LATHROP & GAGE L.C.
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December 18, 2000

**Hand Delivered**
Ms. Alyse Stoy
Assistant Regional Counsel
U.S. Environmental Protection Agency
Region VII
901 N. 5th Street
Kansas City, Kansas 66101

**Re: Sentinel Industries, Inc.**
**Second Response to Information Request**
**Pursuant to CERCLA Section 104(E)**

Dear Alyse:

Enclosed please find Sentinel Industries, Inc.'s Second Response to Information Request Pursuant to CERCLA Section 104(E). Please note that the responses to questions 13 and 14 are submitted as confidential business information, and are submitted in a separate envelope. We will fax you the title search results as soon as we receive them. Please give me a call if you have questions.

Very truly yours,

LATHROP & GAGE L.C.

By: Ginevera K. Moore
Ginevera K. Moore

Enclosures

cc: Donald Farris, Sentinel Industries, Inc.

**SENTINEL INDUSTRIES, INC.**
**SECOND RESPONSE TO INFORMATION REQUEST**
**PURSUANT TO CERCLA SECTION 104(E)**

## Introduction

As previously agreed to by Ms. Alyse Stoy, Assistant Regional Counsel, U.S. Environmental Protection Agency ("EPA"), Sentinel Industries, Inc. submits this *Second Response to Information Request Pursuant to CERCLA Section 104(e)*, based on information it has been able to obtain to date. **The following information is submitted with the specific understanding and agreement by EPA that Sentinel's attorneys have not yet reviewed EPA records concerning its wood treating operations in Ava, Missouri (hereinafter referred to as the "Site"), and that such records review is scheduled for December 18, 2000. Therefore, the responses below may be incomplete.**

In addition, key company personnel who were present during the time periods when the wood treating operations were conducted at the Site are now elderly or deceased. As well, many of the company records were destroyed in a fire that occurred at the company's headquarters in Ashland, Missouri. While it is our current understanding that the information submitted in its *First Response to Information Request Pursuant to CERCLA Section 104(E)*, supplemented by the information below, is complete and accurate, it is possible that additional facts may come to light that could modify the information submitted. Should Sentinel obtain any additional information that materially changes any of the responses herein, Sentinel will update its responses accordingly.

This Response does not include documentation received by Sentinel from review of files of the Missouri Department of Natural Resources ("MDNR"), except as specifically stated herein. This Response also does not include that certain "Report of Findings, Environmental Investigation Conducted at Former Sentinel Wood Treatment Site, Ava, Missouri" dated April 30, 1999, prepared by Kingston Environmental Services, Inc. as we understand that EPA already has a copy of such report.

Pursuant to Sections 104(E) and (F) of CERCLA, 42 U.S.C. Sections 9604(e)(7)(E) and (F), Section 3007(b) of RCRA 42 U.S.C. Section 6927(b) and 40 C.F.R. 2.204(b), Sentinel hereby submits it response to questions 13 and 14 as confidential business information. Documents submitted in response to questions 13 and 14 have been marked accordingly, and are submitted under separate cover.

**Responses**

1. Describe in detail all operations conducted at the Site by Sentinel Industries. Specifically, describe all operations in the wood treatment area furnace area, and lagoon area. In addition, provide all historic site plans, maps and/or photographs which depict the Site and operations conducted at the Site, as well as the location of any on-Site storage tanks (either underground or above-ground) used to store chemicals used in the wood treating process.

**Response:**

See *First Response to Information Request Pursuant to CERCLA Section 104(E),* submitted to EPA on or about November 27, 2000. Company records, maps and photographs that are responsive to this information request are attached as Exhibit A.

2. Describe all measures taken by Sentinel Industries to contain wood treating wastes in the wood treatment area or other areas of the Site, including but not limited to the use of a drip pad. If a drip pad was used, provide information regarding its construction including the date the drip pad was installed and materials used (i.e., concrete) to construct the drip pad.

**Response:**

See *First Response to Information Request Pursuant to CERCLA Section 104(E),* submitted to EPA on or about November 27, 2000.

3. Describe when and how the lagoons located in the northern portion of the Site were constructed. In addition, describe all activities taken to close the lagoons after wood treating operations ceased, when such closure activities occurred, and whether any permits were obtained to close the lagoons.

**Response:**

See *First Response to Information Request Pursuant to CERCLA Section 104(E),* submitted to EPA on or about November 27, 2000.

4. Identify all areas where Sentinel disposed of wood treating wastes both on and off the Site property. Identify the content and volume of the wood treating wastes that were disposed. In addition, describe how the wood treating wastes were transported to the disposal area(s).

**Response:**

To the best of our knowledge and belief, no disposal of wood treating wastes occurred on the Site, other than in the existing lagoons. To the best of our knowledge and belief, no disposal of wood treating wastes occurred off-Site, except when properly disposed at a duly permitted landfill. When the wood treating operation was closed, a small amount of waste was disposed at a properly licensed disposal facility. Copies of disposal certificates were found in MDNR records, and are attached hereto as Exhibit B.

We understand that allegations of disposal of wood treating wastes at off-Site locations have been made. Based on our knowledge and belief to date, we believe these allegations are inaccurate.

Anecdotal information from past employees, and historical information from Mr. Don Farris, has indicated that water from the diversion system which operated at the Site for many years, was taken off-Site and used for irrigation at two locations. It is important to note that this was water that had gone through the on-Site diversion system, that was tested regularly to be sure it met all discharge limitations, and would otherwise have been discharged into the city sewer system, or into Prairie Creek pursuant to NPDES permit (depending on when such wastewater was discharged). First, based on Mr. Farris' best recollection, approximately 1,600 gallons of water that had been processed through the diversion system was taken to the property known as the "Old Bilt-Rite" property, north of B.J. Evan's property, where it was used for irrigation. The "Old Bilt-Rite" property was owned by family members of Mr. Farris at the time. Second, according to Roger Brown, a former employee of Sentinel, seven or eight "loads" of water that had been processed through the diversion system were taken, at the request of a Mr. Max Valentine, to Mr. Valentine's farm and used for irrigation purposes.

Mr. Farris also confirmed that "cut-offs" (e.g. blocks of wood from six to eighteen inches long, that had **not** been treated with pentachlorophenol) were routinely taken from the Sentinel Site in Ava, Missouri, to a location in Romance, Ozark County, Missouri, that Sentinel leased, and used to make charcoal.

5. Describe how wood treating wastes containing pentachlorophenol were burned at the Site. Describe the furnace used to burn such wastes, identify all locations where wood treating wastes were burned, state the time period such wastes were burned, and identify the approximate volume of wood treating wastes burned at the Site. Further,

provide copies of any permits, including permits issued pursuant to the Clean Air Act, for such furnace(s).

**Response:**

See *First Response to Information Request Pursuant to CERCLA Section 104(E),* submitted to EPA on or about November 27, 2000.

6. Describe how wood treated with copper, chromium, and arsenic ("CCA") was burned at the Site. Describe the furnace used to burn the wood, identify all locations where CCA-treated wood was burned, state the time period such wood was burned, and identify the approximate volume of CCA-treated wood burned at the Site. Further, provide copies of any permits, including permits issued pursuant to the Clean Air Act, for such furnace(s).

**Response:**

See *First Response to Information Request Pursuant to CERCLA Section 104(E),* submitted to EPA on or about November 27, 2000.

7. Provide all information regarding the lagoon fire, including the time period the fire occurred, the cause of the fire, who responded to the fire, and any documents pertaining to the fire.

**Response:**

See *First Response to Information Request Pursuant to CERCLA Section 104(E),* submitted to EPA on or about November 27, 2000.

8. Describe the ground water diversion, interception and collection system located at the Site. Provide all information regarding when and how the system was constructed, the purpose of the system, when the system ceased operation, and state whether the system could be operated in the future.

**Response:**

See *First Response to Information Request Pursuant to CERCLA Section 104(E),* submitted to EPA on or about November 27, 2000.

9. Identify all leaks, spills or releases into the environment of any hazardous substances, pollutants, or contaminants that have occurred at the Site, including but not limited to leaks, spills or releases from the pressure treating vessel. In addition, identify:

a. When such releases occurred;
b. How the releases occurred (e.g., when the substances were being stored, delivered by a vendor, transported or transferred, and treated).
c. The amount of each hazardous substance, pollutant, or contaminant so released;
d. Where such releases occurred;
e. Any and all activities undertaken in response to each such release, including the notification of any agencies or governmental units about the release.
f. Any and all investigations of the circumstances, nature, extent or location of each release, including. the results of any soil, water (ground and surface), or air testing undertaken; and
g. All persons with information relating to these releases.

**Response:**

Our research of company records has not indicated any documented spills at the Sentinel Site. However, the company operated long before regulatory requirements for spill documentation were implemented, and long before the requirement for drip pads was implemented. As well, many company records were destroyed in a fire at the company's Ashland, Missouri location.

10. Describe all clean up activities that have been performed at the Site. Specifically, state whether any contaminated soil has ever been excavated or removed from the Site, and if so identify:

a. Amount of soil excavated;
b. Location of excavation;
c. Manner and place of disposal and/or storage of excavated soil;
d. Dates of soil excavation;
e. Identity of persons who excavated or removed the soil;
f. Reason for soil excavation;
g. Whether the excavation or removed soil contained hazardous substances and why the soil contained such substances;
h. All analyses or tests and results of analyses of the soil removed from the Site;
I. All persons, including contractors. with information about (a) through (h) of this request.

**Response:**

To the best of our knowledge and belief, no soil was excavated or removed from the Site during the time periods that Sentinel owned the Site. Sentinel is unaware of activities that occurred during the period of time when it did not own the Site. During clean up activities at the closing of the wood treating operation, hazardous waste was placed in 55 gallon barrels and shipped by a licensed hazardous waste company for disposal in accordance with applicable laws then in effect. See disposal certificates set forth in Exhibit B attached.

11. Describe the corporate history of Sentinel Industries, Inc., and provide copies of all Articles of Incorporation. In addition, describe in detail the corporate relationship between Sentinel Industries, Inc., located in the state of Missouri and Sentinel Industries, Inc., located in the state of Arkansas. Further, describe the corporate relationship between Sentinel Industries, Inc., The Sentinel Wood Treating, Inc., Sentinel Wood Treating Company, and Sentinel Woodtreating, Inc.

**Response:**

See Copy of Articles Of Incorporation, attached as Exhibit C. The following corporate history was provided by Mr. Don Farris:

Sentinel Wood Treating, Inc. was formed April 23, 1957, By F.E. Farris, K.W. Farris and C.W. Farris. On December 12, 1969, the company name was changed to Sentinel Woodtreating, Inc. On January 1, 1978, the company began proceedings to change the company name to Sentinel, Inc., and some operations may have occurred under this name before the company discovered that Sentinel, Inc. was already in use by an unrelated company, and that the name could not be used by Sentinel Woodtreating, Inc. Therefore, the company continued under the name Sentinel Woodtreating, Inc. until December 12, 1986, when it changed its name to Sentinel Industries, Inc. Sentinel Industries, Inc. owns facilities in both Arkansas and Missouri, and operates in both states.

According to Mr. Don Farris, F.E. Farris was president of the company from 1957 until 1962; K.W. Farris was president of the company from 1962 until 1989; and Donald Farris has been the company president since 1989.

12. Identify all prior owners of the Site. In addition, identify all operations conducted at the Site prior to Sentinel Industries' wood treating operation.

**Response:**

Sentinel has requested that a lien and title search be conducted by Douglas County Abstract and Title. Such search was to have been completed by Friday, December 15,

2000. However, due to extremely poor weather conditions in Ava, Missouri during the week of December 11-15, 2000, Douglas County Abstract and Title was unable to complete the search by December 15, 2000. We expect the search to be completed by December 20, 2000 and we will forward the results at that time..

13. Provide copies of all income tax returns, including all attachments thereto, submitted by you to the Internal Revenue Service, the state of Missouri, and any other state in which tax returns were filed for the last five (5) years.

**Response:**

**This information is submitted as confidential business information pursuant to Sections 104(E) and (F) of CERCLA, 42 U.S.C. Sections 9604(e)(7)(E) and (F), Section 3007(b) of RCRA 42 U.S.C. Section 6927(b) and 40 C.F.R. 2.204(b).** See documentation attached as Exhibit D.

14. Provide copies of Sentinel Industries' financial statements, shareholder's reports, financial audits, or other financial reports showing Sentinel Industries' assets, profits, liabilities, and current financial status for the last five (5) years.

**Response:**

**This information is submitted as confidential business information pursuant to Sections 104(E) and (F) of CERCLA, 42 U.S.C. Sections 9604(e)(7)(E) and (F), Section 3007(b) of RCRA 42 U.S.C. Section 6927(b) and 40 C.F.R. 2.204(b).** See documentation attached as Exhibit E.

15. Identify all agreements or contracts, including but not limited to insurance policies, which may indemnify Sentinel Industries, and its present or past owners, operators, partners, and/or shareholders, with respect to any costs that you may have to pay due to EPA's response action conducted at the Site. Provide a copy of each such agreement, contract and insurance policy. In addition, for all such insurance policies state the name of the insurance company providing the insurance, the years each policy was in effect, and the type of coverage provided.

**Response:**

See documentation attached as Exhibit F.

16. If you have reason to believe that there may be persons able to provide a more detailed or complete response to any question contained herein or who may be able to

provide additional responsive documents, identify such persons and the additional information or documents that they may have.

**Response:**

We know of no persons, whose names have not been provided or who are not previously known to EPA, at this time.

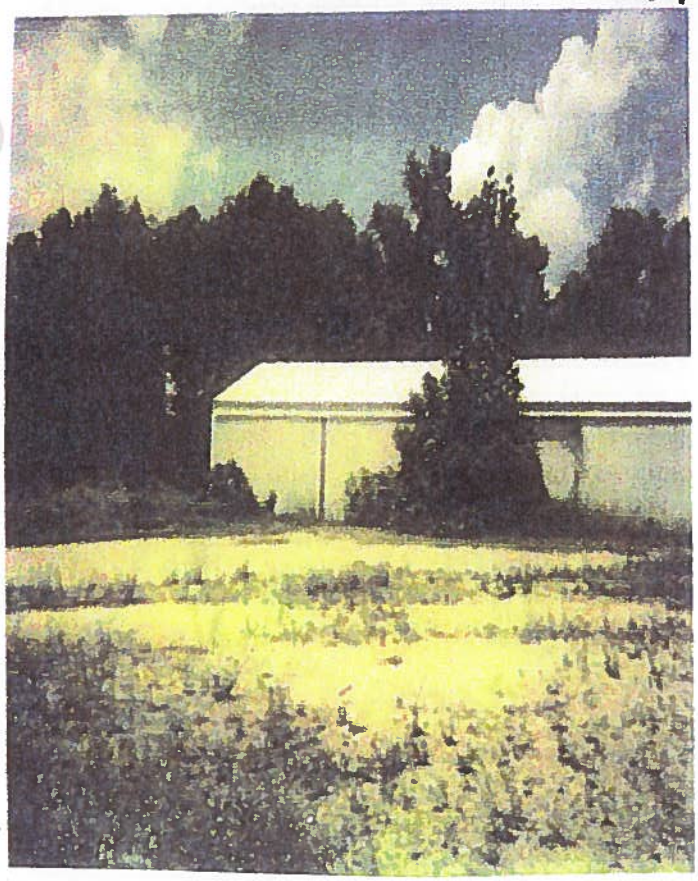
17. For each and every questions contained herein, if information or documents responsive to this Information Request are not in your possession, custody, or control, then identify the persons from whom such information or documents may be obtained.

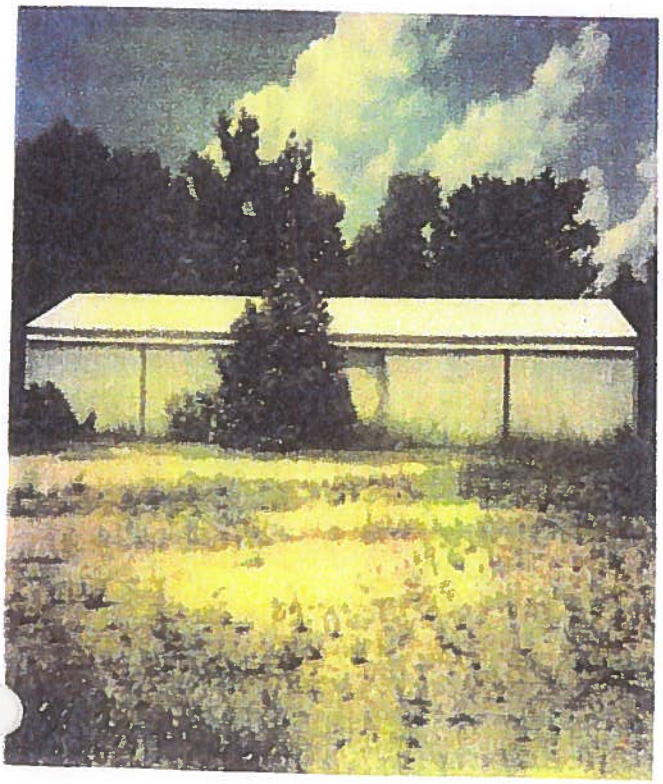
**Response:**

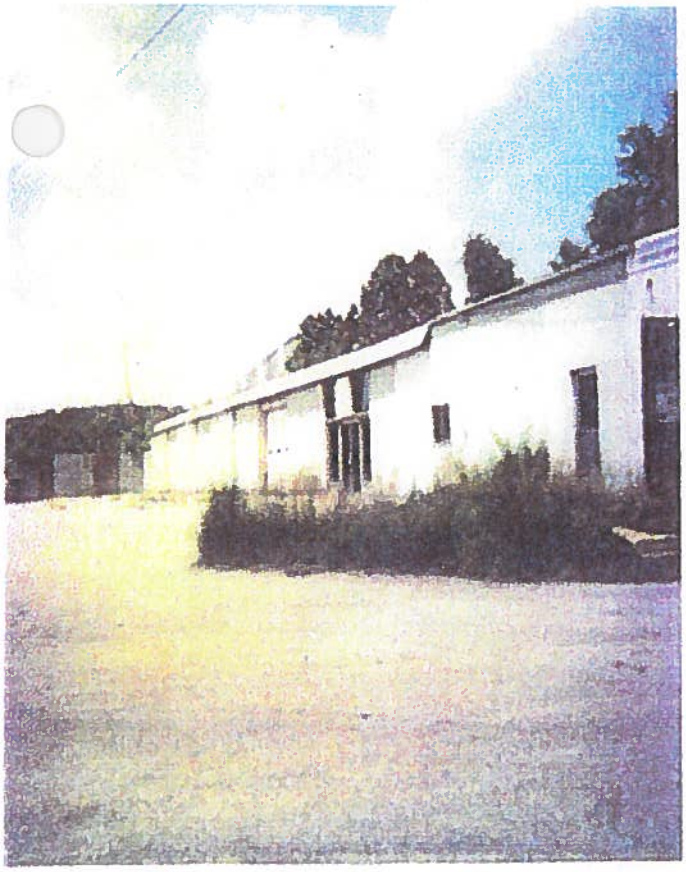
We know of no persons with additional information or documentation, whose names have not been provided or who are not previously known to EPA, at this time.

