pollution effecting shallow and poorly cased wells to some extent. Streams in the area drain into Lake of the Ozarks.

The Camdenton lagoons should not be considered in danger of failure by catastrophic collapse, but localized groundwater pollution is possible. For these reasons, the lagoons are designated as Category 2.

Problems exist at the Hulett lagoon site which appear to be design related and not geologic. Effluent was observed bubbling up approximately 40 feet from the discharge pipe. This area appeared to be solid effluent to within 6 inches of the surface. An open channel existed directly from the inlet pipe to the discharge pipe, thus, causing a short circuit. On closer examination, the thick effluent was not solid but floating. It was possible to extend a rod through the effluent to the bottom of the lagoon. Discharge from the lagoon was dark green in color with a thick white foam floating on the surface. If a short circuit does exist in the Hulett lagoon, corrective measures are needed. A possible solution is the location of the inlet pipe at the opposite end of the lagoon to where the discharge pipe is stationed.

This situation may be a result of effluent from the metal fabricating plant that discharges into this lagoon.

John W. Whitfield

John W. Whitfield, Geologist
Applied Engineering & Urban Geology
Geology & Land Survey
September 14, 1978

Gary St. Ivany

Gary St. Ivany, Lab Technician
Applied Engineering & Urban Geology
Geology & Land Survey
September 14, 1978

Up · Og
Low · Ogg

orig: Jim Odendahl

1.100 condition

called to Jo July 24. Said made & resul in early August

Former Hulett Lagoon Site
Combined PA/SI
Reference 21

June 21, 1984

JUN 25 1984

COPY

Mr. Frank Dolan, P.E.
Environmental Engineer
Mo. Department of Natural Resources
P.O. Box 1368
Jefferson City, Missouri 65102

RE: Test results from Camdenton

Dear Mr. Dolan:

Attached is a copy of the test results for Camdenton's Factory Lagoon. The City will be performing another series of tests but, because of the expense we would appreciate your input concerning the actual items requiring retesting. The City will meet with you now or after the second test results are available. Please contact me or Mr. Buc Riley concerning the tests needed and if we need to schedule a meeting at this time.

If you ahve any questions please feel free to contact me or Mr. Riley.

Sincerely,

James C. Jackson, P.E.

JCJ:sw
enc.
cc: Mr. Curtis Ogg
City of Camdenton

MMTL
Analytical Services

Columbia, MO 65201
314/874-8080

114 East Elm, Suite 3
O'Fallon, MO 63366
314/281-2858

Client: Camdenton, City of
PO Box 399
Camdenton MO 65020

Date Reported: 06/15/84
Date Sampled: 05/22/84
Date Received: 05/23/84

Attention: Bud Riley

MMTL Report No: 17509

Customer P. O. Number: 20502

MMTL Account No: 10238

REPORT OF ANALYSIS

Sample No.	Units	Results
SAMPLE #1		
Residue, Total Suspended	MG/L	2
Total Chromium	MG/L	< .02
Chromium, Hexavalent	MG/L	< .02
Total Copper	MG/L	< .02
Total Zinc	MG/L	.04
SAMPLE #2		
Residue, Total Suspended	MG/L	37
Total Chromium	MG/L	.28
Chromium, Hexavalent	MG/L	< .02
Total Copper	MG/L	2.3
Total Zinc	MG/L	.12
Halomethanes		*
Toluene	UG/L	< 10
Trichloroethylene	UG/L	28
Grease & Oil, gravimetric	MG/L	41
SAMPLE #3		
Residue, Total Suspended	MG/L	6
Total Copper	MG/L	.11
Total Zinc	MG/L	.20
Grease & Oil, gravimetric	MG/L	< 5
SAMPLE #5		
Total Chromium	MG/L	18
Total Copper	MG/L	1400
Total Zinc	MG/L	100
Per Cent Dry Solids	%	3.0

Mean fade

effluent from Lagoon

effluent from Hauser

from Lagoon

Comments:
*See attached table.

Approved by: [signature]

Sample #2

Name	Sample Concentration ug/L
Bis(2-chloroisopropyl) ether	<1
Bis(2-chloroethyl) ether	10
Bis(2-chloroethoxy) methane	<1
4-Chlorophenyl phenyl ether	10
4-Bromophenyl phenyl ether	<5

MMTL
Analytical Services

314/874 8080

114 East Elm Suite 3
O'Fallon, MO 63366
314/281-2658

Client: Sunstrand Tubular Products, Inc.
PO Box 636, Sunset Drive
Camdenton MO 65020

Date Reported: 06/15/
Date Sampled: 05/22/84
Date Received: 05/23/84

Attention: Don Mans

MMTL Report No: 17510

Customer P. O. Number: 1518

MMTL Account No: 10109

REPORT OF ANALYSIS

Sample No.	Units	Results
SAMPLE #4		
Residue, Total Suspended	MG/L	16
Total Chromium	MG/L	< .02
Chromium, Hexavalent	MG/L	< .02
Total Copper	MG/L	.51
Total Zinc	MG/L	.30
Haloethers		*
Toluene	UG/L	15
Trichloroethylene	UG/L	41
Grease & Oil, gravimetric	MG/L	18

for Sunstrand

Comments:

*See attached table

Approved by: [signature]

Sample #4

Name	Sample Concentration ug/L
Bis(2-chloroisopropyl) ether	<1
Bis(2-chloroethyl) ether	140
Bis(2-chloroethoxy) methane	<1
4-Chlorophenyl phenyl ether	5
4-Bromophenyl phenyl ether	<5

Report Number 17693-1

Name	Sample Concentration ug/L
Bis(2-chloroispropyl) ether	1500
Bis(2-chloroethyl) ether	190
Bis(2-chloroethoxy) methane	34
4-Chlorophenyl phenyl ether	<5
4-Bromophenyl phenyl ether	<5

Report Number 17692-1 samples from lagoon AUG 22 1984

Name	Sample Concentration ug/L
Bis(2-chloroispropyl) ether	29
Bis(2-chloroethyl) ether	250
Bis(2-chloroethoxy) methane	320
4-Chlorophenyl phenyl ether	<5
4-Bromophenyl phenyl ether	<5

Former Hulett Lagoon Site
Combined PA/SI
Reference 22

City of Camdenton
112 Court Circle P.O. Box 3
Camdenton, Mo. 65020
314 346 3600

August 20, 1984

Mr. Frank Dolan
Department of Natural Resources
P.O. Box 1368
Jefferson City, Missouri 65102

Dear Mr. Dolan:

This is to confirm our meeting for Monday, August 27, 1984 at 10:00 AM, at City Hall on the pre-treatment program.

Enclosed you will find the second sample results.

Sincerely,

Warren W. Riley, Jr.
City Administrator

WWR/kb

cc: Mayor Kelsey
Mr. Jim Jackson, Jackson Engineering
Mr. Tom Misiak, Sundstrand Tublar Products
Mr. Curtis Ogg, Jefferson City Regional Office

MMTL
Analytical Services

Columbia, MO 65201
314/874-8080

114 East Elm, Suite 3
O'Fallon, MO 63366
314/281-2858

AUG 22 1984

Client: Camdenton, City of
PO Box 399
Camdenton MO 65020

Date Reported: 08/14/84
Date Sampled: 07/19/84
Date Received: 07/20/84

Attention: Bud Riley

MMTL Report No: 17692

Customer P. O. Number:

MMTL Account No: 10238

REPORT OF ANALYSIS

Sample No.	Units	Results
#2		
Residue, Total Suspended	MG/L	95
Total Chromium	MG/L	.5
Chromium, Hexavalent	MG/L	.20
Total Copper	MG/L	4.1
Total Zinc	MG/L	.23
Haloethers		*
Toluene	UG/L	< 10
[illegible]	UG/L	500
Grease & Oil, gravimetric	MG/L	[illegible]

Comments: *See Attached Table

Approved by: [signature]

Page No. 1

Report Number 17692-1 sample from lagoon AUG 22 1984

Name	Sample Concentration ug/L
Bis(2-chloroispropyl) ether	29
Bis(2-chloroethyl) ether	250
Bis(2-chloroethoxy) methane	320
4-Chlorophenyl phenyl ether	<5
4-Bromophenyl phenyl ether	<5

MMTL
Analytical Services

Columbia, MO 65203
314/874-8080

114 East Elm, Suite 3
O'Fallon, MO 63366
314/281-2658

To: Jim Jackson
Sunstrand effluent

Client: Sunstrand Tubular Products, Inc.
PO Box 636, Sunset Drive
Camdenton MO 65020

Date Reported: 08/14/84
Date Sampled: 07/19/84
Date Received: 07/20/84

Attention: Don Mans

MMTL Report No: [illegible]

Customer P. O. Number:

MMTL Account No: [illegible]

REPORT OF ANALYSIS

Sample No.	Units	Results
#4		
Residue, Total Suspended	MG/L	320
Total Chromium	MG/L	7.6
Chromium, Hexavalent	MG/L	< .02
Total Copper	MG/L	29
Total Zinc	MG/L	1.4
Halomethers		*
Toluene	UG/L	< 1000
Trichloroethylene	UG/L	4900
Grease & Oil, gravimetric	MG/L	1400

Comments: *See Attached Table

Approved by: [signature]

1.100 - Camdenton
PT

Former Hulett Lagoon Site
Combined PA/SI
Reference 23

City of Camdenton

112 Court Circle P.O. Box 399
Camdenton, Mo. 65020
314 - 346 - 3600

May 27, 1986

Ms. Leora M. Reising
Environmental Specialist
Department of Natural Resources
Jefferson City Regional Office
1001A Southwest Boulevard
P.O. Box 176
Jefferson City, Missouri 65102

Dear Ms. Reising:

As you are aware, the City of Camdenton has one (1) industry and it is the only industry involved in pretreatment.

With joint efforts between Sundstrand and the City of Camdenton, a CDBG Grant was obtained from the state to construct the retreatment plant for Sundstrand.

The plant has been completed and has been on the line since April 14, 1986. With the exception of some minor start-up problems, the plant appears to be functioning properly. Sundstrand will furnish the City data as it pertains to their testing which will be forwarded to you and your department.

If you have any questions, please feel free to contact me or Trudy Marco.

Sincerely,

Donald Roger Elder
City Administrator

DRE/bc

cc: Mayor Kelsey
Trudy Marco, Grant Coordinator

IDG-011 - Camdenton

Permit Number 2263

Former Hulett Lagoon Site
Combined PA/SI
Reference 24

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESO
MISSOURI CLEAN WATER COMMISSION

1,110 Camdenton

CONSTRUCTION PERMIT

The Missouri Department of Natural Resources hereby issues a permit to: City of Camdenton
112 Court Circle
P.O. Box 399
Camdenton, MO 65020

for the construction of (describe facilities):

SEE ATTACHED SHEET

Permit Conditions:

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 204, RSMo, and regulations promulgated thereunder, or this permit may be revoked by the Department of Natural Resources.

As the Department of Natural Resources does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the Department may inspect the work covered by this permit periodically during construction. Issuance of an operating permit by the Department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of wastewater treatment facilities; it does not apply to other environmentally regulated areas.

September 23, 1986
Effective Date

Frederick A. Brunner, Ph.D.
Director, Department of Natural Resources

March 23, 1988
Termination Date

Director of Staff, Clean Water Commission

Filing Fee Paid

WQP 3.34

CONSTRUCTION PERMIT

SEWERS AND FORCE MAINS: 4,625 lineal feet of 8 inch diameter sewer pipe and 2,367 lineal feet of 6 inch diameter force main as shown on the approved plans.

LIFT STATIONS: A packaged dry well lift station with two pairs of pumps. Each pair of pumps will be capable of discharging at a rate of 175 gpm at a total dynamic head of 185 feet.

These facilities are designed to eliminate the existing factory lagoon, NPDES #MO-0048577, and transport the wastes from the new Sunstrand Expansion to the C.P. White sewage collection system.

Discharge is to be into the C.P. White Lagoon, NPDES # MO-0048569.

Former Hulett Lagoon Site
Combined PA/SI
Reference 25

MISSOURI DEPARTMENT OF NATURAL RESOUI
DIVISION OF ENVIRONMENTAL QUALITY
LABORATORY SERVICES PROGRAM

DEC 15 1987

Pretreatment Monitoring Report
Sundstrand Tubular Products, Inc.
Camden County, Missouri
April 30, 1987

INTRODUCTION

At the request of the Water Pollution Control Program a pretreatment monitoring survey was conducted of the industrial wastewater discharge of the Sundstrand Tubular Products factory in Camden County, Missouri. Sampling was conducted from 1500 through 1530 on April 30, 1987 by Lon O'Bannon, III of the Laboratory Services Program, Division of Environmental Quality.

METHODS

A grab sample (87-1111) was collected of the effluent from the treatment system discharge weir.

All analyses were performed by the Division's Laboratory in Jefferson City. All analyses were conducted in accordance with methods outlined in the Missouri Clean Water Commission Effluent Regulation (10 CSR 20-7.015).

OBSERVATIONS

The sample was light yellow-green and nearly clear.

RESULTS

See the attached analytical results.

Submitted by Lon O'Bannon, III

Lon O'Bannon, III
Water Quality Specialist
Field Services Section
Laboratory Services Program

Date December 7, 1987

Approved by James H. Long

James H. Long
Director
Laboratory Services Program

cc: Richard Kuntz, Permits Section, Water Pollution Control Program
Bill Kesler, Regional Administrator, Jefferson City Regional Office

LABORATORY SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No. 87-1111

Reported to: LON O'BANNON III
Affiliation: WQM

Date: 12/01/87
Project Code: 3211/3222

Sample Description:
SUNDSTRAND TUBULAR PRODUCTS, INC. - CAMDEN CO.
PRETREATMENT MONITORING.
GRAB FROM TREATMENT SYSTEM DISCHARGE WEIR TANK

Collected by: LON O'BANNON III
Affiliation: WQM

Date: 04/30/87

PARAMETERS	RESULTS
CYANIDE	<0.05 mg/L
TOTAL SILVER	<1 ug/L
TOTAL CADMIUM	<2 ug/L
TOTAL CHROMIUM	2,700 ug/L
TOTAL COPPER	890 ug/L
TOTAL HEX. CHROMIUM	180 ug/L

Page 2
Sample no. 87-1111
Date 12/01/87

PARAMETERS	RESULTS
TOTAL NICKEL	50 ug/L
TOTAL LEAD	<5 ug/L
TOTAL ZINC	110 ug/L

VOA RESULT : NO RESULT
COMMENTS: ANALYTICAL ERROR

Former Hulett Lagoon Site
Combined PA/SI
Reference 26

Missouri Engineering Corporation
ENGINEERING CONSULTANTS
P.O. BOX 13
ROLLA, MISSOURI 65401 • PHONE: 314-364-4003

April 25, 1988

APR 26 1988

Dave Friese
Department of Natural Resources
Water Pollution Control Program
P. O. Box 176
Jefferson City, MO 65102

Dear Dave:

You will find enclosed a copy of the sludge analysis report on the sludge from the abandoned Hulett Lagoon in Camdenton, Missouri. I have calculated the amount of dry sludge, based on an average of 9" thickness, at approximately 1250 cubic yards. 9375 gallons

The soil available in the berms to be mixed with the sludge if left on site would be approximately 2000 cubic yards.

I am also sending a copy of this letter to Ken Arnold. Would you both please review the data and let me know what the next step can be?

Sincerely,

MISSOURI ENGINEERING CORP.

Charles Ray

Charles Ray
CR/lc
Enc.
cc: Mayor Webster, Camdenton
Ken Arnold

Mike Phillip
Susan Ranard

ENVIRODYNE
ENGINEERS

12161 Lackland Road
St. Louis, Missouri 63146
(314) 434-6960

REPORT OF ANALYSIS

CLIENT: Valda Mahoney
Missouri Engineering
Post Office Box 13
Rolla, MO 65401

REPORT DATE: April 19, 1988
SAMPLE ANALYZED: Ten sludge samples for metals analysis.

DATE RECEIVED: March 7,1988
P.O. #:

PROJ. #: 3222-00353

Parameter	# 1	# 2	# 3	# 4	# 5	# 6	# 7
Aluminum (MG/L)	55700	67400	77000	89300	79200	47100	52000
Chromium (MG/L)	12400	24300	28900	19000	24300	12300	15600
Cadmium (MG/L)	< 26.0	< 25.4	< 35.7	< 13.3	< 26.0	< 23.2	< 27.8
Copper (MG/L)	28800	24300	15100	52400	22600	34900	18700
Lead (MG/L)*	<101	< 99.1	<139	150	< 101	146	153
Nickel (MG/L)	91.0	119	179	215	110	85.9	69.0
Zinc (MG/L)	4910	4170	4330	5760	3810	4910	3710
	9.02	9.04	5.92	15.78	8.32	9.81	7.83

Parameter	# 8	# 9	# 10
Aluminum (MG/L)	53200	55100	51200
Chromium (MG/L)	11400	6430	15900
Cadmium (MG/L)	< 9.90	< 22.8	< 18.2
Copper (MG/L)	4540	13200	30100
Lead (MG/L)	113	155	125
Nickel (MG/L)	48.5	77.4	111
Zinc (MG/L)	2920	3470	3620
	25.09	9.88	13.89

All results have been corrected for percent solids.
*All concentrations have been corrected for Aluminum interference.
See reverse side for "STANDARD CLAUSES".

ppm 1 gram put in 100 mls of water = Volume

/disk 25

APPROVED: Lisa A. Leeky

Former Hulett Lagoon Site
Combined PA/SI
Reference 27

JOHN ASHCROFT
Governor

FREDERICK A. BRUNNER
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

May 26, 1988

The Honorable Mac Webster
Mayor of Camdenton
112 Court Circle, P.O. Box 1048
Camdenton, MO 65020

Re: IDG - 011 Camdenton, MO
Lagoon Closure

Dear Mayor Webster:

This letter is to explain what options are available for the City to pursue in order to completely abandon and close the Huelett or Factory Lagoon. We have reviewed the sludge sample analysis which your engineer sent to us on April 25, 1988 and May 20, 1988. The first step before you assess each option is to determine the percent moisture and the sludge depth at each sample site and to use the information to calculate the total weight of each of the various metals.

There are several options available to the City which are briefly explained below.

Option 1

Dispose of the sludge on site, at the lagoon. This option will require the preparation of a solid waste disposal area permit application complete with plans and specifications. The Waste Management Program would then review the application to determine if it could issue the permit. A point of contact for additional information and the time requirements of this option would be Mr. Tom Gredell at 751-3176.

Option 2

Haul sludge to a permitted, sanitary landfill. This would require a Special Waste Disposal Request. The sludge must also have no "free liquid" in order to be properly handled. A copy of the special waste disposal request form is enclosed. Tom Gredell would be your contact person as in option #1.

Option 3

Surface application in accordance with the Missouri Sludge Guide, "Agricultural Use of Municipal Wastewater Sludge" (Table 4).

This would require the preparation and approval of a sludge management plan. The plan would limit the rate at which sludge could by applied. The rate would be based upon limiting the weight of metals to be applied to allow the unrestricted use of the land in the future. You should contact Ken Arnold at 751-6624 for additional information.

Option 4

Sub-surface application at the maximum one time rate. This would require either injecting the liquid sludge with chisel plows under the soil surface, or spreading the sludge, discing and then plowing the field. The rate of application would be higher than in option #3, but could not exceed the maximum cumulative site loadings per the Sludge Guide. This option would require the site to be City owned and the site would be restricted for use as a sludge disposal site in the future. Ken Arnold would be your contact person as in option #3.

Please note that what ever option is used, the lagoon must not discharge to the creek unless the City receives a new operating permit. The lagoon currently doesn't have a discharge permit. Preferably, any discharge would be to the City's sewer and be tested for compliance with the City's pretreatment ordinances before being introduced to the sewer.

We suggest you work closely with your engineer to quickly resolve the fate of the sludge disposal and lagoon abandonment. Please note the grant cannot be closed and final reimbursement made until this work is complete. If you should have any questions, please do not hesitate to call me at 751-6619.

Sincerely,

WATER POLLUTION CONTROL PROGRAM

Dave Freise

David Freise, P.E.
Project Engineer

DF/pa

cc: Jefferson City Regional Office
Missouri Engineering Corporation

Former Hulett Lagoon Site
Combined PA/SI
Reference 28

JOHN ASHCROFT
Governor

G. TRACY MEHAN III
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

November 2, 1989

The Honorable Mac Webster
Mayor of Camdenton
112 Court Circle, P.O. Box 1048
Camdenton, MO 65020

Re: IDG-011 Huelett Lagoon

Dear Mayor Webster:

I recently visited the above referenced lagoon site and the temporary sludge storage site at the city airport. During my visit, I noted a berm was not yet in place around the temporary storage to prevent solids run off. This is a condition of the approval issued February 22, 1989. The city administrator, Kent Hixson, stated the berm would be in place as soon as possible.

I would also like to remind you the approval is valid for only one year. Therefore, the sludge spreading must be completed in accordance with the plan and approval letter by February 22, 1990.

Thank you for your consideration in these matters and please thank Kent Hixson for me for the time he spent with me that day.

Sincerely,

WATER POLLUTION CONTROL PROGRAM

Dave Freise

David Freise, P.E.
Project Engineer

DF:mle

cc: Jefferson City Regional Office
City Administrator, Kent Hixson
Missouri Engineering Corporation

Former Hulett Lagoon Site
Combined PA/SI
Reference 29

SPECIFICATIONS
AND
CONTRACT DOCUMENTS
REMOVAL AND STOCKPILING OF
SLUDGE FROM THE HULETT LAGOON
CAMDENTON, MISSOURI

JERRY LYNN
E-10633

March, 1989

MISSOURI ENGINEERING CORPORATION
211 HWY. 63 SOUTH
ROLLA, MISSOURI

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Certificate of Owners's Attorney	
Agreement	A-1 - A-4
Performance Bond	PB-1 - PB-2
Payment Bond	PAB-1 - PAB-2
General Conditions	GC-1 - GC-21
Supplemental General Conditions	SGC-1 - SGC-21
Technical Specifications	1 - 4
Location Map	Appendix I
Sludge Disposal Sites	Appendix II
Access Road & Storage Facility	Appendix III
Hulett Lagoon Location	Appendix IV
Airport Location	Appendix V
Sludge Analysis Report	Appendix VI

Missouri Engineering Corporation
ENGINEERING CONSULTANTS
P O BOX 13
ROLLA, MISSOURI 65401 • PHONE 314-364-4003

April 18, 1989

REMOVAL AND STOCKPILING OF
SLUDGE FROM THE HULETT LAGOON
CAMDENTON, MISSOURI

ADDENDUM NO. 1

This project to be bid May 2, 1989, at 1:30 p.m.

Item No. 1. Bidders are hereby notified of a pre-bid conference at City Hall, Camdenton, Missouri, at 1:00 p.m., April 26, 1989.

MISSOURI ENGINEERING CORPORATION

Charles Ray

Received By:

Ronald A Melomick

5/22/89
Date

INFORMATION FOR BIDDERS

BIDS will be received by City of Camdenton, Missouri

(herein called the "OWNER"), at City Hall, Camdenton, Missouri

until 1:30 PM, May 2, , 19 89 , and then at said office

publicly opened and read aloud.

Each BID must be submitted in a sealed envelope, addressed to City Clerk, City Hall, at Camdenton, MO 65020. Each sealed envelope containing a BID must be plainly marked on the outside as BID for Removal and Stockpiling of Sludge from the Hulett Lagoonand the envelope should bear on the outside the BIDDER's name, address and license number if applicable, and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at City Hall, Camdenton, Missouri.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or type written, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required. Tied bids will not be considered by the OWNER.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 90 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

ADVERTISEMENT FOR BIDS

CITY OF CAMDENTON, MISSOURI
(Owner)

Separate sealed bids for Camdenton Sludge for Removal and Stockpiling of Sludge from the Hulett Lagoon will be received by Brenda Colter, City Clerk at the office of City Hall, Camdenton, Missouri 65020 until 1:30 o'clock (~~A~~M. - P.M., ____ S.T. X D.S.T.) May 2, 1989, and then at said office publicly opened and read aloud.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, and Forms of Bid Bond, Performance and Payment Bond, and other contract documents may be examined at the following:

City Hall, Camdenton, Missouri 65020

Missouri Engineering Corporation

211 Hwy. 63 South, Rolla, MO 65401

Copies may be obtained at the office of Missouri Engineering Corporation located at 211 Hwy. 63 South, Rolla, MO 65401 upon payment of $ 10.00 for each set. Any plan holder, upon returning such set promptly and in good condition, will be refunded $ -0-.

The owner reserves the right to waive any informalities or to reject any or all bids.

Each bidder must deposit with his bid, security in the amount, form and subject to the conditions provided in the Information for Bidders.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and and minimum wage rates to be paid under the contract, Section 3, Segregated Facility, Section 109 and E.O. 11246.

No bidder may withdraw his bid within 30 days after the actual date of the opening thereof.

_____ _____
Date

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve the contractor from fulfilling any of the conditions of the contract.

Each BID must be accompanied by a BID bond payable to the OWNER for five percent of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will return the BONDS of all except the three lowest responsible BIDDERS. When the Agreement is executed the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the payment BOND and performance BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A performance BOND and a payment BOND each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or payment BONDS and performance BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the performance BOND and payment BOND within fifteen (15) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute the Agreement, the OWNER may consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER. Upon default by the first low BIDDER the AWARD may then be made to the next lowest responsible BIDDER, or the WORK may be readvertised for a construction CONTRACT or otherwise, as the OWNER may decide.

The OWNER upon receipt of an acceptable performance BOND, payment BOND, Certificate of Insurance, and AGREEMENT signed by the party to whom the AGREEMENT was awarded, shall within a reasonable period of time sign the AGREEMENT and return to such party an executed duplicate of the AGREEMENT. The OWNER upon signing the AGREEMENT and within a reasonable period of time shall issue the NOTICE TO PROCEED.

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID

if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated therein.

A conditional or qualified BID will not be accepted.

Award will be made to the lowest responsive, responsible BIDDER, based on the total base bid for the work described in the proposal form.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the SUPPLEMENTAL GENERAL CONDITIONS.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

The A/E is Missouri Engineering Corporation. The A/E's address is 211 South Highway 63 South, Rolla, Missouri 65401.

The Bidder agrees by the submission of his bid that he will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, or sex in connection with the performance of work under this bid and/or contract.

PROPOSAL FORM

TO: City Council
Camdenton, Missouri

The UNDERSIGNED BIDDER, having examined the plans, specifications, general and special conditions and other proposed contract documents attached hereto and referred to herein, and any and all addenda thereto; the location, arrangement, and construction of existing railways, streets, roads, structures and facilities which affect or may be affected by the proposed work, the topography and condition of the site of the work, and having acquainted with and fully understanding (a) the extent and character of the work covered by this Proposal; (b) the location, arrangement and specified requirements of and for the proposed new structures and miscellaneous items or work appurtenant thereto; (c) the nature and extent of the excavations to be made and the type, character, and general condition of the materials to be excavated; (d) the necessary handling and rehandling of excavated materials; (e) all existing and local conditions relative to construction difficulties and hazards, labor, transportation, hauling, trucking, and rail delivery facilities; and (f) all other factors and conditions affecting or which may be affected by the specified work.

HEREBY PROPOSES to furnish all required materials, supplies, equipment, tools, and plant; to perform all necessary labor; and to construct, install, erect, and complete all work stipulated in, required by, and in accordance with, the proposed contract documents hereto attached and the plans and other documents referred to therein (as altered, amended, or modified by and all addenda thereto) at the prices stated below.

Bidder hereby agrees to commence work under this contract on or before date to be specified in written "Notice to Proceed" of the Owner and to fully complete the project within: 60 Consecutive Calendar Days

Removal and Stockpiling of Sludge from the Hulett Lagoon

Bidder further agrees to pay as liquidated damages the sum of $100.00 for each consecutive calendar-day thereafter as hereinafter provided in the General Conditions.

Bidder agrees to perfrom all the work as described in the specifications and as shown on the plans for the following prices.

REMOVAL AND STOCKPILING FROM THE HULETT LAGOON

Item No.	Description	Estimated Quantity	Unit Price	Extension
1.	Lagoon Dewatering by Pumping	50 Hrs.	$ 36.50	$ 1,825.00
2.	Lime added to Sludge, Complete	100 Tons	$ 14.60	$ 1,460.00
3.	Discing of Sludge	40 Hrs.	$ 43.25	$ 1,730.00
4.	Sludge Removal from Lagoon and Stockpiling, Complete	1500 Cu Yds	$ 7.73	$ 11,595.00
5.	Site Work at Stockpile Site	L.S.	$	2,920.00
		TOTAL	$	19,530.00

Listed above is the revised proposal form including unit prices and then extensions. This proposal form was revised due to excluding unit prices in the original bid; however the total remains the same. I agree to the above unit prices, extensions and total and agree to perform the work described above for these prices.

Ronald A. McCormick

Ronald A. McCormick, Owner
McCormick Gravel & Excavating

5/6/89
Date

It is mutually understood and agreed by and between the parties of this contract, in signing the agreement thereof, that time is of the essence in this contract. In the event that the Contractor shall fail in the performance of the work specified and required to be performed within the period of time stipulated therefor in the Contract Agreement binding said parties after due allowance for any extension of time which may be granted under provisions of the preceding paragraph, the Contractor shall pay unto the Owner, as stipulated liquidated damages and not as a penalty the sum stipulated therefor in the Proposal, for each and every calendar day that the Contractor shall be in default.

Liquidated damages will be waived for any period of time covered by a time extension granted by the Owner.

In the case of joint responsibility for any delay in the final completion of the work covered by this contract, where two or more separate contracts are in force at the same time and cover work on the same project and at the same site, the total amount of liquidated damages assessed against all contractors under such contracts, for any one day of delay in the final completion of the work, will not be greater than the approximate total of the damages sustained by the Owner by reason of such delay in completion of the work, and the amount assessed against any Contractor for such one day of delay will be based upon the individual responsibility of such Contractor for the aforesaid delay as determined by and in judgment of the Owner.

The Owner shall have the right to deduct said liquidated damages from any moneys in its hand, otherwise due, or to become due, to said Contractor, or to sue for and recover compensation for damages for non-performance of this contract at the time stipulated herein and provided for.

The undersigned hereby agrees to enter into contract on the attached contract forms and furnish the necessary bond and evidence that insurance of the kind and minimum limits specified is in force within ten days from the date of your acceptance of this proposal, to begin assembly of materials and equipment within ten days from receipt of executed copies of the contract and to complete said work within the indicated number of consecutive calendar days from and after the date of receipt from the Owner of a written work order.

If this proposal is accepted, and should (I) (We) for any reason fail to sign the contract within ten days, as above stipulated, the deposit which has been this day made with the Owner shall at the option of the Owner be retained by the Owner as liquidated damage for the delay and expense caused the owner but otherwise it shall be returned to the undersigned in accordance with the provisions set forth in Information for Bidders.

I have ____, have not ✓, participated in a previous contract, subject to the provisions of Section 301 of Executive Order 11246, as amended.

I have ____, have not ✓, submitted required compliance reports under such previous contracts.

DATED AT _____ this 2nd day

of May, 19 89.

SIGNATURE:

If an individual: Ronald A McCormick doing business as

McCormick Gravel & Excavating

If a Partnership: _____

By _____ Member of the Firm

If a Corporation: _____

By _____

Title _____

ATTEST: _____
Secretary

(CORPORATE SEAL)

Business Address of Bidder RR 2 Box 193 E

Versailles, Mo 65084

If Bidder is a corporation, supply the following information:

State in which incorporated _____

Name and Address of its:

President _____

_____

Secretary _____

_____

BIDDERS QUALIFICATIONS & SUBCONTRACTING

To evaluate the bidders' qualifications for acceptance on this project, the Owner requests the following:

a. Previous Experience (Projects of similar construction detail)

Location	Year	Type	Mat'l Type & Size	Approx. Bid
Lake of the Ozarks	1989	Dredging	5520 yd. mud + gravel 6" + under	$6500
Lake of the Ozarks	1989	Dredging	1500 yd mud + gravel 6" + under	$2500
Lake of the Ozarks	1989	Dredging	1500 yd mud + gravel 6" + under	$2500
Laurie, Mo	1989	construct pond	50 yd. X 100 yd. X 6 ft. dirt + rock	$5000

b. List of Equipment available for this job:

John Deere 690B Excavator
Caterpillar 955H Dozer/Loader
2 Dump Trucks (Tandem) John Deere tractor
500 gal water wagon with pump, 2" pump - Disc

c. List of subcontractors contemplated for this job:

(Name)	(Type of Work)
Carl Miller	Dump truck

This report is an integral part of the proposal.

Date 5/2, 19 89.

By Ronald G Tailormich

Title Owner.

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly
(Print)

authorized and acting legal representative of _____

_____, do hereby certify as follows:

I have examined the foregoing contract(s) of _____
(Contractor)

_____ and surety bonds and the manner of

execution thereof, and I am of the opinion that each of the aforesaid agreements have been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof. In addition, I have examined the Certificate of Insurance for amounts and coverages per the requirements of the General Conditions/Supplemental General Conditions of the contract documents and find that adequate insurance is in full force and effect.

Dick Twehl
Project Attorney

6/5/89
Date

Address:

AGREEMENT

THIS AGREEMENT, made this 6TH day of JUNE, 19 89, by and between City of Camdenton, Missouri, hereinafter called (name of Owner), (~~an individual~~)

and McCormick Gravel & Excavating doing business as (an individual), or (a~~partnership~~), or (a~~corporation~~) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements herein after mentioned:

1. The CONTRACTOR will commence and complete the construction of REMOVAL & STOCKPILING FROM THE HULETT LAGOON.

2. The CONTRACTOR will furnish all of the materials, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the PROJECT described herein.

3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within 3 calendar days after the date of the NOTICE TO PROCEED and will complete the same within 60 calendar days unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS.

4. The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of Nineteen thousand five hundred thirty and 00/100 Dollars $ 19,530.00.

5. The term "CONTRACT DOCUMENTS" Means and includes the following:

(A) Advertisement for BIDS

(B) Information for BIDDERS

(C) BID

(D) BID BOND

(E) Agreement

(F) General Conditions

(G) SUPPLEMENTAL GENERAL CONDITIONS

(H) Payment BOND

(I) Performance BOND

(J) NOTICE OF AWARD

(K) NOTICE TO PROCEED

(L) CHANGE ORDER

(M) DRAWINGS prepared by _____

numbered _____ through _____, and dated _____,

(N) SPECIFICATIONS prepared or issued by _____

Missouri Engineering Corporation _____,

dated March _____, 19 89.

(O) ADDENDA:

No. 1, dated April 18, 19 89

_____, _____, 19_____

_____, _____, 19_____

_____, _____, 19_____

_____, _____, 19_____

_____, _____, 19_____

6. The OWNER will pay to the CONTRACTOR in the manner at such times as set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in (4) copies each of which shall be deemed an original on the date first above written.

OWNER:

CITY OF CAMDENTON, MISSOURI

By Mac Webster

Name Mac Webster
(Please Type)

Title Mayor

(SEAL)

ATTEST:

Brenda Cotter

Name Brenda Cotter
(Please Type)

Title City Clerk

CONTRACTOR:

McCORMICK GRAVEL & EXCAVATING

By Ronald A. McCormick

Name Ronald A. McCormick
(Please Type)

Address R. R. 2, Box 193E

Versailles, MO 65084

Employer Identification Number:

42-1311948

(SEAL)

ATTEST:

✓ Danny L. Grupe

Name Danny L. Grupe
(Please Type)

expires 4-14-90

TECHNICAL SPECIFICATIONS

General	Page 1
Lagoon Dewatering	Page 1
Sludge Removal & Stockpiling	
A. Preparation	Page 2
B. Transportation	Page 3
C. Stockpiling	Page 3
Basis of Payment of Sludge Removal	Page 4

GENERAL

The Contractor shall provide the services, equipment and all appurtenances for the removal and stockpiling of the existing wastewater sludge located within the Hulett Lagoon. This lagoon has been eliminated as a part of the city's sewer system with construction of new sewer lines. The lagoon's primary contributor was a metal tubing company and hence, the metals content in the sludge accumulated in the lagoon is of a higher than normal concentration. Test results of samples taken of the sludge are given as an appendix to this report. The locations of the lagoon and the stockpiling area are also given in the appendices. The contractor's responsibility will be to stockpile the sludge at the site provided in accordance with the following specifications.

1. LAGOON DEWATERING: The Contractor shall pump the existing water from the lagoon and discharge it into the existing sewer manhole approximately 100 feet away, see Appendix I. The Contractor shall make all provisions as provided to prevent any solids to be discharged into the sewer system. The lagoon presently has 6" to 12" of water standing in the bottom with the sludge. The contractor shall dewater the sludge to at least a condition where the sludge will cake. The expected solids content is 12 to 15 percent. The contractor will be allowed to construct a sump pit in one of the lower parts of the lagoon. This pit must be of seal tight construction such as metal or fiberglass. This sump can be placed in an area where the sludge has been removed and down to an elevation of approximately 18" depth. The upper portion of the sump shall be provided with screens having mesh wire to prevent

solids easy access to the sump. When the sump has been placed the outer edges shall be backfilled and sealed so as to prevent leakage around the sump box. This will be done by compacting the soil backfill into the excavated areas. The contractor shall be paid for this work at an hourly rate while the pump is in operation. The pump or pumps used shall not exceed a total of 200 GPM into the sewer system. The contractor has sole responsibility for insuring that the dewatering is directly pumped into the sewer line.

2. SLUDGE REMOVAL & STOCKPILING:

A. PREPARATION

The Contractor shall remove as much of the concentrated sludge from the cell as possible without excavating into the soils of the floor. This may be accomplished with a high lift or other piece of equipment as selected by the contractor. If the sludge is not suitable for removal using these methods, after dewatering and normal evaporation, the contractor may add lime and/or disc the sludge to assist in the drying. The proposal form provides for unit costs for these items but will not be paid for unless prior approval is obtained from the city.

After the contractor has removed as much of the sludge as possible from the cell bottom, then upon approval of the Engineers, a pit may be excavated to allow for collection of the remaining sludge. This will only be allowed in an area where tests can be performed to insure proper soils conditions will prevent seepage.

B. TRANSPORTATION

The Contractor shall load the sludge into a truck capable of a liquid tight performance. A rubber seal, gasket, or sealant material between the tailgate and the bed and a bed cover shall be required to pervent leakage of sludge materials from the truck while in transit to the stockpile location. All trucks shall be inspected prior to leaving the site to insure that seepage is not occuring. The contractor is totally responsible for cleaning up any seepage or spills that occur in any area between the two sites.

The Contractor shall provide a water tank or other means, at the stockpile site, to allow the trucks to be cleaned on the exterior of the bed, should accumulation cause for spillage on the return trips.

C. STOCKPILING

The stockpiling site is located approximately 150 linear feet from the county road. The Contractor shall provide his own access to the stockpile area at the location designated. The Contractor shall provide clearing, install culverts, crushed stone, etc. as necessary for his operations.

Before stockpiling begins, the contractor shall plow 2 furrows around the site, except for the area on the higher side, needed for truck access to the area. These furrows shall be sufficient to prevent drainage from the site. The area to be encompassed is approximately 160 feet in diameter.

The sludge shall be stockpiled to a height of no more than 2 feet.

The Contractor shall level the sludge after is is dumped from the trucks as necessary so as to normally maintain this height of less than 2 feet. This could be accomplished once daily.

This access road as provided by the contractor shall remain in place after the contractor's work has been completed.

BASIS OF PAYMENT OF SLUDGE REMOVAL

The sludge was checked for the thickness of the layer at varying points in the lagoon. Two piles of up to 18" thickness are located at each of the inlet pipes. The remainder of the cell is covered with sludge ranging basically in thickness from 6" to 12". The amount of sludge to be removed has been shown on the proposal form at 1500 cubic yards. Actual quantities are believed to be less. Final payment will be based on the actual amount of sludge removed and stockpiled having at least a 12% solids content. The size and number of trucks shall be recorded showing the total trips of each. This shall be used to determine the actual quantity removed. If discrepancies are encountered in the size and number of loads, then the stockpile area shall be guided as a cross check. This will all be done with a member of the construction crew present.

SECTION 1 CALCULATIONS

I. Determination of Acreage for Sludge Disposal

A. Limitations

1. Maximum cumulative copper limit of 500 bls./acre
2. Camdenton Airport
   a. Field No. 1 25.0 acres
   b. Field No. 2 17.4 acres

B. Conversion Factors

1. 1 MG/L = 1 ppm
2. Weight of water = 62.4 lbs/cu ft
3. Weight of lagoon sludge = 1.2 x weight of water
   = (1.2) (62.4) = 74.88 lbs/cu ft

C. Information from Test Reports and References

1. Average metal analysis for ten copper samples = 24,464 MG/L

D. Calculation of Acreage Using DNR Guidelines

1. Total sludge limit of copper in dry tons/acre

a.

Metal	ppm			lbs./dry ton
Cu	24,464	x	0.002 =	48.928

b.

(1) Cumulative Metal Limits lbs./acre	(2) Sludge Metal lbs/dry ton	(3) Total Sludge Limit dry tons/acre col. 1 ÷ col. 2
500	48.928	10.219
250	48.928	5.1095

2. Weight of Dry Sludge

Quanity of Sludge = 1250 cu yd % Solid of Sludge = 20%

$$\frac{(1250 \text{ cu yd})(27 \text{ cu ft/cu yd})(0.2)(74.88 \text{ lbs/cu ft})}{2000 \text{ lbs/ton}} = 253 \text{ Dry Tons}$$

3. Field No. 1 (25.0 acres) accepts a Cumulative Metal Limit of 500 lbs/acre. Apply 164 tons to Field No. 1. The 164 tons will be dispensed on 16.1 acres.

   Field No. 2 (17.4 acres) accepts a Cumulative Metal Limit of 250 lbs/acre. Apply 89 tons to Field No. 2. The 89 tons will be dispensed on 17.4 acres.

II. Acidity Warrents Liming of the Disposal Site

A. Limitations

1. Disposal site should have a pH value of 6.0

B. Information from Test Reports

1. Field No. 1 & 2 at the Camdenton Airport has a Enm requirement of 4330 and 2195 respectively.

2. To determine the amount of limestone needed in tons/acre divide the ENM requirement by the guarantee of the limestone dealer.

C. Procedure for obtaining pH of 6.0

1. Apply lime to disposal site before applying the sludge

2. Disc lime into field before applying the sludge

3. Have soil samples taken to verify an acquired pH of 6.0.

III. Dewatering, Storage and Disposal of Sludge

A. Limitations

1. The sludge will be transported by a dump truck with the means to protect leakage or spillage of the sludge.

B. Information from Test Reports

1. On May 16, 1988 the sludge contained an average of 11.5% soild.

C. Procedure

1. Dewatering of sludge should occur by removal of liquids and Natural evaporation. Discing and Liming sludge maybe used to assist coagulation.

2. Transport sludge by dump truck to a designated storage area at the Camdenton Airport.

3. Precautions should be taken to contain the sludge while stock-piled. A berm will be necessary around the temporary storage site at the airport to contain any run-off.

4. A Dry Sludge Applicator should be used to apply th sludge onto Field No. 1 & 2.

Note:

1. The sludge must be thoroughly mixed before being land applied due to the variability of the metals concentration throughout the lagoon as shown by the sample report dated April 19, 1988.

2. Percent solids concentrations must be run daily on the sludge when it is being applied to ensure the loading rate can be calculated as the application progresses.

3. Upon completion of the work, a summary must be submitted to the Department of Natural Resources.

SECTION 2 REFERENCES

1. Agricultural Use of Municipal Wastewater Sludge - A Planning Guide
   Missouri Department of Natural Resources
   Division of Environmental Quality
   January 1985

2. Process Design Manual for Dewatering Municipal Wastewater Sludges
   U. S. Environmental Protection Agency
   Office of REsearch and Development Municipal Environmental Research Laboratory
   October 1982 EPA - 625/1-82-014

Metal Limitations

See Table 4 for maximum recommended heavy metal loadings. The metals listed in Table 4 are those which are most common in domestic sludges. For other industrial contributors See Table 4-A and contact the Department for any other parameters. Calculate which is the most limiting metal and the number of years to reach the limit at the proposed application rate. A sample worksheet is provided (Appendix B-1).

ppm metal x .002 = lbs. metal per dry ton

TABLE 4
Maximum Cumulative Amounts of Heavy Metals Recommended for Privately Owned Farmland

Metal	kg/ha (pounds/acre in parenthesis) Soil Cation Exchange Capacity (meq/100 g soil)		
	CEC 0 - 5	CEC 5 - 15	CEC 15 +
Cadmium	5 (4.5)	10 (9)	20 (18)
Chromium	560 (500)	1120 (1000)	2250 (2000)
Copper	140 (125)	280 (250)	560 (500)
Lead	560 (500)	1120 (1000)	2250 (2000)
Nickel	140 (125)	280 (250)	560 (500)
Zinc	280 (250)	560 (500)	1120 (1000)

Page 17 of DNR: Argricultural Use of Municipal Wastewater Sludge

APPENDIX B-2 SLUDGE WORKSHEET - CONSERVATIVE MANAGEMENT

Facility _____ Address _____ Date _____

STEP 1 - LAB DATA (see page 27)

A) SLUDGE ANALYSIS (Expressed on dry solids basis)

	ppm		lbs/dry ton
Total Kjeldahl Nitrogen	_____	x .002 =	0
Cadmium (Cd)	0		0
Chromium (Cr)	17,053		26.106
Copper (Cu)	24 964		48.928
Nickel (Ni)	112.58		0.225
Zinc (Zn)	4,161		8.322
Other	64,720		129 440
Other Solids	_____ ppm ÷ 10,000	=	_____ %

B) SOIL TEST ANALYSIS (See Page 13)

pH _____ Limestone needed _____ ENM

Cation Exchange Capacity (CEC) _____ me

STEP 2 - CROP AND SITE INFORMATION (See Page 23 & 24)

Previous Crop _____

Future Crop _____

Slope _____ % Buffer Areas _____ Feet from _____

Geologic Restrictions _____

Pathogen Reduction _____

Cattle Grazing _____

Other _____

Location _____ 1/4, Sec _____, Twp _____, Rge _____, County _____

STEP 3 - APPLICATION RATE

150 lbs/acre Total N ÷ _____ lbs Total N per dry ton of sludge (Step 1) = _____ * dry tons/acre/year of sludge.

* For surface application the maximum rate is 2 dry tons.

STEP 4 - METALS EVALUATION

A) SLUDGE APPLICATION RATE _____ tons/acre/year from Step 2 or Step 3 or lower selected rate.

B) METALS ADDITIONS (See Page 17 & 18)

METAL	(1) CUMULATIVE METAL LIMITS LBS/ACRE (Table 4)	(2) LBS METAL PER DRY TON SLUDGE (Step 1)	(3) TOTAL SLUDGE LIMIT DRY TONS/ACRE (Col 1 ÷ Col 2)	(4)* METALS APPLIED PER YEAR LBS/ACRE (Col 2 x Step 4A)
Cd	18	0	-	_____
Cr	2000	26.106	76.611	_____
Cu	500	48.928	10.219	_____
Ni	500	0.225	2222.222	_____
Zn	1000	8.322	120.163	_____
Other	_____	_____	_____	_____

* Column 4 should not be more than 10-15 % of Column 1.

Cu Most Limiting Metal (lowest in Column 3)

10.219 Dry Tons/Acre Total Sludge Limit (lowest Column 3)

C) SITE LIFE FOR METALS LOADING

_____ Dry Tons/Acre Total Sludge Limit (Step 4B)

- _____ Dry Tons/Acre Sludge Applied Previously

= _____ Dry Tons/Acre Sludge Remaining to Reach Metal Limit

÷ _____ Dry Tons/Acre/Year Sludge Application (Step 4A)

= _____ No. Years To Reach Metals Limits

ENVIRODYNE ENGINEERS

12161 Lackland Road
St. Louis, Missouri [illegible]
[illegible]

REPORT OF ANALYSIS

CLIENT: Valda Mahoney
Missouri Engineering
Post Office Box 13
Rolla, MO 65401

REPORT DATE: April 19, 1986
SAMPLE ANALYZED: Ten sludge samples for metals analysis.

DATE RECEIVED: March 7,1986
P.O. #:

PROJ. #: 3222-00353

Parameter	# 1	# 2	# 3	# 4	# 5	# 6	# 7
Aluminum (MG/L)	55700	67400	97000	89300	79200	47100	52000
Chromium (MG/L)	12400	24300	28900	19000	24300	12300	15600
Cadmium (MG/L)	< 26.0	< 25.4	< 35.7	< 13.3	< 26.0	< 22.2	< 27.8
Copper (MG/L)	28800	24300	15100	52400	22600	34900	18700
Lead (MG/L)	<101	< 97.1	<139	150	< 101	146	153
Nickel (MG/L)	91.0	110	179	215	110	85.9	89.0
Zinc (MG/L)	4910	4170	4330	3760	3810	4910	3710

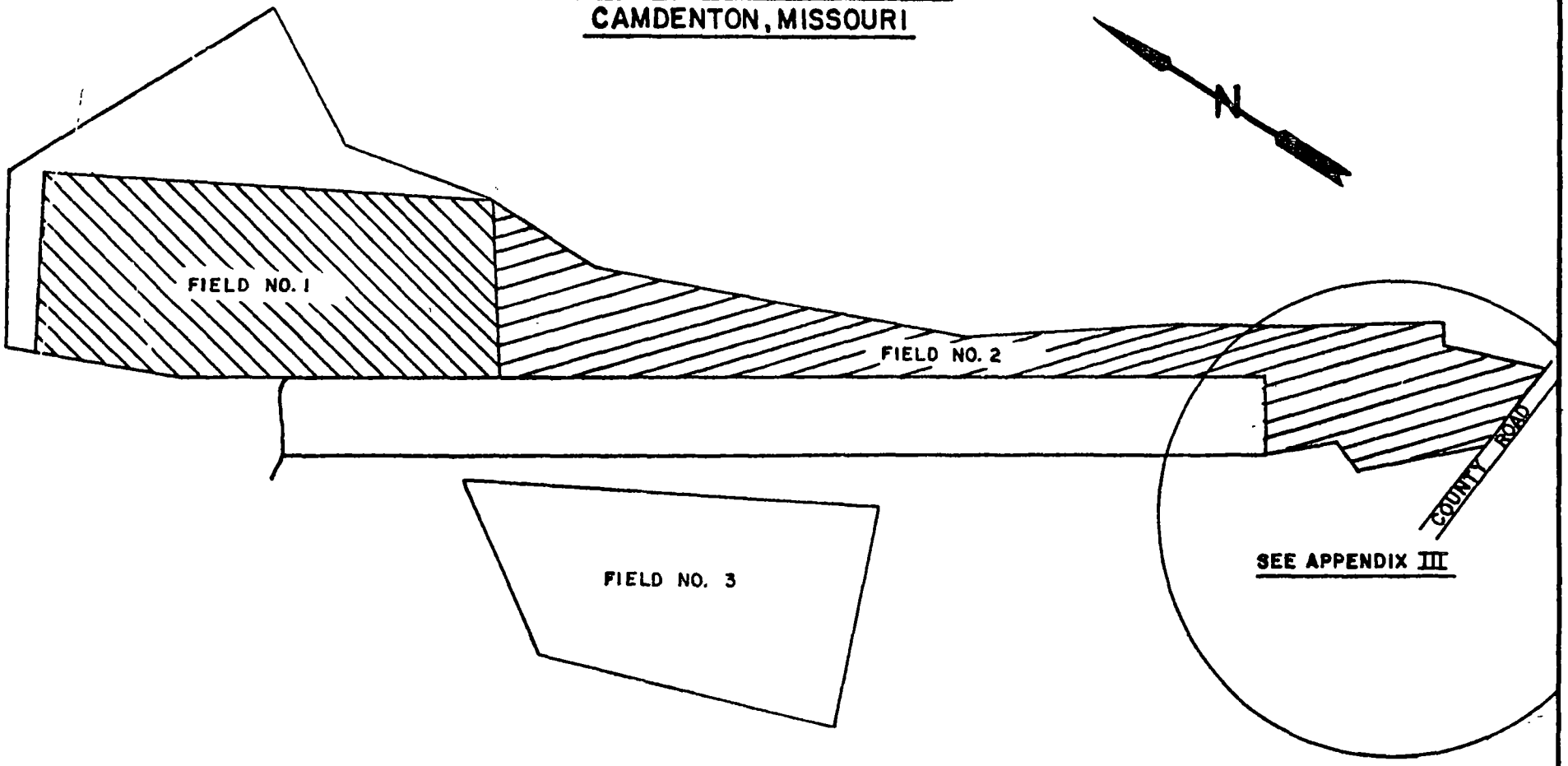
Parameter	# 8	# 9	# 10
Aluminum (MG/L)	55200	55100	51200
Chromium (MG/L)	11400	8430	15900
Cadmium (MG/L)	< 9.90	< 22.8	< 18.2
Copper (MG/L)	4340	13200	30100
Lead (MG/L)	113	155	125
Nickel (MG/L)	48.5	77.4	111
Zinc (MG/L)	2920	3470	3620

All results have been corrected for percent solids.
All concentrations have been corrected for Aluminum interference.
See reverse side for "STANDARD CLAUSES".

/dist 25

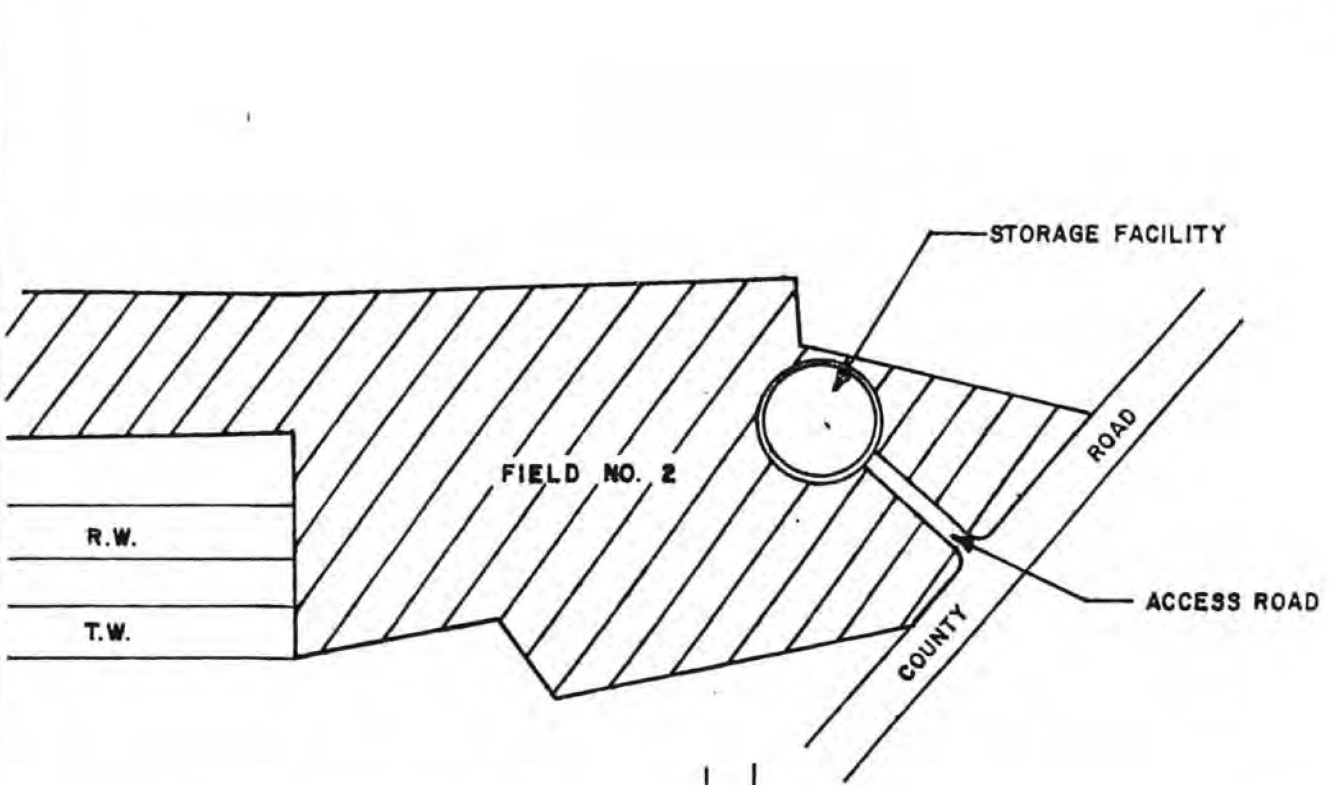
APPROVED: Lisa A. Lesley

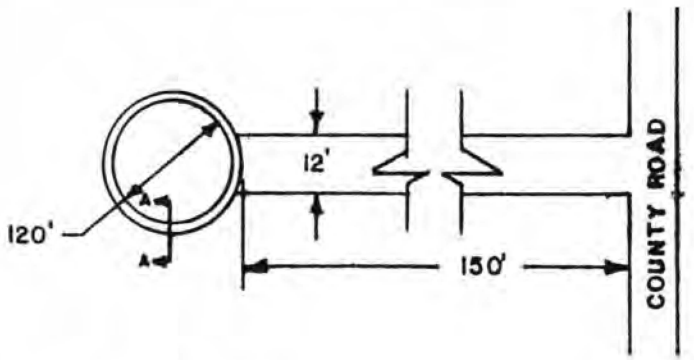
SLUDGE DISPOSAL SITES
CAMDENTON, MISSOURI

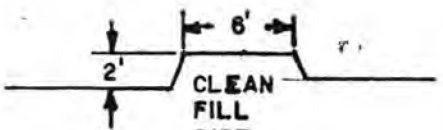


NOTE: FIELD NO.2 AND PART OF FIELD NO 1
TO BE USED FOR DISPOSAL.

MISSOURI ENGINEERING CORP CONSULTING ENGINEERS ROLLA, MISSOURI		
DRAWN BY	SCALE NONE	DRAWING NO
CK'D BY	APP'D DATE	APPENDIX II





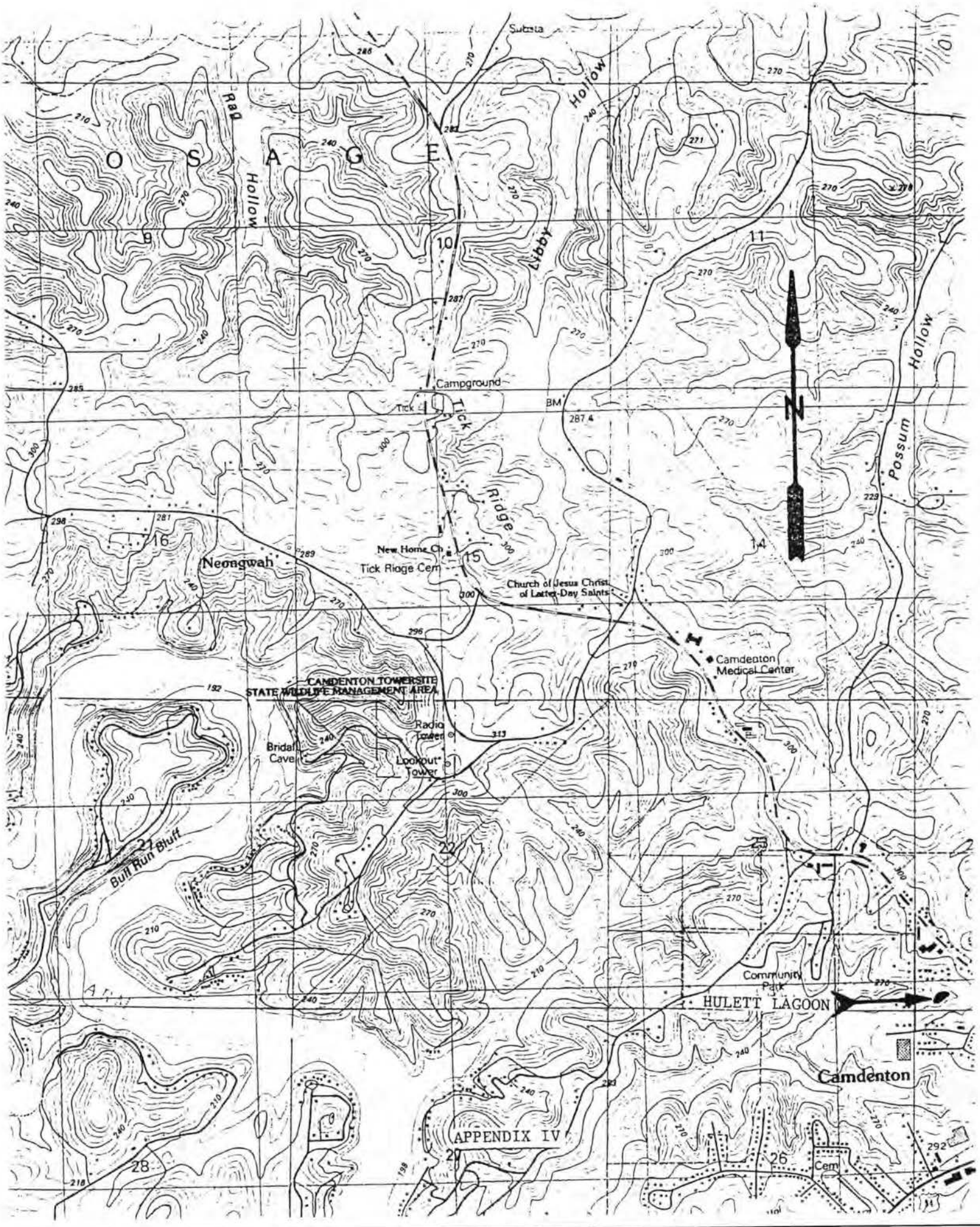


SECTION A-A

ACCESS ROAD & STORAGE FACILITY

APPENDIX III

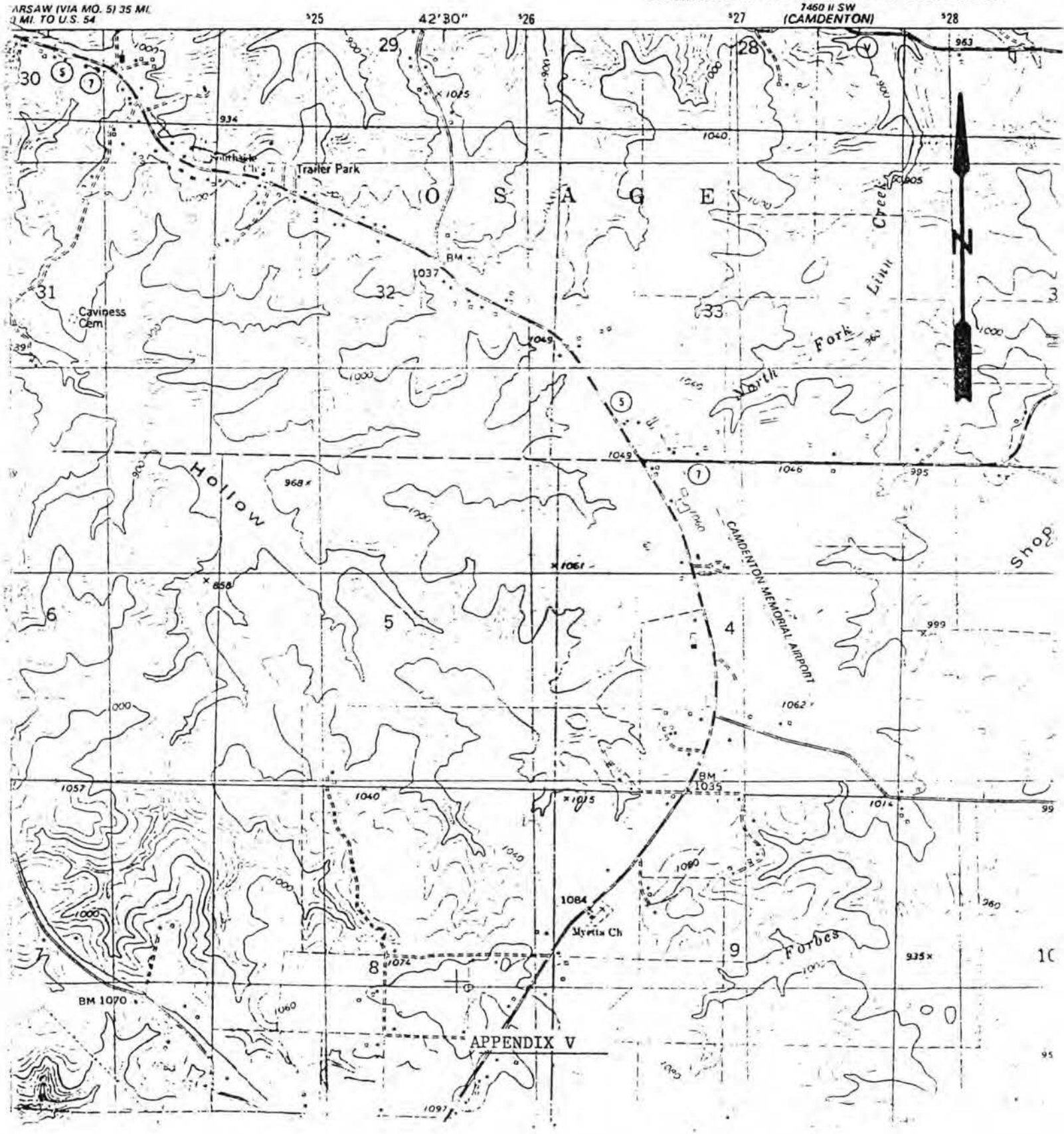
MISSOURI ENGINEERING CORP. CONSULTING ENGINEERS ROLLA, MISSOURI		
DRAWN BY	SCALE 1" = 200'	DRAWING NO.
CK'D. BY	APP'D. DATE	APPENDIX III


Substa
Rag Hollow
Hollow
O S A G E
Libby
Campground
Tick
Tick Ridge
BM
287.4
Possum Hollow
New Home Ch
Tick Ridge Cem
Neongwah
Church of Jesus Christ of Latter-Day Saints
Camdenton Medical Center
CAMDENTON TOWERSITE STATE WILDLIFE MANAGEMENT AREA
Radio Tower
Bridal Cave
Lookout Tower
Bull Run Bluff
Community Park
HULETT LAGOON
Camdenton
Cem

APPENDIX IV

OR

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
WALLACE B. HOWE, STATE GEOLOGIST



APPENDIX V

ENVIRODYNE ENGINEERS

REPORT OF ANALYSIS

CLIENT: Valda Mahoney
Missouri Engineering
Post Office Box 13
Rolla, MO 65401

REPORT DATE: April 19, 1988
SAMPLE ANALYZED: Ten sludge samples for metals analysis.

DATE RECEIVED: March 7,1988
P.O. #:

PROJ. #: 3222-00353

Parameter	# 1	# 2	# 3	# 4	# 5	# 6	# 7
Aluminum (MG/L)	55700	67400	97000	89300	79200	47100	52000
Chromium (MG/L)	12400	24300	28900	19000	24300	12300	15600
Cadmium (MG/L)	< 26.0	< 25.4	< 35.7	< 13.3	< 26.0	< 23.2	< 27.8
Copper (MG/L)	28900	24300	15100	52400	22600	34900	18700
Lead (MG/L)*	<101	< 99.1	<139	159	< 101	146	153
Nickel (MG/L)	91.0	119	179	215	110	85.9	69.0
Zinc (MG/L)	4910	4170	4330	5760	3810	4910	3710

Parameter	# 8	# 9	# 10
Aluminum (MG/L)	53200	55100	51200
Chromium (MG/L)	11400	6430	15900
Cadmium (MG/L)	< 9.80	< 22.8	< 18.2
Copper (MG/L)	4540	13200	30100
Lead (MG/L)	113	155	125
Nickel (MG/L)	48.5	77.4	111
Zinc (MG/L)	2920	3470	3620

All results have been corrected for percent solids.
*All concentrations have been corrected for Aluminum interference.
See reverse side for "STANDARD CLAUSES".

ppm 1 gram put in 100 mls of water = Volume

APPENDIX VI
Page 1

/disk 25

APPROVED: Lisa A. Lipsky

PAGE 1 OF 1

Missouri Engineering Corporation
ENGINEERING CONSULTANTS
P O BOX 13
ROLLA, MISSOURI 65401 • PHONE. 314-364-4003

Former Hulett Lagoon Site
Combined PA/SI
Reference 30

July 21, 1989

SLUDGE REMOVAL PROJECT
HULETT LAGOON - CAMDENTON, MO

Mr. Ron Macormic approached me concerning the spreading of the sludge on the 22 acre area at the airport. This sludge is currently being stockpiled.

His proposal is basically as outlined below.

1. Spreading of sludge complete - $2.25 per cu. yd.
   We have estimated this at 1500 cu yc. or $3375.00.

2 Clearing, bush-hogging, or cutting to be able to utilize the area. May be up to 4 acres.
   His proposal is $400 per acre or $1600.00

3 Discing of the field after sludge application to create a mixture and seed bed.
   A lum sum cost of $560 00.

4. For seeding of the 22 acre tract with 15 lbs per acre of fescue and 1 bushel per acre of cover crop at a cost of $45.00 per acre or a total of $990.00.

Based upon our estimated quantities, this would create a change order increase of a total of $6525.00. If you wish to pursue this method of completing the disposal, please let me know.

MISSOURI ENGINEERING CORP.

Charles Ray
CR/lc

Attachment A

Contractor's
Change Order No. 1

City of Camdenton, Missouri (Owner) of Camden County, State of Missouri

To McCormick Gravel & Excavating for REMOVAL & STOCKPILING HULETT LAGOON (Section of Project)

You are hereby directed to make the following changes from the contract

1. Description, location and reason for change of each item and effect on completion date. (Attach additional sheets if required)

Spreading stockpiled sludge on the 22 acre area at the airport. See Attachment A. Time extension due to poor weather conditions

2. Cost of work affected by this change order.

Item No.	Item Description	Units Provided for	Units To Be Built	Units Add or Deduct	Contract or Unit Price	Amount Added	Amount Deducted
	Spreading Sludge	0	1500	+ 1500	2 25	3,375.00	
	Clearing & bush-hogging	0	4	+ 4	400 00	1,600 00	
	Discing	0	1	+ 1	LS	560 00	
	Seeding	0	22	+ 22	45 00	990.00	
	30 day time extension -- Completion date revised to September 9, 1989.						
				Totals		6,525.00	

1. Contract Amount $19,530 00
2. Add or Deduct this Change Order (Additions - Deductions) + $6,525 00
3. Add or Deduct Previous Change Orders 0
4. Total Add or Deduct to Date + $6,525 00
5. Adjusted Contract Amount $26,055 00

Engineer — Date 8/14/89 — Contractor — Date 8/15/89

Owner — Date

Contractor's
Change Order No. 2

City of Camdenton, Missouri (Owner) of Camden County, State of Missouri

To McCormick Gravel & Excavating for REMOVAL & STOCKPILING HULETT LAGOON (Section of Project)

You are hereby directed to make the following changes from the contract

1. Description, location and reason for change of each item and effect on completion date. (Attach additional sheets if required)

   Time extension due to inclement weather.

2. Cost of work affected by this change order.

Item No.	Item Description	Units Provided for	Units To Be Built	Units Add or Deduct	Contract or Unit Price	Amount Added	Amount Deducted
45	day time extension -- Completion date revised to October 24, 1989						
	NO COSTS INVOLVED						
				Totals			

1. Contract Amount $19,530 00
2. Add or Deduct this Change Order (Additions - Deductions) 0
3. Add or Deduct Previous Change Orders + $6,525 00
4. Total Add or Deduct to Date + $6,525 00
5. Adjusted Contract Amount $26,055 00

Engineer 9/5/89 Date

Contractor 9/19/89 Date

Owner 9/25/89 Date

Contractor's
Change Order No. 3

City of Camdenton, Missouri of Camden County,
(Owner) State of Missouri

To McCormick Gravel & Excavating for Removal & Stockpiling Hulett Lagoon
Section of Project

You are hereby directed to make the following changes from the contract

1. Description, location and reason for change of each item and effect on completion date. (Attach additional sheets if required)

2. Cost of work affected by this change order.

Item No.	Item Description	Units Provided for	Units To Be Built	Units Add or Deduct	Contract or Unit Price	Amount Added	Amount Deducted
	Removal of excess soils to complete lagoon abandonment	0	1	+1	LS	7,000 00	
	Adjustment for spreading of materials at airport for clearing brush, spreading sludge and soils, discing, and seeding	0	1	+1	LS	1,363 50	
				Totals			

1. Contract Amount 19,530.00
2. Add or Deduct this Change Order (Additions - Deductions) + $8,363.50
3. Add or Deduct Previous Change Orders + $6,525 00
4. Total Add or Deduct to Date + $14,888 50
5. Adjusted Contract Amount $34,418 50

Engineer Date 11/30/87 Contractor Date

Owner Date

Former Hulett Lagoon Site
Combined PA/SI
Reference 31

Attached herewith you will find a letter dated November 01 1989 written to Attorney David Welch from Charlie Ray with Missouri Engineering Corporation, along with the Information for Bidders, Proposal Form, additional information for the contractor, and Change Order Nos 3 and 4 concerning the sludge removal at the Hulett Lagoon.

I personally inspected the sludge site at the airport with Kent and Charlie on Wednesday, October 25, 1989. Upon our inspection, it was found that there is soil that was removed from the lagoon, but there are traces of sludge mixed in with the soil.

I will be the first to admit that I am by far no expert on sludge, but is my feeling that if sludge was present at the lagoon, that it should be removed. This being not only to satisfy my concerns, but maybe more importantly, to satisfy DNR. I believe you will agree that we do not want any trouble with DNR over this lagoon sludge removal.

I realize the Mayor or Council was not advised of the additional loads being removed from the lagoon at the time, but let's just suppose we had been told beforehand that additional loads needed to be removed. . .then, would we have said no? Would we have been expert enough to know that no more sludge needed to be removed from the lagoon? Please just take a minute and think about it.

As Charlie states in his letter, weather conditions were not ideal at the time sludge was being pumped from the lagoon, and there were delays, plus each time the rains came, this caused the sludge to spread back over the area of the lagoon, which I feel would need to be removed. Apparently, the contractor felt it necessary to remove the additional soil, as it was contaminated with sludge Although, after the sludge was removed and taken to the stockpile sight and dried out, the majority removed was soil, BUT there was a percentange of sludge in the soil that was tested.

Charles also states that more tests can be performed on the soil at the stockpile sit, but you will note that the eight tests that were run cost $1000.00. Do we want to keep testing the soil and spending thousands of dollars for this?

You will note in the information attached to Charlie's letter, on page GC-20 under No. 30 ARBITRATION, that disputes will be settled by arbitration. Although, some of you may not be too familiar with arbitration, I deal with it everyday in my work, and it has been my experience that this is not the easiest way to prove a point. You may think your case is airtight, but the arbitration committee can easily blow your case right out of the water. I personally believe that if the arbitration committee saw that there was a percentage of sludge in the excess soil removed from the lagon, that they would rule in favor of the contractor Be advised this is my personal opinion, but also, I have dealt with arbitration committees for several years. Our attorney may disagree with me totally, but I do feel very strongly on this point.

I feel we can sit in the council chambers and argue and hash this matter out for several hours, and never settle the dispute. As you know, each of us are separate individuals with our own way of thinking. I am not trying to persuade any one of you in any way, but please take a little time and think carefully about this matter and just maybe, you may reconsider allowing this matter to be resolved by paying the contractor on these change orders.

I do have information from a very reliable and trustworthy individual that McCormick has alread been told that an additional $3000 00+ that he has spent on this sludge removal project will not be taken into consideration for payment, and they have apparently accepted this fact

This matter can be discussed to some extent Tuesday night, but let's not drag it out for any length of time Please be advised that I do intend to make a motion for this additional money to be paid to McCormick and it will be up to the rest of the council to either agree or disagree Remember, in the meantime, the sludge is just sitting idle at the airport waiting to be spread

Thank you for taking the time to read this and reconsidering all the facts involved in this matter

Again, I respect each and everyone of you in the decisions we make as a council, and I do feel that we are a strong and aggressive council who face may tough decisions each time we sit in the council chambers

Sincerely,

Kay Cyrus

Missouri Engineering Corporation
ENGINEERING CONSULTANTS
P O BOX 13
ROLLA, MISSOURI 65401 • PHONE 314-364-4003

November 1, 1989

Dave Welch
Attorney at Law
190 Court Circle
Camdenton, MO 65020

Dear Dave:

Since our meeting Tuesday morning, I have tried to summarize the overall situation of payment on the Hulett Lagoon Sludge Removal and Stockpiling project. I have taken a set of the contract documents and marked what I felt was pertinent information regarding this matter. Mr. McCormick feels that he is due additional funds for sludge removal. I am in agreement with him that he has removed additional material but disagree that it was actually sludge.

The specifications were very clear that the quantities shown were only estimates and that final payment would be made on the quantities actually removed and measured. On GC-8, 13.1, it states that final measurements shall not be considered changes in the work. It also states in the specifications that differing site conditions or weather conditions can govern the work to be performed and paid for. This project is very unique and the conditions encountered during the removal period were not ideal. As you are aware, the Department of Natural Resources had complete control on the approval of this material being removed, but it was at a total cost paid by the City of Camdenton.

The scope of the project included complete removal of the sludge from the lagoon site and stockpiling of this material at the south end of the airport property. I have had conversations with Mr. McCormick over concerns of the project and will try to highlight those in the following statements.

1. I have been told that even though the contractor was prepared to begin removal of the sludge during the last weeks of June, that he was told by the city to not start until after the July 4th holiday period. We lost two weeks of very favorable working days.

2. The removal process began on July 11, 1989. They had hauled approximately 650 cubic yards through July 12 at 1:30 p.m. At that time my inspector told me that they were way less than one-half done with the area. I asked how much dirt was being removed with the sludge. Was it a clean separation? The answer was that the excavation was being made to a level that showed clay material. I asked my inspector to have Mr. McCormick to contact me.

3. Mr. McCormick called me to discuss the problems. He assured me that there was very little dirt being removed and absolutely no more than was necessary. I told him at that time, that if there was going to be more sludge, I had to take the increase to the council. His statement was that he felt that the total yardage would not exceed the 1500 cubic yards in the proposal by very much, maybe a hundred yards.

4. The sludge was left to dry after July 12. Rainfall filled the bottom of the lagoon during the following weeks and created additional pumping. The contractor attempted removal again on August 18 and 19. Rain again stopped the project on August 19.

5. After pumping on the lagoon again and drying the sludge, the contractor again started hauling on September 7 and 8. When work had stopped on August 19, I was advised by my inspector that they were nearly done and if it had not rained, they would have probably finished that day. They were at approximately 1485 cubic yards. After the rains and the contractor continued, he hauled approximately another 910 cubic yards.

In my opinion and as shown at the lagoon site, much of the soils were contaminated with copper each time the lagoon was refilled with rainwater. The reason this showed was because the copper settled out and oxidized causing the soils to appear as the same color of the sludge. Each time the contractor reworked the areas, he was forced to remove additional materials that must have appeared to be sludge when it was wet. After it dried at the stockpile site, it was obvious to me that most of it was soils. The test results that we had performed reflect that this is actually the case.

In eight samples taken from the stockpiled materials, an analysis was made to determine the sludge quantity. These are as follows:

1. 3.08% sludge
2. 0.37% sludge
3. 1.05% sludge
4. 1.53% sludge
5. 8.10% sludge
6. 33.35% sludge
7. 1.68% sludge
8. 2.03% sludge

Also the metals test show a considerable drop from the sludge samples analyzed before the project began. Concentrations of copper dropped from a high of 50,000 parts per million to a high of 5500 parts per million.

It is impossible to test every particle of the stockpiled materials to determine if this is totally representative, but I believe that is is a valid comparison. There are approximately 50 loads that would have to be tested to get an actual sludge analysis. These eight tests cost $1000.

I know that the council feels as if they were left out of this decision, but I do not think that they could have ever reached any other answer other than to continue to remove all necessary materials. This has always been the goal in order to satisfy DNR requirements.

It is my opinion, that the contractor did the work required in order to achieve the completion of the total sludge removal and should be compensated for the additional material removal in the amount of $7,826.50. In addition to this, if we continue with the project and spread the material at the airport, there would be an additional cost of $1,800 to spread the additional materials.

Hopefully this information will be of benefit to you. I would certainly like to see this issue resolved and the project completed.

Sincerely,

MISSOURI ENGINEERING CORP.

Charles Ray

Charles Ray
CR/vm

Former Hulett Lagoon Site
Combined PA/SI
Reference 32
10/20/89

Mr. Hipson + Council Members.

This letter is in regard to the cost overrun involved in the Hulett Lagoon Project.

I was in constant contact with Missouri Engineering at all stages of the job. There was an inspector on the job at all times. Missouri Engineering was well informed of all additional work necessary to complete the job, including additional pumping, extra lime + more sludge to be removed than Missouri Engineering's estimate. I was assured it was not a problem because I was to be paid by the yard for the removal.

I also want to add that I was told that if there was less than 1500 yards of sludge, I would be paid less. If there was more, I would be paid more. I accepted both possibilities as I assumed the council did

As you all know, the weather posed a problem, with an unusual frequency of rainfall. This was no one's fault but it did not allow the sludge to shrink down as it dried the way it should have This kept the bottom of the lagoon soft, making it impossible to prevent getting a small amount of

mud along with the sludge. At no time was more removed than was absolutely necessary in order to get all the sludge out.

At the bid opening for this job, I said in the presence of Mr. Ray, the mayor & the past city administrator that I knew there was a lot more than 1500 yards of sludge in there. The yardage was discussed with Missouri Engineering numerous times and I was always assured it was no problem.

My bid was quite fair. I did not "create" an overrun for my benefit. It would have been to my benefit if there had been only 1500 yards.

The prices I submitted for spreading the sludge, I believe you will also find very reasonable. But, again, all prices are unit prices.

I will attend the November 7 meeting & hope to help clear up any questions as best I can.

Sincerely,

Ron McCormick

Former Hulett Lagoon Site
Combined PA/SI
Reference 33

City of Camdenton

112 Court Circle P O Box 1048
Camdenton MO 65020
314-346-3600

Ronnie Testerman
Department of Natural Resources
P O Box 176
Jefferson City, Mo 65102

April 9, 1990

RE Hulett Lagoon Sludge Disposal
Work Completion Summary

Dear Ronnie,

As per the approved sludge disposal plan for this project, I am submitting to DNR a work completion summary The following is a chronological recounting of the events surrounding the project

January 1989 The fields at the airport were limed in order to improve the pH levels to 6

June, July, August 1989 The contractor mixed the sludge with lime in the lagoon and transported it to the storage site at the airport Rain delays and traffic considerations added to the length of time needed for this work

December, 1989 After allowing it to dry, the contractor began spreading the material via dry sludge applicator on the designated fields at the airport, mixing it with additional soil and discing the sludge into the ground Soils tests were taken to insure the loading rate did not exceed set limits Rain and snow delayed completion of the spreading

March, 1990 Mixing, spreading and discing were completed Soils test were taken and demonstrated that the loading was below the specified levels The fields have been seeded with a mix of Timothy and Fescue grasses in order to provide ground cover and prevent erosion

April, 1990 The fields that are below a pH level of 6 will be limed to bring them up as needed

I hope that this summary statement fulfills the requirements of the approved sludge disposal specifications Should you have any questions or require further information, please feel free to contact me

Your cooperation and assistance in helping the city is very much appreciated

Sincerely,

Kent L Hixson

Kent L Hixson

Former Hulett Lagoon Site
Combined PA/SI
Reference 34

City of Camden

112 Court Circle P O Box 1048
Camdenton MO 65020
314-346-3600

Mr Paul Kieler
Jacobs Engineering Group
10901 W 84th Terrace
Suite 210
Lenexa, Kansas 66214

March 23, 1992

RE Hulett Lagoon Clousre Process

Dear Mr Kieler,

Enclosed are some documents relevant to the closing of Hulett Lagoon This is the sewer lagoon that Modine, formerly Sunstrand, discharged into The lagoon was built in 1962-63 and was taken out of service in 1986-87 after Sunstrand constructed the pre-treatment facility

The actual lagoon closure wasn't completed until late 1989 I had only recently been hired by the City and was not involved in the development of the closure plan

I do know that all the sludge was taken to the municipal airport and land applied then tilled into the soil according to the DNR guidelines The berms of Hulett lagoon were turned in and mixed with on a 1 to 1 ratio

The City is in the process of leveling off the site and opening it up for a neighborhood park

If you have any questions or require further information, please feel free to contact me

Sincerely,

Kent L Hixson
City Administrator

Former Hulett Lagoon Site
Combined PA/SI
Reference 35

PRELIMINARY ASSESSMENT
SUNDSTRAND
CAMDEN COUNTY, MISSOURI

January 31, 1992

Missouri Department of Natural Resources
Hazardous Waste Program

Prepared By:

John Madras,
Environmental
Specialist

Reviewed By:

Jim Belcher,
Chief
Planning and Pre-
Remedial Unit

Approved By:

Edwin D Knight,
Chief
Superfund Section

Date: January 31, 1992

Prepared by: John Madras
Missouri Department of Natural Resources

Site: Sundstrand
City of Camdenton, Camden County, Missouri

EPA ID No.: MOD

1. INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Missouri Department of Natural Resources, through a cooperative agreement with the U.S. Environmental Protection Agency, conducted a Preliminary Assessment (PA) at the Sundstrand site. The purpose of this investigation was to collect information concerning conditions at the site sufficient to assess the threat posed to human health and the environment, and to determine the need for addition investigation under CERCLA/SARA or other action. The scope of this investigation included review of available file information, a comprehensive source survey, a comprehensive target survey, and an on-site reconnaissance.

2. SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

2.1 Location

The Sundstrand site is located in the City of Camdenton, Missouri, at the center of Camden County, Missouri (Figure 1). The geographic coordinates are 38° 00′ 32.5′′N latitude and 92° 45′ 26′′W longitude (Reference 1). The site is located about one-half mile west of the intersections of U S. Route 54 and Missouri Route 5/7. The site can be accessed by turning west onto Sunset Drive from Missouri Route 5/7.

Camden County is characterized by a temperate climate. Summers are warm and humid with daily temperatures reaching 90°F or higher. The winter months are generally cold with normal daily temperatures of 22° to 42°F. Net annual precipitation for the area is 42 inches (Reference 2, pages 1, 13, 43).

2.2 Site Description

The suspected area of contamination includes soil beneath the manufacturing facility, and soil and fill material comprising loading areas and parking lot adjacent to the facility on the west (Reference 3,4) Trichloroethylene (TCE) and 1,1,1-trichloroethane (TCA) have been detected in the soil below the facility and in borings in the adjacent areas outside of the facility (Reference 5) Groundwater may be affected.

Concentrations of TCE and TCA detected at the facility are shown on Figure 2 (from Reference 5)

The facility is located on a gently, sloping terrain which drops steeply toward a permanently flowing tributary of Lake of the Ozarks.

The Sundstrand site appears to be the sole source of potential TCE or TCA contamination in the vicinity of the site itself. Other potential sources are present in the Camdenton area (Reference 6; Electrovert USA site).

Sundstrand was an interim status hazardous waste treatment, storage, and disposal facility (EPA ID# MOD06249351). The Department requested a Part B application to be submitted. The facility was sold to Modine Heat Transfer, Inc , a wholly owned subsidiary of Modine Manufacturing Company. The new owner stated their intention to complete the closure begun by Sundstrand and operate the facility as a "generator only" facility (Reference 7).

Wastewater from the facility was discharged to the City of Camdenton sanitary discharge system. At the time of the alleged release, that discharge was delivered to the City's "Factory" lagoon. This lagoon was subsequently closed and discharges were transferred to the City's new wastewater treatment facility

2.3 Operational History and Waste Characteristics

To date, no governmental agencies have conducted sampling at this site. Routine water well sampling has been conducted for the City of Camdenton wells, the closest of which is about 200 feet from the site. No contamination was detected (Reference 8).

Modine Heat Transfer, Inc., the present owner and operator of the facility, expressed an interest in conducting sampling following a meeting with the Department of Natural Resources on March 11, 1991 (Reference 9). A sampling plan was submitted; however, it was not approved (Reference 10).

After one revision of the plan, the owner decided to proceed without approval by the Department (Reference 11). Sampling was conducted October 5-8, 1991, without approval of the plan or oversight of the sampling by the U S Environmental Protection Agency or the state.

No removal actions or other response actions have occurred at the site.

3 GROUNDWATER PATHWAY

3.1 Hydrogeologic Setting

The following information is reported from the Missouri Division of Geology and Land Survey (Reference 12)

The bedrock at the site is the Roubidoux Formation The surficial materials developed overlying the bedrock are composed of stratified layers of hard, broken chert and sandstone fragments in red, silty clay

Beds of massive boulders, some over three feet thick are not uncommon This residuum is three to nine feet thick

The area is underlain by a thick sequence of Ordovician and Cambrian aged rocks The sequence is primarily dolomite, and may be up to 1,800 feet thick The section that includes the principle aquifers through the Potosi Dolomite is uninterrupted by a consistent confining bed This part of the section is approximately 1,000 feet thick, and is made up of dolomites except for the Roubidoux Formation, which contains intervals of dolomitic sandstone, and the Gunter Sandstone Member of the Gasconade Dolomite Though some units in this sequence may act as relative confining layers, the entire section from the Potosi Dolomite up through the Roubidoux formation should be considered one aquifer

The Davis Formation contains the only persistent confining shale bed in the section It serves as a boundary between the lower part of the Cambrian sequence, and the Potosi and stratigraphically higher formations Vertical circulation of water has enlarged openings along joints and fractures, allowing freer passage of water from the surface through the Potosi Dolomite

There are no major geologic structures in the target area to constitute an aquifer discontinuity There are also no topographic features which transect an aquifer within the target area

The aquifer underlying the site is a karst aquifer Karst features are particularly well developed in the Roubidoux Formation, which is the uppermost bedrock beneath the site Segments of the unnamed stream downgradient from the site are losing

3 2 Groundwater Targets

The majority of the population within a 4-mile radius relies on public water supplies, either the City of Camdenton or one of the other public water supplies The Camdenton public water supply is a blended system that draws water from three wells All three wells are within one mile of the site, and together they serve the population of 2,561 (Reference 13) Sampling of the City of Camdenton wells in 1987 and 1991 did not detect contamination by the hazardous substances of concern at this site (Reference 8)

In addition, there are many other public water supply wells located in the vicinity of the site, including the wells for the City of Linn Creek (see Table 1) There are approximately 374 homes within four miles which use private wells for drinking water (Reference 1) At 2 4 persons per household (the average for Camden County, Reference 14), this equates to 898 residents

The residence using a private well and located closest to a suspected source of the contamination is about 3,700 feet from the western side of the Modine plant. No residences relying on private wells are located within a 0.25-mile radius of this potential source (Reference 1).

All water wells in the area produce from the same aquifer. Most of the lake homes, restaurants, condominiums, and subdivisions have private water supplies, as there are no rural water districts in the area. There is no wellhead protection area in the vicinity of the site.

3.3 Groundwater Conclusions

A release of hazardous substances to the Cambro-Ordovician aquifer is possible through the on-site disposal of solvents. TCE has been detected in area springs in the vicinity of the site, although dye trace work in the Camdenton areas has not been successful in identifying the recharge area of the spring. Due to the relatively high conductivity of the aquifer, potential widespread migration of contaminants is high. There are no residents whose wells are within 0.25 mile of the potential source. TCE and TCA are very mobile contaminants and the direction of groundwater flow is unknown. As no well contamination has been detected in wells close to the site, the remainder of residents dependent upon private wells within four miles are considered to be secondary targets.

4. SURFACE WATER PATHWAY

4.1 Hydrologic Setting

The site is located near the divide between two small branches of an unnamed stream which drains west to the Niangua Arm of the Lake of the Ozarks. Water appears to run off the site to the south and southwest. There are no runoff containment structures on-site. Discharge from the drainage pipe on the west side of the parking lot runs through an excavated area and into a well defined gully west of the site The two drainage pipes on the south side of the facility do not appear to ever discharge large quantities of water since there is no channel leading from the pipe. The site is less than one-half mile southwest of the divide between the Linn Creek drainage and the Niangua River drainage. The two-year 24-hour rainfall for the site is 3.5 inches.

Drainage from the site flows overland to the south and southwest down a steep slope for approximately 700 feet before it enters an unnamed stream, which flows southwest to the Lake of the Ozarks. This unnamed stream contains losing segments The drainage area of the site is less than 50 acres The site is not located in a floodplain

Since this is a karst area, water issuing from springs within the groundwater target area should be considered for the surface water pathway. This would

include Ha Ha Tonka Spring and an unnamed spring near the City of Linn Creek TCE has been previously detected in Ha Ha Tonka Spring

4 2 Surface Water Targets

The unnamed tributary is a permanently flowing water body at the probable point of entry of contaminants from the site (Reference 1) This tributary is not a classified stream in the Missouri Water Quality Standards It is subject to the general criteria for protection of all waters of the State of Missouri (Reference 15, page 11) Lake of the Ozarks, into which this unnamed creek flows, is classified for the protection of livestock and wildlife watering, the protection of warm water aquatic life and human health/fish consumption, whole body contact recreation, and boating and canoeing (Reference 15, page 32)

There are no identified drinking water intakes in the vicinity of the site

There are no identified wetlands in the vicinity of the site There are sensitive environments present in the vicinity of the site (References 16, 17), although they do not occur in surface waters

4 3 Surface Water Conclusions

There are no present indications that hazardous substances have been released into surface waters or into areas that drain toward permanently flowing surface waters The waters of the unnamed tributary appear to be recharged at least partially from shallow groundwater, which is suspected to be contaminated There are no water intakes located on the tributary or on the Lake of the Ozarks No identified wetlands are present in the vicinity of the site A federally designated endangered species, as well as other sensitive environments, are present in the vicinity of the site Primary targets include the fisheries of the tributary and Lake of the Ozarks, and the sensitive environments

5 SOIL EXPOSURE AND AIR PATHWAYS

5 1 Physical Conditions

At this point, no areas of surface soil contamination have been identified Hazardous substances have been detected at shallow depths in parking areas west of the building, and in soil below the floor of the building (the pit under the vapor degreaser)

5 2 Soil and Air Targets

The potential source of the contamination is an active facility Residences are located on properties adjacent to the facility The residence nearest any of the potential sources is located about 200 feet from the former west wall of

the facility (the alleged disposal area). There are 808 residences located within 0.25 mile of this location. The Modine property is fenced with a gate at the road entrance The total population within a 4-mile radius of the lagoon is 6,394 (Reference 14).

There are no wetlands of at least five acres in the vicinity of the site Smaller wetlands may be present. The Gray Bat (Myotis griesescens) is federally and state listed as endangered. The bat is known from four caves in the vicinity of Camdenton. The first cave is 2 1 miles from the site. Spinulose shield fern (Dryopteris carthusiana) is known to occur in the vicinity of the site in Red Sink Natural Area and is state listed endangered. Other sensitive environments are also present in the vicinity of the site (References 16 and 17).

5.3 Soil Exposure and Air Pathway Conclusions

The soil exposure pathway appears to pose a minimal threat at the site due to the inaccessibility of the closest potential source. Although TCE is volatile when exposed to air, a release of TCE to air is not suspected because of the length of time since releases were alleged to have occurred. In addition, many of the sites are covered with pavement, buildings, or vegetation.

6. SUMMARY AND CONCLUSIONS

The Sundstrand site is located in the City of Camdenton, Missouri, at the center of Camden County, Missouri (Figure 1). The site is located about one-half mile west of the intersections of U.S. Route 54 and Missouri Route 5/7 The suspected area of contamination includes soil beneath the Modine Heat Transfer (formerly Sundstrand) manufacturing facility, and soil and fill material comprising loading areas and parking lot adjacent to the facility on the west. The contaminants are known to include trichloroethylene (TCE) and 1,1,1-trichloroethane (TCA). Due to the relatively high conductivity of the aquifer, potential widespread migration of contaminants is high There are no residents whose private wells are within 0.25 mile of the potential source TCE and TCA are very mobile contaminants and the direction of groundwater flow is unknown There are no present indications that hazardous substances have been released into surface waters or into areas that drain toward permanently flowing surface waters. There are no water intakes located on the tributary or on Lake of the Ozarks No identified wetlands are present in the vicinity of the site. Primary targets include the fisheries of the tributary and Lake of the Ozarks, a federally designated endangered species, and other sensitive environments The soil exposure pathway appears to pose a minimal threat at the site due to the inaccessibility of the closest potential source.

REFERENCES

1 U S Geological Survey, 7 1/2 minute topographic quadrangle maps showing site location (Green Bay Terrace, Camdenton, Decaturville, Ha Ha Tonka)

2 The Climatic Atlas of the United States, U S Department of Commerce, 1983

3 Original complaint

4 Former employee's statement

5 Law Environmental, Inc report

6 CERCLIS, Camden County sites

7 MDNR hazardous waste files Hazardous Waste Registrations, Modine correspondence of 12/3/90 and 12/10/91, Sundstrand correspondence of 9/6/90

8 MDNR sampling results

9 Record of Modine/MDNR meeting

10 MDNR comment letter on sampling plan

11 Modine letter stating that it would proceed with sampling

12 Edith Starbuck, Missouri Division of Geology and Land Survey, Memorandum, 1/13/92

13 Phone call with Rick Hixson, 1/24/92

14 Census Bureau, 1990 data

15 Missouri Water Quality Standards, 10 CSR 20-7 031

16 Dan Dichkneite, Missouri Department of Conservation, letter dated 9/6/91

17 Jerry Brabender, U S Fish and Wildlife Service, letter dated 9/16/91

Sundstrand PA
January 31, 1992

TABLE 1

GROUNDWATER TARGETS

Public Water Supplies

City of Camdenton #3 (Rodeo): total depth 940 feet; cased depth 450 feet; aquifer Cambrian-Ordovician; capacity 320 gpm; distance from site 1.0 miles population served 622.

City of Camdenton #4 (Blair): total depth 1045 feet; cased depth 400 feet; aquifer Cambrian-Ordovician; capacity 300 gpm; distance from site 0 6 miles; population served 576.

City of Camdenton #6 (Mulberry): total depth 900 feet; cased depth 400 feet; aquifer Cambrian-Ordovician; capacity 575 gpm; distance from site 08 miles; population served 1105.

City of Linn Creek #1: total depth 385 feet; cased depth 170 feet; aquifer Cambrian-Ordovician; capacity 100 gpm; distance from site 2.9 miles; population served ___.

City of Linn Creek #2: total depth 860 feet; cased depth 528 feet; aquifer Cambrian-Ordovician; capacity 50 gpm; distance from site 3 1 miles; population served ___.

Camden PWSD #2: total depth 848 feet; cased depth 330 feet; aquifer Cambrian-Ordovician; capacity 100 gpm; distance from site 4 0 miles; population served ___.

Autumn Village: cased depth 260 feet; aquifer Cambrian-Ordovician; capacity 50 gpm; distance from site 1.4 miles; population served ___.

Camdenton Medical Center: total depth 1.3 feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site 1.4 miles; population served ___

Camdenton Windsor Estates: total depth 600 feet; cased depth 400 feet; aquifer Cambrian-Ordovician; capacity 140 gpm; distance from site 1 5 miles; population served ___

Cape of the Woods: total depth ___ feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site ___ miles; population served ___

Department of Conservation: elevation ___ feet; total depth ___ feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site ___ miles; population served ___.

TABLE 1

(continued)

New Tribes: total depth ___ feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site 4.0 miles; population served ___.

Oak Bluff Condominiums: total depth 545 feet; cased depth 350 feet; aquifer Cambrian-Ordovician; capacity 60 gpm; distance from site 2.7 miles; population served ___.

Southway Terrace MHC: total depth 505 feet; cased depth 350 feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site 2.5 miles; population served ___.

Watkins Subdivision: total depth 690 feet; cased depth 440 feet; aquifer Cambrian-Ordovician; capacity 60 gpm; distance from site 1.8 miles; population served ___.

Whispering Hills: total depth ___ feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity __ gpm; distance from site ___ miles; population served ___.

___ means no information obtained.

Private Water Supplies

Many motels, hotels, and restaurants along Highway 54 south of Camdenton.

All of the residences not served by the above systems

Former Hulett Lagoon Site
Combined PA/SI
Reference 36

MISSOURI DEPARTMENT OF NATURAL RE
DIVISION OF ENVIRONMENTAL QUAL
ENVIRONMENTAL SERVICES PROGRAM

RECEIVED
JAN 4 1993
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Site Sampling Report
Sundstrand Site
Camdenton, MO
July 20 through July 31, 1992

INTRODUCTION

As part of a site inspection authorized by the Federal Comprehensive Environmental Response, Compensation, and Liability Act, sampling was conducted at the Sundstrand Site in Camdenton, Missouri. The sampling was requested by the Missouri Department of Natural Resources (MDNR), Hazardous Waste Program (HWP), to determine whether hazardous substance releases from the Sundstrand Tubular Products facility (presently Modine Heat Transfer) has caused groundwater contamination in the area. Previous sampling conducted by Modine contractors indicated that soils around the site have been contaminated with trichloroethylene (TCE), 1,1,1 trichloroethane (TCA), tetrachloroethylene (PCE) and vinyl chloride.

Sampling during this inspection included soil and groundwater produced from the construction of monitoring wells on Modine Heat Transfer property, neighboring private wells, surface water from a creek downgradient from the site, and a spring David Mosby of the MDNR, Environmental Services Program (ESP), collected samples and provided contractor oversite. Edith Starbuck of the MDNR, Division of Geology and Land Survey, was present throughout the inspection to provide technical support during well drilling. Floyd Chilcutt and Bert Williams operated the drill rig for Layne-Western Company, subcontractors for the site. Don Mans of Modine Manufacturing Company split some of the samples collected during the inspection. The sampling data will be used in scoring the site according to the U.S. EPA's hazard ranking system.

METHODS

Two monitoring wells (MW#1 and MW#2) were drilled and sampled during the site inspection. An air-rotary drill rig was used for well construction. Monitoring well #1 (MW#1) was drilled south of the facility parking lot at a location considered downgradient of the contaminated area. Monitoring well #2 (MW#2) was drilled near the northeast side of the facility at a location considered to be upgradient of the contamination. (See Appendix A for sampling locations.)

During drilling, soil was collected at five-foot intervals with a split spoon sampler and placed in containers with stainless steel spoons. Surface samples at both drilling locations were collected as direct grabs with stainless steel spoons because samples at this depth could not be collected with the split spoon sampler. Soil samples and drilling activities were monitored for organic vapors using a flame ionization detector (FID) or a photoionization detector (PID).

Drilling of wells ceased when sufficient water was encountered in the desired monitoring zone. After drilling was completed, wells were cased, screened, and grouted by Layne-Western and developed by MDNR and Layne-Western personnel. Wells were developed with a Grundfos submersible pump and/or stainless steel or Teflon bailer. Wells were purged until water turbidity decreased or until field parameters of conductivity, pH, and temperature, measured after each well volume, stabilized within 10% of the prior reading. Three volumes were purged from both wells during development.

Wells were sampled no earlier than the following day after development. Prior to sampling, one to three additional well volumes were purged depending on field parameter stability. Samples were collected by lowering a stainless steel or Teflon bailer to the bottom of the water column, pulling the bailer back up through the well, and filling sample containers directly

Groundwater was sampled from three private wells located downgradient from the site at the E.M Gillemberg, Robert E. Bailey, and Steve Fera residences. Samples were collected from an outside tap after running water out of the lines for three to five minutes.

Two grab samples were collected of surface water downgradient of the site by submersing the appropriate containers into the water body. A small creek, which flows through Jarvis Hollow (just below MW#1) and Ha Ha Tonka Spring, which flows into the Lake of the Ozarks approximately $2^1/_4$ miles south of the site, were sampled.

An equipment blank was collected of the rinsate from the decontamination of the pump and hose used to develop and purge the wells. This sample was collected after sampling MW#1 and before sampling MW#2. Tap water from the facility was used as the rinse water.

The following samples were collected at the above mentioned locations:

SAMPLE #	LOCATION	SAMPLE TYPE	DATE
92-6915	MW#1 10-12 feet deep	soil boring	7/20/92
92-6916	MW#1 15-17 feet deep	soil boring	7/20/92
92-6917	MW#1 20-20.5 feet deep	soil boring	7/20/92
92-6918	creek below site in Jarvis Hollow	surface water	7/22/92
92-6919	Ha Ha Tonka Spring at state park	surface water	7/22/92
92-6920	E.M. Gillemberg residence	groundwater	7/28/92
92-6921	Robert E. Bailey residence	groundwater	7/28/92
92-6922	Steve Fera residence	groundwater	7/28/92
92-6923	MW#2 0-3 inches deep	soil grab	7/28/92
92-6924	MW#2 5-5.5 feet deep	soil boring	7/28/92
92-6925	MW#2 10-12 feet deep	soil boring	7/28/92
92-6926	MW#2 15-16 feet deep	soil boring	7/28/92
92-6927	MW#2 20-22 feet deep	soil boring	7/28/92
92-6928	MW#1	groundwater	7/30/92
92-6930	Sundstrand Site	rinsate blank	7/30/92
92-6931	MW#2	groundwater	7/31/92
92-6932	MW#1 0-3 inches deep	soil grab	7/31/92

All samples were analyzed for volatile organics at the state's environmental laboratory within the Environmental Services Program in Jefferson City. Each sample was given a numbered tag and the corresponding number was recorded on a chain-of-custody form. Other laboratory procedures were followed according to the requirements and standard operating procedures of the Preliminary Assessment/Site Inspection Quality Assurance Project Plan for Fiscal Year 1992.

OBSERVATIONS

Voids at the bedrock/soil interface or in the competent rock itself impeded drilling progress and well construction at MW#1 An outer casing of steel had to be set 80 feet deep and grouted around the outside in order to advance this well to the desired depth

Total well depth of MW#1 was 161 feet and MW#2 was 197 feet. Static water levels were 144 feet and 174.5 feet for MW#1 and MW#2, respectively.

Water in the monitoring wells changed from turbid and reddish-brown, to silty and grey, and finally to colorless and clear during development and purging Since well samples were collected from the bottom of the water column, they were grey and silty, even though water from the top of the water column was colorless and clear.

No organic vapors were detected in the soil borings or drilling air returns from any of the wells.

Soil samples were predominantly composed of red clay Amounts of chert, limestone, topsoil, sandstone, and stringers of tan-colored clay varied with depth and location. Soil from the boring of MW#2 contained more tan clay and sand than MW#1.

Don Mans reported in a phone conversation to Dave Mosby that the sample they split of MW#2 contained low levels of TCE below the detection level used by the MDNR laboratory. Modine did not split the water sample of MW#1.

RESULTS

See Appendix B for sample results.

Submitted by

David E Mosby
Environmental Specialist
Superfund Unit
Environmental Services Program

Date

Dec. 31, 1992

Approved by

James H Long
Director
Environmental Services Program

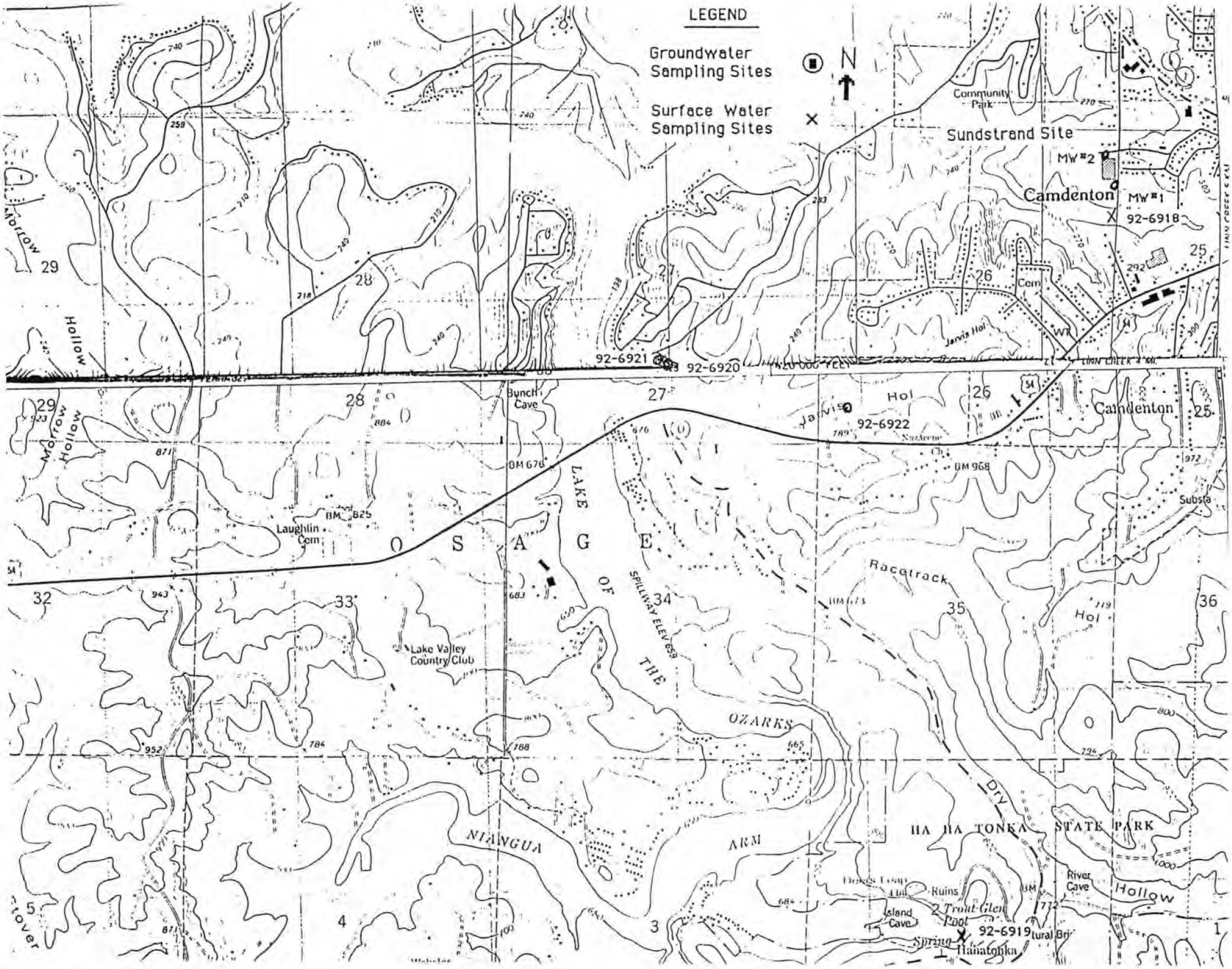
JHL dmd

c Julie Bloss, Environmental Specialist, PA/SI Unit, Superfund Section, Hazardous Waste Program

APPENDIX A

SAMPLING REPORT
SUNDSTRAND SITE
CAMDENTON, MO

Site Map


LEGEND
Groundwater Sampling Sites
Surface Water Sampling Sites
N
Community Park
Sundstrand Site
MW#2
Camdenton
MW#1
92-6918
Cem
Jarvis Hol
92-6921
92-6920
Bunch Cave
Jarvis
Hol
92-6922
Camdenton
BM 676
BM 968
Laughlin Cem
BM 825
LAKE OF THE OZARKS
SPILLWAY ELEV 659
Racetrack
Hol
Lake Valley Country Club
NIANGUA ARM
HA HA TONKA STATE PARK
Dry Hollow
Ruins
Island Cave
Trout Glen Pool
92-6919
Spring
Hahatonka
River Cave
Substa
Morrow Hollow
Clover
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APPENDIX B

SAMPLING REPORT
SUNDSTRAND SITE
CAMDENTON, MO

Sampling Data
July 20 through July 31, 1992

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6915

Reported to DAVID MOSBY
Affiliation SPFD

Date 12/30/92
Project Code 3658/3000

Sample Description
SUNDSTRAND (MODINE MANUFACTURING CO) SITE
CAMDENTON, MO , GRAB OF BOREHOLE CORE
OF SOIL AT 10-12 FT , MW# 1

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/20/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 25 ug/Kg
1,1,2,2-Tetrachloroethane	< 25 ug/Kg
1,1,2-Trichloroethane	< 25 ug/Kg
1,1-Dichloroethane	< 25 ug/Kg
1,1-Dichloroethylene	< 25 ug/Kg
1,2-Dichloroethane	< 25 ug/Kg
1,2-Dichloroethene (Total)	< 25 ug/Kg
1,2-Dichloropropane	< 25 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 100 ug/Kg
4-Methyl-2-Pentanone	< 100 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 25 ug/Kg
Bromodichloromethane	< 25 ug/Kg
Bromoform	< 25 ug/Kg
Bromomethane	< 25 ug/Kg
Carbon Disulfide	< 25 ug/Kg
Carbon Tetrachloride	< 25 ug/Kg
Chlorobenzene	< 25 ug/Kg
Chloroethane	< 25 ug/Kg

Page 2
Sample no 92-6915
Date 12/30/92

PARAMETERS	RESULTS
Chloroform	< 25 ug/Kg
Chloromethane	< 25 ug/Kg
cis-1,3-Dichloropropene	< 25 ug/Kg
Dibromochloromethane	< 25 ug/Kg
Ethylbenzene	< 25 ug/Kg
Methylene Chloride	< 25 ug/Kg
Styrene	< 25 ug/Kg
Tetrachloroethene	< 25 ug/Kg
Toluene	< 25 ug/Kg
trans-1,3-Dichloropropene	< 25 ug/Kg
Trichloroethene	< 25 ug/Kg
Vinyl Acetate	< 100 ug/Kg
Vinyl Chloride/Chloroethene	< 25 ug/Kg
Xylenes (Total)	< 25 ug/Kg

COMMENTS Analyzed by GC/MS at the Missouri DNR laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6916

Reported to DAVID MOSBY
Affiliation SPFD

Date 12/30/92
Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF BOREHOLE CORE
OF SOIL AT 15-17 FT , MW# 1

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/20/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 25 ug/Kg
1,1,2,2-Tetrachloroethane	< 25 ug/Kg
1,1,2-Trichloroethane	< 25 ug/Kg
1,1-Dichloroethane	< 25 ug/Kg
1,1-Dichloroethylene	< 25 ug/Kg
1,2-Dichloroethane	< 25 ug/Kg
1,2-Dichloroethene (Total)	< 25 ug/Kg
1,2-Dichloropropane	< 25 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 100 ug/Kg
4-Methyl-2-Pentanone	< 100 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 25 ug/Kg
Bromodichloromethane	< 25 ug/Kg
Bromoform	< 25 ug/Kg
Bromomethane	< 25 ug/Kg
Carbon Disulfide	< 25 ug/Kg
Carbon Tetrachloride	< 25 ug/Kg
Chlorobenzene	< 25 ug/Kg
Chloroethane	< 25 ug/Kg

Page 2
Sample no 92-6916
Date 12/30/92

PARAMETERS	RESULTS
Chloroform	< 25 ug/Kg
Chloromethane	< 25 ug/Kg
cis-1,3-Dichloropropene	< 25 ug/Kg
Dibromochloromethane	< 25 ug/Kg
Ethylbenzene	< 25 ug/Kg
Methylene Chloride	< 25 ug/Kg
Styrene	< 25 ug/Kg
Tetrachloroethene	< 25 ug/Kg
Toluene	< 25 ug/Kg
trans-1,3-Dichloropropene	< 25 ug/Kg
Trichloroethene	< 25 ug/Kg
Vinyl Acetate	< 100 ug/Kg
inyl Chloride/Chloroethene	< 25 ug/Kg
ylenes (Total)	< 25 ug/Kg

COMMENTS Analyzed by GC/MS at the Missouri DNR laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6917

Reported to DAVID MOSBY
Affiliation SPFD

Date 12/30/92
Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF BOREHOLE CORE
OF SOIL AT 20-20 5 FT , MW# 1

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/20/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 25 ug/Kg
1,1,2,2-Tetrachloroethane	< 25 ug/Kg
1,1,2-Trichloroethane	< 25 ug/Kg
1,1-Dichloroethane	< 25 ug/Kg
1,1-Dichloroethylene	< 25 ug/Kg
1,2-Dichloroethane	< 25 ug/Kg
1,2-Dichloroethene (Total)	< 25 ug/Kg
1,2-Dichloropropane	< 25 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 100 ug/Kg
4-Methyl-2-Pentanone	< 100 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 25 ug/Kg
Bromodichloromethane	< 25 ug/Kg
Bromoform	< 25 ug/Kg
Bromomethane	< 25 ug/Kg
Carbon Disulfide	< 25 ug/Kg
Carbon Tetrachloride	< 25 ug/Kg
Chlorobenzene	< 25 ug/Kg
Chloroethane	< 25 ug/Kg

Page 2
Sample no 92-6917
Date 12/30/92

PARAMETERS	RESULTS
Chloroform	< 25 ug/Kg
Chloromethane	< 25 ug/Kg
cis-1,3-Dichloropropene	< 25 ug/Kg
Dibromochloromethane	< 25 ug/Kg
Ethylbenzene	< 25 ug/Kg
Methylene Chloride	< 25 ug/Kg
Styrene	< 25 ug/Kg
Tetrachloroethene	< 25 ug/Kg
Toluene	< 25 ug/Kg
trans-1,3-Dichloropropene	< 25 ug/Kg
Trichloroethene	< 25 ug/Kg
Vinyl Acetate	< 100 ug/Kg
Vinyl Chloride/Chloroethene	< 25 ug/Kg
Xylenes (Total)	< 25 ug/Kg

COMMENTS Analyzed by GC/MS at the Missouri DNR laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6918

Reported to DAVID MOSBY
Affiliation SPFD

Date 12/30/92
Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF CREEK DOWN HILL FROM FACILITY

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/22/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/L
1,1,2,2-Tetrachloroethane	< 5 0 ug/L
1,1,2-Trichloroethane	< 5 0 ug/L
1,1-Dichloroethane	< 5 0 ug/L
1,1-Dichloroethylene	< 5 0 ug/L
1,2-Dichloroethane	< 5 0 ug/L
1,2-Dichloroethene (Total)	< 5 0 ug/L
1,2-Dichloropropane	< 5 0 ug/L
2-Butanone	< 100 ug/L
2-Hexanone	< 100 ug/L
4-Methyl-2-Pentanone	< 100 ug/L
Acetone	< 100 ug/L
Benzene	< 5 0 ug/L
Bromodichloromethane	< 5 0 ug/L
Bromoform	< 5 0 ug/L
Bromomethane	< 5 0 ug/L
Carbon Disulfide	< 5 0 ug/L
Carbon Tetrachloride	< 5 0 ug/L
Chlorobenzene	< 5 0 ug/L
Chloroethane	< 5 0 ug/L
Chloroform	< 5 0 ug/L

Page 2
Sample no 92-6918
Date 12/30/92

PARAMETERS	RESULTS
Chloromethane	< 5 0 ug/L
cis-1,3-Dichloropropene	< 5 0 ug/L
Dibromochloromethane	< 5 0 ug/L
Ethylbenzene	< 5 0 ug/L
Methylene Chloride	< 5 0 ug/L
Styrene	< 5 0 ug/L
Tetrachloroethene	< 5 0 ug/L
Toluene	< 5 0 ug/L
trans-1,3-Dichloropropene	< 5 0 ug/L
Trichloroethene	< 5 0 ug/L
Vinyl Acetate	< 100 ug/L
Vinyl Chloride/Chloroethene	< 5 0 ug/L
Xylenes (Total)	< 5 0 ug/L

COMMENTS Analyzed by GC/MS at the Missouri DNR Environmental Services Program laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6919

Reported to DAVID MOSBY
Affiliation SPFD

Date 12/30/92
Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF HA HA TONKA SPRING
HA HA TONKA STATE PARK

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/22/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/L
1,1,2,2-Tetrachloroethane	< 5 0 ug/L
1,1,2-Trichloroethane	< 5 0 ug/L
1,1-Dichloroethane	< 5 0 ug/L
1,1-Dichloroethylene	< 5 0 ug/L
1,2-Dichloroethane	< 5 0 ug/L
1,2-Dichloroethene (Total)	< 5 0 ug/L
1,2-Dichloropropane	< 5 0 ug/L
2-Butanone	< 100 ug/L
2-Hexanone	< 100 ug/L
4-Methyl-2-Pentanone	< 100 ug/L
Acetone	< 100 ug/L
Benzene	< 5 0 ug/L
Bromodichloromethane	< 5 0 ug/L
Bromoform	< 5 0 ug/L
Bromomethane	< 5 0 ug/L
Carbon Disulfide	< 5 0 ug/L
Carbon Tetrachloride	< 5 0 ug/L
Chlorobenzene	< 5 0 ug/L
Chloroethane	< 5 0 ug/L

Sample no 92-6919
Date 12/30/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/L
Chloromethane	< 5 0 ug/L
cis-1,3-Dichloropropene	< 5 0 ug/L
Dibromochloromethane	< 5 0 ug/L
Ethylbenzene	< 5 0 ug/L
Methylene Chloride	< 5 0 ug/L
Styrene	< 5 0 ug/L
Tetrachloroethene	< 5 0 ug/L
Toluene	< 5 0 ug/L
trans-1,3-Dichloropropene	< 5 0 ug/L
Trichloroethene	< 5 0 ug/L
Vinyl Acetate	< 100 ug/L
inyl Chloride/Chloroethene	< 5 0 ug/L
Xylenes (Total)	< 5 0 ug/L

COMMENTS Analyzed by GC/MS at the Missouri DNR Environmental Services Program laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6920

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF WELL FROM E M GILLENBERG HOUSEHOLD

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/28/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/L
1,1,2,2-Tetrachloroethane	< 5 0 ug/L
1,1,2-Trichloroethane	< 5 0 ug/L
1,1-Dichloroethane	< 5 0 ug/L
1,1-Dichloroethylene	< 5 0 ug/L
1,2-Dichloroethane	< 5 0 ug/L
1,2-Dichloroethene (Total)	< 5 0 ug/L
1,2-Dichloropropane	< 5 0 ug/L
2-Butanone	< 100 ug/L
2-Hexanone	< 50 ug/L
4-Methyl-2-Pentanone	< 50 ug/L
Acetone	< 100 ug/L
Benzene	< 5 0 ug/L
Bromodichloromethane	< 5 0 ug/L
Bromoform	< 5 0 ug/L
Bromomethane	< 5 0 ug/L
Carbon Disulfide	< 5 0 ug/L
Carbon Tetrachloride	< 5 0 ug/L
Chlorobenzene	< 5 0 ug/L
Chloroethane	< 5 0 ug/L

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Sample no 92-6920
Date 9/02/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/L
Chloromethane	< 5 0 ug/L
cis-1,3-Dichloropropene	< 5 0 ug/L
Dibromochloromethane	< 5 0 ug/L
Ethylbenzene	< 5 0 ug/L
Methylene Chloride	< 5 0 ug/L
Styrene	< 5 0 ug/L
Tetrachloroethene	< 5 0 ug/L
Toluene	< 5 0 ug/L
trans-1,3-Dichloropropene	< 5 0 ug/L
Trichloroethene	< 5 0 ug/L
Vinyl Acetate	< 100 ug/L
Vinyl Chloride/Chloroethene	< 5 0 ug/L
Xylenes (Total)	< 5 0 ug/L

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6921

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF WELL FROM ROBERT E BAILEY HOUSEHOLD

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/28/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/L
1,1,2,2-Tetrachloroethane	< 5 0 ug/L
1,1,2-Trichloroethane	< 5 0 ug/L
1,1-Dichloroethane	< 5 0 ug/L
1,1-Dichloroethylene	< 5 0 ug/L
1,2-Dichloroethane	< 5 0 ug/L
1,2-Dichloroethene (Total)	< 5 0 ug/L
1,2-Dichloropropane	< 5 0 ug/L
2-Butanone	< 100 ug/L
2-Hexanone	< 50 ug/L
4-Methyl-2-Pentanone	< 50 ug/L
Acetone	< 100 ug/L
Benzene	< 5 0 ug/L
Bromodichloromethane	< 5 0 ug/L
Bromoform	< 5 0 ug/L
Bromomethane	< 5 0 ug/L
Carbon Disulfide	< 5 0 ug/L
Carbon Tetrachloride	< 5 0 ug/L
Chlorobenzene	< 5 0 ug/L
Chloroethane	< 5 0 ug/L

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Sample no 92-6921
Date 9/02/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/L
Chloromethane	< 5 0 ug/L
cis-1,3-Dichloropropene	< 5 0 ug/L
Dibromochloromethane	< 5 0 ug/L
Ethylbenzene	< 5 0 ug/L
Methylene Chloride	< 5 0 ug/L
Styrene	< 5 0 ug/L
Tetrachloroethene	< 5 0 ug/L
Toluene	< 5 0 ug/L
trans-1,3-Dichloropropene	< 5 0 ug/L
Trichloroethene	< 5 0 ug/L
Vinyl Acetate	< 100 ug/L
Vinyl Chloride/Chloroethene	< 5 0 ug/L
Xylenes (Total)	< 5 0 ug/L

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6922

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF WELL FROM STEVE FERRA HOUSEHOLD

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/28/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/L
1,1,2,2-Tetrachloroethane	< 5 0 ug/L
1,1,2-Trichloroethane	< 5 0 ug/L
1,1-Dichloroethane	< 5 0 ug/L
1,1-Dichloroethylene	< 5 0 ug/L
1,2-Dichloroethane	< 5 0 ug/L
1,2-Dichloroethene (Total)	< 5 0 ug/L
1,2-Dichloropropane	< 5 0 ug/L
2-Butanone	< 100 ug/L
2-Hexanone	< 50 ug/L
4-Methyl-2-Pentanone	< 50 ug/L
Acetone	< 100 ug/L
Benzene	< 5 0 ug/L
Bromodichloromethane	< 5 0 ug/L
Bromoform	< 5 0 ug/L
Bromomethane	< 5 0 ug/L
Carbon Disulfide	< 5 0 ug/L
Carbon Tetrachloride	< 5 0 ug/L
Chlorobenzene	< 5 0 ug/L
Chloroethane	< 5 0 ug/L

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Sample no 92-6922
Date 9/02/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/L
Chloromethane	< 5 0 ug/L
cis-1,3-Dichloropropene	< 5 0 ug/L
Dibromochloromethane	< 5 0 ug/L
Ethylbenzene	< 5 0 ug/L
Methylene Chloride	< 5 0 ug/L
Styrene	< 5 0 ug/L
Tetrachloroethene	< 5 0 ug/L
Toluene	< 5 0 ug/L
trans-1,3-Dichloropropene	< 5 0 ug/L
Trichloroethene	< 5 0 ug/L
Vinyl Acetate	< 100 ug/L
Vinyl Chloride/Chloroethene	< 5 0 ug/L
ylenes (Total)	< 5 0 ug/L

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6923

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM MW #2 FROM 0-3 INCHES DEEP

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/28/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/Kg
1,1,2,2-Tetrachloroethane	< 5 0 ug/Kg
1,1,2-Trichloroethane	< 5 0 ug/Kg
1,1-Dichloroethane	< 5 0 ug/Kg
1,1-Dichloroethylene	< 5 0 ug/Kg
1,2-Dichloroethane	< 5 0 ug/Kg
1,2-Dichloroethene (Total)	< 5 0 ug/Kg
1,2-Dichloropropane	< 5 0 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 50 ug/Kg
4-Methyl-2-Pentanone	< 50 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 5 0 ug/Kg
Bromodichloromethane	< 5 0 ug/Kg
Bromoform	< 5 0 ug/Kg
Bromomethane	< 5 0 ug/Kg
Carbon Disulfide	< 5 0 ug/Kg
Carbon Tetrachloride	< 5 0 ug/Kg
Chlorobenzene	< 5 0 ug/Kg
Chloroethane	< 5 0 ug/Kg

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Sample no 92-6923
Date 9/02/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/Kg
Chloromethane	< 5 0 ug/Kg
cis-1,3-Dichloropropene	< 5 0 ug/Kg
Dibromochloromethane	< 5 0 ug/Kg
Ethylbenzene	< 5 0 ug/Kg
Methylene Chloride	< 5 0 ug/Kg
Styrene	< 5 0 ug/Kg
Tetrachloroethene	< 5 0 ug/Kg
Toluene	< 5 0 ug/Kg
trans-1,3-Dichloropropene	< 5 0 ug/Kg
Trichloroethene	< 5 0 ug/Kg
Vinyl Acetate	< 100 ug/Kg
Vinyl Chloride/Chloroethene	< 5 0 ug/Kg
Xylenes (Total)	< 5 0 ug/Kg

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6924

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM MW #2 FROM 5 - 5 5 FT DEEP

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/28/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/Kg
1,1,2,2-Tetrachloroethane	< 5 0 ug/Kg
1,1,2-Trichloroethane	< 5 0 ug/Kg
1,1-Dichloroethane	< 5 0 ug/Kg
1,1-Dichloroethylene	< 5 0 ug/Kg
1,2-Dichloroethane	< 5 0 ug/Kg
1,2-Dichloroethene (Total)	< 5 0 ug/Kg
1,2-Dichloropropane	< 5 0 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 50 ug/Kg
4-Methyl-2-Pentanone	< 50 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 5 0 ug/Kg
Bromodichloromethane	< 5 0 ug/Kg
Bromoform	< 5 0 ug/Kg
Bromomethane	< 5 0 ug/Kg
Carbon Disulfide	< 5 0 ug/Kg
Carbon Tetrachloride	< 5 0 ug/Kg
Chlorobenzene	< 5 0 ug/Kg
Chloroethane	< 5 0 ug/Kg

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Sample no 92-6924
Date 9/02/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/Kg
Chloromethane	< 5 0 ug/Kg
cis-1,3-Dichloropropene	< 5 0 ug/Kg
Dibromochloromethane	< 5 0 ug/Kg
Ethylbenzene	< 5 0 ug/Kg
Methylene Chloride	< 5 0 ug/Kg
Styrene	< 5 0 ug/Kg
Tetrachloroethene	< 5 0 ug/Kg
Toluene	< 5 0 ug/Kg
trans-1,3-Dichloropropene	< 5 0 ug/Kg
Trichloroethene	6 8 ug/Kg
Vinyl Acetate	< 100 ug/Kg
Vinyl Chloride/Chloroethene	< 5 0 ug/Kg
Xylenes (Total)	< 5 0 ug/Kg

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6925

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM BORING FOR MW #2 FROM 10 - 12 FT DEEP

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/28/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/Kg
1,1,2,2-Tetrachloroethane	< 5 0 ug/Kg
1,1,2-Trichloroethane	< 5 0 ug/Kg
1,1-Dichloroethane	< 5 0 ug/Kg
1,1-Dichloroethylene	< 5 0 ug/Kg
1,2-Dichloroethane	< 5 0 ug/Kg
1,2-Dichloroethene (Total)	< 5 0 ug/Kg
1,2-Dichloropropane	< 5 0 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 50 ug/Kg
4-Methyl-2-Pentanone	< 50 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 5 0 ug/Kg
Bromodichloromethane	< 5 0 ug/Kg
Bromoform	< 5 0 ug/Kg
Bromomethane	< 5 0 ug/Kg
Carbon Disulfide	< 5 0 ug/Kg
Carbon Tetrachloride	< 5 0 ug/Kg
Chlorobenzene	< 5 0 ug/Kg
Chloroethane	< 5 0 ug/Kg

Page 2
Sample no 92-6925
Date 9/02/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/Kg
Chloromethane	< 5 0 ug/Kg
cis-1,3-Dichloropropene	< 5 0 ug/Kg
Dibromochloromethane	< 5 0 ug/Kg
Ethylbenzene	< 5 0 ug/Kg
Methylene Chloride	< 5 0 ug/Kg
Styrene	< 5 0 ug/Kg
Tetrachloroethene	< 5 0 ug/Kg
Toluene	< 5 0 ug/Kg
trans-1,3-Dichloropropene	< 5 0 ug/Kg
Trichloroethene	< 5 0 ug/Kg
Vinyl Acetate	< 100 ug/Kg
Vinyl Chloride/Chloroethene	< 5 0 ug/Kg
Xylenes (Total)	< 5 0 ug/Kg

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6926

Reported to DAVID MOSBY Date 12/30/92
Affiliation SPFD Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM BORING FOR MW #2 FROM 15 - 16 FT DEEP

Collected by DAVID MOSBY Date 07/28/92
Affiliation SPFD

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/Kg
1,1,2,2-Tetrachloroethane	< 5 0 ug/Kg
1,1,2-Trichloroethane	< 5 0 ug/Kg
1,1-Dichloroethane	< 5 0 ug/Kg
1,1-Dichloroethylene	< 5 0 ug/Kg
1,2-Dichloroethane	< 5 0 ug/Kg
1,2-Dichloroethene (Total)	< 5 0 ug/Kg
1,2-Dichloropropane	< 5 0 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 50 ug/Kg
4-Methyl-2-Pentanone	< 50 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 5 0 ug/Kg
Bromodichloromethane	< 5 0 ug/Kg
Bromoform	< 5 0 ug/Kg
Bromomethane	< 5 0 ug/Kg
Carbon Disulfide	< 5 0 ug/Kg
Carbon Tetrachloride	< 5 0 ug/Kg
Chlorobenzene	< 5 0 ug/Kg
Chloroethane	< 5 0 ug/Kg

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Sample no 92-6926
Date 12/30/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/Kg
Chloromethane	< 5 0 ug/Kg
cis-1,3-Dichloropropene	< 5 0 ug/Kg
Dibromochloromethane	< 5 0 ug/Kg
Ethylbenzene	< 5 0 ug/Kg
Methylene Chloride	< 5 0 ug/Kg
Styrene	< 5 0 ug/Kg
Tetrachloroethene	< 5 0 ug/Kg
Toluene	< 5 0 ug/Kg
trans-1,3-Dichloropropene	< 5 0 ug/Kg
Trichloroethene	37 ug/Kg
Vinyl Acetate	< 100 ug/Kg
Vinyl Chloride/Chloroethene	< 5 0 ug/Kg
Xylenes (Total)	< 5 0 ug/Kg

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6927

Reported to DAVID MOSBY Date 9/02/92
Affiliation SPFD Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM BORING FOR MW #2 FROM 20 - 22 FT DEEP

Collected by DAVID MOSBY Date 07/28/92
Affiliation SPFD

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/Kg
1,1,2,2-Tetrachloroethane	< 5 0 ug/Kg
1,1,2-Trichloroethane	< 5 0 ug/Kg
1,1-Dichloroethane	< 5 0 ug/Kg
1,1-Dichloroethylene	< 5 0 ug/Kg
1,2-Dichloroethane	< 5 0 ug/Kg
1,2-Dichloroethene (Total)	< 5 0 ug/Kg
1,2-Dichloropropane	< 5 0 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 50 ug/Kg
4-Methyl-2-Pentanone	< 50 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 5 0 ug/Kg
Bromodichloromethane	< 5 0 ug/Kg
Bromoform	< 5 0 ug/Kg
Bromomethane	< 5 0 ug/Kg
Carbon Disulfide	< 5 0 ug/Kg
Carbon Tetrachloride	< 5 0 ug/Kg
Chlorobenzene	< 5 0 ug/Kg
Chloroethane	< 5 0 ug/Kg

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Sample no 92-6927
Date 9/02/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/Kg
Chloromethane	< 5 0 ug/Kg
cis-1,3-Dichloropropene	< 5 0 ug/Kg
Dibromochloromethane	< 5 0 ug/Kg
Ethylbenzene	< 5 0 ug/Kg
Methylene Chloride	< 5 0 ug/Kg
Styrene	< 5 0 ug/Kg
Tetrachloroethene	< 5 0 ug/Kg
Toluene	< 5 0 ug/Kg
trans-1,3-Dichloropropene	< 5 0 ug/Kg
Trichloroethene	7 1 ug/Kg
Vinyl Acetate	< 100 ug/Kg
Vinyl Chloride/Chloroethene	< 5 0 ug/Kg
Xylenes (Total)	< 5 0 ug/Kg

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6928

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF MW #1

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/30/92

PARAMETERS	RESULTS
TEMPERATURE	16 9 DEGREES C
COMMENTS ANALYZED IN FIELD	
pH	9 8
COMMENTS ANALYZED IN FIELD	
SPECIFIC CONDUCTANCE	219 umhos/cm
COMMENTS ANALYZED IN FIELD	
1,1,1-Trichloroethane	< 5 0 ug/L
1,1,2,2-Tetrachloroethane	< 5 0 ug/L
1,1,2-Trichloroethane	< 5 0 ug/L
1,1-Dichloroethane	< 5 0 ug/L
1,1-Dichloroethylene	< 5 0 ug/L
1,2-Dichloroethane	< 5 0 ug/L
1,2-Dichloroethene (Total)	< 5 0 ug/L
1,2-Dichloropropane	< 5 0 ug/L
2-Butanone	< 100 ug/L
2-Hexanone	< 50 ug/L
4-Methyl-2-Pentanone	< 50 ug/L
Acetone	< 100 ug/L

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Sample no 92-6928
Date 9/02/92

PARAMETERS	RESULTS
Benzene	< 5 0 ug/L
Bromodichloromethane	< 5 0 ug/L
Bromoform	< 5 0 ug/L
Bromomethane	< 5 0 ug/L
Carbon Disulfide	< 5 0 ug/L
Carbon Tetrachloride	< 5 0 ug/L
Chlorobenzene	< 5 0 ug/L
Chloroethane	< 5 0 ug/L
Chloroform	< 5 0 ug/L
Chloromethane	< 5 0 ug/L
cis-1,3-Dichloropropene	< 5 0 ug/L
Dibromochloromethane	< 5 0 ug/L
Ethylbenzene	< 5 0 ug/L
Methylene Chloride	< 5 0 ug/L
Styrene	< 5 0 ug/L
Tetrachloroethene	< 5 0 ug/L
Toluene	< 5 0 ug/L
trans-1,3-Dichloropropene	< 5 0 ug/L
Trichloroethene	< 5 0 ug/L
Vinyl Acetate	< 100 ug/L
Vinyl Chloride/Chloroethene	< 5 0 ug/L
Xylenes (Total)	< 5 0 ug/L

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6930

Reported to DAVID MOSBY Date 9/02/92
Affiliation SPFD Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , RINSATE BLANK OF PUMP AND HOSE

Collected by DAVID MOSBY Date 07/30/92
Affiliation SPFD

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/L
1,1,2,2-Tetrachloroethane	< 5 0 ug/L
1,1,2-Trichloroethane	< 5 0 ug/L
1,1-Dichloroethane	< 5 0 ug/L
1,1-Dichloroethylene	< 5 0 ug/L
1,2-Dichloroethane	< 5 0 ug/L
1,2-Dichloroethene (Total)	< 5 0 ug/L
1,2-Dichloropropane	< 5 0 ug/L
2-Butanone	< 100 ug/L
2-Hexanone	< 50 ug/L
4-Methyl-2-Pentanone	< 50 ug/L
Acetone	< 100 ug/L
Benzene	< 5 0 ug/L
Bromodichloromethane	< 5 0 ug/L
Bromoform	< 5 0 ug/L
Bromomethane	< 5 0 ug/L
Carbon Disulfide	< 5 0 ug/L
Carbon Tetrachloride	< 5 0 ug/L
Chlorobenzene	< 5 0 ug/L
Chloroethane	< 5 0 ug/L
Chloroform	< 5 0 ug/L

Page 2
Sample no 92-6930
Date 9/02/92

PARAMETERS	RESULTS
Chloromethane	< 5 0 ug/L
cis-1,3-Dichloropropene	< 5 0 ug/L
Dibromochloromethane	< 5 0 ug/L
Ethylbenzene	< 5 0 ug/L
Methylene Chloride	< 5 0 ug/L
Styrene	< 5 0 ug/L
Tetrachloroethene	< 5 0 ug/L
Toluene	< 5 0 ug/L
trans-1,3-Dichloropropene	< 5 0 ug/L
Trichloroethene	< 5 0 ug/L
Vinyl Acetate	< 100 ug/L
Vinyl Chloride/Chloroethene	< 5 0 ug/L
Xylenes (Total)	< 5 0 ug/L

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6931

Reported to DAVID MOSBY Date 9/02/92
Affiliation SPFD Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF MW #2

Collected by DAVID MOSBY Date 07/31/92
Affiliation SPFD

PARAMETERS	RESULTS
TEMPERATURE	16 0 DEGREES C
COMMENTS ANALYZED IN FIELD	
pH	7 5
COMMENTS ANALYZED IN FIELD	
SPECIFIC CONDUCTANCE	831 umhos/cm
COMMENTS ANALYZED IN FIELD	
1,1,1-Trichloroethane	< 5 0 ug/L
1,1,2,2-Tetrachloroethane	< 5 0 ug/L
1,1,2-Trichloroethane	< 5 0 ug/L
1,1-Dichloroethane	< 5 0 ug/L
1,1-Dichloroethylene	< 5 0 ug/L
1,2-Dichloroethane	< 5 0 ug/L
1,2-Dichloroethene (Total)	< 5 0 ug/L
1,2-Dichloropropane	< 5 0 ug/L
2-Butanone	< 100 ug/L
2-Hexanone	< 50 ug/L
4-Methyl-2-Pentanone	< 50 ug/L
Acetone	< 100 ug/L

Page 2
Sample no 92-6931
Date 9/02/92

PARAMETERS	RESULTS
Benzene	< 5 0 ug/L
Bromodichloromethane	< 5 0 ug/L
Bromoform	< 5 0 ug/L
Bromomethane	< 5 0 ug/L
Carbon Disulfide	< 5 0 ug/L
Carbon Tetrachloride	< 5 0 ug/L
Chlorobenzene	< 5 0 ug/L
Chloroethane	< 5 0 ug/L
Chloroform	< 5 0 ug/L
Chloromethane	< 5 0 ug/L
cis-1,3-Dichloropropene	< 5 0 ug/L
Dibromochloromethane	< 5 0 ug/L
Ethylbenzene	< 5 0 ug/L
Methylene Chloride	< 5 0 ug/L
Styrene	< 5 0 ug/L
Tetrachloroethene	< 5 0 ug/L
Toluene	< 5 0 ug/L
trans-1,3-Dichloropropene	< 5 0 ug/L
Trichloroethene	< 5 0 ug/L
Vinyl Acetate	< 100 ug/L
Vinyl Chloride/Chloroethene	< 5 0 ug/L
Xylenes (Total)	< 5 0 ug/L

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6932

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO, GRAB OF SOIL
NEAR BOREHOLE MW #1 FROM 0-3 INCHES

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/31/92

PARAMETERS	RESULTS
1,1,1-Trichloroethane	< 5 0 ug/Kg
1,1,2,2-Tetrachloroethane	< 5 0 ug/Kg
1,1,2-Trichloroethane	< 5 0 ug/Kg
1,1-Dichloroethane	< 5 0 ug/Kg
1,1-Dichloroethylene	< 5 0 ug/Kg
1,2-Dichloroethane	< 5 0 ug/Kg
1,2-Dichloroethene (Total)	< 5 0 ug/Kg
1,2-Dichloropropane	< 5 0 ug/Kg
2-Butanone	< 100 ug/Kg
2-Hexanone	< 50 ug/Kg
4-Methyl-2-Pentanone	< 50 ug/Kg
Acetone	< 100 ug/Kg
Benzene	< 5 0 ug/Kg
Bromodichloromethane	< 5 0 ug/Kg
Bromoform	< 5 0 ug/Kg
Bromomethane	< 5 0 ug/Kg
Carbon Disulfide	< 5 0 ug/Kg
Carbon Tetrachloride	< 5 0 ug/Kg
Chlorobenzene	< 5 0 ug/Kg
Chloroethane	< 5 0 ug/Kg

Page 2
Sample no 92-6932
Date 9/02/92

PARAMETERS	RESULTS
Chloroform	< 5 0 ug/Kg
Chloromethane	< 5 0 ug/Kg
cis-1,3-Dichloropropene	< 5 0 ug/Kg
Dibromochloromethane	< 5 0 ug/Kg
Ethylbenzene	< 5 0 ug/Kg
Methylene Chloride	< 5 0 ug/Kg
Styrene	< 5 0 ug/Kg
Tetrachloroethene	< 5 0 ug/Kg
Toluene	< 5 0 ug/Kg
trans-1,3-Dichloropropene	< 5 0 ug/Kg
Trichloroethene	< 5 0 ug/Kg
Vinyl Acetate	< 100 ug/Kg
Vinyl Chloride/Chloroethene	< 5 0 ug/Kg
Xylenes (Total)	< 5 0 ug/Kg

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

Former Hulett Lagoon Site
Combined PA/SI
Reference 37

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
PO Box 176 Jefferson City MO 65102 0176

MEMORANDUM

DATE September 8, 1998

TO Gary Behrns Chief
Superfund Section Hazardous Waste Program

FROM Arthur H Groner Chief
Permits Section Hazardous Waste Program

SUBJECT Former Hulett Lagoon Camdenton Missouri

The Hazardous Waste Program Permits Section is referring the former Hulett Lagoon in Camdenton, Missouri, to the Hazardous Waste Program Superfund Section The Hulett Lagoon was operated by the City of Camdenton from 1961 to 1988 The City of Camdenton is the current owner of the property The lagoon is located on the east side of Dawson Road and is approximately 1/4 mile northeast of Modine Manufacturing Company (Modine) It received process wastewater from Modine s predecessors Dawson Metal Products from 1967 to 1972 and Sundstrand Tubular Products from 1972 to 1986 Wastewater from the facility contained volatile organic compounds (VOCs) cyanide and various metals In addition to receiving wastewater from the facility the lagoon also received domestic sewage from the surrounding residences A dye trace study of the City of Camdenton's sewer system performed by the Division of Geology and Land Survey (DGLS) on August 5, 1998, verified that facility wastewater mixes with domestic sewage prior to entering city property Therefore the domestic sewage exemption of 40 CFR 261 4 most likely applied during the facility s operating discharges

Closure of the Hulett Lagoon was completed in 1988 by the City of Camdenton pursuant to an Industrial Development Grant overseen by the Missouri Department of Natural Resources Water Pollution Control Program (WPCP) Sampling and analysis of the sludge was limited to metals and total solids High levels of chromium lead and nickel were detected in the sludge The sludge from the lagoon was removed and applied on

the runways at the municipal airport The lagoon berms were turned in and mixed with the surrounding soil The domestic sewage exemption of 40 CFR 261 4 may have applied to the wastewater discharge but is not applicable to the sludges applied on the airport runways The lagoon closure was not designed to meet the substantive requirements of the Hazardous Waste Management Law relative to corrective action At the time of closure no sampling and analysis for VOCs or cyanide were performed, and the horizontal and vertical extent and rate of migration of contamination in environmental media associated with the lagoon were not determined during the 1988 lagoon closure process Hence, the sludge sampling performed was not sufficient for RCRA determinations

Modine has four on-site groundwater monitoring wells and one off-site well located at the southwest edge of the Hulett Lagoon Based on potentiometric maps and a bedrock fracture system study, prepared by Dames & Moore consultants for Modine, the groundwater flow direction is to the southwest Sampling results from one of the on-site wells (MW-4) and the off-site well (MW-5) have shown levels of trichloroethene (TCE) at 173 parts per billion (ppb) and 484 ppb, respectively The Environmental Services Program (ESP) sampled a residential well on April 23 1998 located across the street from the facility and down gradient of monitoring well MW-5 TCE was detected in this well at 210 ppb

TCE was also detected in the City of Camdenton's Mulberry Well as high as 6 3 ppb, which is above the EPA Maximum Contaminant Level (MCL) of 5 ppb The Mulberry Well is located approximately 1/4 mile east of Modine and ½ mile southeast of the Hulett Lagoon The Mulberry Well was the city s highest volume producing well The well is drilled to a total depth of 900 ft below ground surface (bgs) and has a maximum pumping rate of 600 gallons per minute (gpm) The city has taken the Mulberry Well off line and is in the process of drilling a new well

The city has been monitoring the Mulberry Well monthly and the two remaining municipal wells quarterly since February 1998 The two remaining wells have been non detect for TCE and all other constituents During the last sampling event the city sampled a residential well located southwest of the municipal airport TCE was detected in this well at 13 1 ppb Current speculation is that the contamination in this well may have been caused by the application of sludge from the Hulett Lagoon on the airport runways

Due to the close proximity of the Hulett Lagoon and Modine Manufacturing Company and the nature of the groundwater contamination close coordination between the Superfund Section, the Permits Section the Enforcement Section Public Drinking Water Program Jefferson City Regional Office, and the Division of Geology and Land

Survey will be necessary If you have any questions or require additional information regarding this matter, please contact Chris Kump, of my staff, at 751-3068

AHG ckm

c Lyle Crocker, HWP-Enforcement Section
Robert Hentges, JCRO
Cindy Kemper HWP-Director s Office
Ed Knight, WPCP
Terry Timmons PDWP
Diana Travis DGLS
Shelley Woods AGO

bc Christine Kump, HWP
John Jurgensmeyer HWP

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
PO Box 176 Jefferson City MO 65102 0176

MEMORANDUM

DATE March 24 1999

TO Gary Behrns Chief
Superfund Section, Hazardous Waste Program

THROUGH Arthur H Groner Chief
Permits Section Hazardous Waste Program

FROM Christine M Kump Environmental Engineer
Permits Section Hazardous Waste Program

SUBJECT Clarification on Referral Memo - Former Hulett Lagoon Camdenton Missouri

Valerie Wilder, Environmental Specialist, Superfund Section requested I clarify a sentence located in paragraph two of the referral memo sent to you dated September 8 1998 (please see attached letter)

The sentence Ms Wilder requested clarification on reads "The domestic sewage exemption of 40 CFR 261 4 may have applied to the wastewater discharge but is not applicable to the sludges applied on the runways " In consultation with Shelley Woods AGO and other members of the corrective action team prior to writing the referral memo we concluded that Superfund's CERCLA authority would be more inclusive and have stronger support to require action should hazardous constituents be found at or near the runway The corrective action team felt CERCLA's authority would be more defensible in litigation since CERCLA is authorized to pursue hazardous constituents regardless of whether the waste was or is an exempt RCRA hazardous waste

CMK sw

Attachment

Combined Preliminary Assessment/Site Inspection Sampling Report

Former Hulett Lagoon Site
Camdenton, Missouri
Camden County

Field Activities Conducted
January 6-7, 1999
January 21, 1999

Prepared For:

Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

Prepared By:

Missouri Department of Natural Resources
Division of Environmental Quality
Environmental Services Program

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1.0 Introduction

As authorized under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986, the Missouri Department of Natural Resources (MDNR), Hazardous Waste Program (HWP), Site Evaluation Unit is conducting a combined preliminary assessment/site inspection (PA/SI) on the Former Hulett Lagoon site. The MDNR, HWP requested the MDNR, Environmental Services Program (ESP) prepare and implement a sampling plan as part of the combined PA/SI.

Initially, the Former Hulett Lagoon site consisted of two separate areas of concern. After field activities associated with both areas were complete, HWP personnel requested the site be split into two separate sites, each with its own sampling report. This report covers field activities conducted in association with the actual former Hulett lagoon. A separate report has been prepared which covers field activities associated with the newly established "Camdenton Sludge Disposal Area" site.

Field activities were conducted throughout the month of January. Initial groundwater sampling was conducted on January 6-7, 1999. A soil sampling investigation was conducted on January 21, 1999. ESP personnel involved with the various field activities included Environmental Specialists Brian Allen, Ken Hannon, and Doug Thompson. HWP Environmental Specialist Valerie Wilder was present during all field activities conducted. Information learned from field observations and sampling will be used by the HWP in scoring the site's potential as a hazardous waste site under the CERCLA Hazard Ranking System.

2.0 Site Information

2.1 Location

The Former Hulett Lagoon site is located just east of Dawson Road in Camdenton, MO, approximately ¼ mile northeast of the Modine Manufacturing Company facility. The legal description of the former lagoon is SW ¼ SW ¼ SW ¼ sec. 24, T. 38 N., R. 17 W.

2.2 Description

The Former Hulett Lagoon site is on property owned by the City of Camdenton. The former lagoon is located in a mixed residential/industrial area. The lagoon, closed since 1989, has been vegetated and is generally flat with remnants of the former berm still visible. Surface runoff from this area flows to the northwest and enters a nearby intermittent drainage that travels to the west.

2.3 History/Contaminants of Concern

The former Hulett lagoon was one of five lagoons operated by the City of Camdenton prior to the construction of a municipal wastewater treatment plant. The lagoon was in operation from 1961 until approximately 1988, when the City of Camdenton began closure. In addition to municipal wastes, the Hulett lagoon also received wastes generated from a nearby manufacturing facility (discussed below).

In 1967, Dawson Metal Products built a manufacturing facility located approximately ¼ mile southwest of the Hulett lagoon and began operations. Sundstrand Tubular Products purchased the facility in 1972 and continued operations until 1990, when it was purchased by Modine Heat Transfer, Inc., a wholly owned subsidiary of Modine Manufacturing Company. Modine Manufacturing Company currently owns and operates the facility.

From 1967 to the present, manufacturing operations at this facility have consisted of producing air conditioning coils and feeder parts from aluminum and copper tubing, which have included electroplating and the use of solvents. Prior to the construction of the municipal wastewater treatment plant or any facility pretreatment processes, wastes generated from the facility were discharged, in part at least, to the nearby Hulett lagoon.

The primary contaminants of concern at the site include metals and solvents associated with the manufacturing processes from this facility. Specific metals of concern include copper, chromium, lead, and nickel. Various solvents have been used at the facility, including the primary contaminant of concern for this investigation, trichloroethene (TCE). TCE was reportedly used beginning in the early 1970s and continuing to December 1990. It is likely TCE wastes generated at the facility would have been present in the wastestream discharged to the Hulett lagoon.

As part of the Hulett lagoon closure, the city received approval from MDNR to land apply lagoon sludge to an area immediately south of the Camdenton Airport runway currently identified by the MDNR as the Camdenton Sludge Disposal Area site. Information indicates sampling of the sludge was apparently limited to determining the levels of metals prior to approving the disposal method and that no analyses were conducted for the presence of any volatile organic compounds The lagoon closure was completed in 1989

A preliminary assessment and site inspection were conducted of the manufacturing facility property in 1992, which did not include any off-site investigations of the former lagoon or sludge disposal area. Investigations at that time confirmed the presence of chlorinated solvents, including TCE, in the soils and groundwater. Contamination at the facility is likely a result of historic waste handling practices and spills.

The facility is currently negotiating a Corrective Action Abatement Order on Consent through the Resource Conservation and Recovery Act (RCRA) Unit of the MDNR, HWP. As a result of a specific RCRA exclusion, the current and future RCRA work at the manufacturing facility will not include any investigation of or relating to the former lagoon. Investigation of the former lagoon and sludge disposal area must be conducted under CERCLA authority

In March 1993, 2.1 parts per billion (ppb) TCE were detected in a City of Camdenton municipal well, known as the Mulberry Well, which is located near the manufacturing facility. TCE has consistently been detected in this municipal well since 1997 at levels reaching a high of 11.8 ppb. At least one private well, located directly north of the facility, has been shown to contain TCE at 210 ppb.

The MDNR, HWP has extensive file information on the manufacturing facility and the lagoon closure, which should be referenced for a more comprehensive review of historic regulatory activities.

3.0 Methods

3.1 General Field Procedures

A health and safety briefing was conducted on-site and personnel read and signed the site-specific health and safety plan prior to initiating field activities.

Missouri One-Call was notified of proposed field activities prior to ESP personnel arriving on-site, and all applicable underground utilities marked.

Field instruments. including a photoionization detector (PID), pH, specific conductivity, and temperature meters were calibrated on-site following manufacturers' specifications.

ESP personnel employed established standard operating procedures for the collection of various samples. Containers for each sample were filled based upon the volatility of the analytes of concern with the most volatile analytes being collected first. All samples were collected in certified-clean containers and preserved in the field as appropriate.

ESP personnel collected depth-discrete soil grab samples in selected source areas and groundwater samples from selected private wells, municipal/public wells, and monitoring wells in an effort to determine the types of hazardous wastes which may be present, whether a hazardous substance release has occurred to the environment, and whether the substances have impacted, or may impact, human health and/or the environment. Background samples were also collected of each media sampled from areas that would not appear to be impacted from the site.

An ESP global positioning system (GPS) unit was taken to the field and used to determine the geographic coordinates of each sample location. All sample locations and descriptions were noted in a bound field logbook and locations noted on a site map.

3.2 Groundwater Sampling

Specific conductivity, pH, and temperature were determined for each sample at the time of collection. In addition, turbidity was determined on each sample collected from monitoring wells that was submitted for metals analyses. Personnel attempted to gain pertinent information on each well sampled (age, construction, depth, casing length, screened interval, location of tap, etc.) and record such into the field logbook.

Groundwater grab samples were collected of the City of Camdenton's Mulberry and Blair municipal wells, monitoring wells located on the current Modine Manufacturing Company facility and adjacent to the former lagoon, a private well located immediately north of the facility, and a private well considered to be located downgradient of the former lagoon area.

3.2.1 Residential well/Municipal well samples

In general, samples were collected from taps nearest the well heads after opening the tap at a high flow for approximately five minutes. Sample containers were then filled directly from the taps at a low flow.

3.2.2 Monitoring well samples

Samples were collected by first laying clean plastic sheeting on the ground around each well casing. Personnel then accessed each well and determined the total depth (or referred to well logs) and depth to water, then calculated one well volume. A clean or field decontaminated 2-inch submersible pump using clean food-grade polyethylene tubing or a clean, disposable Teflon® or polyethylene bailer, with clean rope, were used to evacuate one well volume (at a low flow if the pump was used). Personnel determined water quality parameters (pH. specific conductivity, and temperature) and evacuation continued until one of three criteria was met: 1) water quality parameters stabilized (pH within 0.1 units, temperature and specific conductivity within 10%) between two consecutive evacuations; 2) three well volumes were removed; or, 3) the well was evacuated dry.

In the event the well was determined to be going dry, a grab sample was collected as soon as the well had recharged sufficiently. Otherwise, once evacuation was complete, the sample was collected by gently lowering a bailer to the bottom of the well and retrieving water back to the surface. A clean, disposable, volatile organic compound (VOC) bottom-emptying device was used to transfer water directly to sample containers.

3.3 Soil Sampling

A membrane interface probe (MIP) was employed to generate soil gas data of the subsurface within and surrounding the boundaries of the former lagoon area. The soil gas data was used, in part, to determine actual sampling locations.

Soil grab samples were collected from discrete depths utilizing a track-mounted hydraulic soil probe. Clean disposable acetate liners were used in conjunction with the soil probe and inserted into stainless steel macro core samplers fitted with clean cutting shoes. The core samplers were advanced to the desired sampling depth via push tubes and the samplers and soil retrieved. The acetate liners were removed and cut open exposing the soil. Personnel immediately collected soils to be submitted for volatile organics analyses with clean EnCore® sampling devices (two 5gm aliquots). An additional aliquot for volatile organics analyses was collected in a 2-oz glass jar, as a backup. Soils to be submitted for the additional analytes of concern were transferred with clean stainless steel spoons to clean aluminum foil pans, homogenized, then placed into appropriate sample containers.

3.4 Sample Quantity

A total of nine soil grab samples and 13 water grab samples were collected during field activities associated with the Former Hulett Lagoon site and submitted to the ESP laboratory for analyses. These sample numbers include quality assurance/quality control samples. Refer to Table 1 for a listing of all samples collected.

3.5 Analyses Requested

Based on the history of the site and HWP data needs, the following analyses were requested. All water grab samples and soil grab samples were submitted for volatile organics and total metals (As, Ba, Cr, Cd, Cu, Pb, Ni, Hg, Se, Ag) analyses. Water grab samples of monitoring wells were also submitted for dissolved metals (same metals as above) analyses. Instructions were relayed to analytical personnel that if a sample's total analyte results were 80% of twenty times the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit, TCLP analysis was to be performed on that sample. Additionally, drinking water detection limits were requested for the public and private well samples, as well as any monitoring well samples, where no contaminants were observed above the standard practical quantitation limits.

3.6 Chain of Custody

All samples received a numbered label and the corresponding number was entered onto a chain of custody form indicating the location, date and time of collection, and analytes requested. Samples were stored and transported on ice in coolers. ESP field personnel maintained custody of the samples until relinquishing them to a sample custodian at the state's environmental laboratory within the Environmental Services Program in Jefferson City for analyses.

4.0 Data Quality

To help ensure precise, accurate, representative, complete, and comparable data were achieved, all field work and analyses were conducted in accordance with the Fiscal Year 1999 Quality Assurance Project Plan for Pre-Remedial Site Assessments dated August 14, 1998. Unless otherwise noted, ESP field personnel utilized standard operating procedures established within the ESP, Field Services Section for all samples collected.

4.1 Field Methods

Clean disposable nitrile gloves were worn by sampling personnel and clean equipment utilized for each separate sample collected to minimize the possibility of cross-contamination.

Field personnel noted all observations, sample locations, descriptions, and methods in a bound field logbook.

4.2 Field Decontamination

Field decontamination of sampling equipment was not required during the sampling event.

4.3 Quality Assurance/Quality Control Samples

4.3.1 Trip blank

One trip blank was submitted for the sampling event. The trip blank was taken to the field and accompanied water grab samples collected and transported back to the ESP laboratory. The trip blank received a numbered label, was entered onto the chain-of-custody form, and submitted for volatile organics analyses.

4.3.2 Duplicate samples (waters)

Two duplicate water grab samples were collected/submitted for the sampling event. The duplicate samples were collected at the same location and time as their respective true samples, using similar technique and equipment. Each duplicate sample received a numbered label, was entered onto the chain-of-custody form, and submitted for the same analytes as their respective true samples.

4.3.3 Replicate sample (soil)

One replicate soil grab sample was collected/submitted for the sampling event. The replicate sample was collected by dividing the true sample evenly into two separate samples and submitting each for laboratory analyses. The portion of each true/replicate sample pair submitted for volatile organics was not homogenized prior to collection. The remaining soil was homogenized prior to splitting the true sample into two samples. The replicate sample received a numbered label, was entered onto the chain-of-custody form, and submitted for the same analytes as its true sample.

5.0 Investigation Derived Wastes (IDW)

Efforts were made to minimize IDW generation. IDW included soil, aqueous liquids (groundwater), disposable sampling equipment, and disposable personal protective equipment (PPE).

Field personnel returned unused soils to their source immediately after generation. IDW generated during private and public well evacuation was discharged to the ground. IDW generated during monitoring well evacuations was containerized and discharged to the Modine Manufacturing Company's pretreatment wastewater system. Disposable PPE and disposable sampling equipment were handled as solid waste, containerized, and properly disposed.

6.0 Observations

6.1 General

A significant snow event occurred on January 2, 1999. As a result of the snow-cover diminishing ground visibility and equipment access, field activities conducted on January 6-7, 1999, were limited to the collection of groundwater samples only. The weather on January 6, 1999, was sunny and approximately 30 degrees Fahrenheit with winds light and variable. The weather on January 7, 1999, was overcast and approximately 10 degrees Fahrenheit with winds light and variable.

Personnel returned to the site on January 21, 1999, once snow had melted, to conduct the soil/source investigation and sampling. The weather on January 21, 1999, was overcast and ranged from 40 to 45 degrees Fahrenheit with winds light and variable Light, intermittent rains occurred throughout the day.

GPS coordinates of all sampling points were post-processed at ESP and entered onto a map of the site. Refer to Table 2 for a listing of all sampling point coordinates and Appendix A for the locations of all samples collected.

6.2 Groundwater Sampling

As to not interfere with any planned investigations under the RCRA Corrective Action Abatement Order, work conducted on the Modine Manufacturing facility property was limited to collecting groundwater samples from monitoring wells located on the facility property (no soil investigations were conducted on the Modine Manufacturing property).

Personnel were required to make adjustments to the monitoring well sampling procedures due to the considerable depths of the monitoring wells (depths ranged from 161 to 197 feet) and well diameters. Due to the significant well depths, personnel were not able to accurately field-determine the depth of each well and, instead, relied upon well logs to determine the total depths

of several wells. As a result of the considerable well volumes associated with the 4-inch monitoring wells, personnel recorded water quality parameters at timed intervals, instead of after each well volume, to determine when the parameters were stable and acceptable to collect a sample. This procedure minimized the volume of evacuation water which was generated. Personnel ensured water quality parameters had stabilized in each well prior to sample collection.

An obstruction in the well casing was encountered in monitoring well (MW-) 2, a two-inch well installed by MDNR, at the approximate 150 foot depth, which did not allow personnel to extend the submersible pump to the screened depth for evacuation. Personnel were able to reach the bottom of the well with a clean, disposable bailer and clean rope, which was used to complete evacuation and sampling.

With HWP personnel's knowledge and permission, ESP collected two grab samples for volatile organics analyses from MW-4 to tentatively compare the effects varying collection methods have on analytical results. One sample (991461) was collected using the submersible pump and the second sample (991462) was collected using a bailer. There were no apparent significant discrepancies noted in the analytical results of the two samples that could be attributed to the collection methods.

MW-3 was evacuated dry after approximately 20 gallons were removed (1 well volume was calculated to be 11 gallons). Therefore, the well was allowed to recharge sufficiently, and the grab sample was collected with a bailer.

ESP personnel collected two sets of 40-ml vials for volatile organics analyses on all water grab samples collected on January 6-7, 1999. The first set of vials in each sample was submitted for volatile organics analyses using the standard practical quantitation limits for water samples (as specified in the QAPP). Per a request from HWP, in the event contaminant levels in a given sample were low enough, the second set of vials was analyzed to realize the lower drinking water detection limits.

All samples collected from public and private wells were noted to be clear and colorless. The descriptions of samples collected from monitoring wells were noted as follows (turbidity was determined in the field and is reported in nephelometric units (NTUs)). There were no separate, free-phase liquids noted in any of the water grab samples.

MW-1	Slightly cloudy (143 NTUs) and light white in color.
MW-2	Cloudy (372 NTUs) and light white in color.
MW-3	Cloudy (951 NTUs) and light reddish-brown in color.
MW-4	Slightly cloudy (86.6 NTUs) and light brown in color.
MW-5	Cloudy (456 NTUs) and transparent white in color.

Refer to Table 3 for monitoring well information.

6.3 Soil Sampling

During the MIP investigation and soil sampling, personnel generally encountered refusal at depths ranging from five to six feet at the former lagoon. A total of ten MIP borings were performed in and around the former lagoon during the field activities. Samples were collected from specific MIP locations based upon the soil gas data generated and the boring locations relative to the areas of concern. Soil samples collected were generally noted to consist of reddish-brown cherty clays with varying amounts of gravel interspersed. Due to the nature of the matrix, sample homogenization was difficult.

Personnel unsuccessfully attempted to collect depth-discrete sediment/soil samples of the intermittent drainage which receives surface drainage from the former lagoon area (as proposed in the sampling plan). Due to the gravel/rock matrix of the drainage bed, no adequate samples could be collected.

Refer to Appendix B for the MIP data logs generated for each boring and the site map for the MIP boring and soil sampling locations. The logs indicate detections noted on the MIP's PID, identified as "Detector 1" and the flame ionization detector "Detector 2".

7.0 Analytical Results

The analytical results of samples collected are attached as Appendix C.