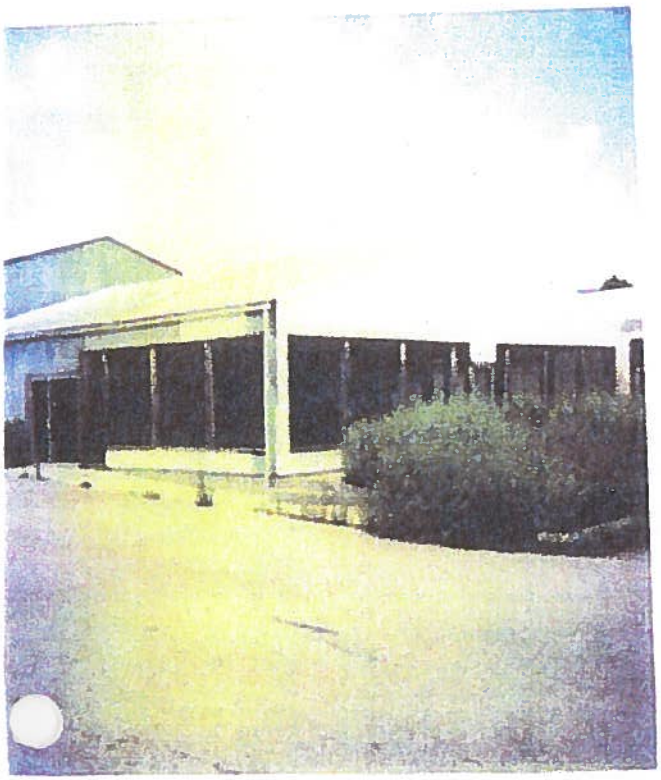
Attachments

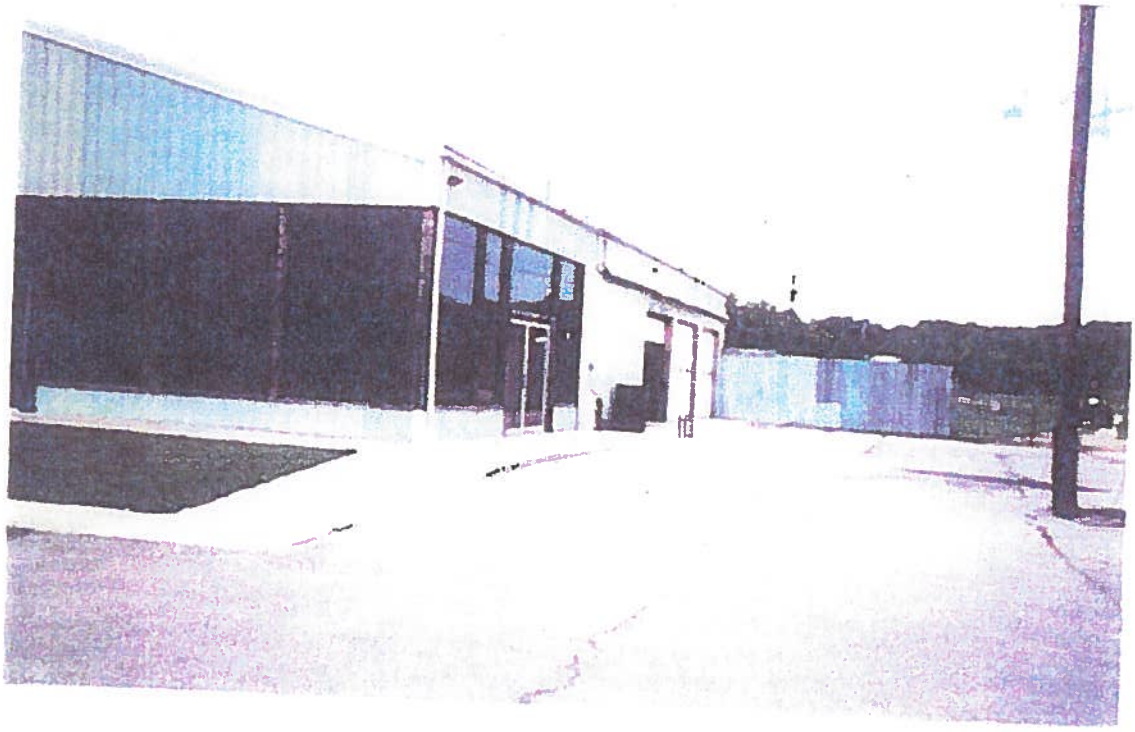
# Exhibit A

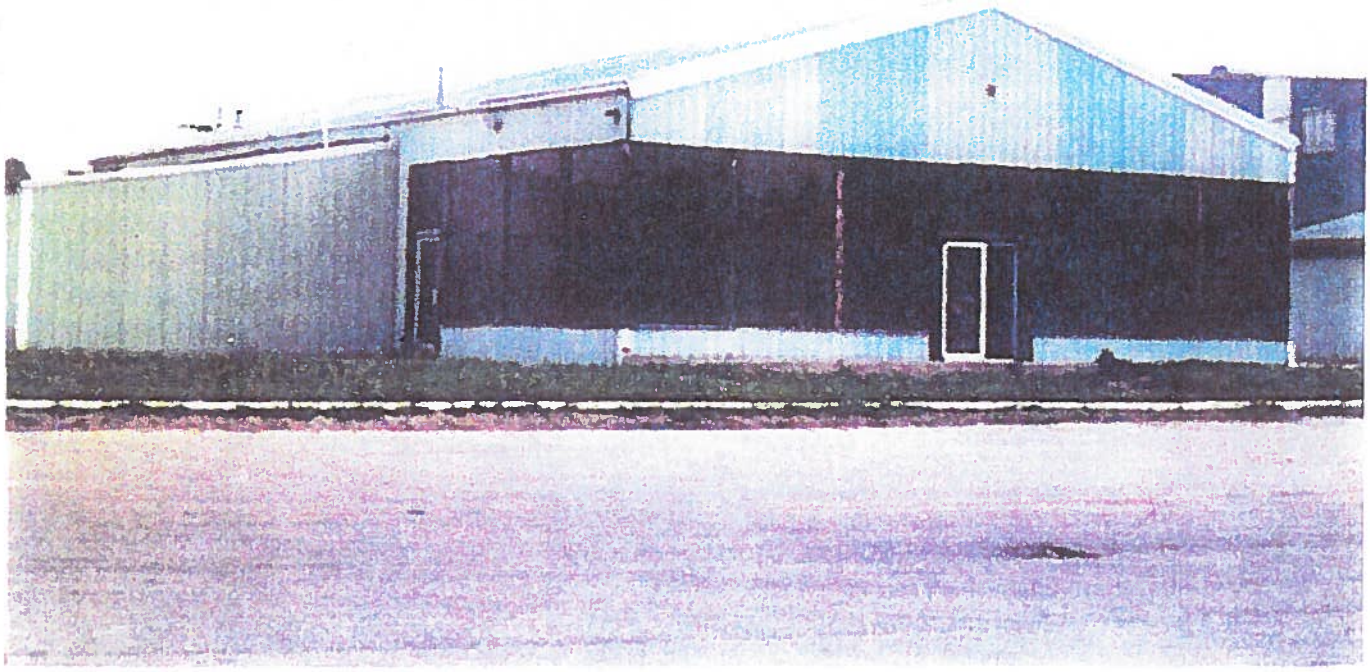


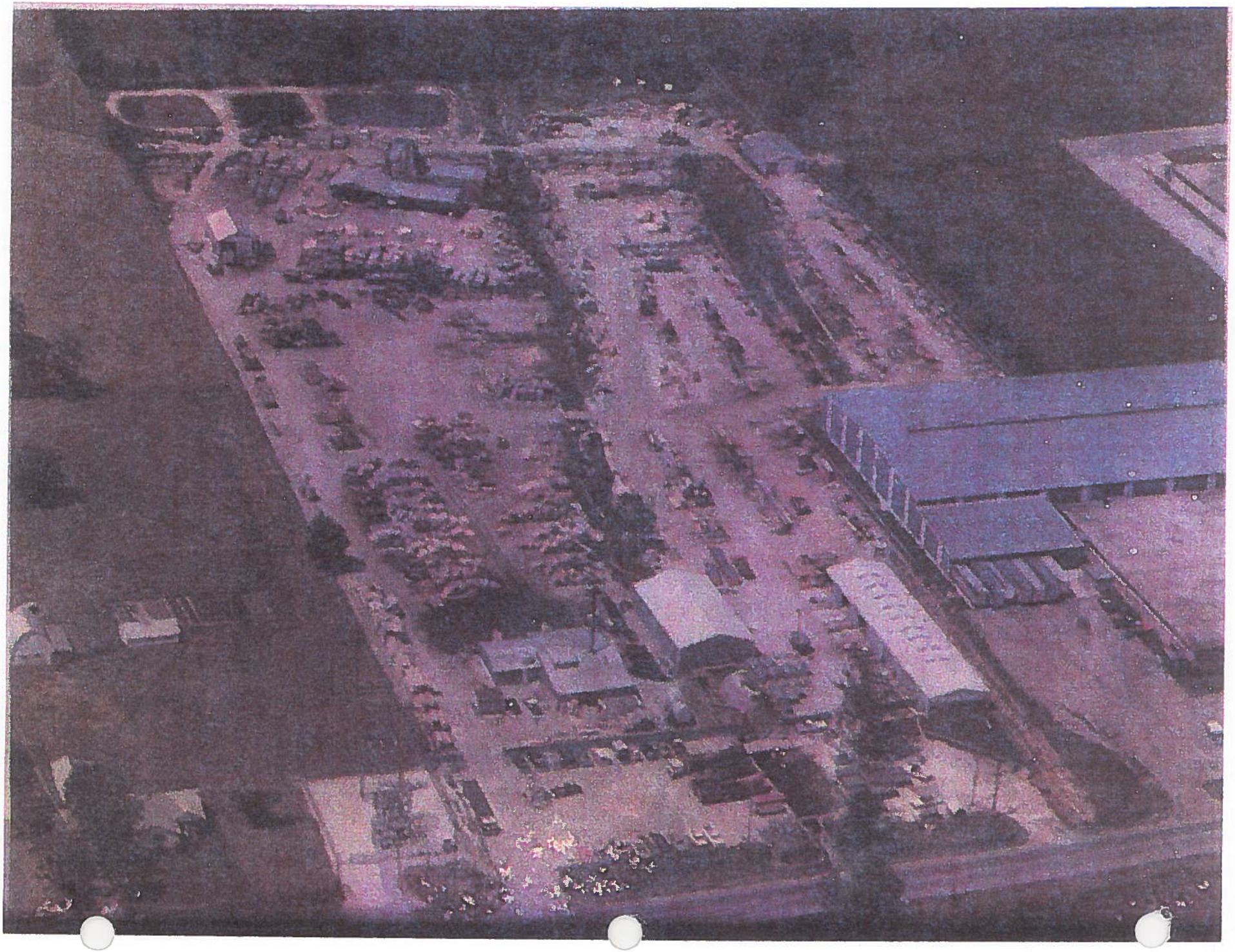


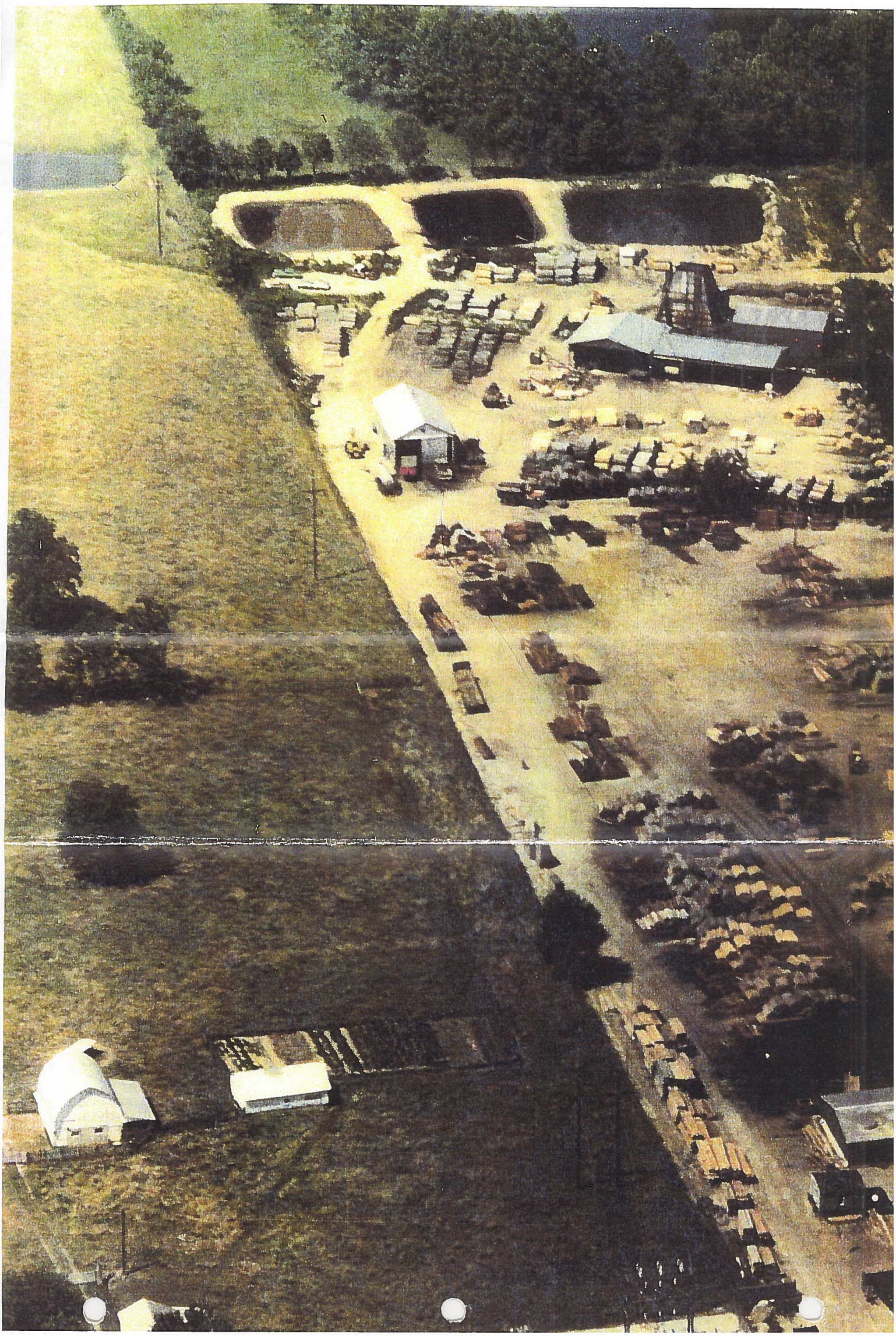


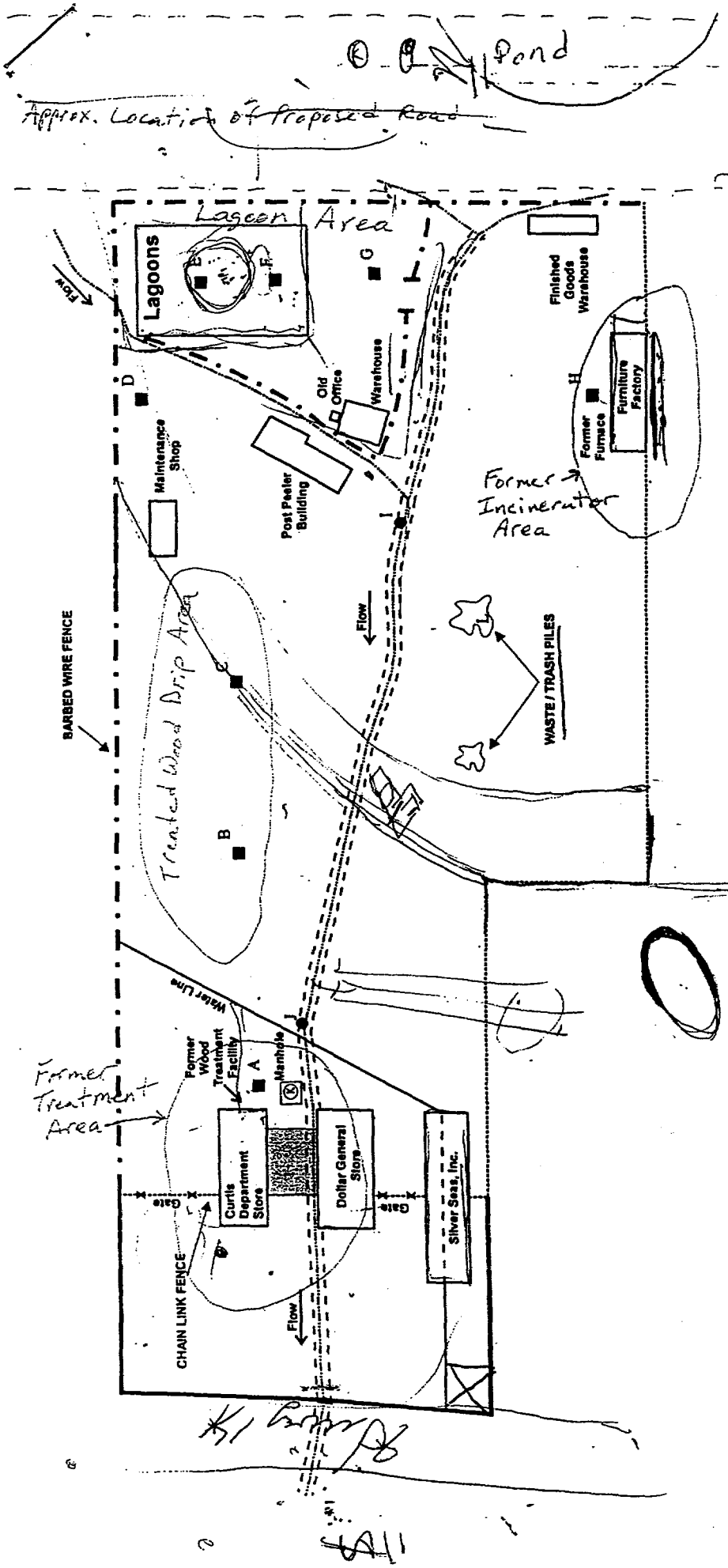













Pond
0.003 ppt dioxin

Proposed road area
no PCP detected
dioxin detected in all 8 samples but all below 1 ppb

Lagoons
up to 48.55 ppb dioxin in subsurface soil
up to 46000 ppm PCP in surface seep
up to 10000 ppm PCP in subsurface soil
up to 2000 ppm PAHs in subsurface soil

Incinerator area
up to 139 ppm arsenic

Treated wood drip area
nothing major found

Former treatment area
up 4.7 ppb dioxin in surface soil
up to ~~22.3 ppb~~ dioxin in subsurface soil (under pavement)
up to 4900 ppm TPH in subsurface soil
up to 31 ppm PCP in subsurface soil

Ground water
(lagoon area only)
up to 34 ppt dioxin
up to 34 ppm PCP
up to 0.5 ppm TPH

Surface water
up to 0.22 ppt dioxin

NOTE: dioxin results not validated

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**REGION VII**
**OFFICE OF REGIONAL COUNSEL**
**901 N. 5th Street**
**KANSAS CITY, KANSAS 66101**

**TO:** Don Farris
Sentinel Industries, Inc.
(573) 657-2484

**RE:** Sentinel Wood Treating Site
Fact Sheet

**DATE:** October 20, 2000

**FROM:** Alyse Stoy
Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency
901 N. 5th Street
Kansas City, Kansas 66101
Telephone Number: (913) 551-7826
FAX Number: (913) 551-7925
E-mail address: stoy.alyse@epa.gov

**NUMBER OF PAGES SENT** (Including Cover Page): 3

**MESSAGE:**

Please feel free to give me a call if you have any questions.

**CONFIDENTIALITY NOTE**

# FACT SHEET

EPA Region 7

## Sentinel Wood Treatment Site
## Ava, Missouri

**October 2000**

### Introduction

The U S. Environmental Protection Agency (EPA) Region 7 and the Missouri Department of Natural Resources (MDNR) are currently investigating the Sentinel Wood Treatment site in Ava, Douglas County, Missouri. The purpose of the investigation is to determine the extent of human health and environmental risk posed by past practices at the site.

EPA and MDNR will address this site under the Comprehensive Environmental Response, Compensation and Liability Act, commonly known as Superfund. Congress established the Superfund program in 1980 in response to growing concerns over human health and environmental risks posed by hazardous waste sites.

EPA's recent investigations have confirmed that certain areas of the site are contaminated with pentachlorophenol (PCP), dioxin, arsenic, and polycyclic aromatic hydrocarbons (PAHs). MDNR will conduct an Expanded Site Inspection (ESI) to better define the extent of contamination. In addition, EPA has determined that a removal action is needed in the former lagoon area of the site.

### Background

Sentinel Industries, Inc. pressure treated wood with PCP at the site from 1959 to approximately 1978. Sludge from the pressure treating process was deposited in three lagoons on the property. EPA has information that these lagoons caught fire sometime in the early 1970s. In addition, sludge from the wood treating operation was burned in an on-site boiler used to steam the wood before being pressure treated.

In the mid-1970s, site waste was found a mile downstream in the sewer system. Consequently, Sentinel Industries constructed a ground water diversion, interception and collection system around the lagoons in the late 1970s. This was designed to catch any water that might carry leachate from the lagoon. Water from the system was pumped to a treatment facility which included charcoal filtration, prior to being discharged to the city sewers. The ground water diversion system has not operated since the mid-1980s. The wood treating operation ceased in 1978 to 1979, and the lagoons were covered with soil.

In 1975 the company started manufacturing hog houses on-site. The wood for the hog houses was pre-treated off-site with Copper Chromium Arsenate (CCA). The sawdust and scrap wood from the hog house manufacturing was burned in an on-site furnace

**Site Assessment**

EPA's most recent site assessment conducted in July 2000, confirmed the presence of high levels of dioxin, PCP, and PAHs in the soil and sludge from the lagoon area. In addition, EPA's assessment revealed arsenic contamination in the northeastern portion of the site, and very low levels of dioxin and PCP in the perched ground water, surface water and associated sediments.

**Next Steps**

EPA and MDNR will conduct an ESI to better define the extent of on-site contamination and possible off-site contamination attributable to Sentinel Industries' past operations. Specifically, future investigations will focus on the southern area of the site where wood treatment occurred, the eastern area of the site where CCA-treated wood was burned, and the area just outside the former lagoons. It has also been determined that a Removal Action (RA) is warranted in the area of the former lagoons. EPA is currently evaluating several options for the RA to determine which is the most appropriate for this site.

EPA and MDNR are coordinating with Missouri Department of Health, the Agency for Toxic Substances and Disease Registry and EPA toxicologists to evaluate the risks to human health and the environment posed by the site.

**Additional Information**

EPA will provide additional information to the community regarding site activities as it becomes available, and will hold an informational meeting in the near future. If you would like additional information about the site please contact:

Hattie Thomas, Community Involvement Coordinator
EPA Region 7
901 N. 5th Street
Kansas City, Kansas 66101
1-913-551-7003
Toll-free 1-800-223-0425
Email: thomas.hattie@epa.gov

AWPI is considering options for addressing this issue. We may ask our Congressional representatives for correction of specific errors by Federal Agencies and we may work with the U.S. Chamber of Commerce on legislation to resolve this problem throughout the government.