Submitted by:

Brian J. Allen
Environmental Specialist
Superfund/RCRA Unit
Environmental Services Program

Date: 3/12/99

Approved by:

James H. Long
Director
Environmental Services Program

JHL:bac

c: Valerie Wilder, Environmental Specialist, HWP
Robert Hentges, Regional Director, JCRO

TABLES
Former Hulett Lagoon Site
Camdenton, Missouri

Table 1
Former Hulett Lagoon Site
Sample Listing

Sample #	Sample Media/Type	Location Collected	Date/Time Collected
991450	QA/QC sample (Trip blank)	ESP laboratory	1/5/99
991451	Water grab	Paul Buckwalter residential well (Box 45A Normac Estates, Camdenton, MO), located apparently downgradient of the former Hulett Lagoon approximately 2 miles Sample collected after approximately 5 minutes evacuation	1/6/99 @ 1025
991452	Water grab	Dave Burnau residential well (178 Sunset Drive, Camdenton, MO), located directly north (across the street) of Modine Manufacturing Sample collected after approximately 5 minutes evacuation time.	1/6/99 @ 1105
991453	QA/QC sample (Duplicate)	Duplicate sample of 991452	1/6/99 @ 1105
991458	Water grab	City of Camdenton municipal well #4 (AKA "Blair" well) Sample collected after approximately 5 minutes evacuation time	1/6/99 @ 1305
991459	Water grab	City of Camdenton municipal well known as the "Mulberry" well Sample collected after approximately 5 minutes evacuation time	1/6/99 @ 1325
991460	Water grab	Monitoring well (MW-) 3, located on the south edge of the Modine Manufacturing facility lot, southwest of the facility building	1/6/99 @ 1530
991461	Water grab	MW-4, located at the main entrance to Modine Manufacturing All sample analytes collected using a submersible pump.	1/6/99 @ 1650
991462	Water grab	MW-4. Sample submitted for volatile organics analyses and collected with a bailer. Sample was collected to compare results with 991461 analytical results for volatile organics.	1/6/99 @ 1720
991463	Water grab	MW-2, located on the northeast side of the Modine Manufacturing facility building Sample was collected with a bailer.	1/7/99 @ 0940
991464	Water grab	MW-1, located in the western gravel parking lot of the Modine Manufacturing facility property. Sample was collected with a bailer.	1/7/99 @ 1100
991465	Water grab	MW-5, located adjacent, southwest edge, of the former Hulett Lagoon. Sample was collected with a bailer.	1/7/99 @ 1230
991466	QA/QC sample (Duplicate)	Duplicate sample of 991465.	1/7/99 @ 1230
991467	Soil grab	Boring "Hulett-03", collected from the 3-4 ft depth.	1/21/99 @ 1030
991468	Soil grab	Boring "Hulett-03", collected from the 4.5-5.5 ft depth.	1/21/99 @ 1045
991469	Soil grab	Boring "Hulett-01", collected from the 4 5-5 ft depth	1/21/99 @ 1135
991470	Soil grab	Boring "Hulett-02", collected from the 6 5-7 ft depth.	1/21/99 @ 1205
991471	Soil grab	Boring "Hulett-04", collected from the 7.5-8 ft depth.	1/21/99 @ 1355
991472	Soil grab	Boring "Hulett-07", collected from the 5.5-6 ft depth.	1/21/99 @ 1450
991473	Soil grab	Boring "Hulett-09", collected from the 6-7 ft depth	1/21/99 @ 1605
991474	QA/QC sample (Replicate)	Replicate sample of 991473	1/21/99 @ 1605
991475	Soil grab	Boring "Hulett-10", collected from the 10 5-11 ft depth	1/21/99 @ 1630

Table 2
Former Hulett Lagoon Site
GPS Data Points

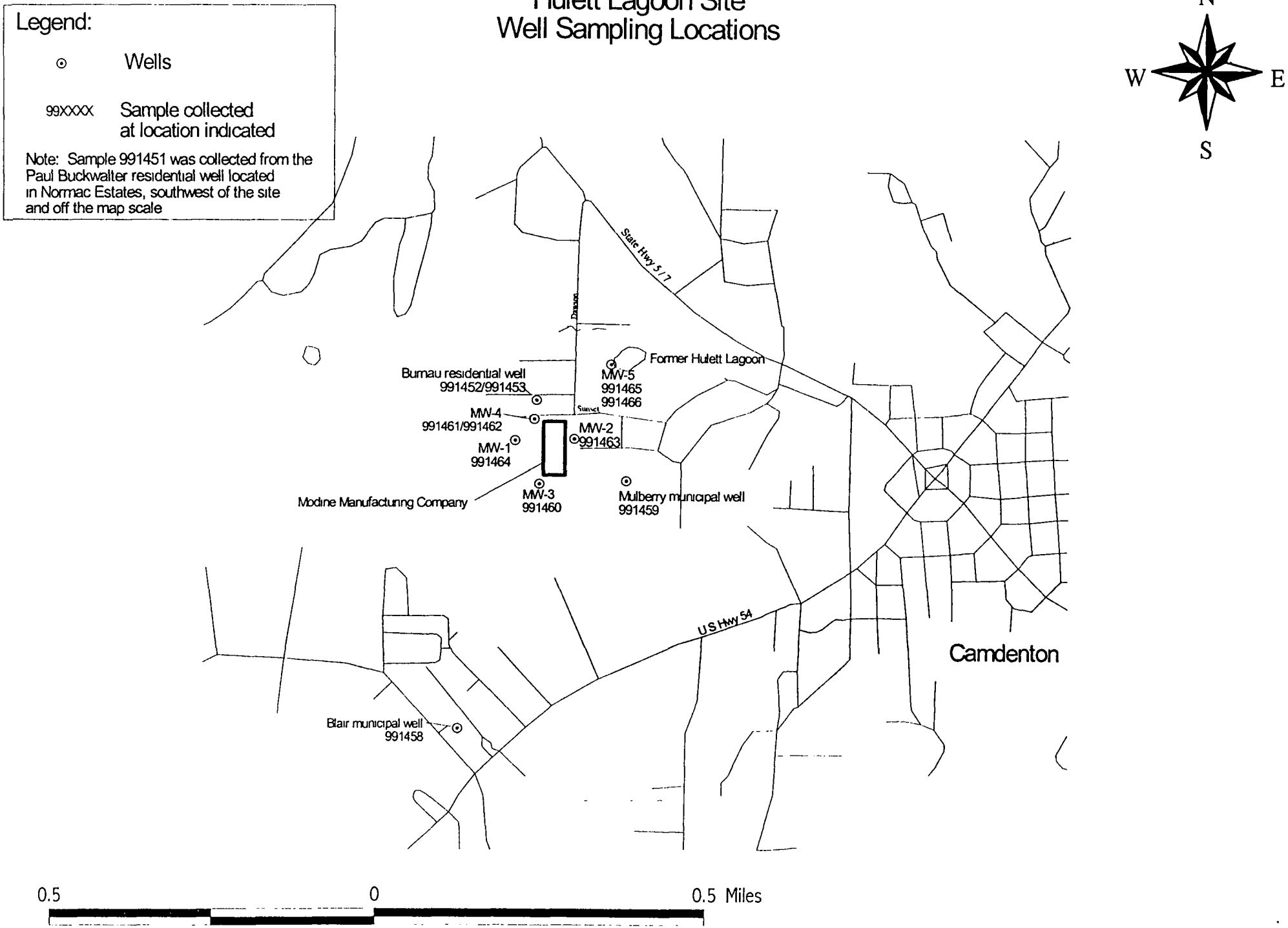
GPS Identification	Location/ Description	Latitude (Degrees N)	Longitude (Degrees W)	ArcView Data Points (UTM)	
				Easting	Northing
A010619A	"Blair" municipal well	+38 001726°	-92.760299°	521045	4206034
A010619B	"Mulberry" municipal well	+38.008235°	-92.754798°	521526	4206757
A010620A	MW-3 Modine Mfr.	+38.008161°	-92.757634°	521277	4206748
A010623A	MW-4 Modine Mfr.	+38 009836°	-92.757792°	521262	4206934
A010714A	MW-2 Modine Mfr.	+38.009324°	-92.756490°	521377	4206877
A010716A	MW-1 Modine Mfr	+38.009287°	-92 758428°	521207	4206873
A010717A	MW-5 Former lagoon	+38.011261°	-92.755284°	521482	4207093
A010617A	Burnau residential well	+38 010320°	-92.757711°	521269	4206988
A010519A	Buckwalter residential well	+38 000833°	-92.786944°	521269	4206988
A012115A	Boring "Hulett 01"	+38 011315°	-92 755011°	521506	4207099
A012115B	Boring "Hulett 02"	+38.011403°	-92 754850°	521520	4207109
A012116A	Boring "Hulett 03"	+38.011508°	-92 754867°	521519	4207120
A012119A	Boring "Hulett 04"	+38.011421°	-92.754655°	521496	4207096
A012120A	Boring "Hulett 05"	+38.011291°	-92.755130°	521495	4207109
A012120B	Boring "Hulett 06"	+38 011406°	-92.755135°	521505	4207120
A012120C	Boring "Hulett 07"	+38 011507°	-92.755024°	521487	4207123
A012120D	Boring "Hulett 08"	+38.011531°	-92.755222°	521481	4207106
A012121A	Boring "Hulett 09"	+38 010986°	-92 754827°	521537	4207111
A012122A	Boring "Hulett 10"	+38 011379°	-92 755299°	521522	4207062

Table 3
Former Hulett Lagoon Site
Monitoring Well Data

Well Identification	Diameter (inches)/ Riser construction	Total well depth (feet) from TOC	Depth to water (feet) from TOC	Water column (feet)	One well volume (gallons)
MW-1	2" PVC	161' (per well log)	153.22	7.78	1.2
MW-2	2" PVC	197' (per well log)	165.72	31.28	5.1
MW-3	4" Metal	170' (per well log)	153.12	16.88	11
MW-4	4" Metal	194.3' (per well log)	158.55	35.75	23.3
MW-5	2" PVC	120.4' (field determined)	102.75	17.65	2.8

APPENDIX A
Site Maps
Former Hulett Lagoon Site
Camdenton, Missouri

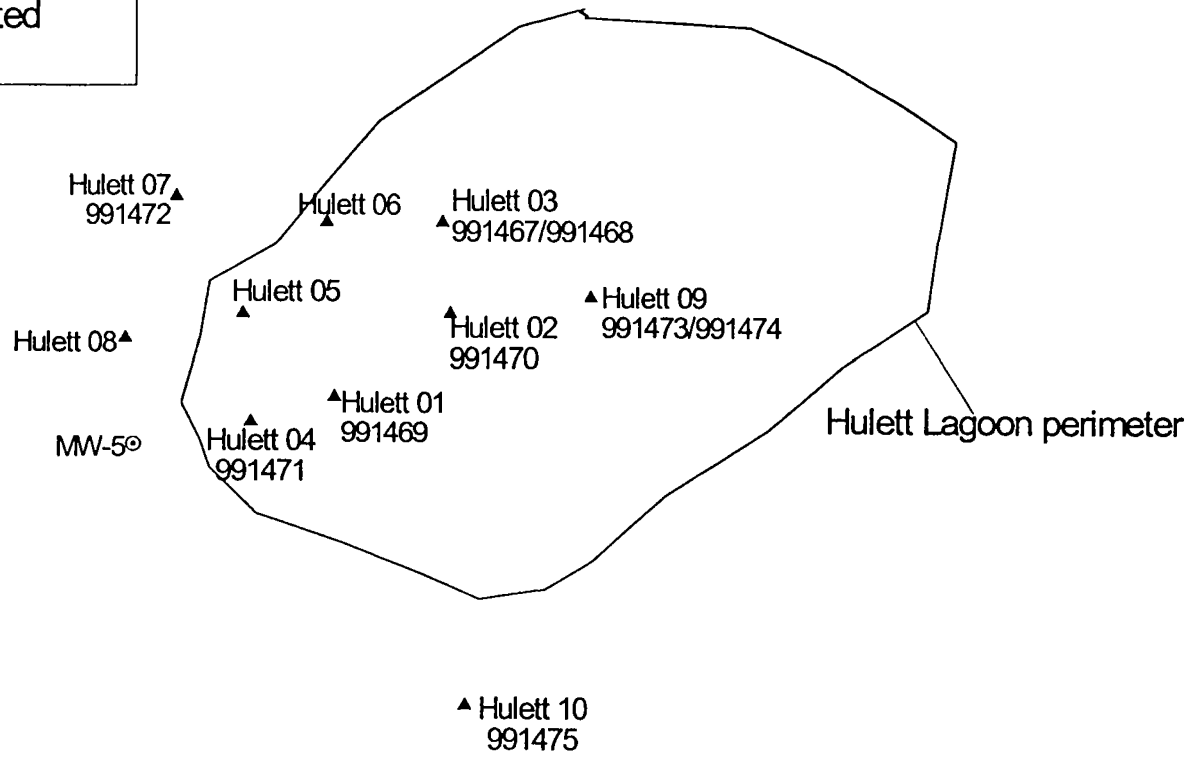
Hulett Lagoon Site
Well Sampling Locations



Hulett Lagoon Site
Soil Sampling Locations

Legend:

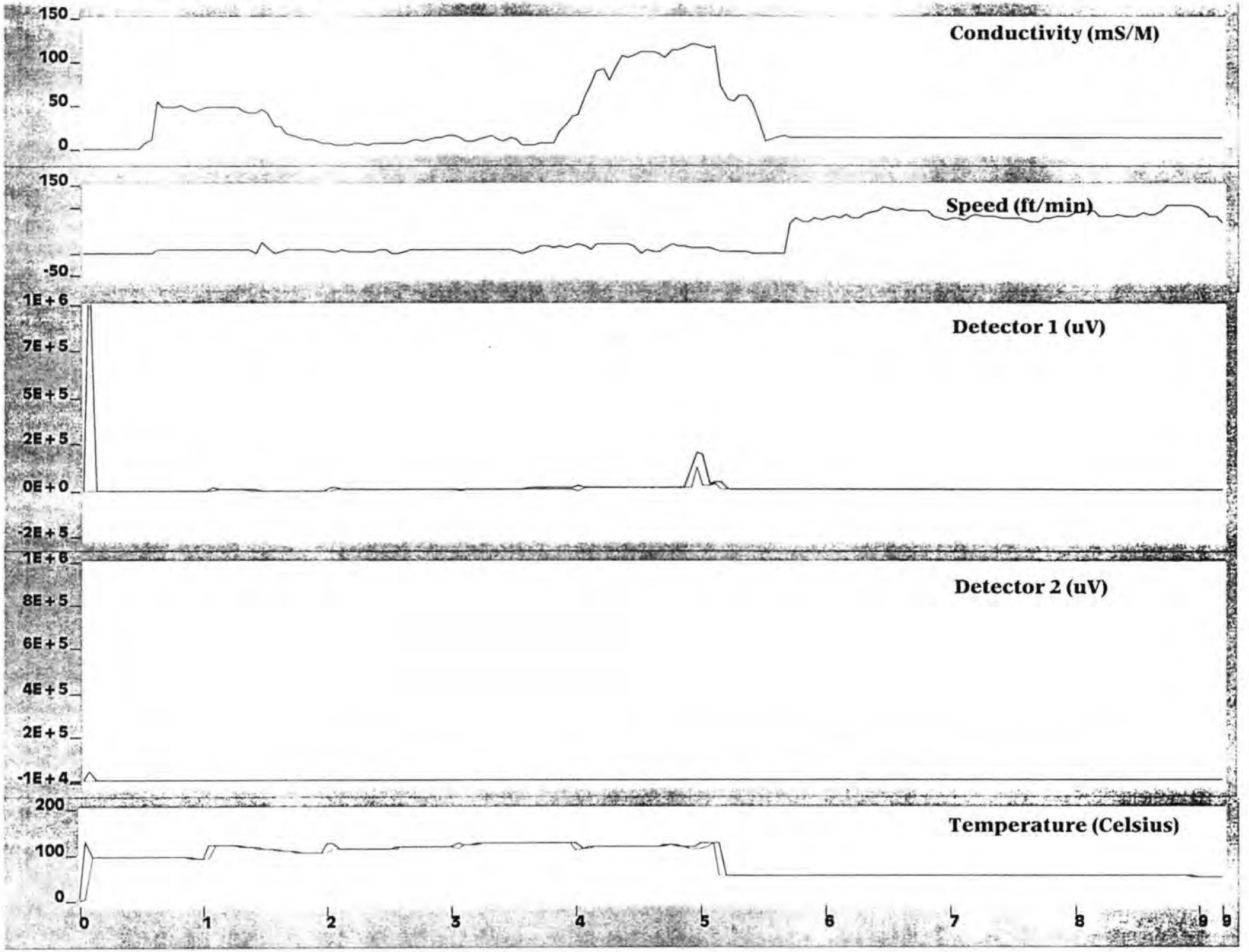
▲	MIP/Soil boring locations/ identifications
⊙	Monitoring well location/ identification
99XXXX	Sample collected at location indicated



300 0 300 Feet

APPENDIX B
MIP Data Logs
Former Hulett Lagoon Site
Camdenton, Missouri

Log: C:\DIRIM95\LOGFILES\Hulett01.dat



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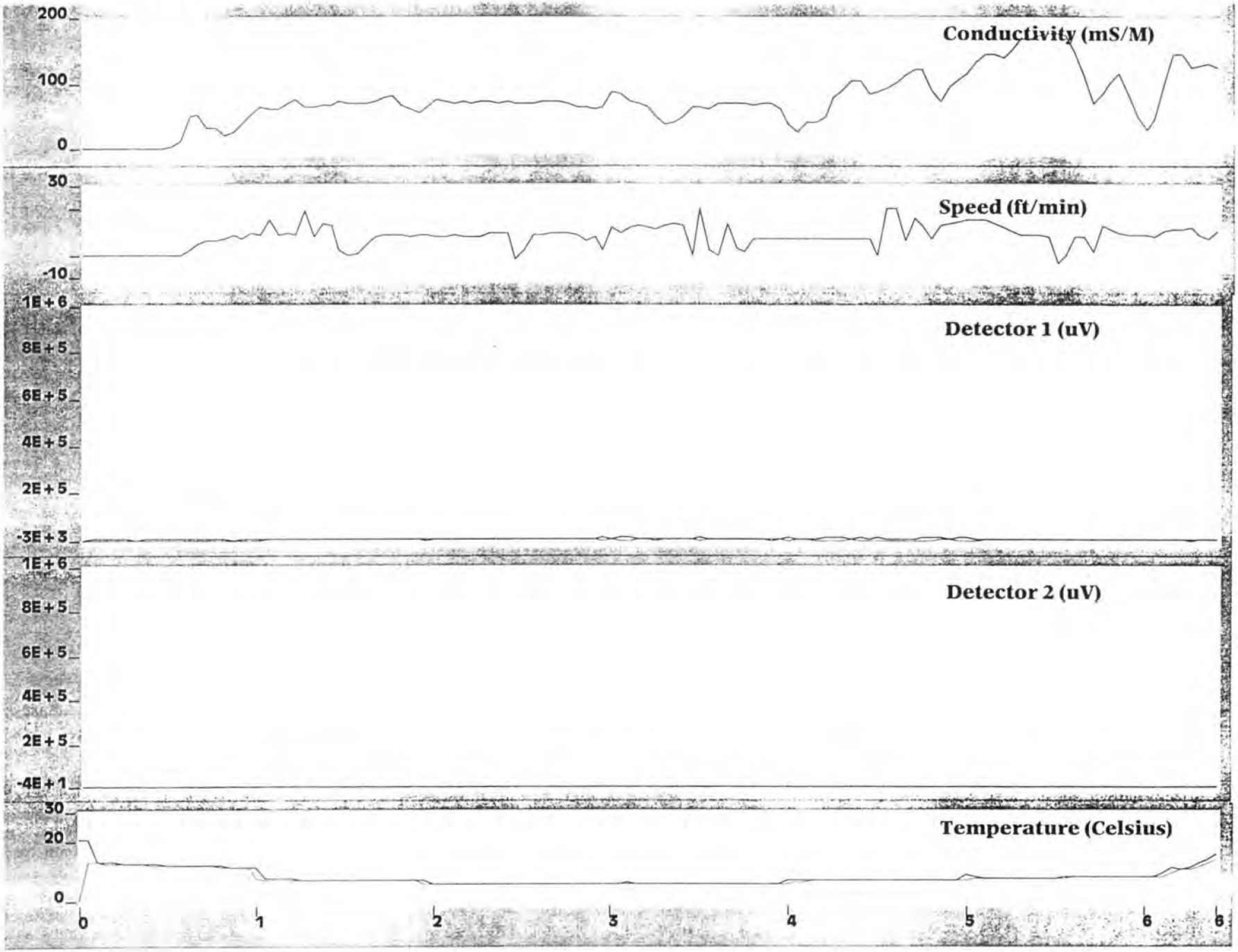

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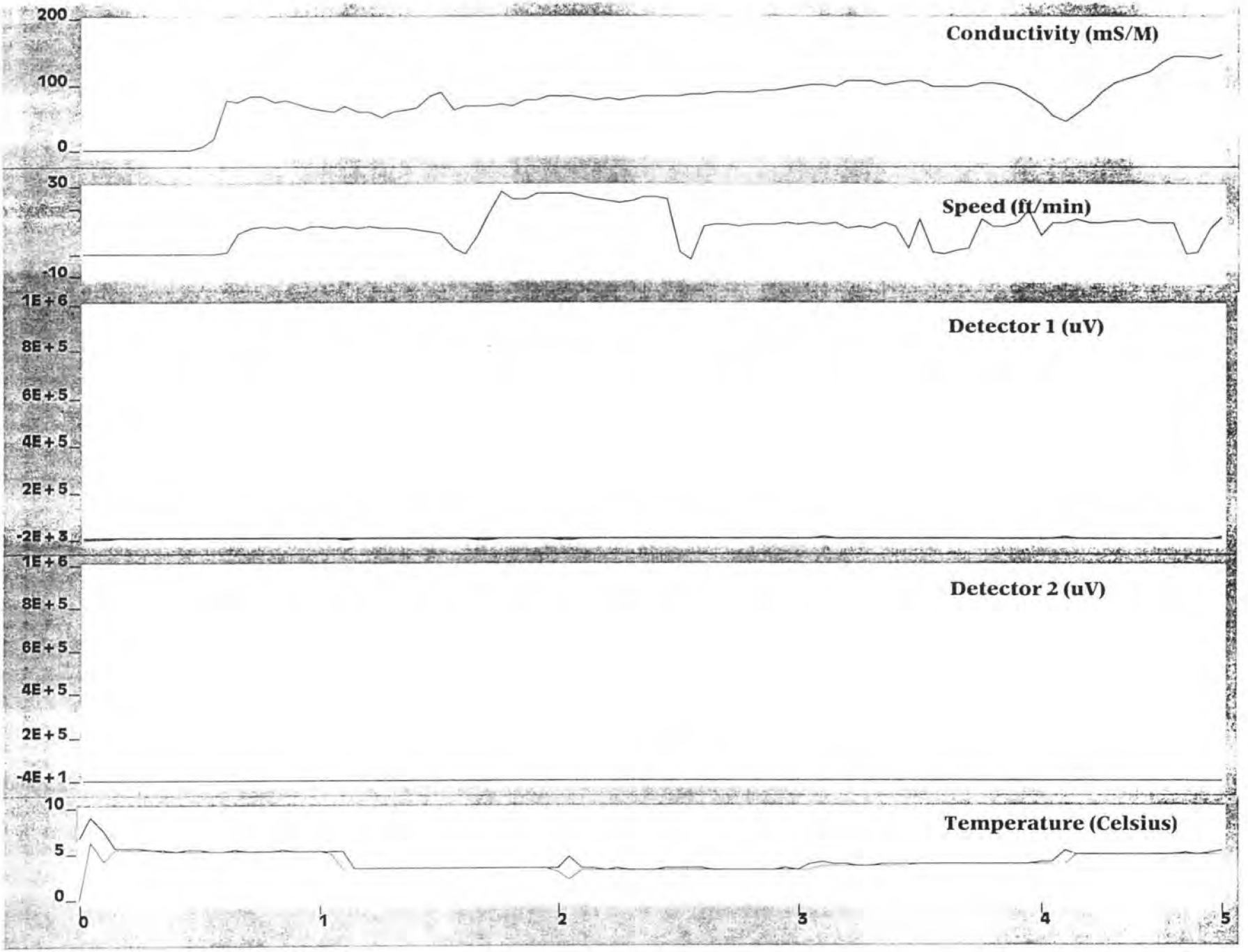

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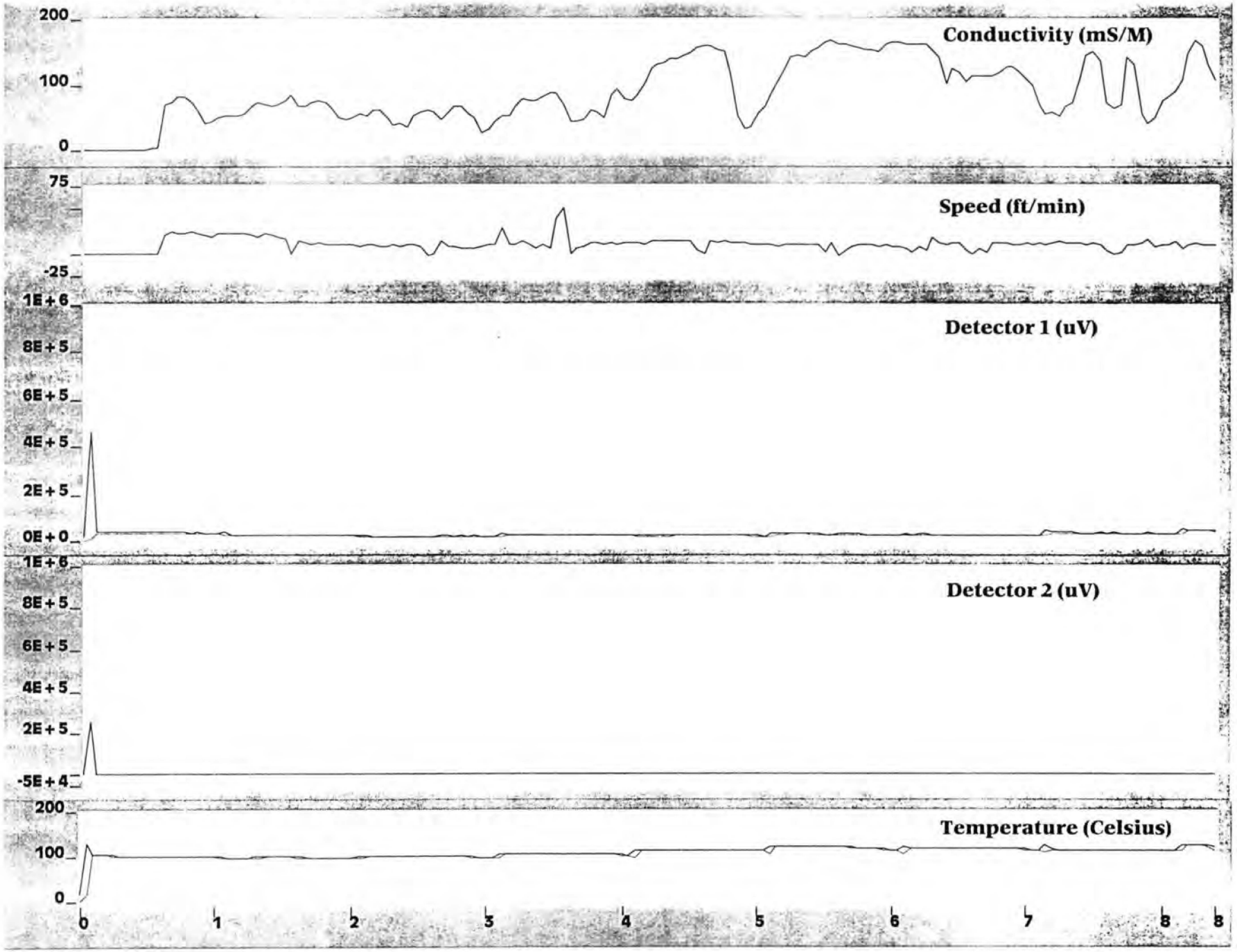

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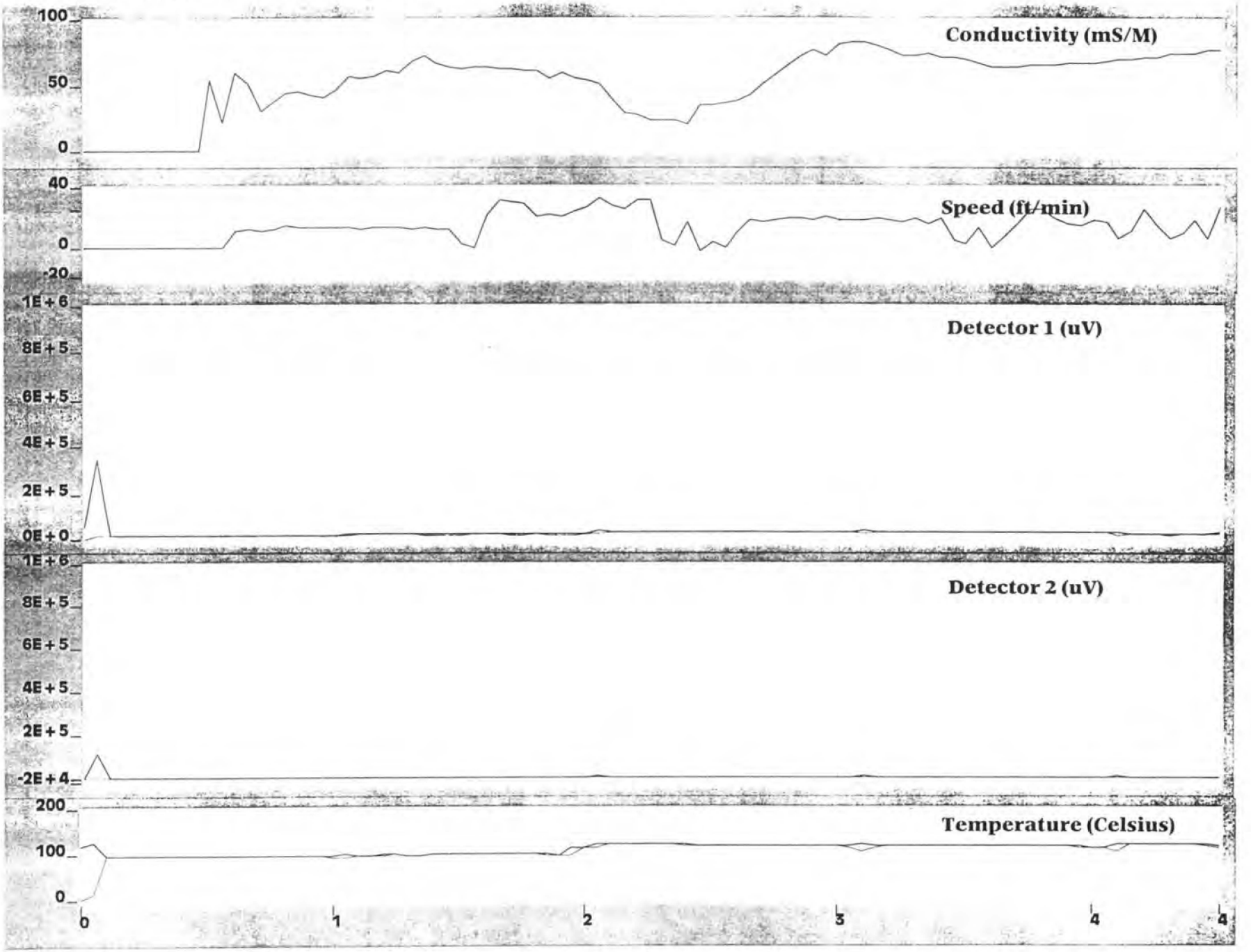

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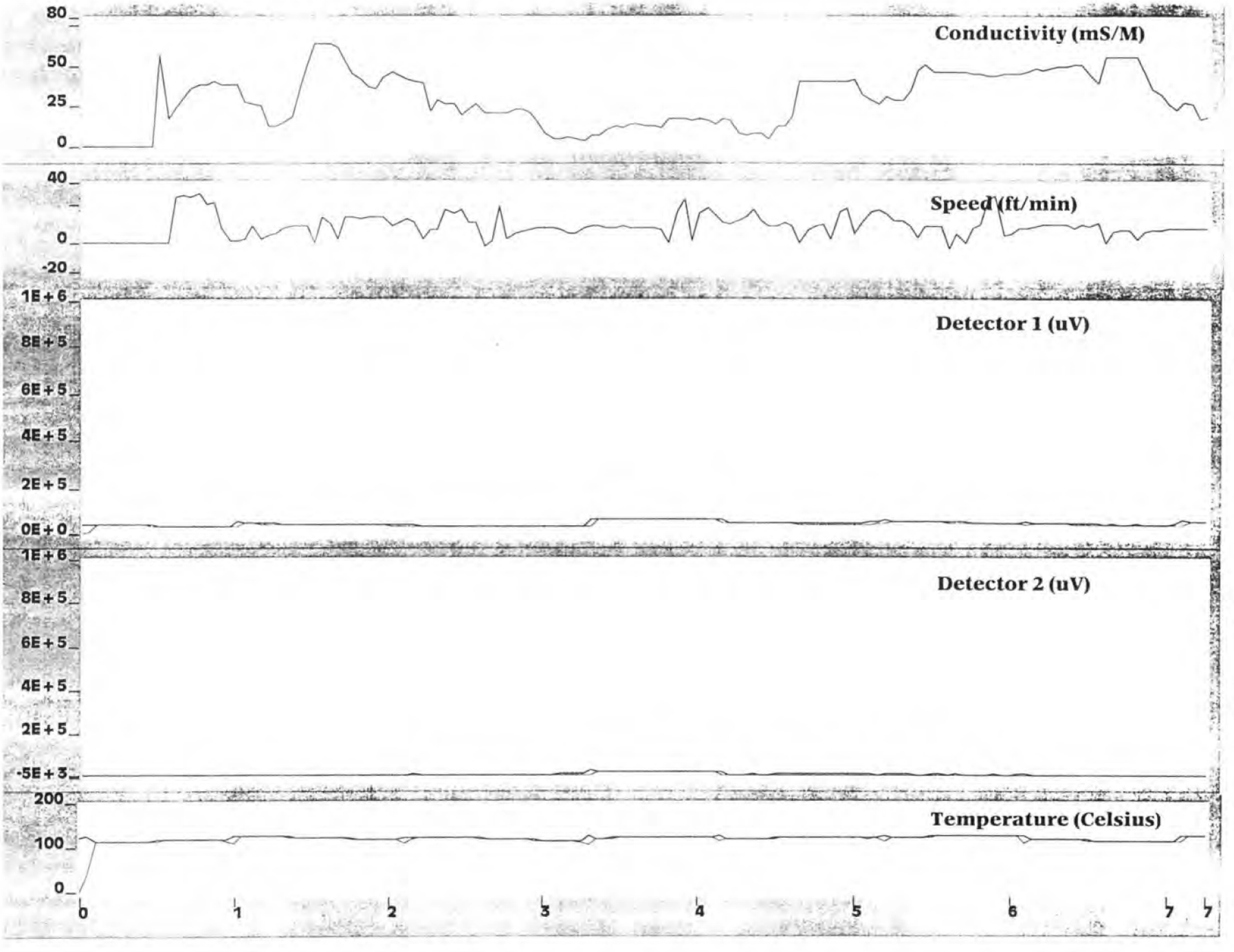

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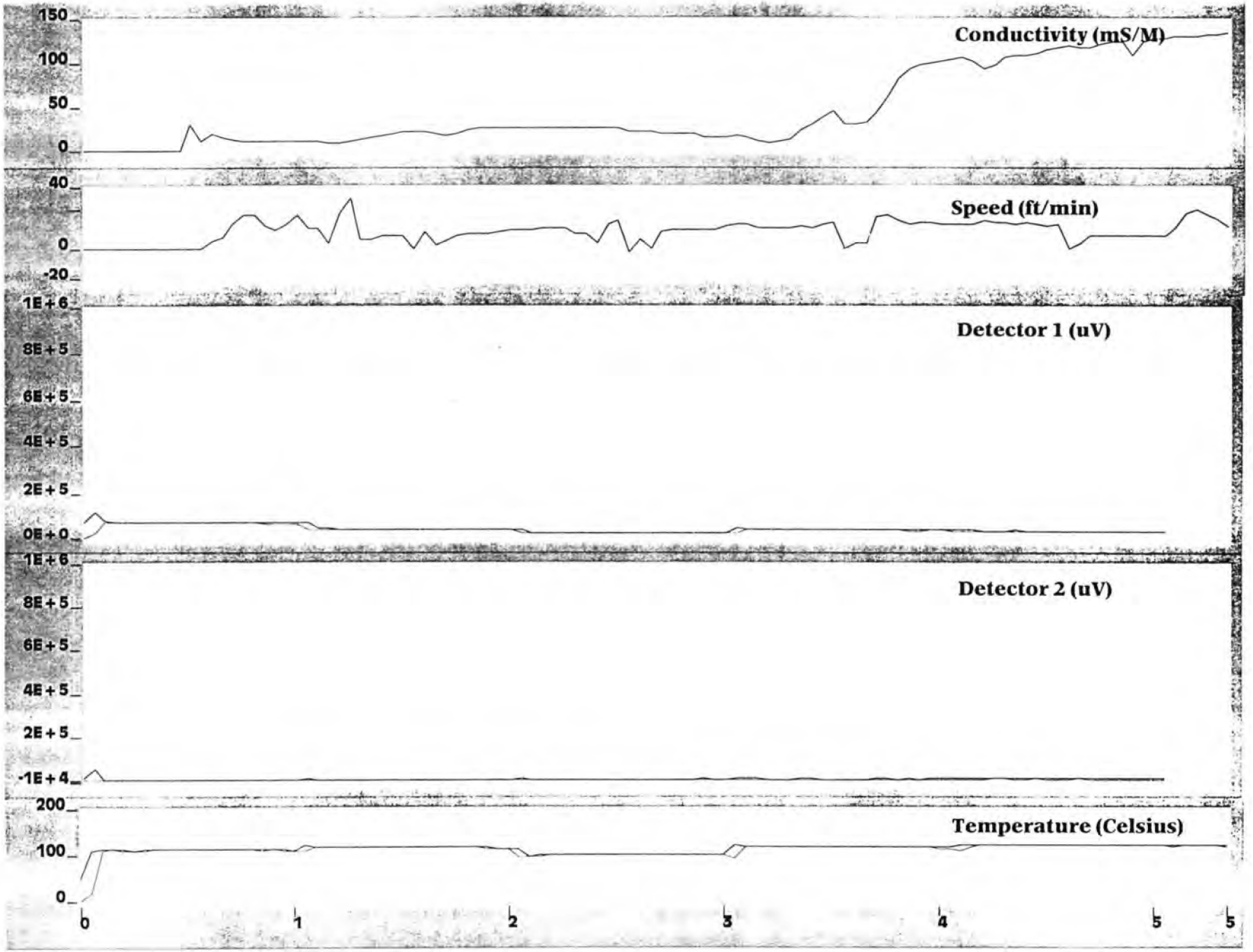

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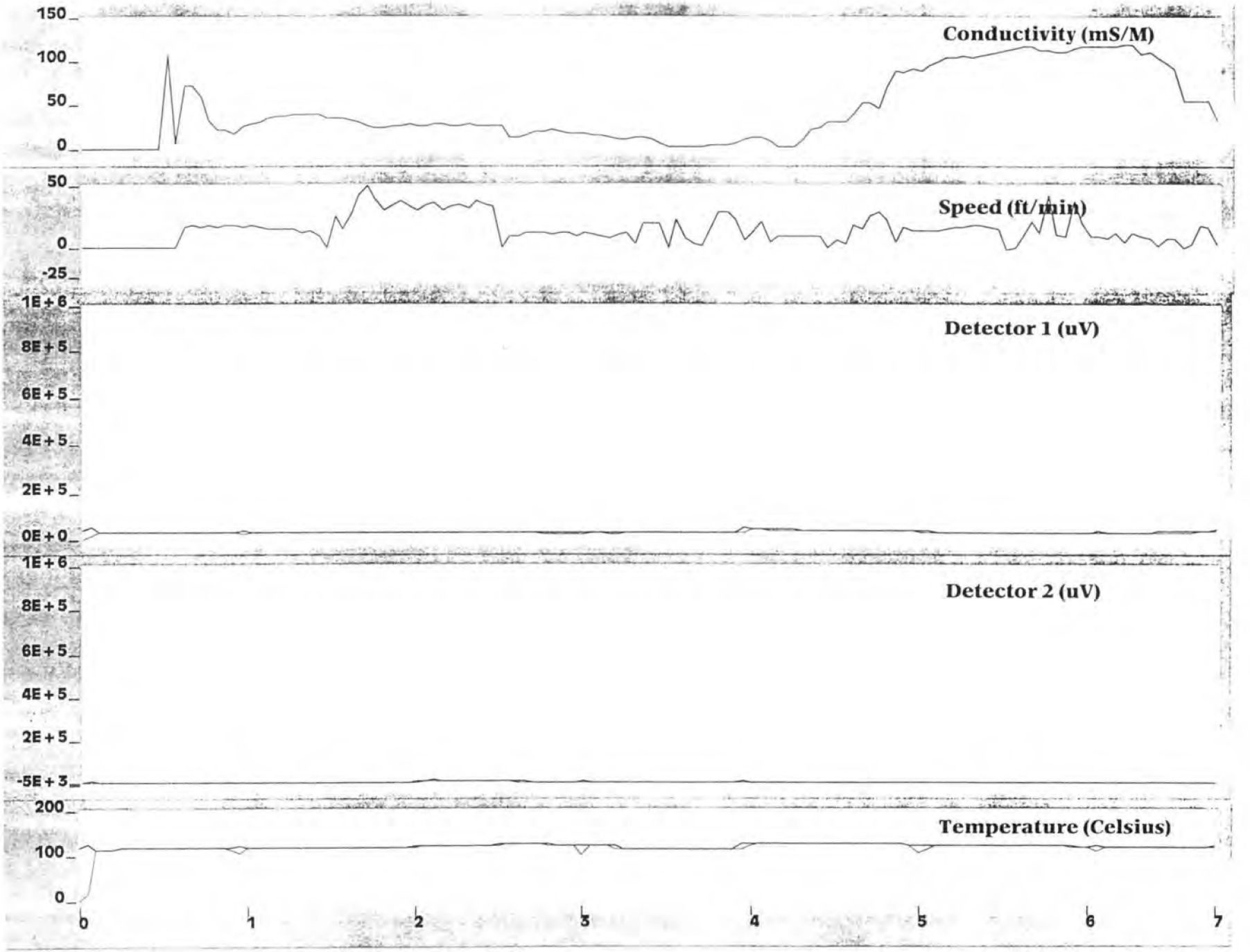
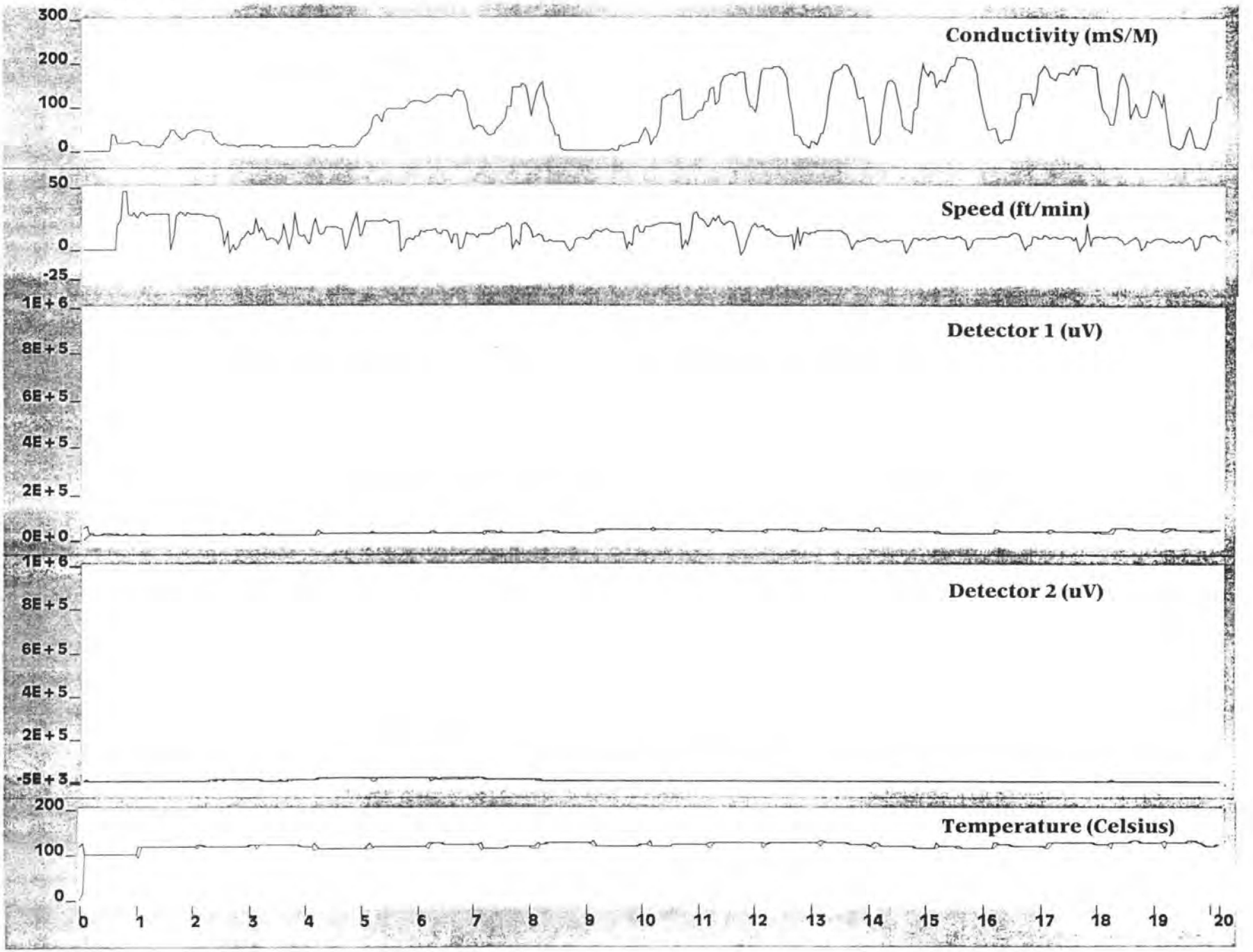


Log: C:\DIRIM95\LOGFILES\Hulett09.dat



APPENDIX C
Analytical Results
Former Hulett Lagoon Site
Camdenton, Missouri

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991450
Lab Number: 99-D9

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 1/26/99
Date Collected: 1/ 5/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: TRIP BLANK
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/12/99	502.2
Chloromethane	< 2.5	ug/L	1/12/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/12/99	502.2
Bromomethane	< 9.0	ug/L	1/12/99	502.2
Chloroethane	< 2.5	ug/L	1/12/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/12/99	502.2
1,1-Dichloroethene	< 0.5	ug/L	1/12/99	502.2
Methylene Chloride	< 0.5	ug/L	1/12/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/12/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/12/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/12/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/12/99	502.2
cis-1,2-Dichloroethene	< 0.5	ug/L	1/12/99	502.2
Chloroform	4.6	ug/L	1/12/99	502.2
Bromochloromethane	< 1.0	ug/L	1/12/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/12/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/12/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/12/99	502.2
Benzene	< 0.5	ug/L	1/12/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/12/99	502.2
Trichloroethene	< 0.5	ug/L	1/12/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/12/99	502.2
Bromodichloromethane	< 0.5	ug/L	1/12/99	502.2
Dibromomethane	< 1.0	ug/L	1/12/99	502.2

Recycled Paper

Lab Number: 99-D9
Sample Number: 991450
January 26, 1999

Analysis Performed	Results		Analyzed	Method
cis-1,3-Dichloropropane	< 2.0	ug/L	1/12/99	502.2
Toluene	< 0.6	ug/L	1/12/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/12/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/12/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/12/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/12/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/12/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/12/99	502.2
Chlorobenzene	< 0.5	ug/L	1/12/99	502.2
Ethylbenzene	< 0.5	ug/L	1/12/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/12/99	502.2
Total Xylenes	< 0.5	ug/L	1/12/99	502.2
Styrene	< 0.5	ug/L	1/12/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/12/99	502.2
Bromoform	< 0.5	ug/L	1/12/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/12/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/12/99	502.2
n-Propylbenzene	< 2.0	ug/L	1/12/99	502.2
Bromobenzene	< 1.0	ug/L	1/12/99	502.2
2-Chlorotoluene	< 2.0	ug/L	1/12/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/12/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/12/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/12/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/12/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/12/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/12/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/12/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/12/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/12/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/12/99	502.2
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/12/99	502.2
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/12/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/12/99	502.2
Naphthalene	< 20.0	ug/L	1/12/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/12/99	502.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991451
Lab Number: 99-D10

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: WATER GRAB OF PAUL BUCKWALTER RESIDENTIAL WELL (BOX 45A, NORMAC ESTATES)
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	918	umhos/cm	1/ 6/99	120.1
Comment: Analyzed in field				
pH	7.03		1/ 6/99	150.1
Comment: Analyzed in field				
Temperature - C	15	Degrees C	1/ 6/99	
Comment: Analyzed in field				
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	62.8	ug/L	1/13/99	200.7
Cadmium, Total	< 1.00	ug/L	1/13/99	200.7
Chromium, Total	< 2.00	ug/L	1/13/99	200.7
Copper, Total	44.7	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	< 3.00	ug/L	1/13/99	200.7
Lead, Total	< 2.5	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/12/99	502.2
Chloromethane	< 2.5	ug/L	1/12/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/12/99	502.2
Bromomethane	< 9.0	ug/L	1/12/99	502.2
Chloroethane	< 2.5	ug/L	1/12/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/12/99	502.2

Recycled Paper

Lab Number: 99-D10
Sample Number: 991451
February 10, 1999

Analysis Performed	Results		Analyzed	Method
1,1-Dichloroethene	< 0.5	ug/L	1/12/99	502.2
Methylene Chloride	< 0.5	ug/L	1/12/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/12/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/12/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/12/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/12/99	502.2
cis-1,2-Dichloroethene	< 0.5	ug/L	1/12/99	502.2
Chloroform	< 0.5	ug/L	1/12/99	502.2
Bromochloromethane	< 1.0	ug/L	1/12/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/12/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/12/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/12/99	502.2
Benzene	< 0.5	ug/L	1/12/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/12/99	502.2
Trichloroethene	< 0.5	ug/L	1/12/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/12/99	502.2
Bromodichloromethane	< 0.5	ug/L	1/12/99	502.2
Dibromomethane	< 1.0	ug/L	1/12/99	502.2
cis-1,3-Dichloropropane	< 2.0	ug/L	1/12/99	502.2
Toluene	< 0.6	ug/L	1/12/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/12/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/12/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/12/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/12/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/12/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/12/99	502.2
Chlorobenzene	< 0.5	ug/L	1/12/99	502.2
Ethylbenzene	< 0.5	ug/L	1/12/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/12/99	502.2
Total Xylenes	< 0.5	ug/L	1/12/99	502.2
Styrene	< 0.5	ug/L	1/12/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/12/99	502.2
Bromoform	< 0.5	ug/L	1/12/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/12/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/12/99	502.2
n-Propylbenzene	< 2.0	ug/L	1/12/99	502.2
Bromobenzene	< 1.0	ug/L	1/12/99	502.2
2-Chlorotoluene	< 2.0	ug/L	1/12/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/12/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/12/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/12/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/12/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/12/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/12/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/12/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/12/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/12/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/12/99	502.2

Lab Number: 99-D10
Sample Number: 991451
February 10, 1999

Analysis Performed	Results		Analyzed	Method
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/12/99	502.2
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/12/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/12/99	502.2
Naphthalene	< 20.0	ug/L	1/12/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/12/99	502.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991452
Lab Number: 99-D11

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF DAVE BURNAN RESIDENTIAL WELL (178 SUNSET DR), LOCATED DIRECTLY NORTH OF MODINE MFG
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	649	umhos/cm	1/ 6/99	120.1
Comment: Analyzed in field				
pH	7.55		1/ 6/99	150.1
Comment: Analyzed in field				
Temperature - C	12	Degrees C	1/ 6/99	
Comment: Analyzed in field				
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	67.5	ug/L	1/13/99	200.7
Cadmium, Total	< 1.00	ug/L	1/13/99	200.7
Chromium, Total	< 2.00	ug/L	1/13/99	200.7
Copper, Total	27.5	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	11.2	ug/L	1/13/99	200.7
Lead, Total	< 2.5	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOA Results:				
Chloromethane	< 5.0	ug/L	1/14/99	8260
Vinyl Chloride	< 5.0	ug/L	1/14/99	8260
Bromomethane	< 5.0	ug/L	1/14/99	8260
Chloroethane	< 5.0	ug/L	1/14/99	8260
1,1-Dichloroethene	< 5.0	ug/L	1/14/99	8260
Acetone	< 20.0	ug/L	1/14/99	8260

Recycled Paper

Lab Number: 99-D11
Sample Number: 991452
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Carbon Disulfide	< 5.0	ug/L	1/14/99	8260
Methylene Chloride	< 20.0	ug/L	1/14/99	8260
Methyl Tert-Butyl Ether	< 5.0	ug/L	1/14/99	8260
trans-1,2-Dichloroethene	< 5.0	ug/L	1/14/99	8260
1,1-Dichloroethane	< 5.0	ug/L	1/14/99	8260
2-Butanone	< 20.0	ug/L	1/14/99	8260
cis-1,2-Dichloroethene	13.0	ug/L	1/14/99	8260
Chloroform	< 5.0	ug/L	1/14/99	8260
1,1,1-Trichloroethane	< 5.0	ug/L	1/14/99	8260
Carbon Tetrachloride	< 5.0	ug/L	1/14/99	8260
Benzene	< 5.0	ug/L	1/14/99	8260
1,2-Dichloroethane	< 5.0	ug/L	1/14/99	8260
Trichloroethene	240	ug/L	1/14/99	8260
1,2-Dichloropropane	< 5.0	ug/L	1/14/99	8260
Bromodichloromethane	< 5.0	ug/L	1/14/99	8260
2-Hexanone	< 20.0	ug/L	1/14/99	8260
Trans-1,3-Dichloropropene	< 5.0	ug/L	1/14/99	8260
Toluene	6.1	ug/L	1/14/99	8260
CIS-1,3-Dichloropropene	< 5.0	ug/L	1/14/99	8260
1,1,2-Trichloroethane	< 5.0	ug/L	1/14/99	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	1/14/99	8260
Tetrachloroethene	< 5.0	ug/L	1/14/99	8260
Dibromochloromethane	< 5.0	ug/L	1/14/99	8260
Chlorobenzene	< 5.0	ug/L	1/14/99	8260
Ethylbenzene	5.3	ug/L	1/14/99	8260
Total Xylenes	15.0	ug/L	1/14/99	8260
Styrene	< 5.0	ug/L	1/14/99	8260
Bromoform	< 5.0	ug/L	1/14/99	8260
1,1,2,2-Tetrachloroethane	< 5.0	ug/L	1/14/99	8260
1,3-Dichlorobenzene	< 5.0	ug/L	1/14/99	8260
1,4-Dichlorobenzene	< 5.0	ug/L	1/14/99	8260
1,2-Dichlorobenzene	< 5.0	ug/L	1/14/99	8260

VOA Comments:
A 1:2 dilution was employed to quantitate TCE.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas H. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991453
Lab Number: 99-D12

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF DAVE BURNAN RESIDENTIAL WELL (178 SUNSET DR), LOCATED DIRECTLY NORTH OF MODINE MFG,(DUPL)
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	649	umhos/cm	1/ 6/99	120.1
Comment: Analyzed in field				
pH	7.55		1/ 6/99	150.1
Comment: Analyzed in field				
Temperature - C	12	Degrees C	1/ 6/99	
Comment: Analyzed in field				
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	66.6	ug/L	1/13/99	200.7
Cadmium, Total	< 1.00	ug/L	1/13/99	200.7
Chromium, Total	< 2.00	ug/L	1/13/99	200.7
Copper, Total	16.3	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	60.4	ug/L	1/13/99	200.7
Lead, Total	< 2.5	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOA Results:				
Chloromethane	< 5.0	ug/L	1/14/99	8260
Vinyl Chloride	< 5.0	ug/L	1/14/99	8260
Bromomethane	< 5.0	ug/L	1/14/99	8260
Chloroethane	< 5.0	ug/L	1/14/99	8260
1,1-Dichloroethene	< 5.0	ug/L	1/14/99	8260
Acetone	< 20.0	ug/L	1/14/99	8260

Recycled Paper

Lab Number: 99-D12
Sample Number: 991453
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Carbon Disulfide	< 5.0	ug/L	1/14/99	8260
Methylene Chloride	< 20.0	ug/L	1/14/99	8260
Methyl Tert-Butyl Ether	< 5.0	ug/L	1/14/99	8260
trans-1,2-Dichloroethene	< 5.0	ug/L	1/14/99	8260
1,1-Dichloroethane	< 5.0	ug/L	1/14/99	8260
2-Butanone	< 20.0	ug/L	1/14/99	8260
cis-1,2-Dichloroethene	13.0	ug/L	1/14/99	8260
Chloroform	< 5.0	ug/L	1/14/99	8260
1,1,1-Trichloroethane	< 5.0	ug/L	1/14/99	8260
Carbon Tetrachloride	< 5.0	ug/L	1/14/99	8260
Benzene	< 5.0	ug/L	1/14/99	8260
1,2-Dichloroethane	< 5.0	ug/L	1/14/99	8260
Trichloroethene	230	ug/L	1/14/99	8260
1,2-Dichloropropane	< 5.0	ug/L	1/14/99	8260
Bromodichloromethane	< 5.0	ug/L	1/14/99	8260
2-Hexanone	< 20.0	ug/L	1/14/99	8260
Trans-1,3-Dichloropropene	< 5.0	ug/L	1/14/99	8260
Toluene	< 5.0	ug/L	1/14/99	8260
CIS-1,3-Dichloropropene	< 5.0	ug/L	1/14/99	8260
1,1,2-Trichloroethane	< 5.0	ug/L	1/14/99	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	1/14/99	8260
Tetrachloroethene	< 5.0	ug/L	1/14/99	8260
Dibromochloromethane	< 5.0	ug/L	1/14/99	8260
Chlorobenzene	< 5.0	ug/L	1/14/99	8260
Ethylbenzene	< 5.0	ug/L	1/14/99	8260
Total Xylenes	< 5.0	ug/L	1/14/99	8260
Styrene	< 5.0	ug/L	1/14/99	8260
Bromoform	< 5.0	ug/L	1/14/99	8260
1,1,2,2-Tetrachloroethane	< 5.0	ug/L	1/14/99	8260
1,3-Dichlorobenzene	< 5.0	ug/L	1/14/99	8260
1,4-Dichlorobenzene	< 5.0	ug/L	1/14/99	8260
1,2-Dichlorobenzene	< 5.0	ug/L	1/14/99	8260

VOA Comments:
A 1:2 dilution was employed to quantitate TCE.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards Jr

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991458
Lab Number: 99-D17

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF CAMDENTON CITY WELL #4 (BLAIR WELL)
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	569	umhos/cm	1/ 6/99	120.1
Comment: Analyzed in field				
pH	7.68		1/ 6/99	150.1
Comment: Analyzed in field				
Temperature - C	16	Degrees C	1/ 6/99	
Comment: Analyzed in field				
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	45.3	ug/L	1/13/99	200.7
Cadmium, Total	< 1.00	ug/L	1/13/99	200.7
Chromium, Total	< 2.00	ug/L	1/13/99	200.7
Copper, Total	21.7	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	< 3.00	ug/L	1/13/99	200.7
Lead, Total	4.4	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/13/99	502.2
Chloromethane	< 2.5	ug/L	1/13/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/13/99	502.2
Bromomethane	< 9.0	ug/L	1/13/99	502.2
Chloroethane	< 2.5	ug/L	1/13/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/13/99	502.2
1,1-Dichloroethene	< 0.5	ug/L	1/13/99	502.2

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Lab Number: 99-D17
Sample Number: 991458
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Methylene Chloride	< 0.5	ug/L	1/13/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/13/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/13/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
cis-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Chloroform	< 0.5	ug/L	1/13/99	502.2
Bromochloromethane	< 1.0	ug/L	1/13/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/13/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/13/99	502.2
Benzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/13/99	502.2
Trichloroethene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/13/99	502.2
Bromodichloromethane	< 0.5	ug/L	1/13/99	502.2
Dibromomethane	< 1.0	ug/L	1/13/99	502.2
cis-1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Toluene	< 0.6	ug/L	1/13/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/13/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/13/99	502.2
Chlorobenzene	< 0.5	ug/L	1/13/99	502.2
Ethylbenzene	< 0.5	ug/L	1/13/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
Total Xylenes	< 0.5	ug/L	1/13/99	502.2
Styrene	< 0.5	ug/L	1/13/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/13/99	502.2
Bromoform	< 0.5	ug/L	1/13/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/13/99	502.2
n-Propylbenzene	< 10.0	ug/L	1/13/99	502.2
Bromobenzene	< 1.0	ug/L	1/13/99	502.2
2-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/13/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/13/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/13/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/13/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/13/99	502.2

Lab Number: 99-D17
Sample Number: 991458
February 10, 1999

Analysis Performed	Results		Analyzed	Method
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/13/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/13/99	502.2
Naphthalene	< 20.0	ug/L	1/13/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/13/99	502.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991459
Lab Number: 99-D18

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF CAMDENTON CITY WELL KNOWN AS MULBERRY WELL
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	526	umhos/cm	1/ 6/99	120.1
Comment: Analyzed in field				
pH	7.74		1/ 6/99	150.1
Comment: Analyzed in field				
Temperature - C	15	Degrees C	1/ 6/99	
Comment: Analyzed in field				
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	45.3	ug/L	1/13/99	200.7
Cadmium, Total	< 1.00	ug/L	1/13/99	200.7
Chromium, Total	< 2.00	ug/L	1/13/99	200.7
Copper, Total	31.7	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	< 3.00	ug/L	1/13/99	200.7
Lead, Total	15.7	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/13/99	502.2
Chloromethane	< 2.5	ug/L	1/13/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/13/99	502.2
Bromomethane	< 9.0	ug/L	1/13/99	502.2
Chloroethane	< 2.5	ug/L	1/13/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/13/99	502.2
1,1-Dichloroethene	< 0.5	ug/L	1/13/99	502.2

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Lab Number: 99-D18
Sample Number: 991459
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Methylene Chloride	< 0.5	ug/L	1/13/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/13/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/13/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
cis-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Chloroform	< 0.5	ug/L	1/13/99	502.2
Bromochloromethane	< 1.0	ug/L	1/13/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/13/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/13/99	502.2
Benzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/13/99	502.2
Trichloroethene	5.3	ug/L	1/13/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/13/99	502.2
Bromodichloromethane	< 0.5	ug/L	1/13/99	502.2
Dibromomethane	< 1.0	ug/L	1/13/99	502.2
cis-1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Toluene	< 0.6	ug/L	1/13/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/13/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/13/99	502.2
Chlorobenzene	< 0.5	ug/L	1/13/99	502.2
Ethylbenzene	< 0.5	ug/L	1/13/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
Total Xylenes	< 0.5	ug/L	1/13/99	502.2
Styrene	< 0.5	ug/L	1/13/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/13/99	502.2
Bromoform	< 0.5	ug/L	1/13/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/13/99	502.2
n-Propylbenzene	< 10.0	ug/L	1/13/99	502.2
Bromobenzene	< 1.0	ug/L	1/13/99	502.2
2-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/13/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/13/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/13/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/13/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/13/99	502.2

Lab Number: 99-D18
Sample Number: 991459
February 10, 1999

Analysis Performed	Results		Analyzed	Method
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/13/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/13/99	502.2
Naphthalene	< 20.0	ug/L	1/13/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/13/99	502.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Brandafor

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991460
Lab Number: 99-D19

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-3, LOCATED ON SOUTH END OF LOT, SOUTHWEST OF MODINE MANUFACTURING BUILDING
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Turbidity	951	NTU	1/ 6/99	180.1
Comment: Analyzed in field				
Specific Conductivity	701	umhos/cm	1/ 6/99	120.1
Comment: Analyzed in field				
pH	7.48		1/ 6/99	150.1
Comment: Analyzed in field				
Temperature - C	15	Degrees C	1/ 6/99	
Comment: Analyzed in field				
Silver, Dissolved	< 5.00	ug/L	1/13/99	200.7
Arsenic, Dissolved	< 1.2	ug/L	1/14/99	206.2
Barium, Dissolved	69.6	ug/L	1/13/99	200.7
Cadmium, Dissolved	< 1.00	ug/L	1/13/99	200.7
Chromium, Dissolved	< 2.00	ug/L	1/13/99	200.7
Copper, Dissolved	< 3.00	ug/L	1/13/99	200.7
Mercury, Dissolved	< 0.20	ug/L	1/29/99	245.1
Nickel, Dissolved	< 3.00	ug/L	1/13/99	200.7
Lead, Dissolved	< 2.5	ug/L	1/14/99	239.2
Selenium, Dissolved	< 1.0	ug/L	1/14/99	270.2
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	6.0	ug/L	1/14/99	206.2
Barium, Total	151	ug/L	1/13/99	200.7
Cadmium, Total	2.26	ug/L	1/13/99	200.7
Chromium, Total	45.7	ug/L	1/13/99	200.7

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Lab Number: 99-D19
Sample Number: 991460
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Copper, Total	51.2	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	29.7	ug/L	1/13/99	200.7
Lead, Total	97.6	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/13/99	502.2
Chloromethane	< 2.5	ug/L	1/13/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/13/99	502.2
Bromomethane	< 9.0	ug/L	1/13/99	502.2
Chloroethane	< 2.5	ug/L	1/13/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/13/99	502.2
1,1-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Methylene Chloride	< 0.5	ug/L	1/13/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/13/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/13/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
cis-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Chloroform	< 0.5	ug/L	1/13/99	502.2
Bromochloromethane	< 1.0	ug/L	1/13/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/13/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/13/99	502.2
Benzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/13/99	502.2
Trichloroethene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/13/99	502.2
Bromodichloromethane	< 0.5	ug/L	1/13/99	502.2
Dibromomethane	< 1.0	ug/L	1/13/99	502.2
cis-1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Toluene	< 0.6	ug/L	1/13/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/13/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/13/99	502.2
Chlorobenzene	< 0.5	ug/L	1/13/99	502.2
Ethylbenzene	< 0.5	ug/L	1/13/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
Total Xylenes	< 0.5	ug/L	1/13/99	502.2
Styrene	< 0.5	ug/L	1/13/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/13/99	502.2
Bromoform	< 0.5	ug/L	1/13/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/13/99	502.2
n-Propylbenzene	< 10.0	ug/L	1/13/99	502.2

Lab Number: 99-D19
Sample Number: 991460
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Bromobenzene	< 1.0	ug/L	1/13/99	502.2
2-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/13/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/13/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/13/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/13/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/13/99	502.2
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/13/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/13/99	502.2
Naphthalene	< 20.0	ug/L	1/13/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/13/99	502.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan Governor • Stephen M. Mahfood Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991461
Lab Number: 99-D20

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-4, LOCATED AT MAIN ENTRANCE TO MODINE MFG PROPERTY COLLECTED VIA SUBMERSIBLE PUMP
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Turbidity	86.6	NTU	1/ 6/99	180.1
Comment: Analyzed in field				
Specific Conductivity	687	umhos/cm	1/ 6/99	120.1
Comment: Analyzed in field				
pH	7.22		1/ 6/99	150.1
Comment: Analyzed in field				
Temperature - C	15	Degrees C	1/ 6/99	
Comment: Analyzed in field				
Silver, Dissolved	< 5.00	ug/L	1/13/99	200.7
Arsenic, Dissolved	< 1.2	ug/L	1/14/99	206.2
Barium, Dissolved	81.6	ug/L	1/13/99	200.7
Cadmium, Dissolved	< 1.00	ug/L	1/13/99	200.7
Chromium, Dissolved	< 2.00	ug/L	1/13/99	200.7
Copper, Dissolved	< 3.00	ug/L	1/13/99	200.7
Mercury, Dissolved	< 0.20	ug/L	1/29/99	245.1
Nickel, Dissolved	5.81	ug/L	1/13/99	200.7
Lead, Dissolved	< 2.5	ug/L	1/14/99	239.2
Selenium, Dissolved	< 1.0	ug/L	1/14/99	270.2
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	88.3	ug/L	1/13/99	200.7
Cadmium, Total	< 1.00	ug/L	1/13/99	200.7
Chromium, Total	5.52	ug/L	1/13/99	200.7

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Lab Number: 99-D20
Sample Number: 991461
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Copper, Total	< 5.00	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	7.61	ug/L	1/13/99	200.7
Lead, Total	38.7	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/13/99	502.2
Chloromethane	< 2.5	ug/L	1/13/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/13/99	502.2
Bromomethane	< 9.0	ug/L	1/13/99	502.2
Chloroethane	< 2.5	ug/L	1/13/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/13/99	502.2
1,1-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Methylene Chloride	< 0.5	ug/L	1/13/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/13/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/13/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
cis-1,2-Dichloroethene	2.1	ug/L	1/13/99	502.2
Chloroform	< 0.5	ug/L	1/13/99	502.2
Bromochloromethane	< 1.0	ug/L	1/13/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/13/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/13/99	502.2
Benzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/13/99	502.2
Trichloroethene	64.1	ug/L	1/13/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/13/99	502.2
Bromodichloromethane	< 0.5	ug/L	1/13/99	502.2
Dibromomethane	< 1.0	ug/L	1/13/99	502.2
cis-1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Toluene	< 0.6	ug/L	1/13/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/13/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/13/99	502.2
Chlorobenzene	< 0.5	ug/L	1/13/99	502.2
Ethylbenzene	< 0.5	ug/L	1/13/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
Total Xylenes	< 0.5	ug/L	1/13/99	502.2
Styrene	< 0.5	ug/L	1/13/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/13/99	502.2
Bromoform	< 0.5	ug/L	1/13/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/13/99	502.2
n-Propylbenzene	< 2.0	ug/L	1/13/99	502.2

Lab Number: 99-D20
Sample Number: 991461
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Bromobenzene	< 1.0	ug/L	1/13/99	502.2
2-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/13/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/13/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/13/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/13/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/13/99	502.2
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/13/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/13/99	502.2
Naphthalene	< 20.0	ug/L	1/13/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/13/99	502.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
Mel Carnahan Governor • Stephen M. Mahfood Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991462
Lab Number: 99-D21

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 1/26/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-4, LOCATED AT MAIN ENTRANCE TO MODINE MFG PROPERTY COLLECTED VIA BAILER
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/13/99	502.2
Chloromethane	< 2.5	ug/L	1/13/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/13/99	502.2
Bromomethane	< 9.0	ug/L	1/13/99	502.2
Chloroethane	< 2.5	ug/L	1/13/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/13/99	502.2
1,1-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Methylene Chloride	< 0.5	ug/L	1/13/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/13/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/13/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
cis-1,2-Dichloroethene	2.3	ug/L	1/13/99	502.2
Chloroform	< 0.5	ug/L	1/13/99	502.2
Bromochloromethane	< 1.0	ug/L	1/13/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/13/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/13/99	502.2
Benzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/13/99	502.2
Trichloroethene	76.5	ug/L	1/13/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/13/99	502.2

Recycled Paper

Lab Number: 99-D21
Sample Number: 991462
January 26, 1999

Analysis Performed	Results		Analyzed	Method
Bromodichloromethane	< 0.5	ug/L	1/13/99	502.2
Dibromomethane	< 1.0	ug/L	1/13/99	502.2
cis-1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Toluene	< 0.6	ug/L	1/13/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/13/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/13/99	502.2
Chlorobenzene	< 0.5	ug/L	1/13/99	502.2
Ethylbenzene	< 0.5	ug/L	1/13/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
Total Xylenes	< 0.5	ug/L	1/13/99	502.2
Styrene	< 0.5	ug/L	1/13/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/13/99	502.2
Bromoform	< 0.5	ug/L	1/13/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/13/99	502.2
n-Propylbenzene	< 2.0	ug/L	1/13/99	502.2
Bromobenzene	< 1.0	ug/L	1/13/99	502.2
2-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/13/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/13/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/13/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/13/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/13/99	502.2
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/13/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/13/99	502.2
Naphthalene	< 20.0	ug/L	1/13/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/13/99	502.2

Lab Number: 99-D21
Sample Number: 991462
January 26, 1999

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991463
Lab Number: 99-D22

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 7/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-2, LOCATED ON NORTHEAST SIDE OF MODINE MFG BUILDING
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Turbidity	372	NTU	1/ 7/99	180.1
Comment: Analyzed in field				
Specific Conductivity	796	umhos/cm	1/ 7/99	120.1
Comment: Analyzed in field				
pH	7.16		1/ 7/99	150.1
Comment: Analyzed in field				
Temperature - C	13	Degrees C	1/ 7/99	
Comment: Analyzed in field				
Silver, Dissolved	< 5.00	ug/L	1/13/99	200.7
Arsenic, Dissolved	< 1.2	ug/L	1/14/99	206.2
Barium, Dissolved	91.0	ug/L	1/13/99	200.7
Cadmium, Dissolved	< 1.00	ug/L	1/13/99	200.7
Chromium, Dissolved	< 2.00	ug/L	1/13/99	200.7
Copper, Dissolved	< 3.00	ug/L	1/13/99	200.7
Mercury, Dissolved	< 0.20	ug/L	1/29/99	245.1
Nickel, Dissolved	< 3.00	ug/L	1/13/99	200.7
Lead, Dissolved	< 2.5	ug/L	1/14/99	239.2
Selenium, Dissolved	< 1.0	ug/L	1/14/99	270.2
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	112	ug/L	1/13/99	200.7
Cadmium, Total	< 1.00	ug/L	1/13/99	200.7
Chromium, Total	14.3	ug/L	1/13/99	200.7
Copper, Total	7.85	ug/L	1/13/99	200.7

Recycled Paper

Lab Number: 99-D22
Sample Number: 991463
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	8.45	ug/L	1/13/99	200.7
Lead, Total	37.2	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/13/99	502.2
Chloromethane	< 2.5	ug/L	1/13/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/13/99	502.2
Bromomethane	< 9.0	ug/L	1/13/99	502.2
Chloroethane	< 2.5	ug/L	1/13/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/13/99	502.2
1,1-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Methylene Chloride	< 0.5	ug/L	1/13/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/13/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/13/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
cis-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Chloroform	< 0.5	ug/L	1/13/99	502.2
Bromochloromethane	< 1.0	ug/L	1/13/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/13/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/13/99	502.2
Benzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/13/99	502.2
Trichloroethene	2.5	ug/L	1/13/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/13/99	502.2
Bromodichloromethane	< 0.5	ug/L	1/13/99	502.2
Dibromomethane	< 1.0	ug/L	1/13/99	502.2
cis-1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Toluene	< 0.6	ug/L	1/13/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/13/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/13/99	502.2
Chlorobenzene	< 0.5	ug/L	1/13/99	502.2
Ethylbenzene	< 0.5	ug/L	1/13/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
Total Xylenes	< 0.5	ug/L	1/13/99	502.2
Styrene	< 0.5	ug/L	1/13/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/13/99	502.2
Bromoform	< 0.5	ug/L	1/13/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/13/99	502.2
n-Propylbenzene	< 10.0	ug/L	1/13/99	502.2
Bromobenzene	< 1.0	ug/L	1/13/99	502.2

Lab Number: 99-D22
Sample Number: 991463
February 10, 1999

Analysis Performed	Results		Analyzed	Method
2-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/13/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/13/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/13/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/13/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/13/99	502.2
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/13/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/13/99	502.2
Naphthalene	< 20.0	ug/L	1/13/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/13/99	502.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991464
Lab Number: 99-D23

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 7/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-1, LOCATED IN WESTERN GRAVEL PARKING LOT ON MODINE MANUFACTURING PROPERTY
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Turbidity	143	NTU	1/ 7/99	180.1
Comment: Analyzed in field				
Specific Conductivity	532	umhos/cm	1/ 7/99	120.1
Comment: Analyzed in field				
pH	7.62		1/ 7/99	150.1
Comment: Analyzed in field				
Temperature - C	13	Degrees C	1/ 7/99	
Comment: Analyzed in field				
Silver, Dissolved	< 5.00	ug/L	1/13/99	200.7
Arsenic, Dissolved	< 1.2	ug/L	1/14/99	206.2
Barium, Dissolved	49.7	ug/L	1/13/99	200.7
Cadmium, Dissolved	< 1.00	ug/L	1/13/99	200.7
Chromium, Dissolved	< 2.00	ug/L	1/13/99	200.7
Copper, Dissolved	< 3.00	ug/L	1/13/99	200.7
Mercury, Dissolved	< 0.20	ug/L	1/29/99	245.1
Nickel, Dissolved	< 3.00	ug/L	1/13/99	200.7
Lead, Dissolved	< 2.5	ug/L	1/14/99	239.2
Selenium, Dissolved	< 1.0	ug/L	1/14/99	270.2
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	58.2	ug/L	1/13/99	200.7
Cadmium, Total	< 1.00	ug/L	1/13/99	200.7
Chromium, Total	3.84	ug/L	1/13/99	200.7

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Lab Number: 99-D23
Sample Number: 991464
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Copper, Total	6.94	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	< 3.00	ug/L	1/13/99	200.7
Lead, Total	14.1	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOC Results:				
Dichlorodifluoromethane	< 200	ug/L	1/13/99	502.2
Chloromethane	< 2.5	ug/L	1/13/99	502.2
Vinyl Chloride	< 0.5	ug/L	1/13/99	502.2
Bromomethane	< 9.0	ug/L	1/13/99	502.2
Chloroethane	< 2.5	ug/L	1/13/99	502.2
Trichlorofluoromethane	< 2.5	ug/L	1/13/99	502.2
1,1-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Methylene Chloride	< 0.5	ug/L	1/13/99	502.2
Methyl-tert-butyl ether	< 2.0	ug/L	1/13/99	502.2
trans-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloroethane	< 1.0	ug/L	1/13/99	502.2
2,2-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
cis-1,2-Dichloroethene	< 0.5	ug/L	1/13/99	502.2
Chloroform	< 0.5	ug/L	1/13/99	502.2
Bromochloromethane	< 1.0	ug/L	1/13/99	502.2
1,1,1-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
1,1-Dichloropropene	< 1.0	ug/L	1/13/99	502.2
Carbon Tetrachloride	< 0.5	ug/L	1/13/99	502.2
Benzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dichloroethane	< 0.5	ug/L	1/13/99	502.2
Trichloroethene	10.1	ug/L	1/13/99	502.2
1,2-Dichloropropane	< 0.5	ug/L	1/13/99	502.2
Bromodichloromethane	< 0.5	ug/L	1/13/99	502.2
Dibromomethane	< 1.0	ug/L	1/13/99	502.2
cis-1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Toluene	< 0.6	ug/L	1/13/99	502.2
trans-1,3-Dichloropropane	< 1.0	ug/L	1/13/99	502.2
1,1,2-Trichloroethane	< 0.5	ug/L	1/13/99	502.2
Tetrachloroethene	< 0.5	ug/L	1/13/99	502.2
1,3-Dichloropropane	< 2.0	ug/L	1/13/99	502.2
Dibromochloromethane	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromoethane	< 2.0	ug/L	1/13/99	502.2
Chlorobenzene	< 0.5	ug/L	1/13/99	502.2
Ethylbenzene	< 0.5	ug/L	1/13/99	502.2
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
Total Xylenes	< 0.5	ug/L	1/13/99	502.2
Styrene	< 0.5	ug/L	1/13/99	502.2
Isopropylbenzene	< 2.0	ug/L	1/13/99	502.2
Bromoform	< 0.5	ug/L	1/13/99	502.2
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	1/13/99	502.2
1,2,3-Trichloropropane	< 1.0	ug/l	1/13/99	502.2
n-Propylbenzene	< 2.0	ug/L	1/13/99	502.2

Lab Number: 99-D23
Sample Number: 991464
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Bromobenzene	< 1.0	ug/L	1/13/99	502.2
2-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
4-Chlorotoluene	< 2.0	ug/L	1/13/99	502.2
1,3,5-Trimethylbenzene	< 2.0	ug/L	1/13/99	502.2
tert-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2,4-Trimethylbenzene	< 1.0	ug/L	1/13/99	502.2
sec-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
p-isopropyltoluene	< 2.0	ug/L	1/13/99	502.2
1,3-Dichlorobenzene	< 1.0	ug/L	1/13/99	502.2
1,4-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
n-Butylbenzene	< 2.0	ug/L	1/13/99	502.2
1,2-Dichlorobenzene	< 0.5	ug/L	1/13/99	502.2
1,2-Dibromo-3-Chloroprop	< 5.0	ug/L	1/13/99	502.2
1,2,4-Trichlorobenzene	< 0.5	ug/L	1/13/99	502.2
Hexachlorobutadiene	< 1.0	ug/L	1/13/99	502.2
Naphthalene	< 20.0	ug/L	1/13/99	502.2
1,2,3-Trichlorobenzene	< 2.0	ug/L	1/13/99	502.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991465
Lab Number: 99-D24

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 7/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-5, LOCATED ADJACENT (SOUTHWEST) TO FORMER HULETT LAGOON
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Turbidity	456	NTU	1/ 7/99	180.1
Comment: Analyzed in field				
Specific Conductivity	709	umhos/cm	1/ 7/99	120.1
Comment: Analyzed in field				
pH	7.50		1/ 7/99	150.1
Comment: Analyzed in field				
Temperature - C	12	Degrees C	1/ 7/99	
Comment: Analyzed in field				
Silver, Dissolved	< 5.00	ug/L	1/13/99	200.7
Arsenic, Dissolved	< 1.2	ug/L	1/14/99	206.2
Barium, Dissolved	55.7	ug/L	1/13/99	200.7
Cadmium, Dissolved	< 1.00	ug/L	1/13/99	200.7
Chromium, Dissolved	< 2.00	ug/L	1/13/99	200.7
Copper, Dissolved	< 3.00	ug/L	1/13/99	200.7
Mercury, Dissolved	< 0.20	ug/L	1/29/99	245.1
Nickel, Dissolved	< 3.00	ug/L	1/13/99	200.7
Lead, Dissolved	< 2.5	ug/L	1/14/99	239.2
Selenium, Dissolved	< 1.0	ug/L	1/14/99	270.2
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	67.9	ug/L	1/13/99	200.7
Cadmium, Total	1.25	ug/L	1/13/99	200.7
Chromium, Total	9.39	ug/L	1/13/99	200.7
Copper, Total	7.52	ug/L	1/13/99	200.7

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Lab Number: 99-D24
Sample Number: 991465
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	5.16	ug/L	1/13/99	200.7
Lead, Total	12.7	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOA Results:				
Chloromethane	< 5.0	ug/L	1/ 8/99	8260
Vinyl Chloride	< 5.0	ug/L	1/ 8/99	8260
Bromomethane	< 5.0	ug/L	1/ 8/99	8260
Chloroethane	< 5.0	ug/L	1/ 8/99	8260
1,1-Dichloroethene	< 5.0	ug/L	1/ 8/99	8260
Acetone	< 20.0	ug/L	1/ 8/99	8260
Carbon Disulfide	< 5.0	ug/L	1/ 8/99	8260
Methylene Chloride	< 20.0	ug/L	1/ 8/99	8260
Methyl Tert-Butyl Ether	< 5.0	ug/L	1/ 8/99	8260
trans-1,2-Dichloroethene	< 5.0	ug/L	1/ 8/99	8260
1,1-Dichloroethane	< 5.0	ug/L	1/ 8/99	8260
2-Butanone	< 20.0	ug/L	1/ 8/99	8260
cis-1,2-Dichloroethene	35.0	ug/L	1/ 8/99	8260
Chloroform	< 5.0	ug/L	1/ 8/99	8260
1,1,1-Trichloroethane	< 5.0	ug/L	1/ 8/99	8260
Carbon Tetrachloride	< 5.0	ug/L	1/ 8/99	8260
Benzene	< 5.0	ug/L	1/ 8/99	8260
1,2-Dichloroethane	< 5.0	ug/L	1/ 8/99	8260
Trichloroethene	1,400	ug/L	1/ 8/99	8260
1,2-Dichloropropane	< 5.0	ug/L	1/ 8/99	8260
Bromodichloromethane	< 5.0	ug/L	1/ 8/99	8260
2-Hexanone	< 20.0	ug/L	1/ 8/99	8260
Trans-1,3-Dichloropropene	< 5.0	ug/L	1/ 8/99	8260
Toluene	< 5.0	ug/L	1/ 8/99	8260
CIS-1,3-Dichloropropene	< 5.0	ug/L	1/ 8/99	8260
1,1,2-Trichloroethane	< 5.0	ug/L	1/ 8/99	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	1/ 8/99	8260
Tetrachloroethene	< 5.0	ug/L	1/ 8/99	8260
Dibromochloromethane	< 5.0	ug/L	1/ 8/99	8260
Chlorobenzene	< 5.0	ug/L	1/ 8/99	8260
Ethylbenzene	< 5.0	ug/L	1/ 8/99	8260
Total Xylenes	< 5.0	ug/L	1/ 8/99	8260
Styrene	< 5.0	ug/L	1/ 8/99	8260
Bromoform	< 5.0	ug/L	1/ 8/99	8260
1,1,2,2-Tetrachloroethane	< 5.0	ug/L	1/ 8/99	8260
1,3-Dichlorobenzene	< 5.0	ug/L	1/ 8/99	8260
1,4-Dichlorobenzene	< 5.0	ug/L	1/ 8/99	8260
1,2-Dichlorobenzene	< 5.0	ug/L	1/ 8/99	8260

Lab Number: 99-D24
Sample Number: 991465
February 10, 1999

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991466
Lab Number: 99-D25

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 7/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-5, LOCATED ADJACENT (SOUTHWEST) TO FORMER HULETT LAGOON (DUPLICATE)
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Turbidity	456	NTU	1/ 7/99	180.1
Comment: Analyzed in field				
Specific Conductivity	709	umhos/cm	1/ 7/99	120.1
Comment: Analyzed in field				
pH	7.50		1/ 7/99	150.1
Comment: Analyzed in field				
Temperature - C	12	Degrees C	1/ 7/99	
Comment: Analyzed in field				
Silver, Dissolved	< 5.00	ug/L	1/13/99	200.7
Arsenic, Dissolved	< 1.2	ug/L	1/14/99	206.2
Barium, Dissolved	51.6	ug/L	1/13/99	200.7
Cadmium, Dissolved	< 1.00	ug/L	1/13/99	200.7
Chromium, Dissolved	< 2.00	ug/L	1/13/99	200.7
Copper, Dissolved	< 3.00	ug/L	1/13/99	200.7
Mercury, Dissolved	< 0.20	ug/L	1/29/99	245.1
Nickel, Dissolved	< 3.00	ug/L	1/13/99	200.7
Lead, Dissolved	< 2.5	ug/L	1/14/99	239.2
Selenium, Dissolved	< 1.0	ug/L	1/14/99	270.2
Silver, Total	< 5.00	ug/L	1/13/99	200.7
Arsenic, Total	< 1.2	ug/L	1/14/99	206.2
Barium, Total	71.3	ug/L	1/13/99	200.7
Cadmium, Total	1.97	ug/L	1/13/99	200.7
Chromium, Total	13.3	ug/L	1/13/99	200.7

Recycled Paper

Lab Number: 99-D25
Sample Number: 991466
February 10, 1999

Analysis Performed	Results		Analyzed	Method
Copper, Total	8.97	ug/L	1/13/99	200.7
Mercury, Total	< 0.20	ug/L	1/29/99	245.1
Nickel, Total	4.26	ug/L	1/13/99	200.7
Lead, Total	15.3	ug/L	1/14/99	239.2
Selenium, Total	< 1.0	ug/L	1/14/99	270.2
VOA Results:				
Chloromethane	< 5.0	ug/L	1/ 8/99	8260
Vinyl Chloride	< 5.0	ug/L	1/ 8/99	8260
Bromomethane	< 5.0	ug/L	1/ 8/99	8260
Chloroethane	< 5.0	ug/L	1/ 8/99	8260
1,1-Dichloroethene	< 5.0	ug/L	1/ 8/99	8260
Acetone	< 20.0	ug/L	1/ 8/99	8260
Carbon Disulfide	< 5.0	ug/L	1/ 8/99	8260
Methylene Chloride	< 20.0	ug/L	1/ 8/99	8260
Methyl Tert-Butyl Ether	< 5.0	ug/L	1/ 8/99	8260
trans-1,2-Dichloroethene	< 5.0	ug/L	1/ 8/99	8260
1,1-Dichloroethane	< 5.0	ug/L	1/ 8/99	8260
2-Butanone	< 20.0	ug/L	1/ 8/99	8260
cis-1,2-Dichloroethene	23.0	ug/L	1/ 8/99	8260
Chloroform	< 5.0	ug/L	1/ 8/99	8260
1,1,1-Trichloroethane	< 5.0	ug/L	1/ 8/99	8260
Carbon Tetrachloride	< 5.0	ug/L	1/ 8/99	8260
Benzene	< 5.0	ug/L	1/ 8/99	8260
1,2-Dichloroethane	< 5.0	ug/L	1/ 8/99	8260
Trichloroethene	1,500	ug/L	1/ 8/99	8260
1,2-Dichloropropane	< 5.0	ug/L	1/ 8/99	8260
Bromodichloromethane	< 5.0	ug/L	1/ 8/99	8260
2-Hexanone	< 20.0	ug/L	1/ 8/99	8260
Trans-1,3-Dichloropropene	< 5.0	ug/L	1/ 8/99	8260
Toluene	< 5.0	ug/L	1/ 8/99	8260
CIS-1,3-Dichloropropene	< 5.0	ug/L	1/ 8/99	8260
1,1,2-Trichloroethane	< 5.0	ug/L	1/ 8/99	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	1/ 8/99	8260
Tetrachloroethene	< 5.0	ug/L	1/ 8/99	8260
Dibromochloromethane	< 5.0	ug/L	1/ 8/99	8260
Chlorobenzene	< 5.0	ug/L	1/ 8/99	8260
Ethylbenzene	< 5.0	ug/L	1/ 8/99	8260
Total Xylenes	< 5.0	ug/L	1/ 8/99	8260
Styrene	< 5.0	ug/L	1/ 8/99	8260
Bromoform	< 5.0	ug/L	1/ 8/99	8260
1,1,2,2-Tetrachloroethane	< 5.0	ug/L	1/ 8/99	8260
1,3-Dichlorobenzene	< 5.0	ug/L	1/ 8/99	8260
1,4-Dichlorobenzene	< 5.0	ug/L	1/ 8/99	8260
1,2-Dichlorobenzene	< 5.0	ug/L	1/ 8/99	8260

Lab Number: 99-D25
Sample Number: 991466
February 10, 1999

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for
James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991467
Lab Number: 99-D136

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/24/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-03" COLLECTED FROM 3-4 FT DEPTH
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	13,600	ug/kg	2/ 4/99	206.2
Barium, Total	244,000	ug/kg	2/ 3/99	200.7
Cadmium, Total	304	ug/kg	2/ 3/99	200.7
Chromium, Total	55,500	ug/kg	2/ 3/99	200.7
Copper, Total	33,600	ug/kg	2/ 3/99	200.7
Mercury, Total	107	ug/kg	1/29/99	245.1
Nickel, Total	49,400	ug/kg	2/ 3/99	200.7
Lead, Total	118,000	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
Lead, TCLP	77.2	ug/L	2/19/99	239.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/25/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/25/99	8260
Bromomethane	< 25.0	ug/kg	1/25/99	8260
Chloroethane	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Acetone	< 100	ug/kg	1/25/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/25/99	8260
Methylene Chloride	< 100	ug/kg	1/25/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/25/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
2-Butanone	< 100	ug/kg	1/25/99	8260

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Lab Number: 99-D136
Sample Number: 991467
February 24, 1999

Analysis Performed	Results		Analyzed	Method
cis-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Chloroform	< 25.0	ug/kg	1/25/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/25/99	8260
Benzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
Trichloroethene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloropropane	< 25.0	ug/kg	1/25/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/25/99	8260
2-Hexanone	< 100	ug/kg	1/25/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
Toluene	< 25.0	ug/kg	1/25/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/25/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/25/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/25/99	8260
Chlorobenzene	< 25.0	ug/kg	1/25/99	8260
Ethylbenzene	< 25.0	ug/kg	1/25/99	8260
Total Xylenes	< 25.0	ug/kg	1/25/99	8260
Styrene	< 25.0	ug/kg	1/25/99	8260
Bromoform	< 25.0	ug/kg	1/25/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/25/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991468
Lab Number: 99-D137

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/24/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-03" COLLECTED FROM 4.5-5.5 FT DEPTH
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	12,500	ug/kg	2/ 4/99	206.2
Barium, Total	519,000	ug/kg	2/ 3/99	200.7
Cadmium, Total	386	ug/kg	2/ 3/99	200.7
Chromium, Total	61,300	ug/kg	2/ 3/99	200.7
Copper, Total	37,500	ug/kg	2/ 3/99	200.7
Mercury, Total	139	ug/kg	1/29/99	245.1
Nickel, Total	69,600	ug/kg	2/ 3/99	200.7
Lead, Total	951,000	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
Barium, TCLP	442	ug/L	2/19/99	200.7
Lead, TCLP	143	ug/L	2/19/99	239.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/25/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/25/99	8260
Bromomethane	< 25.0	ug/kg	1/25/99	8260
Chloroethane	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Acetone	< 100	ug/kg	1/25/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/25/99	8260
Methylene Chloride	< 100	ug/kg	1/25/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/25/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/25/99	8260

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Lab Number: 99-D137
Sample Number: 991468
February 24, 1999

Analysis Performed	Results		Analyzed	Method
2-Butanone	< 100	ug/kg	1/25/99	8260
cis-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Chloroform	< 25.0	ug/kg	1/25/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/25/99	8260
Benzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
Trichloroethene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloropropane	< 25.0	ug/kg	1/25/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/25/99	8260
2-Hexanone	< 100	ug/kg	1/25/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
Toluene	< 25.0	ug/kg	1/25/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/25/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/25/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/25/99	8260
Chlorobenzene	< 25.0	ug/kg	1/25/99	8260
Ethylbenzene	< 25.0	ug/kg	1/25/99	8260
Total Xylenes	< 25.0	ug/kg	1/25/99	8260
Styrene	< 25.0	ug/kg	1/25/99	8260
Bromoform	< 25.0	ug/kg	1/25/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/25/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991469
Lab Number: 99-D138

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/24/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-01" COLLECTED FROM 4.5-5 FT DEPTH
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	16,100	ug/kg	2/ 4/99	206.2
Barium, Total	150,000	ug/kg	2/ 3/99	200.7
Cadmium, Total	453	ug/kg	2/ 3/99	200.7
Chromium, Total	74,900	ug/kg	2/ 3/99	200.7
Copper, Total	39,900	ug/kg	2/ 3/99	200.7
Mercury, Total	102	ug/kg	1/29/99	245.1
Nickel, Total	43,300	ug/kg	2/ 3/99	200.7
Lead, Total	116,000	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
Lead, TCLP	< 25.0	ug/L	2/19/99	239.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/25/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/25/99	8260
Bromomethane	< 25.0	ug/kg	1/25/99	8260
Chloroethane	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Acetone	< 100	ug/kg	1/25/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/25/99	8260
Methylene Chloride	< 100	ug/kg	1/25/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/25/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
2-Butanone	< 100	ug/kg	1/25/99	8260

Recycled Paper

Lab Number: 99-D138
Sample Number: 991469
February 24, 1999

Analysis Performed	Results		Analyzed	Method
cis-1,2-Dichloroethene	190	ug/kg	1/25/99	8260
Chloroform	< 25.0	ug/kg	1/25/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/25/99	8260
Benzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
Trichloroethene	9,500	ug/kg	1/25/99	8260
Comment: Dilution analyzed 1/26/99				
1,2-Dichloropropane	< 25.0	ug/kg	1/25/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/25/99	8260
2-Hexanone	< 100	ug/kg	1/25/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
Toluene	< 25.0	ug/kg	1/25/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/25/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/25/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/25/99	8260
Chlorobenzene	< 25.0	ug/kg	1/25/99	8260
Ethylbenzene	< 25.0	ug/kg	1/25/99	8260
Total Xylenes	< 25.0	ug/kg	1/25/99	8260
Styrene	< 25.0	ug/kg	1/25/99	8260
Bromoform	< 25.0	ug/kg	1/25/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/25/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
VOA TCLP Results:				
Vinyl Chloride (TCLP)	< 200	ug/L	2/ 8/99	8260
1,1-Dichloroethene (TCLP)	< 200	ug/L	2/ 8/99	8260
2-Butanone (TCLP)	< 800	ug/L	2/ 8/99	8260
Chloroform (TCLP)	< 200	ug/L	2/ 8/99	8260
Carbon Tetrachlor. (TCLP)	< 200	ug/L	2/ 8/99	8260
Benzene (TCLP)	< 200	ug/L	2/ 8/99	8260
1,2-Dichloroethane (TCLP)	< 200	ug/L	2/ 8/99	8260
Trichloroethene (TCLP)	< 200	ug/L	2/ 8/99	8260
Tetrachloroethene (TCLP)	< 200	ug/L	2/ 8/99	8260
Chlorobenzene (TCLP)	< 200	ug/L	2/ 8/99	8260
1,4-Dichlorobenz. (TCLP)	< 200	ug/L	2/ 8/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991470
Lab Number: 99-D139

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/17/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-02" COLLECTED FROM 6.5-7 FT DEPTH
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	3,580	ug/kg	2/ 4/99	206.2
Barium, Total	62,400	ug/kg	2/ 3/99	200.7
Cadmium, Total	254	ug/kg	2/ 3/99	200.7
Chromium, Total	31,900	ug/kg	2/ 3/99	200.7
Copper, Total	15,700	ug/kg	2/ 3/99	200.7
Mercury, Total	< 40.0	ug/kg	1/29/99	245.1
Nickel, Total	12,500	ug/kg	2/ 3/99	200.7
Lead, Total	38,100	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/25/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/25/99	8260
Bromomethane	< 25.0	ug/kg	1/25/99	8260
Chloroethane	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Acetone	< 100	ug/kg	1/25/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/25/99	8260
Methylene Chloride	< 100	ug/kg	1/25/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/25/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
2-Butanone	< 100	ug/kg	1/25/99	8260
cis-1,2-Dichloroethene	140	ug/kg	1/25/99	8260

Recycled Paper

Lab Number: 99-D139
Sample Number: 991470
February 17, 1999

Analysis Performed	Results		Analyzed	Method
Chloroform	< 25.0	ug/kg	1/25/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/25/99	8260
Benzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
Trichloroethene	240	ug/kg	1/25/99	8260
1,2-Dichloropropane	< 25.0	ug/kg	1/25/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/25/99	8260
2-Hexanone	< 100	ug/kg	1/25/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
Toluene	< 25.0	ug/kg	1/25/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/25/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/25/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/25/99	8260
Chlorobenzene	< 25.0	ug/kg	1/25/99	8260
Ethylbenzene	< 25.0	ug/kg	1/25/99	8260
Total Xylenes	< 25.0	ug/kg	1/25/99	8260
Styrene	< 25.0	ug/kg	1/25/99	8260
Bromoform	< 25.0	ug/kg	1/25/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/25/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991471
Lab Number: 99-D140

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/24/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-04" COLLECTED FROM 7.5-8 FT DEPTH
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	19,700	ug/kg	2/ 4/99	206.2
Barium, Total	750,000	ug/kg	2/ 3/99	200.7
Cadmium, Total	4,520	ug/kg	2/ 3/99	200.7
Chromium, Total	68,900	ug/kg	2/ 3/99	200.7
Copper, Total	64,300	ug/kg	2/ 3/99	200.7
Mercury, Total	195	ug/kg	1/29/99	245.1
Nickel, Total	90,100	ug/kg	2/ 3/99	200.7
Lead, Total	325,000	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
Barium, TCLP	628	ug/L	2/19/99	200.7
Lead, TCLP	< 25.0	ug/L	2/19/99	239.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/26/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/26/99	8260
Bromomethane	< 25.0	ug/kg	1/26/99	8260
Chloroethane	< 25.0	ug/kg	1/26/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/26/99	8260
Acetone	< 100	ug/kg	1/26/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/26/99	8260
Methylene Chloride	< 100	ug/kg	1/26/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/26/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/26/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/26/99	8260

Recycled Paper

Lab Number: 99-D140
Sample Number: 991471
February 24, 1999

Analysis Performed	Results		Analyzed	Method
2-Butanone	< 100	ug/kg	1/26/99	8260
cis-1,2-Dichloroethene	< 25.0	ug/kg	1/26/99	8260
Chloroform	< 25.0	ug/kg	1/26/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/26/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/26/99	8260
Benzene	< 25.0	ug/kg	1/26/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/26/99	8260
Trichloroethene	< 25.0	ug/kg	1/26/99	8260
1,2-Dichloropropane	< 25.0	ug/kg	1/26/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/26/99	8260
2-Hexanone	< 100	ug/kg	1/26/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/26/99	8260
Toluene	< 25.0	ug/kg	1/26/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/26/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/26/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/26/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/26/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/26/99	8260
Chlorobenzene	< 25.0	ug/kg	1/26/99	8260
Ethylbenzene	< 25.0	ug/kg	1/26/99	8260
Total Xylenes	< 25.0	ug/kg	1/26/99	8260
Styrene	< 25.0	ug/kg	1/26/99	8260
Bromoform	< 25.0	ug/kg	1/26/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/26/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991472
Lab Number: 99-D141

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/24/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-07" COLLECTED FROM 5.5-6 FT DEPTH
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	17,200	ug/kg	2/ 4/99	206.2
Barium, Total	257,000	ug/kg	2/ 3/99	200.7
Cadmium, Total	304	ug/kg	2/ 3/99	200.7
Chromium, Total	73,300	ug/kg	2/ 3/99	200.7
Copper, Total	38,800	ug/kg	2/ 3/99	200.7
Mercury, Total	141	ug/kg	1/29/99	245.1
Nickel, Total	36,200	ug/kg	2/ 3/99	200.7
Lead, Total	80,100	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
Lead, TCLP	< 25.0	ug/L	2/19/99	239.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/26/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/26/99	8260
Bromomethane	< 25.0	ug/kg	1/26/99	8260
Chloroethane	< 25.0	ug/kg	1/26/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/26/99	8260
Acetone	< 100	ug/kg	1/26/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/26/99	8260
Methylene Chloride	< 100	ug/kg	1/26/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/26/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/26/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/26/99	8260
2-Butanone	< 100	ug/kg	1/26/99	8260

Recycled Paper

Lab Number: 99-D141
Sample Number: 991472
February 24, 1999

Analysis Performed	Results		Analyzed	Method
cis-1,2-Dichloroethene	110	ug/kg	1/26/99	8260
Chloroform	< 25.0	ug/kg	1/26/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/26/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/26/99	8260
Benzene	< 25.0	ug/kg	1/26/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/26/99	8260
Trichloroethene	120	ug/kg	1/26/99	8260
1,2-Dichloropropane	< 25.0	ug/kg	1/26/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/26/99	8260
2-Hexanone	< 100	ug/kg	1/26/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/26/99	8260
Toluene	< 25.0	ug/kg	1/26/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/26/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/26/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/26/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/26/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/26/99	8260
Chlorobenzene	< 25.0	ug/kg	1/26/99	8260
Ethylbenzene	< 25.0	ug/kg	1/26/99	8260
Total Xylenes	< 25.0	ug/kg	1/26/99	8260
Styrene	< 25.0	ug/kg	1/26/99	8260
Bromoform	< 25.0	ug/kg	1/26/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/26/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991473
Lab Number: 99-D142

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/17/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-09" COLLECTED FROM 6-7 FT DEPTH
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	9,680	ug/kg	2/ 4/99	206.2
Barium, Total	103,000	ug/kg	2/ 3/99	200.7
Cadmium, Total	< 200	ug/kg	2/ 3/99	200.7
Chromium, Total	58,200	ug/kg	2/ 3/99	200.7
Copper, Total	6,470	ug/kg	2/ 3/99	200.7
Mercury, Total	< 40.0	ug/kg	1/29/99	245.1
Nickel, Total	9,760	ug/kg	2/ 3/99	200.7
Lead, Total	39,100	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/25/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/25/99	8260
Bromomethane	< 25.0	ug/kg	1/25/99	8260
Chloroethane	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Acetone	< 100	ug/kg	1/25/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/25/99	8260
Methylene Chloride	< 100	ug/kg	1/25/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/25/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
2-Butanone	< 100	ug/kg	1/25/99	8260
cis-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260

Recycled Paper

Lab Number: 99-D142
Sample Number: 991473
February 17, 1999

Analysis Performed	Results		Analyzed	Method
Chloroform	< 25.0	ug/kg	1/25/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/25/99	8260
Benzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
Trichloroethene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloropropane	< 25.0	ug/kg	1/25/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/25/99	8260
2-Hexanone	< 100	ug/kg	1/25/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
Toluene	< 25.0	ug/kg	1/25/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/25/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/25/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/25/99	8260
Chlorobenzene	< 25.0	ug/kg	1/25/99	8260
Ethylbenzene	< 25.0	ug/kg	1/25/99	8260
Total Xylenes	< 25.0	ug/kg	1/25/99	8260
Styrene	< 25.0	ug/kg	1/25/99	8260
Bromoform	< 25.0	ug/kg	1/25/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/25/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991474
Lab Number: 99-D143

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/17/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-09" COLLECTED FROM 6-7 FT DEPTH (REPLICATE)
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	4,600	ug/kg	2/ 4/99	206.2
Barium, Total	132,000	ug/kg	2/ 3/99	200.7
Cadmium, Total	204	ug/kg	2/ 3/99	200.7
Chromium, Total	39,800	ug/kg	2/ 3/99	200.7
Copper, Total	8,560	ug/kg	2/ 3/99	200.7
Mercury, Total	< 40.0	ug/kg	1/29/99	245.1
Nickel, Total	12,400	ug/kg	2/ 3/99	200.7
Lead, Total	61,800	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/25/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/25/99	8260
Bromomethane	< 25.0	ug/kg	1/25/99	8260
Chloroethane	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Acetone	< 100	ug/kg	1/25/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/25/99	8260
Methylene Chloride	< 100	ug/kg	1/25/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/25/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
2-Butanone	< 100	ug/kg	1/25/99	8260

Recycled Paper

Lab Number: 99-D143
Sample Number: 991474
February 17, 1999

Analysis Performed	Results		Analyzed	Method
cis-1,2-Dichloroethene	< 25.0	ug/kg	1/25/99	8260
Chloroform	< 25.0	ug/kg	1/25/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/25/99	8260
Benzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/25/99	8260
Trichloroethene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichloropropane	< 25.0	ug/kg	1/25/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/25/99	8260
2-Hexanone	< 100	ug/kg	1/25/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
Toluene	< 25.0	ug/kg	1/25/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/25/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/25/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/25/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/25/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/25/99	8260
Chlorobenzene	< 25.0	ug/kg	1/25/99	8260
Ethylbenzene	< 25.0	ug/kg	1/25/99	8260
Total Xylenes	< 25.0	ug/kg	1/25/99	8260
Styrene	< 25.0	ug/kg	1/25/99	8260
Bromoform	< 25.0	ug/kg	1/25/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/25/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/25/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991475
Lab Number: 99-D144

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/24/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-10" COLLECTED FROM 10.5-11 FT DEPTH
County: CAMDEN

Analysis Performed	Results		Analyzed	Method
Silver, Total	< 1,000	ug/kg	2/ 3/99	200.7
Arsenic, Total	10,700	ug/kg	2/ 4/99	206.2
Barium, Total	203,000	ug/kg	2/ 3/99	200.7
Cadmium, Total	651	ug/kg	2/ 3/99	200.7
Chromium, Total	62,700	ug/kg	2/ 3/99	200.7
Copper, Total	36,800	ug/kg	2/ 3/99	200.7
Mercury, Total	94.7	ug/kg	1/29/99	245.1
Nickel, Total	32,500	ug/kg	2/ 3/99	200.7
Lead, Total	94,200	ug/kg	2/ 3/99	239.2
Selenium, Total	< 1,000	ug/kg	2/ 4/99	270.2
Lead, TCLP	< 25.0	ug/L	2/19/99	239.2
VOA Results:				
Chloromethane	< 25.0	ug/kg	1/26/99	8260
Vinyl Chloride	< 25.0	ug/kg	1/26/99	8260
Bromomethane	< 25.0	ug/kg	1/26/99	8260
Chloroethane	< 25.0	ug/kg	1/26/99	8260
1,1-Dichloroethene	< 25.0	ug/kg	1/26/99	8260
Acetone	< 100	ug/kg	1/26/99	8260
Carbon Disulfide	< 25.0	ug/kg	1/26/99	8260
Methylene Chloride	< 100	ug/kg	1/26/99	8260
Methyl Tertiary Butyl Eth	< 25.0	ug/kg	1/26/99	8260
trans-1,2-Dichloroethene	< 25.0	ug/kg	1/26/99	8260
1,1-Dichloroethane	< 25.0	ug/kg	1/26/99	8260
2-Butanone	< 100	ug/kg	1/26/99	8260

Recycled Paper

Lab Number: 99-D144
Sample Number: 991475
February 24, 1999

Analysis Performed	Results		Analyzed	Method
cis-1,2-Dichloroethene	< 25.0	ug/kg	1/26/99	8260
Chloroform	< 25.0	ug/kg	1/26/99	8260
1,1,1-Trichloroethane	< 25.0	ug/kg	1/26/99	8260
Carbon Tetrachloride	< 25.0	ug/kg	1/26/99	8260
Benzene	< 25.0	ug/kg	1/26/99	8260
1,2-Dichloroethane	< 25.0	ug/kg	1/26/99	8260
Trichloroethene	< 25.0	ug/kg	1/26/99	8260
1,2-Dichloropropane	< 25.0	ug/kg	1/26/99	8260
Bromodichloromethane	< 25.0	ug/kg	1/26/99	8260
2-Hexanone	< 100	ug/kg	1/26/99	8260
Trans-1,3-Dichloropropene	< 25.0	ug/kg	1/26/99	8260
Toluene	< 25.0	ug/kg	1/26/99	8260
CIS-1,3-Dichloropropene	< 25.0	ug/kg	1/26/99	8260
1,1,2-Trichloroethane	< 25.0	ug/kg	1/26/99	8260
4-Methyl-2-Pentanone	< 100	ug/kg	1/26/99	8260
Tetrachloroethene	< 25.0	ug/kg	1/26/99	8260
Dibromochloromethane	< 25.0	ug/kg	1/26/99	8260
Chlorobenzene	< 25.0	ug/kg	1/26/99	8260
Ethylbenzene	< 25.0	ug/kg	1/26/99	8260
Total Xylenes	< 25.0	ug/kg	1/26/99	8260
Styrene	< 25.0	ug/kg	1/26/99	8260
Bromoform	< 25.0	ug/kg	1/26/99	8260
1,1,2,2-Tetrachloroethane	< 25.0	ug/kg	1/26/99	8260
1,3-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260
1,4-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260
1,2-Dichlorobenzene	< 25.0	ug/kg	1/26/99	8260

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Modine - Camdenton HW-TSD File

DAMES & MOORE
721 EMERSON ROAD SUITE 220 ST. LOUIS MISSOURI 63
(314) 993-4599 FAX (314) 993-4895

Former Hulett Lagoon Site
Combined PA/SI
Reference 41

November 4, 1996

Mr. Richard Nussbaum, P.E.
Groundwater Enforcement Unit Chief
Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program
P. O. Box 176
Jefferson City, Missouri 65102-0176

RECEIVED
NOV 05 1996
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Re: Letter Report
Subsurface Investigation
Former Hulett Lagoon
Camdenton, Missouri
Dames & Moore Job No. 27397-023-045

Dear Mr. Nussbaum:

On behalf of Modine Manufacturing Company (Modine), Dames & Moore is pleased to submit this letter report summarizing the results of the Subsurface Investigation at the former Hulett Lagoon in Camdenton, Missouri. The former city owned and operated lagoon is located approximately 1,000 feet northeast of the Modine Heat Transfer facility. Based upon the results of the field fracture survey, the former lagoon is strongly indicated as the source of the observed trichloroethene (TCE) impact to groundwater at the Modine facility. The purpose of this investigation was to determine the presence or absence of volatile organic compounds (VOCs), in particular TCE, in soil underlying the former Hulett Lagoon.

The field investigation was conducted on October 11, 1996. Four hydraulically driven probes were advanced in the area of the lagoon in which an inlet pipe from the former Sundstrand facility and an outlet or discharge pipe from the lagoon were previously located. A figure is attached illustrating the probe locations. The probes were continuously sampled and field screened using a photoionization detector (PID). The probe logs are included as an attachment to this letter report. The sample exhibiting the highest indication of VOC content from each probe was submitted to Inchcape Testing Services Environmental Laboratories in Richardson, Texas. The soil samples were analyzed for VOCs, with TCE as the primary constituent of concern. The samples were shipped in an iced cooler under proper chain of custody by an overnight courier.

The analytical report is included as an attachment to this letter and the analytical results summarized below.

Sample Location	Depth	Analyte Detected	Concentration in parts per billion (ppb)
GP-1	4-6'	Chloroform	200
		TCE	9,170
GP-2	4-5.5'	TCE	1,940
GP-3	4-5'	Chloroform	9.4
		cis-1,2-Dichloroethene	91.4
		TCE	Not detected
GP-4	4-6'	TCE	Not detected

The TCE concentrations encountered in the soil beneath the former lagoon supports our previous position of an off-site source as the source of the observed TCE impact to groundwater at the Modine facility This analytical data and the geological data resulting from the field fracture survey strongly suggests that the former lagoon is the off-site source.

If you have any questions or comments regarding the contents of this report, please contact either of the undersigned or Mr. Thomas Sanicola with Modine at (414) 636-1649.

Very truly yours,

DAMES & MOORE

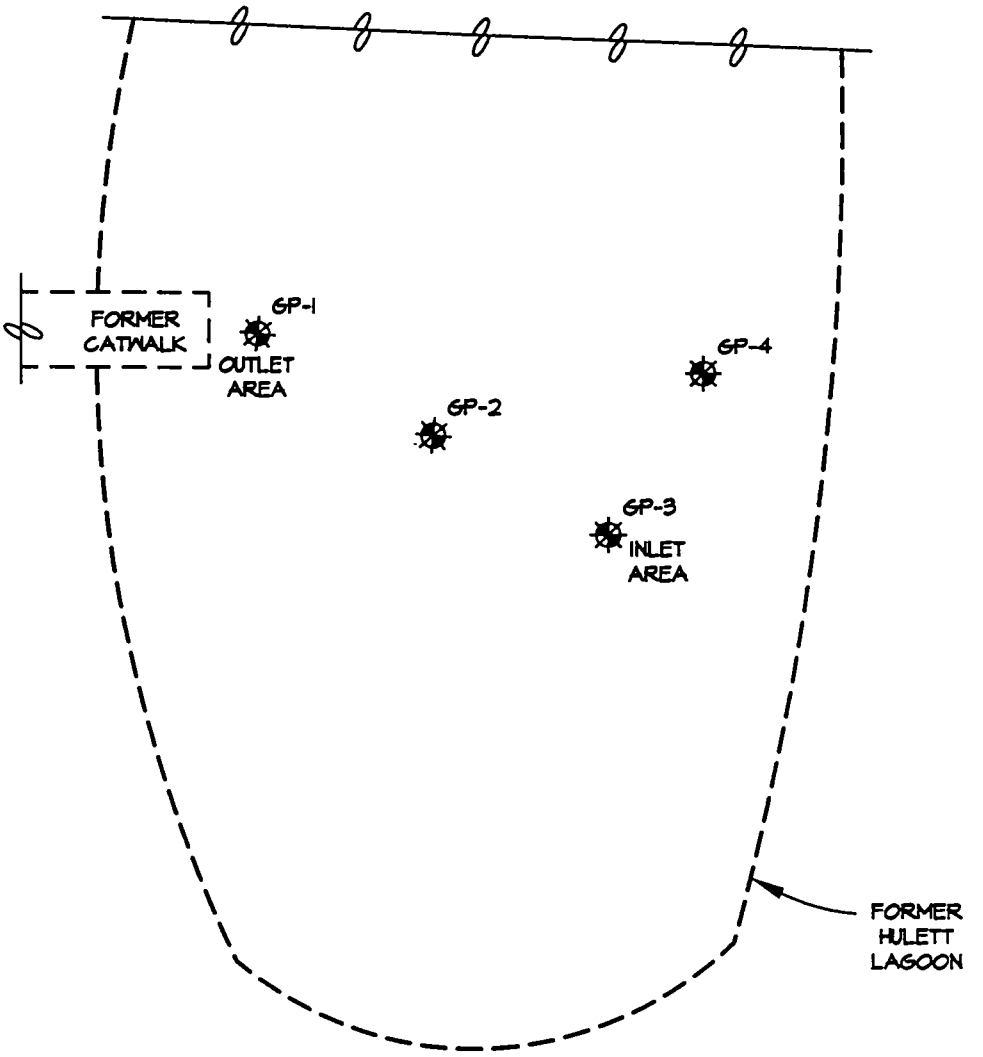
Miesche M. Francis
Assistant Geologist

Daniel J. Price, P.G.
Senior Geologist

DJP:lk
Attachments
cc: Darleen Westcott - MDNR
Thomas Sanicola - Modine
P \045\NOV96\MISC\NUSSBA04.RPT

ATTACHMENT 1

FIGURE



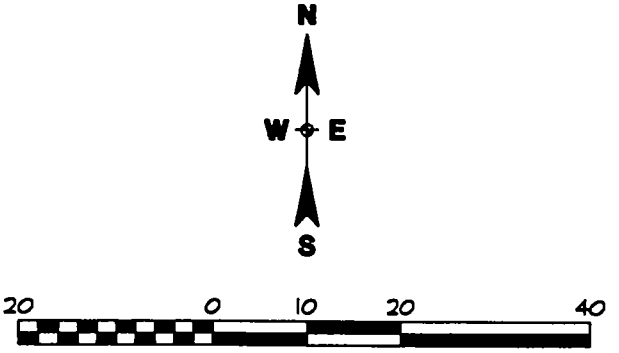


FIGURE 1
GEOPROBE LOCATIONS

FORMER HULETT LAGOON
MODINE MANUFACTURING CO.
CAMDENTON, MISSOURI

DATE: Oct. 30, 1996	
JOB NO.: 27397-023-045	
DRAWN BY: JMS	CHK'D BY: DJP
SCALE: 1" = 20'	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

P:\CADD-J\2T34T\023\023FF161.DWG:10/30/96

ATTACHMENT 2

PROBE LOGS

Client: Modine Heat Transfer, Inc.	**PROBE ID GP-1**
Project Number: 27397-023-045	Monitoring Well Data: / Elevation:
Project: TCE Investigation Former Hulett Lagoon	Pipe: / Datum:
Location: Camdenton, Missouri	Screen: / Ground Surface:
Driller: GeoEnvironmental	Slot: / Measuring Pt:
Borehole Logged By: Miesche Francis	Sand: / Top of Casing:
Drilling Method: GeoProbe®	Sample Type
Date Installed: October 11, 1996	CT - Cuttings; SS - Split Spoon; WA - Wash Sample; CC - Continuos Core; RX - Rock Core; ST - Shelby Tube
Surface Conditions: Grass	

DESCRIPTION	USCS	Stratigraphy	Depth (ft.)	OVM (ppm)	Completion	Sample Lab	Sample Interval	Sample Type
0' - 1" Top soil, with organic material, slight organic odor.			0		GRANULAR BENTONITE			
1" - 4' CLAY, yellowish red, with cherty gravel, soft, moist, slight solvent odor at 4'.	CL		1	142.6				
			2					
			3					
4'-6' CLAY, yellowish red, with cherty gravel, with cherty gravel, trace of organic material, tight, dry, slight solvent odor.			4	1999		Y	4'-6'	CC
			5					
Refusal at 6'.			6					
			7					
			8					
			9					
			10					
			11					
			12					
			13					
			14					
			15					
			16					
			17					
			18					
			19					
			20					
			21					
			22					
			23					
			24					
			25					

Note: This borehole was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Dames & Moore personnel before use by others.

Client: Modine Heat Transfer, Inc.	**PROBE ID GP-2**
Project Number: 27397-023-045	Monitoring Well Data: / Elevation:
Project: TCE Investigation Former Hulett Lagoon	Pipe: / Datum:
Location: Camdenton, Missouri	Screen: / Ground Surface:
Driller: GeoEnvironmental	Slot: / Measuring Pt:
Borehole Logged By: Miesche Francis	Sand: / Top of Casing:
Drilling Method: GeoProbe®	Sample Type
Date Installed: October 11, 1996	CT - Cuttings; CC - Continuos Core; SS - Split Spoon; RX - Rock Core; WA - Wash Sample; ST - Shelby Tube
Surface Conditions: Grass	

DESCRIPTION	USCS	Stratigraphy	Depth (ft.)	OVM (ppm)	Completion	Sample Lab	Sample Interval	Sample Type
0'-4' CLAY, yellowish red, with cherty gravel, soft, moist, abundant organics at 3', musty odor (2' of recovery).	CL		0		GRANULAR BENTONITE			
			1	6.80				
			2					
			3					
4'-5 1/2' CLAY, yellowish red, with cherty gravel, tight, dry, trace of organic material, slight solvent odor.			4	648.3		Y	4'-51/2'	CC
			5					
Refusal at 5 1/2'.			6					
			7					
			8					
			9					
			10					
			11					
			12					
			13					
			14					
			15					
			16					
			17					
			18					
			19					
			20					
			21					
			22					
			23					
			24					
			25					

Note: This borehole was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Dames & Moore personnel before use by others.

Client: Modine Heat Transfer, Inc.	**PROBE ID GP-3**
Project Number: 27397-023-045	Monitoring Well Data: / Elevation:
Project: TCE Investigation Former Hulett Lagoon	Pipe: / Datum:
Location: Camdenton, Missouri	Screen: / Ground Surface:
Driller: GeoEnvironmental	Slot: / Measuring Pt:
Borehole Logged By: Miesche Francis	Sand: / Top of Casing:
Drilling Method: GeoProbe®	Sample Type
Date Installed: October 11, 1996	CT - Cuttings; SS - Split Spoon; WA - Wash Sample; CC - Continuos Core; RX - Rock Core; ST - Shelby Tube
Surface Conditions: Grass	

DESCRIPTION	USCS	Stratigraphy	Depth (ft.)	OVM (ppm)	Completion	Sample Lab	Sample Interval	Sample Type
0'-1" Top soil with organic material.			0					
1"-4' CLAY, yellowish red, with cherty gravel, lower 6" wet, black discoloration at 3.5' (organic material), light gray clay lens at 4' with slight spice odor (2' of recovery).	CL		1	2.8	GRANULAR BENTONITE			
			2					
			3					
4'-5' CLAY, yellowish red, with cherty gravel, some areas of discoloration slight musty odor.			4	75.4		Y	4'-5'	CC
			5					
Refusal at 5'.			6					
			7					
			8					
			9					
			10					
			11					
			12					
			13					
			14					
			15					
			16					
			17					
			18					
			19					
			20					
			21					
			22					
			23					
			24					
			25					

Note: This borehole was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Dames & Moore personnel before use by others.

Client: Modine Heat Transfer, Inc.	**PROBE ID GP-4**
Project Number: 27397-023-045	Monitoring Well Data: / Elevation:
Project: TCE Investigation Former Hulett Lagoon	Pipe: / Datum:
Location: Camdenton, Missouri	Screen: / Ground Surface:
Driller: GeoEnvironmental	Slot: / Measuring Pt:
Borehole Logged By: Miesche Francis	Sand: / Top of Casing:
Drilling Method: GeoProbe®	Sample Type
Date Installed: October 11, 1996	CT - Cuttings; SS - Split Spoon; WA - Wash Sample; CC - Continuos Core; RX - Rock Core; ST - Shelby Tube
Surface Conditions: Grass	

DESCRIPTION	USCS	Stratigraphy	Depth (ft.)	OVM (ppm)	Completion	Sample Lab	Sample Interval	Sample Type
0'-1" Top soil with organic material.			0					
1"-4' CLAY, yellowish red, with cherty gravel, moist, soft, sand lens at 4' with abundant organic material (2' of recovery).	CL		1	0.0	GRANULAR BENTONITE			
			2					
			3					
4'-6' CLAY, yellowish red, with cherty gravel, moist, tight.			4	0.4		Y	4'-6'	CC
			5					
Refusal at 6'.			6					
			7					
			8					
			9					
			10					
			11					
			12					
			13					
			14					
			15					
			16					
			17					
			18					
			19					
			20					
			21					
			22					
			23					
			24					
			25					

Note: This borehole was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Dames & Moore personnel before use by others.

ATTACHMENT 3

ANALYTICAL REPORT

Inchcape Testing Services
Environmental Laboratories

1089 E Collins Blvd.
Richardson, TX 75081
Tel 214-238-5591
Fax 214-238-5592

ANALYTICAL REPORT

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis
PROJECT : 27397-023 Modine Hulett Lagoon

Included in this data package are the analytical results for the sample group which you have submitted to Inchcape Testing Services for analysis. These results are representative of the samples as received by the laboratory.

The information contained herein has undergone extensive review and is deemed accurate and complete. Sample analysis and quality control were performed in accordance with all applicable protocols. Any deviations from these protocols or observations of interest are detailed in an accompanying Case Narrative. Please refrain from reproducing this report except in its entirety.

If you have any questions regarding this report and its associated materials please call your Project Manager at (214) 238-5591.

We appreciate the opportunity to serve you and look forward to providing continued service in the future.

Martin Jeffus
General Manager

DAMES & MOORE
OCT 25 1996
SPRINGFIELD, MO
OCT 31 1996
ST. LOUIS, MISSOURI

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-1
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-1 4-6'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996
ANALYSIS METHOD : EPA 8010 /1
ANALYZED BY : JCH
ANALYZED ON : 15-OCT-1996
DILUTION FACTOR : 100
METHOD FACTOR : 10
QC BATCH NO : 4-101496

VOLATILE HALOCARBONS		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Chloroform	100 µg/Kg	200 µg/Kg
Trichloroethene	100 µg/Kg	9170 µg/Kg

QUALITY CONTROL DATA		
SURROGATE COMPOUND	SPIKE LEVEL	SPIKE RECOVERED
Bromofluorobenzene (SS)	10.0 µg/Kg	114 %

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-1
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-1 4-6'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Solids /1	0.01 %	80.5 %
Analyzed using ASTM D2216 mod. on 17-OCT-1996 by SAB QC Batch No : 888064A		

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-2
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-2 4-5.5'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996
ANALYSIS METHOD : EPA 8010 /1
ANALYZED BY : JCH
ANALYZED ON : 15-OCT-1996
DILUTION FACTOR : 100
METHOD FACTOR : 10
QC BATCH NO : 4-101496

VOLATILE HALOCARBONS		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Trichloroethene	100 µg/Kg	1940 µg/Kg

QUALITY CONTROL DATA		
SURROGATE COMPOUND	SPIKE LEVEL	SPIKE RECOVERED
Bromofluorobenzene (SS)	10.0 µg/Kg	130 %

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-2
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-2 4-5.5'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Solids /1	0.01 %	73.6 %
Analyzed using ASTM D2216 mod. on 17-OCT-1996 by SAB QC Batch No : 888064A		

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-3
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-3 4-5'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996
ANALYSIS METHOD : EPA 8010 /1
ANALYZED BY : JCH
ANALYZED ON : 15-OCT-1996
DILUTION FACTOR : 5
METHOD FACTOR : 10
QC BATCH NO : 4-101496

VOLATILE HALOCARBONS		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Chloroform	5.0 µg/Kg	9.4 µg/Kg
cis-1,2-Dichloroethene	5.0 µg/Kg	91.4 µg/Kg
Trichloroethene	5.0 µg/Kg	< 5.0 µg/Kg

QUALITY CONTROL DATA		
SURROGATE COMPOUND	SPIKE LEVEL	SPIKE RECOVERED
Bromofluorobenzene (SS)	10.0 µg/Kg	115 %

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-3
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-3 4-5'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Solids /1	0.01 %	78.7 %
Analyzed using ASTM D2216 mod. on 17-OCT-1996 by SAB QC Batch No : 888064A		

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-4
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-4 4-6'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996
ANALYSIS METHOD : EPA 8010 /1
ANALYZED BY : JCH
ANALYZED ON : 15-OCT-1996
DILUTION FACTOR : 5
METHOD FACTOR : 10
QC BATCH NO : 4-101496

VOLATILE HALOCARBONS		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Trichloroethene	5.0 µg/Kg	< 5.0 µg/Kg

QUALITY CONTROL DATA		
SURROGATE COMPOUND	SPIKE LEVEL	SPIKE RECOVERED
Bromofluorobenzene (SS)	10.0 µg/Kg	122 %

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-4
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-4 4-6'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Solids /1	0.01 %	72.4 %
Analyzed using ASTM D2216 mod. on 17-OCT-1996 by SAB QC Batch No : 888064A		

Inchcape Testing Services
Environmental Laboratories

REPORT DATE : 22-OCT-1996 REPORT NUMBER : D96-11513

SAMPLE SUBMITTED BY : Dames & Moore
ATTENTION : Miesche Francis
PROJECT : 27397-023 Modine Hulett Lagoon

LABORATORY QUALITY CONTROL REPORT

ANALYTE	Trichloroethene
BATCH NO.	4-101496
LCS LOT NO.	AB709-55B
PREP METHOD	---
PREPARED BY	---
ANALYSIS METHOD	EPA 8010
ANALYZED BY	JCH
UNITS	mg/Kg
METHOD BLANK	< 1.00
SPIKE LEVEL	500
MS RESULT	470
MS RECOVERY %	94.0
MSD RESULT	420
MSD RECOVERY %	84.0
MS/MSD RPD %	11.2
BS RESULT	NA
BS RECOVERY %	NA
BSD RESULT	NA
BSD RECOVERY %	NA
BS/BSD RPD %	NA
DUPLICATE RPD %	NA
LCS LEVEL	20.0
LCS RESULT	16.5
LCS RECOVERY %	82.5
SPIKE SAMPLE ID	11513-3
DUP SAMPLE ID	---

NA Not applicable

Inchca Testing Services Environmental Laboratories 1089 East Co' Blvd., #100 Richardson, TX 75081 (214) 238-5591 CHAIN OF CUSTC 'ECORD

Report to:		Invoice to	
Company:	Dames & Moore	Company:	
Address:	2135 E Sunshine #105 Springfield, MO 65804	Address:	Same as report.
Contact:	Miesche Francis	Contact:	
Phone:	(417) 881-3927	Phone:	
Fax:	(417) 881-6361	PO/SO #:	

ANALYSIS REQUESTED: VOCs 8010 (TCE)

Lab use only
Due Date:

Temp of coolers when received (C°): 1 | 2 ✓ | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: Miesche Francis
Sampler's Signature: Miesche Francis

Proj. No. 27397-023
Project Name: Modine Hulett Lagoon

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt	250 ml	P/O	VOCs 8010 (TCE)	Lab Sample ID (Lab Use Only)
S	10-11	1145		✓	GP-1 4'-6'				✓1	✓	11513-1
S	10-11	1220		✓	GP-2 4-5½'				✓1	✓	-2
S	10-11	1211		✓	GP-3 4-5				✓1	✓	-3
S	10-11	1230		✓	GP-4 4-6'				✓1	✓	-4

Report only TCE unless other constituents are identified in significant quantities.

ORIGINAL

Turn around time: ☐ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS *

* BTEX (602/8020), TPH (418 1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date	Time	Received by (Signature)	Date	Time
Miesche Francis	10/11	1430	D. Fields	10-12	1000
Relinquished by: (Signature)	Date:	Time	Received by: (Signature)	Date	Time
Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time

Remarks: * SEE ABOVE

Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule

[1] Matrix: WW - Wastewater, W - Water, S - Soil, SD - Solid, L - Liquid, A - Air Bag, C - Charcoal tube, SL - Sludge, O - Oil
[2] Container: VOA - 40 ml vial, A/G - Amber / Or Glass 1 Liter, 250 ml - Glass wide mouth, P/O - Plastic or other

Inchcape cannot accept verbal changes. Please Fax written changes to 214-238-5592

OFFICE USE ONLY

FILE Former Hulett LagoonPA/SI Site
CamdenCounty

Former Hulett Lagoon Site
Combined PA/SI
Reference 43

STATE OF MISSOURI
Mel Carnahan Governor • Stephen M. Mahfood Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGY AND LAND SURVEY
P O Box 250 111 Fairgrounds Rd Rolla, MO 65402-0250
(573) 368-2100
FAX (573) 368-2111

STATE OF MISSOURI
NEIL A. ELFRINK
RG0057
REGISTERED GEOLOGIST

March 29, 1999
p 1 of 12

MEMORANDUM

DATE: March 29, 1999

TO: Valerie Wilder, Environmental Specialist
Superfund Section, HWP, DEQ

FROM: Neil Elfrink, Geologist
Environmental Geology Section, GSP, DGLS

SUBJECT: Hydrogeologic Report for the Former Hulett Lagoon Site

LOCATION: SW 1/4, SW 1/4, SW 1/4, Section 24, T. 38 N , R. 17 W., Camden County, Missouri; 38° 00' 42" North Latitude and 92° 45' 18" West Longitude.

The hydrogeologic report for the Former Hulett Lagoon site is enclosed. Please contact me at (573) 368-2162 if you have any questions regarding this report, or if additional information is required.

NE/lh

Attachments

HYDROGEOLOGIC REPORT FOR THE FORMER HULETT LAGOON SITE CAMDENTON, MISSOURI, CAMDEN COUNTY

GENERAL CONSIDERATIONS

Site Location

The Former Hulett Lagoon site is located on the Green Bay Terrace 7.5-minute quadrangle map (Figure 1), in the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of Section 24, Township 38 North, Range 17 West. Coordinates for the center of the former lagoon are approximately 38° 00' 42" north latitude and 92° 45' 18" west longitude. The Former Hulett Lagoon site is located on the east side of Dawson Road, north of Sunset Drive. The site is approximately ¼ mile northeast of Modine Manufacturing Site (Modine).

Physiographic Province

The site is situated on the Salem Plateau region of the Ozark Plateau physiographic province (Missouri Water Atlas, 1986). The topography of the Salem Plateau is characterized by a rolling upland surface with rugged hills dissected by entrenched, narrow stream valleys (Gann, 1976). Karst features, such as springs, sinkholes, and losing streams, are characteristic of the Salem Plateau.

GROUNDWATER PATHWAY

Stratigraphic Units

A stratigraphic column (Table 1) has been tabulated based upon the stratigraphy of nearby wells (Well Log File, 1999).

The youngest bedrock formations beneath the site are expected to be Ordovician-age sediments assigned to the Canadian Series. The Roubidoux Formation consists of dolomite, sandy dolomite, and sandstone (Thompson, 1991). In the Camdenton area, soluble portions of the Roubidoux have generally been removed by dissolution. Nearby well logs indicate that the Roubidoux Formation may have been completely removed by erosion in the vicinity of the site.

Underlying the Roubidoux Formation, the Gasconade Dolomite consists of cherty dolomite and is estimated to be approximately 300 feet thick in the vicinity of the site (Well Logs, 1999). A basal unit of the Gasconade Dolomite, known as the Gunter Sandstone Member, commonly separates the Ordovician- and Cambrian-age strata. The Gunter Sandstone is approximately 25 feet thick in the Camdenton area.

Cambrian rocks in the Camdenton area were deposited in a complex depositional environment. Camdenton is located near the western margin of a Cambrian-age intrashelf sedimentary basin known as the Central Missouri Basin (Palmer and Hayes, 1997). To the west lies the north-south trending Lebanon Arch, which consists of carbonate platform rocks, that in some areas, thin over Precambrian highlands (Gregg et. al., 1989). Dramatically different lithologies and abrupt facies changes are depicted in area well logs (Figure 2). In general, more shaly, basinal rocks to the east pinch-out against the Lebanon Arch.

Because of the tectonic setting, Cambrian beds in the Camdenton area are difficult to categorize, and "layer-cake" stratigraphy should not be assumed. The following descriptions are simplified. The upper-most Cambrian unit in the area is the Eminence Dolomite, which consists of approximately 300 – 635 feet of dolomite with minor amounts of chert. The Eminence Dolomite is underlain by about 25 - 230 feet of Potosi Dolomite, which consists of dolomite, chert, and drusy quartz. Beneath the Potosi Dolomite, in descending order, are the Derby-Doerun Dolomite, the shaly Davis Formation, the Bonneterre Formation, and the Lamotte Sandstone. The entire Cambrian section is estimated to be over 1,150 feet thick.

Cross-sections constructed using information from specific well logs (Well Log Files, 1999) are presented in Figures 2 and 3. The cross-section locations are shown on Figures 1 and 4.

Aquifers

The Ozark Aquifer, which includes all bedrock units above the Cambrian-age Derby-Doerun Dolomite, is the shallowest aquifer beneath site. The Ozark Aquifer is considered exposed at the surface at the Former Hulett Lagoon Site. The total thickness of the aquifer is approximately 950 feet. Each of the units which comprise the Ozark Aquifer have individual characteristics that control their water-bearing capabilities; however, in general, the Ozark Aquifer produces good-quality water, with production rates generally proportional to well depth. Extensive pumping of groundwater in the Camdenton area has created a downward vertical gradient, and the site is located in a groundwater recharge zone.

Because detailed hydrogeologic studies have not been conducted at the site, groundwater flow directions within the bedrock can only be approximated. Prior to pumping of the aquifer, groundwater beneath the site probably flowed westward or northward to discharge areas in the Niangua River valley, (Imes, 1990, Sheet 3). Pumping rates at the Camdenton municipal wells are high enough to engulf the site within the cones of depression that surround the municipal wells. The radius of influence of nearby production wells should be determined.

Groundwater flow in the saturated zone is controlled by gradient. Assertions that preferential pathways in the Ozark Aquifer substantially influence flow direction in the saturated zone (Dames and Moore, 1996; page 13) are incorrect. Water flows downhill; fractures or solution-enlarged channels cannot make water flow uphill. Monitoring well nests are needed to accurately determine the magnitude of the downward vertical gradient. The upper Gasconade Dolomite *may* inhibit the downward migration of contamination. However, fracturing and karst development may have resulted in a local increase in permeability within the otherwise relatively tight upper Gasconade Dolomite.

The Gunter Sandstone is generally highly porous and permeable and is an important source of domestic groundwater supplies in the area. Because the Gunter Sandstone generally yields adequate domestic water supplies, few private wells in the area penetrate the underlying Cambrian Formations. However, municipal wells in the Lake of the Ozarks area are generally cased through the Gunter Sandstone, in order to avoid possible bacterial contamination.

The Eminence and Potosi Dolomites are a major source of municipal drinking water throughout the Ozark area, including the City of Camdenton. The Eminence Dolomite is differentiated from the underlying Potosi Dolomite by the lack of druse. A druse is a rock cavity encrusted with finely crystalline quartz. The druse-rich Potosi Dolomite is the most permeable geologic unit within the Ozark Aquifer and generally has an extensive network of karstic channels.

The shallowest reliable aquitard beneath the site is the St. Francois Confining Unit, approximately 1,200 feet below the surface. The St. Francois Confining Unit separates the Ozark Aquifer from the deeper St. Francois Aquifer. The St. Francois Aquifer includes the Cambrian-age Bonneterre Formation and Lamotte Sandstone. The St. Francois Aquifer is not used as a water source in Camden County. Water losses in the Lamotte Sandstone are common in some parts of the Ozark Region, although the phenomenon is poorly understood. Outside the Cambrian outcrop area, few water wells penetrate the Lamotte Sandstone, since yields may actually be reduced. Groundwater flow directions in the deeper St. Francois Aquifer are generally unknown and may be complicated.

Baseline water-level and pumping rate data needs to be collected before informed decisions about groundwater movement in the Camdenton subsurface can be made. Static water levels should be measured at least monthly at any inactive wells. Detailed records of active wells should include volume of water pumped, length of pumping cycles, and drawdown measurements. The Mulberry City Well (which was shut down on January 26, 1999 because of TCE contamination) produced approximately three times the volume of the other two city wells, suggesting the aquifer is highly heterogeneous. The Mulberry Well probably intercepted more solution-enlarged cavities than the other city wells, although lithologic differences can also explain differences in well yield. Wide variations in aquifer parameters are common in

carbonate areas.

The three Camdenton city wells produced a total of 232,458,000 gallons in 1997. An estimate of the cone of depression produced by this pumping can be made by comparing Camdenton to the city of Rolla, which is located in a similar ridge-top geologic setting approximately 50 miles east of Camdenton (Vandike, 1992). In 1960, four Rolla city wells produced approximately 290,250,000 gallons of water from the Ozark Aquifer. The resulting cone of depression was over five miles wide (Vandike, 1992). By 1960, pumping of the Ozark Aquifer in the Rolla area had dropped water levels up to 150 feet compared to the predevelopment potentiometric surface. The relatively deep depth to groundwater in the Camdenton area suggests a similar radius of effect can be expected. Any potential site-related contaminants reaching the water table are expected to move toward the nearest Camdenton City Well. Until recently, hydraulic control beneath the Former Hulett Lagoon and Modine sites has been maintained by pumping at the Mulberry Well. Now that the Mulberry Well has been shut off, TCE contamination is expected to move toward another city well.

Wells at the Modine site are open to different depth intervals. Therefore, data from these wells cannot be used to create a potentiometric map. The fact that two of the four wells have gone dry in the past suggests that the vertical flow component is significant. Water levels in area wells tend to decrease with depth, supporting the statement that the vertical flow is downward. As previously mentioned, a downward gradient is to be expected in an active municipal well field, particularly if it is located on a ridge top. Static water levels measured during the construction of the newest Camdenton City Well (# 7) also verify the downward gradient (Krehbiel Engineering, Inc., 1998). The Hickory Street Well is 1,100 feet deep with 462 feet of casing. The static water level before pressure-grout sealing of the well casing was 222 feet below the ground surface. Static water level after sealing was 260 feet below ground surface, indicating a downward vertical gradient. A large upland area that might provide recharge to the Camdenton City Wells does not exist. Groundwater monitored by the monitoring wells is essentially moving downward to recharge the pumping wells. Conclusions about lateral flow directions cannot be made based on water levels from the existing monitoring well network.

It has been suggested that contaminants reaching the saturated zone beneath Camdenton will follow "regional groundwater flow" and discharge at the Lake of the Ozarks (Dames & Moore, 1998; page 19). However, groundwater withdrawals averaging over 500,000 gallons per day will create a large cone of depression and obliterate "regional groundwater flow" in any Ozark ridge top setting. A 2-hour pump test of the new Hickory St. Well at 550 gpm caused a 176-foot drawdown in water level (Krehbiel Engineering, Inc., 1998). There is no evidence to suggest that potential contaminants reaching the water table from either the Former Hulett Lagoon or the Modine site can somehow escape the Camdenton well field.

Aquifer Discontinuities

Minor folds and faults in the area cannot be considered aquifer discontinuities. However, it should be noted that the Cambrian-age formations that form the most productive portions of the Ozark Aquifer beneath the site are highly variable in lithology. The aquifer cannot be considered isotropic, nor does it possess radial symmetry. Aquifer parameters may be so variable as to render groundwater modeling useless.

Wellhead Protection Area

The Former Hulett Lagoon site is located in a Wellhead Protection Area according to section 1428 of the Safe Drinking Water Act. In Missouri, Wellhead Protection Areas are designated by the Missouri Wellhead Protection Program. The Former Hulett Lagoon Area site is located within a 1-mile radius of a wellhead in a carbonate aquifer system (Public Drinking Water Program, 1994, page 15).

Revisions to the 1994 Missouri Wellhead Protection Program document are currently under review by EPA. However, the Former Hulett Lagoon site should remain in a designated Wellhead Protection Area under any new management program that may be approved.

In addition to the Wellhead Protection Area discussed above, Camdenton is also subject to Well Construction Rules under the Water Well Drillers Act, section 256.600 to 256.640 RSMo. Most of the Camdenton area is located in Area 1, as designated by the DGLS Wellhead Protection Section. Since September 1987, Area 1 bedrock wells have been required to have 80 feet of casing and penetrate at least 30 feet of bedrock. Wells within ¼ mile of the Lake of the Ozarks are located in Sensitive Area B and subject to additional requirements (Missouri Well Construction Rules, 1996).

Karst Features

The Camdenton area is considered karst (Missouri Water Atlas, 1986). Significant karst features are present within a 4-mile radius of the site. A monitoring well drilled at the site encountered numerous fractures and small voids (Dames & Moore, 1998). Over 5,000 gallons of water was lost during the drilling of the monitoring well.

Geologic Structures

Geophysical logging of monitoring wells at the Modine site suggests that formations beneath the site are essentially flat-lying. Small faults and folds have been mapped within a 4-mile target radius. The axis of a northwest-trending syncline, called the

Racetrack Hollow Syncline, has been mapped less than 2 miles south of the site (Brown, 1984). The Red Arrow Fault is located approximately 3 miles south of the site (Wedge, in preparation). The fault strikes northwest and, in general, the southwest side is downthrown approximately 100 feet. However, geology along the fault zone is complicated. LOGMAIN Well # 25162 (Figure 3) is located along the fault zone and indicates significant upward movement. Ha Ha Tonka Spring is located along the trace of The Red Arrow Fault.

The poorly defined Proctor anticline runs across Camden County (McCracken, 1971). The anticline is evident on the regional cross-section (Figure 3). The Proctor anticline roughly corresponds with the Lebanon Arch, an area of shallow-water carbonate deposition during the Cambrian Period. The anticline is probably related to a rejuvenated Precambrian fault. The effects of the structural deformation on groundwater are poorly understood, but the faulting and folding has probably increased hydraulic conductivities in some areas. Groundwater may flow along conduits within the structures.

Travel Time Factor

Rock layers that underlie the site are karst. The resulting Travel Time Factor Value is 35 (Federal Register, 1990).

GROUNDWATER TARGETS

Target Distance Limit

Groundwater use within the 4-mile groundwater target distance limit is extensive. The City of Camdenton has provided water service since 1952, with groundwater as the sole source of water. Most businesses and residences near the Former Hulett Lagoon site utilize on city water.

Wells

Over 195 well locations within the groundwater target distance limit are recorded in the databases available at the Division of Geology and Land Survey. The LOGMAIN database contains information on older wells. The DGLS Well Wellhead Protection Section's Water Well Information System (W.I.M.S) database contains information on wells drilled since 1987. Well site locations are presented on Figures 5 and 6, and the corresponding well data is tabulated in Table 2. Some locations may be estimated or based on section centroids. The vast majority of the wells on record are domestic supply wells. Some wells may no longer be active. Many active wells may not be recorded in DGLS databases.

According to databases available at DGLS, one private well is located with ¼ mile of the Former Hulett Lagoon Site. One community well is located with ½ mile of the Former Hulett Lagoon Site. A total of 4 wells are located between 0.5 and 1 mile of the site, including 2 community wells and 2 private wells. An additional 31 wells are located between 1 and 2 miles from the site, including 1 community well, 1 nontransient noncommunity well, 2 transient noncommunity wells and 27 private wells. 72 wells are located between 2 and 3 miles from the site, including 2 community wells, 1 nontransient noncommunity well, 9 transient noncommunity wells and 60 private wells. 96 wells are located between 3 and 4 miles of the site including 3 nontransient noncommunity well, 3 transient noncommunity wells and 90 private wells.

Nearest Wells

The nearest public drinking water supply well on record is The City of Camdenton Well #6 (Mulberry Well), located about 1/4 mile south of the Former Hulett Lagoon site. The well was closed in 1999 due to TCE contamination. The City of Camdenton has three other wells inside the 4-mile target distance limit. Total production from the three wells was 221,003,300 gallons in 1993. All of these wells draw water from the Ozark Aquifer.

The nearest possible private drinking water well on record is located approximately 1/4 mile east of the Former Hulett Lagoon site (Figure 5). The well was drilled in 1990 and its current status is unknown.

SURFACE WATER PATHWAY

Hydrologic Setting

The Former Hulett Lagoon site is situated near the headwaters of a small unnamed stream which drains southwest to the Niangua Arm of the Lake of the Ozarks. The site of the former lagoon has been leveled, while the surrounding terrain exhibits moderate natural relief (5% to 9% slopes). East of the site lies the City of Camdenton. West of the site, the landscape is more rugged, and forests extend down to the Lake of the Ozarks. The natural landforms and drainage patterns at the site have been obscured by lagoon construction and, later, by soil removal actions. Land use patterns for the surrounding upland areas near the Former Hulett Lagoon site include residential properties with some light-industrial and commercial use.

Rainfall Data

The average annual precipitation in the area of the Former Hulett Lagoon site is slightly more than 37 inches. Average annual run-off is around 10 inches, and

evapotranspiration amounts to about 28 inches per year; therefore, little precipitation is available for infiltration (Vandike, 1995). The 2-year, 24-hour rainfall for the area is about 3.5 inches (Rainfall Frequency Atlas, undated).

Surface Water Migration Path

Below the Former Hulett Lagoon Site, the receiving stream is fairly steep and the bedload consists mostly of cobbles and gravels. Any metals or solvents that may have reached the stream are unlikely to be detected in the sediments. Groundwater contamination is the main concern at the Former Hulett Lagoon Site.

In 1992 James Vandike, a DGLS geologist with the Water Resources Program, examined area streams as part of the Modine investigation (Vandike, March 18, 1992). The Former Hulett Lagoon site is located on the valley floor of an intermittent stream referred to by Van Dike as the "northeast branch" of an unnamed tributary to Jarvis Hollow (Figure 1). The "southeast branch" of the tributary drains the Modine site. The northeast and southeast branches join near the western corporate boundary of the City of Camdenton, approximately 0.6 miles downstream of the Former Hulett Lagoon Site. The lagoon was constructed near the headwaters of the northeast branch, just west of the ridge top where most of Camdenton is located. Water runs onto the site from the upper section of the northeast branch. This channel has been diverted around the northern edge of the former lagoon; thus, only the southern slope of the valley provides surface runoff to the site. The assigned Hazard Ranking System (HRS) Drainage Area Value is 1 (Federal Register, 1990).

Run-off from the site enters the northeast branch and flows toward the west for ¼ mile. Runoff then flows southwest approximately 1.6 miles and enters Jarvis Hollow in the NE ¼, NE ¼, SE1/4 of Section 34, Township 38 North, Range 17 West. According to the 7.5 minute Hahatonka topographic map, the 0.15-mile-long stream segment below this confluence appears to be perennial. Thus, the confluence of the unnamed tributary and the stream in Jarvis Hollow is considered the probable point of entry (PPE) to surface water. If the short stream segment is not perennially flowing, the PPE would then be located at the mouth of Jarvis hollow, where the stream enters the Lake of the Ozarks. Runoff from the Former Hulett Lagoon reaches the Lake of the Ozarks approximately 1.97 miles downstream of the site. Figure 1 illustrates drainage patterns and overland flow directions in the vicinity of the site.

The 1983 Green Bay Terrace 7.5-minute topographic map does not distinguish perennial from intermittent streams. All streams are shown as solid blue lines. However, the 1959 Green Bay Terrace map depicts the unnamed tributary that drains the site as intermittent.

Vandike noted that the unnamed tributary lost flow in some locations, especially when encountering the Gunter Sandstone. However, Vandike anticipated that any flow lost in

the streambed would stay in the valley. He noted that very little rainfall was necessary to generate surface flow throughout the reach of the stream. The receiving stream for the Former Hulett Lagoon Site has not been officially classified by DGLS, but based on available reports, the stream should be considered losing. The Gasconade Dolomite that forms much of the stream bed is not particularly karst. Many nearby streams have been classified as losing (Losing Stream File, 1999).

The 15-mile downstream limit (Figure 4) ends near Shepard Cove on the Osage River Arm of the Lake of the Ozarks, approximately 29.5 miles above Bagnell Dam. This point is located on the Camdenton, MO 7.5-minute quadrangle; SE ¼, Section 24, T. 39 N., R. 17 W. The Osage River flows in a north-easterly direction, toward the Missouri River.

SURFACE WATER TARGETS

Drinking Water Intakes

No known direct intake of stream water is located within 15 downstream miles of the PPE (Hahatonka, Green Bay Terrace, and Camdenton Quadrangles; DuCharme and Miller, 1996; and Inventory of Missouri Public Water Systems, 1997). The 15-mile surface water target distance limit is shown on Figure 4.

SOIL / AIR PATHWAY

Contaminated soils at the Former Hulett Lagoon were trucked off to the Camdenton Sludge Disposal Area in 1988. Potential downstream or downwind receptors are not likely to be affected by the Former Hulett Lagoon Site itself.

The native soil in the vicinity of the Former Hulett Lagoon site was the Clarksville-Gepp very cherty silt loam (Wolf, 1994). The Clarksville-Gepp soils are deep, well-drained soils typical of sloping uplands. Permeability is moderate. The content of organic material is moderately low. The shrink-swell potential is moderate. Grass at the site limits wind erosion.

The HRS Soil Group Designation from Table 4-4 is B (Federal Register, 1990).

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Table 1. Stratigraphic Column for Former Hulett Lagoon, Camden County (after Harvey et. al.,1983)

System	Aquifer Group	Approximate Site – Specific Thickness (ft)	Formation	Hydraulic Conductivity (cm/sec)	Regional Thickness (ft)	Dominant Lithology	Water-bearing Character
Quaternary		8	Colluvium and residuum		0-90	Regolith of residual clay, sand, chert pebbles and cobbles	May contain small amounts of perched water.
Ordovician	Ozark Aquifer	0?	Roubidoux Formation	10^{-3}	0-90	Clayey residuum, sandstone and sandy dolomite	Not present in sufficient thickness in the Camdenton area to produce usable quantities of water.
		300	Gasconade Dolomite	10^{-6}	300-385	Cherty dolomite, minor sandstone, and shale	Yields moderate to large quantities of water to wells. Yields range from 20 to 75 gpm. Less-permeable Upper Gasconade may act as a leaky confining unit.
		25	Gunter Sandstone Member	10^{-4}	10-45	Sandstone	Contributes moderate to large quantities of water. Most wells open to other formations.
Cambrian		500?	Eminence Dolomite	10^{-5}	240-600?	Cherty dolomite	Yields 6-100 gpm, the average being about 20 gpm
		150?	Potosi Dolomite	10^{-4}	30-330	Dolomite; contains abundant quartz druse	Yields large quantities of water to wells. Yields range from 100 to 750 gpm.
	St. Francois Confining Unit	180	Derby-Doerun Dolomite	10^{-7}	80?-215	Shaley dolomites and shale	Reliable aquitard.
		80	Davis Formation	10^{-7}	50-380?		
	St. Francois Aquifer	160	Bonneterre Formation	10^{-5}	85-200	Dolomite and limestone	Generally used only in outcrop areas. May contribute additional 100-200 gpm to wells open to other formations.
		240	Lamotte Sandstone	10^{-5}	140-300	Sandstone and arkosic conglomerate	
Precambrian	Basement Confining Unit					Igneous and metamorphic rocks	Does not yield water to wells in this area

able 2: Former Hulett Lagoon (PA/SI), Camden County, Missouri

Wells located 0 to 0.25 Miles from the Former Hulett Lagoon

Source	Well ID	Depth	CSG	Q1	Q2	Q3	SEC	TWN	RNG	Elev	SWL	Date	Use	Owner	Aquifer	PWSSID/EXT ID#	GPM
0 to 0.25 Miles																	
WIMS	0054495A	407	105		SE	SW	24	38N	17W	0	0	10/17/90	Private Well	PRICE	Ozark		0
0.25 to 0.5 Miles																	
PDWP	40376	900	400	SW	NE	NW	25	38N	17W		95	1986	Community	CITY OF CAMDENTON #6 - Mulberry	Ozark	3010130103	600
0.5 to 1 Mile																	
LOGMAIN	27877	1060	400	NE	NW	NE	25	38N	17W	1010	315	1974	Community	CITY OF CAMDENTON #4 - Blair	Ozark	3010130102	300
WIMS	0019268A	1100	463	SE	SE	SE	24	38N	17W	1024	260	11/16/98	Community	CITY OF CAMDENTON #7 - Hickory	Ozark		550
WIMS	0068392A	400	220	NE	SW	SE	23	38N	17W	230	220	11/13/91	Private Well		Ozark		30
WIMS	0084612A	420	100		SW	SE	23	38N	17W	0	210	4/27/92	Private Well	HULETT	Ozark		30
1 to 2 Miles																	
LOGMAIN	20180	1020	450	SE	SE	NE	25	38N	17W	1036	254	1961	Community	CITY OF CAMDENTON #3 - Rodeo	Ozark	3010130101	325
LOGMAIN	26540	600	403	NW	SE	SW	14	38N	17W	1006	165	1969	Nontransient	PROF NURSING HOME OF AM.	Ozark		140
LOGMAIN	28665	725	235				22	38N	17W	0		1987	Transient	MO.DEPT.CONSERVATION #2	Ozark		
PDWP	41987	0	0	0	0	0	0	0	0	0	0	0	Transient	Lake Dental Clinic	Ozark	3238244101	0
WIMS	0002076A	251	127			SE	04	30N	19W	0	90	8/14/87	Private Well	GALLAGHER, SR	Ozark		33
WIMS	0004240A	0	0				30	38N	16W	0	0	10/20/87	Private Well	DIAL	Ozark		0
WIMS	0005180A	282	84		NE	NW	22	38N	17W	0	120		Private Well	STINER	Ozark		20
WIMS	0005184A	175	170		SW	SE	22	38N	17W	0	15	9/25/87	Private Well	RAKEY	Ozark		40
WIMS	0006144A	0	0		NE	NE	27	38N	17W	0	0	5/16/88	Private Well	SULHAM	Ozark		0
WIMS	0014191A	725	235		NW	NE	22	38N	17W	1045	370	8/17/87	Private Well	CONSERVATION	Ozark		35
WIMS	0015210A	695	440		SE	SE	14	38N	17W	0	180	12/21/88	Private Well	WATKINS	Ozark		80
WIMS	0016656A	467	166		NW	NE	22	38N	17W	0	280	7/6/89	Private Well	WEBB	Ozark		20
WIMS	0034711A	260	105		NW	SE	27	38N	17W	689	20	6/7/90	Private Well	BOYCE	Ozark		25
WIMS	0034716A	240	105		NW	SE	27	38N	17W	669	8	5/29/90	Private Well	FIFIELD	Ozark		0
WIMS	0046879A	233	140		SW	NW	22	38N	17W	689	40	5/20/91	Private Well	DICKEMANN	Ozark		40
WIMS	0046891A	498	122		SW	NE	22	38N	17W	0	325	11/7/93	Private Well	MARR	Ozark		18
WIMS	0052628A	210	120		SE	SW	22	38N	17W	0	35	5/1/92	Private Well	SPICER	Ozark		30
WIMS	0052656A	210	100		NW	NE	34	38N	17W	0	35	8/15/92	Private Well	SALLS	Ozark		20

Wells located 1 to 2 Miles from the Former Hulett Lagoon

Source	Well ID	Depth	CSG	Q1	Q2	Q3	SEC	TWN	RNG	Elev	SWL	Date	Use	Owner	Aquifer	PWSSIDEXT ID#	GPM
WIMS	0054516A	407	168		NE	NW	13	38N	17W	0	220	10/25/90	Private Well		Ozark		40
WIMS	0059221A	215	106				27	38N	17W	690	22	12/6/90	Private Well	MONTGOMERY	Ozark		25
WIMS	0062723A	380	102		NE	SW	27	38N	17W	0	265	3/13/91	Private Well	MCKEVER	Ozark		30
WIMS	0066010A	260	121			SW	27	38N	17W	0	12	5/19/92	Private Well	BAILEY	Ozark		30
WIMS	0091425A	200	140	NE	SE	NW	27	38N	17W	698	18	8/26/93	Private Well	BRIGGS	Ozark		20
WIMS	0096827A	178	14	SW	NE	SW	27	38N	17W	0	23	12/16/93	Private Well		Ozark		15
WIMS	0096841A	340	220	NW	NE	NW	27	38N	17W	787	125	2/18/94	Private Well	BARE	Ozark		40
WIMS	0120553A	520	250	NW	SW	NE	22	38N	17W	0	350	9/14/94	Private Well	LEDBETTER	Ozark		25
WIMS	0120852A	235	174		NW	SE	22	38N	17W	0	80	6/27/94	Private Well	HOLLINGSWORTH	Ozark		25
WIMS	0120868A	293	110	NE	SE	SW	22	38N	17W	0	140	11/24/94	Private Well	ZEY	Ozark		25
WIMS	0173794A	220	143				27	38N	17W	0	30	10/31/92	Private Well	STONER	Ozark		35
WIMS	0186114A	320	142		NW	SE	27	38N	17W	0	20	9/25/97	Private Well	NEWILL	Ozark		65
WIMS	0190879A	230	160		NW	SE	27	38N	17W	0	20	5/22/97	Private Well	WOMACK	Ozark		0

2 to 3 Miles

LOGMAIN	006568	70	41	NW	SE	SE	16	38N	17W	671		1940	Private Well	SCOTT, L C #1	Ozark		50
LOGMAIN	014093	570	250	SE	SE	NW	15	38N	17W	990	195	1955	Private Well	SCOTT, L.C. #2	Ozark		55
LOGMAIN	25162	550	250	SE	NW	SE	33	38N	17W	764	78	1967	Transient	LAKE VALLEY COUNTRY CLUB	Ozark		93
LOGMAIN	26629	505	350	S2	N2	NW	32	38N	16W	1021	250	1970	Nontransient	VIRGIL EADES TRAILER CT	Ozark	3048141101	100
LOGMAIN	28620	860	528				17	38N	16W	0	90	1983	Community	CITY OF LINN CREEK	Ozark	3010471102	225
LOGMAIN	5698	296	170	SE	NW	NW	17	38N	16W	696	15	1939	Community	CITY OF LINN CREEK	Ozark		40
PDWP	41487	0	0	0	0	0	0	0	0	0	0	0	Transient	Cedar Green Resort	Ozark	3010130103	0
PDWP	41580	350	80	0	0	0	0	0	0	0	63	1978	Transient	Adam's Ale Resort Inc	Ozark	3191518101	0
PDWP	41581	140	20	0	0	0	0	0	0	0	20	1973	Transient	Rippling Waters Resort	Ozark	3191747101	25
PDWP	41615	300	0	0	0	0	0	0	0	0	0	1984	Transient	Lake Valley Condos	Ozark	3210248101	0
PDWP	42571	300	0	0	0	0	0	0	0	0	0	1985	Transient	Lake Valley Condos	Ozark	3258251101	0
PDWP	42572	340	0	0	0	0	0	0	0	0	0	1986	Transient	Lake Valley Condos	Ozark	3238026102	0
PDWP	42573	340	0	0	0	0	0	0	0	0	0	1987	Transient	Lake Valley Condos	Ozark	3238026103	0
PDWP	42611	150	20	0	0	0	0	0	0	0	30	1982	Transient	Rippling Waters Resort	Ozark	3238026104	25
WIMS	0000624A	138	82				28	38N	17W	0	50	6/15/87	Private Well	RESORT	Ozark		25
WIMS	0001841A	380	305				32	38N	16W	0	225	7/30/87	Private Well	BOND	Ozark		30
WIMS	0002012A	260	84				28	38N	17W	0	90	8/25/87	Private Well	ULIUS	Ozark		20
WIMS	0002249A	420	147				31	38N	16W	0	215	8/25/87	Private Well	MOSIER	Ozark		30
WIMS	0004060A	400	105		SW	NE	31	38N	16W	0	200	10/5/87	Private Well	DAUGHERTY, SR.	Ozark		30
WIMS	0005182A	198	84		NE	NW	03	37N	17W	685	38		Private Well	SUTTON	Ozark		20
WIMS	0005246A	195	105		SW	NE	28	38N	17W	0	30	4/21/88	Private Well	BRANY	Ozark		30
WIMS	0005557A	300	126				17	38N	16W	0	200	4/22/88	Private Well	ENTERPRISES	Ozark		25
WIMS	0005948A	217	88		SW	NE	28	38N	17W	0	0		Private Well		Ozark		30
WIMS	0005951A	340	105		SW	NE	34	38N	17W	0	145	11/21/87	Private Well	SALLS	Ozark		30

Wells located 2 to 3 Miles from the Former Hulett Lagoon

Source	Well ID	Depth	CSG	Q1	Q2	Q3	SEC	TWN	RNG	Elev	SWL	Date	Use	Owner	Aquifer	PWSSIDEXT ID##	GPM
WIMS	0005999A	178	105		NW	NW	03	37N	17W	0	25	7/25/87	Private Well	WEBB	Ozark		20
WIMS	0006000A	218	147		NW	NW	03	37N	17W	0	60		Private Well	HANKS	Ozark		25
WIMS	0007295A	380	126		SE	SE	17	38N	16W	0	270	7/27/88	Private Well	WILLIAMS	Ozark		40
WIMS	0007296A	380	85		SW	NE	17	38N	16W	0	250	5/22/88	Private Well	KOWAL	Ozark		20
WIMS	0007306A	530	210		SE	NE	33	38N	17W	0	65	6/23/88	Private Well	LAKE VALLEY	Ozark		75
WIMS	0007320A	155	105		SW	NE	12	38N	17W	0	20	8/5/88	Private Well	WILBURN	Ozark		60
WIMS	0011103A	0	0	SE	NE	NW	03	37N	17W	0	12	6/24/88	Private Well	LUKOSIUS	Ozark		0
WIMS	0011741A	0	84		SW	NE	28	38N	17W	0	90	8/25/87	Private Well	ULIUS	Ozark		20
WIMS	0012040A	385	83		NE	SE	01	37N	17W	0	200	9/1/88	Private Well	JONES	Ozark		37
WIMS	0012651A	178	105		NE	NE	21	38N	17W	680	20	3/16/89	Private Well	STAUCH	Ozark		20
WIMS	0014203A	340	168				16	38N	17W	0	210	8/18/87	Private Well	THOMPSON	Ozark		35
WIMS	0015206A	343	103		NE	SW	32	38N	16W	0	140	6/15/89	Private Well	HICK	Ozark		25
WIMS	0015367A	170	108		SW	NE	28	38N	17W	0	0	2/15/89	Private Well	MORRIS	Ozark		30
WIMS	0026787A	343	105		NE	NE	28	38N	17W	0	60	11/14/89	Private Well	HEAD	Ozark		35
WIMS	0033740A	158	90		NW	NW	03	37N	17W	670	10	7/25/89	Private Well	SUTTON	Ozark		20
WIMS	0043289A	100	0		NE	NW	34	38N	17W	0	0		Private Well	LAMPERT	Ozark		0
WIMS	0044602A	380	139		SW	NW	32	38N	16W	0	205	6/18/89	Private Well	NEELEY	Ozark		25
WIMS	0044623A	200	126		NE	NE	21	38N	17W	690	43	10/27/89	Private Well	STAUCH	Ozark		20
WIMS	0044635A	220	126		NW	NW	03	37N	17W	670	62	11/24/89	Private Well	PERSELS	Ozark		30
WIMS	0047228A	235	140		NE	SW	21	38N	17W	0	45	8/16/90	Private Well	MCADAMS	Ozark		30
WIMS	0052590A	250	175	SW	SW	SW	21	38N	17W	0	60	11/11/90	Private Well	COLLINS	Ozark		55
WIMS	0052595A	151	80	NE	NW	SW	34	38N	17W	680	10	12/13/90	Private Well	FOSTER	Ozark		25
WIMS	0052626A	231	110	SW	SE	SW	34	38N	17W	710	65	9/3/93	Private Well	DICKMAN	Ozark		25
WIMS	0054310A	240	120		NW	SW	34	38N	17W	660	35	11/20/90	Private Well	ROWE	Ozark		30
WIMS	0054311A	220	119		NW	SW	34	38N	17W	720	30	10/19/90	Private Well	BALMER	Ozark		30
WIMS	0054493A	282	126		SE	SW	12	38N	17W	0	35	10/10/90	Private Well	THOMASON	Ozark		35
WIMS	0058354A	360	126		SE	NW	32	38N	16W	0	205	11/30/90	Private Well	SIMMONS	Ozark		20
WIMS	0062718A	200	100	NW	SE		20	38N	16W	0	12	3/9/91	Private Well	BARCLAY	Ozark		60
WIMS	0062770A	175	107	NE	NW	SW	27	38N	17W	689	22	7/19/91	Private Well	STOVER	Ozark		30
WIMS	0064171A	170	124		NW	SE	10	38N	17W	0	30	6/25/91	Private Well	OCAMPO	Ozark		30
WIMS	0064821A	475	153	SW	SE	SW	34	38N	17W	730	78	11/3/94	Private Well	LUTHER	Ozark		25
WIMS	0068405A	198	100	SW	NW	NE	03	37N	17W	680	15	10/14/91	Private Well	REAM	Ozark		20
WIMS	0077405A	375	80	NE	NE	NE	15	38N	17W	940	240	2/15/93	Private Well	BENBOW	Ozark		25
WIMS	0077412A	351	80		NE	SW	10	38N	17W	0	150	12/10/92	Private Well	ROBINSON	Ozark		25
WIMS	0077420A	370	80		SE	NE	20	38N	16W	0	195	11/1/92	Private Well	SHMIDT	Ozark		20
WIMS	0077771A	200	140	NW	SW	SE	34	38N	17W	660	23	9/17/92	Private Well	LOMBARDO	Ozark		25
WIMS	0088177A	210	82		NE	SW	28	38N	17W	0	90	5/13/92	Private Well	CYROS	Ozark		25
WIMS	0091365A	195	140	NW	NW	SW	27	38N	17W	689	42	5/22/93	Private Well	SWANSON	Ozark		30
WIMS	0120260A	180	120				21	38N	17W	0	15		Private Well	JACKSON	Ozark		20

Wells located 2 to 3 Miles from the Former Hulett Lagoon

Source	Well ID	Depth	CSG	Q1	Q2	Q3	SEC	TWN	RNG	Elev	SWL	Date	Use	Owner	Aquifer	PWSSIDEXT ID#	GPM
WIMS	0120860A	352	80	NE	SW	NW	32	38N	16W	0	170	9/15/94	Private Well	BURNS	Ozark		20
WIMS	0120864A	375	100	SE	NW	SE	17	38N	16W	0	270	10/2/94	Private Well	SHRAUGEN	Ozark		20
WIMS	0120872A	393	100		SW	NE	17	38N	16W	0	260	11/9/94	Private Well	BOOKE	Ozark		25
WIMS	0120872A	393	100		SW	NE	17	38N	16W	0	260	11/9/94	Private Well	BOOKE	Ozark		25
WIMS	0138061A	310	80		SW	NE	17	38N	16W	0	170	4/10/96	Private Well	WITTE	Ozark		20
WIMS	0158044A	340	102		SE	SW	34	38N	17W	0	140	8/22/96	Private Well	GOLDSTEN	Ozark		20
WIMS	0169782A	300	97				10	38N	17W	0	175	5/28/97	Private Well	EBERT	Ozark		30
WIMS	0182558A	340	100		NW	NW	03	37N	17W	0	120	6/30/97	Private Well	WILSMAN	Ozark		15

3 to 4 Miles

LOGMAIN	013462	275	66	NE	NE	SE	07	37N	16W	1065	225	1955	Private Well	CHANDLER, MOCK	Ozark		5
LOGMAIN	015981	365	0	SE	NE	SW	16	38N	16W	979		1956	Private Well	PARKINSON, JOHN	Ozark		30
LOGMAIN	018777	140	28	C	SW	NW	09	38N	16W	790	20	1959	Private Well	BOND, GUY O.	Ozark		20
LOGMAIN	27342	540	400	NW	SW	NE	17	38N	16W	800	150	1973	Nontransient	ST. MORITZ	Ozark		75
LOGMAIN	27691	925	430	SE	NW	NE	02	38N	17W	886	230	1974	Nontransient	CAMELOT ESTATES	Ozark		
LOGMAIN	28162	800	470	C	NW	SW	05	38N	16W	900			Nontransient	CAPE OF THE WOODS	Ozark		
PDWP	41567	300	150	0	0	0	0	0	0	0	20	1984	Transient	Clearwater Resort	Ozark	3190757101	30
PDWP	41610	0	0	0	0	0	0	0	0	0	0	0	Transient	54 & A Truck Stop & Restaurant	Ozark	3191748101	0
PDWP	41619	0	0	0	0	0	0	0	0	0	0	0	Transient	Windwood Condos	Ozark	3238026101	0
WIMS	0000178A	200	84				01	38N	17W	0	82	4/15/87	Private Well	GROHE	Ozark		15
WIMS	0000428A	300	84				01	38N	17W	0	166	4/30/87	Private Well	SHUMATO	Ozark		15
WIMS	0001307A	138	103				03	37N	17W	0	15	6/4/87	Private Well	TALLEY	Ozark		20
WIMS	0002013A	300	84				16	38N	16W	0	0	8/31/87	Private Well	HENSON	Ozark		20
WIMS	0002293A	196	103				29	38N	17W	0	30	7/23/87	Private Well	KEARNS	Ozark		30
WIMS	0002386A	238	84				16	38N	16W	0	30	9/18/87	Private Well	CONSTRUCTION	Ozark		30
WIMS	0002387A	238	0				16	38N	16W	0	0	9/18/87	Private Well	CONSTRUCTION	Ozark		0
WIMS	0004178A	363	105		NE	SW	03	38N	17W	0	100		Private Well	CLARK	Ozark		0
WIMS	0005142A	360	105				09	38N	17W	0	160	2/12/88	Private Well	COLEMAN	Ozark		35
WIMS	0005995A	176	105		SW	NE	06	38N	16W	0	15	8/10/87	Private Well	DONOHO	Ozark		30
WIMS	0006398A	0	0				21	38N	16W	0	0	5/9/88	Private Well	BAHNMILLER	Ozark		0
WIMS	0006809A	360	0		NE	SW	29	38N	17W	0	140	2/15/88	Private Well	COLEMAN	Ozark		0
WIMS	0006866A	0	0				16	38N	16W	0	0	6/3/88	Private Well	EBLING	Ozark		0
WIMS	0008263A	220	105				06	38N	16W	0	30	4/8/88	Private Well	LONG	Ozark		10
WIMS	0008591A	322	106				09	37N	17W	0	25	9/3/88	Private Well	COLLINS	Ozark		40
WIMS	0008592A	385	84				29	38N	17W	0	180	9/10/88	Private Well	DAILEY	Ozark		30
WIMS	0008719A	400	181		NW	SE	28	38N	16W	0	155	8/25/88	Private Well	TRUITT	Ozark		30
WIMS	0008724A	477	87		SW	SW	33	38N	17W	0	260	8/28/88	Private Well	COY	Ozark		22
WIMS	0009625A	240	110		SE	SE	20	38N	17W	0	30	10/18/88	Private Well	WARD	Ozark		18
WIMS	0009676A	180	126		SW	NE	03	38N	17W	0	30	8/9/88	Private Well	DERRINGER	Ozark		40