## Courts Rulings May Deem Retroactive Liability Unconstitutional; What About Superfund?

For years AWPI has argued that retroactive liability under Superfund is "unfair," but new court rulings come a step closer to calling it "unconstitutional." A recent Supreme Court ruling found that a statute creating a health benefit fund for retired coal miners as it applied to former coal mine company, Eastern Enterprise, was invalid and impermissably retroactive because it attached new legal consequences to an employment relationship that was completed before the law's enactment. In handing down its June 25, 1998 ruling in this case, the Court cited the following criteria as a test of the law's violation:

- It imposes severe retroactive liability;
- Liability is on a limited class of parties that could not have anticipated the liability; and
- Extent of the liability is substantially disportionate to the parties' experience.

### Fifth Amendment Applies

The Fifth Amendment protects us against the government "taking" our property without compensation. The principle that the government cannot make a law today that can make a person or corporation liable for actions they took yesterday seems logical and essential to orderly and just government. However, since the environmental movement of the 1970s people seem to have lost their sense of freedom when it comes to the environment. In particular, the Superfund statute contains language that appears to create liability for contamination of the environment through actions that were legal in the past. Actually, it was not Congress, but rather the U.S. EPA that created much of the burden of "strict, joint and several liability" that has characterized Superfund between 1980 and 1998. Occasionally, defendants have protested that "it wasn't illegal when I did it," but the EPA and the courts generally ignore the Constitutional question and only consider the statutory and regulatory standards.

Another key court case is shaping up in *U.S. v. Asarco*. The EPA is trying to hold Asarco liable under Superfund for remediation estimated at a billion dollars for mining activities in Idaho even though the agency acknowledges that Asarco was only involved in about 25 percent of the cost and all the company's actions were before Superfund's enactment in 1980. Watch this case. It could be critical to the future liability of contaminated sites. As always, AWPI provides this information as a news item, and you should seek legal advice from your lawyer. AWPI will continue to closely monitor this issue.

## AWPI's '99 Convention Will Take Place Mar. 21-23 In Stone Mountain, GA – Don't Miss It!

Mark your calendars for March 21-23 to attend AWPI's Annual Convention in beautiful Stone Mountain, Georgia at the Marriott's lush Evergreen Resort and Conference Center. Located inside the scenic 3200 acre Stone Mountain Park, the Evergreen Resort offers fishing, golf, hiking and an indoor pool as well as a wide range of other recreational and leisure activities. All this just a short drive from Atlanta.

Convention activities will begin on Sunday, Mar. 21 with a golf tournament and welcome reception. The accessibility of the resort and the exciting programs currently being finalized, together with the picturesque beauty of the meeting facility promise to make this the biggest and best AWPI Conference in many years. Please plan to attend and stay tuned for more details on the meeting.

AWPI is considering options for addressing this issue. We may ask our Congressional representatives for correction of specific errors by Federal Agencies and we may work with the U.S. Chamber of Commerce on legislation to resolve this problem throughout the government.

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- It imposes severe retroactive liability;
- Liability is on a limited class of parties that could not have anticipated the liability; and
- Extent of the liability is substantially disportionate to the parties' experience.

**Fifth Amendment Applies**

The Fifth Amendment protects us against the government "taking" our property without compensation. The principle that the government cannot make a law today that can make a person or corporation liable for actions they took yesterday seems logical and essential to orderly and just government. However, since the environmental movement of the 1970s people seem to have lost their sense of freedom when it comes to the environment. In particular, the Superfund statute contains language that appears to create liability for contamination of the environment through actions that were legal in the past. Actually, it was not Congress, but rather the U.S. EPA that created much of the burden of "strict, joint and several liability" that has characterized Superfund between 1980 and 1998. Occasionally, defendants have protested that "it wasn't illegal when I did it," but the EPA and the courts generally ignore the Constitutional question and only consider the statutory and regulatory standards.

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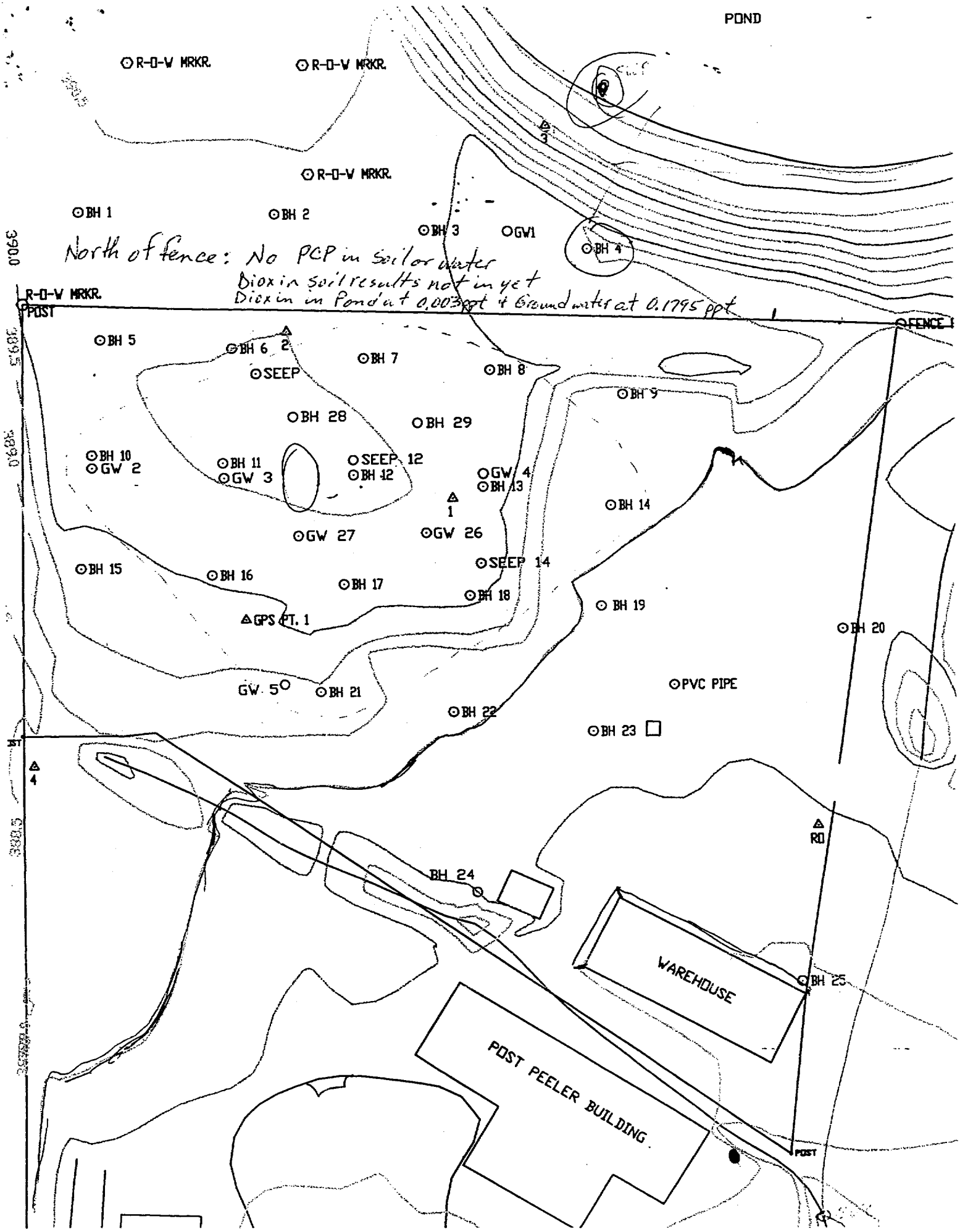

POND
R-O-W MRKR.
R-O-W MRKR.
R-O-W MRKR.
BH 1
BH 2
BH 3
GW1
BH 4
North of fence: No PCP in soil or water
Dioxin soil results not in yet
Dioxin in Pond at 0.003 ppt & Groundwater at 0.1795 ppt
R-O-W MRKR.
POST
FENCE
BH 5
BH 6
BH 7
BH 8
BH 9
SEEP
BH 28
BH 29
BH 10
GW 2
BH 11
GW 3
SEEP 12
BH 12
GW 4
BH 13
BH 14
GW 27
GW 26
SEEP 14
BH 15
BH 16
BH 17
BH 18
BH 19
BH 20
GPS PT. 1
GW 5
BH 21
PVC PIPE
BH 22
BH 23
RD
BH 24
WAREHOUSE
BH 25
POST PEELER BUILDING
POST

**TABLE**
**Summary of PCP and Dioxin Samples**

| Sample Number | PCP (ppm) | PCDD/PCDF Equivalent (ppb) |
|---|---|---|
| 1A (2-4') | ND | 0.0121 |
| 1B (6-8') | ND | 0.0016 |
| 2A (2-4') | ND | 0.0012 |
| 2B (6-8') | ND | 0.0016 J |
| 3A (2-4') | ND | 0.0011 |
| 3B (6-8') | ND | 0.0027 |
| 4A (2-4') | ND | 0.0008 |
| 4B (6-8') | ND | pending (results expected 9/27/00) |
| 5A (2-4') | ND | 0.1234 |
| 5B (6-8') | ND | 0.0411 |
| 6A (2-4') | 4.0 | 0.3036 |
| 6B (6-8') | 1.1 | 0.1327 (0.00006) |
| 7A (2-4') | 280 | 4.944 |
| 7B (6-8') | 27 | 0.2315 (0.0053) |
| 8A (2-4') | 320 | 0.1194 (0.00053 |
| 8B (6-8') | 2 | 0.0038 (0.0013) |
| 8C (10-12') | ND | 0.0004 |
| 9A (2-4') | ND | no sample |
| 9B (6-8') | ND | no sample |
| 9C (10-12') | ND | no sample |
| 9D (12-14') | ND | no sample |
| 10A (2-4') | 63 | 0.4404 (0.0012) |
| 10A1 (4-6') | 230 | 0.1551 |
| 10B (6-8) | 5.4 | 0.0838 |
| 10C (10-12') | 2.7B | 0.0013 |
| 10D (12-14') | 2.8B | 0.0005 |
| 10E (14-16') | 9.5B | 0.0011 |

| | | |
|---|---|---|
| 11A (2-4') | 4.6B | 0.0137 |
| 11B (6-8') | 120B | 0.6586 |
| 11C (8-10') | 220B | 0.0887 |
| 11D (10-11') | 5.2B | 0.0013 |
| 12A (2-4') | 78B | 1.7 |
| 13A (2-4') | 1100B | 9.914 |
| 13B (6-8') | 47B | 0.2090 |
| 13C (8-10') | 2.1B | 0.0619 |
| 14A (2-4') | 82 | no sample |
| 14B (6-8') | ND | no sample |
| 15A (2-4') | ND | 0.0044 |
| 15A1 (4-6') | 1.8B | 0.9617 |
| 15B (6-8') | 0.47J | 0.0121 |
| 15C (10-12') | ND | 0.0004 |
| 16A (2-4') | 1400 | 9.046 |
| 16A1 (4-6') | 27B | 0.5690 (0.0048) |
| 16B (6-8') | 140B | 1.536 |
| 17A (2-4') | 9900B | 29.02 (0.0947) |
| 17B (6-8') | 150B | 1.701 |
| 17C (10-12') | 17 | 0.0266 |
| 18A (2-4') | 110 | 3.078 |
| 18B (6-8') | 57 | 0.8973 |
| 18C (8-9.5') | 25 | 1.077 |
| 19A (2-4') | ND | no sample |
| 19B (6-8') | ND | no sample |
| 20A (2-4') | ND | no sample |
| 20B (6-8') | ND | no sample |
| 20C (10-12') | ND | no sample |
| 20D (12-13') | ND | no sample |
| 21A (2-4') | 400 | no sample |
| 21B (6-8') | 34 | no sample |

| | | |
|---|---|---|
| 21C (10-12') | 4.2 | no sample |
| 21D (13-15') | 2.1 | no sample |
| 21E (15-16.5') | [illegible] | no sample |
| 22A (2-4') | [illegible] | no sample |
| 22B (6-8') | ND | no sample |
| 22C (10-12') | ND | no sample |
| 23A (2-4') | ND | no sample |
| 23B (6-8') | ND | no sample |
| 23C (8-9.5') | ND | no sample |
| 24A (2-4') | ND | no sample |
| 24B (6-8') | ND | no sample |
| 24C (10-12') | ND | no sample |
| 24D (12-13') | ND | no sample |
| 25A (2-4') | 0.1 | no sample |
| 25B (6-8') | 0.29 | no sample |
| 25C (10-12') | ND | no sample |
| 26A (2-4') | 1800 | 48.55 |
| 26B (6-8') | 2400 | 4.890 |
| 26C (9-11') | 46 | 0.0961 |
| 29A (2-4') | 530 | 2.409 |
| 29B (6-8') | 680 | 0.1065 |
| 29C (9-11') | 320 | 0.5921 |
| SEDP (pond) | | 0.0085 |
| SEDC (confluence) | | 0.0119 |
| SEDB (bridge) | | 0.0772 |
| SEEP12 | 46000 | 13.16 |
| SEEP14 (18) | 5400 | 0.6218 |

**TABLE**
**Summary of Selected SVOCs in Seep Samples** ppm

| Contaminant | Seep 12 | Seep 14 | MDNR STARC | Region 9 PRG |
|---|---|---|---|---|
| Pentachlorophenol | 46,000 | 5,400 | 22 | 15 |
| Naphthalene | 950 J | 66 J | 3,100 | 190 |
| 2-Methylnaphthalene | 6,800 J | 690 J | NA | NA |
| Acenaphthene | ND | 56 J | 14,000 | 28,000 |
| Dibenzofuran | 690 J | 53 J | NA | 3,200 |
| Fluorene | 930 J | 97 J | 9,300 | 22,000 |
| Phenanthrene | 4,100 J | 570 J | NA | NA |
| Anthracene | ND | 170 J | 69,000 | 220,000 |
| Fluoranthene | ND | 59 J | 1,900 | 37,000 |
| Pyrene | ND | 100 J | 6,900 | 26,000 |
| Benzo(a)anthracene | ND | 160 J | NA | 3.6 |
| Chrysene | ND | 200 J | 143 | 360 |
| Benzo(b)fluoranthene | ND | 1,600 | 3.7 | 3.6 |
| Benzo(k)fluoranthene | ND | 1,000 | 32 | 36 |
| Benzo(a)pyrene | ND | 1,900 | 0.63 | 0.36 |
| Dibenzo(a,h)anthracene | ND | 580 J | 0.57 | 0.36 |
| Indeno(1,2,3-cd)pyrene | ND | 1,600 | 11 | 3.6 |
| Benzo(g,h,i)perylene | ND | 2,000 | NA | NA |
| Acenaphthylene | ND | 180 J | NA | NA |

**TABLE**
**Summary of PCP and Dioxin Water Samples**

| Sample Number | PCP (ppm) | PCDD/PCDF Equivalent (ppt) |
|---|---|---|
| GW1 | 0.005J | 0.1795 |
| GW2* | 0.790 | 0.3002 µg/kg |
| GW3 | 34 | 2.792 |
| GW4 | 34 | 1.215 |
| GW4 (filtered) | no sample | pending |
| GW5 | 0.560 | 34.06 |
| SWP (pond) | ND | 0.003 |
| SWC (stream confluence) | ND | 0.2214 |
| SWC (filtered) | no sample | pending |
| GWR (probe rinsate) | 70 | 0.0298 |
| GWFB (field blank) | ND | 0.0006 |

* = A large amount of sediment was found in this sample and after a check of the percent moisture, it was determined by the laboratory that it should be run as a soil sample. Therefore, the results are in µg/kg. The percent moisture was 45.84.

STATE OF MISSOURI
Roger B. Wilson, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

October 27, 2000

Mr. Don Ferris
Sentinel Industries, Inc.
P.O. Box 165
Ashland, MO 65010

Re: Sentinel Wood Treating Site
Ava, Douglas County, Missouri

Dear Mr. Ferris:

This letter is being sent as notification that the Missouri Department of Natural Resources' (DNR) Hazardous Waste Program (HWP) is initiating an Expanded Site Inspection (ESI) for the Sentinel Wood Treating site located in Ava, Douglas County. Missouri. The investigation is being conducted under authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), through a cooperative agreement with the U.S. Environmental Protection Agency (EPA).

The purpose of an ESI is to collect information to assess the threat posed to human health and the environment and to determine whether the site qualifies for listing on the National Priority List (NPL) site using the Hazard Ranking System. In 1984, a Preliminary Assessment conducted by the DNR documented apparent pentachlorophenol (PCP) contamination in the surface soils on-site. In January 1993, a Site Inspection was conducted by the EPA that confirmed PCP in the lagoon area. In 1998, the Missouri Department of Health conducted a health consultation for the site at the request of EPA which recommended that a removal action is necessary due to the presence of dioxin toxicity equivalents, arsenic, and PCP in soils onsite. The EPA has recently determined that a removal action is warranted in the former lagoon area, and they are currently evaluating alternatives to determine the most appropriate removal action.

We have tentatively scheduled sampling for the week of November 27th, if that is agreeable to you. We are currently working on the scope of sampling for the ESI. At this time, we intend to collect groundwater, surface water and soil samples from both on and off site. You may collect splits of those samples collected from your property if you choose to. The analytical results for those samples collected from your property will be provided to you as soon as they are available.

We appreciate your cooperation. If you have any questions regarding this investigation, please contact me at (573) 751-8629.

Sincerely,

HAZARDOUS WASTE PROGRAM

Valerie Wilder

Valerie Wilder
Environmental Specialist

cc: Ms. Kara Valentine, AGO
Mr. Chris Cady, VCP
Mr. Eric Nold, EPA Region VII
Ms. Alyse Stoy, EPA Region VII
Mr. Bryant Burnett, EPA Region VII

# PERSONAL MONEY ORDER

THIS DOCUMENT HAS AN ARTIFICIAL WATERMARK PRINTED ON THE BACK.
THE FRONT OF THE DOCUMENT HAS A MICRO-PRINT SIGNATURE LINE.
ABSENCE OF THESE FEATURES WILL INDICATE A COPY.

590 0669701

75-1522/910

PAY
TO THE
ORDER OF _____

DATE _____

$ _____

NOTICE TO CUSTOMERS: The purchase of an Indemnity Bond will be required before this instrument will be replaced in the event it is lost, misplaced or stolen.

**Boone County National Bank**

**NOT NEGOTIABLE**

The customer procuring the Personal Money Order form, corresponding in number and amount to that shown hereon, agrees to insert thereon in ink, the date, payee, his/her signature and address and assumes responsibility for all events made possible by his/her failure to do so.

SAVE THIS COPY FOR YOUR RECORD

NON-NEGOTIABLE

Sentinel Industries, Inc.
SIGNATURE OF REMITTER

P.O. Box 165
ADDRESS

Ashland, MO 65010
CITY & STATE

DRAWER: TRAVELERS EXPRESS COMPANY, INC.
P.O. BOX 9476, MINNEAPOLIS, MN 55480
DRAWEE: FIRSTAR BANK OF MINNESOTA, N.A. ST., PAUL, MN

K01

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

SEP 25 1998

Mr. Don Farris
Sentinel Industries, Inc.
P.O. Box 165
Ashland, Missouri 65010

Subject: Voluntary Cleanup at 412 NW 12th Street, Ava, Missouri

Dear Mr. Farris:

Enclosed please find an Environmental Remediation Oversight Letter of Agreement for the former Sentinel Wood Treating Site site located at 412 NW 12th Street, Ava, Missouri. The Letter of Agreement is a part of the application process for the Voluntary Cleanup Program (VCP) and explains the responsibilities of the participant and the department as they pertain to the voluntary cleanup process. VCP must receive the signed Letter of Agreement and the deposit check prior to conducting any further review on this project.

If the terms are acceptable, please sign and date the Letter of Agreement in the appropriate spaces and return it, with the deposit, to Mr. Jim Belcher at the letterhead address. Thank you for participating in the Voluntary Cleanup Program. We look forward to working with you on this project.

Sincerely,

HAZARDOUS WASTE PROGRAM

Chris Cady

Chris Cady
Environmental Specialist
Voluntary Cleanup Section

cc:ph

Enclosure

The department appreciates your interest in the Voluntary Cleanup Program and looks forward to working with you.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

John A. Young
Director

JAY:jbp

Enclosures

# VOLUNTARY CLEANUP PROGRAM QUARTERLY BILLING

*MISSOURI DEPARTMENT OF NATURAL RESOURCES*
*HAZARDOUS WASTE PROGRAM/VOLUNTARY CLEANUP SECTION*

SAMPLE

Site Number: XXXX

Billing Period: 11/01/94 thru 12/31/94

Site Name: ABC Company

---

Quarterly expenses include:

| Employee | Date | Pay | Total |
|---|---|---|---|
| Employee A | 11/23/94 | 33.0196 | $33.02 |
| Employee A | 11/23/94 | 77.0458 | $77.05 |
| Employee A | 12/05/94 | 19.9166 | $19.92 |
| Employee B | 12/23/94 | 2.0386 | $2.04 |

TOTAL PERSONAL SERVICE COSTS $132.02
X 2.5 $330.05

| Travel | No. of miles | @.26 per | Total |
|---|---|---|---|

| | Item: | Total |
|---|---|---|
| Equipment | | |
| Supplies | | |
| Other | | |

TOTAL $0.00

---

Original Application Fee Paid to MDNR: $200.00
Original Deposit Paid to MDNR: (Up to $5,000) $1,500.00

| MDNR Costs Incurred: | Billing Period | Total Deposit & App. Fee | Balance on hand from App. Fee & Dep. |
|---|---|---|---|
| Personnel | $330.05 | | |
| Expenses | $0.00 | | |
| TOTALS | $330.05 | $1,700.00 | $697.14 |

| | |
|---|---|
| FEE & DEPOSIT BALANCE ON HAND | $1,700.00 |
| PREVIOUS BILLING AMOUNT | $1,002.86 |
| PREVIOUS BALANCE | $697.14 |
| minus TOTAL THIS PERIOD | $330.05 |
| NEW BALANCE | $367.09 |

Mail payment in the form of a Cashier's Check or irrevocable letter of credit issued by a MO bank within 60 days to:

Missouri Department of Natural Resources
Hazardous Waste Program/Voluntary Cleanup
P.O. 176, Jefferson City, MO 65102

For Office Use Only:

| Date: | Amt Due: | Amt Received: | Initials: |
|---|---|---|---|
| | | | |

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

SEP 24 1998

Mr. Don Farris
Sentinel Industries, Inc.
P.O. Box 165
Ashland, Missouri 65010

Subject: Environmental Remediation Oversight Letter of Agreement

Dear Mr. Farris:

The former Sentinel Wood Treating site has been accepted into the Hazardous Substance Environmental Remediation Program (Voluntary Cleanup Program, VCP) for the remediation of contaminants under the review and oversight of the Missouri Department of Natural Resources (department). Please note that sites where remediation has been initiated or completed since August 28, 1994 cannot be accepted into VCP except in cases where limited action was taken to abate an emergency resulting from a release of a hazardous substance.

This letter serves as an agreement between the department and Sentinel Industries, Inc. regarding the department's review of documents and oversight of remediation of hazardous substances at 412 NW 12th Street, Ava, Missouri.

A $2000 initial deposit to be used for document review and oversight expenses incurred by the department must accompany the fully completed agreement. The deposit may be in the form of a cashier's check payable to the Missouri Department of Natural Resources or an irrevocable letter of credit issued by a Missouri bank. VCP must receive the signed Letter of Agreement and the deposit check prior to conducting any further review on this project.

The department's document review and oversight costs will include personnel and expense costs, plus indirect costs as per subparagraphs (8) (A) 1. and 2. of 10 CSR 25-15.010 (copy enclosed).

Should the $200 application fee and the $2000 deposit be expended prior to completion of the project, any further department expenses will be billed quarterly, with the option to

bill monthly, as per the enclosed sample. Because of the limited scope of work envisioned under this Letter of Agreement, accounting details above the level of the sample enclosed will not be provided by the department.

Any disputes arising from the review and oversight costs will be handled in accordance with 10 CSR 25-15.010 (8) (C). The department is in the process of increasing the multiplier used to calculate the hourly rate charged for oversight of Voluntary Cleanup Program projects. We have determined that the amount charged heretofore is insufficient to cover our actual costs. Costs associated with this project will be billed at the higher rate, and this will be reflected in quarterly billing statements sent to you during the course of this project.

In the event review and oversight costs do not meet or exceed the funds on deposit; the department will refund within sixty (60) days of the close of the project, all the funds remaining in excess of the actual costs.

A copy of the Phase I environmental site assessment and all existing and relevant reports and supporting documentation, or other information concerning any site assessments, investigations, sample collections, and sample analyses that have not previously been provided to the department, shall be submitted with this signed agreement or within ninety (90) days following acceptance of this Letter of Agreement.

The department agrees to review all existing and relevant environmental documents received to determine if remediation of the above referenced site is necessary to meet state standards. If remediation is needed and you desire the department's oversight and participation, you must develop a Remedial Action Plan for cleanup of the site. The Remedial Action Plan must be approved by the department prior to implementation. The Remedial Action Plan shall include work plans, safety plans, testing protocols, and appropriate monitoring plans. Oversight by the department will be in accordance with the provisions of the Remedial Action Plan. A Notification of Completion letter will be issued by the department director upon successful completion of the Remedial Action Plan.

The owner(s)/authorized agent shall allow the department access to the site for purposes of overseeing the implementation of the remedial action plan, including sampling at the site; conducting investigations relating to soil and groundwater contamination at, beneath, or near the site; and observing and monitoring the progress of the work.

During the investigation and remediation of this site, you shall submit quarterly progress reports to the department on forms furnished by the department.

In the event that contaminants of concern will remain at the site above unrestricted land use levels, a restrictive covenant and a monitoring contract with the department shall be required.

Sentinel Industries, Inc. may terminate this Letter of Agreement at any time for any reason by giving written notice, via certified mail, to the department. The department may terminate this Letter of Agreement for cause, which includes the grounds set forth in Section 260.569.3, Revised Statutes of Missouri (RSMo). Only those costs incurred by the department prior to the effective date of any termination of this Letter of Agreement shall be recoverable by the department under this agreement.

Sentinel Industries, Inc. shall hold the department harmless for any claims (including, but not limited to, claims for property damage or personal injury) arising from activities of Sentinel Industries, Inc. that are reviewed or overseen under this Letter of Agreement. This Letter of Agreement is not and shall not be construed as an admission by Sentinel Industries, Inc. of any liability under 10 CSR 25-15.010 or any other law or as a waiver of any defense to such liability. This Letter of Agreement is not and shall not be construed as a waiver, release, or settlement of claims the department may have against Sentinel Industries, Inc. or any other person, or as a waiver of any enforcement authority the department may have with respect to Sentinel Industries, Inc. or the property. If determined to be necessary, the preparation and submittal of any permit applications are your responsibility as participant. The processing and review of permit applications, which are awarded by the department and may be necessary for work conducted under this agreement, are not subject to the time limits established for the Voluntary Cleanup Program.

This letter of agreement must be signed and returned to the department within 60 days from the date of this letter. Unless DNR grants a written extension, if this letter is not returned signed, within the prescribed period, this letter of agreement shall be null and void.

If the terms of this Letter of Agreement are acceptable, please execute this Letter of Agreement by signing in the space provided below and return, along with the $2000 deposit. Checks should be made payable to the Missouri Department of Natural Resources and sent to:

Mr. Jim Belcher, Chief
Voluntary Cleanup Section
Hazardous Waste Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 25—Hazardous Waste Management Commission
Chapter 15—Hazardous Substance Environmental Remediation

## 10 CSR 25-15.010 Hazardous Substance Environmental Remediation

*PURPOSE: This rule defines those persons who may apply to the Missouri Department of Natural Resources for oversight of an environmental remediation cleanup in accordance with sections 260.565—260.575, RSMo, and establishes procedures for participation.*

(1) Applicability. Any person, including, but not limited to, a person acquiring, disposing of or possessing a lien holder interest in real property that is known to be or suspected to be contaminated by hazardous substances, may apply to remediate the real property with oversight by the Missouri Department of Natural Resources.

(2) Definitions and Substitution of Terms. This section supplements and modifies the definitions in 10 CSR 25-3. Where these definitions differ from those in 10 CSR 25-3, the modified definition is applicable only in this rule.

(A) Additional Definitions.

1. Days means calender days unless otherwise specified.

2. Environmental remedial cleanup means a remedial action at an affected site undertaken and financed by a person, which remedial action is subject to oversight and approval by the department, and with respect to which remedial action the person agrees to pay the department's site-specific costs incurred in administration and oversight.

3. Hazardous substance means any hazardous substance specified in the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. sections 9601(14)(A)—(F) and any hazardous waste as defined in section 260.360, RSMo or any rules promulgated under sections 260.350—260.480, RSMo.

4. Nonresidential property means any real property currently or previously used for industrial or commercial purposes, or both.

5. Participation fees means the two hundred dollar ($200) application fee, the initial oversight costs deposit not to exceed five thousand dollars ($5000) and all additional oversight cost reimbursements.

6. Person means any individual, partnership, copartnership, firm, company, public or private corporation, association, joint stock company, trust, estate, political subdivision or any agency, board, department or bureau of the state or federal government or any other legal entity which is recognized by law as the subject of rights and duties.

7. Phase I environmental site assessment means a noninvasive physical assessment of the real property conducted in accordance with American Society for Testing and Materials (ASTM) Standard E.1527 by a technical consultant who is familiar with the nature of the operations and activities that have occurred on the real property.

8. Phase II environmental site assessment means an invasive investigation by a technical consultant of those areas of concern identified during the Phase I environmental site assessment.

(B) Modified definition applicable only to this rule. Remediation or remedial action means all appropriate actions taken to clean up contaminated real property, including but not limited to removal, remedial action and response as these terms are defined by the federal Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9601).

(3) Intent to Participate.

(A) Persons desiring to remediate real property with oversight by the department shall request an application form from the department.

(B) The application form shall include the information set forth in section 260.567.1., RSMo and any other existing and relevant information required by the department. The application form shall be filled out completely and returned to the department with the two hundred dollar ($200) application fee. Application forms may be submitted at any time from the completion of a Phase I environmental site assessment up through the development, but not including the implementation, of a remedial action plan.

(C) The department will review the form for completeness. The department will return any form deemed incomplete to the person for completion. Upon receipt of all requested information, the department will notify the person that the application form is complete and proceed according to section (4) of this rule.

(D) The department will deny applications for sites which warrant clean-up under force of law or regulation under Resource Conservation and Recovery Act, 42 U.S.C. section 6901 et seq., as amended, or the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. section 9601 et seq., as amended, or the Missouri Hazardous Waste Management law that fall within any of the following categories:

1. Conditions at a site constitute an imminent and substantial threat to public health or the environment;

2. Site inspection is completed and the site is being evaluated for listing on the NPL;

3. Permitted or interim status Resource Conservation Recovery Act facilities; or

4. Sites which warrant enforcement action for clean-up under the Resource Conservation and Recovery Act, the Comprehensive Environmental Response Compensation and Liability Act, or the Missouri Hazardous Waste Management Law.

(4) Environmental Remediation Oversight Agreement.

(A) Upon approval of the application, the department shall enter into a site-specific environmental remediation oversight agreement with the person. This agreement shall set forth the responsibilities of the person and the department.

(B) The person shall post an initial five thousand dollar ($5000) deposit with the department or a lesser amount as determined by the department to cover the department's initial oversight costs. The deposit may be satisfied by a cashier's check or an irrevocable letter of credit issued by a Missouri bank.

(C) The person shall submit a copy of all reports concerning the results of any site assessments, investigations, sample collections and sample analyses, and any other existing and relevant information requested by the department. At a minimum, such reports and information shall consist of a Phase I environmental site assessment.

1. All reports, including other information requested by the department pursuant to subsection (4)(C) of this rule, shall be submitted within ninety (90) days following receipt of notice from the department that these reports are required. An extension may be granted at the department's discretion.

2. The department will review and comment on the reports within one hundred eighty (180) days. The one hundred eighty (180) days shall start upon receipt of all the reports or the deposit required in subsection (4)(B) of this rule, whichever is later.

(5) Remedial Action Plan.

(A) The person shall submit a remedial action plan for any contamination identified in the environmental site assessments within ninety (90) days following notice from the department that this information is required. An extension may be granted at the department's discretion. The remedial action plan shall satisfy the requirements of section 260.567.6., RSMo.

Accepted and agreed to this 5th day of Oct, 1998 in the State of Mo, County of Boone.

**Owner(s) signature(s):**

Sentinel Industries, Inc — SENTINEL INDUSTRIES.
(Signature) (Print Name)

Don Farris (Pres) — DON FARRIS
(Signature) (Print Name)

NOTARY PUBLIC:

Donna J. Farris
My commission expires Oct 18, 1998.

If signed by an authorized agent, please indicate relationship to owner(s), work title, address, and telephone number. As owner(s) agent, I certify that I am fully authorized to enter into the terms and conditions of this Letter of Agreement and to bind the owner(s) I represent to this agreement.

_____ _____
(Authorized Agent Signature) (Print Name)

_____ ( )_____
(Relationship to Owner(s)) (Telephone Number)

_____
_____
_____
(Address)

NOTARY PUBLIC:

_____
My commission expires_____.

# VOLUNTARY CLEANUP PROGRAM QUARTERLY BILLING

*MISSOURI DEPARTMENT OF NATURAL RESOURCES*
*HAZARDOUS WASTE PROGRAM/VOLUNTARY CLEANUP SECTION*

INVOICE NO. 90550018
4th Quarter 9

**Site Name:Sentinel Wood Treating** **Site #: 9055** Billing Period 10-01-98 through 12-31-98

**Mr. Don Farris**
**Sentinel Industries, Inc.**
**P.O. Box 165**
**Ashland, MO 65010**

**Quarterly expenses include:**

| Employee | Date | Pay |
|---|---|---|
| Cady, Christopher | 10/16/98 | 7.76 |
| Cady, Christopher | 10/19/98 | 77.59 |
| Cady, Christopher | 10/20/98 | 46.55 |
| Cady, Christopher | 10/26/98 | 46.55 |
| Cady, Christopher | 10/27/98 | 46.55 |
| Cady, Christopher | 10/28/98 | 46.55 |
| Cady, Christopher | 10/29/98 | 31.04 |
| Cady, Christopher | 12/01/98 | 29.63 |
| Cady, Christopher | 12/02/98 | 148.13 |
| Cady, Christopher | 12/03/98 | 14.81 |
| Cady, Christopher | 12/11/98 | 7.41 |
| Cady, Christopher | 12/16/98 | $29.63 |
| Cady, Christopher | 12/21/98 | $22.22 |
| Cady, Christopher | 12/29/98 | $14.81 |

| | | |
|---|---|---|
| DIRECT LABOR | $569.23 | |
| OVERHEAD COSTS | $853.85 | |
| TOTAL PERSONAL SERVICE COSTS | | **$1,423.08** |
| **TRAVEL** | $84.17 | |
| INDIRECT EXPENSE (19.2%) | $16.16 | |
| TOTAL EXPENSE & EQUIPMENT COSTS | | **$100.33** |
| CURRENT CHARGES | | $1,523.41 |

| | | |
|---|---|---|
| Original Application Fee Paid to MDNR: | 03/05/98 | $200.00 |
| **Original Deposit Paid to MDNR: (Up to $5,000)** | 10/07/98 | $2,000.00 |

| **MDNR Costs Incurred:** | **Billing Period** |
|---|---|
| **Personnel** | **$1,423.08** |
| Expenses | $100.33 |
| TOTALS | $1,523.41 |

| | | |
|---|---|---|
| CREDIT REMAINING AS OF | 10/01/98 | ($2,143.57) |
| PAYMENTS RECEIVED | | $0.00 |
| CHARGES THIS PERIOD | | $1,523.41 |
| **AMOUNT DUE** | | **$0.00** |
| **CREDIT** | | **($620.16)** |

Mail payment in the form of a Cashier's Check or irrevocable letter of credit issued by a MO bank within 60 days to:

**Missouri Department of Natural Resources**
**Hazardous Waste Program/Voluntary Cleanup**
**P.O. 176, Jefferson City, MO 65102**

| For Office Use Only: | | | |
|---|---|---|---|
| Date: | Amt Due: | Amt Received: | Initials: |
| | | | |

In case of an inquiry please contact us at (314) 751-3176.

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

September 9, 1998

Sentinel Wood Treating
Donald Farris, President
PO Box 165
Ashland, MO 65010

Dear Mr. Farris:

As you know, this site is listed on the *Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri (Registry)*. In accordance with Section 260.445 RSMo 1986, the department must assess or reassess the classification and priority of each site listed on the Annual *Registry*.

A five-member voting committee, made up of representatives from the Missouri Department of Natural Resources' Division of Geology and Land Survey, Hazardous Waste Program, Public Drinking Water Program, Environmental Services Program, and the Missouri Department of Health, met on August 13, 1998, to complete this task for each site. Each classification was determined in accordance with criteria contained in 260.445 and 260.450. Enclosed is a copy of the site classification definitions, according to the state Superfund Law.

This is to inform you that this site will be included in the 1998 Annual Report as a Class 2 and Priority 6. Petitions for changes or modifications in site classification may be made, pursuant to Section 260.460. If you would like more information as to the reason for your site's classification or priority, please feel free to contact the Hazardous Waste Program's Registry Unit, at (573) 751-8629.

Sincerely,

HAZARDOUS WASTE PROGRAM

Pia Capell

Pia E. Capell
Environmental Specialist

PEC:ln

Enclosures

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

August 25, 1999

Sentinel Wood Treating
Donald Farris, President
PO Box 165
Ashland, MO 65010

Dear Mr. Farris:

As you know, your property is listed on the *Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri (Registry).* In accordance with Section 260.445 RSMo. 1986, the department must annually assess or reassess the classification and priority of each site listed on the *Registry.*

A five-member voting committee, made up of representatives from the Missouri Department of Natural Resources' Division of Geology and Land Survey, Hazardous Waste Program, Public Drinking Water Program, Environmental Services Program, and the Missouri Department of Health, met on August 17, 1999, to complete this task for each site. Each classification was determined in accordance with criteria contained in 260.445 and 260.450 RSMo. 1986, and Title 10, Division 25, Chapter 10 of the Code of State Regulations [10 CSR 25-10.010].

A revision of 10 CSR 25-10.010 was finalized on December 31, 1998. The revised regulation includes a new subsection that defines the Site Assessment Committee and site classification criteria. Please note that the Class V criteria were subject to significant modification. A copy of the revised 10 CSR 25-10.010 is enclosed for your convenience.

This purpose of this letter is to inform you that your property will appear in the 1999 *Registry* Annual Report as a Class II and Priority 4. Petitions for changes or modifications in site classification may be made, pursuant to Section 260.460. If you would like more information as to the reason for your site's classification or priority, please feel free to contact the Hazardous Waste Program's Registry Unit, at (573) 751-8629.

Sincerely,

HAZARDOUS WASTE PROGRAM

Hannah Martin

Hannah Martin
Environmental Specialist

HM:ln

Enclosures

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

SEP - 8 1998

CERTIFIED MAIL NO. - P 179 978 422
RETURN RECEIPT REQUESTED

Mr. Donald Farris, President
P.O. Box 165
Ashland, MO 65010

RE: Placement on the *Registry* - Sentinel Wood Treating Site

Dear Mr. Farris:

Pursuant to Section 260.440, RSMo 1986, the Missouri Department of Natural Resources has placed this property on the *Registry of Confirmed or Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri (Registry).* The property placed on the *Registry* is described as follows:

A tract of land situated in the NE 1/4 of the NW 1/4 of Section 11, Township 26 North, Range 16 West, Douglas County, Missouri, being more particularly described as follows: Beginning at the Northwest corner of said NE 1/4 NW 1/4; thence S89°19'07"E along the North line of said NE 1/4 NW 1/4, 315.00 feet; thence S7°39'04"W, 308.80 feet; thence N57°45'20"W, 107.12 feet; thence N63°20'27"W, 204.26 feet to a point on the West line of said NE 1/4 NW 1/4; thence N0°15'23"W along said West line, 161.00 feet to the point of beginning, containing 1.59 acres, more or less, subject to all easements and restrictions of record and together with a 20.00 foot wide easement, said easement lying 20.00 feet adjacent to and on the East side of the West line of said NE 1/4 NW 1/4 beginning at a point being S0°15'23"E, 161.00 feet from the Northwest corner thereof and running S0°15'23"E, 1114.41 feet to the Northerly right-of-way line of M.S.H. No. 14.

A tract of land situated in the NE 1/4 of the NW 1/4 of Section 11, Township 26 North, Range 16 West, Douglas County, Missouri, being more particularly described as follows: Beginning at the Northwest corner of said NE 1/4 NW 1/4; thence S89°19'07"E along the North line of said NE 1/4 NW 1/4, 315.00 feet for a new point of beginning; thence continue S89°19'07"E along said North line, 229.08 feet; thence S0°09'05"E, 725.00 feet; thence N89°24'04"W, 176.24 feet; thence S0°09'34"E, 558.65 feet to a point on the Northerly right-of-way line of

M.S.H.D. No. 14; thence S89°42'59"W along said right-of-way line, 88.66 feet; thence N74°02'01"W along said right-of-way line, 52.27 feet; thence S89°43'57"W along said right-of-way line, 226.67 feet to a point on the West line of said NE 1/4 NW 1/4; thence N0°15'23"W along said West line, 1114.41 feet; thence S63°20'27"E, 204.26 feet; thence S57°45'20"E, 107.12 feet; thence N7°39'04"E, 308.80 feet to the new point of beginning, containing 12.09 acres, more or less, subject to all easements and restrictions of record and subject to a 20.00 foot wide easement along the West side thereof.

In accordance with Section 260.465(1), RSMo 1986, the owner must obtain the approval of Stephen Mahfood, Director, prior to changing the use of the above-listed property.

In accordance with Section 260.465(2), RSMo 1986, the owner must notify any buyer, early in the negotiation process, that the site is on the *Registry*. This department should also be notified of the transfer of property within thirty (30) days after the transaction occurs.