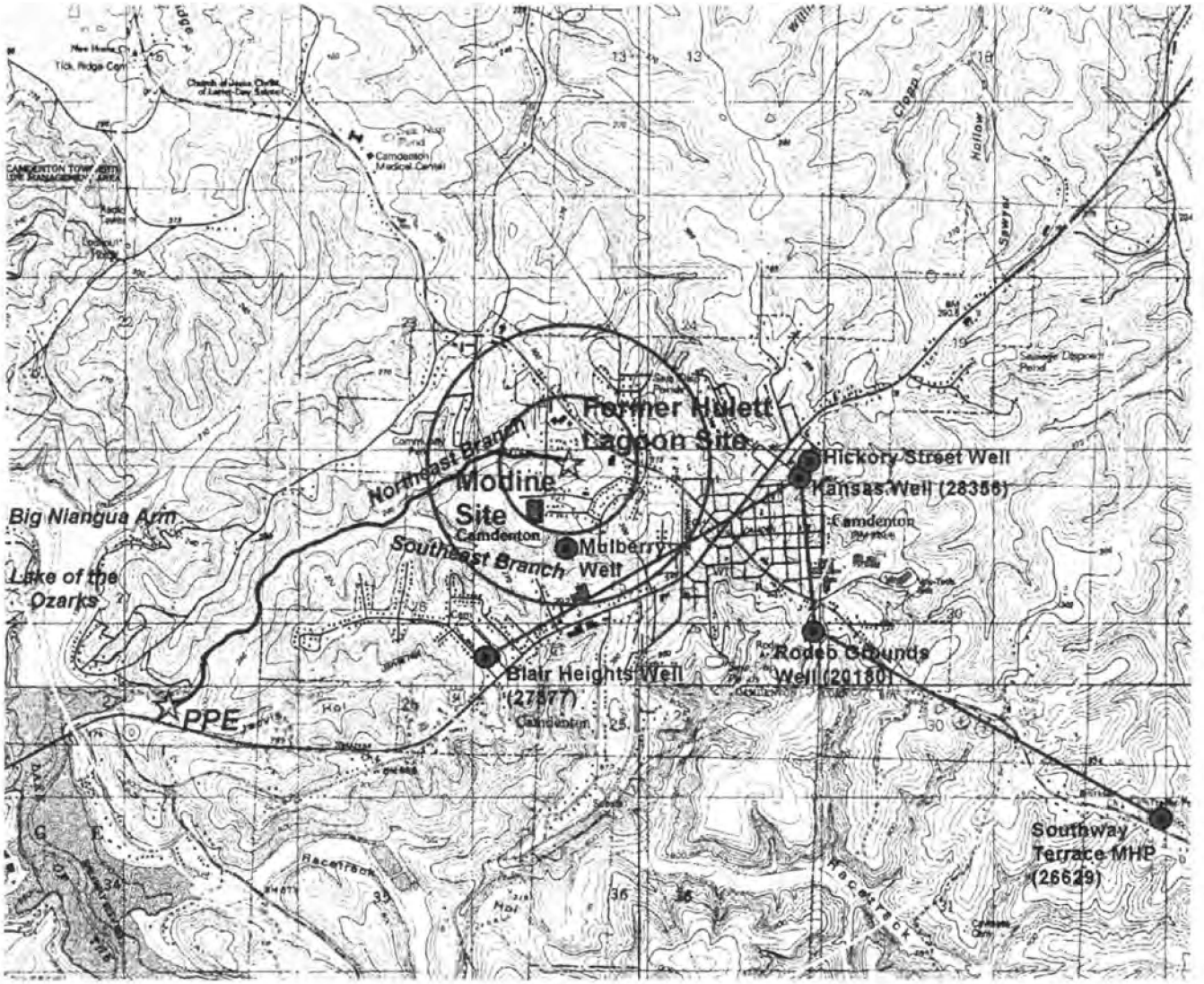
Wells located 3 to 4 Miles from the Former Hulett Lagoon

Source	Well ID	Depth	CSG	Q1	Q2	Q3	SEC	TWN	RNG	Elev	SWL	Date	Use	Owner	Aquifer	PWSSID/EXT ID#	GPM
WIMS	0011489A	400	106		SE	NW	28	38N	16W	0	160	10/16/88	Private Well	RAYBURN	Ozark		25
WIMS	0011697A	375	80		NE	SE	20	38N	17W	0	0	7/26/88	Private Well	SHARP	Ozark		18
WIMS	0012606A	219	84				03	38N	17W	0	0	5/1/88	Private Well	HASTINGS	Ozark		40
WIMS	0015212A	651	405		SW	SW	33	38N	16W	0	170	5/16/89	Private Well		Ozark		90
WIMS	0015364A	200	92		NE	NE	07	38N	16W	0	10	3/18/89	Private Well		Ozark		40
WIMS	0015368A	210	87		NW	NE	04	37N	17W	0	30	2/1/89	Private Well	MORRIS	Ozark		12
WIMS	0019739A	480	202		NE	NE	01	38N	17W	0	140	12/9/96	Private Well	FRETHOLM	Ozark		50
WIMS	0026793A	198	190		SE	NW	04	37N	17W	720	0	1/23/90	Private Well	COLLINS	Ozark		60
WIMS	0035888A	333	121		NE	SW	28	38N	16W	0	210	6/25/91	Private Well	ROYALS	Ozark		20
WIMS	0035889A	332	80		SE	NW	16	38N	17W	0	180	5/10/94	Private Well	STIDHAM	Ozark		18
WIMS	0035905A	297	86		SW	NE	16	38N	16W	0	115	2/20/90	Private Well	EVANS	Ozark		100
WIMS	0035914A	353	128		NE	SW	16	38N	16W	0	180	12/9/89	Private Well	MABREY	Ozark		50
WIMS	0043866A	400	103		SE	NW	16	38N	17W	0	207	5/8/90	Private Well	LUX	Ozark		20
WIMS	0046869A	353	106		NE	SW	33	38N	17W	0	245	12/26/90	Private Well	MORRIS	Ozark		15
WIMS	0046884A	190	80		NE	NW	16	38N	16W	0	45	7/8/93	Private Well	EVELAND	Ozark		12
WIMS	0046895A	377	119		NE	NE	05	37N	16W	0	205	10/1/93	Private Well	GEORGE	Ozark		25
WIMS	0052598A	312	100		NW	SW	21	38N	16W	0	155	9/13/92	Private Well	BARTLETT	Ozark		25
WIMS	0052601A	210	140		NW	SE	20	38N	17W	0	40	5/2/93	Private Well	MCGRATH	Ozark		50
WIMS	0052623A	248	84		NE	NE	17	38N	16W	0	35	7/15/92	Private Well	JACKSON	Ozark		30
WIMS	0052632A	210	120	SE	SW	SE	20	38N	17W	665	45	7/1/92	Private Well	WERNER	Ozark		30
WIMS	0052650A	291	80		NW	SW	33	38N	17W	0	140	8/18/92	Private Well	RODGERS	Ozark		25
WIMS	0054161A	340	106		NW	SW	21	38N	16W	0	166	7/23/90	Private Well	STRINE	Ozark		22
WIMS	0054164A	355	170	SW	SW	NE	16	38N	17W	905	207	8/3/90	Private Well	SHERRELL	Ozark		30
WIMS	0057058A	210	100		SE	NW	33	38N	17W	0	55	2/22/94	Private Well	BULLOCK	Ozark		30
WIMS	0062753A	200	100				06	38N	16W	0	50	6/3/91	Private Well	ALSBACH	Ozark		20
WIMS	0062774A	360	144		NW	NW	21	38N	16W	0	205	7/30/91	Private Well	WEST	Ozark		30
WIMS	0066002A	260	182		NE	NE	04	37N	17W	0	90	3/31/92	Private Well	ICENOGLE	Ozark		25
WIMS	0068399A	200	100	NW	NW	NW	28	38N	17W	669	18	10/21/91	Private Well		Ozark		20
WIMS	0068406A	220	120	SE	SW	NE	20	38N	17W	679	18	10/1/91	Private Well	WHITE	Ozark		8
WIMS	0077419A	360	80		SE	NW	21	38N	16W	0	210	12/16/92	Private Well	WEBB	Ozark		40
WIMS	0091289A	250	103		NW	NE	04	37N	17W	0	23	12/1/93	Private Well	GRECO	Ozark		20
WIMS	0091290A	170	103		NW	NE	04	37N	17W	0	0	12/2/93	Private Well	FRUEH	Ozark		30
WIMS	0091373A	480	105	SW	SE	NW	16	38N	17W	0	290	7/14/93	Private Well	ROBBINS	Ozark		20
WIMS	0096836A	240	160	SW	NW	NW	03	37N	17W	680	50	3/26/94	Private Well	OVERBY	Ozark		30
WIMS	0100968A	460	167	NE	NW	NE	08	37N	16W	0	196	3/18/94	Private Well	ADAMS	Ozark		15
WIMS	0108332A	280	100	SW	SW	SE	03	37N	17W	0	102	12/30/94	Private Well	MIELKE	Ozark		20
WIMS	0108341A	260	160	SW	SW	NW	21	38N	17W	722	30	2/13/95	Private Well	FEUSER	Ozark		18
WIMS	0120261A	320	82			SE	29	38N	17W	0	160	5/11/94	Private Well	TURRICK	Ozark		25
WIMS	0120853A	273	84	SW	SW	NE	03	38N	17W	0	127	7/29/94	Private Well	ROOFENER	Ozark		35

Wells located 3 to 4 Miles from the Former Hulett Lagoon

Source	Well ID	Depth	CSG	Q1	Q2	Q3	SEC	TWN	RNG	Elev	SWL	Date	Use	Owner	Aquifer	PWSSID/EXT ID#	GPM
WIMS	0120873A	170	110	SW	NW	NE	29	38N	17W	0	25	8/15/94	Private Well	WERNER	Ozark		20
WIMS	0138031A	351	100	SW	SW	NW	21	38N	16W	0	155	9/1/95	Private Well	STAMPER	Ozark		25
WIMS	0138062A	333	108		NW	SE	28	38N	16W	0	0	12/4/95	Private Well	LOCK	Ozark		25
WIMS	0138068A	230	80		SE	NW	16	38N	16W	0	70	3/15/96	Private Well	HARGROVE	Ozark		35
WIMS	0138069A	371	105		NW	SW	21	38N	16W	0	170	3/20/96	Private Well	SAMULSON	Ozark		25
WIMS	0138081A	310	80		NW	SE	28	38N	16W	0	145	10/22/96	Private Well	STAMPER	Ozark		20
WIMS	0138085A	310	80		SW	NE	16	38N	16W	0	125	4/10/97	Private Well	WILLIAMS	Ozark		25
WIMS	0141774A	395	100	NE	SW	NE	21	38N	16W	0	210	7/6/95	Private Well	LAKE WOOD CONS	Ozark		40
WIMS	0148329A	415	100				28	38N	16W	0	150	6/28/96	Private Well	DEVIS	Ozark		50
WIMS	0148588A	320	104	NW	SE	NW	21	38N	16W	0	110	12/15/95	Private Well	LATHROP	Ozark		40
WIMS	0154616A	300	120	NW	SE	NE	17	38N	16W	0	158	8/19/96	Private Well	OSTER	Ozark		25
WIMS	0157304A	375	82			SW	16	38N	16W	0	233	7/15/96	Private Well	KIMMBLE	Ozark		32
WIMS	0157305A	355	82			SW	16	38N	16W	0	188	7/15/96	Private Well		Ozark		24
WIMS	0157532A	460	100			NW	11	37N	17W	0	240	10/8/96	Private Well	NOBLE	Ozark		20
WIMS	0157785A	150	120				20	38N	17W	670	7	11/23/96	Private Well	BELL	Ozark		30
WIMS	0173793A	430	142				07	37N	16W	0	260	6/30/96	Private Well	ROTHOVE	Ozark		50
WIMS	0181020A	360	82	NE	SE	NW	03	38N	17W	258	220	7/7/97	Private Well	BARE	Ozark		15
WIMS	0185537A	300	180				08	38N	17W	0	90	9/8/97	Private Well	WRIGHT	Ozark		30
WIMS	0190450A	415	100		NW	NE	08	38N	16W	0	200	9/30/97	Private Well	WILLIAMS	Ozark		30

Former Hulett Lagoon PA/SI
Camdenton, Missouri Camden County
Figure 1: Surface Water Pathway



Receiving Stream

Target Distance Limit (miles)

- 0.25
- 0.5
- 1
- 2

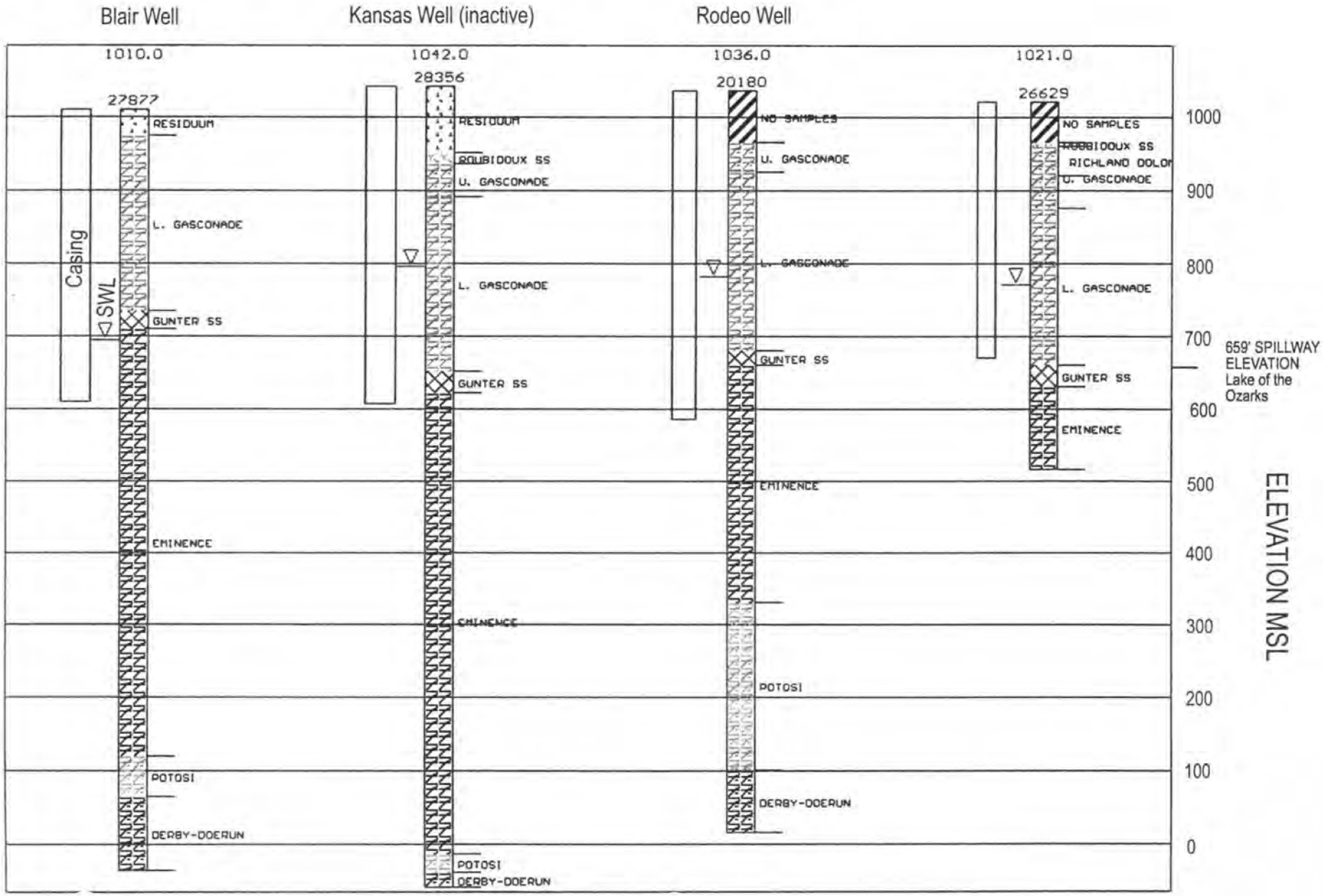
Select Community Well (LOGMAIN Number)

Cross-Section Location (See Figure 2)

0.5 0 0.5 1 Miles

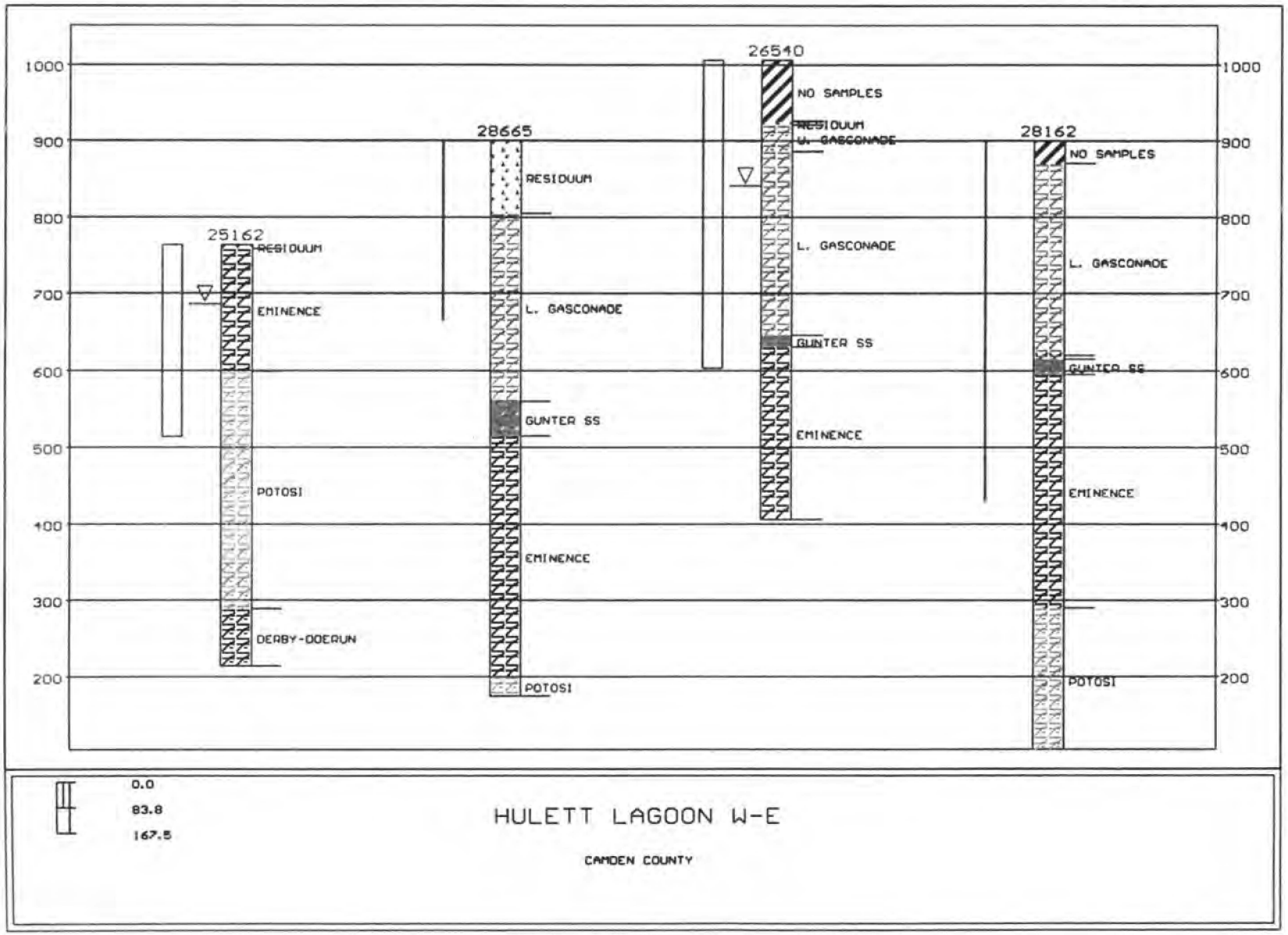
N W E S

Former Hulett Lagoon PA/SI, Camdenton Missouri
Figure 2: Cross-Section (see figure 1 for well locations)

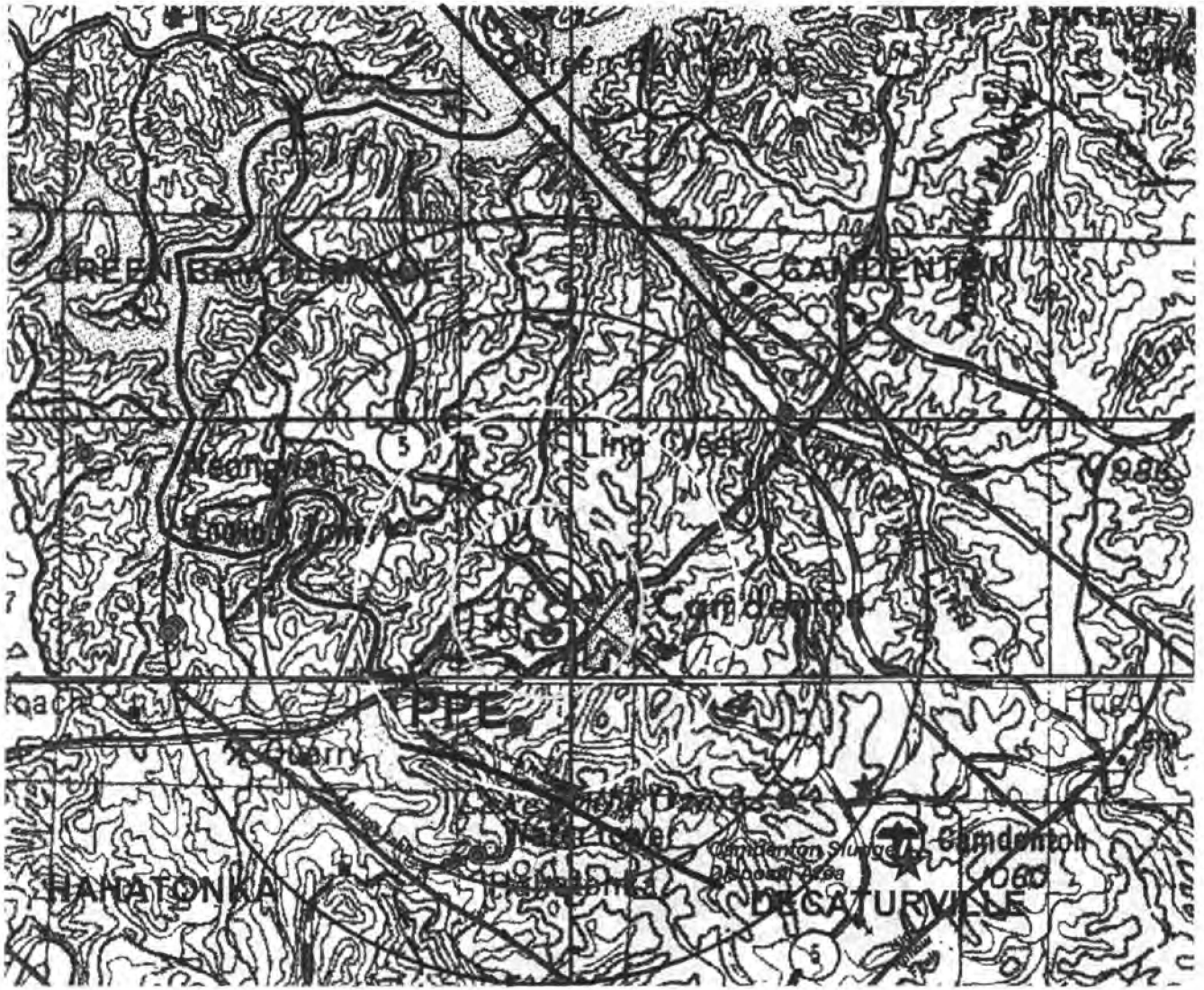


Former Hulett Lagoon PA/SI, Camdenton Missouri
Figure 3 (see figure 4 for well locations)

Southwest Northeast



Former Hulett Lagoon PA/SI
Camden County
Figure 4: 15-Mile Surface Water Target Distance Limit



15-Mile Surface Water Target Distance Limit

Spring

Regional Cross-Section with LOGMAIN Wells (see figure 3)

Fold

Fault

Target Distance Limit (Miles)

- 0.25
- 0.5
- 1
- 2
- 3
- 4

7.5 MINUTE QUADRANGLE NAME

0 4 8 Miles

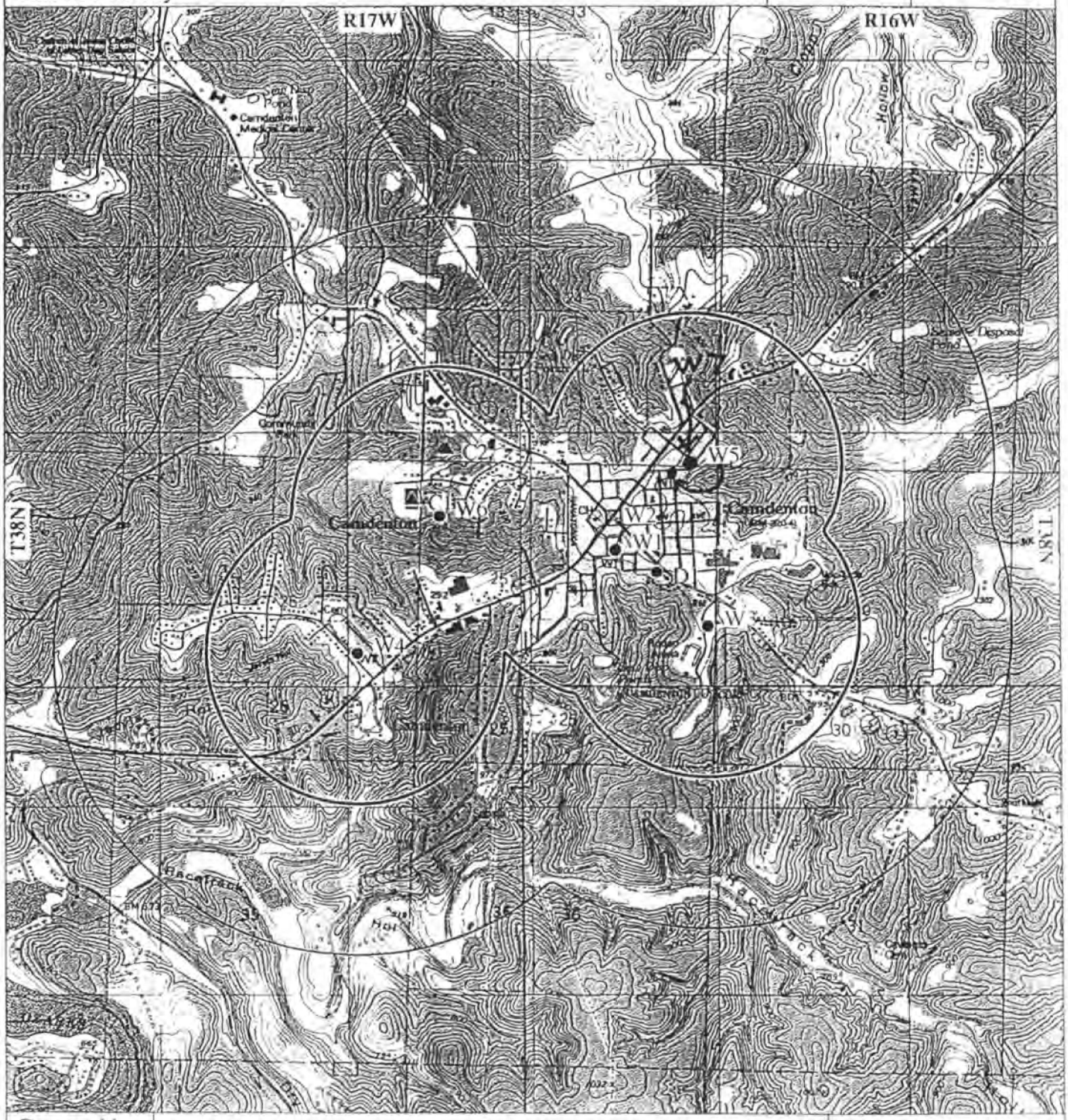
N W E S

Former Hulett Lagoon Site
Combined PA/SI
Reference 44

Camdenton
3010130
6 wells, 2 chemical sites, 1 dealership
Camden County

This map is subject to change as a result of new information is added. Production Date: November 05, 1998

2-24-99



Prepared by

CARES
University of Missouri – Columbia

- Wellhead
- Chemical Site
- Dealership
- Tank or WTP
- Half Mile Buffer
- One Mile Buffer
- Chemical Area Site
- Dealership Area Site

For base map symbols see the U.S. Geological Survey publication 'Topographic Map Symbols'

N

0 5000
feet

Missouri Department of Natural Resources

Division of Environmental Quality
Public Drinking Water Program

Camdenton
3010130
6 wells

*Temporary DGLS well number. The correct well number is requested.

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map Blanks indicate missing data. This table is subject to change as additional information is acquired Source: Missouri Department of Natural Resources, Public Drinking Water Program. Production Date: November 05, 1998

Well Number	W1	W2	W3	W4	W5
Extended PWS #	3010130101	3010130102	3010130103	3010130104	3010130105
Local Well Name	City Hall	City Hall	Rodeo Grounds	Blair Hgts.	Kansas
DGLS Well #	46039*	46040*	20180	27877	28356
Facility Type	City	City	City	City	City
Status	Abandoned	Abandoned	Active	Active	Inactive
Latitude	38 0 23.78 N	38 0 23.69 N	38 0 10.49 N	38 0 5.85 N	38 0 38.87 N
Longitude	92 44 39.29 W	92 44 39.41 W	92 44 18.82 W	92 45 36.61 W	92 44 22.34 W
USGS 7.5 Quadrangle	Camdenton	Camdenton	Camdenton	Green Bay Terrace	Camdenton
County	Camden	Camden	Camden	Camden	Camden
DNR Region	Jefferson City	Jefferson City	Jefferson City	Jefferson City	Jefferson City
Date Drilled (year)	1935	1940	1961	1974	1980
Material (C/U)	Consolidated	Consolidated	Consolidated	Consolidated	Consolidated
Yielding Strata	Potosi	Potosi	Potosi Dolomite	Potosi Dolomite	
Total Depth (feet)	794.0	800.0	940.0	1060.0	1100.0
Ground Elevation (ft)	1031.0	1031.0			
Top Seal	Yes			Satisfactory	Pressure Grout
Bottom Seal	Yes			Satisfactory	Pressure Grout
Casing Depth (feet)	80.0	75.0	450.0	400.0	435.0
Casing Size (inches)	12.0	6.0	8.0	10.0	10.0
Casing Type	Steel	Steel	Steel	Steel	Steel
Elev. of Casing Top (ft)					
Outer Casing Depth (ft)				46.0	20.0
Outer Casing Size (in)				16.0	16.0
Screen Length (feet)					
Screen Size (inches)					
Static Water Level (ft)	95.0	95.0	254.0	315.0	232.0
Well Yield (gpm)	100		380	100	
Head (feet)			50.0	100.0	
Draw Down (feet)			375.0	395.0	
Pump Test Date (year)			1984	1990	
Pump Type	Vertical Turbine	Vertical Turbine	Vertical Turbine	Vertical Turbine	
Pump Manufacturer	Worthington	Fairbanks Morse	Layne	Aurora	
Pump Depth (feet)			420	450	
Pump Capacity (gpm)	100	100	380	100	
Pump Meter (Y/N)		Y	Y	Y	
Standby Power (Y/N)			N	N	
VOC Detections (Y/N)			N	N	
Nitrate Detection (Y/N)			N	N	
Chlorination (Y/N)			N	N	
Filtration (Y/N)			N	N	
GWUDISW (Y/N)					
State Approved (Y/N)					
Surface Drainage	Satisfactory	Satisfactory		Satisfactory	
Date Abandoned (year)	1989	1989			
Date Plugged (year)					
Location Method	Map Interpolation	Map Interpolation			Map Interpolation
Method Accuracy (feet)	1300	1300			100

Camdenton
3010130
6 wells

*Temporary DGLS well number. The correct well number is requested.

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map Blanks indicate missing data. This table is subject to change as additional information is acquired
Source: Missouri Department of Natural Resources, Public Drinking Water Program
Production Date November 05, 1998 2-2

Well Number	W6	W7
Extended PWS #	3010130106	
Local Well Name	Mulberry Lane	Hickory
DGLS Well #	40376*	
Facility Type	City	
Status	Active	Active
Latitude	38 0 29.63 N	
Longitude	92 45 17.85 W	
USGS 7.5 Quadrangle	Green Bay Terrace	
County	Camden	
DNR Region	Jefferson City	
Date Drilled (year)	1986	1998
Material (C/U)	Consolidated	
Yielding Strata	Potosi Dolomite	
Total Depth (feet)	900.0	1100
Ground Elevation (ft)		
Top Seal	Pressure Grout	pressure grout
Bottom Seal	Pressure Grout	pressure grout
Casing Depth (feet)	400.0	450
Casing Size (inches)	12.0	8
Casing Type	Steel	steel
Elev. of Casing Top (ft)		
Outer Casing Depth (ft)	48.0	
Outer Casing Size (in)	16.0	
Screen Length (feet)		
Screen Size (inches)		
Static Water Level (ft)	95.0	
Well Yield (gpm)	600	
Head (feet)	85.0	135
Draw Down (feet)	265.0	
Pump Test Date (year)	1994	
Pump Type	Vertical Turbine	submersible
Pump Manufacturer	Fairbanks Morse	
Pump Depth (feet)	350	500
Pump Capacity (gpm)	100	500
Pump Meter (Y/N)	Y	
Standby Power (Y/N)	N	
VOC Detections (Y/N)	Y	
Nitrate Detection (Y/N)	N	
Chlorination (Y/N)	N	
Filtration (Y/N)	N	
GWUDISW (Y/N)		
State Approved (Y/N)		
Surface Drainage	Satisfactory	
Date Abandoned (year)		
Date Plugged (year)		
Location Method		map interpolation
Method Accuracy (feet)		100

Camdenton
3010130
2 chemical sites

The information below represents the data currently associated with the water supply layers. The chemical site number corresponds to the chemical site numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired.
Source Missouri Department of Natural Resources, Public Drinking Water Program.
Production Date: November 05, 1998

Chemical Site #	C1	C2
Site ID #	30035	30036
Latitude	38 0 32.69 N	38 0 41.53 N
Longitude	92 45 24.18 W	92 45 16.23 W
Name	Modine Heat Transfer, Inc.	Hulett Lagoon
Address	_____	_____
City	Camdenton	Camdenton
ZIP Code	_____	_____
Location Method	Map Interpolation	Map Interpolation
Method Accuracy (feet)	40	40
Chemical, Db	Trichloroethylene (TCE), Db 999 Cyanides, Db 999 Multiple Metals, Db 999 Multiple VOCs, Db 999	Cyanides, Db 999 Multiple Metals, Db 999 Multiple VOCs, Db 999

Camdenton
3010130
1 dealership

The information below represents the data currently associated with the water supply layers The dealership number corresponds to the dealership numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired
Source Missouri Department of Natural Resources, Public Drinking Water Program
Production Date November 05, 1998

Dealership #	D1
Site ID #	20187
Latitude	38 0 19.8 N
Longitude	92 44 30.2 W
Name	Camdenton Farm & Garden
Address	Hwy 5 S
City	Camdenton
ZIP Code	65020
Database #	48
Location Method	_____
Method Accuracy (feet)	_____
Active	No

SUPPLY CAMPENTON

WELL DATA:

	Well No. ~~2~~ 1 (Abandoned)	Well No. ~~3~~ 2 (Abandoned)	Well No. 3	Well No. 4	Well No. ~~5~~ (No Pump)	Well No. 6
Date Drilled	1931	1931	1961	1974	1980	1986
Local Designation	CITY HALL	CITY HALL	Rodeo Grounds	Blair Hgts	Kansas St	Mulberry
Type	DRILLED	DRILLED	DRILLED	Drilled	Drilled	Drilled
Total Depth	800'	794'	940'	1045'	1100 <1000'	900'
Depth and Size of Casing	79'-6"	80'-8"	450'-8"	400' of 10"	435' of 10"	400' of 12"
Casing Material	STEEL	STEEL	STEEL	Steel	Steel	Steel
Size Hole Below Casing Point	6"	8"	8"	10"	10"	12"
Static Water Level	95'	95'	254'	315'		
Draw Down and Yield	-170GPM	-170GPM	-325GPM	(new) 2.6 gpm/ft.		
Water-Bearing Strata	POTOSI	POTOSI	ROUBIDOUX			
Top Seal (Method)	SPLIT RING SAN WELL SEAL	SPLIT RING SAN. WELL SEAL	PUMP MOTOR BASE	Pump Motor Base		
Bottom Seal		PRESSURE GROUT	PRESSURE GROUT 8/25/61	10-24-74 Press. Grout	3-19-80 Pres. Grout	6-24-86 Pres Grout
Pump Type	SUBMERSIBLE	SUBMERSIBLE	VERT. TURBINE water lub	Vert. Turbine		Vert. Turb water lube
Manufacturer	REDA	REDA	LAYNE	Aurora		Fairbanks Morse
Capacity	170+ GPM	170+ GPM	~~400+~~ 320 GPM	300 gpm		575 100 HP
Pump Setting	350'	400'	420'			
Meter	YES	YES	YES	Yes		YES
Size and Length of Screen	—	—	—	—		
Type of Standby Power						
Surface Drainage	OK	O.K.	O.K.	OK.		
Date Abandoned	No Pump 9/87	No Pump 9/87			No Pump 9/87	
Date Plugged						

ELEVATION

LOCATION

E 2.03 - Rev.

Former Hulett Lagoon Site
Combined PA/SI
Reference 45

FEBRUARY 24, 1999

VALERIE H. WILDER
DEPARTMENT OF NATURAL RESOURCES
P.O. BOX 176
JEFFERSON CITY MO 65102-0176

DERR VALERIE:

THE MULBERRY WELL WAS TAKEN OFF LINE ON FEBRUARY 2, 1999 IN THE CITY OF CAMDENTON I HAVE PUMPED THE MULBERRY WELL TO WASTE ON THE 22, 26 AND 29 OF JANUARY 1999 FOR A TOTAL OF 5 HRS

ON FEBRUARY 2, 1999 BLAIR WELL HAD ELECTRICAL PROBLEMS AND I HAD TO PUT MULBERRY BACK ON LINE, I SHUT MULBERRY OFF FEBRUARY 9, 1999 AND TOOK MULBERRY WELL OFF LINE. I PUMPED A TOTAL OF 400,000 GALS IN THAT TIME.

I DID NOT PUMP MULBERRY WELL AGAIN UNTIL FEBRUARY 12, 1999. WHEN I HAD TO PUT THE WELL BACK ON LINE WHEN WE HAD

(2)

PROBLEMS WITH OUR WATER CONTROL'S AND REPAIRS WERE MADE BY R. E. PEDROTTI CO. I USED THE WELL FOR FOUR DAYS AND PUMPED 1,314 GAL'S INTO THE SYSTEM. MULBERRY WAS TAKEN OUT OF LINE ON FEBRUARY 16, 1999. I HAVE NOT PUMPED MULBERRY INTO THE SYSTEM TO DATE.

I HAVE PUMPED MULBERRY TO WASTE ON FEBRUARY 23, 1999 FOR ONE HOUR. AND HAVE NOT PUMPED THE WELL SENSE

IF YOU HAVE ANY QUESTIONS CONCERNING MULBERRY WELL PUMPAGE OR OTHER QUESTIONS PLEASE CONTACT ME AT (573) 346-7293

SINCERELY,

VINCENT COSTA
DIRECTOR PUBLIC WORKS

VALERIE

MULBERRY PUMPS 570 TO 600 G.P.M
MULBERRY WAS OUR LEAD WELL UNTIL
JULY OF 1998. WHEN WE HAD OUR NEW
CONTROLS PUT IN THIS JULY WE WERE
ABLE TO SET OUR WELLS AS TOO THE
TIME THEY WERE TO COME ON. I
PUT MULBERRY AS THE THIRD WELL.
WHEN WE HAD OUR OLD CONTROLS
MULBERRY ALWAYS WAS THE FIRST
WELL TO RUN. BLAIR WELL & RODEO
WELL RAN WHEN MULBERRY WAS NOT
ABLE TO HANDLE THE DEMAND. WE
AVERAGE ABOUT 600,000 PER DAY.
MULBERRY WITH THE OLD CONTROLS
PUMPED ABOUT 70 % ~~THE~~ THE WATER

WITH THE NEW CONTROLS I WAS ABLE
TO CUT MULBERRY DOWN TO ABOUT
40 % OF THE WATER USAGE.

I HOPE THAT THIS WILL HELP YOU

INVENTORY OF MISSOURI PUBLIC WATER SYSTEMS 1998

RECEIVED
MAR 0 5 1999
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Missouri Department of Natural Resources
Division of Environmental Quality

Former Hulett Lagoon Site
Combined PA/SI
Reference 46

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CITY WATER SYSTEMS

COMMUNITY WATER SYSTEM NAME		YEAR BEGAN	OPER LVL	OWN	POP SERV	SERV CON	PCT SUR	PCT GRD	PCT PUR SUR	PCT PUR GRD	SUPPLY CAPACITY M.G.D.	AVG DLY CONSUMP M.G.D.	FINISHED WATER STORAGE
CALIFORNIA		1992	D	4	3,400	1,711	0	100	0	0	2.8000	1.1100	0.2250
ID NUMBER MO3010124	COUNTY LOCATION MONITEAU												
CALLAO		1960	E	4	332	179	0	0	100	0	0.0432	0.0240	0.0500
ID NUMBER MO2010125	COUNTY LOCATION MACON												
CAMDENTON		1931	E	4	3,010	1,260	0	100	0	0	1.2000	0.5000	0.4250
ID NUMBER MO3010130	COUNTY LOCATION CAMDEN												
CAMERON		1919	B	4	8,300	1,900	100	0	0	0	3.1680	1.1500	1.9600
ID NUMBER MO1010131	COUNTY LOCATION CLINTON												
CAMPBELL		1911	E	4	2,350	1,216	0	100	0	0	1.1520	0.3260	0.3500
ID NUMBER MO4010132	COUNTY LOCATION DUNKLIN												
CANTON		1937	B	4	2,623	860	0	100	0	0	0.7200	0.2091	0.3630
ID NUMBER MO2010134	COUNTY LOCATION LEWIS												
CAPE GIRARDEAU		1931	A	4	39,500	13,236	76	24	0	0	4.7400	3.6000	5.2550
ID NUMBER MO4010136	COUNTY LOCATION CAPE GIRARDEAU												
CARDWELL		1951	E	4	792	398	0	100	0	0	0.4320	0.1210	0.0750
ID NUMBER MO4010137	COUNTY LOCATION DUNKLIN												
CARL JUNCTION		1910	D	4	3,875	1,550	0	100	0	0	1.8640	0.3500	0.3000
ID NUMBER MO5010138	COUNTY LOCATION JASPER												
CARROLLTON		1941	A	4	4,406	2,117	0	100	0	0	2.4000	0.6750	0.8400
ID NUMBER MO2010140	COUNTY LOCATION CARROLL												
CARTERVILLE		1910	E	4	1,972	754	0	100	0	0	0.0000	0.1260	0.0000
ID NUMBER MO5010141	COUNTY LOCATION JASPER												
CARTHAGE		1909	B	4	10,747	4,700	0	100	0	0	4.0000	2.8000	2.3900
ID NUMBER MO5010142	COUNTY LOCATION JASPER												

CITY WATER SYSTEMS

COMMUNITY WATER SYSTEM NAME		YEAR BEGAN	OPER LVL	OWN	POP SERV	SERV CON	PCT SUR	PCT GRD	PCT PUR SUR	PCT PUR GRD	SUPPLY CAPACITY M.G.D.	AVG DLY CONSUMP M.G.D.	FINISHED WATER STORAGE
LEWISTOWN		1966	C	4	502	294	100	0	0	0	0.1580	0.0502	0.0711
ID NUMBER MO2010463	COUNTY LOCATION LEWIS												
LEXINGTON		1884	B	2	5,200	2,278	100	0	0	0	1.2000	0.4640	0.2500
ID NUMBER MO1010464	COUNTY LOCATION LAFAYETTE												
LIBERAL		1937	D	4	867	347	0	100	0	0	0.6980	0.0700	0.0550
ID NUMBER MO5010465	COUNTY LOCATION BARTON												
LIBERTY		1962	A	4	28,000	7,800	0	100	0	0	9.0000	2.8500	5.0000
ID NUMBER MO1010466	COUNTY LOCATION CLAY												
LICKING		1988	E	4	1,328	630	0	100	0	0	0.5330	0.1676	0.2500
ID NUMBER MO4010467	COUNTY LOCATION TEXAS												
LILBOURN		1946	D	4	1,500	600	0	100	0	0	0.6690	0.1685	0.1000
ID NUMBER MO4010468	COUNTY LOCATION NEW MADRID												
LINCOLN		1950	D	4	860	450	0	100	0	0	0.5400	0.0900	0.0500
ID NUMBER MO3010469	COUNTY LOCATION BENTON												
LINN		1937	E	4	1,220	605	0	100	0	0	0.9300	0.1250	0.3000
ID NUMBER MO3010470	COUNTY LOCATION OSAGE												
LINN CREEK		1939	E	4	260	80	0	100	0	0	0.0700	0.0350	0.0300
ID NUMBER MO3010471	COUNTY LOCATION CAMDEN												
LINNEUS		1957	C	4	529	222	100	0	0	0	0.2160	0.0440	0.0640
ID NUMBER MO2010472	COUNTY LOCATION LINN												
LOCKWOOD		1928	D	4	1,450	580	0	100	0	0	1.0800	0.1900	0.3500
ID NUMBER MO5010475	COUNTY LOCATION DADE												
LOUISBURG		1991	D	4	157	63	0	100	0	0	0.4240	0.0150	0.0100
ID NUMBER MO5011068	COUNTY LOCATION DALLAS												

SUBDIVISION, MOBILE HOME PARK, INSTITUTION, MISCELLANEOUS WATER SYSTEMS

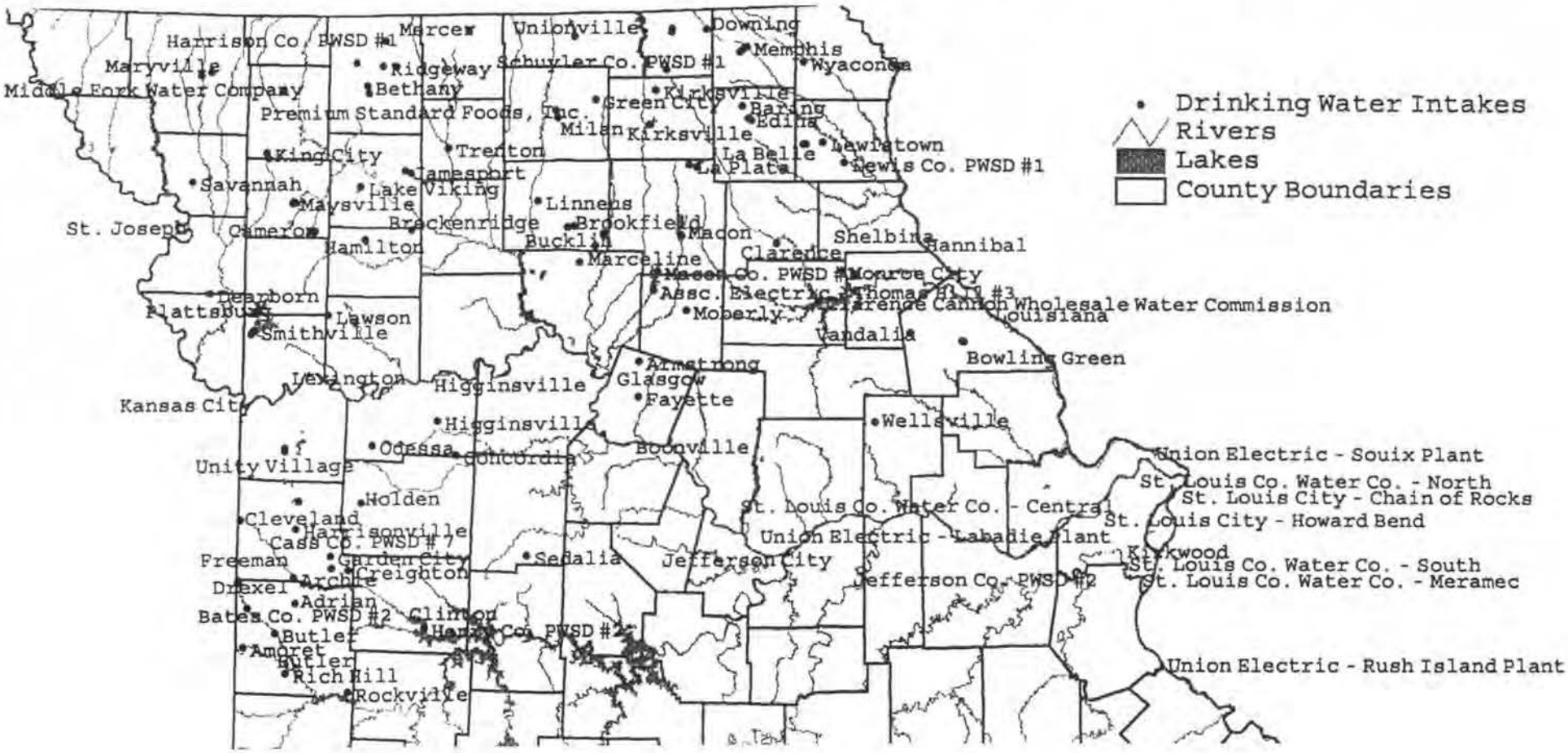
COMMUNITY WATER SYSTEM NAME	YEAR BEGAN	OPER LVL	OWN	POP SERV	SERV CON	PCT SUR	PCT GRD	PCT PUR SUR	PCT PUR GRD	SUPPLY CAPACITY M.G.D.	AVG DLY CONSUMP M.G.D.	FINISHED WATER STORAGE
SOUTHERN HILLS ESTATES SUBD	1989	D	2	59	16	0	100	0	0	0.1970	0.0044	0.0005
ID NUMBER MO5036259 — COUNTY LOCATION NEWTON												
SOUTHERN HILLS WATER CO	1986	D	2	190	52	0	100	0	0	0.0700	0.0160	0.0020
ID NUMBER MO3036065 — COUNTY LOCATION PETTIS												
SOUTHFORK MHP	1991	C	2	800	480	0	0	100	0	0.0000	0.0000	0.0000
ID NUMBER MO1048442 — COUNTY LOCATION CASS												
SOUTHGATE SUBDIVISION	1992	X	2	200	63	0	100	0	0	0.0600	0.0200	0.0080
ID NUMBER MO3036179 — COUNTY LOCATION PETTIS												
SOUTHSIDE MHP LLC	1987	E	2	80	35	0	100	0	0	0.1250	0.0080	0.0002
ID NUMBER MO3048015 — COUNTY LOCATION BOONE												
SOUTHWAY TERRACE MHP	1970	X	2	85	35	0	100	0	0	0.0000	0.0070	0.0020
ID NUMBER MO3048141 — COUNTY LOCATION CAMDEN												
SOUTHWOOD ACRES SUBD	1967	X	2	75	20	0	100	0	0	0.0450	0.0070	0.0640
ID NUMBER MO3036066 — COUNTY LOCATION PETTIS												
SPARTA MHP	1971	X	2	75	30	0	100	0	0	0.0432	0.0050	0.0004
ID NUMBER MO5048154 — COUNTY LOCATION CHRISTIAN												
SPOKANE HIGHLANDS	1994	E	2	25	1	0	100	0	0	0.0000	0.0000	0.0000
ID NUMBER MO5031093 — COUNTY LOCATION CHRISTIAN												
SPRING CREEK 2ND ADD	1992	D	2	35	15	0	100	0	0	0.0000	0.0000	0.0004
ID NUMBER MO5030391 — COUNTY LOCATION TANEY												
SPRING CREEK ADDITION MHP	1983	X	2	62	25	0	100	0	0	0.0000	0.0030	0.0006
ID NUMBER MO5048221 — COUNTY LOCATION TANEY												

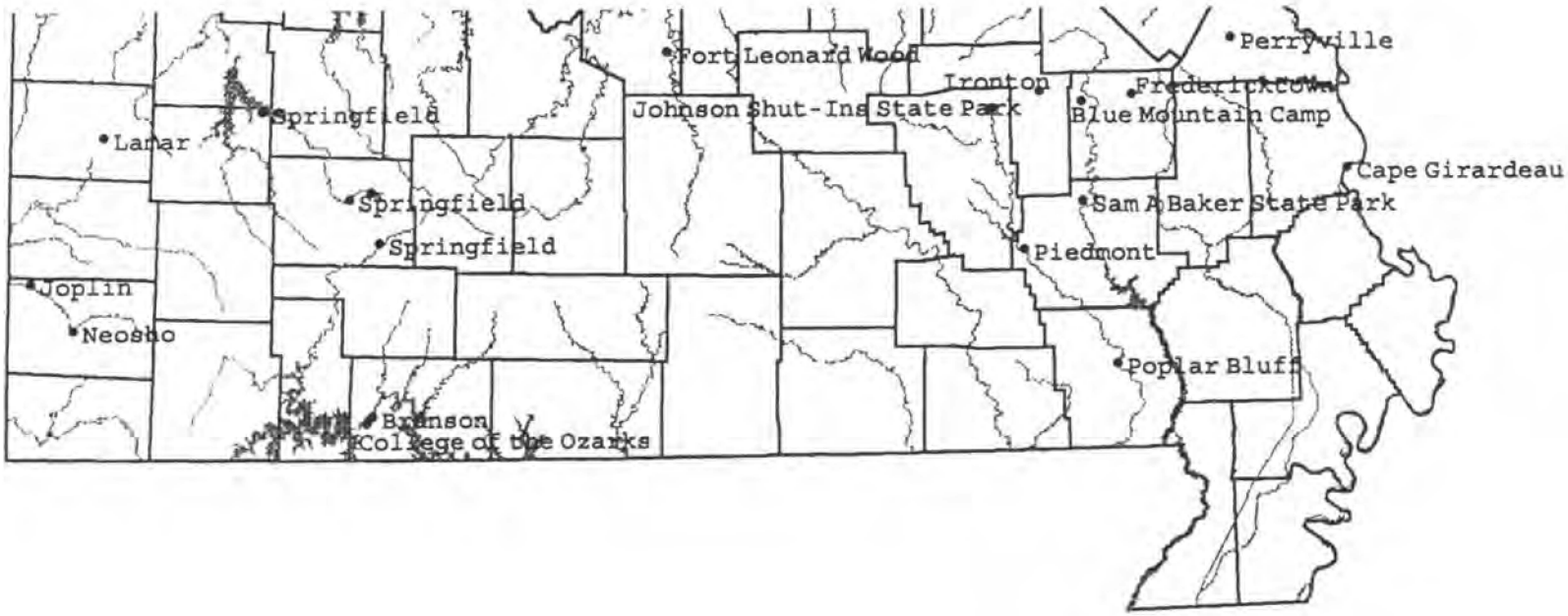
SUBDIVISION, MOBILE HOME PARK, INSTITUTION, MISCELLANEOUS WATER SYSTEMS

COMMUNITY WATER SYSTEM NAME	YEAR BEGAN	OPER LVL	OWN	POP SERV	SERV CON	PCT SUR	PCT GRD	PCT PUR SUR	PCT PUR GRD	SUPPLY CAPACITY M.G.D.	AVG DLY CONSUMP M.G.D.	FINISHED WATER STORAGE
WHITSON SCENIC VIEW MHP ID NUMBER MO3048132 — COUNTY LOCATION PHELPS	1965	X	2	90	45	0	100	0	0	0.0200	0.0100	0.0005
WILD OAKS WATER COMPANY ID NUMBER MO4036310 — COUNTY LOCATION WAYNE	1976	D	2	42	14	0	100	0	0	0.0000	0.0080	0.0001
WILDEN HEIGHTS SUBD ID NUMBER MO5036192 — COUNTY LOCATION GREENE	1992	X	2	52	21	0	100	0	0	0.0580	0.0040	0.0010
WILDERNESS CLUB INC ID NUMBER MO5031102 — COUNTY LOCATION TANEY	1995	E	2	100	70	0	100	0	0	0.1296	0.0000	0.0300
WINDSOR BAY ID NUMBER MO5036168 — COUNTY LOCATION BARRY	1989	X	2	35	137	0	100	0	0	0.1080	0.0010	0.0110
WINDSOR ESTATES NURSING HOME ID NUMBER MO3069006 — COUNTY LOCATION CAMDEN	1969	X	2	70	1	0	100	0	0	0.0000	0.0090	0.0012
WINDWOOD ESTATES SUBD ID NUMBER MO4031196 — COUNTY LOCATION CAPE GIRARDEAU	1997	D	2	45	16	0	100	0	0	0.0000	0.0000	0.0000
WINEGARS TEAL BEND SUBD ID NUMBER MO3036121 — COUNTY LOCATION BENTON	1950	X	2	400	140	0	100	0	0	0.1700	0.0150	0.0140
WINTERHAVEN MOBILE HOME ESTATE ID NUMBER MO5048077 — COUNTY LOCATION NEWTON	1990	E	2	120	48	0	100	0	0	0.0000	0.0080	0.0002
WOOD RIDGE ESTATES ID NUMBER MO5036071 — COUNTY LOCATION STONE	1989	D	2	80	32	0	100	0	0	0.0576	0.0040	0.0200
WOODCREST MHP ID NUMBER MO3048127 — COUNTY LOCATION PHELPS	1968	E	2	292	146	0	100	0	0	0.0900	0.0290	0.0050

Missouri Public Drinking Water

Surface Water Systems




Perryville
Fort Leonard Wood
Ironton
Fredericktown
Johnson Shut-Ins State Park
Blue Mountain Camp
Springfield
Lamar
Cape Girardeau
Springfield
Sam A Baker State Park
Springfield
Piedmont
Joplin
Neosho
Poplar Bluff
Branson
College of the Ozarks

Former Hulett Lagoon Site
Combined PA/SI
Reference 48

1990 Census of
Population and Housing

Summary Population and Housing Characteristics

Missouri

STOCK # 003-024-07326-9

$20.00

Issued August 1991

U.S. Department of Commerce
Robert A. Mosbacher, Secretary
Rockwell A. Schnabel, Deputy Secretary

Economics and Statistics Administration
Michael R. Darby, Under Secretary
for Economic Affairs and Administrator

BUREAU OF THE CENSUS
Barbara Everitt Bryant, Director

TABLE FINDING GUIDE

;ubjects by Type of Geographic Area and Table Number

Subjects covered in this report are shown on the left side, and types of geographic areas are shown at the top. For a description of area classifica-ons, see appendix A. For definitions and explanations of subject characteristics, see appendix B]

;ubject	The State	County	Place: By county and county subdivision	Place: Alphabetically for the State	County subdivision: By county	County subdivision: Alphabetically for the State[1]	American Indian and Alaska Native area
OPULATION CHARACTERISTICS							
ge	1,2	1,2	1	2	1	2	17
amilies and family characteristics	5,6	5,6	5	6	5	6	18
roup quarters	5,6	5,6	5	6	5	6	...
ıspanic origin	3,4	3,4	3	4	3	4	...
ouseholds and household characteristics	5,6	5,6	5	6	5	6	18
opulation density	15,16	15,16	15	16	15	16	...
ace	3,4	3,4	3	4	3	4	...
ex	3,4	3,4	3	4	3	4	17
OUSING CHARACTERISTICS							
ontract rent	11,12	11,12	11	12	11	12	18
spanic origin of householder	13,14	13,14	13	14	13	14	...
eals included in rent	11,12	11,12	11	12	11	12	...
ersons per occupied unit	9,10,11,12	9,10,11,12	9,11	10,12	9,11	10,12	...
ersons per room	7,8	7,8	7	8	7	8	...
ace of householder	13,14	13,14	13	14	13	14	...
ooms	7,8,9,10,11,12	7,8,9,10,11,12	7,9,11	8,10,12	7,9,11	8,10,12	...
enure	9,10,11,12	9,10,11,12	9,11	10,12	9,11	10,12	18
nits in structure	7,8,9,10,11,12	7,8,9,10,11,12	7,9,11	8,10,12	7,9,11	8,10,12	...
acancy characteristics	7,8	7,8	7	8	7	8	...
alue	9,10	9,10	9	10	9	10	18
AND AREA	15,16	15,16	15	16	15	16	18

... Not applicable

[1]County subdivisions within the State are shown alphabetically with places only in the reports for the following 12 States: Connecticut, Maine, assachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin

Table 6. Household, Family, and Group Quarters Characteristics: 1990

[For definitions of terms and meanings of symbols, see text]

State County Place and [In Selected States] County Subdivision	Persons in households	All households	Family households: Total	Family households: Married-couple family	Family households: Female householder, no husband present	Nonfamily households: Total	Nonfamily households: Householder living alone: Total	Nonfamily households: Householder living alone: 65 years and over: Total	Nonfamily households: Householder living alone: 65 years and over: Female	Persons per— Household	Persons per— Family	Persons in group quarters: Total	Persons in group quarters: Institutionalized persons	Persons in group quarters: Other persons in group quarters
The State	**4 971 676**	**1 961 206**	**1 368 334**	**1 104 723**	**208 175**	**592 872**	**510 684**	**221 516**	**177 384**	**2.54**	**3.08**	**145 397**	**80 854**	**64 543**
COUNTY														
Adair County	21 279	9 060	5 408	4 551	676	3 652	2 740	1 122	908	2 35	2 96	3 298	456	2 842
Andrew County	14 340	5 429	4 185	3 673	367	1 244	1 121	616	489	2 64	3 06	292	263	29
Atchison County	6 960	2 961	2 033	1 762	200	928	830	481	380	2 35	2 87	497	173	324
Audrain County	23 009	9 205	6 667	5 670	782	2 538	2 350	1 344	1 053	2 50	3 01	590	527	63
Barry County	27 201	10 858	8 046	6 987	759	2 812	2 554	1 420	1 102	2 51	2 95	346	331	15
Barton County	11 140	4 524	3 188	2 770	319	1 336	1 253	768	594	2 46	3 01	172	110	62
Bates County	14 733	5 918	4 303	3 710	432	1 615	1 503	903	724	2 49	2 98	292	243	49
Benton County	13 651	5 764	4 212	3 727	359	1 552	1 423	826	607	2 37	2 80	208	179	29
Bollinger County	10 457	3 946	3 057	2 662	284	889	814	500	364	2 65	3 07	162	106	56
Boone County	101 696	41 937	25 573	20 602	3 965	16 364	11 531	2 770	2 248	2 42	3 01	10 683	1 145	9 538
Buchanan County	80 649	32 486	22 319	17 669	3 717	10 167	8 990	4 500	3 646	2 48	3 04	2 434	1 698	736
Butler County	38 003	15 334	10 970	8 859	1 730	4 364	3 922	2 027	1 587	2 48	2 98	762	597	165
Caldwell County	8 187	3 222	2 369	2 083	217	853	799	503	409	2 54	3 04	193	193	-
Callaway County	30 364	11 552	8 639	7 302	1 016	2 913	2 524	1 184	925	2 63	3 08	2 445	1 298	1 147
Camden County	27 190	11 305	8 596	7 685	648	2 709	2 331	1 061	778	2 41	2 76	305	253	52
Cape Girardeau County	58 261	23 390	16 158	13 550	2 077	7 232	5 933	2 511	2 051	2 49	3 02	3 372	792	2 580
Carroll County	10 570	4 332	3 016	2 580	322	1 316	1 234	809	642	2 44	3 00	178	176	2
Carter County	5 456	2 128	1 520	1 266	187	608	564	319	229	2 56	3 10	59	59	-
Cass County	62 988	22 892	17 839	15 411	1 879	5 053	4 379	2 057	1 722	2 75	3 15	820	634	186
Cedar County	11 833	5 003	3 525	3 080	340	1 478	1 371	873	681	2 37	2 86	260	260	-
Chariton County	9 055	3 661	2 597	2 295	214	1 064	1 009	639	477	2 47	3 02	147	146	1
Christian County	32 280	11 937	9 510	8 264	954	2 427	2 125	966	792	2 70	3 07	364	364	-
Clark County	7 450	2 859	2 108	1 813	197	751	701	396	304	2 61	3 09	97	97	-
Clay County	150 449	58 915	42 458	35 673	5 274	16 457	13 829	4 353	3 577	2 55	3 04	2 962	1 667	1 295
Clinton County	16 253	6 112	4 639	4 029	440	1 473	1 325	728	589	2 66	3 11	342	333	9
Cole County	58 032	22 976	15 887	13 331	2 031	7 089	6 286	2 372	1 998	2 53	3 11	5 547	5 108	439
Cooper County	13 561	5 359	3 903	3 360	417	1 456	1 338	787	634	2 53	3 02	1 274	1 080	194
Crawford County	18 901	7 299	5 455	4 722	538	1 844	1 677	938	731	2 59	3 05	272	259	13
Dade County	7 235	2 976	2 098	1 846	182	878	824	515	400	2 43	2 96	214	211	3
Dallas County	12 507	4 899	3 648	3 158	355	1 251	1 158	703	531	2 55	3 02	139	121	18
Daviess County	7 765	3 040	2 211	1 976	172	829	776	520	420	2 55	3 08	100	100	-
DeKalb County	7 781	3 054	2 246	2 000	176	808	763	498	404	2 55	3 05	2 186	2 178	8
Dent County	13 499	5 327	3 938	3 394	435	1 389	1 270	787	630	2 53	3 00	203	157	46
Douglas County	11 761	4 587	3 409	2 993	291	1 178	1 069	614	479	2 56	3 03	115	102	13
Dunklin County	32 522	13 128	9 292	7 345	1 614	3 836	3 566	2 102	1 721	2 48	3 01	590	552	38
Franklin County	79 786	28 856	22 246	18 984	2 426	6 610	5 783	2 793	2 227	2 76	3 20	817	767	50
Gasconade County	13 735	5 543	3 959	3 461	342	1 584	1 430	851	656	2 48	2 99	271	263	8
Gentry County	6 618	2 756	1 909	1 682	172	847	808	556	466	2 40	2 96	230	213	17
Greene County	197 756	81 463	54 525	45 018	7 502	26 938	21 635	8 686	7 256	2 43	2 96	10 193	3 294	6 899
Grundy County	10 277	4 346	2 994	2 594	311	1 352	1 264	799	653	2 36	2 92	259	249	10
Harrison County	8 281	3 574	2 460	2 173	207	1 114	1 060	676	534	2 32	2 86	188	188	-
Henry County	19 700	8 189	5 689	4 837	642	2 500	2 289	1 400	1 114	2 41	2 94	344	309	35
Hickory County	7 224	3 183	2 349	2 123	164	834	776	485	350	2 27	2 67	111	111	-
Holt County	5 906	2 440	1 689	1 503	126	751	702	478	365	2 42	2 99	128	128	-
Howard County	8 898	3 571	2 518	2 114	303	1 053	960	598	469	2 49	3 03	733	219	514
Howell County	30 876	12 283	9 027	7 683	1 036	3 256	3 002	1 707	1 370	2 51	2 98	571	513	58
Iron County	10 308	3 995	2 970	2 520	347	1 025	937	554	423	2 58	3 04	418	353	65
Jackson County	621 967	252 582	164 361	121 736	34 400	88 221	74 760	26 937	21 661	2 46	3 08	11 265	7 634	3 631
Jasper County	88 285	36 134	24 890	20 428	3 549	11 244	9 904	4 885	3 991	2 44	2 98	2 180	888	1 292
Jefferson County	169 796	59 199	47 211	39 763	5 432	11 988	9 859	3 433	2 757	2 87	3 23	1 584	1 399	185
Johnson County	37 913	14 579	10 213	8 823	1 007	4 366	3 153	1 189	975	2 60	3 08	4 601	357	4 244
Knox County	4 366	1 819	1 273	1 111	114	546	511	324	267	2 40	2 94	116	77	39
Laclede County	26 650	10 420	7 749	6 652	831	2 671	2 421	1 324	1 044	2 56	3 01	508	211	297
Lafayette County	30 169	11 732	8 570	7 299	921	3 162	2 907	1 714	1 386	2 57	3 07	938	741	197
Lawrence County	29 670	11 724	8 487	7 255	928	3 237	2 950	1 733	1 384	2 53	3 03	566	555	11
Lewis County	9 326	3 745	2 655	2 284	264	1 090	989	578	461	2 49	3 02	907	253	654
Lincoln County	28 539	10 316	7 913	6 851	758	2 403	2 137	1 045	817	2 77	3 21	353	285	68
Linn County	13 544	5 704	3 837	3 346	373	1 867	1 745	1 111	892	2 37	2 97	341	339	2
Livingston County	13 798	5 645	3 910	3 345	437	1 735	1 618	944	769	2 44	3 01	794	794	-
McDonald County	16 681	6 386	4 784	4 058	504	1 602	1 434	760	603	2 61	3 05	257	156	101
Macon County	15 017	6 160	4 376	3 829	405	1 784	1 663	1 029	838	2 44	2 96	328	326	2
Madison County	10 966	4 344	3 205	2 683	388	1 139	1 041	623	486	2 52	2 99	161	161	-
Maries County	7 877	3 028	2 271	1 989	207	757	711	391	296	2 60	3 08	99	99	-
Marion County	26 826	10 728	7 412	6 137	1 013	3 316	3 042	1 675	1 367	2 50	3 08	856	541	315
Mercer County	3 655	1 577	1 079	972	66	498	470	307	245	2 32	2 88	68	61	7
Miller County	20 456	7 977	5 740	4 819	681	2 237	1 999	1 003	775	2 56	3 07	244	204	40
Mississippi County	14 218	5 411	3 968	2 908	869	1 443	1 336	781	635	2 63	3 13	224	224	-
Moniteau County	11 876	4 563	3 328	2 896	324	1 255	1 169	707	575	2 59	3 13	422	422	-
Monroe County	8 900	3 471	2 466	2 175	217	1 005	935	528	411	2 56	3 14	204	167	37
Montgomery County	11 047	4 341	3 114	2 668	326	1 227	1 133	713	550	2 54	3 06	308	308	-
Morgan County	15 287	6 269	4 629	4 097	374	1 640	1 477	836	595	2 44	2 87	287	222	65
New Madrid County	20 624	7 795	5 726	4 448	1 066	2 069	1 897	1 067	858	2 65	3 15	304	304	-
Newton County	43 745	16 886	12 678	10 982	1 267	4 208	3 736	1 937	1 540	2 59	3 04	700	471	229
Nodaway County	18 905	7 620	4 996	4 330	497	2 624	2 065	1 025	816	2 48	3 05	2 804	252	2 552
Oregon County	9 359	3 851	2 820	2 406	285	1 031	971	580	440	2 43	2 89	111	108	3
Osage County	11 848	4 292	3 181	2 800	253	1 081	950	545	414	2 78	3 31	170	170	-
Ozark County	8 495	3 486	2 616	2 319	210	870	799	469	336	2 44	2 86	103	88	15
Pemiscot County	21 549	8 210	5 757	4 086	1 411	2 453	2 268	1 340	1 043	2 62	3 21	372	327	45
Perry County	16 296	6 111	4 537	3 934	427	1 574	1 439	857	662	2 67	3 17	352	314	38
Pettis County	35 077	14 056	9 947	8 298	1 266	4 109	3 636	1 915	1 538	2 50	3 00	360	190	170
Phelps County	32 673	13 277	9 125	7 705	1 106	4 152	3 459	1 427	1 158	2 46	2 98	2 575	690	1 885
Pike County	15 629	6 083	4 380	3 670	511	1 703	1 565	907	719	2 57	3 10	340	305	35
Platte County	57 117	22 142	16 077	13 694	1 754	6 065	5 063	1 198	925	2 58	3 06	750	502	248
Polk County	20 455	8 031	5 899	5 189	523	2 132	1 837	1 059	848	2 55	3 00	1 371	454	917
Pulaski County	35 214	12 377	9 882	8 451	1 110	2 515	2 235	905	709	2 84	3 23	6 093	235	5 858
Putnam County	4 994	2 166	1 472	1 296	132	694	657	446	336	2 31	2 87	85	59	26
Ralls County	8 392	3 226	2 474	2 199	136	752	692	413	295	2 60	3 03	84	60	24
Randolph County	22 387	8 943	6 235	5 242	788	2 708	2 409	1 360	1 104	2 50	3 05	1 983	1 843	140
Ray County	21 747	8 020	6 215	5 405	592	1 805	1 640	902	713	2 71	3 13	224	224	-
Reynolds County	6 558	2 542	1 950	1 677	191	592	534	306	244	2 58	2 97	103	87	16

Table 6. Household, Family, and Group Quarters Characteristics: 1990—Con.

[For definitions of terms and meanings of symbols, see text]

State County Place and [In Selected States] County Subdivision	Persons in households	All households	Family households: Total	Family households: Married-couple family	Family households: Female householder, no husband present	Nonfamily households: Total	Nonfamily households: Householder living alone: Total	Nonfamily households: Householder living alone: 65 years and over: Total	Nonfamily households: Householder living alone: 65 years and over: Female	Persons per— Household	Persons per— Family	Persons in group quarters: Total	Persons in group quarters: Institutionalized persons	Persons in group quarters: Other persons in group quarters
PLACE AND COUNTY SUBDIVISION—Con.														
Bel-Nor village, St. Louis County	2 644	1 092	735	526	178	357	328	129	112	2.42	3.04	291	112	179
Bel-Ridge village, St. Louis County	3 185	1 176	807	444	299	369	313	81	58	2.71	3.28	14	14	–
Belton city, Cass County	17 881	6 393	4 873	4 003	697	1 520	1 280	400	338	2.80	3.23	269	109	160
Benton city, Scott County	575	239	169	151	13	70	67	44	38	2.41	2.95	–	–	–
Benton City town, Audrain County	139	49	42	39	1	7	6	4	3	2.84	3.10	–	–	–
Berger city, Franklin County	247	94	71	58	12	23	22	9	7	2.63	3.11	–	–	–
Berkeley city, St. Louis County	12 423	4 280	3 279	1 946	1 120	1 001	853	262	200	2.90	3.34	27	16	11
Bernie city, Stoddard County	1 847	783	546	427	98	237	224	139	114	2.36	2.88	–	–	–
Bertrand city, Mississippi County	655	266	202	156	40	64	62	35	29	2.46	2.83	37	37	–
Bethany city, Harrison County	2 817	1 307	815	696	96	492	474	302	250	2.16	2.79	188	188	–
Bethel town, Shelby County	117	61	31	24	7	30	29	20	13	1.92	2.74	–	–	–
Beverly Hills city, St. Louis County	660	275	173	97	64	102	97	39	24	2.40	3.08	–	–	–
Bevier city, Macon County	643	271	179	150	26	92	81	51	41	2.37	2.97	–	–	–
Bigelow village, Holt County	32	13	9	6	3	4	2	1	–	2.46	2.89	–	–	–
Big Lake village, Holt County	170	87	59	54	5	28	27	11	6	1.95	2.37	–	–	–
Billings city, Christian County	989	403	285	229	42	118	110	64	50	2.45	2.99	–	–	–
Birch Tree city, Shannon County	599	255	166	147	16	89	84	51	43	2.35	3.00	–	–	–
Birmingham village, Clay County	222	78	59	51	7	19	18	12	11	2.85	3.37	–	–	–
Bismarck city, St. Francois County	1 557	604	441	355	69	163	152	104	83	2.58	3.06	22	11	11
Blackburn city	308	110	83	76	3	27	26	19	14	2.80	3.29	–	–	–
Lafayette County	22	7	6	6	–	1	1	1	1	3.14	3.50	–	–	–
Saline County	286	103	77	70	3	26	25	18	13	2.78	3.27	–	–	–
Black Jack city, St. Louis County	5 857	2 000	1 596	1 295	234	404	339	121	106	2.93	3.33	271	271	–
Blackwater city, Cooper County	221	92	64	54	5	28	24	15	11	2.40	2.86	–	–	–
Blairstown city, Henry County	185	75	50	43	3	25	23	12	9	2.47	3.10	–	–	–
Bland city	640	257	176	141	20	81	69	39	33	2.49	3.05	11	3	8
Gasconade County	640	257	176	141	20	81	69	39	33	2.49	3.05	11	3	8
Osage County	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Blodgett town, Scott County	202	81	58	43	12	23	21	9	8	2.49	3.00	–	–	–
Bloomfield city, Stoddard County	1 709	744	494	391	86	250	236	157	139	2.30	2.88	91	91	–
Bloomsdale city, Ste. Genevieve County	353	142	102	92	5	40	39	28	23	2.49	3.04	–	–	–
Blue Eye town, Stone County	112	45	29	26	2	16	16	9	6	2.49	3.31	–	–	–
Blue Springs city, Jackson County	39 896	13 529	11 055	9 426	1 285	2 474	2 012	616	520	2.95	3.29	257	240	17
Blythedale village, Harrison County	130	58	33	28	4	25	24	17	14	2.24	3.12	–	–	–
Bogard city, Carroll County	228	93	69	57	7	24	23	15	12	2.45	2.87	–	–	–
Bolckow city, Andrew County	253	93	65	58	7	28	28	11	6	2.72	3.46	–	–	–
Bolivar city, Polk County	5 866	2 607	1 620	1 372	205	987	816	492	423	2.25	2.82	979	237	742
Bonne Terre city, St. Francois County	3 819	1 474	1 037	819	180	437	405	264	228	2.59	3.17	52	41	–
Boonville city, Cooper County	5 870	2 503	1 660	1 338	263	843	782	454	384	2.35	2.92	1 225	1 031	–
Bosworth city, Carroll County	334	149	103	95	6	46	43	30	25	2.24	2.71	–	–	–
Bourbon city, Crawford County	1 188	479	311	263	38	168	157	98	83	2.48	3.16	–	–	–
Bowling Green city, Pike County	2 822	1 191	762	581	142	429	405	231	195	2.37	3.04	154	119	35
Bragg City town, Pemiscot County	117	44	35	33	2	9	9	7	3	2.66	3.06	–	–	–
Brandsville city, Howell County	167	56	44	33	8	12	11	6	6	2.98	3.39	–	–	–
Branson city, Taney County	3 603	1 678	1 070	914	127	608	556	342	294	2.15	2.70	103	70	33
Brashear city, Adair County	318	123	93	81	10	30	30	25	22	2.59	3.10	–	–	–
Braymer city, Caldwell County	886	388	257	199	50	131	122	84	71	2.28	2.65	–	–	–
Breckenridge city, Caldwell County	418	188	117	94	14	71	64	43	37	2.22	2.83	–	–	–
Breckenridge Hills village, St. Louis County	5 404	2 091	1 449	950	396	642	523	202	151	2.58	3.08	–	–	–
Brentwood city, St. Louis County	8 149	4 025	2 130	1 725	333	1 895	1 657	484	395	2.02	2.78	1	1	–
Bridgeton city, St. Louis County	17 238	6 793	4 933	4 075	646	1 860	1 534	555	463	2.54	3.00	541	541	–
Brimson village, Grundy County	72	27	21	21	–	6	6	3	3	2.67	3.14	–	–	–
Bronaugh city, Vernon County	211	88	61	48	9	27	27	13	10	2.40	2.95	–	–	–
Brookfield city, Linn County	4 711	2 133	1 301	1 093	168	832	771	483	395	2.21	2.88	177	176	1
Brookline village, Greene County	283	111	93	84	3	18	17	6	5	2.55	2.82	–	–	–
Brooklyn Heights village, Jasper County	116	46	35	31	3	11	7	1	–	2.52	2.77	–	–	–
Browning city	331	146	94	75	14	52	50	28	24	2.27	2.86	–	–	–
Linn County	255	109	75	63	9	34	32	15	13	2.34	2.84	–	–	–
Sullivan County	76	37	19	12	5	18	18	13	11	2.05	2.95	–	–	–
Brownington town, Henry County	84	38	26	22	–	12	12	6	3	2.21	2.77	–	–	–
Brumley town, Miller County	81	32	25	16	8	7	5	2	2	2.53	2.72	–	–	–
Brunswick city, Chariton County	1 023	480	283	219	49	197	186	121	97	2.13	2.82	51	50	1
Bucklin city, Linn County	616	277	168	142	22	109	105	75	56	2.22	2.95	–	–	–
Buckner city, Jackson County	2 873	1 007	782	617	129	225	208	107	93	2.85	3.28	–	–	–
Buffalo city, Dallas County	2 312	1 039	644	479	137	395	377	264	220	2.23	2.88	102	102	–
Bunceton city, Cooper County	341	144	95	78	12	49	44	27	24	2.37	2.94	–	–	–
Bunker city	390	152	104	83	15	48	45	30	22	2.57	3.22	–	–	–
Dent County	159	59	39	34	4	20	17	13	9	2.69	3.46	–	–	–
Reynolds County	231	93	65	49	11	28	28	17	13	2.48	3.08	–	–	–
Burgess town, Barton County	97	31	22	20	2	9	7	5	3	3.13	3.91	–	–	–
Burlington Junction city, Nodaway County	624	267	169	147	18	98	97	63	56	2.34	3.06	10	–	10
Butler city, Bates County	3 913	1 717	1 133	903	180	584	545	360	309	2.28	2.84	186	186	–
Butterfield village, Barry County	248	93	73	65	3	25	21	11	10	2.53	2.96	–	–	–
Byrnes Mill city, Jefferson County	1 578	559	438	374	44	121	87	28	23	2.82	3.20	–	–	–
Cabool city, Texas County	1 931	871	546	429	105	325	315	211	177	2.22	2.88	75	75	–
Cainsville city, Harrison County	387	189	116	99	9	73	71	48	37	2.05	2.68	–	–	–
Cairo village, Randolph County	282	110	74	64	9	36	36	26	19	2.56	3.30	–	–	–
Caledonia village, Washington County	142	65	38	30	4	27	27	25	21	2.18	3.00	–	–	–
Calhoun city, Henry County	450	187	126	103	20	61	58	39	27	2.41	3.03	–	–	–
California city, Moniteau County	3 333	1 471	927	751	146	544	516	323	283	2.27	2.93	132	132	–
Callao city, Macon County	332	137	93	82	10	44	36	20	13	2.42	3.00	–	–	–
Calverton Park village, St. Louis County	1 404	523	408	343	56	115	101	43	30	2.68	3.10	–	–	–
Camden city, Ray County	238	92	66	55	6	26	22	11	9	2.59	3.03	–	–	–
Camden Point city, Platte County	373	125	106	96	7	19	16	10	9	2.98	3.28	–	–	–
Camdenton city, Camden County	2 544	1 105	717	540	148	388	352	201	178	2.30	2.90	17	17	–
Cameron city	4 632	1 989	1 293	1 054	198	696	647	375	337	2.33	2.96	199	199	–
Clinton County	3 737	1 544	1 053	853	164	491	446	237	208	2.42	2.99	54	54	–
De Kalb County	895	443	240	201	34	205	201	138	129	2.01	2.83	145	145	–
Campbell city, Dunklin County	2 075	904	576	441	114	328	305	206	159	2.30	2.94	90	90	–
Canalou city, New Madrid County	319	128	97	86	9	31	30	18	14	2.49	2.95	–	–	–
Canton city, Lewis County	1 969	870	533	444	63	337	304	178	154	2.26	2.91	654	–	654

MODINE

Former Hulett Lagoon Site
Combined PA/SI
Reference 49

Certified Mail P 917 752 129
Return Receipt Requested

July 2, 1997

Darleen Westcott
Environmental Engineer
Hazardous Waste Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

Dear Ms. Westcott:

Enclosed are the latest quarterly groundwater sampling results from the well installed at the Modine Manufacturing Company Camdenton site. The results show 120 ppb in MW-4. If you have any questions, please contact me at (414) 636-1649 or at the letterhead address.

Sincerely,

Thomas S. Sanicola
Environmental Engineer

Enclosure
cc: Modine Manufacturing - Camdenton
N. Gladding - Bryan Cave
file(2)

Modine Manufacturing Company
1500 DeKoven Avenue
Racine, Wisconsin 53403

Telephone 414-636-1200
Telex 26-4447
FAX 414-636-1424

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

2135 East Sunshine, Suite 105
Springfield, Missouri 65804
417 881 3927 Tel
417 881 6361 Fax

June 30, 1997

Mr. Thomas S. Sanicola
Environmental Engineer
Modine Manufacturing Company
1500 DeKoven Avenue
Racine, Wisconsin 53403

RE: JUNE 1997 QUARTERLY SAMPLING ANALYTICAL RESULTS FOR THE MODINE HEAT TRANSFER, INC. SITE CAMDENTON, MISSOURI

Dear Mr. Sanicola:

The purpose of this letter is to present the analytical results for the June 1997 quarterly sampling event at the Modine Heat Transfer, Inc. Site located in Camdenton, Missouri. The groundwater sample was collected on June 4, 1997 and was analyzed for volatile organic compounds (VOCs) with Trichloroethene (TCE) as the primary constituent of concern. The laboratory reporting limit for TCE was 5 parts per billion (ppb).

The results are as follows:

Well Identification	Location	Results
MW-1	West of facility	Quarterly Sampling no longer required
MW-2	East of facility	Quarterly Sampling no longer required
MW-3	Southwest of facility	Quarterly Sampling no longer required
MW-4	Northwest of facility	TCE detected at 120 ppb

Enclosed is a copy of the laboratory analytical results for this sampling event and a table comparing the results over the last seven sampling events.

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

Mr. Thomas S. Sanicola
Modine Manufacturing Company
Re: Quarterly Sampling Analytical Results
Modine Heat Transfer, Inc.
June 30, 1997
Page 2

Please call either Mr. Price at (314) 993-4599 or Ms. Francis at (417) 881-3927 to discuss any comments or questions you may have.

Very truly yours,

DAMES & MOORE

DJW

Miesche M. Francis
Staff Geologist

DJW

Daniel J. Price, P.G.
Senior Geologist

Enclosures

c: Don Mans - Modine Heat Transfer, Inc.

GROUNDWATER ANALYTICAL RESULTS
MODINE HEAT TRANSFER, INC.
CAMDENTON, MISSOURI
AUGUST 1995 - JUNE 1997

TCE CONCENTRATIONS								
Well ID	**8/16, 22/95**	**11/16/95**	**2/15, 16/96**	**5/16/96**	**8/20/96**	**12/12/96**	**2/28/97, 3/3/97**	**6/4/97**
MW-1	11.8	9.4	ND (Dup. 5.4)	ND	ND	ND (Dup. ND)	NT	NT
MW-2	ND (Dup. ND)	ND	ND	ND	NT	NT	NT	NT
MW-3	8.0	ND	6.6	ND	ND (Dup. ND)	NS	ND	NT
MW-4	88.9	142 (Dup. 154)	173.0	10.0	NS	NS	34 (Dup. 37)	120

Results in this table are presented in parts per billion (ppb).
NT - Not Tested
ND - Not Detected at or above 5 ppb
NS - Not Sampled due to insufficient volume

AMERICAN TECHNICAL & ANALYTICAL SERVICES, INC.
875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 • FAX (314) 434-0080

June 18, 1997

Miesche Francis
Dames & Moore
2135 E Sunshine Street, Suite 105
Springfield, MO 65804

RE: ATAS #19097.01
#27397-005-045 - Modine

Dear Mr. Francis:

Enclosed is the analytical report for the sample received in our laboratory on June 6, 1997.