Section 260.465(1) states,

"No person may substantially change the manner in which an abandoned or uncontrolled hazardous waste disposal site on the *Registry*, prepared and maintained by the department pursuant to section 260.440, is used without the written approval of the director."

Section 260.465(2) states,

"No person may sell, convey or transfer title to an abandoned or uncontrolled hazardous waste disposal site which is on the *Registry* prepared and maintained by the department pursuant to section 260.440 without disclosing to the buyer early in the negotiation process that the site is on the *Registry*, specifying applicable use restrictions and providing all *Registry* information for the site. The seller shall also notify the buyer that he may be assuming liability for any remedial action at the site; provided, however, the sale, conveyance or transfer of property shall not absolve any person responsible for site contamination, including the seller, of liability for any remedial action at the site. The seller shall notify the department of the transfer of ownership within thirty days after the transfer."

Finally, in accordance with 260.465(4), RSMo, penalties may be sought for a violation of the aforementioned statutes.

Section 260.465(4), RSMo, states,

> "If the department has reason to believe that the provisions of this section have been violated, or are in imminent danger of being violated, it may institute a civil action in any court of competent jurisdiction for injunctive relief to prevent such violation and for the assessment of a civil penalty not to exceed one thousand dollars per day for each day of the violation."

If you have any questions or comments, please contact the Hazardous Waste Program at P. O. Box 176, Jefferson City, Missouri 65102, or telephone (573) 751-8629.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

John A. Young
Director

JAY:hmn

# POLICY FOR
# CLEANING UP REGISTRY SITES UNDER VCP

June 3, 1998

Kara Valentine

wants to keep the site off of the Registry, the property owner's only option is to enter into a Consent Agreement. The language of the Registry Law implies that, after a proposal to list, VCP is no longer an option. The Registry Consent Agreement must meet all of the requirements set out in 10 CSR 25-10.010(E), Opportunity to Allow Responsible Party Cleanups. Specifically, the Consent Agreement must establish a schedule and specific responsibilities for completion of any site investigation and remedial action, and it must include all necessary actions to achieve a Class V (site properly closed, no evidence of present or potential adverse impact -- no further action required) in order for DNR to withdraw its proposed listing.

The second reason why the site is no longer eligible for a traditional VCP agreement is found in the VCP law. Under § 260.567.2, RSMo, sites where contaminants warrant action under §§ 260.350 to 260.480, RSMo, (which includes the Registry Law found at §§ 260.435 to 260.470, RSMo) are not eligible for a VCP agreement. The law specifically says that, in those situations, DNR "shall deny the request."

Property owners commonly prefer a VCP cleanup to a cleanup under a Registry Consent Agreement for a number of reasons, including tax incentives offered by the Department of Economic Development (DED), which requires VCP participation. One problem with letting a proposed Registry site enter into a VCP cleanup is that VCP does not require all sites to be cleaned up to the equivalent of a Class V. As a result, the site may undergo a successful VCP cleanup but still be eligible for listing on the Registry. Another reason why a VCP agreement is not advised for proposed Registry sites is because, under VCP, the property owner can refuse to carry out the cleanup, yet the site is not automatically placed on the Registry, effectively allowing the potentially responsible party (PRP) to stall remediation actions. The Registry

accepting sites with contaminants that warrant action under the Registry Law is no longer applicable. As a result, sites listed on the Registry are eligible for VCP.

- **RECOMMENDATION:** Sites proposed for the Registry can enter a consent agreement under VCP. The agreement is different from traditional VCP agreements because of the Registry status of the property, and should include the following special conditions:
  - cleanup must be to a Class V
  - failure to meet the terms of the consent agreement will result in listing the site on the Registry

## III. AFTER THE SITE IS LISTED ON THE REGISTRY

The Registry Law is silent on how a site can be cleaned up after it has been listed on the Registry. As a result, the property owner can remediate the property anyway the owner chooses, including VCP. For example, a property owner could enter into a VCP cleanup to potentially achieve a Class V and remove the site from the Registry, or simply to change the classification of the site by doing some, but not full, remediation.

- **RECOMMENDATION:** A property owner who requests to enter into a VCP agreement after the site is listed on the Registry should be accepted into VCP assuming all other VCP eligibility requirements are met.

## SPECIFIC SITES

A. Lewistown Heet - Kirksville

Lewistown Heet had the option of entering into VCP up until the time it was proposed for the Registry in 1996. Even after that date, Lewistown Heet had several discussions with VCP but failed to commit to a VCP agreement. It was only after the hearing officer issued a decision

B. Sentinel Wood - Ava

Sentinel Wood is a dioxin contaminated site in Ava. The site has been proposed for the Registry, and the property owner recently approached VCP to enter into a VCP agreement. This site should be offered the same option as Lewistown Heet, which is to enter into a Consent Agreement under the supervision of VCP that requires a Class V cleanup and listing of the site on the Registry should the agreement be violated. This way, Sentinel Wood can remediate the site and take advantage of the DED tax incentives, but at the same time meet the requirements of the Registry Law to clean the site to a Class V.

C. Pacific Metal - Pacific

Pacific Metal is an abandoned metal plating plant in Pacific. The owner of the company filed for bankruptcy and abandoned a number of chemicals which EPA moved into a building at the site. The Bank of Washington holds a lien on the property, and is interested in undertaking at least a partial remediation of the site. The Bank of Washington is not a PRP.

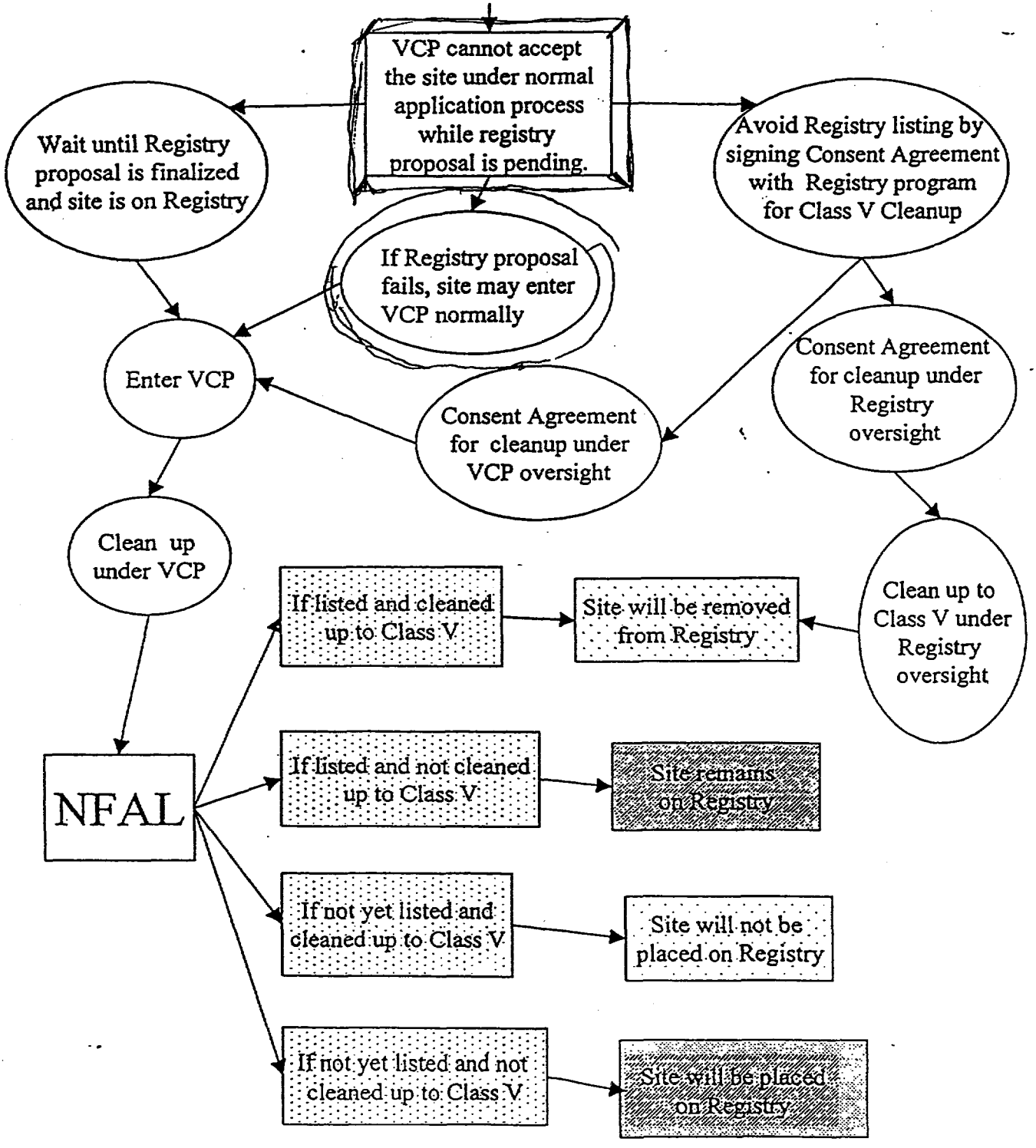
The Pacific Metal site is not eligible for a VCP cleanup because the contaminants at the site warrant action under CERCLA, rendering the site ineligible under § 260.567.2, RSMo. The MDNR has already determined that time critical action under CERCLA is necessary at this site. The site is eligible under the new state cooperative program, and the Bank of Washington has expressed an interest in removing the liquids from the building under that program. Once that work is complete, this site is probably eligible under VCP for additional work because the contaminants no longer warrant action under CERCLA as prohibited under the VCP law.

Note that the Pacific Metal site is unique because it is being cleaned up by a non-PRP. Allowing part of the site to be cleaned up under the state cooperative program and another later

# Eligibility of Proposed Registry Sites for VCP

Scenario 1: Site applies to VCP prior to proposal for listing on the Registry.
No conflict. Site can be accepted into VCP, Registry action proceeds separately.

Scenario 2: Site is Proposed for Registry listing prior to VCP application:



## SITE CLASSIFICATIONS

CLASS 1: Sites that are causing, or presenting an imminent danger of causing, irreversible or irreparable damage to the public health or environment -- immediate action required.

CLASS 2: Sites that are a significant threat to the environment -- action required.

CLASS 3: Sites that do not present a significant threat to the public health or the environment -- action may be deferred.

CLASS 4: Sites that have been properly closed -- require continued management.

CLASS 5: Sites that have been properly closed with no evidence of present or potential adverse impact -- no further action required.

MISSOURI DEPARTMENT OF HEALTH

Mel Carnahan
Governor

Maureen E. Dempsey, M.D.
Director

P.O. Box 570, Jefferson City, MO 65102-0570 • 573/751-6400 • FAX 573/751-6010

June 8, 1998

Mr. Don Farris
Sentinel Industries, Inc.
P.O. Box 165
Ashland, MO 65010

Dear Mr. Farris:

Enclosed for your information is a copy of the Sentinel Wood Treating Company Health Consultation. The health consultation was requested by the Environmental Protection Agency after contamination was detected on the site.

The health consultation was prepared by the Missouri Department of Health under a cooperative agreement with the federal environmental health agency, the Agency for Toxic Substances and Disease Registry (ATSDR).

If you have any questions, please contact Arthur Busch or Scott Clardy of my staff at (800) 392-7245 or (573) 751-6404.

Sincerely,

Daryl W. Roberts, Director
Section for Environmental Public Health

DWR:ALB/mdh
Enclosure

cc: Jerry Foster, MDNR

# HEALTH CONSULTATION

420 NW 12TH

SENTINEL WOOD TREATING COMPANY INCORPORATED

AVA, DOUGLAS COUNTY, MISSOURI

CERCLIS NO. MOD029684438

Prepared by:

Missouri Department of Health
Environmental Public Health
Under a Cooperative Agreement with
Agency for Toxic Substances and Disease Registry

# STATEMENT OF ISSUES AND BACKGROUND

## STATEMENT OF ISSUES

The Environmental Protection Agency (EPA), through the Agency for Toxic Substances and Disease Registry (ATSDR) regional office, has requested the Missouri Department of Health (DOH) to complete a health consultation for the Sentinel Wood Treating site. This health consultation will examine the contaminant and exposure levels at this site and determine whether further assessment or a removal action are warranted.

## BACKGROUND

The Sentinel Wood Treating, Incorporated site, Ava, Douglas County, Missouri is the location of a former pressure wood treating operation that used pentachlorophenol (PCP) in its wood-treating process. Approximately 15 acres in size, the site is on the north side of Missouri Highway 14 in a mixed industrial, agricultural, and commercial area of the city (1). Highway 14 is the major thoroughfare through the city, and the area around the site has had numerous new commercial developments in the past few years.

The Sentinel Wood Treating facility treated wood with PCP from 1959 to approximately 1978. Sludge from the wood-treating process was burned in the boiler at the pressure treating operation or deposited in three lagoons on the northern edge of the site (see Figure 1) (1). Most of the sludge was burned in the boiler, but some remained in the lagoons, which were closed in 1978-79 when pressure-treating wood operations ceased at the Sentinel property (1,2).

In 1975, the company started manufacturing hog houses and later, in 1980, portable and/or outdoor wood furniture from CCA- (copper, chromium, and arsenic) treated lumber. Although the CCA lumber was treated off site, the sawdust and scrap wood from the manufacturing was burned in an on-site incinerator. In the late 1980s, Sentinel Industries ceased all operations at the site and sold all but the 3 acres containing the lagoon area. In December 1995, Sentinel Industries bought back the 12 acres sold previously and resumed sole ownership of the site (3).

On February 5, 1998, personnel of the Missouri Department of Health (DOH) and the Douglas County Health Department conducted a site visit. There are nine buildings on the site. All of the pressure treatment equipment has been removed and the buildings are used for businesses or storage. Three buildings on the southern portion of the site face the highway and house commercial operations. Of these three, the building farthest to the west is the former location of the wood treatment facility. Access to the southern edge of the site is limited by a chain-link

Samples were also taken of the municipal wells to see if the site had affected the area groundwater. Analyses indicated no site contaminants in the city well (1).

In June 1997, a Removal Assessment was conducted to locate any areas of surface soil, surface water, or sediment contamination and to determine whether off-site migration of PCP has impacted city wells. Limited investigation of the subsurface soils was also conducted to determine the vertical extent of PCP and other contaminants. Samples were taken of surface and subsurface soil, sediment, bulk waste, surface water, and groundwater.

Contaminants found above ATSDR's EMEGs or DOH's ASLs in the lagoon subsurface soil (4-6 feet deep) and their maximum concentration included PCP (11,000 ppm), 2-methylnapthalene (2,200 ppm), and phenanthrene (1,600 ppm). PCP was detected in surface soil, but not at a level above DOH's ASL. The only surface soil sample analyzed for metals was taken from the former furnace location (see Figure 1). It contained 62 ppm arsenic, which is above DOH's ASL. A surface soil sample taken from the location of the former wood treatment facility and a subsurface soil sample taken from the lagoon contained 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)toxicity equivalents of 4.73 parts per billion (ppb) and 10.3 ppb, respectively.

PCP was found in the diversion ditch at a concentration of 1.1 ppb, which is slightly above the maximum contaminant level (MCL) for PCP of 1.0 ppb. Bis (2-ethylhexyl) phthalate (a.k.a. di (2-ethylhexyl) phthalate) was detected in surface water upstream of the site, on site, and downstream of the site (7 ppb, 29 ppb, 44 ppb, respectively) (see Figure 1). Each of these concentrations was above the MCL, but below the child EMEG for intermediate exposure (the most conservative EMEG available). PCP was detected in the city well but at a level that was below that detected in the field blank. The bulk sample was analyzed for asbestos and tested negative (3).

## DISCUSSION

### Soil:

The Sentinel Wood Treating site subsurface soil is contaminated with pentachlorophenol (PCP) at a level above the Agency for Toxic Substances and Disease Registry's (ATSDR's) Environmental Media Evaluation Guides (EMEGs) and the Missouri Department of Health's (DOH's) Any-Use Soil Levels (ASLs). EMEGs are guidelines used to determine if there is a need to further investigate exposure to a chemical for its possible health effects. Levels below the EMEG are unlikely to pose a health threat. An ASL is a health-based value that represents the maximum concentration of a chemical that will always be acceptable in the soil, regardless of future land use.

In addition, subsurface soil contains TCDD toxicity equivalents (TEQs) above DOH's level of concern. TCDD is one chemical in a large class of compounds known as chlorinated

concern. PCP-contaminated subsurface soil does remain at the site and could lead to future groundwater contamination.

### Sediment:

Magnesium was found at an elevated level in off-site sediment. The sediment was in a drainage ditch from the site, but is not expected to be site related. Magnesium is an essential element in human, animal and plant nutrition (4). Exposure to sediment with elevated magnesium levels is not expected to be occurring. If exposure was to occur, no health effects would be expected since calculated potential intakes are below the level needed to maintain magnesium balance in the body (4). The human body excretes excessive magnesium as a normal function unless there is a major kidney malfunction (4).

### PCP toxicity:

Short-term exposures to large amounts of PCP or long-term exposure to low levels can harm the liver, kidneys, blood, lungs, nervous system, immune system, and gastrointestinal tract. Direct contact with PCP can irritate the skin, eyes, and mouth. The International Agency for Research on Cancer has determined that PCP is possibly carcinogenic to humans (5).

### Arsenic toxicity:

High levels of inorganic arsenic ($\geq$ 60 ppm) in food or water can be fatal. Arsenic damages many tissues including nerves, stomach and intestines, and skin. Lower levels of exposure to inorganic arsenic may cause nausea, vomiting and diarrhea, decreased production of red and white blood cells, abnormal heart rhythm, blood vessel damage, and a "pins and needles" sensation in the hands and feet. Long-term exposure may lead to a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, or torso. Direct skin contact may cause redness and swelling. The U. S. Department of Health and Human Services has determined that arsenic is a known carcinogen (6).

### TCDD and related compounds toxicity:

Since the toxicity of all TCDD-like compounds is compared to TCDD toxicity in this health consultation, only TCDD toxicity will be discussed. TCDD (dioxin) has been associated with a wide variety of adverse health effects. Chloracne is the most noted health effect in people exposed to relatively large amounts of TCDD. Chloracne is a severe skin disease that usually occurs on the face and upper body. It is characterized by lesions and follicular hyperkeratosis (comedones) similar to acne. It is, however, more disfiguring than common acne, and often lasts for years after initial exposure. The levels of exposure at this site are lower than those historically associated with chloracne. Thus, chloracne is not expected to be experienced by persons exposed to TCDD at this site.

3. It appears that surface water and the public water supply do not pose a significant threat to public health at this time. There was, however, a very small amount of PCP detected in Municipal Well #4. PCP-contaminated subsurface soil could lead to contamination of the groundwater.

4. The site appears to be secure.

## RECOMMENDATIONS

1. Based upon current information, it appears a Removal Action is necessary due to the TCDD TEQs and arsenic in surface soil, along with the TCDD TEQs and PCP in subsurface soil. Although current exposures are limited, future exposures could occur, depending on use of the site. In addition, PCP contaminated subsurface soil could contaminate the groundwater.

2. Conduct further soil sampling to determine the extent of arsenic and dioxin contamination in surface and subsurface soil.

3. Place restrictions on any on-site soil disturbance (e.g., digging).

4. Investigate on-site groundwater to determine if it has been contaminated.

5. Continue to monitor the public water supply to ensure it does not become contaminated with PCP.

6. Maintain site security to prevent unnecessary exposure to on-site contaminants.

Preparers of the Report: Arthur Busch, Scott Clardy, Brian Quinn, Missouri Department of Health.

Attachments: Figure 1, Sentinel Wood Treating Site Map
Table 1, Sentinel Wood Treating Site Maximum Contaminant Levels of Public Health Concern (by Media) and Health Comparison Values

## CERTIFICATION

The Sentinel Wood Treating Company, Inc. Health Consultation was prepared by the Missouri Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

Technical Project Officer, SPS, SSAB, DHAC

The Superfund Site Assessment Branch of the Division of Health Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

Chief, SPS, SSAB, DHAC

# REFERENCES

1. CDM Federal Programs Corporation. Site Inspection Report for Site Assessment Activity at The Sentinel Wood Treating Site, Ava, Missouri. September 27, 1993.

2. Missouri Department of Natural Resources. Preliminary Assessment, Sentinel Wood Treating Company, Ava, Missouri. June 1984.

3. Ecology and Environment, Inc. Memorandum: Removal Assessment: Sentinel Wood Treating Site, Ava, Missouri. December 23, 1997.

4. National Academy of Sciences, Drinking Water and Health, Safe Drinking Water committee, Washington D.C., 1977, pp. 262-263.