If, in your review, you should have any questions or require additional information, please call Rhonda Tinker, Assistant Project Manager, or me at (314) 434-4570.

Thank you for choosing ATAS for your analytical needs.

Sincerely,

Richard H. Mannz
Project Manager

Enclosures

RHM/dms

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: DAMES & MOORE
2135 E SUNSHINE STREET, SUITE 105
SPRINGFIELD, MO 65804
ATTN: MIESCHE FRANCIS

REPORT: 1909701V(286)

DATE : 06-18-97

SAMPLE MATRIX : WATER
ATAS # : 19097.01
DATE SUBMITTED: 06-06-97
DATE ANALYZED : 06-12-97
METHOD REF. : SW846-8240, EPA METHODOLOGY
PROJECT : #27397-005-045 - MODINE
SAMPLE ID : MW-4

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

VOLATILES	R.L.	RESULTS
TRICHLOROETHENE	5	120

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(80-116) 101% BROMOFLUOROBENZENE(86-115) 103%
1,2-DICHLOROETHANE-D4(76-114) 103%

B = ANALYTE DETECTED IN METHOD BLANK, POSSIBLY BELOW THE REPORTING LIMIT.
RL = REPORTING LIMIT; DEFINED AS THE PRACTICAL QUANTITATION LIMIT PLUS ANY DILUTION, POSITIVE VALUES BELOW THIS LIMIT WERE NOT REPORTED.
ND = NOT DETECTED ABOVE REPORTING LIMIT

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: DAMES & MOORE
2135 E SUNSHINE STREET, SUITE 105
SPRINGFIELD, MO 65804
ATTN: MIESCHE FRANCIS

REPORT: 1909701V(286)

DATE : 06-18-97

SAMPLE MATRIX : WATER
ATAS # : METHOD BLANK
DATE SUBMITTED: 06-06-97
DATE ANALYZED : 06-12-97
METHOD REF. : SW846-8240, EPA METHODOLOGY
PROJECT : #27397-005-045 - MODINE
SAMPLE ID : METHOD BLANK

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

VOLATILES	R.L.	RESULTS
TRICHLOROETHENE	5	ND

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(80-116) 101% BROMOFLUOROBENZENE(86-115) 103%
1,2-DICHLOROETHANE-D4(76-114) 86%

B = ANALYTE DETECTED IN METHOD BLANK, POSSIBLY BELOW THE REPORTING LIMIT.
RL = REPORTING LIMIT; DEFINED AS THE PRACTICAL QUANTITATION LIMIT PLUS ANY DILUTION, POSITIVE VALUES BELOW THIS LIMIT WERE NOT REPORTED.
= NOT DETECTED ABOVE REPORTING LIMIT

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

LABORATORY QUALITY CONTROL SEQUENCE

SAMPLE MATRIX : WATER
DATE ANALYZED : 06-12-97
METHOD REF. : SW846-8240, EPA METHODOLOGY

REPORT DATE: 06-18-97

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	19085.05 MS % REC.	19085.05 MSD % REC.	RPD	QC RPD	ADVISORY LIMITS
1,1-DICHLOROETHENE	90	86	5	16	70-127
TRICHLOROETHENE	88	88	0	11	75-111
BENZENE	90	88	2	12	83-120
TOLUENE	90	88	2	10	80-122
CHLOROBENZENE	86	86	0	8	86-109

* = VALUES OUTSIDE OF ADVISORY LIMITS

ATAS

AMERICAN TECHNICAL & ANALYTICAL SERVICES, Inc.

875 Fee Fee Road • Maryland Heights, MO 63043-3211 • Office (314) 434-4570 • FAX (314) 434-0080

CHAIN OF CUSTODY RECORD

ATAS Client Name: Dames & Moore

Project Name: Modine

Project #: 27397-005.045

Form Completed By: M. Francis

PO #:

Sample ID	Sample Date	Sample Time	Sample Matrix	Grab	Comp	No. of Containers	Type of Analysis: VOC 8240								Preservative: Ice	Preservative: Chemical (see below)	Remarks	Lab Use Only: Initials LM, Date 6-6-97, Location/Temp 2 13c
MW-4	6-4-97	1220	Water	✓		2	X								✓	E	TCE at a reporting limit of 5 ppb.	19097.01

Relinquished by:	Received by:	Relinquished by:	Received by:
Signature: Miesche Francis	Signature: L. Massenberg	Signature:	Signature:
Printed Name: Miesche Francis	Printed Name: L. Massenberg	Printed Name:	Printed Name:
Firm: Dames & Moore	Firm: ATAS	Firm:	Firm:
Date/Time: 6-4-97 1230	Date/Time: 6-6-97 0945	Date/Time:	Date/Time:

Turnaround Requirements
- ___ 1 to 2 working days
- ___ 3 working days
- ___ 5 working days
- X 10 working days
- ___ 15 working days

Preservative codes
- A - none
- B - HNO_3
- C - H_2SO_4
- D - NaOH
- E - HCl
- F - ___

SEND RESULTS TO (Name & Company): Miesche Francis Dames & Moore

Original to ATAS/Copy to Client

Former Hulett Lagoon Site
Combined PA/SI
Reference 50

Continental Analytical
SERVICES, INC.

Client: Missouri Dept. of Health
Attn: Larry Evert
307 W. McCarty
Jefferson City, MO 65101

Date Sample Rptd: 04/01/93
Date Sample Recd: 03/18/93
CAS File No: 92-5364
CAS Order No: 15740
Client P.O.:

Lab Number: 93031353
Sample Description: Mulberry Well 3010130Camdenton

Date Sampled: 03/16/93
Time Sampled: 0715

Analysis	Concentration		Units	Date Analyzed	Book/Page
MDNR Regulated Vocs				03/25/93	/
1,1,1-Trichloroethane	ND(0.5)		µg/L		1546/35
1,1-Dichloroethylene	ND(0.5)		µg/L		1546/35
1,2-Dichloroethane	ND(0.5)		µg/L		1546/35
1,2-Dichloropropane	ND(0.5)		µg/L		1546/35
Benzene	ND(0.5)		µg/L		1546/35
Carbon Tetrachloride	ND(0.5)		µg/L		1546/35
cis-1,2-Dichloroethylene	ND(0.5)		µg/L		1546/35
Chlorobenzene	ND(0.5)		µg/L		1546/35
Ethylbenzene	ND(0.5)		µg/L		1546/35
o-Dichlorobenzene	ND(0.5)		µg/L		1546/35
p-Dichlorobenzene	ND(0.5)		µg/L		1546/35
Styrene	ND(0.5)		µg/L		1546/35
Tetrachloroethylene	ND(0.5)		µg/L		1546/35
Toluene	ND(0.5)		µg/L		1546/35
trans-1,2-Dichloroethylene	ND(0.5)		µg/L		1546/35
Trichloroethylene	2.1		µg/L		1546/35
Vinyl Chloride/Chloroethene	ND(0.5)		µg/L		1546/35
Xylene	ND(0.5)		µg/L		1546/35
MDNR Unregulated Vocs				03/25/93	/
1,1,1,2-Tetrachloroethane	ND(0.5)		µg/L		1546/35
1,1,2,2-Tetrachloroethane	ND(0.5)		µg/L		1546/35
1,1,2-Trichloroethane	ND(0.5)		µg/L		1546/35
1,1-Dichloroethane	ND(0.5)		µg/L		1546/35
1,1-Dichloropropene	ND(0.5)		µg/L		1546/35
1,2,3-Trichloropropane	ND(0.5)		µg/L		1546/35
1,2,4-Trichlorobenzene	ND(0.5)	Q	µg/L		1546/35
1,3-Dichloropropane	ND(0.5)		µg/L		1546/35
2,2-Dichloropropane	ND(0.5)	Q	µg/L		1546/35
Bromobenzene	ND(0.5)		µg/L		1546/35
Bromodichloromethane	ND(0.5)		µg/L		1546/35
Bromoform	ND(0.5)		µg/L		1546/35
Bromomethane	ND(0.5)		µg/L		1546/35
Chloroethane	ND(0.5)		µg/L		1546/35
Chloroform	ND(0.5)		µg/L		1546/35
Chloromethane	I		µg/L		1546/35
cis-1,3-Dichloropropene	ND(0.5)		µg/L		1546/35
Dibromochloromethane	ND(0.5)	Q	µg/L		1546/35
Dibromomethane	ND(0.5)		µg/L		1546/35
Dichloromethane	ND(0.5)		µg/L		1546/35
m-Dichlorobenzene	ND(0.5)		µg/L		1546/35

-Continued-

1804 Glendale Road • Salina, Kansas 67401
913-827-1273 • 800-535-3076 • FAX 913-823-7830

CONTINENTAL ANALYTICAL SERVICES, INC.

Client: Missouri Dept. of Health
Lab Number: 93031353

Analysis	Concentration	Units	Date Analyzed	Book/Page
o-Chlorotoluene	ND(0.5)	µg/L		1546/35
p-Chlorotoluene	ND(0.5)	µg/L		1546/35
trans-1,3-Dichloropropene	ND(0.5)	µg/L		1546/35

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
MDNR Regulated Vocs	NA	1GC4084	TEB	MDNR/502.2M
MDNR Unregulated Vocs	NA	1GC4084	TEB	MDNR/502.2M

Q - This compound did not meet the method Quality Control criteria.

I - Matrix interferences were noted at the time of analysis.

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations part 136, July 1, 1986 or in EPA Publication, SW-846, 3rd edition, Nov. 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

CAS

Client: Missouri Dept. of Health
Attn: Larry Evert
307 W. McCarty
Jefferson City, MO 65101

Date Sample Rptd: 04/01/93
Date Sample Recd: 03/18/93
CAS File No: 92-5364
CAS Order No: 15740
Client P.O.:

Lab Number: 93031354
Sample Description: Blair Well 3010130 Camdenton

Date Sampled: 03/16/93
Time Sampled: 0729

Analysis	Concentration		Units	Date Analyzed	Book/Page
MDNR Regulated Vocs				03/27/93	/
1,1,1-Trichloroethane	ND(0.5)		µg/L		1536/28
1,1-Dichloroethylene	ND(0.5)		µg/L		1536/28
1,2-Dichloroethane	ND(0.5)		µg/L		1536/28
1,2-Dichloropropane	ND(0.5)		µg/L		1536/28
Benzene	ND(0.5)		µg/L		1536/28
Carbon Tetrachloride	ND(0.5)		µg/L		1536/28
cis-1,2-Dichloroethylene	ND(0.5)		µg/L		1536/28
Chlorobenzene	ND(0.5)		µg/L		1536/28
Ethylbenzene	ND(0.5)		µg/L		1536/28
o-Dichlorobenzene	ND(0.5)		µg/L		1536/28
p-Dichlorobenzene	ND(0.5)		µg/L		1536/28
Styrene	ND(0.5)		µg/L		1536/28
Tetrachloroethylene	ND(0.5)		µg/L		1536/28
Toluene	ND(0.5)		µg/L		1536/28
trans-1,2-Dichloroethylene	ND(0.5)		µg/L		1536/28
Trichloroethylene	ND(0.5)		µg/L		1536/28
Vinyl Chloride/Chloroethene	ND(0.5)		µg/L		1536/28
Xylene	ND(0.5)		µg/L		1536/28
MDNR Unregulated Vocs				03/27/93	/
1,1,1,2-Tetrachloroethane	ND(0.5)		µg/L		1536/28
1,1,2,2-Tetrachloroethane	ND(0.5)	Q	µg/L		1536/28
1,1,2-Trichloroethane	ND(0.5)		µg/L		1536/28
1,1-Dichloroethane	ND(0.5)		µg/L		1536/28
1,1-Dichloropropene	ND(0.5)		µg/L		1536/28
1,2,3-Trichloropropane	ND(0.5)	Q	µg/L		1536/28
1,2,4-Trichlorobenzene	ND(0.5)		µg/L		1536/28
1,3-Dichloropropane	ND(0.5)		µg/L		1536/28
2,2-Dichloropropane	ND(0.5)		µg/L		1536/28
Bromobenzene	ND(0.5)		µg/L		1536/28
Bromodichloromethane	ND(0.5)		µg/L		1536/28
Bromoform	ND(0.5)	Q	µg/L		1536/28
Bromomethane	ND(0.5)		µg/L		1536/28
Chloroethane	ND(0.5)		µg/L		1536/28
Chloroform	ND(0.5)		µg/L		1536/28
Chloromethane	ND(0.5)		µg/L		1536/28
cis-1,3-Dichloropropene	ND(0.5)		µg/L		1536/28
Dibromochloromethane	ND(0.5)	Q	µg/L		1536/28
Dibromomethane	ND(0.5)		µg/L		1536/28
Dichloromethane	ND(0.5)		µg/L		1536/28
m-Dichlorobenzene	ND(0.5)		µg/L		1536/28

-Continued-

CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT

Client: Missouri Dept. of Health
Lab Number: 93031354

Analysis	Concentration	Units	Date Analyzed	Book/Page
o-Chlorotoluene	ND(0.5)	µg/L		1536/28
p-Chlorotoluene	ND(0.5)	µg/L		1536/28
trans-1,3-Dichloropropene	ND(0.5)	µg/L		1536/28

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
MDNR Regulated Vocs	NA	1GC3085	DKT	MDNR/502.2M
MDNR Unregulated Vocs	NA	1GC3085	DKT	MDNR/502.2M

Q - This compound did not meet the method Quality Control criteria.

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations part 136, July 1, 1986 or in EPA Publication, SW-846, 3rd edition, Nov. 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

Continental Analytical
S E R V I C E S , I N C

Client: Missouri Dept. of Health
Attn: Larry Evert
307 W. McCarty
Jefferson City, MO 65101

Date Sample Rptd: 04/01/93
Date Sample Recd: 03/18/93
CAS File No: 92-5364
CAS Order No: 15740
Client P.O.:

Lab Number: 93031355
Sample Description: Rodeo Well 3010130 Camdenton

Date Sampled: 03/16/93
Time Sampled: 0740

Analysis	Concentration		Units	Date Analyzed	Book/Page
MDNR Regulated Vocs				03/27/93	/
1,1,1-Trichloroethane	ND(0.5)		µg/L		1536/29
1,1-Dichloroethylene	ND(0.5)		µg/L		1536/29
1,2-Dichloroethane	ND(0.5)		µg/L		1536/29
1,2-Dichloropropane	ND(0.5)		µg/L		1536/29
Benzene	ND(0.5)		µg/L		1536/29
Carbon Tetrachloride	ND(0.5)		µg/L		1536/29
cis-1,2-Dichloroethylene	ND(0.5)		µg/L		1536/29
Chlorobenzene	ND(0.5)		µg/L		1536/29
Ethylbenzene	ND(0.5)		µg/L		1536/29
o-Dichlorobenzene	ND(0.5)		µg/L		1536/29
p-Dichlorobenzene	ND(0.5)		µg/L		1536/29
Styrene	ND(0.5)		µg/L		1536/29
Tetrachloroethylene	ND(0.5)		µg/L		1536/29
Toluene	ND(0.5)		µg/L		1536/29
trans-1,2-Dichloroethylene	ND(0.5)		µg/L		1536/29
Trichloroethylene	ND(0.5)		µg/L		1536/29
Vinyl Chloride/Chloroethene	ND(0.5)		µg/L		1536/29
Xylene	ND(0.5)		µg/L		1536/29
MDNR Unregulated Vocs				03/27/93	/
1,1,1,2-Tetrachloroethane	ND(0.5)		µg/L		1536/29
1,1,2,2-Tetrachloroethane	ND(0.5)	Q	µg/L		1536/29
1,1,2-Trichloroethane	ND(0.5)		µg/L		1536/29
1,1-Dichloroethane	ND(0.5)		µg/L		1536/29
1,1-Dichloropropene	ND(0.5)		µg/L		1536/29
1,2,3-Trichloropropane	ND(0.5)	Q	µg/L		1536/29
1,2,4-Trichlorobenzene	ND(0.5)		µg/L		1536/29
1,3-Dichloropropane	ND(0.5)		µg/L		1536/29
2,2-Dichloropropane	ND(0.5)		µg/L		1536/29
Bromobenzene	ND(0.5)		µg/L		1536/29
Bromodichloromethane	ND(0.5)		µg/L		1536/29
Bromoform	ND(0.5)	Q	µg/L		1536/29
Bromomethane	ND(0.5)		µg/L		1536/29
Chloroethane	ND(0.5)		µg/L		1536/29
Chloroform	ND(0.5)		µg/L		1536/29
Chloromethane	ND(0.5)		µg/L		1536/29
cis-1,3-Dichloropropene	ND(0.5)		µg/L		1536/29
Dibromochloromethane	ND(0.5)	Q	µg/L		1536/29
Dibromomethane	ND(0.5)		µg/L		1536/29
Dichloromethane	ND(0.5)		µg/L		1536/29
m-Dichlorobenzene	ND(0.5)		µg/L		1536/29

-Continued-

CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT

Client: Missouri Dept. of Health
Lab Number: 93031355

Analysis	Concentration	Units	Date Analyzed	Book/Page
o-Chlorotoluene	ND(0.5)	µg/L		1536/29
p-Chlorotoluene	ND(0.5)	µg/L		1536/29
trans-1,3-Dichloropropene	ND(0.5)	µg/L		1536/29

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
MDNR Regulated Vocs	NA	1GC3085	DKT	MDNR/502.2M
MDNR Unregulated Vocs	NA	1GC3085	DKT	MDNR/502.2M

Q - This compound did not meet the method Quality Control criteria.

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations part 136, July 1, 1986 or in EPA Publication, SW-846, 3rd edition, Nov. 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

CAS

Continental Analytical
S E R V I C E S , I N C

Client: Missouri Dept. of Health
Attn: Larry Evert
307 W. McCarty
Jefferson City, MO 65101

Date Sample Rptd: 04/01/93
Date Sample Recd: 03/18/93
CAS File No: 92-5364
CAS Order No: 15740
Client P.O.:

Lab Number: 93031356
Sample Description: Trip Blank 3010130 Camdenton

Date Sampled: / /
Time Sampled:

Analysis	Concentration	Units	Date Analyzed	Book/Page
MDNR Regulated Vocs			03/26/93	/
1,1,1-Trichloroethane	ND(0.5)	µg/L		1546/36
1,1-Dichloroethylene	ND(0.5)	µg/L		1546/36
1,2-Dichloroethane	ND(0.5)	µg/L		1546/36
1,2-Dichloropropane	ND(0.5)	µg/L		1546/36
Benzene	ND(0.5)	µg/L		1546/36
Carbon Tetrachloride	ND(0.5)	µg/L		1546/36
cis-1,2-Dichloroethylene	ND(0.5)	µg/L		1546/36
Chlorobenzene	ND(0.5)	µg/L		1546/36
Ethylbenzene	ND(0.5)	µg/L		1546/36
o-Dichlorobenzene	ND(0.5)	µg/L		1546/36
p-Dichlorobenzene	ND(0.5)	µg/L		1546/36
Styrene	ND(0.5)	µg/L		1546/36
Tetrachloroethylene	ND(0.5)	µg/L		1546/36
Toluene	ND(0.5)	µg/L		1546/36
trans-1,2-Dichloroethylene	ND(0.5)	µg/L		1546/36
Trichloroethylene	ND(0.5)	µg/L		1546/36
Vinyl Chloride/Chloroethene	ND(0.5)	µg/L		1546/36
Xylene	ND(0.5)	µg/L		1546/36
MDNR Unregulated Vocs			03/26/93	/
1,1,1,2-Tetrachloroethane	ND(0.5)	µg/L		1546/36
1,1,2,2-Tetrachloroethane	ND(0.5)	µg/L		1546/36
1,1,2-Trichloroethane	ND(0.5)	µg/L		1546/36
1,1-Dichloroethane	ND(0.5)	µg/L		1546/36
1,1-Dichloropropene	ND(0.5)	µg/L		1546/36
1,2,3-Trichloropropane	ND(0.5)	µg/L		1546/36
1,2,4-Trichlorobenzene	ND(0.5) Q	µg/L		1546/36
1,3-Dichloropropane	ND(0.5)	µg/L		1546/36
2,2-Dichloropropane	ND(0.5) Q	µg/L		1546/36
Bromobenzene	ND(0.5)	µg/L		1546/36
Bromodichloromethane	ND(0.5)	µg/L		1546/36
Bromoform	ND(0.5) Q	µg/L		1546/36
Bromomethane	ND(0.5)	µg/L		1546/36
Chloroethane	ND(0.5)	µg/L		1546/36
Chloroform	ND(0.5)	µg/L		1546/36
Chloromethane	I	µg/L		1546/36
cis-1,3-Dichloropropene	ND(0.5)	µg/L		1546/36
Dibromochloromethane	ND(0.5) Q	µg/L		1546/36
Dibromomethane	ND(0.5)	µg/L		1546/36
Dichloromethane	ND(0.5)	µg/L		1546/36
m-Dichlorobenzene	ND(0.5)	µg/L		1546/36

-Continued-

1804 Glendale Road • Salina, Kansas 67401
913-827-1273 • 800-535-3076 • FAX 913-823-7830

CONTINENTAL ANALYTICAL SERVICES, INC.

Client: Missouri Dept. of Health
Lab Number: 93031356

Analysis	Concentration	Units	Date Analyzed	Book/Page
o-Chlorotoluene	ND(0.5)	µg/L		1546/36
p-Chlorotoluene	ND(0.5)	µg/L		1546/36
trans-1,3-Dichloropropene	ND(0.5)	µg/L		1546/36

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
MDNR Regulated Vocs	NA	1GC4084	TEB	MDNR/502.2M
MDNR Unregulated Vocs	NA	1GC4084	TEB	MDNR/502.2M

Q - This compound did not meet the method Quality Control criteria.

I - Matrix interferences were noted at the time of analysis.

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations part 136, July 1, 1986 or in EPA Publication, SW-846, 3rd edition, Nov. 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

CAS

STATE OF MISSOURI
Mel Carnahan Governor • David A. Shorr Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No. 94-C602

Reported to: TERRY TIMMONS
Affiliation: PDW

Date: 5/13/94
Project Code: 3404/3000

Sample Description:
CAMDENTON, MULBERRY WELL
MO3010130

Collected by: BOB MARSHALL
Affiliation: MISC

Date: 04/27/94

PARAMETERS	RESULTS
VOC Results:	
Benzene	<0.5 ug/L
Bromobenzene	<1.0 ug/L
Bromochloromethane	<1.0 ug/L
Bromodichloromethane	<1.0 ug/L
Bromoform	<2.5 ug/L
Bromomethane	<2.5 ug/L
n-Butylbenzene	<2.0 ug/L
sec-Butylbenzene	<2.0 ug/L
tert-Butylbenzene	<2.0 ug/L
Carbon tetrachloride	<0.5 ug/L
Chlorobenzene	<0.5 ug/L
Chloroethane	<2.5 ug/L
Chloroform	<1.0 ug/L
Chloromethane	<2.5 ug/L
2-Chlorotoluene	<2.0 ug/L
4-Chlorotoluene	<2.0 ug/L
Dibromochloromethane	<1.0 ug/L
1,2-Dibromo-3-chloropropane	<5.0 ug/L
1,2-Dibromoethane	<2.0 ug/L
Dibromomethane	<1.0 ug/L

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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P O Box 176 Jefferson City, MO 65102-0176

Page 3
Sample no. 94-C602
Date 5/13/94

PARAMETERS	RESULTS
1,1,2-Trichloroethane	<0.5 ug/L
Trichloroethene	<0.5 ug/L
Trichlorofluoromethane	<2.5 ug/L
1,2,3-Trichloropropane	<1.0 ug/L
1,2,4-Trimethylbenzene	<1.0 ug/L
1,3,5-Trimethylbenzene	<2.0 ug/L
Vinyl Chloride	<0.5 ug/L
o-Xylene	<0.5 ug/L
m&p-xylene	<0.5 ug/L

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan, Governor • Doyle A. Sloan, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A758

Sample Number: 97-A466

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 24, 1997
Date Collected: January 29, 1997
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	3.8	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

RECYCLED PAPER

Report Date: February 24, 1997

Lab Number: 97-A758
Sample Number: 97-A466

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chlorobenz	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Sample Number: 97-0486
Lab Number: 97-A2244

Reported To: JIM HOULIHAN
Affiliation: JCRO
Project Code: 3404/3000

Report Date: 3/17/97
Date Collected: 3/12/97
Date Received: 3/12/97

Sample Collected by: JIM HOULIHAN, JCRO
PWS Supply Name: CAMDENTON
PWS Identification: MO3010130
PWS County: CAMDEN
Sampling Location: MULBERRY WELL
Sample Description: CONFIRMATION SAMPLE

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	3.8	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L

Report Date: March 17, 1997

Lab Number: 97-A2244
Sample Number: 97-0486

Analysis Performed	Results	MCL	Units
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chlorobenz	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: TERRY TIMMONS, PDWP

STATE OF MISSOURI
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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A4822

Sample Number: 97-F101

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 13, 1997
Date Collected: June 3, 1997
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	4.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L

Report Date: June 13, 1997

Lab Number: 97-A4822
Sample Number: 97-F101

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chlorobenz	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A7751

Sample Number: 97-I658

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 4, 1997
Date Collected: August 26, 1997
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	4.3	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L

Report Date: September 4, 1997

Lab Number: 97-A7751
Sample Number: 97-I658

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chlorobenz	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE - CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A7752

Sample Number: 97-I659

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 4, 1997
Date Collected: August 26, 1997
PWS ID: MO3010130
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	4.3	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L

Report Date: September 4, 1997

Lab Number: 97-A7752
Sample Number: 97-I659

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chlorobenz	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A11630

Sample Number: 97-L708

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: December 18, 1997
Date Collected: December 1, 1997
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	4.4	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L

RECYCLED PAPER

Report Date: December 18, 1997

Lab Number: 97-A11630
Sample Number: 97-L708

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED
FEB 23 1998

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A896

Sample Number: 98-B383

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 18, 1998
Date Collected: February 2, 1998 PWS ID: MO3010130
Sample Location: MULBERRY WELL, SPECIAL REQUEST
PWS Name: CAMDENTON

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	6.3	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

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PUBLIC DRINKING WATER

Report Date: February 18, 1998

Lab Number: 98-A896
Sample Number: 98-B383

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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MAR 20 1998
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

STATE OF MISSOURI
Mel Carnahan Governor • Stephen M. Mahfood Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A1807

Sample Number: 98-C482

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: March 11, 1998
Date Collected: February 17, 1998
PWS ID: MO3010130
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	5.2	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L

Report Date: March 11, 1998

Lab Number: 98-A1807
Sample Number: 98-C482

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A3749

Sample Number: 98-B784

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: March 31, 1998
Date Collected: March 25, 1998
Sample Location: MULBERRY WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	3.6	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: March 31, 1998

Lab Number: 98-A3749
Sample Number: 98-B784

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A4982

Sample Number: 98-F440

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: May 7, 1998
Date Collected: April 23, 1998
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	4.1	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: May 7, 1998

Lab Number: 98-A4982
Sample Number: 98-F440

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6299

Sample Number: 98-H069

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 9, 1998
Date Collected: May 21, 1998
Sample Location: MULBERRY WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	11.8	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L

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Report Date: June 9, 1998

Lab Number: 98-A6299
Sample Number: 98-H069

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6820

Sample Number: 98-F519

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 18, 1998
Date Collected: June 8, 1998
Sample Location: MULBERRY WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	5.1	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

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Report Date: June 18, 1998

Lab Number: 98-A6820
Sample Number: 98-F519

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
PO Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE - CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A14822

Sample Number: 98-U834

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 9, 1998
Date Collected: August 25, 1998
PWS ID: MO3010130
Sample Location: MULBERRY WELL
PWS Name: CAMDENTON

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 200	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	4.2	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 1.0	1000	ug/L

Report Date: September 9, 1998

Lab Number: 98-A14822
Sample Number: 98-U834

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

Missouri Department of Natural Resources

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From Dianne Holtmeyer on 01/25/99 03:30:50 PM

To: Valerie Wilder/HWP/DEQ/MODNR@MODNR
cc: TERRY TIMMONS@NetTalk @ MODNR
Subject: Camdenton

Fourth quarter TCE results for samples collected on 12/2/98 at Camdenton (MO3010130) were:

Blair Well - <0.50 ug/L (No detect)
Rodeo Well - <0.50 ug/L (No detect)
Mulberry Well - 4.40 ug/L
Hickory Well - <0.50 ug/L (No detect)

Dianne Holtmeyer
Missouri Department of Natural Resources
Public Drinking Water Program
P.O. Box 176
Jefferson City, MO 65102
Phone: (573) 526-3479/Fax: (573) 751-3110
Internet mail: nrholtd@mail.dnr.state.mo.us

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HAZARDOUS WASTE PROGRAM
DEPARTMENT OF
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STATE OF MISSOURI

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DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 99-A402

Sample Number: 9901502

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: March 10, 1999
Date Collected: January 13, 1999 PWS ID: MO3010130
Sample Location: MULBERRY WELL, SPECIAL REQUEST
PWS Name: CAMDENTON

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 2.5	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	1.3	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	26.2	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

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Report Date: March 10, 1999

Lab Number: 99-A402
Sample Number: 9901502

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 20.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 5.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 0.5	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No. 94-C603

Reported to: TERRY TIMMONS
Affiliation: PDW

Date: 5/13/94
Project Code: 3404/3000

Sample Description:
CAMDENTON, BLAIR WELL
MO3010130

Collected by: BOB MARSHALL
Affiliation: MISC

Date: 04/27/94

PARAMETERS	RESULTS
VOC Results:	
Benzene	<0.5 ug/L
Bromobenzene	<1.0 ug/L
Bromochloromethane	<1.0 ug/L
Bromodichloromethane	<1.0 ug/L
Bromoform	<2.5 ug/L
Bromomethane	<2.5 ug/L
n-Butylbenzene	<2.0 ug/L
sec-Butylbenzene	<2.0 ug/L
tert-Butylbenzene	<2.0 ug/L
Carbon tetrachloride	<0.5 ug/L
Chlorobenzene	<0.5 ug/L
Chloroethane	<2.5 ug/L
Chloroform	<1.0 ug/L
Chloromethane	<2.5 ug/L
2-Chlorotoluene	<2.0 ug/L
4-Chlorotoluene	<2.0 ug/L
Dibromochloromethane	<1.0 ug/L
1,2-Dibromo-3-chloropropane	<5.0 ug/L
1,2-Dibromoethane	<2.0 ug/L
Dibromomethane	<1.0 ug/L

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P O. Box 176 Jefferson City, MO 65102-0176

Page 2
Sample no. 94-C603
Date 5/13/94

PARAMETERS	RESULTS
1,2-Dichlorobenzene	<0.5 ug/L
1,3-Dichlorobenzene	<1.0 ug/L
1,4-Dichlorobenzene	<0.5 ug/L
Dichlorodifluoromethane	<2.5 ug/L
1,1-Dichloroethane	<1.0 ug/L
1,2-Dichloroethane	<0.5 ug/L
1,1-Dichloroethene	<0.5 ug/L
cis-1,2-Dichloroethene	<0.5 ug/L
trans-1,2-Dichloroethene	<0.5 ug/L
1,2-Dichloropropane	<0.5 ug/L
1,3-Dichloropropane	<2.0 ug/L
2,2-Dichloropropane	<1.0 ug/L
1,1-Dichloropropene	<1.0 ug/L
cis-1,3-Dichloropropene	<2.0 ug/L
trans-1,3-Dichloropropene	<1.0 ug/L
Ethylbenzene	<0.5 ug/L
Hexachlorobutadiene	<1.0 ug/L
Isopropylbenzene	<2.0 ug/L
p-Isopropyltoluene	<2.0 ug/L
Methylene Chloride	<0.5 ug/L
Naphthalene	<2.0 ug/L
n-Propylbenzene	<2.0 ug/L
Styrene	<0.5 ug/L
1,1,1,2-Tetrachloroethane	<1.0 ug/L
1,1,2,2-Tetrachloroethane	<1.0 ug/L
Tetrachloroethene	<0.5 ug/L
Toluene	<0.5 ug/L
1,2,3-Trichlorobenzene	<2.0 ug/L
1,2,4-Trichlorobenzene	<0.5 ug/L
1,1,1-Trichloroethane	<0.5 ug/L

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P.O. Box 176 Jefferson City, MO 65102-0176

Page 3
Sample no. 94-C603
Date 5/13/94

PARAMETERS	RESULTS
1,1,2-Trichloroethane	<0.5 ug/L
Trichloroethene	<0.5 ug/L
Trichlorofluoromethane	<2.5 ug/L
1,2,3-Trichloropropane	<1.0 ug/L
1,2,4-Trimethylbenzene	<1.0 ug/L
1,3,5-Trimethylbenzene	<2.0 ug/L
Vinyl Chloride	<0.5 ug/L
o-Xylene	<0.5 ug/L
m&p-xylene	<0.5 ug/L

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A759

Sample Number: 97-A467

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 24, 1997
Date Collected: January 29, 1997
Sample Location: BLAIR ST WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: February 24, 1997

Lab Number: 97-A759
Sample Number: 97-A467

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chlorobenz	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A898

Sample Number: 98-B385

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 10, 1998
Date Collected: February 2, 1998
PWS ID: MO3010130
Sample Location: BLAIR WELL, SPECIAL REQUEST
PWS Name: CAMDENTON

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: February 10, 1998

Lab Number: 98-A898
Sample Number: 98-B385

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Date: 2/18/98
To: Terry Timmons, PDWP
From: Mary King, ESP
Subject: Samples with Results Greater than PDWP Monitoring Trigger

Sample Number	MO ID	Supplyname Analyte	Results	MCL	Trigger
98-B383	MO3010130	CAMDENTON			
		Trichloroethene	6.3 ug/L	5.0	0.5

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ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A3751

Sample Number: 98-B786

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: March 31, 1998
Date Collected: March 25, 1998
Sample Location: BLAIR WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: March 31, 1998

Lab Number: 98-A3751
Sample Number: 98-B786

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A4981

Sample Number: 98-F439

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: May 7, 1998
Date Collected: April 23, 1998
Sample Location: BLAIR STREET
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: May 7, 1998

Lab Number: 98-A4981
Sample Number: 98-F439

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6300

Sample Number: 98-H070

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 8, 1998
Date Collected: May 21, 1998
Sample Location: BLAIR WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L

Report Date: June 8, 1998

Lab Number: 98-A6300
Sample Number: 98-H070

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6822

Sample Number: 98-F521

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 15, 1998
Date Collected: June 8, 1998
Sample Location: BLAIR WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: June 15, 1998

Lab Number: 98-A6822
Sample Number: 98-F521

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE - CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A14824

Sample Number: 98-U836

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 9, 1998
Date Collected: August 25, 1998
PWS ID: MO3010130
Sample Location: BLAIR WELL
PWS Name: CAMDENTON

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 200	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 1.0	1000	ug/L

Report Date: September 9, 1998

Lab Number: 98-A14824
Sample Number: 98-U836

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan Governor • David A. Shorr Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No. 94-C601

Reported to: TERRY TIMMONS
Affiliation: PDW

Date: 5/13/94
Project Code: 3404/3000

Sample Description:
CAMDENTON, RODEO WELL
MO3010130

Collected by: BOB MARSHALL
Affiliation: MISC

Date: 04/27/94

PARAMETERS	RESULTS
VOC Results:	
Benzene	<0.5 ug/L
Bromobenzene	<1.0 ug/L
Bromochloromethane	<1.0 ug/L
Bromodichloromethane	<1.0 ug/L
Bromoform	<2.5 ug/L
Bromomethane	<2.5 ug/L
n-Butylbenzene	<2.0 ug/L
sec-Butylbenzene	<2.0 ug/L
tert-Butylbenzene	<2.0 ug/L
Carbon tetrachloride	<0.5 ug/L
Chlorobenzene	<0.5 ug/L
Chloroethane	<2.5 ug/L
Chloroform	<1.0 ug/L
Chloromethane	<2.5 ug/L
2-Chlorotoluene	<2.0 ug/L
4-Chlorotoluene	<2.0 ug/L
Dibromochloromethane	<1.0 ug/L
1,2-Dibromo-3-chloropropane	<5.0 ug/L
1,2-Dibromoethane	<2.0 ug/L
Dibromomethane	<1.0 ug/L

STATE OF MISSOURI
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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P O Box 176 Jefferson City, MO 65102-0176

Page 2
Sample no. 94-C601
Date 5/13/94

PARAMETERS	RESULTS
1,2-Dichlorobenzene	<0.5 ug/L
1,3-Dichlorobenzene	<1.0 ug/L
1,4-Dichlorobenzene	<0.5 ug/L
Dichlorodifluoromethane	<2.5 ug/L
1,1-Dichloroethane	<1.0 ug/L
1,2-Dichloroethane	<0.5 ug/L
1,1-Dichloroethene	<0.5 ug/L
cis-1,2-Dichloroethene	<0.5 ug/L
trans-1,2-Dichloroethene	<0.5 ug/L
1,2-Dichloropropane	<0.5 ug/L
1,3-Dichloropropane	<2.0 ug/L
2,2-Dichloropropane	<1.0 ug/L
1,1-Dichloropropene	<1.0 ug/L
cis-1,3-Dichloropropene	<2.0 ug/L
trans-1,3-Dichloropropene	<1.0 ug/L
Ethylbenzene	<0.5 ug/L
Hexachlorobutadiene	<1.0 ug/L
Isopropylbenzene	<2.0 ug/L
p-Isopropyltoluene	<2.0 ug/L
Methylene Chloride	<0.5 ug/L
Naphthalene	<2.0 ug/L
n-Propylbenzene	<2.0 ug/L
Styrene	<0.5 ug/L
1,1,1,2-Tetrachloroethane	<1.0 ug/L
1,1,2,2-Tetrachloroethane	<1.0 ug/L
Tetrachloroethene	<0.5 ug/L
Toluene	<0.5 ug/L
1,2,3-Trichlorobenzene	<2.0 ug/L
1,2,4-Trichlorobenzene	<0.5 ug/L
1,1,1-Trichloroethane	<0.5 ug/L

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Page 3
Sample no. 94-C601
Date 5/13/94

PARAMETERS	RESULTS
1,1,2-Trichloroethane	<0.5 ug/L
Trichloroethene	<0.5 ug/L
Trichlorofluoromethane	<2.5 ug/L
1,2,3-Trichloropropane	<1.0 ug/L
1,2,4-Trimethylbenzene	<1.0 ug/L
1,3,5-Trimethylbenzene	<2.0 ug/L
Vinyl Chloride	<0.5 ug/L
o-Xylene	<0.5 ug/L
m&p-xylene	<0.5 ug/L

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A760

Sample Number: 97-A468

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 24, 1997
Date Collected: January 29, 1997
Sample Location: RODEO WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	3.9	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

RECYCLED PAPER

Report Date: February 24, 1997

Lab Number: 97-A760
Sample Number: 97-A468

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chlorobenz	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Sample Number: 97-0487
Lab Number: 97-A2243

Reported To: JIM HOULIHAN
Affiliation: JCRO
Project Code: 3404/3000

Report Date: 3/17/97
Date Collected: 3/12/97
Date Received: 3/12/97

Sample Collected by: JIM HOULIHAN, JCRO
PWS Supply Name: CAMDENTON
PWS Identification: MO3010130
PWS County: CAMDEN
Sampling Location: RODEO WELL
Sample Description: CONFIRMATION SAMPLE

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L

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Report Date: March 17, 1997

Lab Number: 97-A2243
Sample Number: 97-0487

Analysis Performed	Results	MCL	Units
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chlorobenz	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 2.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: TERRY TIMMONS, PDWP

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DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A897

Sample Number: 98-B384

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 10, 1998
Date Collected: February 2, 1998
PWS ID: MO3010130
Sample Location: RODEO WELL, SPECIAL REQUEST
PWS Name: CAMDENTON

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: February 10, 1998

Lab Number: 98-A897
Sample Number: 98-B384

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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DIVISION OF ENVIRONMENTAL QUALITY

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ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A4983

Sample Number: 98-F441

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: May 7, 1998
Date Collected: April 23, 1998
Sample Location: RODEO WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: May 7, 1998

Lab Number: 98-A4983
Sample Number: 98-F441

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6301

Sample Number: 98-H071

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 8, 1998
Date Collected: May 21, 1998
Sample Location: RODEO WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L

Report Date: June 8, 1998

Lab Number: 98-A6301
Sample Number: 98-H071

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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NOV 0 2 1998

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6821

Sample Number: 98-F520

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 15, 1998
Date Collected: June 8, 1998
Sample Location: RODEO WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 20.0	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 0.5	1000	ug/L
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L

Report Date: June 15, 1998

Lab Number: 98-A6821
Sample Number: 98-F520

Analysis Performed	Results	MCL	Units
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

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STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

PO Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE - CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A14823

Sample Number: 98-U835

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 9, 1998
Date Collected: August 25, 1998
Sample Location: RODEO WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

Analysis Performed	Results	MCL	Units
VOC Results:			
Dichlorodifluoromethane	< 200	--	ug/L
Chloromethane	< 2.5	--	ug/L
Vinyl Chloride	< 0.5	2.0	ug/L
Bromomethane	< 9.0	--	ug/L
Chloroethane	< 2.5	--	ug/L
Trichlorofluoromethane	< 2.5	--	ug/L
1,1-Dichloroethene	< 0.5	7.0	ug/L
Methylene Chloride	< 0.5	5.0	ug/L
Methyl-tert-butyl ether	< 5.0	--	ug/L
trans-1,2-Dichloroethene	< 0.5	100	ug/L
1,1-Dichloroethane	< 1.0	--	ug/L
2,2-Dichloropropane	< 1.0	--	ug/L
cis-1,2-Dichloroethene	< 0.5	70.0	ug/L
Chloroform	< 0.5	--	ug/L
Bromochloromethane	< 1.0	--	ug/L
1,1,1-Trichloroethane	< 0.5	200	ug/L
1,1-Dichloropropene	< 1.0	--	ug/L
Carbon Tetrachloride	< 0.5	5.0	ug/L
Benzene	< 0.5	5.0	ug/L
1,2-Dichloroethane	< 0.5	5.0	ug/L
Trichloroethene	< 0.5	5.0	ug/L
1,2-Dichloropropane	< 0.5	5.0	ug/L
Bromodichloromethane	< 0.5	--	ug/L
Dibromomethane	< 1.0	--	ug/L
cis-1,3-Dichloropropane	< 2.0	--	ug/L
Toluene	< 1.0	1000	ug/L

Report Date: September 9, 1998

Lab Number: 98-A14823
Sample Number: 98-U835

Analysis Performed	Results	MCL	Units
trans-1,3-Dichloropropane	< 1.0	--	ug/L
1,1,2-Trichloroethane	< 0.5	5.0	ug/L
Tetrachloroethene	< 0.5	5.0	ug/L
1,3-Dichloropropane	< 2.0	--	ug/L
Dibromochloromethane	< 0.5	--	ug/L
1,2-Dibromoethane	< 2.0	--	ug/L
Chlorobenzene	< 0.5	100	ug/L
Ethylbenzene	< 0.5	700	ug/L
1,1,1,2-Tetrachloroethane	< 1.0	--	ug/L
Total Xylenes	< 0.5	10000	ug/L
Styrene	< 0.5	100	ug/L
Isopropylbenzene	< 2.0	--	ug/L
Bromoform	< 0.5	--	ug/L
1,1,2,2-Tetrachloroethane	< 1.0	--	ug/L
1,2,3-Trichloropropane	< 1.0	--	ug/l
n-Propylbenzene	< 2.0	--	ug/L
Bromobenzene	< 1.0	--	ug/L
2-Chlorotoluene	< 2.0	--	ug/L
4-Chlorotoluene	< 2.0	--	ug/L
1,3,5-Trimethylbenzene	< 2.0	--	ug/L
tert-Butylbenzene	< 2.0	--	ug/L
1,2,4-Trimethylbenzene	< 1.0	--	ug/L
sec-Butylbenzene	< 2.0	--	ug/L
p-isopropyltoluene	< 2.0	--	ug/L
1,3-Dichlorobenzene	< 1.0	--	ug/L
1,4-Dichlorobenzene	< 0.5	75.0	ug/L
n-Butylbenzene	< 2.0	--	ug/L
1,2-Dichlorobenzene	< 0.5	600	ug/L
1,2-Dibromo-3-Chloroprop	< 5.0	--	ug/L
1,2,4-Trichlorobenzene	< 0.5	70.0	ug/L
Hexachlorobutadiene	< 1.0	--	ug/L
Naphthalene	< 20.0	--	ug/L
1,2,3-Trichlorobenzene	< 2.0	--	ug/L

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

Former Hulett Lagoon Site
Combined PA/SI
Reference 51

1998

under DNR gun

By Joyce L. Miller

CAMDENTON - A Camdenton manufacturing plant is under the the gun to comply with an order from the Missouri Department of Natural Resources after being identified as a potential source of chemical contamination in the city's water supply.

DNR says Camdenton's water continues to show traces of contamination from an industrial-type cleaning chemical known as trichlethylene. So far, levels of TCE have stayed below those considered acceptable by federal and state standards.

DNR has ordered Modine Manufacturing Company to come up with a plan to address any contamination at the facility that may pose a threat to people or the environment. Modine has 30 days to comply. Failure to do so could force DNR to take legal action against the company.

Modine engineer Bob King said the DNR order was forwarded to corporation headquarters in Racine, Wisconsin.

According to King, the order was vague and didn't contain

(Continued on page 4, col. 1)

DNR

(Continued from page 1)

any specific course of action.

DNR says the order will establish a regulatory time frame and schedule for the manufacturing plant to follow, in order to deal with potential contamination at the plant's location on Sunset Drive. The plan will be negotiated between DNR and Modine.

DNR and city officials believe the chemical was probably spilled more than a decade ago by Modine's predecessor. The plant is located across from the Mulberry Street well which, up until now, has supplied most of the city's water.

Modine contends the chemical has never been used in the manufacturing process at the Camdenton plant.

Increased levels of TCE have been showing up in the city's water system over the last year. Traces started appearing as early as last summer. Since that time, city officials have determined the contamination was entering the water supply at the Mulberry Street well.

The city is in the process of putting together a deal for a new well on Hickory Street. The well, property and engineering is expected to run the city about $250,000. In the meantime, the Mulberry Street well is being used as little as possible, according to Public Works Director Vince Costa.

TCE is considered to be a human carcinogen by the International Agency for Research on cancer and the Environmental Protection Agency, depending on levels of exposure, duration and amounts.

DNR engineer Chris Kump said the consent order is the first step in the process of determining the nature and extent of the TCE contamination. Based on what is found, clean-up measures may be recommended.

"The order requires Modine to determine the nature and extent of contamination, including groundwater, resulting from past waste handling practices at the facility," DNR spokesman Connie Patterson said. "The order also requires Modine to perform a corrective measure study and detail a final remedy to be applied at the

TCE is considered to be a human carcinogen by the International Agency for Research on cancer and the Environmental Protection Agency, depending on levels of exposure, duration and amounts.

site. The public will be asked for review and comment on the proposed final remedy prior to approval by DNR and implementation by Modine."

Modine Manufacturing Company has operated the Camdenton facility since October, 1990. Modine manufactures air-conditioning coils and feeder parts from aluminum and copper tubing. The facility was previously owned by Sunstrand Tubular Products from 1974 to 1990.

Kump said Modine has been very willing to work with DNR to get the TCE problem corrected.

Former Hulett Lagoon Site
Combined PA/SI
R Reference 52

MAY 21 1998

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

RCRA Sampling Investigation Report

Modine Site - Burnau Private Well
Camdenton, Missouri

April 23, 1998

Prepared For:

Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

Prepared By:

Missouri Department of Natural Resources
Division of Environmental Quality
Environmental Services Program

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1.0 Introduction

At the request of the Hazardous Waste Program (HWP) a sampling investigation was conducted on April 23, 1998, by Eric Sappington of the Environmental Services Program (ESP). The purpose of the investigation was to collect a water sample from a private well located at the Dave Burnau residence, 178 Sunset Drive in Camdenton, Missouri. The Burnau home is located across the street from the Modine Heat Transfer, Inc. facility. Information obtained from previous investigations raised concerns that organic solvent contaminants, known to exist in the soils and groundwater at the Modine site, may have migrated to the nearby Burnau well.

The private well at the Burnau residence is a secondary water source, the primary drinking water source being the Camdenton public water supply. There were no samples collected from the Camdenton public water supply during this investigation.

2.0 Site Description and History

2.1 Site Location

The Burnau residence is located at 178 Sunset Drive, Camdenton, Missouri. The Modine Heat Transfer, Inc. facility is located at 179 Sunset Drive, directly across the street from the Burnau residence.

2.2 Site Description

The Burnau home is located in a residential neighborhood adajcent to the Modine facility.

2.3 Site History/Contaminants of Concern

Previous investigations conducted at the Modine site found evidence of organic solvent contamination in both soils and groundwater in the vicinity of the manufacturing plant. Trichloroethylene (trichloroethene), tetrachloroethylene, 1,1,1-trichloroethane, and vinyl chloride are among the contaminants that have been detected in the soils and/or groundwater at the site.

Further historical or background information regarding the Modine site can be found in the ESP and HWP files.

3.0 Methods

3.1 Field Procedures

Sample 98-4702 was collected from an outside spigot located at the rear of the Burnau residence. Sample 98-4703 was collected from the same location as a duplicate to 98-4702. Prior to sample collection, the spigot was turned on and allowed to flow for 12 minutes in order to purge the stagnant water from the pressure tank. According to Mr. Burnau, the pressure tank has a capacity of 30 to 40 gallons. Using a stop watch and a graduated bucket, the flow rate was calculated at four gallons per minute. Thus, 48 gallons were purged prior to sample collection. The water was discharged into a storm drain on the Burnau property.

In order to minimize agitation and aeration at the spigot, the flow rate was reduced to a thin stream for sample collection. The vials for volatile organic parameters were filled first, then the flow rate was increased slightly to facilitate filling the one-liter sample containers for semi-volatile organic parameters.

The sample vials for the volatile organic parameters were pre-preserved with a few drops of hydrochloric acid. The containers for semi-volatile organic parameters required no chemical preservatives. Upon collection, all sample containers were labelled and placed immediately on ice in a cooler.

Clean nitrile gloves were worn for sample collection.

Modine was contacted prior to the investigation and offered the opportunity to collect split samples from the Burnau well. The company was initially interested in collecting samples, but then declined the offer.

3.2 Chain-of-Custody

Each sample container received a numbered label upon collection. A chain-of-custody form was then completed which recorded the sample number assigned to each container, the description of the location of the sample collected, the date and time collected, and the parameters to be analyzed.

The ESP representative maintained custody of the samples and hand delivered the samples to the Environmental Services Program in Jefferson City where they were relinquished to a sample custodian.

3.3 Analyses Requested

All samples were analyzed for volatile organic and semi-volatile organic parameters.

3.4 Quality Assurance/Quality Control (QA/QC)

All samples were analyzed in accordance with the general requirements and standard operating procedures described in the Fiscal Year 1998 Generator/TSD Quality Assurance Project Plan.

Sample 98-4701 was collected as a trip blank and analyzed for the same parameters as the groundwater samples.

4.0 Investigation Derived Wastes

All disposable personal protective equipment generated by the ESP representative was returned to the ESP laboratory for proper disposal.

5.0 Observations

The samples collected from the Burnau private well were clear, colorless and had no discernable odor.

When asked at the time of the investigation, Mr. Burnau was not aware of the well characteristics (e.g. total well depth, static water level, casing depth, or depth of pump). The ESP did not open up the well and made no attempt to measure the well characteristics.

Mr. Burnau stated that he used the private well primarily for watering his lawn and that he did not use the well as a source of drinking water. There was nothing unusual noted regarding the lawn and there were no obvious signs of stressed vegetation observed.

The weather on the day of sampling was sunny and warm.

6.0 Data Reporting

The analytical results of the sampling investigation are attached to this report.

In response to a request made by Mr. Burnau at the time of the investigation, Eric Sappington provided the sample results to Mr. Burnau during a telephone conversation that took place on May 18, 1998. Mr. Burnau was informed that the level of trichloroethene (TCE) in his private well exceeded the Maximum Contaminant Level (MCL) for public drinking water supplies. The MCL for TCE is 5 parts per billion (ug/L). Mr. Burnau was advised not to drink the water and was provided with a contact at the Missouri Department of Health (Randy Maley) should he have any questions regarding the health effects of TCE.

Submitted by: Eric Sappington
Environmental Specialist
Field Services Section
Environmental Services Program

Date: 5/20/98

Approved by: James H. Long
Director
Environmental Services Program

ES:

c: Chris Kump, HWP
Bob Hentges, Regional Director, JCRO

Appendix A

RCRA Sampling Investigation Report
Modine Site - Burnau Private Well
Camdenton, Missouri
April 23, 1998

Analytical Results

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 98-4701
Lab Number: 98-D933

Reported To: ERIC SAPPINGTON
Affiliation: ESP
Project Code: 3735/3000

Report Date: 5/ 6/98
Date Collected: 4/23/98
Date Received: 4/24/98

Sample Collected by: ERIC SAPPINGTON, ESP
Sampling Location: MODINE SITE, CAMDENTON, MO,
Sample Description: TRIP BLANKS

Analysis Performed	Results		Analyzed	Method
VOA Results:				
Chloromethane	< 5.0	ug/L	4/28/98	8260
Vinyl Chloride	< 5.0	ug/L	4/28/98	8260
Bromomethane	< 5.0	ug/L	4/28/98	8260
Chloroethane	< 5.0	ug/L	4/28/98	8260
1,1-Dichloroethene	< 5.0	ug/L	4/28/98	8260
Acetone	< 20.0	ug/L	4/28/98	8260
Carbon Disulfide	< 5.0	ug/L	4/28/98	8260
Methylene Chloride	< 20.0	ug/L	4/28/98	8260
Methyl Tert-Butyl Ether	< 5.0	ug/L	4/28/98	8260
trans-1,2-Dichloroethene	< 5.0	ug/L	4/28/98	8260
1,1-Dichloroethane	< 5.0	ug/L	4/28/98	8260
2-Butanone	< 20.0	ug/L	4/28/98	8260
cis-1,2-Dichloroethene	< 5.0	ug/L	4/28/98	8260
Chloroform	< 5.0	ug/L	4/28/98	8260
1,1,1-Trichloroethane	< 5.0	ug/L	4/28/98	8260
Carbon Tetrachloride	< 5.0	ug/L	4/28/98	8260
Benzene	< 5.0	ug/L	4/28/98	8260
1,2-Dichloroethane	< 5.0	ug/L	4/28/98	8260
Trichloroethene	< 5.0	ug/L	4/28/98	8260
1,2-Dichloropropane	< 5.0	ug/L	4/28/98	8260
Bromodichloromethane	< 5.0	ug/L	4/28/98	8260
2-Hexanone	< 20.0	ug/L	4/28/98	8260
Trans-1,3-Dichloropropene	< 5.0	ug/L	4/28/98	8260
Toluene	< 5.0	ug/L	4/28/98	8260
CIS-1,3-Dichloropropene	< 5.0	ug/L	4/28/98	8260

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Lab Number: 98-D933
Sample Number: 98-4701
May 6, 1998

Analysis Performed	Results		Analyzed	Method
1,1,2-Trichloroethane	< 5.0	ug/L	4/28/98	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	4/28/98	8260
Tetrachloroethene	< 5.0	ug/L	4/28/98	8260
Dibromochloromethane	< 5.0	ug/L	4/28/98	8260
Chlorobenzene	< 5.0	ug/L	4/28/98	8260
Ethylbenzene	< 5.0	ug/L	4/28/98	8260
Total Xylenes	< 5.0	ug/L	4/28/98	8260
Styrene	< 5.0	ug/L	4/28/98	8260
Bromoform	< 5.0	ug/L	4/28/98	8260
1,1,2,2-Tetrachloroethane	< 5.0	ug/L	4/28/98	8260
1,3-Dichlorobenzene	< 5.0	ug/L	4/28/98	8260
1,4-Dichlorobenzene	< 5.0	ug/L	4/28/98	8260
1,2-Dichlorobenzene	< 5.0	ug/L	4/28/98	8260
BNA Results:				
Phenol	< 2.0	ug/L	4/30/98	8270
bis(-2-Chloroethyl)Ether	< 2.0	ug/L	4/30/98	8270
2-Chlorophenol	< 5.0	ug/L	4/30/98	8270
1,3-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
1,4-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
N-nitrosodimethylamine	< 2.0	ug/L	4/30/98	8270
1,2-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
2-Methylphenol	< 2.0	ug/L	4/30/98	8270
bis(2-Chloroisopropyl)Eth	< 2.0	ug/L	4/30/98	8270
4-Methylphenol	< 2.0	ug/L	4/30/98	8270
N-Nitro-Di-n-Propylamine	< 2.0	ug/L	4/30/98	8270
Hexachloroethane	< 2.0	ug/L	4/30/98	8270
Nitrobenzene	< 2.0	ug/L	4/30/98	8270
Isophorone	< 2.0	ug/L	4/30/98	8270
2-Nitrophenol	< 2.0	ug/L	4/30/98	8270
2,4-Dimethylphenol	< 2.0	ug/L	4/30/98	8270
Benzoic Acid	< 2.0	ug/L	4/30/98	8270
bis(2-Chloroethoxy)Methan	< 2.0	ug/L	4/30/98	8270
2,4-Dichlorophenol	< 2.0	ug/L	4/30/98	8270
1,2,4-Trichlorobenzene	< 2.0	ug/L	4/30/98	8270
Naphthalene	< 2.0	ug/L	4/30/98	8270
4-Chloroaniline	< 5.0	ug/L	4/30/98	8270
Hexachlorobutadiene	< 2.0	ug/L	4/30/98	8270
4-Chloro-3-Methylphenol	< 5.0	ug/L	4/30/98	8270
2-Methylnaphthalene	< 2.0	ug/L	4/30/98	8270
Hexachlorocyclopentadiene	< 2.0	ug/L	4/30/98	8270
2,4,6-Trichlorophenol	< 2.0	ug/L	4/30/98	8270
2,4,5-Trichlorophenol	< 5.0	ug/L	4/30/98	8270
2-Chloronaphthalene	< 2.0	ug/L	4/30/98	8270
2-Nitroaniline	< 5.0	ug/L	4/30/98	8270
Dimethylphthalate	< 2.0	ug/L	4/30/98	8270
Acenaphthylene	< 2.0	ug/L	4/30/98	8270
2,6-Dinitrotoluene	< 2.0	ug/L	4/30/98	8270
3-Nitroaniline	< 5.0	ug/L	4/30/98	8270

Lab Number: 98-D933
Sample Number: 98-4701
May 6, 1998

Analysis Performed	Results		Analyzed	Method
Acenaphthene	< 2.0	ug/L	4/30/98	8270
2,4-Dinitrophenol	< 5.0	ug/L	4/30/98	8270
4-Nitrophenol	< 5.0	ug/L	4/30/98	8270
Dibenzofuran	< 2.0	ug/L	4/30/98	8270
2,4-Dinitrotoluene	< 2.0	ug/L	4/30/98	8270
Diethylphthalate	< 2.0	ug/L	4/30/98	8270
4-Chlorophenyl-phenylethe	< 2.0	ug/L	4/30/98	8270
Fluorene	< 2.0	ug/L	4/30/98	8270
4-Nitroaniline	< 5.0	ug/L	4/30/98	8270
4,6-Dinitro-2-Methylpheno	< 5.0	ug/L	4/30/98	8270
N-Nitrosodiphenylamine	< 2.0	ug/L	4/30/98	8270
4-Bromophenyl-phenylether	< 2.0	ug/L	4/30/98	8270
Hexachlorobenzene	< 2.0	ug/L	4/30/98	8270
Pentachlorophenol	< 5.0	ug/L	4/30/98	8270
Phenanthrene	< 2.0	ug/L	4/30/98	8270
Anthrancene	< 2.0	ug/L	4/30/98	8270
Di-n-Butylphthalate	< 5.0	ug/L	4/30/98	8270
Fluoranthene	< 2.0	ug/L	4/30/98	8270
Pyrene	< 2.0	ug/L	4/30/98	8270
Butylbenzylphthalate	< 2.0	ug/L	4/30/98	8270
3-3'-Dichlorobenzidine	< 5.0	ug/L	4/30/98	8270
Benzo(a)anthracene	< 2.0	ug/L	4/30/98	8270
Chrysene	< 2.0	ug/L	4/30/98	8270
bis(2-ethylhexyl)phthalat	< 5.0	ug/L	4/30/98	8270
Di-n-Octylphthalate	< 2.0	ug/L	4/30/98	8270
Benzo(b)fluoranthene	< 2.0	ug/L	4/30/98	8270
Benzo(k)fluoranthene	< 2.0	ug/L	4/30/98	8270
Benzo(a)pyrene	< 2.0	ug/L	4/30/98	8270
Indeno(1,2,3-cd)pyrene	< 2.0	ug/L	4/30/98	8270
Dibenz(a,h)anthracene	< 2.0	ug/L	4/30/98	8270
Benzo(g,h,i)perylene	< 2.0	ug/L	4/30/98	8270

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 98-4702
Lab Number: 98-D935

Reported To: ERIC SAPPINGTON
Affiliation: ESP
Project Code: 3735/3000

Report Date: 5/ 6/98
Date Collected: 4/23/98
Date Received: 4/24/98

Sample Collected by: ERIC SAPPINGTON, ESP
Sampling Location: MODINE SITE, CAMDENTON, MO,
Sample Description: BURNAU RESIDENCE, GROUNDWATER, PRIVATE WELL

Analysis Performed	Results		Analyzed	Method
VOA Results:				
Chloromethane	< 5.0	ug/L	4/28/98	8260
Vinyl Chloride	< 5.0	ug/L	4/28/98	8260
Bromomethane	< 5.0	ug/L	4/28/98	8260
Chloroethane	< 5.0	ug/L	4/28/98	8260
1,1-Dichloroethene	< 5.0	ug/L	4/28/98	8260
Acetone	< 20.0	ug/L	4/28/98	8260
Carbon Disulfide	< 5.0	ug/L	4/28/98	8260
Methylene Chloride	< 20.0	ug/L	4/28/98	8260
Methyl Tert-Butyl Ether	< 5.0	ug/L	4/28/98	8260
trans-1,2-Dichloroethene	< 5.0	ug/L	4/28/98	8260
1,1-Dichloroethane	< 5.0	ug/L	4/28/98	8260
2-Butanone	< 20.0	ug/L	4/28/98	8260
cis-1,2-Dichloroethene	12.0	ug/L	4/28/98	8260
Chloroform	< 5.0	ug/L	4/28/98	8260
1,1,1-Trichloroethane	< 5.0	ug/L	4/28/98	8260
Carbon Tetrachloride	< 5.0	ug/L	4/28/98	8260
Benzene	< 5.0	ug/L	4/28/98	8260
1,2-Dichloroethane	< 5.0	ug/L	4/28/98	8260
Trichloroethene	210	ug/L	4/28/98	8260
1,2-Dichloropropane	< 5.0	ug/L	4/28/98	8260
Bromodichloromethane	< 5.0	ug/L	4/28/98	8260
2-Hexanone	< 20.0	ug/L	4/28/98	8260
Trans-1,3-Dichloropropene	< 5.0	ug/L	4/28/98	8260
Toluene	< 5.0	ug/L	4/28/98	8260

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Lab Number: 98-D935
Sample Number: 98-4702
May 6, 1998

Analysis Performed	Results		Analyzed	Method
CIS-1,3-Dichloropropene	< 5.0	ug/L	4/28/98	8260
1,1,2-Trichloroethane	< 5.0	ug/L	4/28/98	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	4/28/98	8260
Tetrachloroethene	< 5.0	ug/L	4/28/98	8260
Dibromochloromethane	< 5.0	ug/L	4/28/98	8260
Chlorobenzene	< 5.0	ug/L	4/28/98	8260
Ethylbenzene	< 5.0	ug/L	4/28/98	8260
Total Xylenes	< 5.0	ug/L	4/28/98	8260
Styrene	< 5.0	ug/L	4/28/98	8260
Bromoform	< 5.0	ug/L	4/28/98	8260
1,1,2,2-Tetrachloroethane	< 5.0	ug/L	4/28/98	8260
1,3-Dichlorobenzene	< 5.0	ug/L	4/28/98	8260
1,4-Dichlorobenzene	< 5.0	ug/L	4/28/98	8260
1,2-Dichlorobenzene	< 5.0	ug/L	4/28/98	8260
BNA Results:				
Phenol	< 2.0	ug/L	4/30/98	8270
bis(-2-Chloroethyl)Ether	< 2.0	ug/L	4/30/98	8270
2-Chlorophenol	< 5.0	ug/L	4/30/98	8270
1,3-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
1,4-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
N-nitrosodimethylamine	< 2.0	ug/L	4/30/98	8270
1,2-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
2-Methylphenol	< 2.0	ug/L	4/30/98	8270
bis(2-Chloroisopropyl)Eth	< 2.0	ug/L	4/30/98	8270
4-Methylphenol	< 2.0	ug/L	4/30/98	8270
N-Nitro-Di-n-Propylamine	< 2.0	ug/L	4/30/98	8270
Hexachloroethane	< 2.0	ug/L	4/30/98	8270
Nitrobenzene	< 2.0	ug/L	4/30/98	8270
Isophorone	< 2.0	ug/L	4/30/98	8270
2-Nitrophenol	< 2.0	ug/L	4/30/98	8270
2,4-Dimethylphenol	< 2.0	ug/L	4/30/98	8270
Benzoic Acid	< 2.0	ug/L	4/30/98	8270
bis(2-Chloroethoxy)Methan	< 2.0	ug/L	4/30/98	8270
2,4-Dichlorophenol	< 2.0	ug/L	4/30/98	8270
1,2,4-Trichlorobenzene	< 2.0	ug/L	4/30/98	8270
Naphthalene	< 2.0	ug/L	4/30/98	8270
4-Chloroaniline	< 5.0	ug/L	4/30/98	8270
Hexachlorobutadiene	< 2.0	ug/L	4/30/98	8270
4-Chloro-3-Methylphenol	< 5.0	ug/L	4/30/98	8270
2-Methylnaphthalene	< 2.0	ug/L	4/30/98	8270
Hexachlorocyclopentadiene	< 2.0	ug/L	4/30/98	8270
2,4,6-Trichlorophenol	< 2.0	ug/L	4/30/98	8270
2,4,5-Trichlorophenol	< 5.0	ug/L	4/30/98	8270
2-Chloronaphthalene	< 2.0	ug/L	4/30/98	8270
2-Nitroaniline	< 5.0	ug/L	4/30/98	8270
Dimethylphthalate	< 2.0	ug/L	4/30/98	8270
Acenaphthylene	< 2.0	ug/L	4/30/98	8270
2,6-Dinitrotoluene	< 2.0	ug/L	4/30/98	8270

Lab Number: 98-D935
Sample Number: 98-4702
May 6, 1998

Analysis Performed	Results		Analyzed	Method
3-Nitroaniline	< 5.0	ug/L	4/30/98	8270
Acenaphthene	< 2.0	ug/L	4/30/98	8270
2,4-Dinitrophenol	< 5.0	ug/L	4/30/98	8270
4-Nitrophenol	< 5.0	ug/L	4/30/98	8270
Dibenzofuran	< 2.0	ug/L	4/30/98	8270
2,4-Dinitrotoluene	< 2.0	ug/L	4/30/98	8270
Diethylphthalate	< 2.0	ug/L	4/30/98	8270
4-Chlorophenyl-phenylethe	< 2.0	ug/L	4/30/98	8270
Fluorene	< 2.0	ug/L	4/30/98	8270
4-Nitroaniline	< 5.0	ug/L	4/30/98	8270
4,6-Dinitro-2-Methylpheno	< 5.0	ug/L	4/30/98	8270
N-Nitrosodiphenylamine	< 2.0	ug/L	4/30/98	8270
4-Bromophenyl-phenylether	< 2.0	ug/L	4/30/98	8270
Hexachlorobenzene	< 2.0	ug/L	4/30/98	8270
Pentachlorophenol	< 5.0	ug/L	4/30/98	8270
Phenanthrene	< 2.0	ug/L	4/30/98	8270
Anthrancene	< 2.0	ug/L	4/30/98	8270
Di-n-Butylphthalate	< 5.0	ug/L	4/30/98	8270
Fluoranthene	< 2.0	ug/L	4/30/98	8270
Pyrene	< 2.0	ug/L	4/30/98	8270
Butylbenzylphthalate	< 2.0	ug/L	4/30/98	8270
3-3'-Dichlorobenzidine	< 5.0	ug/L	4/30/98	8270
Benzo(a)anthracene	< 2.0	ug/L	4/30/98	8270
Chrysene	< 2.0	ug/L	4/30/98	8270
bis(2-ethylhexyl)phthalat	< 5.0	ug/L	4/30/98	8270
Di-n-Octylphthalate	< 2.0	ug/L	4/30/98	8270
Benzo(b)fluoranthene	< 2.0	ug/L	4/30/98	8270
Benzo(k)fluoranthene	< 2.0	ug/L	4/30/98	8270
Benzo(a)pyrene	< 2.0	ug/L	4/30/98	8270
Indeno(1,2,3-cd)pyrene	< 2.0	ug/L	4/30/98	8270
Dibenz(a,h)anthracene	< 2.0	ug/L	4/30/98	8270
Benzo(g,h,i)perylene	< 2.0	ug/L	4/30/98	8270

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI
Mel Carnahan Governor • Stephen M. Mahfood Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 98-4703
Lab Number: 98-D936

Reported To: ERIC SAPPINGTON
Affiliation: ESP
Project Code: 3735/3000

Report Date: 5/13/98
Date Collected: 4/23/98
Date Received: 4/24/98

Sample Collected by: ERIC SAPPINGTON, ESP
Sampling Location: MODINE SITE, CAMDENTON, MO,
Sample Description: BURNAU RESIDENCE, GROUNDWATER, PRIVATE WELL (DUPLICATE)

Analysis Performed	Results		Analyzed	Method
VOA Results:				
Chloromethane	< 5.0	ug/L	4/29/98	8260
Vinyl Chloride	< 5.0	ug/L	4/29/98	8260
Bromomethane	< 5.0	ug/L	4/29/98	8260
Chloroethane	< 5.0	ug/L	4/29/98	8260
1,1-Dichloroethene	< 5.0	ug/L	4/29/98	8260
Acetone	< 20.0	ug/L	4/29/98	8260
Carbon Disulfide	< 5.0	ug/L	4/29/98	8260
Methylene Chloride	< 20.0	ug/L	4/29/98	8260
Methyl Tert-Butyl Ether	< 5.0	ug/L	4/29/98	8260
trans-1,2-Dichloroethene	< 5.0	ug/L	4/29/98	8260
1,1-Dichloroethane	< 5.0	ug/L	4/29/98	8260
2-Butanone	< 20.0	ug/L	4/29/98	8260
cis-1,2-Dichloroethene	13.0	ug/L	4/29/98	8260
Chloroform	< 5.0	ug/L	4/29/98	8260
1,1,1-Trichloroethane	< 5.0	ug/L	4/29/98	8260
Carbon Tetrachloride	< 5.0	ug/L	4/29/98	8260
Benzene	< 5.0	ug/L	4/29/98	8260
1,2-Dichloroethane	< 5.0	ug/L	4/29/98	8260
Trichloroethene	170	ug/L	4/29/98	8260
1,2-Dichloropropane	< 5.0	ug/L	4/29/98	8260
Bromodichloromethane	< 5.0	ug/L	4/29/98	8260
2-Hexanone	< 20.0	ug/L	4/29/98	8260
Trans-1,3-Dichloropropene	< 5.0	ug/L	4/29/98	8260
Toluene	< 5.0	ug/L	4/29/98	8260

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Lab Number: 98-D936
Sample Number: 98-4703
May 13, 1998

Analysis Performed	Results		Analyzed	Method
CIS-1,3-Dichloropropene	< 5.0	ug/L	4/29/98	8260
1,1,2-Trichloroethane	< 5.0	ug/L	4/29/98	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	4/29/98	8260
Tetrachloroethene	< 5.0	ug/L	4/29/98	8260
Dibromochloromethane	< 5.0	ug/L	4/29/98	8260
Chlorobenzene	< 5.0	ug/L	4/29/98	8260
Ethylbenzene	< 5.0	ug/L	4/29/98	8260
Total Xylenes	< 5.0	ug/L	4/29/98	8260
Styrene	< 5.0	ug/L	4/29/98	8260
Bromoform	< 5.0	ug/L	4/29/98	8260
1,1,2,2-Tetrachloroethane	< 5.0	ug/L	4/29/98	8260
1,3-Dichlorobenzene	< 5.0	ug/L	4/29/98	8260
1,4-Dichlorobenzene	< 5.0	ug/L	4/29/98	8260
1,2-Dichlorobenzene	< 5.0	ug/L	4/29/98	8260
BNA Results:				
Phenol	< 2.0	ug/L	4/30/98	8270
bis(-2-Chloroethyl)Ether	< 2.0	ug/L	4/30/98	8270
2-Chlorophenol	< 5.0	ug/L	4/30/98	8270
1,3-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
1,4-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
N-nitrosodimethylamine	< 2.0	ug/L	4/30/98	8270
1,2-Dichlorobenzene	< 2.0	ug/L	4/30/98	8270
2-Methylphenol	< 2.0	ug/L	4/30/98	8270
bis(2-Chloroisopropyl)Eth	< 2.0	ug/L	4/30/98	8270
4-Methylphenol	< 2.0	ug/L	4/30/98	8270
N-Nitro-Di-n-Propylamine	< 2.0	ug/L	4/30/98	8270
Hexachloroethane	< 2.0	ug/L	4/30/98	8270
Nitrobenzene	< 2.0	ug/L	4/30/98	8270
Isophorone	< 2.0	ug/L	4/30/98	8270
2-Nitrophenol	< 2.0	ug/L	4/30/98	8270
2,4-Dimethylphenol	< 2.0	ug/L	4/30/98	8270
Benzoic Acid	< 2.0	ug/L	4/30/98	8270
bis(2-Chloroethoxy)Methan	< 2.0	ug/L	4/30/98	8270
2,4-Dichlorophenol	< 2.0	ug/L	4/30/98	8270
1,2,4-Trichlorobenzene	< 2.0	ug/L	4/30/98	8270
Naphthalene	< 2.0	ug/L	4/30/98	8270
4-Chloroaniline	< 5.0	ug/L	4/30/98	8270
Hexachlorobutadiene	< 2.0	ug/L	4/30/98	8270
4-Chloro-3-Methylphenol	< 5.0	ug/L	4/30/98	8270
2-Methylnaphthalene	< 2.0	ug/L	4/30/98	8270
Hexachlorocyclopentadiene	< 2.0	ug/L	4/30/98	8270
2,4,6-Trichlorophenol	< 2.0	ug/L	4/30/98	8270
2,4,5-Trichlorophenol	< 5.0	ug/L	4/30/98	8270
2-Chloronaphthalene	< 2.0	ug/L	4/30/98	8270
2-Nitroaniline	< 5.0	ug/L	4/30/98	8270
Dimethylphthalate	< 2.0	ug/L	4/30/98	8270
Acenaphthylene	< 2.0	ug/L	4/30/98	8270
2,6-Dinitrotoluene	< 2.0	ug/L	4/30/98	8270

Lab Number: 98-D936
Sample Number: 98-4703
May 13, 1998

Analysis Performed	Results		Analyzed	Method
3-Nitroaniline	< 5.0	ug/L	4/30/98	8270
Acenaphthene	< 2.0	ug/L	4/30/98	8270
2,4-Dinitrophenol	< 5.0	ug/L	4/30/98	8270
4-Nitrophenol	< 5.0	ug/L	4/30/98	8270
Dibenzofuran	< 2.0	ug/L	4/30/98	8270
2,4-Dinitrotoluene	< 2.0	ug/L	4/30/98	8270
Diethylphthalate	< 2.0	ug/L	4/30/98	8270
4-Chlorophenyl-phenylethe	< 2.0	ug/L	4/30/98	8270
Fluorene	< 2.0	ug/L	4/30/98	8270
4-Nitroaniline	< 5.0	ug/L	4/30/98	8270
4,6-Dinitro-2-Methylpheno	< 5.0	ug/L	4/30/98	8270
N-Nitrosodiphenylamine	< 2.0	ug/L	4/30/98	8270
4-Bromophenyl-phenylether	< 2.0	ug/L	4/30/98	8270
Hexachlorobenzene	< 2.0	ug/L	4/30/98	8270
Pentachlorophenol	< 5.0	ug/L	4/30/98	8270
Phenanthrene	< 2.0	ug/L	4/30/98	8270
Anthrancene	< 2.0	ug/L	4/30/98	8270
Di-n-Butylphthalate	< 5.0	ug/L	4/30/98	8270
Fluoranthene	< 2.0	ug/L	4/30/98	8270
Pyrene	< 2.0	ug/L	4/30/98	8270
Butylbenzylphthalate	< 2.0	ug/L	4/30/98	8270
3-3'-Dichlorobenzidine	< 5.0	ug/L	4/30/98	8270
Benzo(a)anthracene	< 2.0	ug/L	4/30/98	8270
Chrysene	< 2.0	ug/L	4/30/98	8270
bis(2-ethylhexyl)phthalat	< 5.0	ug/L	4/30/98	8270
Di-n-Octylphthalate	< 2.0	ug/L	4/30/98	8270
Benzo(b)fluoranthene	< 2.0	ug/L	4/30/98	8270
Benzo(k)fluoranthene	< 2.0	ug/L	4/30/98	8270
Benzo(a)pyrene	< 2.0	ug/L	4/30/98	8270
Indeno(1,2,3-cd)pyrene	< 2.0	ug/L	4/30/98	8270
Dibenz(a,h)anthracene	< 2.0	ug/L	4/30/98	8270
Benzo(g,h,i)perylene	< 2.0	ug/L	4/30/98	8270

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

Former Hulett Lagoon Site
Combined PA/SI
Reference 53

JOHN ASHCROFT
Governor

Acting Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGY AND LAND SURVEY
P.O Box 250 111 Fairgrounds Rd. Rolla, MO 65401

MONITORING WELL INSTALLATION FOR SUNDSTRAND PA/SI

On July 22-29, 1992, two monitoring wells were drilled at the Sundstrand site in Camdenton. This site is located in Section 26, T. 38 N., R. 17 W., in Camden County. These two wells are an upgradient well and a downgradient well for the site. Both monitor the water table which was encountered at depths of 160 to 175 feet. The locations of these wells are indicated on an attached map.

In the downgradient well, bedrock was encountered at a much greater depth than anticipated, and nominal 8 inch steel surfacing casing was installed to a depth of 94 feet. This casing was grouted full length with a 2% CaCl cement. No surface casing was used in the upgradient well. Both wells are completed in the Gasconade Dolomite.

In both wells schedule 80 PVC screen with a size 10 slot, 12-20 sand, and 2" schedule 40 PVC riser pipe was used.

Edith Starbuck, Geologist
Environmental Geology Section
Geology & Land Survey
August 7, 1992

ES/dsb

Post-It® Fax Note 7671	Date 11-9-94	# of pages ▶ 4
To Jim Tucholski	From Edie Starbuck	
Co./Dept. H.W.P. - DEQ	Co DGLS - Rolla	
Phone # 314-751-2674	Phone # 314-368-2136	
Fax # 314-751-7869	Fax # 314-368-2111	

Missouri State Parks 75th Anniversary
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MW-2

GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION	PAGE NO. of	HOLE NO.
Sundstrand PA/SI, Camdenton		MW-2

START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH
7/28	7/29	Layne	air rotary	8¼"	2"	19 –

LOGGER	TOP OF CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED
Starbuck		approx.	176, 7/29/92 (Possibly no fully recharged)

upgradient - inside fenced area, east of building

SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
					12					fill material to about 5', thin sandstones in sandy red clay with chert	
					24'					much chert	
					37'					medium gray dolomite with chert, often sandy	
					123						slightly moist cutting
					145						
					157						w.l. 176'
					197						v. wet @ 196'
										Aug 9 1995 159.53 below T.O.C.	2' seal, 52' sand, 40' screen

*ASTM D1586
SS = SPLIT SPOON
D = DENNISON
ST = SHELBY TUBE
C = CORE
CT = CUTTINGS
CS = CONTINUOUS SAMPLER
HA = BUCKET AUG.

PAGE NO. of | HOLE NO.

FIGURE 3-1
FIELD DRILL LOG

Not to scale

GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION: Sundstrand PA/SI, Camdenton

PAGE NO. of | HOLE NO.

START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH
7/28	7/29	Layne	air rotary	8¼"	2"	197

LOGGER	TOP of CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED
Starbuck		approx. ~~950~~	176, 7/29/92 (Possibly not fully recharged)

upgradient - inside fenced area, east of building

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
					12					fill material to about 5'; thin sandstones in sandy red clay with chert	
					24'					much chert	
					37'					medium gray dolomite with chert, often sandy	
					123						slightly moist cutting
					197						v. wet @ 196' 2' seal 52' sand 40' screen

*ASTM D1586
SS = SPLIT SPOON
O = DENNISON
ST = SHELBY TUBE
C = CORE
CT = CUTTINGS
CS = CONTINUOUS SAMPLER
BA = BUCKET AUG.

PAGE NO. of | HOLE NO.

FIGURE 3-1
FIELD DRILL LOG

Wai-

when cement will be ready

GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION: Sundstrand, Camdenton MO

PAGE NO. of | HOLE NO. up

START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH
7/28	7/29					

LOGGER	TOP of CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED
			176 - 7/29/92

schd 40 pipe, schd 80 screen 40' 10 slot 12-20 sand (16 bags)

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
					0'					poor samples - encountering gravel in (fill?)	
					5'					"	
					10-12					~1" of dense red clay above 8" of poorly consolidated sand (red stain)	
					15'-14'					fine - frosted - poorly rounded sandy clay, ~2" sand, broken dk gray chert	
					20-22					somewhat sandy dense red clay w/2" sandy dolomite	
					24'					lots of chert gray	
					30'					chert & white some dolo - little sandy.	damp
							37' "good bedrock"				
					40'					lt gray dolo - some dk gr chert some clayey seams	frequent clay seams
					50					lt gray micro xln dolomite	
					60					"	
										some med gray chert	
					70					"	
					80					lt gray ~~fine~~ xln dolomite	
					90					tan-gray dolomite - little gray chert	
					100					med gray sandy dolomite - little wht chert	
					110					tan gray " " "	
					120					"	moist
					123						~~slight~~ moist
					127					tan-gray dolomite w/ little chert	dry
					132						moisture
					~~138~~					" w/ lots of gray chert	slightly moist
					143						
				145'	147					sandy dolomite	" dry
				157'	152					let stand ~1 hr - v.v. little water	
					178					buff-colored dolomite	
					183						little moist
					185					" " w/ some chert	
					190						v. wet
					196					v. wet - a respectable amount of water	
					197					T.D	

*ASTM D1586
SS = SPLIT SPOON
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C = CORE
CT = CUTTINGS
CS = CONTINUOUS SAMPLER
BA = BUCKET AUG.

PAGE NO. of | HOLE NO.

Floyd said damp @ ~163'

FIGURE 3-1
FIELD DRILL LOG

MW

GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION: Sundstrand PA/SI, Camdenton						PAGE NO. of	HOLE NO. MW-1
START 7/22	FINISH 7/27	DRILLER Layne	DRILL METHOD air rotary	BOREHOLE DIAMETER 8½"/12"	WELL DIAMETER 2"	TOTAL DEPTH 178	
LOGGER Starbuck		TOP of CASING ELEV.	GROUND ELEVATION approx ~~940'~~ 950'	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED 161 . 7/28/92			

downgradient - 50' west of west parking lot

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
										silty red clay with chert. the zone from 10-20 had little chert	~~94~~ Surface casing to 94 feet
					25					boulders or relict bedding of cherit and dolomite	
					80'						
										much chert	
					90						
					100					sandy dolomite with chert	moist cutting ↓
					120					medium gray dolomite with very little chert	w.c. 161'
					178						2' seal 50' sand 40' screen
										Aug 9 '95. 147.28 below T.O.C.	

*ASTM D1586
SS = SPLIT SPOON
D = DENNISON
ST = SHELBY TUBE
C = CORE
CT = CUTTINGS
CS = CONTINUOUS SAMPLER
BA = BUCKET AUG.

PAGE NO. of | HOLE NO.

FIGURE 3-1
FIELD DRILL LOG

Not to scale

GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION: Sundstrand PA/SI, Camdenton					PAGE NO. of	HOLE NO.
START: 7/22	FINISH: 7/27	DRILLER: Layne	DRILL METHOD: air rotary	BOREHOLE DIAMETER: 8½"/12"	WELL DIAMETER: 2"	TOTAL DEPTH: 178'
LOGGER: Starbuck		TOP of CASING ELEV.	GROUND ELEVATION: approx ~~970'~~ 950	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED: 161 . 7/28/92		

downgradient - 50' west of west parking lot

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
										silty red clay with chert. the zone from 10-20 had little chert	~~SS~~ surface casing to 94 feet
					25					boulders or relict bedding of cherit and dolomite	
					80'					much chert	
					90						
					100					sandy dolomite with chert	moist cuttings ↓
					120					medium gray dolomite with very little chert	
					178						2' seal 50' sand 40' screen

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SS = SPLIT SPOON
D = DENNISON
ST = SHELBY TUBE
C = CORE
CT = CUTTINGS
CS = CONTINUOUS SAMPLER
BA = BUCKET AUG.