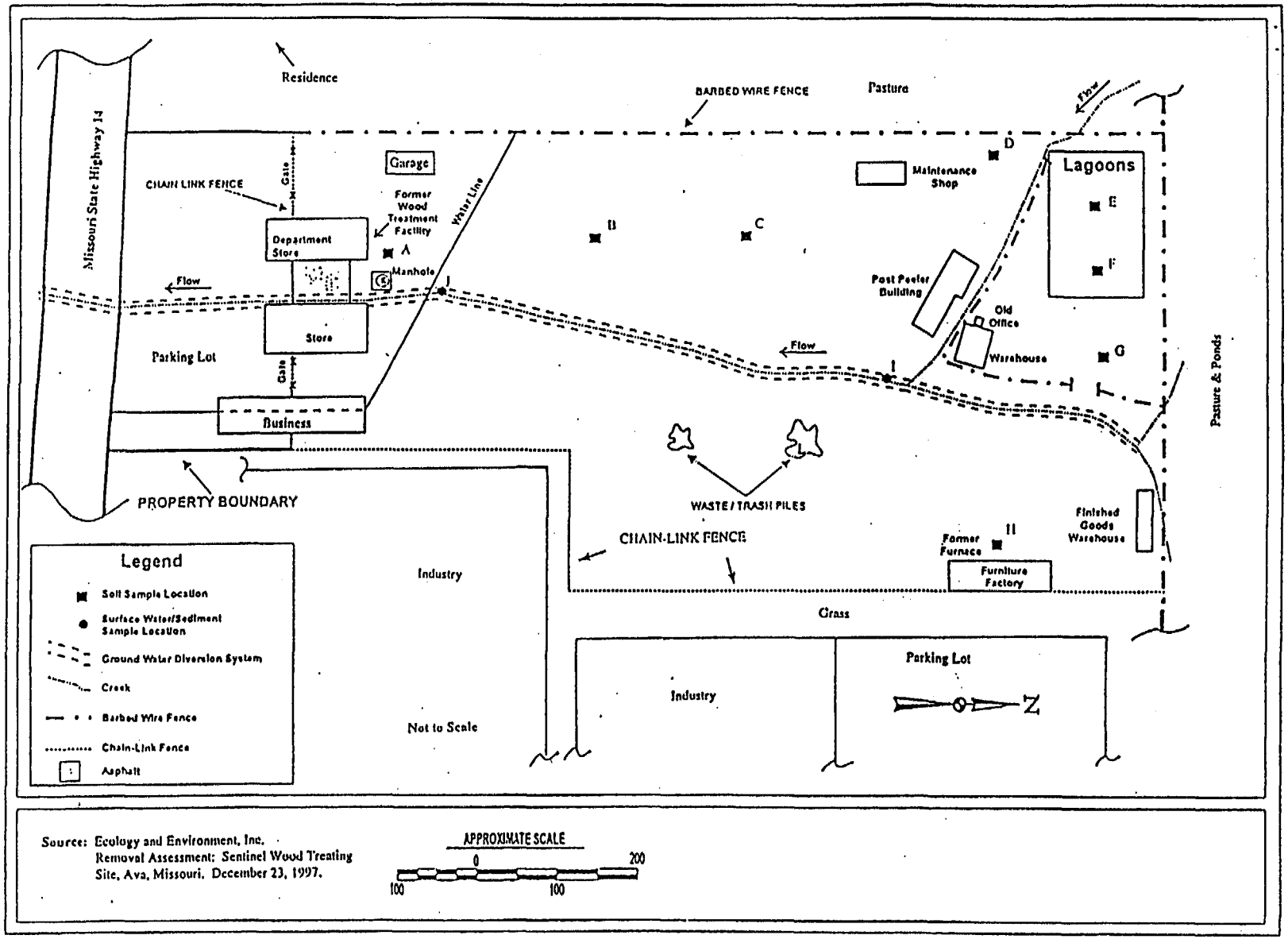
5. Agency for Toxic Substances and Disease Registry. Fact sheet for Pentachlorophenol. Atlanta: ATSDR, September 1995.

6. Agency for Toxic Substances and Disease Registry. Fact sheet for Arsenic. Atlanta: ATSDR, April 1993.

7. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Chlorinated Dibenzo-p-dioxins, Update, Draft for Public Comment. Atlanta: ATSDR, September 1997.

# Figure 1

## Sentinel Wood Treating Site Map




Source: Ecology and Environment, Inc. Removal Assessment: Sentinel Wood Treating Site, Ava, Missouri. December 23, 1997.

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

OCT 1 1997

CERTIFIED MAIL - P 179 978 430
RETURN RECEIPT REQUESTED

Mr. Donald Ferris, President
Sentinel Industries, Inc.
P.O. Box 165
Ashland, MO 65010

RE: Proposal for the *Registry* - Sentinel Wood Treating Site

Dear Mr. Ferris:

Because many Missourians have unknowingly purchased property in or around areas where hazardous wastes are located, the Missouri General Assembly has passed the State Superfund Law, as an amendment to the Missouri Hazardous Waste Management Law. This law has directed the Missouri Department of Natural Resources (DNR) to develop and maintain a *Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri (Registry)*. The Superfund Law (Section 260.455, RSMo 1986) directs DNR to notify all property owners who hold any part of a hazardous waste site, of its intention to place that property on the *Registry*.

Your property is being proposed for the *Registry* due to pentachlorophenol (PCP) contamination, although other contaminants may also exist. The sludge from using PCP for wood treating processes was discovered in the subsurface soil of the PCP sludge disposal lagoons, located on your property. The PCP waste, a listed EPA hazardous waste K001, is suspected to have been disposed of on the property from 1959 to 1978. The listing of this property on the *Registry* may be appealed by submitting such a request to me, in writing, with a copy of the appeal also being sent to Mr. Gary T. Behrns, Chief, Superfund Section, at the address listed above. Please state the reason(s) for your appeal. This appeal is available under 10 CSR 25-10.010 Paragraph (2), and must be postmarked within 30 calendar days of receipt of this notification. There is also an opportunity for a responsible party cleanup under 10 CSR 25-10.010 Paragraph (2)(E). In some instances, the area of the property to be placed on the *Registry* may be reduced by performing a survey of the site, according to certain requirements which are available from the department.

When the DNR Director places a site on the *Registry*, this department is required to file a Notice with the Recorder of Deeds, describing the period in which the property was used as a hazardous waste disposal area. When the DNR Director finds that a site on the *Registry* has been properly cleaned up or closed with no evidence of potential adverse environmental impact, he shall file this finding with the Recorder of Deeds.

Enclosed is a copy of the rules governing abandoned or uncontrolled hazardous waste disposal sites. These outline all the procedures for the registration and appeal process.

The legal description of the property is as follows:

(Books 171 & 293 , pages 479 & 337)

Parcel No. I: A tract of land situated in the NE1/4NW1/4 of Section 11, Township 26 North, Range 16 West, Douglas County, Missouri, being more particularly described as follows: Beginning at the Northwest corner of said NE1/4NW1/4, thence run South 89 degrees 19 minutes 07 seconds East, along the North line of said NE1/4NW1/4, 315.00 feet for a NEW POINT OF BEGINNING, thence continue South 89 degrees 19 minutes 07 seconds East along said North line, 229.08 feet, thence run South 0 degrees 09 minutes 05 seconds East, 725.00 feet, thence run North 89 degrees 24 minutes 04 seconds West, 176.24 feet, thence run South 0 degrees 09 minutes 34 seconds East, 558.65 feet to a point on the Northerly right-of-way line of Missouri State Highway Department No. 14, thence run South 89 degrees 42 minutes 59 seconds West, along said right-of-way line, 88.66 feet, thence run North 74 degrees 02 minutes 01 seconds West along said right-of -way line 52.27 feet, thence run South 89 degrees 43 minutes 57 seconds West, along said right-of-way line, 226.67 feet to a point on the West line of said of NE1/4NW1/4, thence run North 0 degrees 15 minutes 23 seconds West along said West line, 1114.41 feet, thence run South 63 degrees 20 minutes 27 seconds East, 204.26 feet, thence run South 57 degrees 45 minutes 20 seconds East, 107.12 feet, thence run North 7 degrees 39 minutes 04 seconds East, 308.80 feet back to the NEW POINT OF BEGINNING, as the SAME APPEARS of record in Plat Book No. 2 at Page 49 in the office of the Douglas County Recorder.

SUBJECT to all easements and restrictions, of record. ALSO SUBJECT to the RESERVATION of an EASEMENT OF ingress and egress over the West 20 feet of this property.

Parcel No. II: That part of the Northeast Quarter of the Northwest Quarter of Section Eleven (11), Township Twenty-six (26), Range Sixteen (16) described as commencing at a point 433 feet East of the Northwest corner of said forty and run East 112 feet, thence South 725 feet, thence West 112 feet and thence North 725 feet to the point of beginning.

Known and numbered as East 12th , Ava, Missouri.

If you have questions concerning this notification, please contact Ms. Pia Capell, of my staff, at (573) 751-8629.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

John A. Young
Director

JAY:pcn

Enclosure

c: Scott B. Totten, DEQ
Bryant Burnett, EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

NOV 14 1997

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Don Farris
Sentinel Industries Inc.
P.O. Box 165
Ashland, Mo 65010

Dear Mr. Farris:

RE: Former Sentinel Wood Treating Site located in Ava, Missouri.

On August 5th and 6th, 1997, the U.S. Environmental Protection Agency (EPA) collected soil and water samples from the above referenced site. The soil and water samples were collected in order to determine if any significant levels of pentachlorophenol and associated compounds are located at this site and to determine if any additional actions are warranted.

Enclosed, for your information, is a copy of the validated Analysis Request Report for activity AZXYD. As required by Section 104 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), EPA is providing this data to you as an owner of property sampled.

Also enclosed are tables which summarize the data in a more readily understandable format. A map with these tables describe where the samples were taken. As expected, high levels of pentachlorophenol were found at the subsurface where the lagoons used to be located. Lower levels of pentachlorophenol were found in both surface soil and water samples taken from other locations of the site.

EPA is in the process of having these results reviewed by the Agency for Toxic Substances and Disease Registry (ATSDR) to determine if the levels of pentachlorophenol and/or other contaminants are at or above levels of concern for this particular site and what adverse health effects may be associated with these contaminates. This review will also assist in making the determination if any additional sampling, site security, or removal actions are needed. Until this review is complete, EPA recommends that unnecessary contact with potentially contaminated soil be avoided. We also recommend against digging into the subsurface (especially the lagoon area) where the highest levels of pentachlorophenol exist.

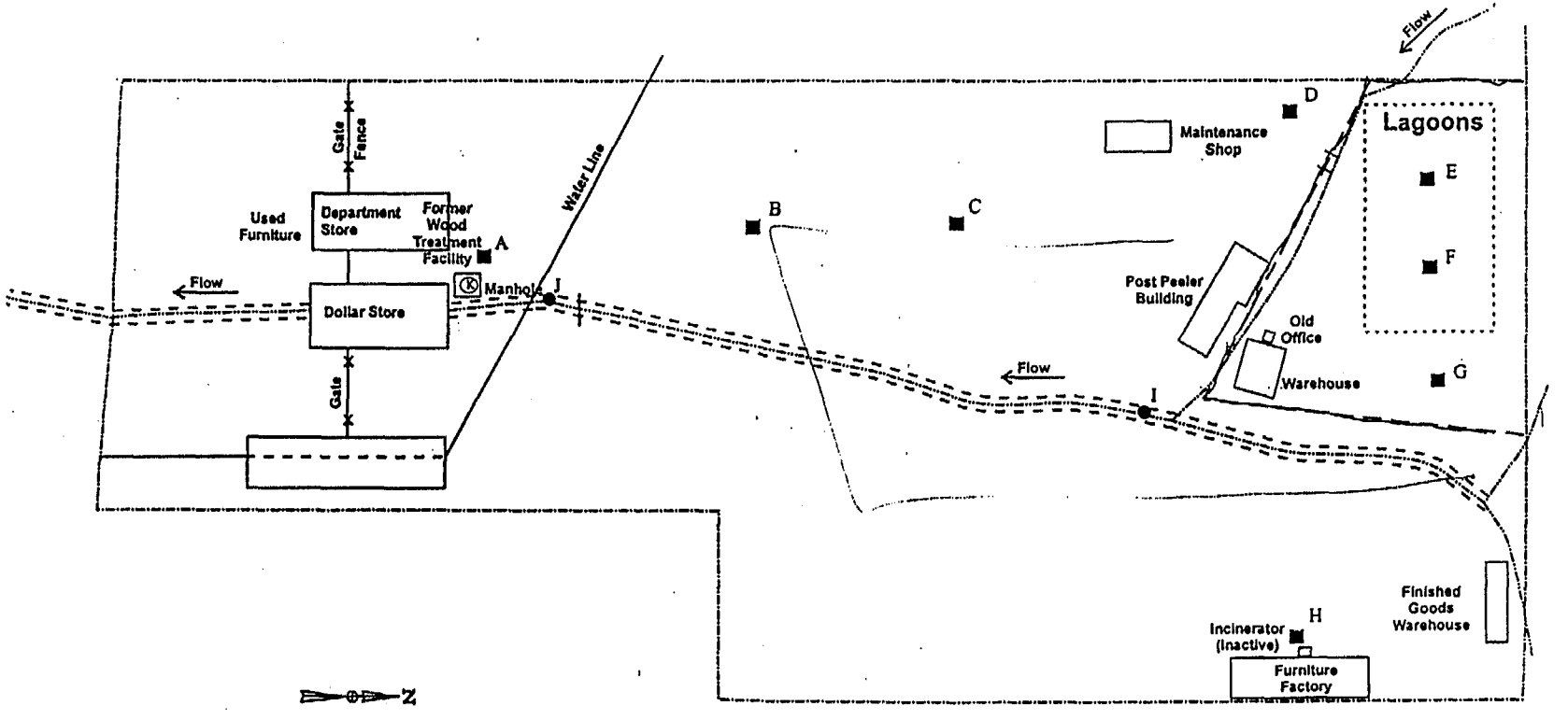
In addition to the health consultation from ATSDR, a formal report will be prepared which describes in detail the sampling which was done in August 1997. I will send both of these reports to you when they have been completed. I expect these reports to be done by late December 1997. Please contact me at (913) 551-7818 if you have any questions regarding this data.

Sincerely,

Donald F. Hamera, On Scene Coordinator
Emergency Response and Removal

Enclosures: Analytical Data for AZXYD, data tables, map showing sample locations

cc: Jerry Foster, Missouri Department of Natural Resources (w/encl)
Missouri Department of Health (w/encl)
City of Ava, Missouri (w/encl)
Douglas County Health Department (w/encl)




**Sentinel Wood Treating**
**Ava, Missouri**
**Attachment A: Site Sketch**

WILLIAM D. POWELL, P.C.
Attorney at Law
401 Locust - 400 Market Square
Columbia, MO 65201

Telephone: (573) 874-1122
Facsimile: (573) 875-5108

FAXED 12/30/97 HLD 2:47

December 30, 1997

VIA FAX AND
ORDINARY MAIL

Kara L. Valentine (Johnson)
Assistant Attorney General
Attorney General of Missouri
P.O. Box 899
Jefferson City, MO 65102

Re: Sentinel Wood

Dear Ms. Valentine:

Thank you for your letter of December 29, 1997, concerning the real state owned by my client Sentinel ~~Wood~~ Resource Industries in Ava, Missouri.

Please accept this letter as the indication that my client Sentinel Wood is proceeding to develop an investigation work plan regarding the Ava parcels in order to determine the feasibility of cleaning up the larger parcel and also, potentially, the smaller parcel. Until we have this plan, we will not be able to make an absolute commitment with regard to cleanup. However, it is our intention at this time, subject to the results of the plan being financially feasible, to clean up the larger parcel.

I will look forward to receiving from you the improved "form consent agreement" once you have the same. The terms contained in this agreement will have an impact on Sentinel Wood's view of the financial feasibility for the potential cleanup of each of these parcels.

To assist your office, the DNR and myself in identifying the precise legal descriptions of the two parcels in question, Don Farris has contacted the surveyor and asked the surveyor to denominate on the unrecorded survey the two parcels as "Tract 1" and "Tract 2" and to record the survey, furnishing me with a copy of the recorded document. Once I have received this, I will forward it to you.

We very much appreciate the assistance that we have received thus far and, in particular, the cooperative attitude displayed by

all concerned in what I hope will be a total elimination of this problem.

Thank you.

Sincerely,

WILLIAM D. POWELL

WDP:akd

## Sample Results Summary
## Sentinel Wood Treating Site, Ava, MO
## August 1997

| Compound | Soil Sample Concentration (ng/kg or parts per trillion) | | | |
|---|---|---|---|---|
| | A1 Surface | A3 2-5 Ft. BGS[1] | F1 Surface | F2 4-6 Ft. BGS[1] |
| 2,3,7,8-TCDD Total Equivalents | 4,730 J | 270 | 32.6 | 10300 |
| 2,3,7,8-dibenzo-p-dioxin (rapid screen) | 27.6 | 1.0 U | 1.0 U | 1.0 U |
| 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin | 157,000 J | 4,200 | 1,080 | 449,000 J |
| octachlorodibenzo-p-dioxin | 1,100,000 J | 185,000 J | 5,560 | 3,480,000 J |
| 2,3,7,8-tetrachlorodibenzo-p-furan | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| octachlorodibenzo-p-furan | 81,200 | 3,480 | 542 | 270,000 J |
| 1,2,3,7,8-pentachlorodibenzo-p-furan | 69.2 | 5.0 U | 5.0 U | 24.6 |
| 1,2,3,4,7,8-hexachlorodibenzo-p-furan | 1,850 | 49.7 | 16.9 | 4,550 |
| 1,2,3,6,7,8-hexachlorodibenzo-p-furan | 817 | 15.8 | 6.15 | 5.0 U |
| 1,2,3,7,8,9-hexachlorodibenzo-p-furan | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| 2,3,4,6,7,8-hexachlorodibenzo-p-furan | 519 | 5.0 U | 5.1 | 5.0 U |
| 1,2,3,4,6,7,8-heptachlorodibenzo-p-furan | 26,800 | 816 | 248 | 59,800 |
| 1,2,3,4,7,8,9-heptachlorodibenzo-p-furan | 2,240 | 85.2 | 31.9 | 7,370 |
| 1,2,3,7,8-pentachlorodibenzo-p-dioxin | 582 | 5.87 | 5.0 U | 5.0 U |
| 1,2,3,4,7,8-hexachlorodibenzo-p-dioxin | 1,680 | 5.0 U | 17.4 | 5.0 U |
| 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin | 4,960 | 157 | 50.1 | 8,710 |
| 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin | 3,300 | 59.1 | 33.5 | 5.0 U |
| 2,3,7,8-pentachlorodibenzo-p-furan | 113 | 5.0 U | 5.0 U | 147 |

[1]BGS = Below Ground Surface

**Data Qualifiers:**
U = Analyte not detected. Value represents the sample detection limit.
J = Concentration given is estimated.

## Sample Results Summary
## Sentinel Wood Treating Site, Ava, MO
## August 1997

| Compound | Soil/Sediment Sample Pentachlorophenol Concentration (mg/kg or ppm) | | | | |
|---|---|---|---|---|---|
| | A1 Surface | A2 6-12 In. BGS[1] | A3 2-5 Ft. BGS[1] | B Surface | C Surface |
| Pentachlorophenol | 1.90 | 25.0 J | 2.5 | 4.30 | 1.90 |
| | F2 4-6 Ft. BGS[1] | H Surface | I Upstream Sediment | J Downstream Sediment | |
| Pentachlorophenol | 11,000 | 1.90 | 1.0 | 1.5 | |

[1]BGS = Below Ground Surface

**Data Qualifiers:**
U = Analyte not detected. Value represents the sample detection limit.
J = Concentration given is estimated.

| Compound | Soil/Lagoon Subsurface Sample Concentration (µg/kg or ppb) Sample F2 (4-6 Ft. BGS[1]) |
|---|---|
| **Semivolatile Compounds** | |
| Pentachlorophenol | 11,000 |
| 2-Meylnapthalene | 2,200 |
| Fluorene | 440 |
| Phenanthrene | 1600 |
| **Volatile Compunds** | |
| Toluene | 18 |
| Ethyl benzene | 15 |
| Acetone | 210 J |
| Methylethyl ketone | 26 J |
| Xylenes (total) | 120 |

[1]BGS = Below Ground Surface

**Data Qualifiers:**
J = Concentration given is estimated.

## Sample Results Summary
## Sentinel Wood Treating Site, Ava, MO
## August 1997

| Analyte | Surface Soil Metals Concentrations (mg/kg or ppm) Sample H |
|---|---|
| Silver | 2.0 U |
| Aluminum | 1,500 |
| Arsenic | 62 |
| Barium | 240 |
| Beryllium | 1.0 U |
| Cadmium | 1.0 U |
| Cobalt | 10 U |
| Chromium | 41 |
| Copper | 39 |
| Iron | 4,900 |
| Manganese | 160 |
| Nickel | 8.0 U |
| Lead | 25 |
| Antimony | 12 U |
| Selenium | 1.0 U |
| Thallium | 2.0 U |
| Vanadium | 10 U |
| Zinc | 280 |
| Calcium | 130,000 |
| Magnesium | 84,000 |
| Sodium | 1000 U |
| Potassium | 1000 U |

[1]BGS = Below Ground Surface

**Data Qualifiers:**
U = Analyte not detected. Value represents the sample detection limit.

## Sample Results Summary
## Sentinel Wood Treating Site, Ava, MO
## August 1997

| Compound | Water Sample Concentration (µg/L) | | | | |
|---|---|---|---|---|---|
| | I Upstream Creek | J Downstream Creek | K Groundwater Diversion | Munucipal Well #4 | Field Blank |
| Semivolatile Compounds | | | | | |
| Pentachlorophenol | 0.56 | 0.36 | 1.10 | 0.0036 | 0.0038 |
| Bis(2-ethylhexyl) phthalate | 7 | 44 | 29 | 5 U | 5 U |

**Data Qualifiers:**
U = Analyte not detected. Value represents the sample detection limit.

# Kingston Environmental Services

February 25, 1998

Mr. Don Farris
Sentinel Industries, Inc.
P.O. Box 165
Ashland, MO 65010

Re: Work Plan for Sample Collection and Analyses for the Former Wood Treatment Facility Located in Ava, Missouri

Dear Mr. Farris:

As requested at our recent site visit, Kingston Environmental Services (Kingston) has prepared the referenced Work Plan. We believe the Work Plan will be acceptable to the Missouri Department of Natural Resources (MDNR) Voluntary Cleanup Program while minimizing the costs to you. If this Work Plan is acceptable, we will "overnight" original copies to you for distribution to your interested parties and the MDNR.