PAGE NO. of | HOLE NO.

FIGURE 3-1
FIELD DRILL LOG

GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION	PAGE NO. of	HOLE NO. dowr

START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH
7/22	7/27					178

LOGGER	TOP of CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED
			161' 7/28

50' west and 160' south of NW corner of lot

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
				100						buff color sandy dolomite & chert (lt gray)	*
				110						" " less chert	
				120						med gray dolomite w/ small amt gray chert	
				130						med gray dolomite - no chert	
				140						"	moist
				150						gray dolo - white & gray chert	
				160						" - "	
				170						" "	
				178							total dep
										7/27/92 WL=159' 28 WL=161'	

*ASTM D1586
SS = SPLIT SPOON ST = SHELBY TUBE
D = DENNISON C = CORE CS = CONTINUOUS SAMPLER
CT = CUTTINGS BA = BUCKET AUG.

PAGE NO. of	HOLE NO.

* Dave said - lots of chert in 80'-94'

FIGURE 3-1
FIELD DRILL LOG

0 tan + red silty clay
5' - ns - silty red clay w/ much chert
5+ stiff red clay w/ small chert fragments
10-12' v. stiff red clay w gray chert (flint) and sandy dolomite fragments
15-17' " (chert in 3' zone ~ 16½')
20-20.5' - stiff red clay w/ small chert fragments
21 - chert
25' - } to ice, bailing (dolo + chert) NO sample
30 "
39' - more rock - lam clay
65' - ~~bedrock~~ rock layer
80' - bedrock
12" hole to 94'
tremie pipe to 85' 2% Ca
> ⅔ of 75 bags

Call Dave

Former Hulett Lagoon Site
Combined PA/SI
Reference 54

COMPREHENSIVE GROUNDWATER MONITORING EVALUATION
MODINE MANUFACTURING COMPANY
CAMDENTON, MISSOURI

Conducted by

MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

CHRIS KUMP
ENVIRONMENTAL ENGINEER

JANUARY, 1998

COMPREHENSIVE MONITORING EVALUATION REPORT

MODINE MANUFACTURING COMPANY

CAMDENTON, MISSOURI

Prepared by

Chris Kump
Environmental Engineer

MDNR HAZARDOUS WASTE PROGRAM

JANUARY, 1998

EXECUTIVE SUMMARY

Modine Manufacturing Company, Camdenton, Missouri produces air-conditioning coils and feeder parts from aluminum and copper tubing. The facility was originally owned and operated by Dawson Metal Products form 1967 to 1974. Sundstrand Tubular products purchased the facility in 1974, and continued operating until 1990. In October 1990 the facility was purchased by Modine Heat Transfer, Inc., now Modine Manufacturing Company. Modine is the current owner/operator of the facility.

Before Modine purchased the facility, Sundstrand submitted a closure plan in September 1990 to terminate interim status and hold generator status only. The closure plan, with approval from MDNR, was implemented in July 1993. Results from the closure plan revealed a release of hazardous waste beneath the facility Therefore, clean closure could not be granted. As a result, Modine became subject to groundwater monitoring requirements contained in 40 CFR 265 Subpart F This included the requirement that a groundwater monitoring system be installed to determine whether groundwater contamination has occurred due to the storage of hazardous waste at the facility.

This Comprehensive Groundwater Monitoring Evaluation (CME) was prepared as part of Missouri's authorization under RCRA, on behalf of EPA and under the Missouri Hazardous Waste Management Law and Regulations to determine the regulatory and technical adequacy of Modine's RCRA groundwater monitoring system. As a result of this evaluation MDNR has determined that:

1 Modine must draft and submit a Sampling and Analysis Plan that adequately defines the sampling procedures to be followed by sampling personnel.

2 The existing groundwater monitoring wells do not adequately determine the rate and extent of groundwater contamination at the facility Therefore, Modine must install additional monitoring wells

3 Modine must submit an annual groundwater monitoring report that documents the sampling results and activities, operation and maintenance of the groundwater monitoring system and the adequacy of the monitoring system at the facility for the year

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TABLE 2

MONITORING WELL COMPLETION DATA

WELL NUMBER	DATE INSTALLED	CASING MATERIAL	CASING DIAMETER	DEPTH TO SCREEN	SCREENED INTERVAL	TOC ELEVATION (bgs)	TOTAL DEPTH (bgs)
MW-1	7/92	PVC	2"	NR	NR	186.61'	161'
MW-2	7/92	PVC	2"	NR	NR	204.26'	197'
MW-3	8/9/95	Steel Surface Casing to 64', Open Hole 64' to 167'	5"* 4-3/4"	None	Open Hole 64' to 167' bgs	193.74'	167'
MW-4	8/11/95	Steel Surface Casing to 44', Open Hole 44' to 158'	5"* 4-3/4"	None	Open Hole 44' to 158' bgs	192.24'	158'

bgs - below ground surface NR - Not Known * - Surface Casing Diameter

Groundwater monitoring wells MW-3 and MW-4, have shown chronic "insufficient well volume" during sampling events. Both wells have shown detectable levels of VOC contamination during past sampling events, and it is not clear why they are chronically dry If Modine cannot obtain samples from these wells, then a remedy must be sought (i e , redevelopment, well replacement, deepening, etc.) to enable collection at these wells

Special consideration should be given to Modine's close proximity (i e., within a 4 mile radius) to at least 130 private and at least 1 public drinking water well It is important that Modine look at the groundwater situation very seriously since any potential groundwater contamination could have a direct affect on the health of groundwater users in the area It is for this reason that additional monitoring wells to define the limits of potential contamination must be installed in a timely manner

Former Hulett Lagoon Site
Combined PA/SI
Reference 55

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

721 Emerson Road, Suite 220
Saint Louis, Missouri 63141-6748
314 993 4599 Tel
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October 19, 1998

Mr. Thomas S. Sanicola
Environmental Engineer
Modine Manufacturing Company
1500 DeKoven Avenue
Racine, Wisconsin 53403

RECEIVED
OCT 21 1998
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Re: Final Letter Report
Subsurface Investigation
Monitoring Well Installation - Former Hulett Lagoon
Camdenton, Missouri
Dames & Moore Project No. 27397-035-045

Dear Mr. Sanicola:

Dames & Moore is pleased to submit this letter report summarizing activities relative to the installation of monitoring well MW-5, at the former Hulett Lagoon in Camdenton, Missouri for the Modine Manufacturing Company (Modine). The former Hulett Lagoon is located approximately 1,000 feet northeast of the Modine facility and appears, based upon the results of a previous field fracture survey, to be the source of the observed trichloroethylene (TCE) impact to groundwater. The purpose of this investigation was to determine the presence or absence of volatile organic compounds (VOCs), in particular, TCE in the groundwater underlying the former Hulett Lagoon.

It is our understanding that the Hulett Lagoon is owned and was operated by the City of Camdenton. The lagoon reportedly received wastewater from a number of commercial and industrial facilities; including Sundstrand Tubular Products (Sundstrand), the former owners and operators of the current Modine facility.

The subsurface investigation field activities were conducted from July 7, 1998, through July 16, 1998. A project specific health and safety plan was developed for Dames & Moore personnel and a health and safety briefing was held prior to initiation of the work.

1.0 MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING

Layne-Western Company, Inc. of St. Louis, Missouri was subcontracted by Dames & Moore for drilling services. The monitoring well was drilled using a truck-mounted hollow stem auger drilling rig and an air rotary drilling rig. Following completion, the monitoring well was

surveyed for location and elevation relative to the existing monitoring wells at the Modine facility by Robert F. Arnold & Associates of Camdenton, Missouri.

The shallow, non-lithified material was drilled utilizing a hollow stem auger drilling rig. Soil samples were continuously collected with a two and one half foot long split spoon sampler advanced ahead of the augers with a hydraulic hammer. The soil samples were logged by Dames & Moore personnel in accordance with the Unified Soil Classification System (USCS).

Each soil sample collected was stored in a Zip-loc® bag. A photoionization detection (PID) reading was taken of the headspace gas in each of the bagged samples by puncturing the plastic with the tip of the PID probe. The headspace reading is used to approximate organic vapor concentrations. The PID, a Thermo-Environmental OVM Model 580-B, was calibrated daily to a 100 parts per million (ppm) isobutlyene standard. There was no field evidence of impact to the soil based on the PID readings and olfactory indications in the monitoring well; therefore, no soil samples were submitted to the laboratory for analysis. PID readings are presented on the monitoring well log.

Once bedrock was encountered, a temporary casing was set at a depth of 10.5 feet below ground surface (bgs) and the hole was re-entered and diamond cored (NX core) to a depth of approximately 104 feet bgs. The purpose of the temporary casing was to ensure that water used in the coring operation could be recovered and recirculated. Potable water from the City of Camdenton public water supply was used as the coring fluid.

The bedrock was continuously cored using a ten foot NX core barrel. All core material was appropriately marked, logged according to standard logging methods, and stored in NX core boxes. As each core run was removed from the barrel, the bedrock was field screened using the PID. The probe of the PID was run along the length of the core to determine the presence of organic vapors. There was no evidence of impact to the bedrock based on the PID readings and olfactory indications. A well log is attached to this letter report.

The original intent had been to core the well to total depth. However, water loss was encountered during the drilling process beginning at a depth of approximately 22 feet bgs. Water loss appears to have occurred due to the presence of open fractures and void spaces. The water loss problem increased as the boring was deepened, so that the coring operation was terminated at a depth of 104 feet bgs. A total of approximately 5,000 gallons of potable water was lost to the formation.

Following coring activities, the hole was re-entered and reamed out to a depth of approximately 118 feet bgs. Groundwater was encountered at an approximate depth of 105 feet bgs.

Permanent surface casing was installed in competent bedrock to a depth of approximately 37 feet bgs. This depth was chosen in order to case off several void spaces which had been encountered during the drilling, notably the void space from 35.0 to 36.5 feet bgs. The monitoring well was constructed with schedule 80, two-inch inside diameter, polyvinyl chloride (PVC) casing with a 0.010 inch slotted screen in accordance with "Missouri Well Construction Rules, June 1996". The well is completed with a screen length of thirty feet and contains a filter pack that extends approximately four feet above the top of the screen. Approximately five feet of bentonite pellets were placed above the filter pack to serve as an annular seal, and were hydrated. Bentonite grout was placed in the hole to approximately 10 feet bgs. The remaining depth was completed with bentonite pellets to approximately one foot below the top of PVC casing. The well was completed approximately two and one half feet above surface grade with a 6-inch diameter protective casing surrounded by a two foot square concrete surface pad. A locking cap was placed on the protective casing to ensure the integrity of the well.

Prior to sampling, the well was gauged to assess the groundwater level and determine the volume of water to be purged. An attempt was made to air lift the water out during development; however, due to the limited water column and the low recharge rate, the procedure was unsuccessful. In order to develop the well, approximately 10 well volumes of groundwater were removed (approximately 30 gallons). The monitoring well was purged in accordance with RCRA Ground-Water Monitoring TEGD guidelines. Purging was done with a dedicated, disposable, polyethylene bailer and new poly-rope. The purged water was containerized in an on-site 55-gallon drum.

The well was sampled using a dedicated disposable bailer and new poly-rope. The bailer was slowly lowered into the water to minimize agitation. Samples were transferred from the bailer to the sample containers in a manner as to minimize agitation and aeration. Personnel conducting the groundwater sampling wore a new pair of clean disposable latex gloves. A duplicate sample was also collected from the well. The samples were shipped, under proper Chain-of-Custody, in an iced cooler by overnight delivery service to Specialized Assays, Inc. and were analyzed for volatile organic compounds (VOCs) by EPA Method 8260.

Measures were taken to reduce the possibility of cross contamination between sampled intervals. After each use, the soil samplers were decontaminated with a high pressure wash. Personnel who handled tools and collected samples wore a new pair of disposable latex gloves for each sample

acquisition. A decontaminated set of augers, barrel rods, and air rotary rods were used for the installation of the monitoring well.

Investigation-derived waste was segregated according to waste type. The purged water was stored in a 55-gallon drum which remains stored near MW-5 for future use. The water used in the air rotary process and the reamed bedrock material were stored in 55-gallon drums. The drums were properly labeled and staged at the facility in a fenced in area on the west side of the building. Modine is responsible for the proper disposal of these investigation-derived waste.

2.0 ANALYTICAL RESULTS

Soil samples were not submitted to the laboratory for analysis. A groundwater sample and a duplicate sample were collected from MW-5 for analysis. Additionally, a water sample was collected from the decontamination water holding tank and the coring water holding tank. The results obtained for each of the samples are summarized below:

- Monitoring Well MW-5: The groundwater sample collected from MW-5 exhibited a concentration of TCE at 484.1 ppb and cis-1,2-dichloroethene at 28.0 ppb. A duplicate sample was collected from MW-5 which exhibited a concentration of TCE of 458.5 ppb and cis-1,2-dichloroethene of 28.2 ppb.

- Core Holding Tank: The water collected from the core holding tank originated at the facility and exhibited a TCE concentration of 3.0 ppb.

- Decontamination Holding Tank: The water collected from the decontamination holding tank originated at the facility and exhibited a TCE concentration of 3.2 ppb.

3.0 GROUNDWATER ELEVATIONS

Groundwater depths relative to top of casing were determined for all five monitor wells on July 31, 1998. Groundwater depths were determined using a decontaminated Solinst® electronic water level indicator. This indicator was decontaminated between each use. The resulting groundwater elevations, along with the surveyed elevations of the casing tops are shown in Table 1.

The groundwater elevations (Figure 1) confirm the generally trough-like configuration of the groundwater potentiometric surface, which has been observed in previous gauging events. MW-1

is approximately in the center of the trough-like surface. Data from MW-5 demonstrate that groundwater is flowing generally to the southwest, in the direction of the Modine facility. This flow direction is parallel to the direction of the primary fracture set identified in the 1996 Fracture System Investigation. These data strongly suggest that TCE in groundwater beneath the former Hulett lagoon is the source for TCE-impacted groundwater at MW-4.

4.0 GEOPHYSICAL LOGGING

Dames & Moore contracted with Century Geophysical Corporation (Century) to perform geophysical logging of MW-5. This logging was accomplished on July 31. 1998 and was witnessed by Ms. Miesche Francis of Dames & Moore.

The suite of logs run in this well included induction resistivity, gamma ray, and neutron. The 2-inch diameter casing size prevented running the density tool. Since the well contained water only at the base, acoustic and spontaneous potential logs were not run. Copies of the geophysical logs are included as Appendix B.

The results of the logging are discussed below. All depths discussed in this section are depth below top of casing, except as noted.

The resistivity log for MW-5 indicates metallic casing installed to a depth of 40 feet. Rock beneath this casing is shown to be fairly high in resistivity, which is consistent with carbonate rock, and fairly uniform. Both the resistivity and the gamma ray curves do not support major changes in lithology. A conspicuous gamma ray peak, which corresponds to a resistivity low, occurs at 84 feet. This appears to be the same feature observed in all four of the other wells and was referred to in the 1996 fracture system report as the "gamma marker". In all five wells, this feature marks the upper boundary of an increase in resistivity. The gamma marker is estimated to be approximately three feet thick in MW-5. The neutron response increases for nearly 20 feet below the gamma marker, indicating less porous rock. According to the core log, the gamma marker corresponds approximately with a fractured, vuggy crystalline limestone, which overlies a relatively nonporous grainstone. The structural elevation of the gamma marker is 95.44 feet, approximately 30 feet higher relative to the marker at the Modine plant. Therefore, any stratigraphic component of flow in the unsaturated zone may be in the direction of the Modine facility (Figure 2).

6.0 FUTURE TASKS

Dames & Moore has begun the procedures to conduct a groundwater tracing event at the facility. The proper documents have been completed and submitted to the Missouri Department of Natural Resources (MDNR) to obtain permission to conduct this trace. As of the date of this letter report, Dames & Moore has not received a response from the MDNR. However, dye bugs consisting of activated charcoal were placed in all of the on-site monitoring wells (MW-1, MW-2, MW-3, and MW-4) for the purpose of background sampling to determine if fluorescein dye exists in the groundwater beneath the facility. The dye bugs were lowered in the well column approximately half way into the groundwater and left in place for one week. The dye bugs along with a grab groundwater sample were collected from all of the on-site wells and a grab groundwater sample was also collected from the City of Camdenton Mulberry Well. The samples were placed in appropriate containers and shipped via overnight courier to Ozark Underground Laboratory, Inc. to determine the presence, if any, of fluorescein.

7.0 SUMMARY AND CONCLUSIONS

TCE was detected in the groundwater sample collected from MW-5 located near the former Hulett Lagoon. The concentration of TCE significantly exceeds the Drinking Water Standards and Health Advisories level of 5 ppb for TCE. Groundwater appears to flow southwest from the former Hulett Lagoon towards the Modine facility. Based upon these results, it is Dames & Moore's opinion that the source of the TCE in the groundwater beneath the Modine facility is the former Hulett Lagoon.

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

Dames & Moore is pleased to present this letter report summarizing the activities associated with the installation of MW-5 at the former Hulett Lagoon and additional tasks associated with the subsurface investigation at the Modine facility in Camdenton, Missouri. If you have any questions or comments regarding the contents of this report, please contact either of the undersigned at (314) 993-4599.

Very truly yours,

DAMES & MOORE

Daniel J. Price, R.G.
Managing Principal
St. Louis Office

J. Ronald Sides, Ph. D.
Senior Geologist

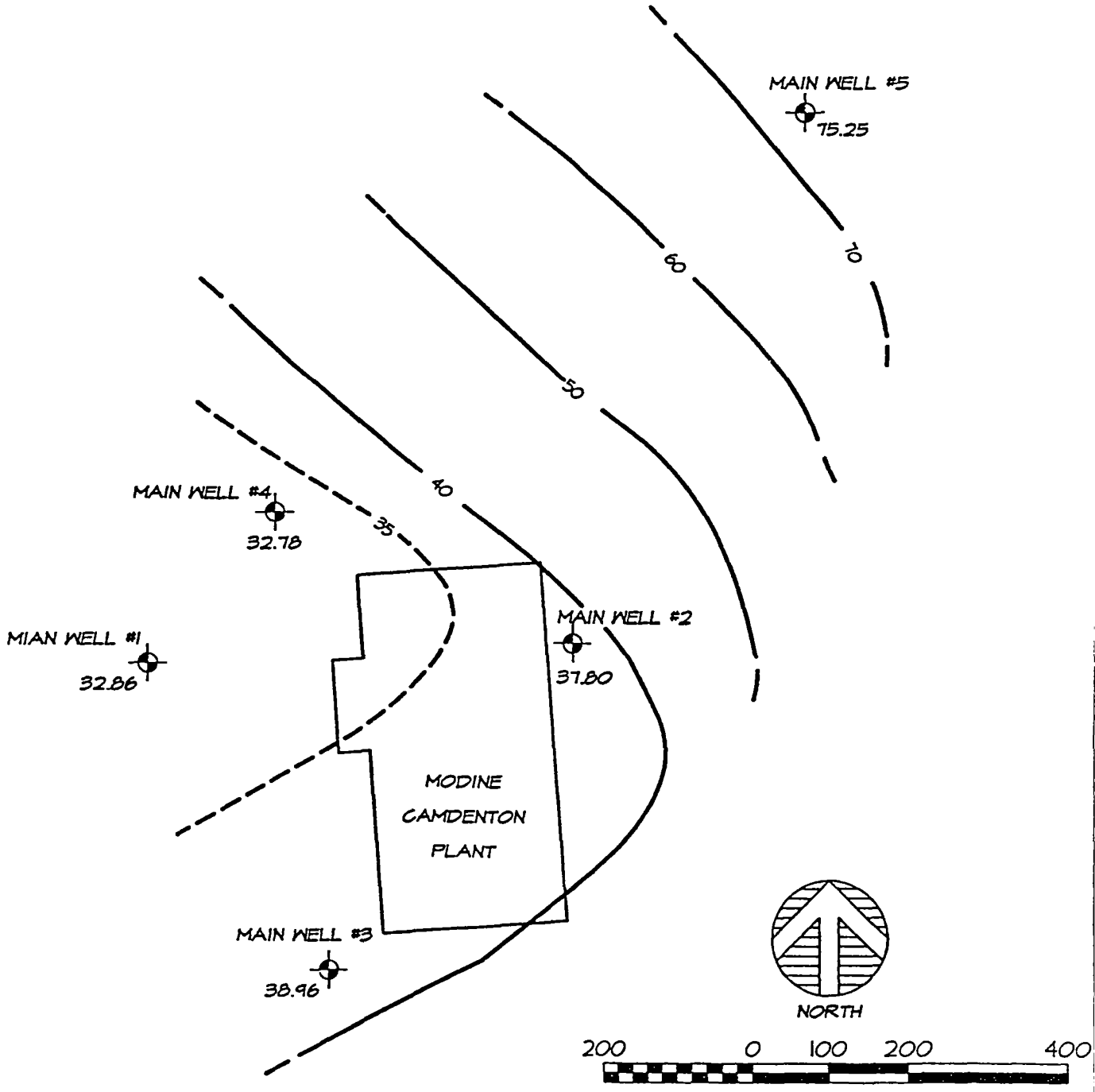
DJP/JRS:nkh
P \045\10-OCT98\MISC_JOB\CORRSPND\SANI_19.JRS

TABLE 1

Groundwater Elevations
July 31, 1998
Modine Heat Transfer Facility
Camdenton, Missouri

	Casing Elevation	Depth to Water	Groundwater Elevation
MW-1	186.61	153.75	32.86
MW-2	204.26	166.46	37.80
MW-3	193.74	154.78	38.96
MW-4	192.24	159.46	32.78
MW-5	179.44	104.19	75.25

* Elevation references a coordinate system previously established for this project.



NOTE:
VERTICAL DATUM IS PROJECT SPECIFIC, NOT USGS.

CONTOUR INTERVAL IS 10 FEET, EXCEPT WHERE DASHED (5 FEET).

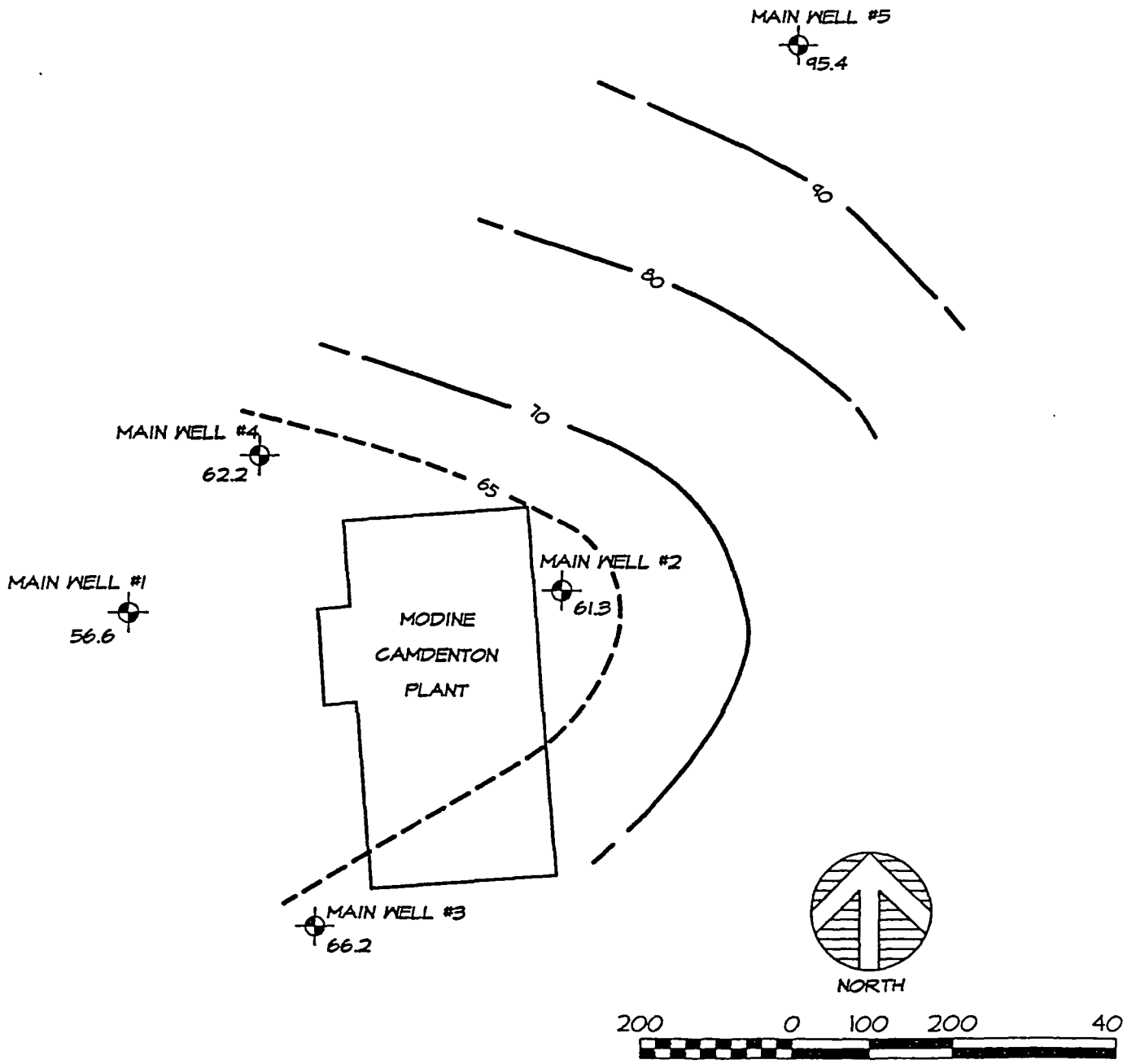
FIGURE 1
GROUNDWATER ELEVATIONS (ft)
ON JULY 31, 1998

MODINE HEAT TRANSFER, INC.
CAMDENTON, MISSOURI

DATE: Aug. 20, 1998	
JOB NO.: 27397-035-05	
DRAWN BY JMS	CHK'D BY JRS
SCALE: AS SHOWN	

DAMES & MOORE GROUP
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599

R:\ENV\27397.035\MODINEF1.DWG 08/20/98



NOTE:
VERTICAL DATUM IS PROJECT SPECIFIC, NOT USGS.

CONTOUR INTERVAL IS 10 FEET, EXCEPT WHERE DASHED (5 FEET).

FIGURE 2
SUBSURFACE STRUCTURE ELEVATION OF GAMMA MARKER

MODINE HEAT TRANSFER, INC.
CAMDENTON, MISSOURI

DATE: Aug. 20, 1998	
JOB NO.: 27397-035-05	
DRAWN BY JMS	CHK'D BY JRS
SCALE: AS SHOWN	

DAMES & MOORE GROUP
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599

R:\ENV\27397.035\MODINEF2.DWG 08/20/98

GEOLOGIC LOG

Sheet No. 1 of 6
Date 7-7-98

PROJECT MARINE SUBSURFACE INVESTIGATION

Hole No. MW-5
Feature Former Hulett Lagoon
Coordinates: N
E
Core Sizes

Angle (from Horizontal) Vertical
Bearing
Date Started 7-7-98
Date Completed 7-10-98
Total Depth 104'

Ground Elevation
Rock Elevation
Overburden Thickness 10.5'
Ground–Water Elevation 104.2' (7-16-98)
Logged by M.M. FRANCIS

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.—Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
1				ML BROWN SILTY CLAY with brownish yellow stringers, soft, dry, with trace cherty gravel grading to BROWNISH YELLOW.					50% Recovery
2					2	5	5	7	ovm 9.8 #1 0-2'
3				CL YELLOWISH RED CLAY with brown stringers, hard, moist, stiff, with cherty gravel					50% Recovery
4					4	4	7	8	ovm 10.7 #2 2-4'
5									75% Recovery
6					4	6	10	10	ovm 8.8 #3 4-6'
7				1" chert lens at 7.0'					100% Recovery
8					3	4	9	10	ovm 16.2 #4 6-8'
9				Slight green [illegible] at 9.0'					50% Recovery
10					4	6	11	50	4" ovm 5.9 #5 8-10'
				Weathered limestone, H. brown, chert bearing					
11			O	Top of Rock at 10.5'					Core #1 Start 3:55 P Stop 4:25 P
12	LS		O	Xtalline Limestone, Grainstone, Light Gray, thin layers of more finely xtalline [illegible] porous					Fracture not open
13			O			100%	56%		OVM 0.0
14			O						
15			O	Vuggy and Chert bearing 14.5'-15.0' Bedding Plane Joints					
16			O	Limestone, grainstone, H gray, porous vuggy					Core #2 Start [illegible] Stop 9:11 A
17			O	Mudst [illegible] gray and tan		100%	53%		Fractures not open
18				[illegible] 18.2'-18.5'					No PID reading
19			O	Limestone grainstone H gray [illegible]					Core #3 Start [illegible] A Stop [illegible] A

7/8/95

GEOLOGIC LOG

Sheet No. 2 of
Date 7-8-98

PROJECT Monie Sinkhole Investigation

Hole No. MW-5
Feature Former Hulett Lagoon
Coordinates: N
E
Core Sizes

Angle (from Horizontal) Vertical
Bearing
Date Started 7-7-98
Date Completed 7-10-98
Total Depth 104'

Ground Elevation
Rock Elevation
Overburden Thickness 10.5'
Ground-Water Elevation
Logged by M. M. [illegible]

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.—Graphic	Core Rec. %	RQD %	Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
21	LS		0	[illegible]		93%	34%	Fractures not open
			70	21.2' 70° Fracture.				1" fluid loss
22			0	Limestone [illegible]				[48" x 96" trough]
23			0	Limestone [illegible]				
			60	23.3' 60° Fracture [illegible]				
24								
25				Limestone [illegible]				Core #4 Start 10:14A Stop 11:14A
26			0	Open fracture				
27				VOID 26.6' - 27.6'				Clay [illegible]
28	LS		0	[illegible]		66%	42%	
29								
30			0	29.4' open fracture				2" fluid loss
31			0					
32								
33				VOID 32.1' - 33.3'				
34			45°	[illegible]				Core #5 Start [illegible]
35			90°					
36				VOID 35.0' - 36.5'		60%	20%	No circulation 100% fluid loss
37	LS			Limestone [illegible] clay [illegible]				Open fracture
38								
39				VOID 38.5' - 39.5'				
				[illegible]				Core #6 [illegible]

GEOLOGIC LOG

Sheet No. ____
Date 7-[illegible]

PROJECT MONINE SUBSURFACE INVESTIGATION

Hole No. 1AW-5 | Angle (from Horizontal) Vertical | Ground Elevation ____
Feature Forever Hulett Logger | Bearing ____ | Rock Elevation ____
Coordinates: N ____ | Date Started 7-7-98 | Overburden Thickness 10.5'
E ____ | Date Completed 7-10-98 | Ground–Water Elevation ____
Core Sizes ____ | Total Depth 100' | Logged by M.M. FRANCIS

Depth (Elevation)	Graphic Log: Lithology	Structure	Attitude	Classification and Physical Condition	C.R.–Graphic	Core Rec. %	RQD %	Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
40								
41			45	40.6' 45° fracture				
			0	Chert, gray to light gray banded				
42			0	42.0-42.8' Chert, rubble, with glauconite fractured.		100%	30%	
43			0					
			0	Limestone rubble, lt. brown w/sandstone				
44				Limestone, grainstone, brown				
			0	44.5' Open fractures				Core #1 Start 5:10p
45			0					
			65	45.3' 65° fracture				
46	LS			Limestone, mudstone, lt brown to beige, mottled				
				Limestone, grainstone, banded, lt brown to beige, vuggy				
48				48.3' Limestone, mudstone to grainstone lt brown				
			0			99%	67%	
			35	49.8' 35° fracture				
			0					
			0					
			0					
7-9-98			75	52.2' 75° fracture				
			0					OVM 0.0 Stop 6:10p
			0	Chert rubble, banded gray to lt gray				7-9-98 Start 7:30A
			70	53.3' Limestone, grainstone, brown, mottled				Nurses other [illegible] made to complete run. Stop 12:47p
			75	53.5' 70° fracture 53.8' 75° fracture				Core #3 Start 1:00p
			0	Chert, lt beige, vuggy				Stop 1:26p
			0	Limestone, grainstone, lt brown, chert bearing				
			90	55.7' 90° open fracture				OVM 0.0
			0	Chert, rubble, gray		100%	60%	
			0	Limestone, mudstone, lt brown, mottled chert bearing (beige)				
				chert, gray, vuggy				
			0	59.0' 45° open fracture				Core #4 Start 1:35p
			0					

GEOLOGIC LOG

Sheet No. 4 of 6
Date 7-9-98

PROJECT MODINE SUBSURFACE INVESTIGATION

Hole No. MW-5
Feature Former Hulk # Lagoon
Coordinates: N
E
Core Sizes

Angle (from Horizontal)
Bearing
Date Started 7-7-98
Date Completed 7-10-98
Total Depth 104'

Ground Elevation
Rock Elevation
Overburden Thickness 10.5'
Ground–Water Elevation
Logged by M.M. FRANCIS

Depth (Elevation)	Graphic Log: Lithology	Structure	Attitude	Classification and Physical Condition	C.R.—Graphic	Core Rec. %	RQD %	Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
60								
			0	60.0' open fracture				
			70	Chert, rubble gray				
61			0	61.2' Limestone, lt brown				
				61.4' Chert				
62			0 90°	61.6' Limestone, grainstone, lt brown		96%	50%	OVM 0.0
			0	banded, vuggy, mottled				
			0	62.0' open fractures				
63			0	62.5' Limestone, lt brown, chert bearing.				
64								
	LS							Core# 10 Start 2:14p Stop 2:57p
65			0	Limestone, grainstone, chert bearing, vuggy, mottled, banded				
66			0	lt beige		100%	85%	OVM 0.0
67								
			0					
68			90°	Chert, lt. gray to med. gray bands with limestone vugs				
69			0	68.2-68.6' vertical open fracture				Core# 11 Start 4:50p 5:11p
			0	69.2' Limestone, grainstone, lt.				
70			0	brown to beige banded, mottled, vuggy (chert filled)		100%	88%	OVM 0.0
71	LS			porous				
72								
73				Limestone, mudstone, vuggy, chert bearing				
7-10-98 74				FORMER LOSS OF 0.5'				
				Limestone, grainstone, lt brown, banded, vuggy, chert bearing				Core # 12. Start 11:32A 7-10-98 Stop 1:45P
75			0					
	LS		0	open fractures				
76			0					OVM 0.0
77								
78			0	open fracture		98%	84%	
			0	chert, lt. beige, mottled with gray bands				
79								
			0	open fracture.				

GEOLOGIC LOG

Sheet No. 5 of 6
Date 7-10-98

PROJECT MODINE SUBSURFACE INVESTIGATION

Hole No. MW-5
Feature Former Hulett Lagoon
Coordinates: N
E
Core Sizes

Angle (from Horizontal)
Bearing
Date Started 7-7-98
Date Completed 7-10-98
Total Depth 104'

Ground Elevation
Rock Elevation
Overburden Thickness 10.5'
Ground–Water Elevation
Logged by M. M. Franas

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.–Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
80				Chert, gray to med. gray banded					
			0	open fracture					
81				Limestone, brown, xystalline					
				Chert, gray, mottled, vuggy					
82			0	Limestone, lt brown		98%	84%		
			0	Chert, gray banded					
83			0	Limestone, brown, vuggy					
			45	83.6' 45° fracture					
84			0						
									Core #13 Start 1:55P Stop 2:38P
85				Chert, gray to lt gray banded					
86		1	90	open vertical fracture					OVM 0.0
			0						
87				Limestone, lt brown					
				Chert (86.0')					
88			0	Limestone, grainstone, chert bearing, vugy, mottled					
89			0			92%	73%		
			45						
90			30						
			0						
91									
92									
			0						
93			0						
94			0	Limestone, porous, grainstone, lt. brown					Core #14 Start 3:17P Stop 3:30P
95			0	Chert, med. gray mottled, vuggy					
96			0						OVM 0.0
97				Limestone, lt. brown, grainstone banded		98%	75%		
98									
99			0						

GEOLOGIC LOG

Sheet No. 6 of 6
Date 7-10-98

PROJECT MODINE SUBSURFACE INVESTIGATION

Hole No. MW-5
Feature FORMER HULETT LAGOON
Coordinates: N
E
Core Sizes

Angle (from Horizontal)
Bearing
Date Started 7-7-98
Date Completed 7-10-98
Total Depth 104'

Ground Elevation
Rock Elevation
Overburden Thickness 10.5'
Ground–Water Elevation
Logged by M.M. FRANCIS

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.—Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
100			0	Limestone, lt gray, porous grainstone					
101									
102	LS			Chert, lt gray with dark gray vugs					
103				Limestone, grainstone, lt. brown banded, mottled, chert bearing					
104			0	END OF CORE					

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

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721 Emerson Road, Suite 220
Saint Louis, Missouri 63141-6748
314 993 4599 Tel
314 993 4895 Fax

Fax Sheet

To CHRIS KUMP Company MDNR Fax Number 573-526-5268

From RON SIDES

Date 11/5/98

Subject MODINE

No. of pages 7

ANALYTICAL REPORTS, MW-5

1) SAMPLE
2) SAMPLE DUP
3) TRIP BLANK

CALL WITH ANY QUESTIONS

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ANALYTICAL REPORT

DAMES & MOORE 7378
DEBORAH Y. WHITAKER
2135 E. SUNSHINE, SUITE 105
SPRINGFIELD, MO 65804

Lab Number: 98-A83247
Sample ID: MW05-GW1-Q1-98
Sample Type: Ground water
Site ID:

Date Collected: 7/16/98
Time Collected: 12:52
Date Received: 7/17/98
Time Received: 9:00

Project: 27397-035-045
Project Name: MODINE SUBSURFACE INVEST
Sampler: MIESCHE FRANCIS

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS										
Acetone	ND	mg/l	0.0100	0.0100	1	7/18/98	1:15	G.Norton	8260B	199
Benzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Bromobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Bromochloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Bromoform	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Bromomethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
2-Butanone	ND	mg/l	0.0100	0.0100	1	7/18/98	1:15	G.Norton	8260B	199
n-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
sec-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
t-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Carbon disulfide	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Carbon tetrachloride	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Chlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Chloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
2-Chloroethylvinylether	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Chloroform	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Chloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
2-Chlorotoluene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
4-Chlorotoluene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,2-Dibromo-3-chloropropane	ND	mg/l	0.0100	0.0100	1	7/18/98	1:15	G.Norton	8260B	199
Dibromochloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,2-Dibromoethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Dibromomethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,2-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,3-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,4-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Dichlorodifluoromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,1-Dichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,2-Dichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,1-Dichloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
cis-1,2-Dichloroethene	0.0280	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
trans-1,2-Dichloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	19[illegible]
1,2-Dichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	1[illegible]

ANALYTICAL REPORT

Laboratory Number: 98-A83247
Sample ID: MW05-GW1-Q1-98

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3-Dichloropropane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
2,2-Dichloropropane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,1-Dichloropropene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
cis-1,3-Dichloropropene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
trans-1,3-Dichloropropene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Ethylbenzene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Hexachlorobutadiene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
2-Hexanone	ND	ug/l	0.0100	0.0100	1	7/18/98	1:15	G.Norton	8260B	199
Isopropylbenzene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
4-Isopropyltoluene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
4-Methyl-2-pentanone	ND	ug/l	0.0100	0.0100	1	7/18/98	1:15	G.Norton	8260B	199
Methylene chloride	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Naphthalene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
n-Propylbenzene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Styrene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,1,1,2-Tetrachloroethane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,1,2,2-Tetrachloroethane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Tetrachloroethene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Toluene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,2,3-Trichlorobenzene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,2,4-Trichlorobenzene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,1,1-Trichloroethane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,1,2-Trichloroethane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Trichloroethene	0.4841	ug/l	0.0200	0.0020	10	7/20/98	16:39	G.Norton	8260B	199
1,2,3-Trichloropropane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,2,4-Trimethylbenzene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
1,3,5-Trimethylbenzene	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Vinyl chloride	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Xylenes	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Bromodichloromethane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199
Trichlorofluoromethane	ND	ug/l	0.0020	0.0020	1	7/18/98	1:15	G.Norton	8260B	199

ND = Not detected at the report limit.

Surrogate	% Recovery	Target Range
VOA Surrogate, 1,2-Dichloroethane, d4	77.	70. - 131.
VOA Surrogate, Toluene d8	90.	83. - 115.
VOA Surrogate, 4-Bromofluorobenzene	88.	73. - 119.
VOA Surrogate, Dibromofluoromethane	82.	72. - 130.

ANALYTICAL REPORT

DAMES & MOORE 7378
DEBORAH Y. WHITAKER
2135 E. SUNSHINE, SUITE 105
SPRINGFIELD, MO 65804

Lab Number: 98-A83248
Sample ID: MW05-GW1-Q1-98-D
Sample Type: Ground water
Site ID:

Date Collected: 7/16/98
Time Collected: 12:52
Date Received: 7/17/98
Time Received: 9:00

Project: 27397-035-045
Project Name: MODINE SUBSURFACE INVEST
Sampler: MIESCHE FRANCIS

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS										
Acetone	ND	mg/l	0.0100	0.0100	1	7/18/98	1:51	G.Norton	8260B	199
Benzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Bromobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Bromochloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Bromoform	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Bromomethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
2-Butanone	ND	mg/l	0.0100	0.0100	1	7/18/98	1:51	G.Norton	8260B	199
n-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
sec-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
t-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Carbon disulfide	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Carbon tetrachloride	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Chlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Chloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
2-Chloroethylvinylether	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Chloroform	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Chloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
2-Chlorotoluene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
4-Chlorotoluene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,2-Dibromo-3-chloropropane	ND	mg/l	0.0100	0.0100	1	7/18/98	1:51	G.Norton	8260B	199
Dibromochloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,2-Dibromoethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Dibromomethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,2-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,3-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,4-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Dichlorodifluoromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,1-Dichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,2-Dichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,1-Dichloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
cis-1,2-Dichloroethene	0.0282	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
trans-1,2-Dichloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,2-Dichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199

ANALYTICAL REPORT

Laboratory Number: 98-AB3248
Sample ID: MW05-GW1-Q1-98-D

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3-Dichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
2,2-Dichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,1-Dichloropropene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
cis-1,3-Dichloropropene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
trans-1,3-Dichloropropene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Ethylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Hexachlorobutadiene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
2-Hexanone	ND	mg/l	0.0100	0.0100	1	7/18/98	1:51	G.Norton	8260B	199
Isopropylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
4-Isopropyltoluene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
4-Methyl-2-pentanone	ND	mg/l	0.0100	0.0100	1	7/18/98	1:51	G.Norton	8260B	199
Methylene chloride	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Naphthalene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
n-Propylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Styrene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,1,1,2-Tetrachloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,1,2,2-Tetrachloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Tetrachloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Toluene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,2,3-Trichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,2,4-Trichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,1,1-Trichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,1,2-Trichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Trichloroethene	0.4585	mg/l	0.0200	0.0020	10	7/20/98	11:57	G.Norton	8260B	199
1,2,3-Trichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,2,4-Trimethylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
1,3,5-Trimethylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Vinyl chloride	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Xylenes	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Bromodichloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199
Trichlorofluoromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	1:51	G.Norton	8260B	199

ND = Not detected at the report limit.

Surrogate	% Recovery	Target Range
VOA Surrogate, 1,2-Dichloroethane, d4	82.	70. - 131.
VOA Surrogate, Toluene d8	89.	83. - 115.
VOA Surrogate, 4-Bromofluorobenzene	90.	73. - 119.
VOA Surrogate, Dibromofluoromethane	85.	72. - 130.

ANALYTICAL REPORT

DAMES & MOORE 7378
DEBORAH Y. WHITAKER
2135 E. SUNSHINE, SUITE 105
SPRINGFIELD, MO 65804

Lab Number: 98-A83249
Sample ID: TRIP BLANK
Sample Type: Ground water
Site ID:

Date Collected:
Time Collected:
Date Received: 7/17/98
Time Received: 9:00

Project: 27397-035-045
Project Name: MODINE SUBSURFACE INVEST
Sampler: MIESCHE FRANCIS

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
VOLATILE ORGANICS										
Acetone	ND	mg/l	0.0100	0.0100	1	7/18/98	0:01	G.Norton	8260B	199
Benzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Bromobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Bromochloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Bromoform	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Bromomethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
2-Butanone	ND	mg/l	0.0100	0.0100	1	7/18/98	0:01	G.Norton	8260B	199
n-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
sec-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
t-Butylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Carbon disulfide	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Carbon tetrachloride	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Chlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Chloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
2-Chloroethylvinylether	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Chloroform	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Chloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
2-Chlorotoluene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
4-Chlorotoluene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2-Dibromo-3-chloropropane	ND	mg/l	0.0100	0.0100	1	7/18/98	0:01	G.Norton	8260B	199
Dibromochloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2-Dibromoethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Dibromomethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,3-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,4-Dichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Dichlorodifluoromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,1-Dichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2-Dichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,1-Dichloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
cis-1,2-Dichloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
trans-1,2-Dichloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2-Dichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199

ANALYTICAL REPORT

Laboratory Number: 98-A83249
Sample ID: TRIP BLANK

Page 2

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
1,3-Dichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
2,2-Dichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,1-Dichloropropene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
cis-1,3-Dichloropropene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
trans-1,3-Dichloropropene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Ethylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Hexachlorobutadiene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
2-Hexanone	ND	mg/l	0.0100	0.0100	1	7/18/98	0:01	G.Norton	8260B	199
Isopropylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
4-Isopropyltoluene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
4-Methyl-2-pentanone	ND	mg/l	0.0100	0.0100	1	7/18/98	0:01	G.Norton	8260B	199
Methylene chloride	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Naphthalene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
n-Propylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Styrene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,3,1,2-Tetrachloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,1,2,2-Tetrachloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Tetrachloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Toluene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2,3-Trichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2,4-Trichlorobenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,1,1-Trichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,1,2-Trichloroethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Trichloroethene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2,3-Trichloropropane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,2,4-Trimethylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
1,3,5-Trimethylbenzene	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Vinyl chloride	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Xylenes	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Bromodichloromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199
Trichlorofluoromethane	ND	mg/l	0.0020	0.0020	1	7/18/98	0:01	G.Norton	8260B	199

ND = Not detected at the report limit.

Surrogate	% Recovery	Target Range
VOA Surrogate, 1,2-Dichloroethane, d4	100.	70. - 131.
VOA Surrogate, Toluene d8	87.	83. - 115.
VOA Surrogate, 4-Bromofluorobenzene	94	73. - 119.
VOA Surrogate, Dibromofluoromethane	95.	72. - 130.

Former Hulett Lagoon Site
Combined PA/SI
Reference 57

MISSOURI DEPARTMEN

Headqu

2901 West Truman Boulevard, P O Box 180, Jefferson City, Missouri 65102-0180
Telephone 573/751-4115 ◆ Missouri Relay Center. 1-800-735-2966 (TDD)

JERRY M CONLEY, Director

Season's Greetings

December 14, 1998

RECEIVED

DEC 1 5 1998

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Ms. Julie Kelsey
Department of Natural Resources
P. O. Box 176
Jefferson City, MO 65102-0176

Re: Herculaneum Smelter; Faerber Farm
Former Hulett Lagoon; Highway AF Wells

Dear Ms. Kelsey:

Thank you for your letter of November 2, 1998 regarding rare, threatened and endangered species within the proposed project area.

Review of our records show that public lands, sensitive species or communities are known to exist on or near the above referenced sites. Please refer to the enclosed Heritage Database report for details. This report reflects information we currently have in our database. We provide this information for planning purposes only; it should not be regarded as a definitive statement as to the presence or absence of rare/endangered species or high-quality natural communities. Additional on-site inspections may be needed to verify the presence or absence of such species or communities.

Thank you for the opportunity to review and comment.

Sincerely,

Mary Lyon

MARY LYON
POLICY ANALYST

ML:klm
Enclosure

COMMISSION

ANITA B GORMAN
Kansas City

RANDY HERZOG
St Joseph

RONALD J. STITES
Plattsburg

HOWARD L. WOOD
Bonne Terre

MO DEPARTMENT OF NATURAL RESOURCES
P.O. BOX 176
JEFFERSON CITY, MO 65102-0176

FORMER HULETT LAGOON

The following species and/or natural communities are known to occur on or in the vicinity of the project site:

Scientific Name	Common Name	Federal Status	State Status	State Rank	Size/ Acres	Township/ Range	Sec.	Ownership
4-mile radius - source #1 and #2								
SPIRANTHES OVALIS VAR EROSTELLATA	OVAL LADIES' TRESSES			S2	0	037N017W	01	DNR
AMBYSTOMA ANNULATUM	RINGED SALAMANDER			S3	0	038N017W	27	PRIVATE
CHERT SAVANNA				S2	45	037N017W	02	DNR
DOLOMITE GLADE				S3	17	037N017W	11	DNR
CHERT SAVANNA				S2	50	037N017W	14	DNR
TYPHLICHTHYS SUBTERRANEUS	SOUTHERN CAVEFISH			S2S3	0	037N017W	02	DNR
DOLOMITE GLADE				S3	24	038N017W	35	DNR
DOLOMITE GLADE				S3	12	037N017W	10	DNR
MOIST LIMESTONE/DOLOMITE CLIFF				S4S5	0	037N017W	01	DNR
ARDEA HERODIAS	GREAT BLUE HERON			S5	0	037N017W	03	DNR
DOLOMITE GLADE				S3	13	037N017W	12	DNR
DRYOPTERIS CARTHUSIANA	SPINULOSE SHIELD FERN			S1	0	037N017W	01	DNR
DOLOMITE GLADE				S3	21	037N017W	11	DNR
HEMIDACTYLIUM SCUTATUM	FOUR-TOED SALAMANDER			S3	0	037N017W	02	DNR
MYOTIS GRISESCENS	GRAY BAT	E	E	S3	0	037N017W	02	DNR
LIMESTONE/DOLOMITE TALUS				S4S5	3	037N017W	01	DNR
DOLOMITE GLADE				S3	20	037N017W	11	DNR
MESIC FOREST				S3	5	037N017W	01	DNR
DRYOPTERIS GOLDIANA	GOLDIE'S FERN			S2	0	037N017W	01	DNR
DOLOMITE GLADE				S3	14	037N017W	10	DNR
DOLOMITE GLADE				S3	12	037N017W	01	DNR
DOLOMITE GLADE				S3	10	037N016W	18	PRIVATE
15 river miles, source #1								
MYOTIS GRISESCENS	GRAY BAT	E	E	S3	0	038N018W	02	PRIVATE

MO DEPARTMENT OF NATURAL RESOURCES

FORMER HULETT LAGOON

Additional in formation for planning purposes:

Gray bats are likely to occur in the project area, as they forage over streams, rivers, and reservoirs in this part of Missouri.

Pallid sturgeons are big river fish that may range widely in the Mississippi River and Missouri River system. Because the preferred habitat and range of the species are unknown, any project that modifies big river habitat or impacts water quality should consider the possible impact to pallid sturgeon populations.

Overwintering bald eagles may occur in the project area, as they are common winter residents in big river habitats and major lakes where they feed on fish.

Public land in the 4-mile radius, source #1 and #2:

Camdenton Conservation Service Center	Missouri Depratment of Conservation
Ha Ha Tonka State Park	Missouri Department of Natural Resources
Ha Ha Tonka Savanna Natural Area	Missouri Department of Natural Resources

Public land along 15 river miles, source #1:

Larry Gale Access	Missouri Department of Conservation

FEDERAL STATUS - The federal status is derived from the provisions of the federal Endangered Species Act, which is administered by the U.S Fish and Wildlife Service. The Endangered Species Act provides federal protection for plants and animals listed as Endangered or Threatened. E = Endangered, T = Threatened, C = Candidate for Federal listing.

STATE STATUS (E) - the state status is determined by the Department of Conservation under constitutional authority. Rule 3CSR10-4.111Endangered Species of the *Wildlife Code of Missoun* and certain state statutes apply to state Endangered species

STATE RANK - A numeric rank of relative endangerment based primanly on the number of occurrences of the species within the state of Missouri. S1 = Critically imperiled in the state, S2 = Imperiled in the state, S3 = Rare and uncommon in the state

Heron rookeries, eastern collared lizard populations, natural communities and geologic features are recognized as sensitive biological resources and may also appear on this report

Former Hulett Lagoon Site
Combined PA/SI
Reference 58

United States Department of the I

FISH AND WILDLIFE SERVICE
Ecological Services
Columbia Field Office
608 East Cherry Street, Room 200
Columbia, Missouri 65201
Tel: 573/876-1911 Fax: 573/876-1914

IN REPLY REFER TO.

FWS/AES-CMFO

DEC 18 1998

Ms. Julie B. Kelsey
Department of Natural Resources
Hazardous Waste Program
P.O. Box 176
Jefferson City, Missouri 65102-0176

Dear Ms. Kelsey:

This letter is in response to your November 2, 1998 letter asking the U.S. Fish and Wildlife Service (Service) for information on the presence of federally-listed threatened and endangered species, sensitive environments, and wetlands which may be present at or near the Herculaneum Smelter in Johnson County (Township 41N, Range 5E, Section 29), the Faerber Farm in Gasconade County (Township 45N, Range 4W, Section 6), the former Hulett Lagoon in Camden County (Township 38N, Range 17W, Section 24), and the Highway AF Wells in Franklin County (Township 40N, Range 2W, Section 5). This response is provided by the Service under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Environmental Policy Act of 1969 (42 U.S C. 4321-4327), and the Endangered Species Act of 1973, as amended (16 U.S.C 1531-1543).

None of the sites being investigated appear to impact State or Federal fish and wildlife lands or facilities, nor do they impact lands which were acquired or are managed with Federal grant-in-aid assistance under the Wildlife Restoration Act (Pittman-Robertson Act, Public Law 75-415) or the Fish Restoration Act (Dingell-Johnson Act, Public Law 81-681).

Herculaneum Smelter and Faerber Farm

Both the Herculaneum Smelter and the Faerber Farm are in close proximity to the Missouri and Mississippi Rivers and habitats associated with the federally-listed endangered pallid sturgeon (*Scaphirhynchus albus*), threatened Bald Eagle (*Haliaeetus leucocephalus*), endangered Interior Least Tern (*Sterna antillarum athalassos*), and endangered Piping Plover (*Charadrius melodius*), which occur along either river during certain times of the year Due to the proximity of the Faerber Farm to the Missouri River and the proximity of the Herculaneum site to Jefferson County, the federally-listed endangered Indiana bat (*Myotis sodalis*) might also occur

Pallid Sturgeon

The federally-listed pallid sturgeon is widely distributed in the Missouri River and also occurs in the Mississippi River south of St. Louis, downstream from the mouth of the Missouri These fish are well adapted to the bottoms of large, turbid, free-flowing rivers with swift water

Major threats to this species include habitat destruction, over harvest, and pollution. Though more research is necessary, it is suspected that pollution of the Missouri River by organic wastes coming from cities, livestock impoundments, industrial areas, and packing houses have negatively affected populations as sites such as these have increased over time and occur in nearly 45% of the pallid sturgeon's range.

In addition, elevated polychlorinated biphenyls (PCB's), cadmium, mercury, and selenium have been detected in tissue samples collected from pallid sturgeon in the Missouri River. Other contaminants, such as chlordane, DDE, DDT, and dieldrin have also been detected. Abandoned landfills, mines, sewage treatment plants, and industries all have high potential to contaminate pallid sturgeon habitat.

Bald Eagle

The federally-listed threatened Bald Eagle frequently winters in forested habitat along the Missouri and Mississippi Rivers. Bald Eagles generally prefer the largest trees (> 12 inches diameter at breast height) for perching and roosting. They generally forage on fish, dead and dying waterfowl, and carrion. Wintering populations have been increasing in Missouri, although counts fluctuate widely from year to year dependent upon ice over in the northern part of the eagle's range. Nesting Bald Eagles are also increasing, but to date, no nest sites are near either the Herculaneum or Faerber sites.

Eagles can be adversely affected by heavy metals, bacteria, and other contaminants. Due to the scavenger behaviors of the eagle, they often feed on dead or dying prey which may have been poisoned in some way or may have elevated bacterial levels. In such cases, eagles can be affected through a secondary pathway in the food chain which could harm or kill individuals. Direct toxic effects of organochlorines such as dieldrin, endrin and DDT have also contributed significantly to declines in eagle populations.

Interior Least Tern

The federally-listed endangered Interior Least Tern currently nests in the Bootheel region of Missouri along the Mississippi River. Terns presently use the Missouri River as a migration corridor from nesting sites in Nebraska and the Dakotas. During these times, May and between August and early September, birds are seen more frequently. They may use shallow, seasonal wetlands located in the Missouri River floodplain to rest and forage. The primary cause of decline for Interior Least Terns is habitat destruction and predation, though elevated levels of heavy metals have been found in egg tissue taken from the bootheel nesting grounds (Charbonneau, pers. comm).

Piping Plover

The federally-listed threatened Piping Plover occur in Missouri as transients during migrational periods to wintering grounds on the Gulf Coast and are predominantly from the Northern Great Plains population. Piping Plovers do not nest in Missouri, and historical records do not indicate they ever did (Fish and Wildlife Service, 1988). Birds only occur very rarely between April and May and August through September during migrational flights. Mud flats, sand bars, and wet open fields on or near the Missouri River floodplain may be utilized during this period for rest and foraging. The primary cause for

Piping Plover decline is habitat destruction, predation, and human disturbance.

Indiana bat

The federally-listed endangered Indiana bat may also occur near these two sites. Indiana bats spend the winter hibernating in caves in the Ozarks. During April and May, females migrate north and establish small maternity colonies in suitable sites within wooded riparian areas, floodplain forests, or upland woodlots. Maternity roost sites tend to be in dead or dying trees greater than 9 inches in diameter at breast height and with loose or exfoliating bark. Trees most likely to have loose or exfoliating bark are dead oaks, hickories, elms, green and white ash, silver maple, and eastern cottonwood, or living shagbark hickory. Preferred roost sites are located in forest openings, at the forest edge, or where tree canopy is sparse, and within 1 km (0.6 mi.) of water where they forage on flying insects. Indiana bats continue to decline in parts of its range, including Missouri. Reasons for decline are habitat disturbance/destruction, deforestation, stream channelization, and pesticides.

Finally, both the sturgeon chub (*Macrhybopsis gelida*) and sicklefin chub (*M. meeki*) have been proposed as Candidates for listing and occur in the Mississippi and Missouri Rivers. To date, they have no protection under the Endangered Species Act, and are provided here for your information only. Both the sicklefin and the sturgeon chub are close associates, occupying the open channels of swift, large, turbid rivers over sand and fine gravel. Neither species have ever been abundant in the Missouri River but are more common in the lower 300 miles of the river.

Former Hulett Lagoon

No federally-listed threatened or endangered species occur directly on this site, however, Bald Eagles do winter at the Lake of the Ozarks. Please see our comments above regarding habitat and life history traits of wintering Bald Eagles.

Highway AF Wells

The federally-listed endangered Indiana bat has been documented at Meramec State Park. The three creeks listed are not within the same watershed as the Meramec, however, during the summer roosting period, Indiana bats may utilize habitats along each creek as they migrate north. See our comments above regarding Indiana bat habitat and life history traits.

The federally-listed endangered gray bat *(Myotis grisescens)* also has been documented in cave habitats at Meramec State Park. The gray bat occupies a limited geographic range in limestone karst areas of the southeastern United States, including Missouri. With rare exception, the gray bat roosts in caves year-round. In winter, most gray bats hibernate in vertical (pit) caves with cool, stable temperatures below 10 degrees Celsius. Summer caves, especially those used by maternity colonies, are nearly always located within a kilometer (0.6 mile) of rivers or reservoirs over which bats feed. The summer caves are warm with dome ceilings that trap body heat. Most gray bats migrate seasonally between hibernating and maternity caves, and both types of caves are located in Missouri. Gray bats are active at night, foraging for insects

over water or along shorelines, and they need a corridor of forest riparian cover between roosting caves and foraging areas. They can travel as much as 20 kilometers (12 miles) from their roost caves to forage.

We are concerned about the water quality of Spring Creek, Winsel Creek, and the Bourbouse River due to the presence of many mussel "species of concern". The sheepnose (*Plethobasus cyphyus*), snuffbox (*Plagiola triquetra*), and scaleshell (*Leptodea leptodon*) all occur in the Bourbeuse river near the Highway AF Wells. Mussels are extremely sensitive to pollutants and heavy metals, including pesticides, runoff from agricultural fields, livestock wastes, mine tailings, industrial pollutants, and heavy organic loads from sewage. Again, each of these mussel species currently have no protection under that Endangered Species Act and they are provided here for your information.

If you have not already done so, please contact the Missouri Department of Conservation regarding Missouri species of conservation concern (Planning Division, P.O. Box 180, Jefferson City, Missouri 65102).

Wetlands

Because your letter did not identify the specific site locations, we can only comment on wetlands in general. There are numerous small farm impoundments within the sections identified in your letter. Though these may have wetland characteristics, the Service is primarily concerned with naturally occurring wetlands. Most wetland habitat near these sites can be found along streams and within the floodplains of major rivers. The Service's National Wetland Inventory (NWI) maps are available for all of Missouri and may help you identify wetlands and other aquatic habitats near each site. NWI maps for approximately the northern two-thirds of Missouri are available free of charge in digital form over the Internet at: *http://www.nwi.fws.gov*. You can also order paper NWI maps through the U.S. Geological Survey's Earth Science Information Center (ESIC). For information and NWI map availability, call ESIC's toll free number 1-800-USA-MAPS. Orders and payment for NWI maps in Missouri should be sent to:

USGS/ESIC
Mid Continent Mapping Center
1400 Independence Road, Mail Stop 231
Rolla, Missouri 65401
(573) 308-3500

Thank you for contacting the Service for the opportunity to review this project. Please contact Ms. Kelly Srigley Werner of my staff at (573) 876-1911 ext. 112 if you have further questions or need additional assistance.

Sincerely,

Rick L. Hauser

for R. Mark Wilson
Field Supervisor

Former Hulett Lagoon Site
Combined PA/SI
Reference 60

WELCOME!
MABLE/Geocorr Geographic Correspondence Engine
Version 3.01

[OSEDA Mirror] | [SEDAC Mirror] | [CENSUS Mirror]

This application allows you to access the MABLE geographic data base and to generate custom "correlation lists" as reports and/or files.

Help | Examples | Usage Notes
Output Samples | New in V3 | Articles | Future

This form has 5 main sections. Only the first 2 are required.
Input | Output | Point & Distance | Bounding Box | Geographic Filter

Note: In most of the select-list boxes below you can make multiple selections. Some browsers require that you hold down the ctrl key while clicking before it will recognize multiple selections.

• Input Options

Select state(s) to process. (Limit of 5 states on weekdays, 7 AM - 6 PM)
(Required Option)

Random Pick
ALABAMA
ALASKA
ARIZONA
ARKANSAS
CALIFORNIA
COLORADO
CONNECTICUT
DELAWARE

For background information and help with any of the geographic codes used in the MABLE database (source/target geocodes) consult the file:
• MAGGOT •
(Master Area Geographic Glossary Of Terms)

Select "SOURCE" Geocode(s)	Select "TARGET" Geocode(s)

Entire Universe [no code] --- State (1990) County (1990) County Subdivision: MCD (1990) Place: City, Town, Village, etc. (1990) Census Tract/BNA (1990) Census Block Group (1990) Census Block (1990) (+) 5-digit Postal ZIP Code (circa 7/1991) --- Concentric Ring Pseudo-Geocode (*) Hydrologic Unit Code: HUC (***) --- Urban-Rural Portion (1990) Metro Area: MSA or CMSA (1990) Primary MSA: PMSA (1990) Urbanized Area: UA (1991) Congressional District: 102nd (1990) Congressional District: 103rd (1992) PUMA: Code A, 5% Sample (PUMS 1990)	Entire Universe [no code] --- State (1990) County (1990) County Subdivision: MCD (1990) Place: City, Town, Village, etc. (1990) Census Tract/BNA (1990) Census Block Group (1990) Census Block (1990) (+) 5-digit Postal ZIP Code (circa 7/1991) --- Concentric Ring Pseudo-Geocode (*) Hydrologic Unit Code: HUC (***) --- Urban-Rural Portion (1990) Metro Area: MSA or CMSA (1990) Primary MSA: PMSA (1990) Urbanized Area: UA (1991) Congressional District: 102nd (1990) Congressional District: 103rd (1992) PUMA: Code A, 5% Sample (PUMS 1990)

Notes:

+ If you chose census block then you may not choose more than 5 states.

* If you chose "Concentric Ring Pseudo-Geocode" from either list (above) then you **must** specify the "Point and Distance" **or** "Ring Geocode" options below.

** The 95 MSA and PMSA codes are not available in New England. NECMA95 codes are available *only* for New England.

*** Hydrologic Unit Codes are normally 8 digits, but you can specify keeping only the first 2, 4 or 6 (region, subregion and accounting units). These codes not available for Alaska and Hawaii.

- **Digits of Hydrological Unit Codes to keep:** ○ 2 ○ 4 ○ 6 ◉ 8

Weighting Variable:

Specify the weighting variable to use for determining the portion of the source geocodes corresponding to the target geocodes:

Population (1990 census)
Land Area (square km)
Housing Units (1990 census)

☐ Ignore Census Blocks with a value of 0 for the weighting variable.

Output Options

☐ Have weighted centroids calculated and kept on the output file(s)	☐ Generate 2nd allocation factor (AFACT2): portion of *target* geocodes in *source* geocodes	☑ Sort by target geocodes, then source geocodes (default is by source, then target)

You have your choice of 2 output formats: a comma-separated-value (".csv") file **and/or** a report format (".lst") file. For each file you can specify whether you want just the geographic codes, or the codes *and* the names associated with them (where applicable), or just the names.

Comma Separated Value File	Listing File
☑ Generate a CSV file	☑ Generate a listing file
Just Codes (No Names) Codes and Names Just Names (No Codes)	Just Codes (No Names) Codes and Names Just Names (No Codes)
☐ Use tabs (not commas) as delimiter	

- Process time for large areas may be several minutes.

Reset Defaults | Run Request

...following options further limit criteria set above

Point-and-Distance Options

Specify a point (location) and distance to be used as filter:

Value for radius of Circle **or** radius of largest Ring: 4 (In miles, unless you check ☐ here to specify kilometers.)

(See just below for links to help find coordinates.)

Coordinates of Point: 38.01143 degrees latitude, 92.75471 degrees longitude.

Label of Point: (optional)

Define Ring criteria specifying only one of the following two options:

Either: # of equi-distant rings (integer value between 1 and 10). Radius specified above will be divided by this to derive width of each Ring.

Or: Specify your own custom list of up to 10 ring radii values in ascending order (values must be greater than zero, may be fractional, and largest should equal the radius of the Circle specified above):

#1 0.25 #2 0.5 #3 1 #4 2 #5 3
#6 4 #7 #8 #9 #10

Links are provided here to facilitate obtaining coordinates for your location. See the HELP file

for more detailed information.

- The ETAK Eagle geocoder site lets you enter a street address or street intersection. It displays the coordinates as well as a long list of geographic codes (and will also draw you a map of the area about the point.)
- To get the coordinates of any ZIP code or city use Chris Stuber's Gazetteer
- To view the region of interest try his Tiger Map Server page.
- An alternate site for street addresses or street intersections is the Yahoo Map Server (but you'll need to see the help to find lat-long coordinates).
- View county names on state level maps, check the Census Bureau's Map Stats

Note: If you specify a lat-long location the variable "distance" will be added to your output. This requires that weighted centroids also be calculated (set automatically). The "distance" variable will be between the weighted centroid and the specified Point. If you specify Ring Pseudo-Geocodes then distance and weighted centroid values will *not* be calculated or stored (because weighted centroids of donuts are misleading).

Bounding Box Filter Option

If you want to limit processing to blocks with center points that fall in a specified rectangular area you can enter the coordinates for such a "bounding box" next.

Define the "bounding box" coordinates in decimal degrees:

	Northern-most Latitude		Southern-most Latitude
	Western-most Longitude		Eastern-most Longitude

- Process time for large areas may be several minutes.

Reset Defaults | Run Request

***NOTE:** The rest of this form allows you to specify options that will limit the geographic universe to be processed. If you just want to process the entire state(s) that you have selected then you can ignore the rest of this form and submit your request now.*

Geographic Filtering Options

You can specify any or all of 3 types of geography to limit the universe to be processed. You may, for example, only want to see a file with geography for a set of counties, or for a specific metro area (or areas), or possibly for a city (place). You can do so by entering the appropriate FIPS (Federal Information Processing Standard) codes in the text entry boxes that follow. If you need to "look up" the codes you can click on the links to the code-list files in each section.

By default, if you specify more than one kind of geography here then the application assumes that you want to "and" the selections, keeping only areas that satisfy all criteria. For example, if you specified three counties and a metro area, you would only get data based on blocks that were in **both** the counties and the metro area (i.e. the intersection of the selected areas.) To override this default and

choose geographies that satisfy *any* (rather than *all*) of your select criteria -- CLICK HERE:

All selections made below are in addition to the state-level or distance-based filtering which you specified above

County codes . Enter 5-digit FIPS county codes with leading zeroes separated by blanks. You may enter 3-digit codes if you selected only one state. Your output will be limited to the counties specified.
Examples:

- 29189 29510 17163 17119 (selects 4 counties in 2 states)
- 005 017 049 (selects 3 counties from the single state selected)

Metro Area codes. Enter 4-digit FIPS metro area codes with leading zeroes separated by blanks. MSA, CMSA and PMSA codes may be used (4-digit only). The 1990 definitions will be used. Your output will be limited to the metro areas specified. New England NECMA codes can **not** be used.
Examples:

- 3760 1602 (Selects Kansas City MSA and Chicago CMSA)

Place codes. Enter 7-digit FIPS place codes with leading zeroes separated by blanks. You can enter 5-digit codes if only one state has been selected. Your output will be limited to the official city limits of these cities as of the 1990 census.
Examples:

- 70520 70545 70550 53780 06020
  (Saginaw City, Saginaw Township North and South, Midland, Bay City, MI)

- Process time for large areas may be several minutes.

Reset Defaults | Run Request

| Top | SEDAC | UMSL UIC | FTP Archive | DDViewer | Credits | Comments and Suggestions |

Last Update: 09-22-98

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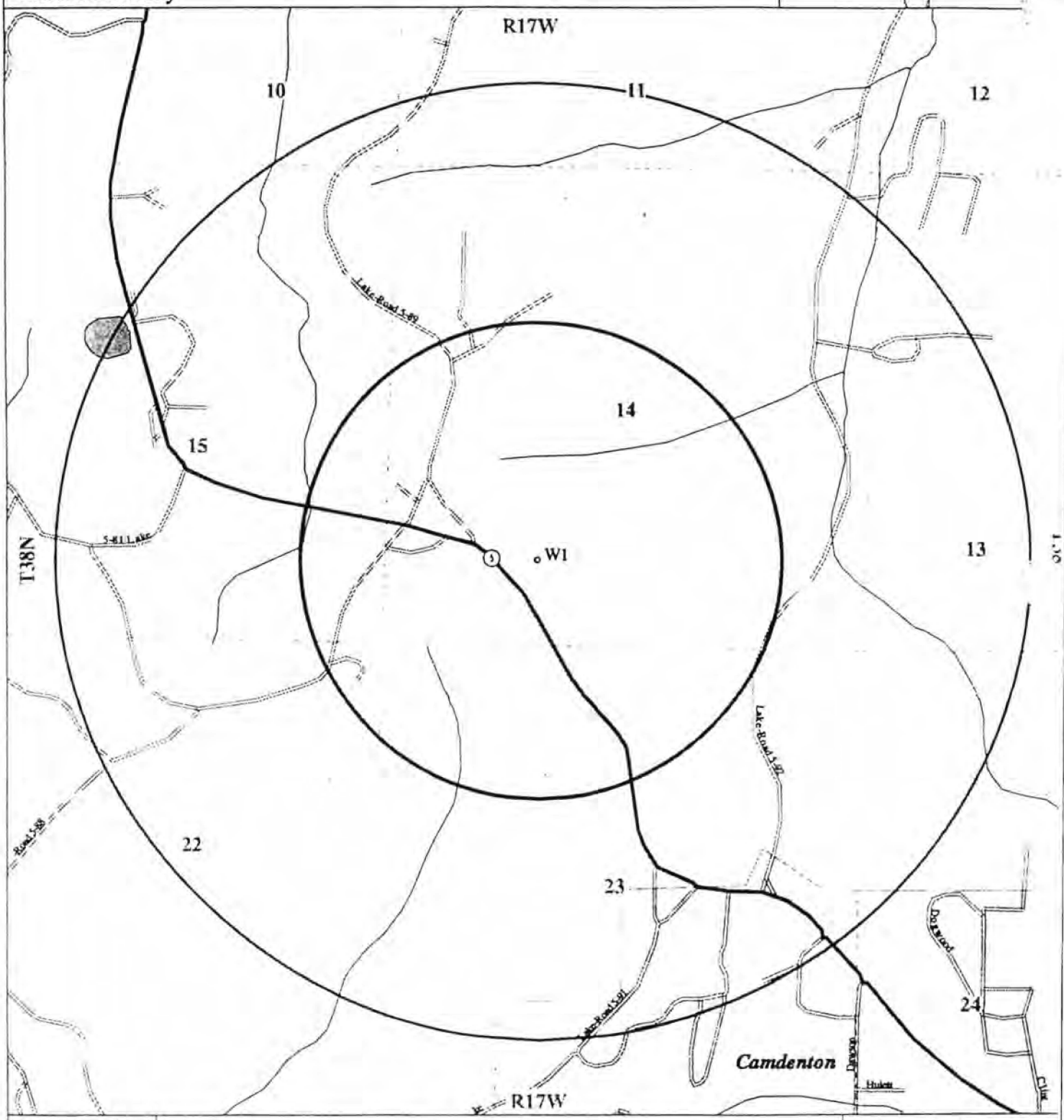
geocorr3 3.03 Rev. 99/01/15 / Process: 23822 (OSEDA/UIC, U. of Missouri) - Run 0
Listing of Geographic Correlations

COUNTY	TRACT	RING	POP	AFACT
29029	9505.00	0.25	180	0.053
		0.50	696	0.204
29029	9504.00	1.00	0	0.000
29029	9505.00	1.00	1267	0.371
29029	9504.00	2.00	117	0.167
29029	9505.00	2.00	983	0.288
29029	9508.00	2.00	0	0.000
29029	9503.00	3.00	83	0.311
29029	9504.00	3.00	134	0.191
29029	9505.00	3.00	283	0.083
29029	9506.00	3.00	198	0.391
29029	9508.00	3.00	582	0.561
29029	9503.00	4.00	184	0.689
29029	9504.00	4.00	451	0.642
29029	9505.00	4.00	6	0.002
29029	9506.00	4.00	308	0.609
29029	9508.00	4.00	456	0.439

Windsor Estates Nursing Home
3069006
1 well, 0 contaminant sites, 0 dealerships
Camden County

Former Hulett Lagoon Site
Combined PA/SI
Reference 61



Prepared by
CARES
University of Missouri – Columbia

- Wellhead
- Contaminant Site
- Dealership
- One Mile Buffer
- Half Mile Buffer
- Highway
- Street or Road
- Stream
- U.S. Land Survey
- County Boundary
- Incorporated Area
- Water Body

This map is subject to change as additional information is acquired.
Production Date: October 02, 1996

0 3000
feet

N

Missouri Department of Natural Resou
Division of Environmental Quality
Public Drinking Water Program

Windsor Estates Nursing Home
3069006
1 well

*Temporary DGLS well number. The correct well number is requested.

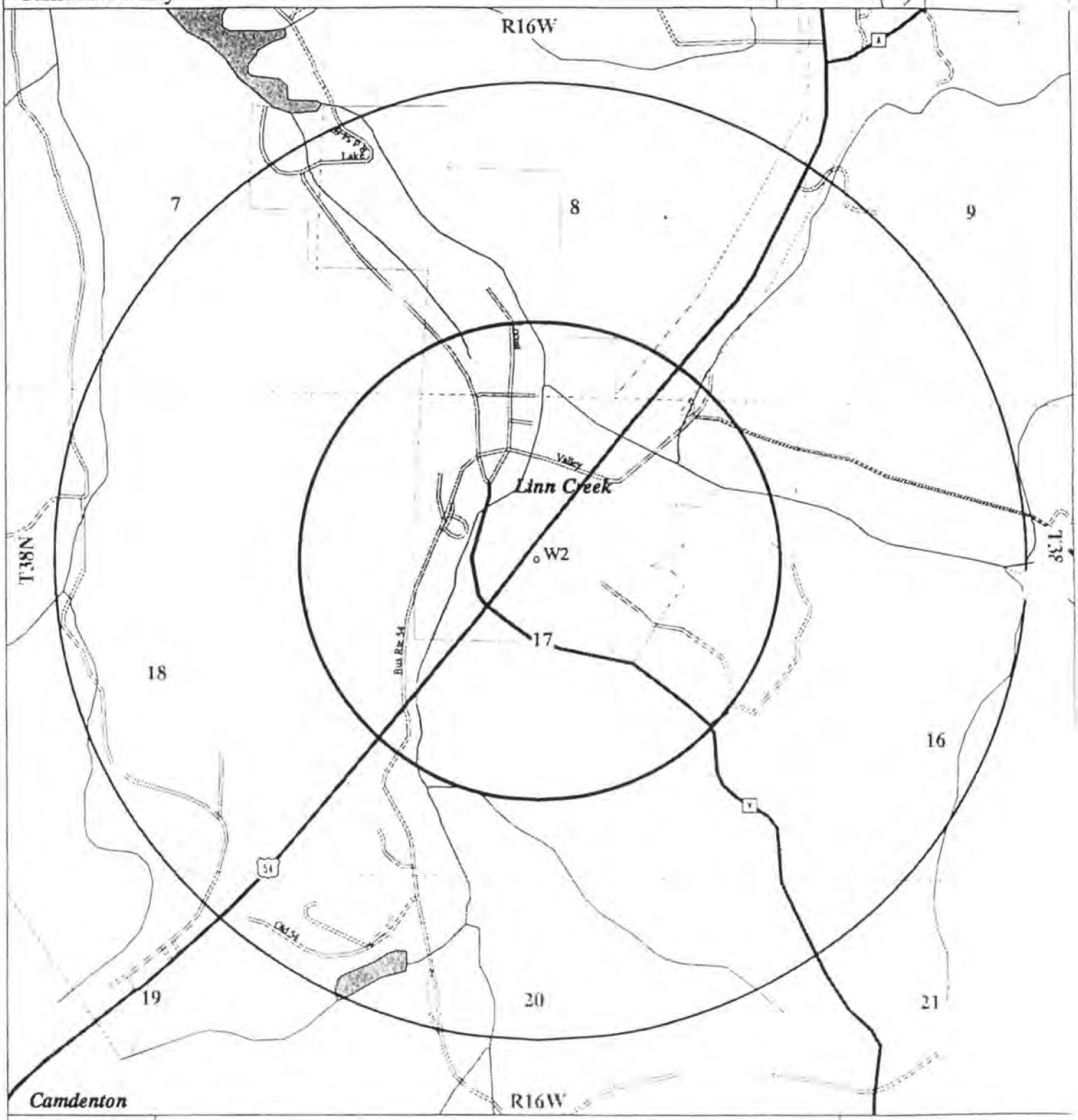
The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired. Source: Missouri Department of Natural Resources, Public Drinking Water Program. Production Date: October 02, 1996

Well Number	W1
Extended PWS #	3069006101.
Local Well Name	
DGLS Well #	40392*
Latitude	38 1 42.1 N
Longitude	92 46 4.6 W
USGS 7.5 Quadrangle	Green Bay Terrace
County	Camden
DNR Region	Jefferson City
Date Drilled	1969
Material (C/U)	Consolidated
Total Depth (ft)	600.000
Casing Depth (ft)	400.0
Casing Size (in)	6.
Casing Type	
Screen Length (ft)	
Screen Size (in)	
Static Water Level (ft)	165.0
Well Yield (gpm)	
Draw Down Level	
Determination Date	
Yielding Strata	
Pump Type	
Pump Level (ft)	
Capacity (gpm)	
Pump Meter (Y/N)	
Standby Power (Y/N)	
Date Abandoned	
Date Plugged	
VOC detections (Y/N)	N
Nitrate–N Level (mg/l)	N
Chlorination (Y/N)	N
Filtration (Y/N)	N
GWUDISW (Y/N)	
State Approved (Y/N)	

Linn Creek
3010471
1 well, 0 contaminant sites, 0 dealerships

Camden County

Former Hulett Lagoon Site
Combined PA/SI
Reference 62



Prepared by

CARES
University of Missouri – Columbia

- Wellhead
- Contaminant Site
- Dealership
- One Mile Buffer
- Half Mile Buffer
- Highway
- Street or Road
- Stream
- U.S. Land Survey
- County Boundary
- Incorporated Area
- Water Body

This map is subject to change as additional information is acquired.
Production Date: October 02, 1996

0 3000
feet

N

Missouri Department of Natural Resources

Division of Environmental Quality
Public Drinking Water Program

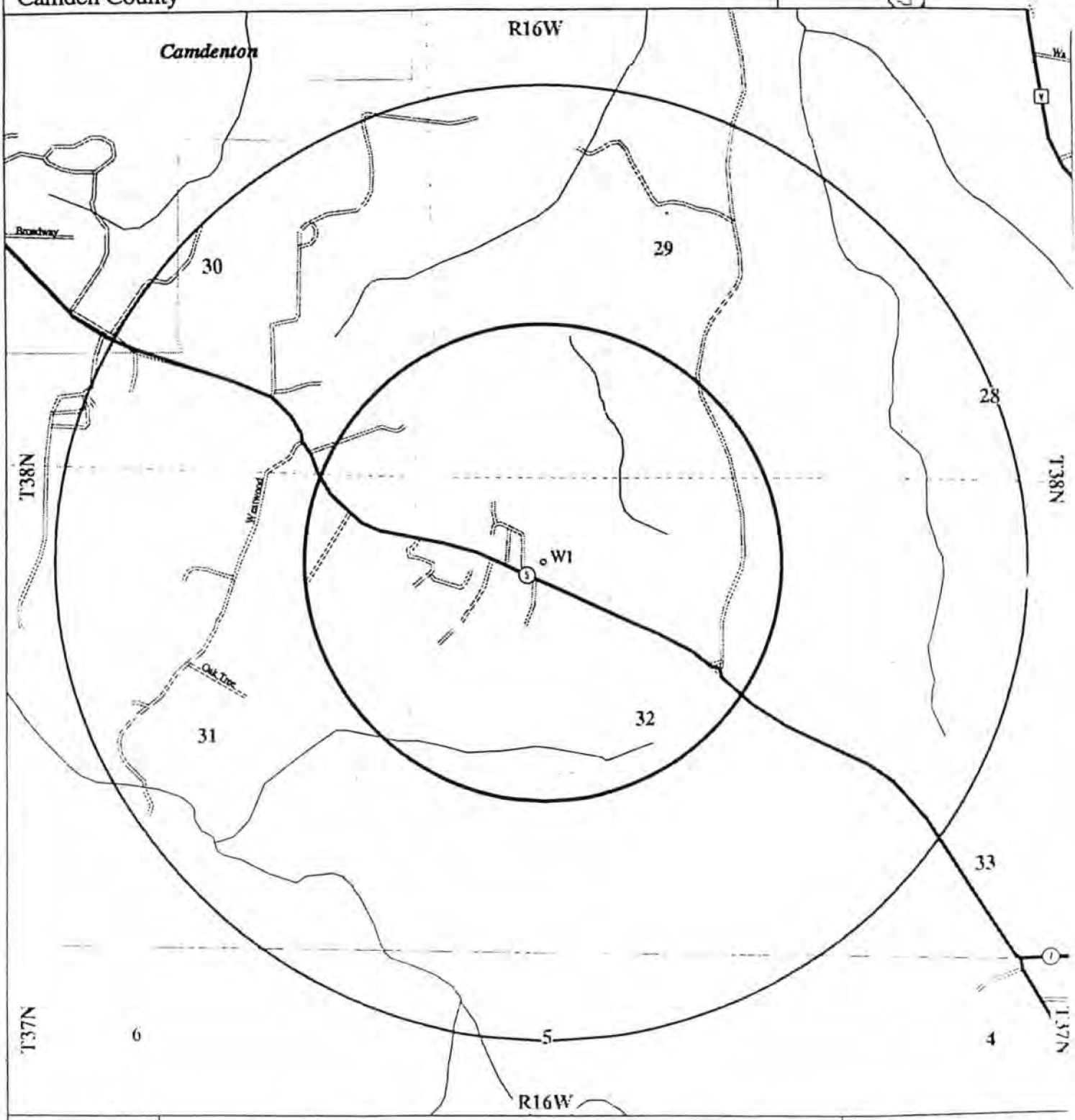
Linn Creek
3010471
1 well

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired. Source: Missouri Department of Natural Resources, Public Drinking Water Program.
Production Date: October 02, 1996

Well Number	W2
Extended PWS #	3010471102.
Local Well Name	Well #2
DGLS Well #	28620
Latitude	38 2 3.7 N
Longitude	92 42 36.2 W
USGS 7.5 Quadrangle	Camdenton
County	Camden
DNR Region	Jefferson City
Date Drilled	1984
Material (C/U)	Consolidated
Total Depth (ft)	860.000
Casing Depth (ft)	528.0
Casing Size (in)	6.
Casing Type	Steel
Screen Length (ft)	
Screen Size (in)	
Static Water Level (ft)	104.0
Well Yield (gpm)	70
Draw Down Level	125.0
Determination Date	1983
Yielding Strata	
Pump Type	
Pump Level (ft)	294
Capacity (gpm)	10
Pump Meter (Y/N)	
Standby Power (Y/N)	N
Date Abandoned	
Date Plugged	
VOC detections (Y/N)	Y
Nitrate–N Level (mg/l)	N
Chlorination (Y/N)	N
Filtration (Y/N)	N
GWUDISW (Y/N)	
State Approved (Y/N)	

Southway Terrace MHP
3048141
1 well, 0 contaminant sites, 0 dealerships
Camden County

Former Hulett Lagoon Site
Combined PA/SI
Reference 63



Prepared by

CARES
University of Missouri – Columbia

- Wellhead
- Contaminant Site
- Dealership
- One Mile Buffer
- Half Mile Buffer
- Highway
- Street or Road
- Stream
- U.S. Land Survey
- County Boundary
- Incorporated Area
- Water Body

This map is subject to change as additional information is acquired.
Production Date: October 02, 1996

0 3000
feet

N

Missouri Department of Natural Resou

Division of Environmental Quality
Public Drinking Water Program

Southway Terrace MHP
3048141
1 well

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired. Source: Missouri Department of Natural Resources, Public Drinking Water Program. Production Date: October 02, 1996

Well Number	W1
Extended PWS #	3048141101
Local Well Name	
DGLS Well #	26629
Latitude	37 59 35.2 N
Longitude	92 42 56.5 W
USGS 7.5 Quadrangle	Decaturville
County	Camden
DNR Region	Jefferson City
Date Drilled	1970
Material (C/U)	Consolidated
Total Depth (ft)	550.000
Casing Depth (ft)	350.0
Casing Size (in)	6.
Casing Type	Steel
Screen Length (ft)	
Screen Size (in)	
Static Water Level (ft)	175.0
Well Yield (gpm)	
Draw Down Level	
Determination Date	
Yielding Strata	
Pump Type	Submersible
Pump Level (ft)	
Capacity (gpm)	
Pump Meter (Y/N)	
Standby Power (Y/N)	
Date Abandoned	
Date Plugged	
VOC detections (Y/N)	N
Nitrate–N Level (mg/l)	N
Chlorination (Y/N)	N
Filtration (Y/N)	N
GWUDISW (Y/N)	N
State Approved (Y/N)	Y

APPENDIX E

SAMPLE PERMIT APPLICATION FORM

Note: Please read all attached instructions prior to completing this application.