The laboratory analytical results of the samples collected in August, 1997 indicated the presence of dioxin and furan. However, the Environmental Protection Agency (EPA) or MDNR have not (in any correspondence we are in receipt of) discussed or required sample collection and analyses for these chemicals. They may, however, require testing for these chemicals at a later date. We have not discussed dioxin or furan in the Work Plan.

Attached to the Work Plan is our estimated cost to complete the work. When the Work Plan is implemented, actual site conditions may indicate the need for additional sample collection and analyses that would increase the costs. If additional work is necessary, Kingston will contact you to obtain permission before proceeding with the additional work.

If you have any questions or comments, please contact either Bill Worley or me.

Sincerely,

Gene Mayfield
Superintendent

enclosure

1600 SW Market, Lee's Summit, Missouri 64081
816-524-8811 Fax: 816-525-5027
www.kingstonenv.com info@kingstonenv.com

**WORK PLAN**
**ENVIRONMENTAL INVESTIGATION**
**FORMER SENTINEL WOOD TREATING SITE LOCATED IN AVA, MISSOURI**
**February 25, 1998**



## INTRODUCTION

Kingston Environmental Services (Kingston) has prepared this Work Plan at the request of Mr. Don Farris. The purpose of this Work Plan is to complete environmental sample collection and laboratory analyses at the Former Sentinel Wood Treating Facility located in Ava, Missouri (Site). Figure 1 shows the location of the Site.

The United States Environmental Protection Agency (EPA) completed a Site Investigation dated September, 1993. The EPA conducted additional sample collection and analyses in August, 1997 and prepared a report of the activities. The Reports summarized the results of surface soil sample collection and analyses for areas identified on the property with a high potential for environmental impact. Sample analyses included a comprehensive list of compounds typically associated with wood treatment industries, such as semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs). These sample results indicated the presence of several SVOCs. However, pentachlorophenol (the primary component of wood treating) was the only SVOC identified as a target compound that was identified above the "Any Soil Use Levels" (ASLs). Trace levels of VOCs were detected. However, the concentrations are apparently far below the ASLs.

In addition to wood treatment at the former facility, the site was used to construct hog pens using copper, chromium, and arsenic (CCA) treated lumber delivered from an offsite source. The wood scrap and sawdust generated from the assembly process was burned in the former site incinerator. The potential for heavy metals above the ASLs exists in this area.

Based on this information, the three (3) primary areas identified that require additional assessment and delineation are as follows:

- The former incinerator area
- The area used to store the treated lumber
- The area near the former wood treatment building

## SCOPE OF WORK

### Task 1- Prepare Health & Safety and Quality Assurance/Control Plan

Kingston will prepare an internal use Site Health & Safety Plan (HASP) to ensure workers safety while on site. The HASP will be prepared in accordance with regulatory requirements and standard industry practices. Kingston will prepare an internal use Quality Assurance/Quality Control Plan (QA/QC Plan). The purpose of the QA/QC plan is to assure the integrity of the data

by installing controls and reasonable procedures that will minimize potential errors introduced throughout the investigation not only by Kingston, but by Kingston's subcontractors which have a role in the generation of the data.

**Task 2-Sample Collection and Analytical Plan**

Kingston will collect soil samples at the site using appropriate sample collection, preservation, shipping and handling procedures including proper cleaning of sampling equipment between each discrete sample location. Equipment will be cleaned using lab grade detergent and water, followed by a potable water, followed by a deionized water rinse. Where possible, disposable equipment will be used such as gloves, "lab grade" sampling spoons, and paper plates. The QA/QC plan will address these activities in more detail.

Kingston will mobilize our SIMCO hydraulic driven push type probe (HDP) rig to complete shallow subsurface soil sample collection. A simple hand auger may also be used in lieu of or to supplement the HDP.

Figure 2 shows the proposed sample locations. The following **subtasks** are provided to more specifically discuss sampling and analytical requirements for each of the three (3) primary areas of concern:

**Task 2a-Former Incinerator Area**

Previous sample collection and analyses in the vicinity of the former incinerator indicated the presence of metals that ***may*** be above background levels for the area. However, only arsenic was present above the current Missouri ASLs for this area. The sample collection and analyses is planned to determine if CCA is present at levels of concern and if so, to delineate the extent of impact:

- Eight (8) samples will be collected at the locations shown on Figure 2. At each location, a sample will be collected from land surface (ls) to 1 ft below land surface (bls) and from 1 to 2 ft bls (16 total samples).
- Each sample will be placed in a laboratory prepared sample container, properly labeled and placed in a cooler with ice and shipped to Analytical Management Laboratory in Olathe , Kansas.
- The eight (8) samples from ls to 1 ft bls will be analyzed for total copper chromium and arsenic using EPA method 6010.
- If CCA is detected at a concentration above the ASLs, then the sample from 1 to 2 ft bls at that location ***may*** be advanced for analyses.
- All sample collection protocol and data analyses will be completed in accordance with the QA/QC.

**Task 2b-Former Treated Wood Storage Area**

After wood was treated at the treatment facility building, the wood was stored in the west central portion of the site. The potential exists for surface soil impacted with semivolatile compound in this area and the following samples are planned:

- Three (3) samples will be collected at the locations shown on Figure 2. At each location, a sample will be collected from ls to 1 ft bls and a sample from 1 to 2 ft bls (6 total samples).

- Each sample will be placed in a laboratory prepared sample container, properly labeled and placed in a cooler with ice and shipped to Analytical Management Laboratory in Olathe, Kansas.

- The three (3) samples from ls to 1 ft bls will be analyzed for SVOCs using EPA method 8270. The northern most sample location near the former maintenance building will also be analyzed for total petroleum hydrocarbons, methyltertiary butyl ether, benzene, toluene, ethylbenzene and xylene using method 8015 OA1 and OA2.

- If SVOC compounds are detected at concentrations above the ASLs, then the sample from 1 to 2 ft bls at that location ***may*** be advanced for analyses.

- All sample collection protocol and data analyses will be completed in accordance with the QA/QC.

**Task 2c-Former Wood Treatment Facility**

Pentachlorophenol and related SVOCs were present in the surface soil sample collected near the former treatment building. However, the concentrations were below ASLs. In fact, the only sample that Kingston is aware of that exceeded the ASLs for SVOCs was collected from the former lagoons. However, sample collection and analyses of the lagoons is not included in this Work Plan. To determine if semivolatile SVOCs are present at a level of concern in this area, and if so, to delineate the extent of impact, the following will be completed:

- The SIMCO HDP rig will be used to collect surface soil and shallow subsurface samples at the twelve (12) locations shown on Figure 2. At each location samples will be collected from ls to 1 ft bls and then in 2 foot increments to a maximum depth of 5 ft bls or probe refusal, whichever occurs first.

- The sample locations nearest to the building will be completed first. The sample locations will then be advanced outward from the building to delineate the extent of impact. If at any location visual or odor observations indicate the presence of pentachlorophenol or a related compound, then the sample ***may not*** be forwarded for laboratory analyses. A new sample location will be selected outward from the impacted location.

- The sample from ls to 1 ft bls will be analyzed for SVOCs using EPA method 8270.

- If SVOC compounds are detected at concentrations above the ASLs, then the sample from the greatest depth at that location ***may*** be advanced for analyses.

- All sample collection protocol and data analyses will be completed in accordance with the QA/QC.

**Task 3-Report of Findings**

Kingston will prepare a report of the findings of the first phase. The report will include the following:

- A summary of field work including sample collection procedures.
- A site map showing all sample locations physically measured from a reference point.
- A table of analytical results and copies of laboratory reports.
- Conclusions.

## COST

The following is our estimated cost to complete the Scope of Work.

| | | |
|---|---|---|
| **Task 1** | | |
| Labor | | $1,940 |
| Other Direct Costs | | 164 |
| | **Subtotal Task 1** | $2,104 |
| **Task 2** | | |
| **Subtask 2a** | | |
| Labor | $ 524 | |
| Equipment | 856 | |
| Analytical (8 samples @ $42/sample) | 336 | |
| Disposables and Other Direct Costs | 150 | |
| | $1,866 | |
| **Subtask 2b** | | |
| Labor | $ 340 | |
| Equipment | 321 | |
| Analytical (3 samples @ $320/sample) | 960 | |
| Analytical (1 samples @ $160/sample) | 160 | |
| Disposables and Other Direct Costs | 375 | |
| | $2,156 | |
| **Subtask 2c** | | |
| Labor | $ 680 | |
| Equipment | 2,120 | |
| Analytical (12 samples @ $320/sample) | 3,840 | |
| Disposables and Other Direct Costs | 375 | |
| | $7,015 | |
| **Subtask 2d** | | |
| Labor | $ 680 | |
| Equipment | 1,420 | |
| Analytical (2 samples @ $320+200/sample) | 1,040 | |
| Disposables and Other Direct Costs | 375 | |
| | $3,515 | |
| | **Subtotal Task 2** | $15,832 |
| **Task 3** | | |
| Labor | | $3,300 |
| Other Direct Costs | | 260 |
| | **Subtotal Task 3** | $3,560 |
| | **TOTAL** | **$20,216** |

**KINGSTON ENVIRONMENTAL SERVICES, INC.**
**PROFESSIONAL SERVICES AGREEMENT**

Kingston Environmental Services, Inc. (KES) agrees to provide the services set forth in Exhibit A on behalf of Client. The professional services to be provided by KES pursuant to this agreement will be performed in accordance with generally accepted principles and practices. The Client may request or approve changes within the general scope of services in the Agreement. If such changes affect KES' cost of or time required for performance of the services, an equitable adjustment in fees to be paid KES will be made by an amendment to this Agreement.

**Article 1 - Scope of Services** (hereinafter referred to as "the Work")

The Scope of Services which KES agrees to perform for Client is set forth in Exhibit A & B.

**Article 2 - Warranty**

KES warrants that the services to be rendered pursuant to this agreement shall be performed in accordance with the standards customarily provided by an experienced and competent professional rendering the same or similar services.

**Article 3 - Right of Entry**

As appropriate, Client grants a right of periodic entry to KES, its agents, staff, consultant, and contractors or subcontractors, for the purpose of performing all acts, studies, and research, including without limitation the obtaining of samples, and the performance of tests and evaluations, pursuant to the scope of services.

**Article 4 - Invoicing and Payment**

Client shall pay KES for services rendered in accordance with the cost estimate or rate schedule identified in Exhibit A & B to this Agreement. Client will pay the full amount of the invoice within thirty (30) days of the date of the invoice. Client will pay 1.5 percent per month for any part of a month the payment is past due. KES shall maintain accurate accounting records of all reimbursable costs paid or incurred by KES in connection with the Work. All invoices not paid within thirty days of the date of the invoice may be considered by KES to be a breach of this Agreement and shall entitle KES to suspend or stop work. Timely payment is a substantial condition of client's performance of any agreement between KES and client. In the event KES must take legal action to be paid for its services and prevails, all collection and legal costs associated with such action shall be reimbursed by client.

**Article 5 - Compliance with Laws**

KES agrees to comply with all local, state, and federal laws and regulations pertaining to the Work under this agreement.

**Article 6 - Indemnity**

Subject to the foregoing limitations, KES agrees to indemnify and hold client harmless from and against any and all claims, suits, costs and expenses including reasonable attorney's fees and court costs arising out of KES' negligence, recklessness or intentional wrongful acts, or any such actions by a subcontractor of KES. Client shall provide the same protection to the extent of its negligence. In the event that client or client's principal shall bring any suit, cause of action, claim or counterclaim against KES, or vice versa, the party initiating such action shall pay the defendant the costs and expenses incurred by the defendant to investigate, answer and defend it, including reasonable attorney's and witness fees and court costs to the extent that the defendant shall prevail in such suit.

**Article 7 - Entire Agreement**

This agreement contains the entire understanding between the parties. Client acknowledges that no representations, warranties, undertakings or promises have been made other than and except those expressly contained herein. This agreement may be amended, modified or terminated only by a written instrument signed by each of the parties hereto.

**Article 8 - Documents**

All documents, including but not limited to, reports, drawings, specifications, boring logs, field notes, laboratory test data, calculations and estimates prepared by KES as part of the service pursuant to this Agreement, shall not be used for any project not expressly provided for in this Agreement without KES' prior written permission. Any reuse with KES' permission is at the Client's sole risk without liability or legal exposure to KES, and Client shall indemnify and hold KES harmless from all claims, damages, losses and expenses including attorney's fees arising from such unauthorized reuse. KES shall have the right to retain copies of all these materials, but shall treat them as confidential.

**Article 9 - Confidentiality**

KES will retain in confidence and not improperly disclose to third parties, or use for the benefit of anyone other than Client without written consent of Client, any confidential information compiled or developed during the course of the work.

**Article 10 - Force Majeure**

KES is not responsible for damages or delay in performance caused by acts of God, strikes, lockouts, accidents, or other events beyond the control of KES.

**Article 11 - Successors and Assigns**

This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns. Neither party may assign its interests herein without the prior written consent of the other party, which consent will not be unreasonably withheld (and unless the assignee assumes in writing assignor's obligations hereunder). No assignment shall operate to relieve the assignor of its obligations under this Agreement.

**Article 12 - Third Party Beneficiary**

The undersigned parties to this Agreement agree that there are no express, intended, or implied third-party beneficiaries to this Agreement, and the Agreement may only be enforced by the undersigned parties.

**Article 13 - Severability**

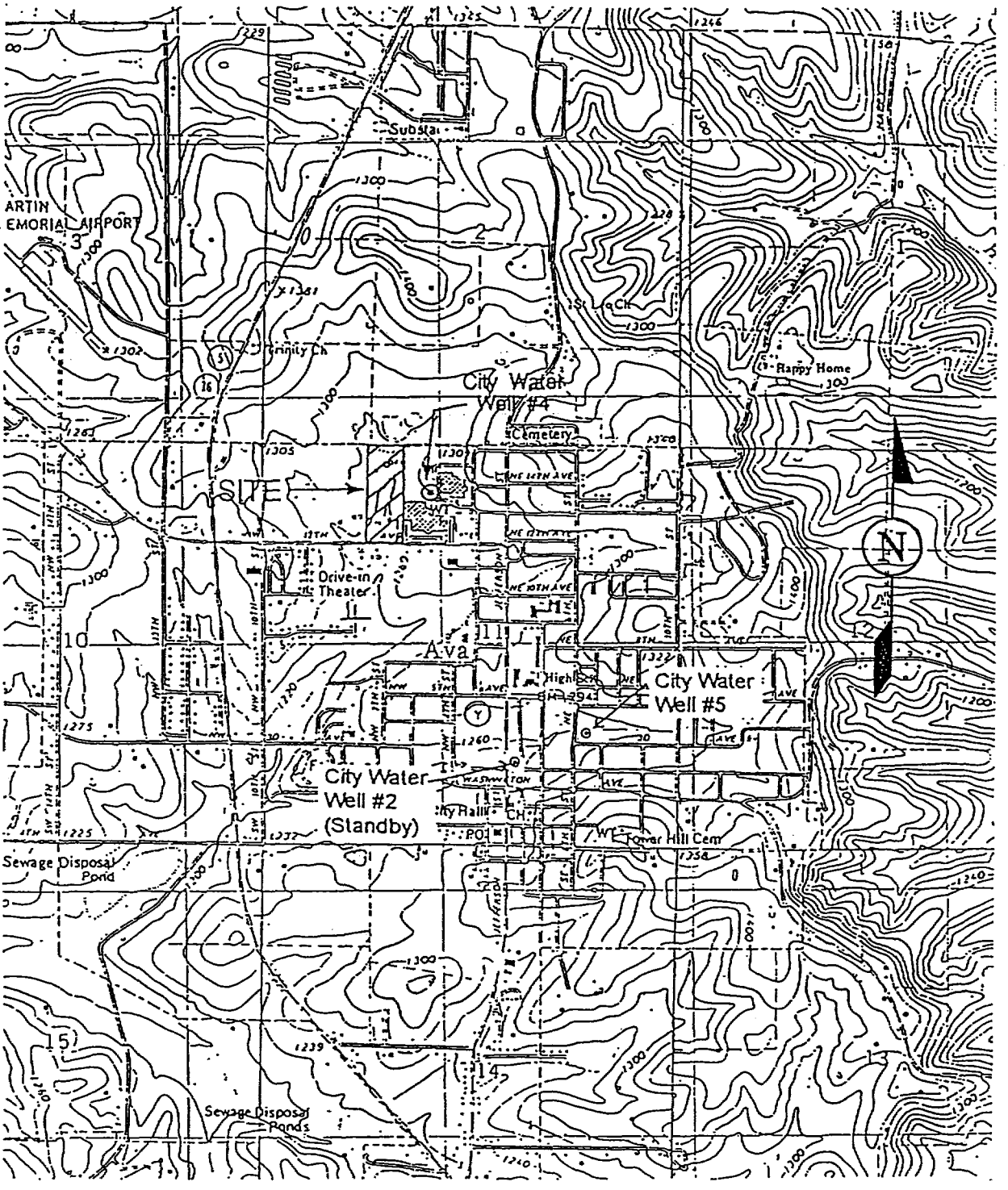
It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is held illegal or in conflict with any law of the State where made or having jurisdiction over any of the parties hereto, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions held to be invalid.

**Article 14 - Integration**

This Agreement and the Attachments hereto and which are incorporated herein constitute the entire Agreement between the parties and cannot be changed except by a written instrument signed by all parties hereto.