SECTION A - GENERAL INFORMATION

1. Facility Name: MODINE HEAT TRANSFER, INC.

   a. Operator Name: MODINE MANUFACTURING COMPANY

   b. Is the operator identified in 1.a., the owner of the facility?
   Yes [X] No [ ]

   If no, provide the name and address of the operator and submit a copy of the contract and/or other documents indicating the operator's scope of responsibility for the facility. _____

2. Facility Address:
   Street: SUNSET DRIVE
   City: CAMDENTON State: MO Zip: 65020

3. Business Mailing Address:
   Street or P.O. Box: P.O. BOX 636
   City: CAMDENTON State: MO Zip: 65020

4. Designated signatory authority of the facility:
   [Attach similar information for each authorized representative]

   Name: GAYLORD OLSON
   Title: PLANT MANAGER
   Address: P.O. BOX 636
   City: CAMDENTON State: MO Zip: 65020
   Phone #: 314-346-5693

5. Designated facility contact:

   Name: DONAVON MANS
   Title: PLANT ENGINEER
   Phone #: 314-346-5696

SECTION B - BUSINESS ACTIVITY

1. If your facility employs or will be employing processes in any of the industrial categories or business activities listed below (regardless of whether they generate wastewater, waste sludge, or hazardous wastes), place a check beside the category of business activity (check all that apply).

Industrial Categories*

[X] Aluminum Forming
[ ] Asbestos Manufacturing
[ ] Battery Manufacturing
[ ] Can Making
[ ] Carbon Black
[ ] Coal Mining
[ ] Coil Coating
[X] Copper Forming
[ ] Electric and Electronic Components Manufacturing
[ ] Electroplating
[ ] Feedlots
[ ] Fertilizer Manufacturing
[ ] Foundries (Metal Molding and Casting)
[ ] Glass Manufacturing
[ ] Grain Mills
[ ] Inorganic Chemicals
[X] Iron and Steel
[ ] Leather Tanning and Finishing
[X] Metal Finishing
[X] Nonferrous Metals Forming
[ ] Nonferrous Metals Manufacturing
[ ] Organic Chemicals Manufacturing
[ ] Paint and Ink Formulating
[ ] Paving and Roofing Manufacturing
[ ] Pesticides Manufacturing
[ ] Petroleum Refining
[ ] Pharmaceutical
[ ] Plastic and Synthetic Materials Manufacturing
[ ] Plastics Processing Manufacturing
[ ] Porcelain Enamel
[ ] Pulp, Paper, and Fiberboard Manufacturing
[ ] Rubber
[ ] Soap and Detergent Manufacturing
[ ] Steam Electric
[ ] Sugar Processing
[ ] Textile Mills
[ ] Timber Products

NOTE: Although we do several of the above operations, it has been determined that we are required to operate under the Metal Finishing EPA catagorical standards. All chemical wastewaters are a result of chemical cleaning and etching of aluminum and copper material.

A facility with processes inclusive in these business areas may be covered by Environmental Protection Agency's (EPA) categorical pretreatment standards. These facilities are termed "categorical users".

2. Give a brief description of all operations at this facility including primary products or services (attach additional sheets if necessary):
Modine Heat Transfer, Inc. manufacturers fin-and-tube coils, and feeder parts for original equipment manufacturers of heating, air conditioning and refrigeration equipment.

3. Indicate applicable Standard Industrial Classification (SIC) for all processes (If more than one applies, list in descending order of importance.):

a. 3585
b.
c.
d.
e.

4. PRODUCT VOLUME:

PRODUCT (Brandname) (levels with others (and no u.l)	PAST CALENDAR YEAR Amounts Per Day (Daily Units)		ESTIMATE THIS CALENDAR YEAR Amounts Per Day (Daily Units)	
	Average	Maximum	Average	Maximum
COILS	750	1000	1000	1500

SECTION C - WATER SUPPLY

1. Water Sources: (Check as many as are applicable)

[ ] Private Well
[ ] Surface Water
[X] Municipal Water Utility (Specify City): CAMDENTON, MO.
[ ] Other (Specify): _____

2. Name on the water bill: MODINE HEAT TRANSFER, INC.

Name: MODINE HEAT TRANSFER, INC.
Street: SUNSET DRIVE
City: CAMDENTON State: MO Zip: 65020

3. Water service account number: Meter # 2-166

4. List average water usage on premises:
[New facilities may estimate]

Type	Average Water Usage (GPD)	Indicate Estimated (E) or Measured (M)
a. Contact cooling water	1902	(E)
b. Non-contact cooling water	2451	(E)
c. Boiler feed	7	(M)
d. Process	5612	(E)
e. Sanitary	1747	(E)
f. Air pollution control	93	(E)
g. Contained in product		
h. Plant and equipment washdown		
i. Irrigation and lawn watering	565	(E)
j. Other		
PRETREATMENT REAGENT DILUTION	544	(E)
k. TOTAL OF A-J	12921	(E)

SECTION D - SEWER INFORMATION

1. a. For an existing business:

Is the building presently connected to the public sanitary sewer system?

[X] Yes: Sanitary sewer account number Based On Meter # 2-166

[ ] No: Have you applied for a sanitary sewer hookup? [ ] Yes [ ] No

b. For a new business:

(i). Will you be occupying an existing vacant building (such as in an industrial park)? [ ] Yes [ ] No

(ii). Have you applied for a building permit if a new facility will be constructed? [ ] Yes [ ] No

(iii). Will you be connected to the public sanitary sewer system? [ ] Yes [ ] No

2. List size, descriptive location, and flow of each facility sewer which connects to the City's sewer system. (If more than three, attach additional information on another sheet.)

	Sewer Size	Descriptive Location of Sewer Connection or Discharge Point	Average Flow (GPD)
SW1	6"	Manhole in front of maint Plant entrance.	4374
PW9	6"	Manhole in front of Main entrance	13597
SW2	6"	Connected to line East of plant	4374

NOTE: 8747 GPD sanitary water estimated in Section C4e is divided evenly for the two sanitary waste lines.

SECTION E - WASTEWATER DISCHARGE INFORMATION

1. Does (or will) this facility discharge any wastewater other than from restrooms to the City sewer?

   [X] Yes If the answer to this question is "yes", complete the remainder of the application.

   [ ] No If the answer to this question is "no", skip to Section I.

2. Provide the following information on wastewater flow rate. [New facilities may estimate]

   a. Hours/Day Discharged (e.g., 8 hours/day):

   M 17 T 17 W 17 TH 17 F 17 SAT 8½ SUN 0

   b. Hours of Discharge (e.g., 9 a.m. to 5 p.m.):

   M 7-12 T 7-12 W 7-12 TH 7-12 F 7-12 SAT 7-3:30 SUN ____

   c. Peak hourly flow rate (GPD) NA

   d. Maximum daily flow rate (GPD) 18653 *

   e. Annual daily average (GPD) 3788

3. If batch discharge occurs or will occur, indicate: [New facilities may estimate]

   a. Number of batch discharges _____ per day

   b. Average discharge per batch _____ (GPD)

   c. Time of batch discharges _____ at _____
   (days of week) (hours of day)

   d. Flow rate _____ gallons/minute

   e. Percent of total discharge _____

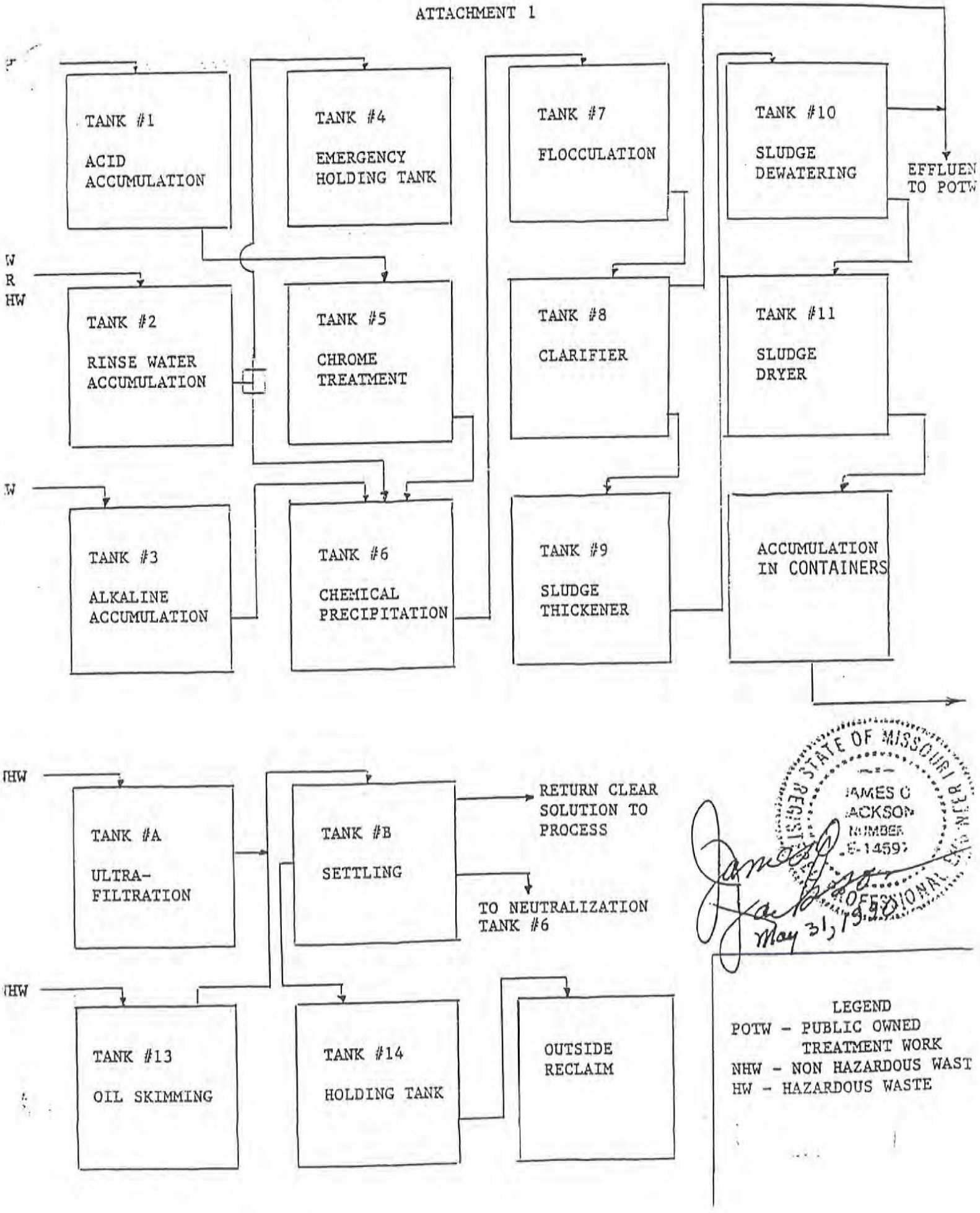
* One day maximum flow rate taken from daily flow in pretreatment operating log and estimated sanitary.

4. Schematic Flow Diagram - For each major activity in which wastewater is or will be generated, draw a diagram of the flow of materials, products, water, and wastewater from the start of the activity to its completion, showing all unit processes. Indicate which processes use water and which generate wastestreams. Include the average daily volume and maximum daily volume of each wastestream [new facilities may estimate]. If estimates are used for flow data this must be indicated. Number each unit process having wastewater discharges to the community sewer. Use these numbers when showing this unit processes in the building layout in Section H. This drawing must be certified by a State Registered Professional Engineer.

See Attachment 1

PRETREATMENT PERMIT APPLICATION

ATTACHMENT 1



Facilities that checked activities in question 1 of Section B are considered Categorical Industrial Users and should skip to question 6.

5. For Non-Categorical Users Only: List average wastewater discharge, maximum discharge, and type of discharge (batch, continuous, or both), for each plant process. Include the reference number from the process schematic that corresponds to each process. [New facilities should provide estimates for each discharge].

No.	Process Description	Average Flow (GPD)	Maximum Flow (GPD)	Type of Discharge (batch,continuous,none)

ANSWER QUESTIONS 6 & 7 ONLY IF YOU ARE SUBJECT TO CATEGORICAL PRETREATMENT STANDARDS

6. For Categorical Users: Provide the wastewater discharge flows for each of your processes or proposed processes. Include the reference number from the process schematic that corresponds to each process. [New facilities should provide estimates for each discharge].

No.	Regualted Process	Average Flow (GPD)	Maximum Flow (GPD)	Type of Discharge (batch,continuous,none)
1	Aluminum Cleaning Line	400	2,880	Intermittent
2	Copper Cleaning Line	1,849	5,270	Intermittent

No.	Unregulated Process	Average Flow (GPD)	Maximum Flow (GPD)	Type of Discharge (batch,continuous,none)
3	Long Coil Cleaning Line	520	7,200	Intermittent

No.	Dilution	Average Flow (GPD)	Maximum Flow (GPD)	Type of Discharge (batch,continuous,none)

7. For Categorical Users Subject To Total Toxic Organic (TTO) Requirements:

Provide the following (TTO) information.

a. Does (or will) this facility use any of the toxic organics that are listed under the TTO standard of the applicable categorical pretreatment standards published by EPA?

[X] Yes
[ ] No

b. Has a baseline monitoring report (BMR) been submitted which contains TTO information?

[X] Yes
[ ] No

c. Has a toxic organics management plan (TOMP) been developed?

[ ] Yes, (Please attach a copy)
[X] No

8. Do you have, or plan to have, automatic sampling equipment or continuous wastewater flow metering equipment at this facility?

Current:	Flow Metering	[X] Yes	[ ] No	[ ] N/A
	Sampling Equipment	[X] Yes	[ ] No	[ ] N/A
Planned:	Flow Metering	[ ] Yes	[ ] No	[ ] N/A
	Sampling Equipment	[ ] Yes	[ ] No	[ ] N/A

If so, please indicate the present or future location of this equipment on the sewer schematic and describe the equipment below:

Flowmetering - Red Lion Control No. IMP 23101
STI Sensor No. 303-5

Sampling equipment. DMP - Supplied with system - 24 hr. composite

9. Are any process changes or expansions planned during the next three years that could alter wastewater volumes or characteristics? Consider production processes as well as air or water pollution treatment processes that may affect the discharge.

[X] Yes
[ ] No, (skip question 10)

10. Briefly describe these changes and their effects on the wastewater volume and characteristics: (Attach additional sheets if needed.)
Volume and toxicity will continue to be reduced by waste minimization and water conservation programs.
1.) Eliminate or reduce use of contact cooling water.
2.) Modifications to copper cleaning line will increase volume with no change to characteristics.

11. Are any materials or water reclamation systems in use or planned?

[ ] Yes
[X] No, (skip question 12)

12. Briefly describe recovery process, substance recovered, percent recovered, and the concentration in the spent solution. Submit a flow diagram for each process: (Attach additional sheets if needed.)

SECTION F - CHARACTERISTICS OF DISCHARGE

All current industrial users are required to submit monitoring data on all pollutants that are regulated specific to each process. Use the tables provided in this section to report the analytical results. **DO NOT LEAVE BLANKS.** For all other (nonregulated) pollutants, indicate whether the pollutant is known to be present (P), suspected to be present (S), or known not to be present (O), by placing the appropriate letter in the column for average reported values. Indicate on either the top of each table, or on a separate sheet, if necessary, the sample location and type of analysis used. Be sure methods conform to 40 CFR Part 136; if they do not, indicate what method was used.

New dischargers should use the table to indicate what pollutants will be present or are suspected to be present in proposed wastestreams by placing a P (expected to be present), S (may be present), or O (will not be present) under the average reported values.

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	Acenaphthene								
B	Acrolein								
B	Acrylonitrile								
B	Benzene								
B	Benzidine								
B	Carbon tetrachloride								
B	Chlorobenzene								
B	1,2,4-Trichlorobenzene								
B	Hexachlorobenzene								
B	1,2-Dichloroethane								
P	1,1,1-Trichloroethane				89.25		2	ppb	
B	Hexachloroethane								
B	1,1-Dichloroethane								
B	1,1,2-Trichloroethane								
B	1,1,2,2-Tetrachloroethane								
B	Chloroethane								
B	Bis(2-chloroethyl) ether								
B	17 Bis (chloro methyl) ether								
B	2-Chloroethyl vinyl ether								
B	2-Chloronaphthalene								
B	2,4,6-Trichlorophenol								
B	Parachlorometa cresol								
B	Chloroform								
B	2-Chlorophenol								
B	1,2-Dichlorobenzene								
B	1,3-Dichlorobenzene								
B	1,4-Dichlorobenzene								
B	3,3-Dichlorobenzidine								
B	1,1-Dichloroethylene								
B	1,2-Trans-dichloroethylene								
B	2,4-Dichlorophenol								
B	1,2-Dichloropropane								
B	1,2-Dichloropropylene								
B	1,3-Dichloropropylene								

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	2,4-Dimethylphenol								
B	2,4-Dinitrotoluene								
B	2,6-Dinitrotoluene								
B	1,2-Diphenylhydrazine								
B	Ethylbenzene								
B	Fluoranthene								
B	4-Chlorophenyl phenyl ether								
B	4-Bromophenyl phenyl ether								
B	Bis(2-chlorisopropyl) ether								
B	Bis(2-chloroethoxy) methane								
P	Methylene chloride				31.4		2	ppb	
B	Methyl chloride								
B	Methyl bromide								
B	Bromoform								
B	Dichlorobromomethane								
B	Chlorodibromomethane								
B	Hexachlorobutadiene								
B	Hexachlorocyclopentadiene								
B	Isophorone								
B	Naphthalene								
B	Nitrobenzene								
B	Nitrophenol								
B	2-Nitrophenol								
B	4-Nitrophenol								
B	2,4-Dinitrophenol								
B	4,6-Dinitro-o-cresol								
B	N-nitrosodimethylamine								
B	N-nitrosodiphenylamine								
B	N-nitrosodi-n-propylamine								
B	Pentachlorophenol								
B	Phenol								
B	Bis(2-ethylhexyl) phthalate								
B	Butyl benzyl phthalate								
B	Di-n-butyl phthalate								

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	Di-n-octyl phthalate								
B	Diethyl phthalate								
B	Dimethyl phthalate								
B	Benzo(a)anthracene								
B	Benzo(a)pyrene								
B	3,4-benzofluoranthene								
B	Benzo(k) fluoranthane								
B	Chrysene								
B	Acenaphthylene								
B	Anthracene								
B	Benzo(ghi)perylene								
B	Fluorene								
B	Phenanthrene								
B	Dibenzo(a,h)anthracene								
B	Indeno(1,2,3-cd)pyrene								
B	Pyrene								
B	Tetrachloroethylene								
S	Toluene								
B	Trichloroethylene								
B	Vinyl chloride								
B	Aldrin								
B	Dieldrin								
B	Chlordane								
B	4,4'-DDT								
B	4,4'-DDE								
B	4,4'-DDD								
B	Alpha-endosulfan								
B	Beta-endosulfan								
B	Endosulfan sulfate								
B	Endrin								
B	Endrin aldehyde								
B	Heptachlor								

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	Heptachlor epoxide								
B	Alpha-BHC								
B	Beta-BHC								
B	Gamma-BHC								
B	Delta-BHC								
B	PCB-1242								
B	PCB-1254								
B	PCB-1221								
B	PCB-1232								
B	PCB-1248								
B	PCB-1260								
B	PCB-1016								
B	Toxaphene								
B	(TCDD)								
B	Asbestos								
B	Acidity								
B	Alkalinity								
B	Bacteria								
B	BOD_5								
B	COD								
S	Chloride								
B	Chlorine								
S	Flouride								
B	Hardness								
B	Magnesium								
B	NH_3-N								
P	Oil and Grease				15.7		2	mg/l	
P	TSS				46.5		2	mg/l	
B	TOC								
B	Kjeldahl N								
B	Nitrate N								
B	Nitrite N								
B	Organic N								
S	Orthophosphate P								
S	Phosphorous								

	Pollutant	Detection Level Used	Maximum Daily Value		Average of Analyses		Number of Analyses	Units	
			Conc.	Mass	Conc.	Mass		Conc.	Mass
B	Sodium								
B	Specific Conductivity								
S	Sulfate (SO_4)								
S	Sulfide (S)								
S	Sulfite (SO_3)								
B	Antimony								
B	Arsenic								
B	Barium								
B	Beryllium								
P	Cadmium	.05			<.05		2	mg/1	
P	Chromium	.02			.10		12	mg/1	
P	Copper	.01			.38		12	mg/1	
P	Cyanide	.01			<.01		12	mg/1	
P	Lead	.1			<.1		2	mg/1	
B	Mercury								
P	Nickel	.01			<.10		2	mg/1	
B	Selenium								
P	Silver	.01			<.10		2	mg/1	
B	Thallium								
P	Zinc	NK			.645		2	mg/1	

SECTION G - TREATMENT

1. Is any form of wastewater treatment (see list below) practiced at this facility?

   [X] Yes
   [ ] No

2. Is any form of wastewater treatment (or changes to a existing wastewater treatment) planned for this facility within the next three years?

   [ ] Yes, describe: _____
   [X] No

3. Treatment devices or processes used or proposed for treating wastewater or sludge (check as many as appropriate).

   [ ] Air flotation
   [ ] Centrifuge
   [X] Chemical precipitation (Tank 6)
   [ ] Chlorination
   [ ] Cyclone
   [X] Filtration (Tank 10)
   [ ] Flow equalization
   [X] Grease or oil separation, type: Gravity (Tank B)
   [ ] Grease trap
   [ ] Grinding filter
   [ ] Grit removal
   [ ] Ion exchange
   [X] Neutralization, pH correction (Tank 6)
   [ ] Ozonation
   [ ] Reverse osmosis
   [ ] Screen
   [X] Sedimentation (Tank 7, 8, & 9)
   [ ] Septic tank
   [ ] Solvent separation
   [X] Spill protection
   [ ] Sump
   [ ] Biological treatment, type: _____
   [ ] Rainwater diversion or storage
   [X] Other chemical treatment, type: Chrome Reduction (Tank 5)
   [ ] Other physical treatment, type: _____
   [ ] Other, type: _____

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 6 is a Fiberglass tank. The maximum capacity is 734 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year.

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
None

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 10 is a Carbon Steel Tank. The maximum capacity is 22 gallons.
The design capacity is 60 gpm., with a flow rate of 1382620 gallons/year.
(See Attachment 1, Tank 10)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank B is a Polyethylene tank with a liner. The maximum capacity is 612 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons/year. (See Attachment 1, Tank B)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 5 is a Fiberglass tank. The maximum capacity is 734 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year. (See Attachment 1, Tank 5)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 7 is a Fiberglass tank. The maximum capacity is 264 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year.
(See Attachment 1 Tank 7)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 8 is a Carbon Steel Tank. The maximum capacity is 1080 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year. (See Attachment 1, Tank 8)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

4. Description

Describe the pollutant loadings, flow rates, design capacity, physical size, and operating procedures of each treatment facility checked above.
Tank 9 is a Fiberglass tank. The maximum capacity is 1269 gallons. The design capacity is 60 gpm., with a flow rate of 1382620 gallons per year. (See Attachment 1, Tank 9)

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and by-product volumes, and design and operating conditions.
See Attachment 5

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the sanitary sewer. Please include estimated completion dates.
NONE

7. Do you have a treatment operator? [X] Yes [ ] No

(if Yes,) Name: Dale Bland
Title: Maintenance A

Phone: 314-346-5693

Full time: 7:00 a.m. to 3:30 p.m. (specify hours)

Part time: _____ (specify hours)

8. Do you have a manual on the correct operation of your treatment equipment?
[X] Yes [ ] No

9. Do you have a written maintenance schedule for your treatment equipment?
[X] Yes [ ] No

SECTION H - FACILITY OPERATIONAL CHARACTERISTICS

1. Shift Information

Work Days		[X] Mon.	[X] Tues.	[X] Wed.	[X] Thur.	[X] Fri.	[ ] Sat.	[ ] Sun.
Shifts per work day:		2	2	2	2	2		
Empl's per shift:	1st	130	130	130	130	130		
	2nd	55	55	55	55	55		
	3rd	0	0	0	0	0		
Shift start and end times:	1st	7:30 to 3:30	7:30 to 3:30	7:30 to 3:30	7:30 to 3:30	7:30 to 3:30		
	2nd	3:30 to 12:00	3:30 to 12:00	3:30 to 12:00	3:30 to 12:00	3:30 to 12:00		
	3rd							

2. Indicate whether the business activity is:

[X] Continuous through the year, or
[ ] Seasonal - Circle the months of the year during which the business activity occurs:

J F M A M J J A S O N D

COMMENTS: _____

3. Indicate whether the facility discharge is:

[X] Continuous through the year, or
[ ] Seasonal - Circle the months of the year during which the business activity occurs:

J F M A M J J A S O N D

COMMENTS: _____

4. Does operation shut down for vacation, maintenance, or other reasons?

[ ] Yes, indicate reasons and period when shutdown occurs:

[X] No

5. List types and amounts (mass or volume per day) of raw materials used or planned for use (attach list if needed):

Copper Tubing	(2,000,000 lbs annual)	8333/day
Aluminum	(1,000,000 lbs annual)	4167/day
Galvanized Steel	(300,000 lbs annual)	1250/day

6. List types and quantity of chemicals used or planned for use (attach list if needed). Include copies of Manufacturer's Safety Data Sheets (if available) for all chemicals identified:

Chemical	Quantity
See Chemical List - Attachment 2	

7. Building Layout - Draw to scale the location of each building on the premises. Show map orientation and location of all water meters, storm drains, numbered unit processes (from schematic flow diagram), public sewers, and each facility sewer line connected to the public sewers. Number each sewer and show existing and proposed sampling locations. This drawing must be certified by a State Registered Professional Engineer.

   A blueprint or drawing of the facilities showing the above items may be attached in lieu of submitting a drawing on this sheet.

See Attachment 3

SECTION I - SPILL PREVENTION

1. Do you have chemical storage containers, bins, or ponds at your facility? [X] Yes [ ] No

   If yes, please give a description of their location, contents, size, type, and frequency and method of cleaning. Also indicate in a diagram or comment on the proximity of these containers to a sewer or storm drain. Indicate if buried metal containers have cathodic protection.
   See Attachment 6

2. Do you have floor drains in your manufacturing or chemical storage area(s)? [X] Yes [ ] No If yes; Where do they discharge to?
   Waste Water Treatment System

3. If you have chemical storage containers, bins, or ponds in manufacturing area, could an accidental spill lead to a discharge to: (check all that apply).

   [X] an onsite disposal system
   [ ] public sanitary sewer system (e.g. through a floor drain)
   [ ] storm drain
   [X] to ground
   [ ] other, specify:
   [ ] not applicable, no possible discharge to any of the above routes

4. Do you have an accidental spill prevention plan (ASPP) to prevent spills of chemicals or slug discharges from entering the Control Authority's collection systems?

   [X] Yes - **[Please enclose a copy with the application]** See Attachment 4
   [ ] No
   [ ] N/A, Not applicable since there are no floor drains and/or the facility discharge(s) only domestic wastes.

5. Please describe below any previous spill events and remedial measures taken to prevent their reoccurrence.

SECTION K - AUTHORIZED SIGNATURES

Compliance certification:

1. Are all applicable Federal, State, or local pretreatment standards and requirements being met on a consistent basis?

   Yes [X] No [ ] Not yet discharging [ ]

2. <u>If No:</u>

   a. What additional operations and maintenance procedures are being considered to bring the facility into compliance? Also, list additional treatment technology or practice being considered in order to bring the facility into compliance.

   b. Provide a schedule for bringing the facility into compliance. Specify major events planned along with reasonable completion dates. Note that if the Control Authority issues a permit to the applicant, it may establish a schedule for compliance different from the one submitted by the facility.

Milestone Activity	Completion Date

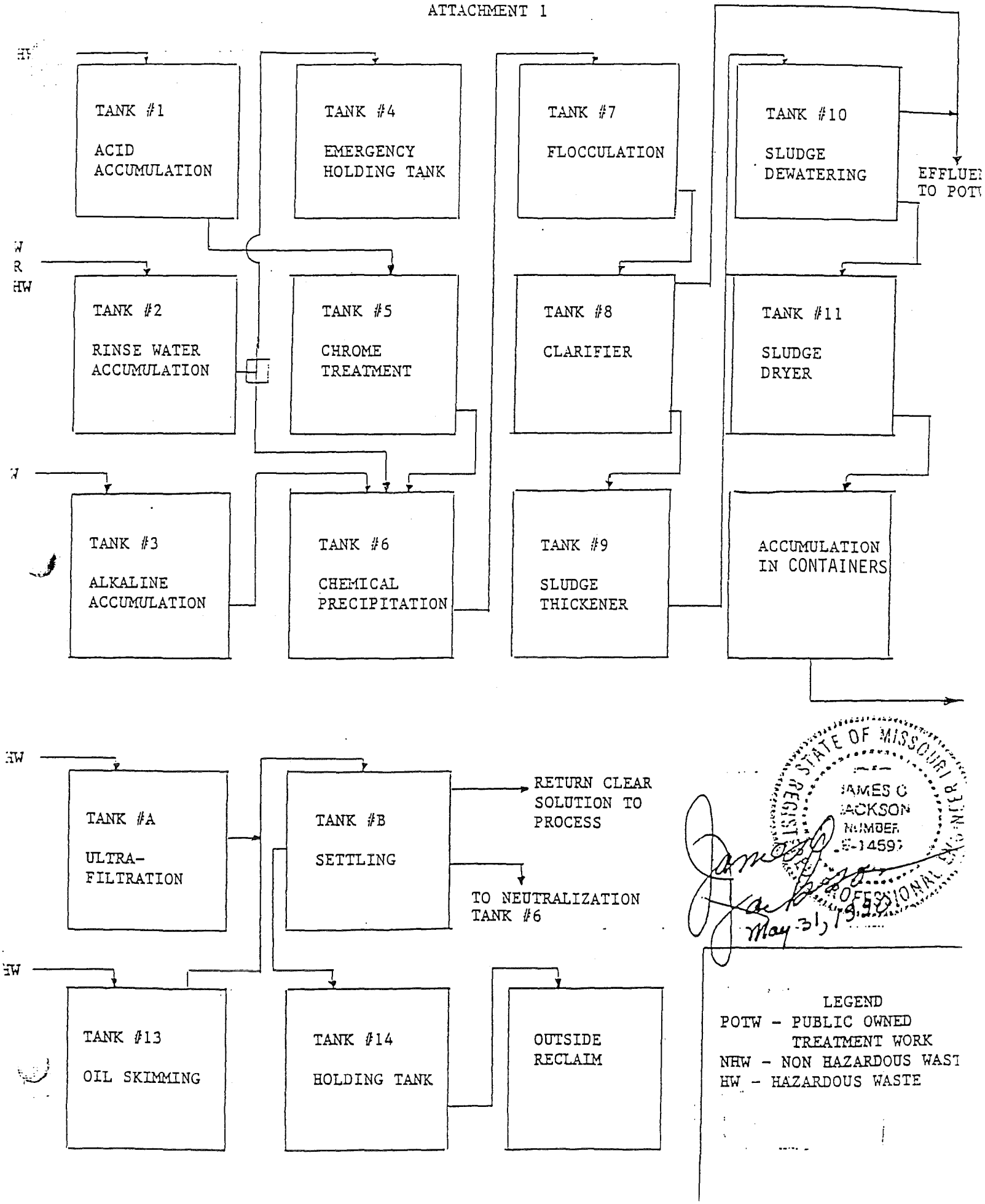
Authorized Representative Statement:

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.

Gaylord S. Olson	Plant Manager	
Name(s)	Title	
Gaylord S. Olson	9/28/95	314-346-5693
Signature	Date	Phone

PRETREATMENT PERMIT APPLICATION

ATTACHMENT 1



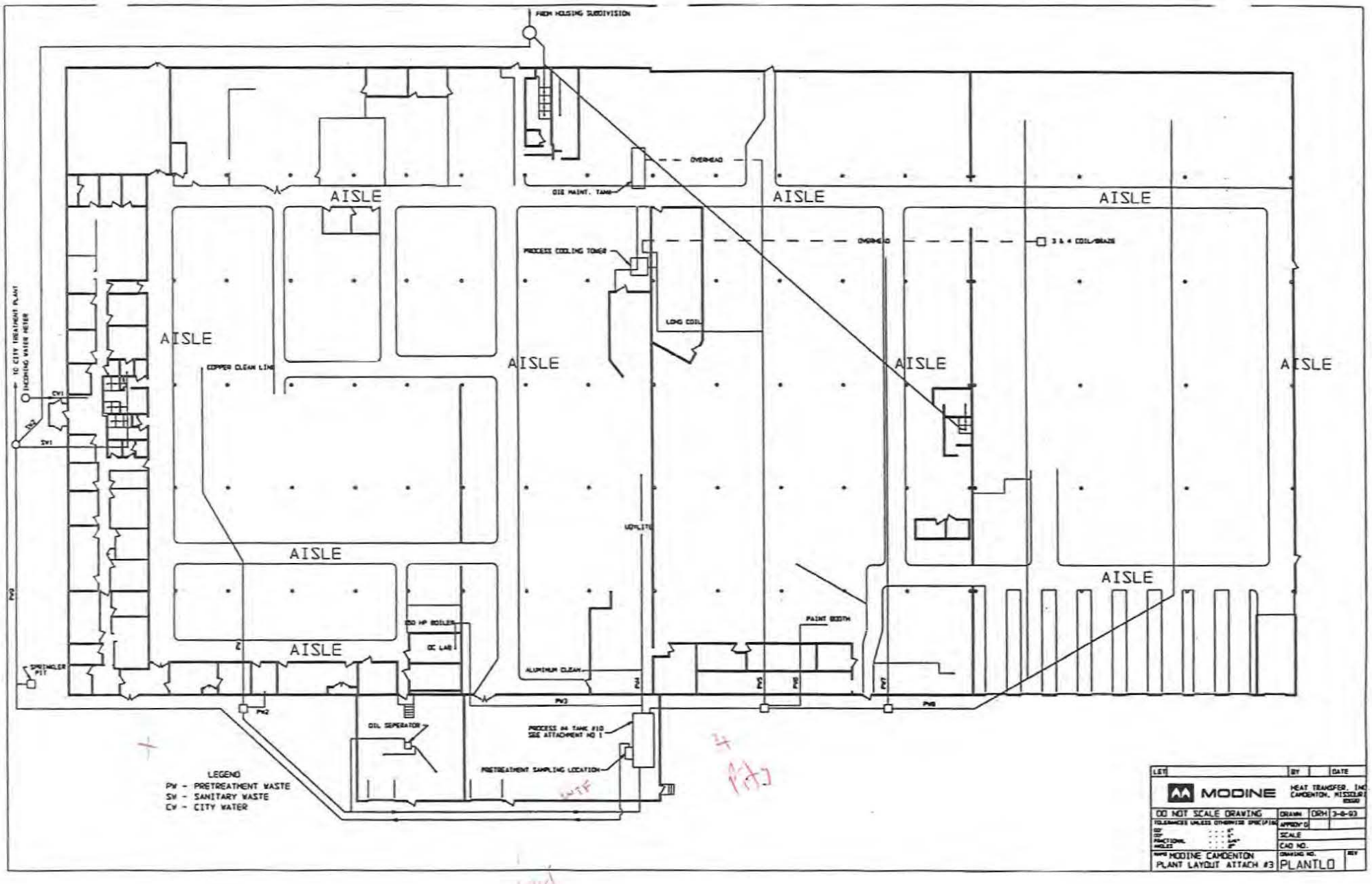
TTY94 MAINTENANCE STORES CODE NUMBER REPORT 09/28/95
FOR CHEMICALS USED IN 1994 16:52.09

CODE NUMBER	DESCRIPTION	PART NUMBER	ISSUE QUANTITY	UOM
700005	PROPANE		48,422	GAL
700010	FREON BULK	R-22	3,666	LB
700050	FREON 30LB BOTTLE	R-500	12	LB
700111	1 1 1-TRICHLOROETHANE		49,750	LB
700112	1 1 1-TRICHLOROETHANE		288	LB
700510	THINNER ACETONE		6	GAL
700515	THINNER PAINT XYLENE		4	DRM
700607	OIL HI VIS ADDITIVE 55GAL	A-1453	23	GAL
700608	OIL MOTOR MM	10W	3	EA
700705	SODIUM SULFIDE FLAKE 400#	TECH. NICK.	830	LB
701005	CLEANER ALKALINE	RIDOLINE 27	325	LB
701055	ACID MURIATIC 20 BE	HCL	1	DRM
701060	ACID SULFURIC LIQUID 66BE	H2SO4 REGULAR	8,991	LB
701075	ACID CITRIC		500	LB
701086	PAINT BLACK (345 TOTE)	5372	17,645	GAL
701088	PAINT BLK, WATER/RED, S/G	5441 ENAMEL	-110	GAL
701095	ACID MURIATIC INHIB. 5GAL	CL-631	4	GAL
701100	SOLVENT ISOPARAFFINIC	SOLTROL 170	648	GAL
701105	OIL MAGNUS 150 (5GAL)	ISO VG32	23	DRM
701110	CLEANER ALKALINE 475 LBS	RIDOLINE 53	8,550	LB
701120	ACID NITRIC (55GAL)	H2N03	12	DRM
701124	FLOCULANT 465LB PR DRUM	9137A	275	LB
701145	SODIUM HYDROXIDE LIQUID	NAOH RAYON	10,004	LB
701160	FLUX TORCH BRAZING 5GAL	#33	17	DRM
701165	ACID CLEANER COPPER	CU-BRITE 1143	4	DRM
701193	FREON 100LB DRUM	42F1830/R11	100	LBS
701256	FLUX GAS (5 GAL)	TYPE W	33	DRM
701288	OIL 300 VIS FIN STAMPING	T1288	152	GAL
701730	OIL MAGNUS MAG 465 55GAL	ISO VG 100	55	GAL
701750	OIL HYDRAULIC (MAG 315)	ISO 68	1,617	GAL
701826	TREATMENT H20 CLARIFYING	50232	525	LBS
701836	OIL MAGNUS HYD	A-ISO-46	225	GAL
701837	FLUID H/D SYN. PUNCHING	LM58080	2	GAL
701930	OIL MOTOR AP 1 SC	SAE-30	418	QT
701980	OIL GEAR	90WT	55	GAL
702010	OIL GEAR PHILUBE (5GAL)	SMP SAE 85W-140	2	DRM
702050	OIL RECLAIMED PROCESS		330	GAL
702051	OIL RECLAIMED FIN	T-1287	2,442	GAL
702090	OIL WAYTAC 220	220	70	GAL
702091	OIL MOTOR TYPE MM	SAE 40	15	QT
702095	OIL MOTOR TYPE MM	SAE 30	4	EA
702100	OIL MOTOR	20W-20	2	QT
702505	AUTO TRANSMISSION FLUID	ATF	13	GA
702525	OIL WAYTAC 68	VACTRA #2	55	GAL
703120	SODIUM BISULFITE		920	LB
703185	OIL (54 GAL DRUM)	CINDOL 3102	864	GAL
703190	OIL VANISHING	CINDOL 3411	62	GAL
704351	INHIBITER CORROSION (C.T.	CW4351	530	LB
705535	SOLVENT FLORINATED	GENESOLV 5535	4,432	LB

CCITY94 MAINTENANCE STORES CODE NUMBER REPORT 09/28/95
FOR CHEMICALS USED IN 1994 11:05.35

CODE NUMBER	DESCRIPTION	PART NUMBER	ISSUE QUANTITY	UOM
700005	PROPANE		131,770	GAL
700010	FREON BULK	R-22	27,086	LB
700111	1,1,1-TRICHLOROETHANE		49,840	LB
700113	METHYLENE CHLORIDE	1021712/1040003	30,367	LB
701090	OIL FIN STAMPING	T-1094	1,391	GAL
702020	OIL FIN	T1287	2,769	GAL

Attachment 3



Camdenton Treatment Plant Lagoon
Camdenton, Missouri
Pre-CERCLA Screening
Camdenton, 1981

City of Camdenton

112 Court Circle P.O. Box 399
Camdenton, Mo. 65020
314 346 3600

SEP 3 1981

August 28, 1981

Mr. Frank J. Dolan
Environmental Engineer
Missouri Department of Natural Resources
P.O. Box 1368
2010 Missouri Blvd.
Jefferson City, MO. 65102

Re: Camdenton Pretreatment

Dear Mr. Dolan:

The City of Camdenton is hereby requesting the approval of its Pretreatment Program. As suspected, there is not a serious problem with the effluent discharge to the POTW by the various businesses and industries. The Pretreatment Questionnaire indicated that only one industry will require the issuance of a permit to discharge into the POTW.

The following information is furnished as attachments:

Attachment 1, Statement of General Information

Attachment 2, Statement Concerning the Pretreatment Program

Attachment 3, Copy of Ordinance 838-1, Providing for the Establishment of Pretreatment Regulations

Attachment 4, Camdenton Pretreatment Questionnaire Review

Attachment 5, Copy of the Pretreatment Questionnaire

Attachment 6, Copy of the Completed Questionnaire From Sundstrand.

Thank you for your assistance with this matter. If you need assistance please feel free to call Mr. Bud Riley, City Administrator, at 346-3600 or Mr. Jim Jackson, Consulting Engineer, at 346-5662.

Sincerely,

Mac Webster

Mac Webster
Mayor, Camdenton, MO.

MW/is
cc: Krehbiel Engineering, Inc.

MODINE9756

STATEMENT OF GENERAL INFORMATION

The pretreatment questionnaire was sent to twenty three businesses in Camdenton. The completed questionnaire was returned by thirteen businesses, a 56.5% return rate. Of the thirteen returns received 3 or 27.3% are not hooked on to the POTW. Only one return indicated a discharge that would require pretreatment.

Sundstrand Tubular Products, Inc., Box 636, Camdenton, MO., 65020 has a discharge of the following pollutants to the POTW:

1. Copper at 4.72 lbs/day
2. Emulsified oils at 18.88 lbs/day
3. Chrome at 0.04 lbs/day

A copy of the reply from Sundstrand is attached.

The results of the Pretreatment Questionnaire indicates that Camdenton does not have a serious Pretreatment problem. Sundstrand has identified the various types of pollutants released to the POTW and have an active program to prevent damage to the POTW. As indicated in the Questinnaire, the company disposes of several types of materials by use of independent, private operators. The plant will be subject to metal finishing point source catagory pretreatment standards.

As required by the General Pretreatment Regulations for existing and new sources of Pollution, 403.9, the following specific information is furnished:

1. A statement from the City Administrator certifying that the POTW has the authority to carry out the Pretreatment Program is attached.

2. A copy of the Camdenton Pretreatment Ordinance is attached.

3. The Pretreatment Program will be administered by the City Administrator, as spelled out in the Pretreatment Ordinance.

4. The requirements for this program are small and the implementation of the program will be handled by the City Administrator on a part time basis.

5. Sampling requirements are contained in the Ordinance. It is not economically feasible for the city to purchase the equipment to conduct these samples. Therefore, it is recommended that the City use an independent laboratory when they

require samples. Also, the Ordinance requires the industry issued a permit to perform self sampling and furnish the results to the City. The City has the right to observe the sampling and the City can require the industry to perform some sampling for the City.

6. The Ordinance enacted by Camdenton to control the effluent discharged to the POTW by an industry gives Camdenton the authority to enforce the Pretreatment Standards as outlined in the Ordinance. The Ordinance contains at least the following minimum requirements concerning the Pretreatment Standards:

a. The condition of new or increased contributions of pollutants, denial of request to increase flow and changes in the nature of pollutants is outlined in the Ordinance and is a function of the City Administrator to approve or disapprove.

b. The industries are required to comply with all EPA and/or State Pretreatment Standards as well as the standards esttablished in the permit issued by the City.

c. The contribution to the POTW by the Industrial User is controlled by a permit as issued under the Ordinance.

d. The Ordinance requires the Industrial User to develop a compliance schedule and the submission of all self-monitoring reports to the City.

e. The City is empowered to carry out all inspections, surveillance, and monitoring proceedures necessary to determine the compliance or noncompliance of the Industrial User with the Pretreatment Standards.

f. The Ordinance contains penalties for noncompliance.

STATEMENT CONCERNING THE PRETREATMENT PROGRAM

I certify that I have been designated by the City of Camdenton to act as the administrator of the Pretreatment Program. I further certify that the following statements concerning the City and the Pretreatment Program are true:

1. The City of Camdenton is a legal entity, recognized by the State of Missouri, and that the POTW operated by the City of Camdenton has the authority to establish the Pretreatment Ordinance and to enforce the requirements of the Ordinance.

2. The Ordinance establishes the requirement for all industrial users of the POTW to apply for and be issued a permit to discharge to the POTW.

3. The Ordinance established the requirement for self monitoring by the industry and as required monitoring by the City to insure compliance with the Pretreatment Ordinance. Specific steps are spelled out in the Ordinance concerning the action to be taken if an industry is found to be in noncompliance.

Warren W. Riley, Jr.
City Administrator

BILL NO. 839-81 ORDINANCE NO. 838-81

AN ORDINANCE PROVIDING FOR THE ESTABLISHMENT OF PRETREATMENT REGULATIONS

BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF CAMDENTON, MISSOURI, AS FOLLOWS:

SECTION 1 GENERAL PROVISIONS

1.1 Purpose and Policy

This ordinance sets forth uniform requirements for direct and indirect contributors into the wastewater collection and treatment system for the City of Camdenton and enables the City to comply with all applicable State and Federal laws required by the Clean Water Act of 1977 and the General Pretreatment Regulations (40 CFR, Part 403).

The objectives of this ordinance are:

(a) To prevent the introduction of pollutants into the municipality wastewater system which will interfere with the operation of the system or contaminate the resulting sludge;

(b) To prevent the introduction of pollutants into the municipal wastewater system which will pass through the system, inadequately treated, into receiving waters or the atmosphere or otherwise be imcompatible with the system;

(c) To improve the opportunity to recycle and reclaim wastewaters and sludges from the system; and

(d) To provide for equitable distribution of the cost of the municipal wastewater system.

This ordinance provides for the regulation of direct and indirect contributors to the municipal wastewater system through the issuance of permits to certain non-domestic users and through enforcement of general requirements for the other users, authorizes monitoring and enforcement activities, requires user reporting, assumes that existing customer's capacity will not be pre-empted, and provides for the setting of fees for the equitable distribution of costs resulting from the program established herein.

This ordinance shall apply to the City of Camdenton and to persons outside the City who are, by contract or agreement with the City, users of the City Public Owned Treatment Works (POTW). Except as otherwise provided herein, the City Administrator of Camdenton shall administer, implement, and enforce the provisions of this ordinance.

1.2 Definitions

Unless the context specifically indicates otherwise, the following terms and phrases, as used in this ordinance, shall have the meanings hereinafter designated:

(1) Act or "the Act". The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. 1251, et. seq.

(2) Approval Authority. The Director in an NPDES state with an approve State Pretreatment Program and the Administrator of the EPA in a non-NPDES state or NPDES state without an Approved State Pretreatme Program.

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(3) Authorized Representative of Industrial User. An authorized representative of an Industrial User may be: (1) A principal executive officer of at least the level of vice-president, if the Industrial User is a corporation; (2) A general partner or proprietor if the industrial user is a partnership or proprietorship, respectively; (3) A duly authorized representative of the individual designated above if such representative is responsible for the overall operation of the facilities from which the indirect discharge originates.

(4) Biochemical Oxygen Demand (BOD). The quantity of oxygen utilized in the biochemical oxidation of the organic matter under standard laboratory procedure, five (5) days at 20° centigrade expressed in terms of weight and concentration (milligrams per liter (mg/l)).

(5) Building Sewer. A sewer conveying wastewater from the premises of a User to the POTW.

(6) Categorical Standards. National Categorical Pretreatment Standards or Pretreatment Standard.

(7) City. The City of Camdenton or the City Council of Camdenton.

(8) Cooling Water. The water discharged from any use such as air conditioning, cooling or refrigeration, or to which the only pollutant added is heat.

(9) Control Authority. The term "control authority" shall refer to the "Approval Authority", defined hereinabove; or the City Administrator if the City has an approved Pretreatment Program under the provision of 40 CFR, 403.11.

(10) Direct Discharge. The discharge of treated or untreated wastewater directly to the waters of the State of Missouri.

(11) Environmental Protection Agency, or EPA. The U.S. Environmental Protection Agency, or where appropriate the term may also be used as a designation for the Administrator or other duly authorized official of said agency.

(12) Grab Sample. A sample which is taken from a waste stream on a one-time basis with no regard to the flow in the waste stream and without consideration of time.

(13) Holding tank waste. Any waste from holding tanks such as vessels, chemical toilets, campers, trailers, septic tanks, and vacuum-pump tank trucks.

(14) Indirect Discharge. The discharge or the introduction of nondomestic pollutants from any source regulated under section 307(b) or (c) of the Act, (33 U.S.C. 1317), into the POTW (including holding tank waste discharged into the system).

(15) Industrial User. A source of Indirect Discharge which does not constitute a "Discharge of pollutants" under regulations issued

pursuant to section 402, of the Act. (33 U.S.C. 1342).

(16) Interference. The inhibition or disruption of the POTW treatment processes or operations which contributes to a violation of any requirement of the City's NPDES Permit. The term includes prevention of sewage sludge use or disposal by the POTW in accordance with 405 of the Act, (33 U.S.C. 1345) or any criteria, guidelines, or regulations developed pursuant to the Solid Waste Disposal Act (SWDA), the Clean Air Act, the Toxic Substances Control Act, or more stringent state criteria (including those contained in any State sludge management plan prepared pursuant to Title IV of SWDA) applicable to the method of disposal or use employed by the POTW.

(17) National Categorical Pretreatment Standard or Pretreatment Standard. Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with section 307(b) and (c) of the Act (33 U.S.C. 1347) which applies to a specific category of Industrial Users.

(18) National Prohibitive Discharge Standard or Prohibitive Discharge Standard. Any regulation developed under the authority of 307(b) of the Act and 40 CFR, Section 403.5.

(19) New Source. Any source, the construction of which is commenced after the publication of proposed regulations prescribing a section 307(c) (33 U.S.C. 1317) Categorical Pretreatment Standard which will be applicable to such source, if such standard is thereafter promulaged within 120 days of proposal in the Federal Register. Where the standard is promulaged later than 120 days after proposal, a new source means any source, the construction of which is commenced after the date of promulgation of the standard.

(20) National Pollution Discharge Elimination System or NPDES Permit. A permit issued pursuant to section 402 of the Act (33 U.S.C. 1342).

(21) Person. Any individual, partnership, copartnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine, the singular shall include the plural where indicated by the context.

(22) pH. The logarithm (base 10) of the reciprocal of the concentration of hydrogen ions expressed in grams per liter of solution.

(23) Pollution. The man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

(24) Pollutant. An dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

(25) Pretreatment or Treatment. The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater to a less harmful state prior to or in lieu of discharging or otherwise introducing such pollutants into the POTW. The reduction or alteration can be obtained by physical, chemical or biological processes, or process changes other means, except as prohibited by 40 CFR Section 403.6(d).

(26) Pretreatment Requirements. Any substantive or procedural requirement related to pretreatment, other than a National Pretreatment Standard imposed on an industrial user.

(27) Publicly Owned Treatment Works (POTW). A treatment works as defined by section 212 of the Act, (33 U.S.C. 1292) which is owned in this instance by the City. This definition includes any sewers that convey wastewater to the POTW treatment plant, but does not include pipes, sewers or other conveyances not connected to a facility providing treatment. For the purposes of this ordinance, "POTW" shall also include any sewers that convey wastewaters to the POTW from persons outside the city who are, by contract or agreement with the city, users of the city's POTW.

(28) POTW Treatment Plant. That portion of the POTW designed to provide treatment to wastewater.

(29) Shall is manatory: May is permissive.

(30) Significant Industrial User. Any Industrial User of the City's wastewater disposal system who (i) has a discharge flow of 25,000 gallons or more per average work day, or (ii) has a flow greater than 5% of the flow in the City's wastewater treatment system, or (iii) has in his wastes toxic pollutants as defined pursuant to Section 307 of the Act of State Statutes and rules or (iv) is found by the City, State Control Agency or the U.S. Environmental Protection Agency (EPA) to have significant impact, either singly or in combination with other contributing industries, on the wastewater treatment system, the quality of sludge, the system's effluent quality, or air emissions generated by the system.

(31) State. State of Missouri.

(32) Standard Industrial Classification (SIC). A classification pursuan to the Standard Industrial Classification Manual issued by the Executive Office of the President, Office of Management and Budget, 1972.

(33) Storm Water. Any flow occuring during or following any form or natural precipitation and resulting therefrom.

(34) Suspended Solids. The total suspended matter that floats on the surface of, or is suspended in, water, wastewater or other liquids, and which is removable by laboratory filtering.

(35) Superintendent. The person designated by the City to supervise the operation of the publicly owned treatment works and who is charged with certain duties and responsibilities by this article, or his duly authorized representative.

(36) Toxic Pollutant. Any pollutant or combination of pollutants listed as toxic in regulations promulgated by the Administrator of the Environmental Protection Agency under the provision of CWA 307(a) or other Acts.

(37) User. Any person who contributes, causes or permits the contribution of wastewater into the City's POTW.

(38) Wastewater. The liquid and water-carried industrial or domestic wastes from dwellings, commercial buildings, industrial facilities, and institutions, together with may be present, whether treated or untreated, which is contributed into or permitted to enter the POTW.

(39) Waters of the State. All streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artifical, public or private, which are contained within, flow through, or border upon the State or any portion thereof.

(40) Wastewater Contribution Permit. As set forth in section 4.2 of this ordinance.

1.3 Abbreviations

The following abbreviations shall have the designated meanings:

- BOD - Biochemical Oxygen Demand.
- CFR - Code of Federal Regulations.
- COD - Chemical Oxygen Demand.
- EPA - Environmental Protection Agency
- l - Liter.
- mg - Milligrams.
- mg/l - Milligrams per liter.
- NPDES - National Pollutant Discharge Elimination System.
- POTW - Publicly Owned Treatment Works.
- SIC - Standard Industrial Classification.
- SWDA - Solid Waste Disposal Act, 42, U.S.C. 6901, et. seq.
- USC - United States Code.
- TSS - Total Suspended Solids.

SECTION 2 - REGULATIONS

2.1 General Discharge Prohibitions

No User shall contribute or cause to be contributed, directly or indirectly, any pollutant or wastewater which will interfere with the operation or performance of the POTW. These general prohibitions apply to all such Users of the POTW whether or not the User is subject to National Categorical Pretreatment Standards or any other National, State, or local Pretreatment Standards or Requirements. A user may not contribute the following substances to any POTW:

a) Any liquids, solids or gases which by reason of their nature or quantity are, or may be, sufficient either alone or by interaction with other substances to cause fire or explosion or be injurious in any other way to the POTW or to the

operation of the POTW. At no time, shall two successive readings on an explosion hazard meter, at the point of discharge into the system (or at any point in the system) be more than five percent (5%) nor any single reading over ten percent (10%) of the Lower Explosive Limit (LEL) of the meter. Prohibited materials include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, baromates, carbides, hydrides and sulfides and ~~any other~~ substances which the City, the State or EPA has notified the User is a fire hazard or a hazard to the system.

b) Solid or viscous substances which may cause obstruction to the flow in a sewer or other interferenced with the operation of the wastewater treatment facilities such as, but not limited to: grease, garbage with particles greater than one-half inch (½") in any dimension, animal guts or tissues, paunch manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastics, gas, tar, asphalt residues, residues from refining, or processing of fuel or lubricating oil, mud, or glass grinding or polishing wastes.

c) Any wastewater having a pH less than 5.0, unless the POTW is specifically designed to accommodate such wastewater, or wastewater having any other corrosive property capable of causing damage or hazard to structures, equipment, and/or personnel of the POTW.

d) Any wastewater containing toxic pollutants in sufficient quantity, either singly or by interaction with other pollutants, to injure or interfere with any wastewater treatment process, constitute a hazard to humans or animals, create a toxic effect in the receiving waters of the POTW, or to exceed the limitation set forth in a Categorical Pretreatment Standard. A toxic pollutant shall include but not be limited to any pollutant identified pursuant to Section 307(a) of the Act.

e) Any noxious or malodorous liquids, gases, or solids which either singly or by interaction with other other wastes are sufficient to create a public nuisance or hazard to life or are sufficient to prevent entry into the sewers for maintenance and repair.

f) Any substance which may cause the POTW's effluent or any other product of the POTW such as residues, sludges, or scums, to be unsuitable for reclamation and reuse or to interfere with the reclamation process. In no case, shall a substance discharge to the POTW cause the POTW to be in non-compliance with sludge use or disposal criteria, guidelines or regulations developed under Section 405 of the Act; any criteria, guidelines, or regulations affecting sludge use or disposal development pursuant to the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, or State criteria applicable to the sludge management method being used.

g) Any substance which will cause the POTW to violate its NPDES and/or State Disposal System Permit or the receiving water quality standards.

h) Any wastewater with objectionable color not removed in the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions.

i) Any wastewater having a temperature which will inhibit biological activity in the POTW treatment plant resulting in Interference, but in no case wastewater with a temperature at the introduction into the POTW which exceeds 40°C (104°F) unless the POTW treatment plant is designed to accomodate such temperature.

j) Any pollutants, including oxygen demanding pollutants (BOD, etc) released at a flow rate and/or pollutant concentration which a user knows or has reason to know will cause Interference to the POTW. In no case shall a slug load have a flow rate or contain concentration or qualities of pollutants that exceed for any time period longer than fifteen (15) minutes more than five (5) times the average twenty-four (24) hour concentration, quantities, or flow during normal operation.

k) Any wastewater containing any radioactive wastes or isotopes of such halflife or concentration as may exceed limits established by the City Administrator in compliance with applicable State or Federal regulations.

l) Any wastewater which causes a hazard to human life or creates a public nuissance.

When the City Administrator determines that the User(s) is contributing to the POTW, any of the above enumerated substances in such amounts as to Interfere with the operation of the POTW, the City Administrator shall:
1) Advise the User(s) of the impact of the contribution on the POTW; and
2) Develop effluent limitation(s) for such User to correct the Interference with the POTW.

the City for review, and shall be approved by the City before construction of the facility. All existing Users shall complete such a plan by January 1, 1983. No user who commences contribution to the POTW after the effective date of this ordinance shall be permitted to introduce pollutants into the system until accidental discharge procedures have been approved by the City. Review and approval of such plans and operating procedures shall not relieve the industrial user from the responsibility to modify the user's facility as necessary to meet the requirements of this Ordinance. In the case of an accidental discharge, it is the responsibility of the user to immediately telephone and notify the POTW of the incident. The notification shall include location of discharge, type of waste, concentration and volume, and corrective actions.

Written Notice Within five (5) days following an accidental discharge; the User shall submit to the City Administrator a detailed written report describing the cause of the discharge and the measures to be taken by the User to prevent similar future occurrenances. Such notification shall not relieve the user of any expense, loss, damage, or other liability which may be incurred as a result of damage to the POTW, fish kills, or any other damage to person or property; nor shall such notification relieve the user of any fines, civil penalties, or other liability which may be imposed by this article or other applicable law.

Notice to Employees: A notice shall be permanently posted on the User's bulletin board or other prominent place advising employees whom to call in the event of a dangerous discharge. Employers shall insure that all employees who may cause or suffer such a dangerous discharge to occur are advised of the emergency notification procedure.

SECTION 3 - FEES

3.1 Purpose

It is the purpose of this chapter to provide for the recovery of costs from Users of the City's wastewater disposal system for the implementation of the program established herein. The applicable charges or fees shall be set forth the City's Schedule of Charges and Fees.

3.2 Charges and Fees

The City may adopt charges and fees which may include:

a) fees for reimbursement of costs of setting up and operating the City's Pretreatment Program;

b) fees for monitoring, inspections and surveillance procedures;

c) fees for reviewing accidental discharge procedures and construction;

d) fees for permit applications;

e) fees for filing appeals;

2.2 Federal Categorical Pretreatment Standards

Upon the promulgation of the Federal Categorical Pretreatment Standards for a particular industrial subcategory, the Federal Standard, if more stringent than limitations impose under this Ordinance for sources in that subcategory, shall immediately supersede the limitations imposed under this Ordinance. The City Administrator shall notify all affected Users of the applicable reporting requirements under 40 CFR, Section 403.12.

2.3 Modification of Federal Categorical Pretreatment Standards

Where the City's wastewater treatment system achieves consistent removal of pollutants limited by Federal Pretreatment Standards, the City may apply to the Approval Authority for modification of specific limits in the Federal Pretreatment Standards. "Consistent Removal" shall mean reduction in the amount of a pollutant or alteration of the nature of the pollutant by the wastewater treatment system to a less toxic or harmless state in the effluent which is achieved by the system 95 percent of the samples taken when measured according to the procedures set forth in Section 403.7(c) (2) of (Title 40 of the Code of Federal Regulations, Part 403) - "General Pretreatment Regulations for Existing and New Sources of Pollution" promulgated pursuant to the Act. The City may then modify pollutant discharge limits in the Federal Pretreatment Standards if the requirements contained in 40 CFR, Part 403, Section 403.7, are fulfilled and prior approval from the Approved Authority is obtained.

2.4 State Requirements

State requirements and limitations on discharges shall apply in any case where they are more stringent than Federal requirements and limitations or those in this ordinance.

2.5 City's Right of Revision

The City reserves the right to establish by ordinance more stringent limitations or requirements on discharges to the wastewater disposal system if deemed necessary to comply with the objectives presented in Section 1.1 of this Ordinance.

2.6 Excessive Discharge

No User shall ever increase the use of process water or, in any way, attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in the Federal Categorical Pretreatment Standards, or in any other pollutant-specific limitation developed by the City or State.

2.7 Accidental Discharges

Each User shall provide protection from accidental discharge of prohibited materials or other substances regulated by this Ordinance. Facilities to prevent accidental discharge of prohibited materials shall be provided and maintained at the owner or user's own cost and expense. Detailed plans showing facilities and operating procedures to provide this protection shall be submitted to

f) fees for consistent removal (by the City) of pollutants otherwise subject to Federal Pretreatment Standards;

g) other fees as the City may deem necessary to carry out the requirements contained herein.

These fees relate solely to the matters covered by this Ordinance and are separate from all other fees chargeable by the City.

SECTION 4 - ADMINISTRATION

4.1 Wastewater Dischargers

It shall be unlawful to discharge without a city permit to any natural outlet within the City of Camdenton, or in any area under the jurisdiction of said city, and/or to the POTW any wastewater except as authorized by the City Administrator in accordance with the provisions of this Ordinance.

4.2 Wastewater Contribution Permits

4.2.1 General Permits

All significiant users proposing to connect to or to contribute to the POTW shall obtain a Wastewater Discharge Permit before connecting to or contributing to the POTW. All existing significant users connected to or contributing to the POTW shall obtain a Wastewater Contribution Permit within 60 days after the effective date of this Ordinance.

4.2.2. Permit Application

Users required to obtain a Wastewater Contribution Permit shall complete and file with the City, an application in the form prescribed by the City, and accompanied by a fee of $25.00. Existing users shall apply for a Wastewater Contribution Permit within 30 days after the effective date of this Ordinance, and proposed new users shall apply at least 90 days prior to connecting to or contributing to the POTW. In support of the application, the user shall submit, in units and terms appropriate for evaluation, the following information:

a) Name, address, and location, (if different from the address);

b) SIC number according the Standard Industrial Classification Manual, Bureau of the Budget, 1972, as amended;

c) Wastewater constituents and characteristics including but not limited to those mentioned in Section 2 of this Ordinance as determined by a reliable analythical laboratory; sampling and analysis shall be performed in accordance with procedures established by the EPA pursuant to Section 304(g) of the Act and contained in 40 CFR, Part 136, as amended;

d) Time and duration of contribution;

e) Average daily and 3 minute peak wastewater flow rates, including daily, monthly and seasonal variations if any;

f) Site plans, floor plans, mechanical and plumbing plans and details to show all sewers, sewer connections, and appurtenances by the size, location and elevation;

g) Description of activities, facilities and plant processes on the premises including all materials which are or could be discharged;

h) Where known, the nature and concentration of any pollutants in the discharge which are limited by any City, State, or Federal Pretreatment Standards, and a statement regarding whether or not the pretreatment standards are being met on a consistent basis and if not, whether additional Operation and Maintenance (O&M) and/or additional pretreatment is required for the User to meet applicable Pretreatment Standards;

i) If additional pretreatment and/or O&M will be required to meet the Pretreatment Standards; the shortest schedule by which the User will provide such additional pretreatment. The completion date in this schedule shall not be later than the compliance date established for the applicable Pretreatment Standard:

The following conditions shall apply to this schedule:

(1) The schedule shall contain increments of progress in the form of dates for the commencement and completion of major events leading to the construction and operation of additional pretreatment required for the User to meet the applicable Pretreatment Standards (e.g., hiring an engineer, completing preliminary plans, completing final plans, executing contract for major components, commencing construction, completing construction, etc.).

(2) No increment referred to in paragraph (1) shall exceed 9 months.

(3) Not later than 14 days following each date in the schedule and the final date for compliance, the User shall submit a progress report to the City Administrator including, as a minimum, whether or not it complied with the increment of progress to be met on such date and, if not, the date on which it expects to comply with this increment of progress, the reason for delay, and the steps being taken by the User to return the construction to the schedule established. In no event shall more than 9 months elapse between such progress reports to the City Administrator

j) Each product produced by type, amount, process or processes and rate of production;

k) Type and amount of raw materials processed (average and maximum per day);

l) Number and type of employees, and hours of operation of plant

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and proposed or actual hours of operation of pretreatment system;

m) Any other information as may be deemed by the City to be necessary to evaluate the permit application.

The City will evaluate the data furnished by the user and may require additional information. After evaluation and acceptance the data furnished, the City may issue a Wastewater Contribution Permit subject to terms and conditions provided herein.

4.2.3 Permit Modifications

Within 9 months of the promulgation of a National Categorical Pretreatment Standard, the Wastewater Contribution Permit of Users subject to such standards shall be revised to require compliance with such standard within the time frame prescribed by such standard. Where a User, subject to a National Categorical Pretreatment Standard, has not previously submitted an application for a Wastewater Contribution Permit as required by 4.2.2, the User shall apply for a Wastewater Contribution Permit within 180 days after the promulgation of the Applicable National Categorical Pretreatment Standard. In addition, the User with an existing Wastewater Contribution Permit shall submit to the City Administrator within 180 days after the promulgation of an applicable Federal Categorical Pretreatment Standard the information required by paragraph (h) and (i) of Section 4.2.2.

4.2.4 Permit Conditions

Wastewater Discharge Permits shall be expressly subject to all provisions of this Ordinance and all other applicable regulations, user charges and fees established by the City. Permits may contain the following:

a) The unit charge or schedule or user charges and fees for the wastewater to be discharged to a community sewer;

b) Limits on the average and maximum wastewater constituents and characteristics;

c) Limits on average and maximum rate and time of discharge or requirements for flow regulations and equalization.

d) Requirements for installation and maintenance of inspection and sampling facilities;

e) Specifications for monitoring programs which may include sampling locations, frequency of sampling, number, types, and standards for tests and reporting schedule;

f) Compliance schedules;

g) Requirements for submission of technical reports or discharge reports (see 4.3);

h) Requirements for maintaining and retaining plant records relating to wastewater discharge as specified by the City, and affording City access thereto;

i) Requirements for notification of the City of any new introduction of wastewater constitutents or any substantial change in the volume or character of the wastewater constitutents being introduced into the wastewater treatment system.

j) Requirements for notification of slug discharges as per 5.2;

k) Other conditions as deemed appropriate by the City to ensure compliance with this Ordinance.

4.2.5 Permits Duration

Permits shall be issued for a specified time period, not to exceed five (5) years. A permit may be issued for a period less than a year or may be stated to expire on a specific date. The user shall apply for permit reissuance a minimum of 180 days prior to the expiration of the user's existing permit. The terms and conditions of the permit may be subject to modification by the City during the term of the permit as limitations or requirements as identified in Section 2 are modified or other just cause exists. The User shall be informed of any proposed changes in his permit at least 30 days prior to the effective date of change. Any changes or new conditions in the permit shall include a reasonable time schedule for compliance.

4.2.6 Permit Transfer

Wastewater Dishcarge Permits are issued to a specific User for a specific operation. A wastewater discharge permit shall not be reassigned or transferred or sold to a new owner, new User, different premises, or a new or changed operation without the approval of the City. Any succeeding owner or User shall also comply with the terms and conditons of the existing permit.

4.3 Reporting Requirements for Permittee

4.3.1 Compliance Date Report

Within 90 days following the date for final compliance with applicable Pretreatment Standards or, in the case of a New Source, following commencement of the introduction of wastewater into the POTW, any User subject to Pretreatment Standards and Requirements shall submit to the City Administrator a report indicating the nature and concentration of all pollutants in the discharge from the regulated process which are limited by Pretreatment Standards and Requirements and the average and maximum daily flow for these process units in the User facility which are limited by such Pretreatment Standards or Requirements. The report shall state whether the applicable Pretreatment Standards are being met on a consistent basis and, if not, additional O&M and/or pretreatment is necessary to bring the User into compliance with the applicable Pretreatment Standards or Requirements. This statement shall be signed by an authorized representative of the Industrial User, and certified to by a

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4.3.2 Periodic Compliance Reports

(1) Any User subject to a Pretreatment Standard, after the compliance date of such Pretreatment Standard, or, in the case of a New Source, after commencement of the discharge into the POTW, shall submit to the City Administrator during the months of June and December, unless required more frequently in the Pretreatment Standard or by the City Administrator, a report indicating the nature and concentration, of pollutants in the effluent which are limited by such Pretreatment Standards. In addition, this report shall include a record of all daily flows which during the reporting period exceeded the average daily flow reported in paragraph 4.2.4 of this section. At the discretion of the City Administrator and in consideration of such factors as local high or low flow rates, holidays, budget cycles, etc., the City Administrator may agree to alter the months during which the above reports are to be submitted.

(2) The City Administrator may impose mass limitations on Users which are using dilution to meet applicable Pretreatment Standards or Requirements, or in other cases where the imposition of mass limitations are appropriate. In such cases, the report required by subparagraph (1) of this paragraph shall indicate the mass of pollutants regulated by Pretreatment Standards in the effluent of the User. These reports shall contain the results of sampling and analysis of the discharge, including the flow and the nature and concentration, or production and mass where requested by the City Administrator, of pollutants contained therein which are limited by the applicable Pretreatment Standards. The frequency of monitoring shall be prescribed in the applicable Pretreatment Standard. All analysis shall be performed in accordance with procedures established by the Administrator pursuant to section 304(g) of the Act and contained in 40 CFR, Part 136 and amendments thereto or with any other test procedures approved by the Administrator. Sampling shall be performed in accordance with the techniques approved by the Administrator.

4.4 Monitoring Facilities

The City shall require to be provided and operated at the User's own expense, monitoring facilities to allow inspection, sampling, and flow measurement of the building sewer and/or internal drainage systems. The monitoring facility should normally be situated on the User's premises, but the City may, when such a location would be impractical or cause undue hardship on the User, allow the facility to be constructed in the public street or sidewalk area and located so that it will not be obstructed by landscaping or parked vehicles.

There shall be ample room in or near such sampling manhole or facility to allow accurate sampling and preparation of samples for analysis. The facility, sampling, and measuring equipment shall be maintained at all times in a safe and proper operating condition at the expense of the user.

Whether constructed on public or private property, the sampling and monitoring facilities shall be provided in accordance with the City's requirements and all applicable local construction standards and specifications. Construction shall be completed within 90 days following written notification by the City.

4.5 Inspection and Sampling

The City shall inspect the facilities of any User to ascertain whether the purpose of this Ordinance is being met and all requirements are being complied with. Persons or occupants of premises where wastewater is created or discharged shall allow the City or their representative ready access at all reasonable times to all parts of the premises for the purposes of inspection, sampling, records examination or in the performance of any of their duties. The City, Approval Authority and (where the NPDES State is the Approval Authority) EPA shall have the right to set up on the User's property such devices as are necessary to conduct sampling inspection, compliance monitoring and/or metering operatons. Where a User has security measures in force which would require proper identifications and clearance before entry into their premises, the User shall make necessary arrangements with their security guards so that upon presentation of suitable identification, personnel from the City, Approval Authority and EPA will be permitted to enter, without delay, for the purposes of performing their specific responsibilities.

4.6 Pretreatment

Users shall provide necessary wastewater treatment as required to comply with this Ordinance and shall achieve compliance with all Federal Categorical Pretreatment Standards within the time limitations as specified by the Federal Pretreatment Regulations. Any facilities required to pretreat wastewater to a level acceptable to the City shall be provided, operated, and maintained at the User's expense. Detailed plans showing the pretreatment facilities and operating procedures shall be submitted to the City for review, and shall be acceptable to the City before construction of the facility. The review of such plans and operating procedures will in no way relieve the user from the responsibility of modifying the facility as necessary to produce an effluent acceptable to the City under the provisions of this Ordiance. Any subsequent changes in the pretreatment facilities or method of operation shall be reported to and be acceptable to the City prior to the User's initiation of the changes.

The City shall annually publish in the Central Missouri Leader newspaper a list of the Users which were not in compliance with any Pretreatment Requirements or Standards at least once during the 12 previous months. The notification shall also summarize any enforcement actions taken against the User(s) during the same 12 months.

All records relating to compliance with Pretreatment Standards shall be made available to officials of the EPA or Approval Authroity upon request.

4.7 Confidential Information

Information and data on a User obtained from reports, questionnaires, permit applications, permits and monitoring programs and from inspection

shall be available to the public or other governmental agency without restriction unless the User specifically requests and is able to demonstrate to the satisfaction of the City that the release of such information would divulge information, processes or methods of production entitled to protection as trade secrets of the User.

When requested by the person furnishing a report, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public but shall be made available upon written request to governmental agencies for uses related to this Ordinance, the National Pollutant Discharge Elimination System (NPDES) Permit, State Disposal System permit and/or the Pretreatment Programs; provided, however, that such portions of a report shall be available for use by the State or any state agency in judicial review or enforcement proceedings involving the person furnishing the report. Wastewater constituents and characteristics will not be recognized as confidential information.

Information accepted by the City as confidential, shall not be transmitted to any governmental agency or to the general public by the City until and unless a ten-day notification is given to the User.

SECTION 5 - ENFORCEMENT

5.1 Harmful Contributions

The City may suspend the wastewater treatment service and/or a Wastewater Contribution Permit when such suspension is necessary, in the opinion of the City, in order to stop an actual or threatened discharge which presents or may present an imminent or substantial endangerment to the health or welfare of persons, to the environment, causes Interference to the POTW or causes the City to violate any condition of its NPDES Permit.

Any person notified of a suspension of the wastewater treatment service and/or the Wastewater Contribution Permit shall immediately stop or eliminate the contribution. In the event of a failure of the person to comply voluntarily with the suspension order, the City shall take such steps as deemed necessary including immediate severance of the sewer connection, to prevent or minimize damage to the POTW system or endangerment to any individuals. The City shall reinstate the Wastewater Contribution Permit and/or the wastewater treatment service upon proof of the elimination of the non-complying discharge. A detailed written statement submitted by the user describing the causes of the harmful contribution and the measures taken to prevent any future occurrence shall be submitted to the City within 15 days of the date of occurrence.

5.2 Revocation of Permit

Any User who violates the following conditions of this Ordinance, or applicable state and federal regulations, is subject to having his permit revoked in accordance with the procedures of Section 5 of this Ordinance:

a) Failure of a User to factually report the wastewater constituents and characteristics of his discharge;

b) Failure of the User to report significant changes in operations, or wastewater constituents and characteristics;

c) Refusal of reasonable access to the User's premises for the purpose of inspection or monitoring; or,

d) Violation of conditions of the permit.

5.3 Notification of Violation

Whenever the City finds that any User has violated or is violating this Ordinance, wastewater contribution permit, or any prohibition, limitation of requirements contained herein, the City may serve upon such person a written notice stating the nature of the violation. Within 30 days of the date of the notice, a plan for the satisfactory correction thereof shall be submitted to the City by the User.

5.4 Show Cause Hearing

5.4.1 Notification

The City may order any User who causes or allows an unauthorized discharge to enter the POTW to show cause before the City Council why the proposed enforcement action should not be taken. A notice shall be served on the User specifying the time and place of a hearing to be held by the City Council regarding the violation, the reasons why the action is to be taken, the proposed enforcement action, and directing the User to show cause before the City Council why the proposed enforcement action should not be taken. The notice of the hearing shall be served personally or by registered or certified mail (return receipt requested) at least ten days before the hearing. Service may be made on any agent or officer of a corporation.

5.4.2 Hearing

The City Council may itself conduct the hearing and take the evidence, or may designate any of its members or any officer or employee of the (assigned department) to:

a) Issue in the name of the City Council notices of hearings requesting the attendance and testimony of witnesses and the production of evidence relevant to any matter involved in such hearings;

b) Take the evidence;

c) Transmit a report of the evidence and hearing, including transcripts and other evidence, together with recommendations to the City Council for action thereon.

5.4.3 Hearing Transcript

At any hearing held pursuant to this Ordinance, testimony taken must be under oath and recorded stenographically. The transcript, so recorded, will be made available to any member of the public or any party to the hearing upon payment of the usual charges thereof.

5.4.4 City Council Action

After the City Council has reviewed the evidence, it may issue an order to the User responsible for the discharge directing that, following a specified time period, the sewer service be discontinued unless adequate treatment facilities, devices or other related appurtenances shall have been installed on existing treatment facilities, devices or other related appurtenances are properly operated. Further orders and directives as are necessary and appropriate may be issued.

5.5 Legal Action

If any person discharges sewage, industrial wastes or other wastes into the city's wastewater disposal system contrary to the provisions of this Ordinance, Federal or State Pretreatment Requirements, or any order of the City, the City Attorney may commence an action for appropriate legal and/or equitable relief in the Circuit Court of this county.

SECTION 6 - PENNALTY: COSTS

6.1 Civil Penalties

Any User who is found to have violated an Order of the City Council or who willfully or negligently failed to comply with any provision of this Ordinance, and the orders, rules, regulations and permits issued hereunder, shall be fined not less than One Hundred Dollars ($100.00) nor more than Five Hundred Dollars ($500.00) for each offense. Each day on which a violation shall occur or continue shall be deemed a separate and distinct offense. In addition to the penalties provided herein, the City may recover reasonable attorney fees, court costs, court reporters' fees and other expenses of litigation by appropriate suit at law against the person found to have violated this Ordinance or the orders, rules, regulations, and permits issued hereunder.

6.2 Falsifying Information

Any person who knowingly makes any false statements, representation or certification in any application, record, report, plan or other document filed or required to be maintained pursuant to this Ordinance, or Wastewater Contribution Permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required under this Ordinance, shall, upon conviction, be punished by a fine of not more than $500.00 or by imprisonment for not more than Ninety (90) days, or by both.

SECTION 7 - SEVERABILITY

If any provision, paragraph, word, section or article of this Ordinance is invalidated by any court of competent jurisdiction, the remaining provisions, paragraphs, words, sections, and chapters shall not be affected and shall continue in full force and effect.

SECTION 8 - CONFLICT

All other Ordinances and parts of other Ordinances inconsistent or conflicting with any part of this Ordinance are hereby repealed to the extent of such inconsistency or conflict.

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SECTION 9 - EFFECTIVE DATE

This Ordinance shall be in full force and effect from and after its passage, approval and publication, as provided by law.

INTRODUCED the 19th day of May, 19 81.

FIRST READING: May 19, 19 81.

SECOND READING: May 19, 19 81.

PASSED this 2nd day of June, 19 81.

AYES: Miller, Kelsey, Stonitsch, Hicks and Shannon

NAYES:

ABSENT: Cross

NOT VOTING:

APPROVED by me this 11th day of June, 19 81.

MAYOR, CITY OF CAMDENTON

ATTEST: (Seal) City Clerk

Published the _____ day of _____, 19___.

SECTION 10 - INDUSTRIAL SEWER CONNECTION APPLICATION

To the City of Camdenton:

The undersigned being the _____ of the property located at _____

_____

does hereby request a permit to _____ an industrial sewer connection serving _____, which company is engaged in _____

_____

at said location.

1. A plan to the property showing accurately all sewer and drains now existing is attached hereunto as Exhibit "A".

2. Plans and specifications covering any work proposed to be performed under this permit is attached hereunto as Exhibit "B".

3. A complete schedule of all process waters and industrial wastes produced or expected to be produced at said property, including a description of the character of each waste, the daily volume and maximum rates of discharge, representative analyses, and compliance with any applicable Pretreatment Standard or Requirements, is attached hereunto as Exhibit "C".

4. The name and address of the person or firm who will perform the work covered by this permit is_____
_____.

In consideration of the granting of this permit the undersigned agrees:

1. To furnish any additional information relating to the installation or use of the industrial sewer for which this permit is sought as may be requested by the City.

2. To accept and abide by all provisions of Ordinance No._____ of the City of Camdenton, and of all other pertinent Ordinance or regulations that may be adopted in the future.

3. To operate and maintain any waste pretreatment facilities, as may be required as a condition of the acceptance into the wastewater treatment system of the industrial wastes involved, in an efficient manner at all times, and at no expense to the City.

4. To cooperate at all times with the City and it's representatives in their inspecting, sampling, and study of the industrial wastes, and any facilities provided for pretreatment.

5. To notify the City immediately in the event of any accident, or other occurrence that introduces to the wastewater treatment system any wastewater or substances prohibited or not covered by this permit.

6. To pay the following charges for the wastewater to be discharged into the Camdenton Sewer System: $_____per 1000 gallons.

7. To install and maintain the required inspection and sampling facilities.

8. To abide by and perform the monitoring program (Addendum I), to include but is not necessarily limited to the frequency of sampling, number, types and standards for tests and reporting schedule.

9. To submit any and all technical reports or discharge reports in a timely manner.

10. To maintain and retain plant records relating to wastewater discharge to the city owned treatment works.

11. To notify the City of any new wastewater constitutents or any substantial change in the volume or character of the wastewater constitutents being introduced into the wastewater treatment system.

12. To notify the City immediately of any slug discharge.

Date:_____ Signed_____

$_____inspection fee paid_____

Application approved and permit granted:

Date:_____ Signed_____

Table 1 221 Sunset Drive Manufacturing Facility Pretreatment Effluent TCE Levels*		
Date	**Result, µg/l (ppb)**	**Notes**
April 24, 1986	<10	Monitoring
May 2, 1986	14	Monitoring
May 7, 1986	<10	Pre-connection
May 15, 1986	40	Pre-connection
May 15, 1986	150	Pre-connection
May 20, 1986	1580	Pre-connection
May 20, 1986	2,230	Pre-connection
May 21, 1986	380	Pre-connection
June 3, 1986	1,100	Pre-connection
June 11, 1986	230	Pre-connection
June 18, 1986	290	Pre-connection
June 25, 1986	240	Pre-connection

* reference (Mans, 1986)

Table 2		
Estimate of Total TCE Mass Discharged to the CTPL from 221 Sunset Drive Manufacturing Facility between December 1987 and June 1989		
1	Gallons per day discharged from pre-treatment plant (average)*	3,788
2	Discharge period, days (18 months x 30 days per month)	540
3	Volume discharged, gallons (line 1 x line 2)	2,045,520
4	Volume discharged, liters (line 3 x 3.8 liters per gallon)	7,772,976
5	Maximum TCE concentration measured in effluent, µg/l **	2,230
6	Mass of TCE discharged to CTPL, µg (line 4 x line 5)	17,333,736,480
8	Mass of TCE discharged to CTPL, lbs (line 6 / 4.536E8 µg/lb)	38
9	Pounds of TCE per gallon of TCE	12
10	Volume of TCE discharged to CTPL, gallons (line 8 / line 9)	3

* reference (Olson, 1989)

** reference (Mans, 1986)