**Article 15 - Choice of Law**

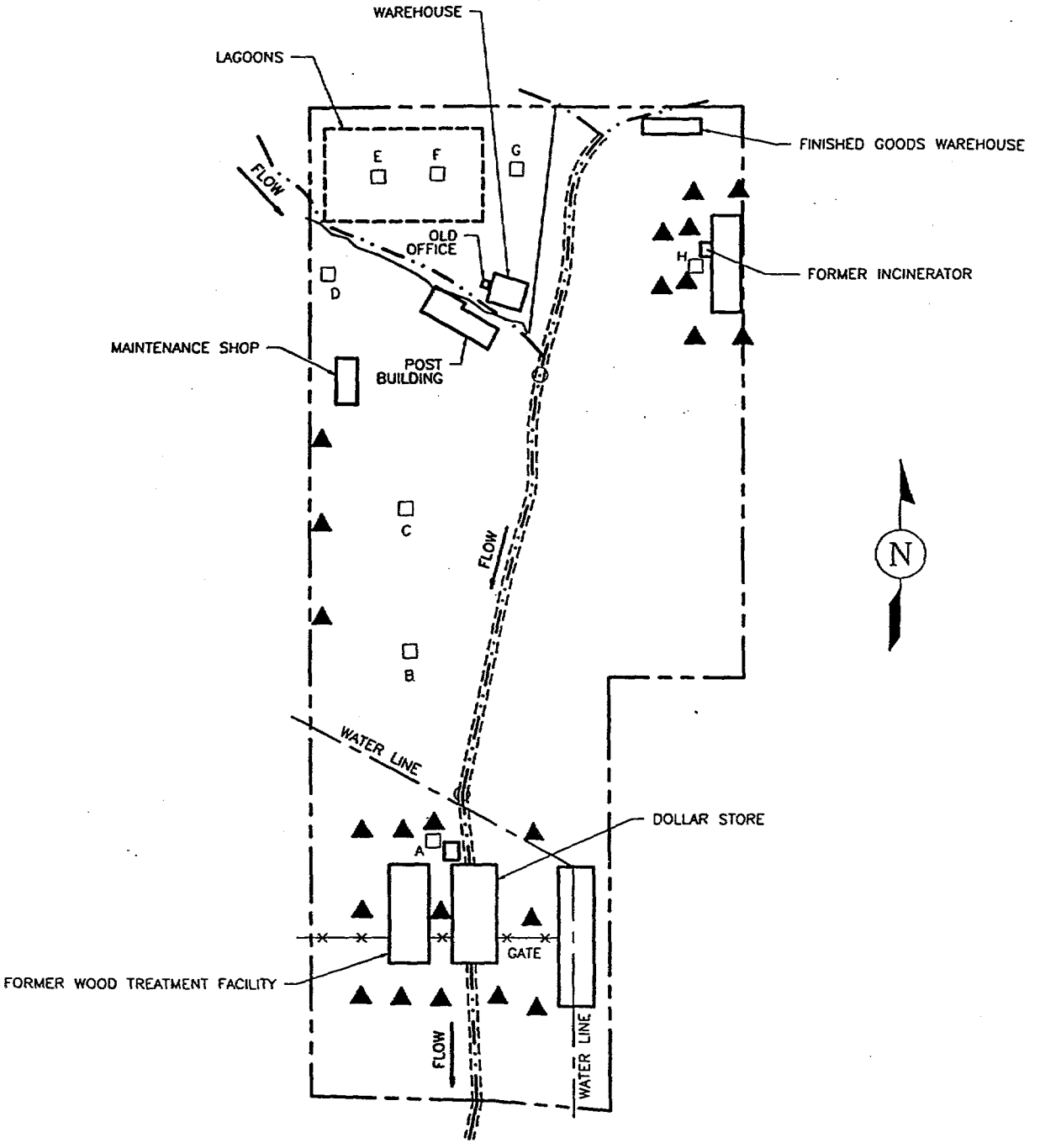
Client and KES agree that this Agreement is to be construed under Missouri law.




| | |
|---|---|
| 1" - 2000' | DRAWN BY : J.N.C. |
| DATE : 2-24-98 | FIGURE #1 |
| DWG. # : 912-1 | |
| PROJ. # : PROPOSAL | |

# SITE LOCATION MAP
# SENTENIAL WOOD TREATING
# AVA, MO

Kingston Environmental Services
1600 S.W. Market
Lee's Summit, Mo. 64081 (816) 524-8811




LEGEND:

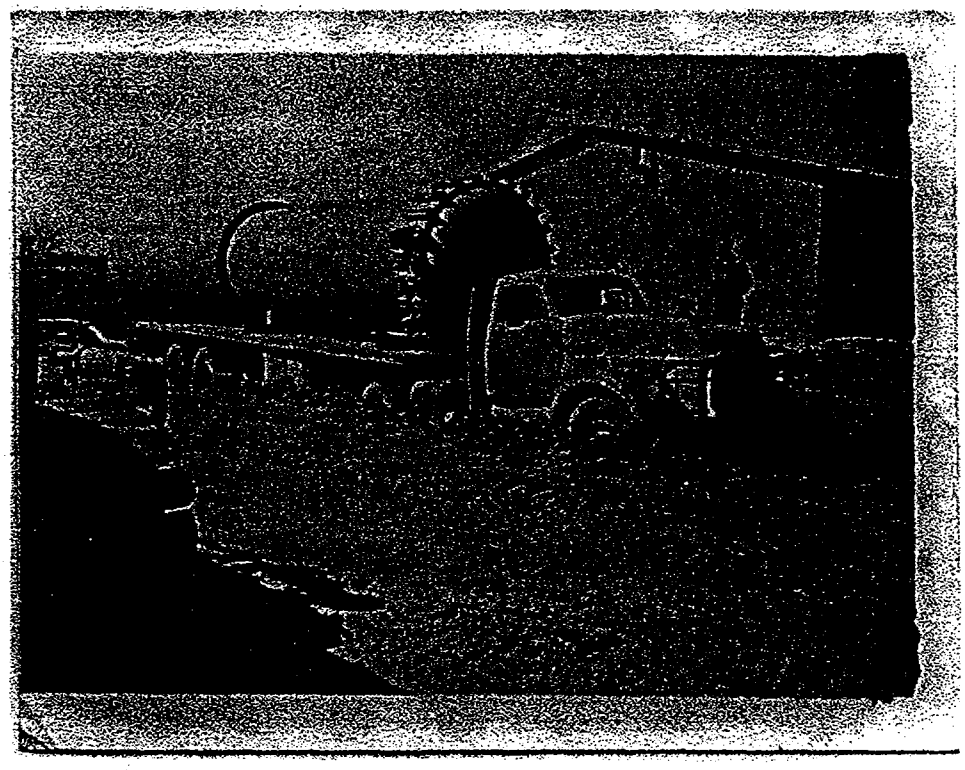
- ○ PREVIOUS SURFACE WATER/SEDIMENT SAMPLE LOCATION
- □ PREVIOUS SOIL SAMPLE LOCATION
- ▲ PROPOSED SOIL SAMPLE LOCATION

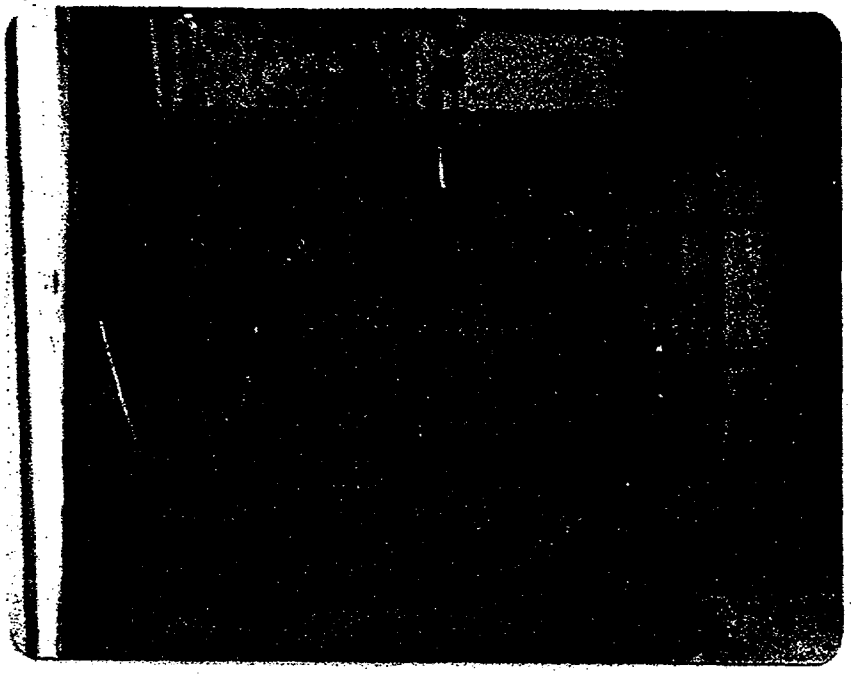
| | |
|---|---|
| APPROX. SCALE: 1" = 200' | DRAWN BY : J.N.C. |
| DATE : 2-24-98 | FIGURE #2 |
| DWG. # : 912-1 | |
| PROJ. # : PROPOSAL | |

# PROPOSED SAMPLING LOCATIONS SENTENIAL WOOD TREATING AVA, MO

Kingston Environmental Services
1600 S.W. Market
Lee's Summit, Mo. 64081 (816) 524-8811


SENTINEL WOOD TREATING INC.





Spill Report 4-26-82

Sentinel Wood Treating

Ava, Mo.

6:45 A.M (4-26-82)

1- Upon arriving at Sentinel, I noticed an oil sheen coming down Prairie Creek above our dam. The water pooled just above the dam was completely covered with an oil film.

2- I told Roger Brown & Don Scrivner to quickly check the source and report back to me.

3- They discovered the oil coming from the tubes which come under the Rawlings Plant, specifically the South tube which dumps drain water into the concrete sump tank on the west side of their building.

4- I had Roger drive around on the Rawlings lot, on the East side of their plant. He found a pool of oil on the ground near the drain mentioned above and observed some of it running into the drain, which eventually drains into Prairie Creek.

5- I placed a call to Lynn Tucker, Rawlings 3-4157 Manager at 7:00 A.M. which he returned at about 7:15. I advised him of the situation and suggested that he check it out and get it cleaned up. He responded that he would look into the problem.

6- I also placed a call to John Lumb, S.C.S. to come over and as a third party to observe the spill. John was ill but sent Rex Hamilton over to look at the spill and he said he would document the fact the oil was coming from the direction of Rawlings.

7- 10:30 A.M.
I called Lynn Tucker again to see if he had located his problem & he said he [redacted] had. I asked him again if he was going to clean up the stream and he said he would come look at it.

8- 2:30 P.M.
John Lumb, SCS. came to look at oil spill and verified that it was coming from Rawlings. Mr. Tucker had not come yet.

4-27-82 0630 A.M.

9- Noticed that hay or straw had been put on water on oil in creek sometime during nite in attempt to soak up oil. Bale of hay on West side of creek near dam. Heavy layer of oil still on water.

Scotty Rees

-1) 3:00 P.M. 12-21-84

- Observed oil on Prairie Creek behind dam. Further inspection revealed it had come from drainage tubes coming from under the Rawlings plant.

- I called the Manager at Rawlings and advised him of this. He acknowledged they had had an oil spill and had tried to clean it up. Said he could get someone over to clean it.

- They started work on it immediately and worked thru weekend cleaning up.

- Upon observation on 12-26-84, appeared to be cleaned up well, however was oil coming down creek. Saw Don Haught 12-26. Said they were coming back to finish cleaning up oil and would stay on it until done.

Scotty Rees

United States Department of Agriculture
Soil Conservation Service
1437A S Highway 63
Houston, Missouri 65483

APR 29 1982

Subject: MGMT SERV - 330-7 - Trip Report - Douglas County
April 26, 1982

Date: April 27, 1982

To: Jim Rickman, Area Engineer
SCS, Houston, MO

I arrived at Ava at approximately 10:00AM for a scheduled date with John Lumb. We were to look at a spring that the landowner wished to develop, possibly with the installation of a hydraulic ram.

John was not at work due to back problems and the appointment was cancelled.

However, John had been contacted earlier by Scotty Rees of Sentinel requesting that he come to the Sentinel property and observe an oily material that was entering Prairie Creek. John requested that I contact Scotty and observe the problem, which I did at 10:30 A.M.

Sentinel is a wood products firm located in Ava on Prairie Creek, a tributary of Cowskin Creek. Sentinel had previously had problems with wood treating material entering Prairie Creek and causing a pollution problem. In 1977 Sentinel, in conjunction with some government agencies, installed an extensive drain collection and sump system to alleviate this problem.

The oily material was collecting in a settling pond that is located on Sentinel property just upstream of Hwy. 5. The settling pond is in Prairie Creek, and at the time I observed it, appeared to still be retaining the oily material. The surface of Prairie Creek at Hwy. 5 didn't have any oil visible.

Scotty and I followed Prairie Creek upstream approximately 200 feet, at which point 2 CMP culverts enter the channel from the east side. The water surface upstream of this point had no visible oily film, and it was obvious that the oily material had been discharged from the CMPs. Scotty stated that the CMPs connected to a sump (open concrete drop box) located on Rawling's property just east of the Sentinel property.

We observed the sump from a lumber pile on Sentinel property. Three CMPs discharge into the sump. One CMP appears to come from the east, and two CMPs from the northeast. The single CMP from the east was discharging the oily material into the sump box. At this time the discharge was a trickle, but the oily material was visible on the sides of the pipe and in the bottom of the sump.

Scotty stated that he had contacted officials at the Rawlings plant and made them aware of the problem earlier in the morning. At the time I was on the

site, they had not tried to clean up the material in the settling basin on Sentinel property.

I left the site at approximately 11:00 A.M.

G. Rex Hamilton
Engrg Technician

cc: H. Lane Thurman
John Lumb

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

August 11, 1988

Mr. Donald Farris
Executive Vice President
Sentinel Industries, Inc.
P. O. Box 165
Ashland, MO 65010

Dear Mr. Farris:

RE: Sentinel Wood Treating, Inc.
Ava, MO

The Missouri Department of Natural Resources (MDNR) and Environmental Protection Agency (EPA) have reviewed your letter of July 15, 1988 and the status of Sentinel Wood Treating, Inc.

We concur with your conclusion that a part B application or closure plan is not required as previously requested by MDNR and EPA. Sentinel Wood Treating, Inc. will only be subject to the appropriate generator requirements.

If you have any questions, please call me at 314-751-3176.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

Daniel M. Tschirgi

Daniel M. Tschirgi, P.E., Chief
Hazardous Waste Permit Unit
Waste Management Program

DMT:jms

cc: Ms. Jane Ratcliff, EPA Region VII
Mr. Bob Stewart, EPA Region VII

To Ron 6-16-88

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 1915 Southridge Drive Jefferson City, Missouri 65102 (314) 751-3241

January 21, 1982

Frank S. Rees
Sentinel Wood Treating Company
P.O. Box 336
Ava, Missouri 65608

Dear Mr. Rees:

Enclosed please find a copy of the Resource Conservation and Recovery Act Compliance Inspection Report for your facility. I believe it is self-explanatory.

If you have any questions or if we can be of assistance to you, don't hesitate to contact either the regional office or Mr. Paul Meiburger of this office.

Sincerely,

David E. Bedan

David E. Bedan, Ph.D.
Director
Waste Management Program

DEB/PM/bki

cc: Springfield Regional Office
U.S. EPA Region VII Enforcement Branch

Enclosures

To Dan 6-15-88

# HAZARDOUS WASTE COMPLIANCE INSPECTION REPORT

Sentinel Wood Treating Company
P. O. Box 336
Ava, Missouri 65608
(417) 683-4145
EPA ID# MOD029684438
MDNR #01435

On December 7, 1981, Burt McCullough, Missouri Department of Natural Resources, Springfield Regional Office conducted a hazardous waste compliance inspection at Sentinel Wood Treating Company at Ava in Douglas County, Missouri. Sentinel treats wood with pentachlorophenol for use in the manufacture of treated wood products. Sentinel is a relatively small wood treating operation. They treat as few as one day per week, and during busier times, as often as seven days per week. The hazardous waste generated is wastewater treatment sludge (K001) from the bottom of a 5-stage concrete system of treatment tanks. Since the effective dates of RCRA and the Missouri Hazardous Waste Law, no sludge has been removed from the tanks.

UNSATISFACTORY FEATURES:

1. None

COMMENTS:

The wastewater treatment sludge is generated at a very slow rate. The last time these pits were cleaned out was in 1977. These concrete tanks are enclosed in a locked building.

The entire plant is equipped with a leachate collection and treatment system. Storm water is diverted away from the plant area to prevent surface water contamination. Spill control plans are in effect at the plant to prevent discharge of pentachloroplenol to the environment. Sentinel is registered with the EPA as a generator, but not as a treatment, storage, or disposal facility.

During the mid-1970's and prior to that time, Sentinel posed some serious environmental problems to the area. Due to a joint effort between Sentinel and the Missouri Clean Water Commission, quantum advances in the environmental quality in the area have been made.

RECOMMENDATIONS:

1. Sentinel should make a determination of the exact quantity of hazardous waste (K001- wastewater treatment sludges from wood preservation processes )which is stored at the facility at any given time.

2. If the quantity of hazardous waste is greater than 1,000 Kg, Sentinel should either apply for a permit as a RCRA storage facility; or, they should take steps to assure that the accumulation of hazardous wastes on-site never exceeds 1,000 Kg. (453.6 kg)

APPROVED:

John R. Nixon, P.E.
Administrator

SUBMITTED:

Burt McCullough
Environmental Specialist

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

August 11, 1988

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Executive Vice President
Sentinel Industries, Inc.
P. O. Box 165
Ashland, MO 65010

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Ava, MO

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We concur with your conclusion that a part B application or closure plan is not required as previously requested by MDNR and EPA. Sentinel Wood Treating, Inc. will only be subject to the appropriate generator requirements.

If you have any questions, please call me at 314-751-3176.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

Daniel M. Tschirgi

Daniel M. Tschirgi, P.E., Chief
Hazardous Waste Permit Unit
Waste Management Program

DMT:jms

cc: Ms. Jane Ratcliff, EPA Region VII
Mr. Bob Stewart, EPA Region VII

Retail
Division

# Sentinel Industries, Inc.

SINCE 1957

P.O. Box 165 • Ashland, Missouri 65010 • 314-657-2164

K. W. FARRIS, *President*
DONALD FARRIS, *Executive Vice President*
CHARLES FARRIS, *Vice President & Treasurer*
DANIEL FARRIS, *Vice President & Secretary*
ROLAND KING, *Vice President*

July 15, 1988

Mr. Dan Tschirgi
Waste Management Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Dear Mr. Tschirgi:

This letter is in response to your request for submittal of Part B permit or the closure plan. It appears that some confusion has prevailed as to the status of this facility as a TSD facility.

Sentinel Wood Treating, Inc., Ava, Missouri, had originally filed as a TSD facility in August, 1980. However, this was a protective filing and USEPA had changed our status to a "Small Quantity Generator" through its letter dated September 30, 1982. The report on the MDNR inspection performed on December 7, 1981 states that "...Sentinel is registered with the EPA as a generator but not as a treatment, storage or disposal facility." This inspection considered Sentinel to be a small quantity generator as evidenced by the inspection checklist attached to the report.

Sentinel had originally filed HWG-1 and HWG-1A forms with MDNR in July, 1980, indicating that they were a generator of more than 220 lbs. per month. However, based on actual operations, Sentinel had submitted revised forms HWG-1 and HWG-1A to MDNR that they generate 80 lbs. per month of K001 waste on an intermittent basis. With this generation rate, Sentinel is a conditionally exempt small quantity generator and would not require any permit based on our understanding of 40 CFR 261.5(b). Please also note that Sentinel has never accumulated more than 110 gallons of Penta-contaminated sludge as indicated by the manifests for off-site shipments. The K001 waste has not been stored at the plant for more than 90 days from its generation.

Because of the facts represented above, we do not feel that our operations at the Ava plant can be construed to represent a hazardous waste TSD facility. Hence, it is not necessary for Sentinel to submit a Part B application or a facility closure plan.

For your convenience, we have enclosed the documents referred to in this letter. We would appreciate an early response to this letter. If you need additional information, please contact me.

Sincerely,

Donald Farris

Donald Farris
Executive Vice President

lc

POST
BARN POLES
TIMBERS
LUMBER

# Sentinel, Inc.

AVA, MISSOURI 65608
683-4145

ASHLAND, MISSOURI 65010
657-2164

K. W. FARRIS, PRESIDENT
DONALD FARRIS, SECRETARY & VICE PRESIDENT
CHARLES FARRIS, TREASURER

November 18, 1980

Fred Woods
U. S. Environmental Protection Agency
Region VI
Attention: 6AEP
1201 Elm Street
First International Building
Dallas, Texas 75270

Re: EPA I.D. No. ARD047335096
EPA I.D. No. ARD990742165

Dear Mr. Woods:

Although we have not received Acknowledgement of Notification of Hazardous Waste Activity from you, we are aware that your computer will probably indicate that our firm needs to seek Interim Status under the Resource Conservation Recovery Act. We would like to advise you that we intend to operate our facilities within the special requirements set forth for persons who handle small quantities of hazardous waste. We understand from page 1-5 of your Application for a Hazardous Waste Permit - Consolidated Permits Program that we are excluded from the requirement to obtain a permit in that we will be "certain persons treating, storing, or disposing of small quantities of hazardous waste...".

Sincerely,

Don Farris
Secretary-Vice President

cc: Moore & Wolfinbarger

To Don 6-16-88

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
324 EAST ELEVENTH STREET
KANSAS CITY, MISSOURI - 64106

657-2164

SEP 30 1982

Mr. Donald Farris
Secretary-Vice President
Sentinel Wood Treating, Inc.
Ava, Missouri 65608

RE: MOD029684438

Dear Mr. Farris:

Thank you for your prompt response to our request for clarification of your status in the Federal Resource Conservation and Recovery Act (RCRA) program.

Based on your written response we are changing your status to small quantity generator with reduced reporting requirements under the Federal RCRA system. Your identification number is being retained in the computer for future reference.

If your process should change or if you do not understand the requirements placed on a small quantity generator, please feel free to contact Mrs. Betti Harris of my staff. She can be reached at 816-374-6534.

The action described in this letter pertains only to the Federal RCRA system and does not dismiss you from compliance with the Missouri Solid and Hazardous Waste Laws and Regulations, 260.200 - 260.240 RSMo and 260.350 - 260.430 RSMo respectively. If you have any questions concerning this, please contact the Waste Management Program of the Missouri Department of Natural Resources at 314-751-3241.

Sincerely yours,

Robert L. Morby
Chief, Waste Management Branch
Air and Waste Management Division

cc: David Bedan, Director
Waste Management Program, MDNR

To Don 6-16-88

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 1915 Southridge Drive Jefferson City, Missouri 65102 (314) 751-3241

January 21, 1982

Frank S. Rees
Sentinel Wood Treating Company
P.O. Box 336
Ava, Missouri 65608

Dear Mr. Rees:

Enclosed please find a copy of the Resource Conservation and Recovery Act Compliance Inspection Report for your facility. I believe it is self-explanatory.

If you have any questions or if we can be of assistance to you, don't hesitate to contact either the regional office or Mr. Paul Meiburger of this office.

Sincerely,

David E. Bedan

David E. Bedan, Ph.D.
Director
Waste Management Program

DEB/PM/bki

cc: Springfield Regional Office
U.S. EPA Region VII Enforcement Branch

Enclosures

To Dan 6-16-88

# HAZARDOUS WASTE COMPLIANCE INSPECTION REPORT

Sentinel Wood Treating Company
P. O. Box 336
Ava, Missouri 65608
(417) 683-4145
EPA ID# MOD029684438
MDNR #01435

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UNSATISFACTORY FEATURES:

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The wastewater treatment sludge is generated at a very slow rate. The last time these pits were cleaned out was in 1977. These concrete tanks are enclosed in a locked building.

The entire plant is equipped with a leachate collection and treatment system. Storm water is diverted away from the plant area to prevent surface water contamination. Spill control plans are in effect at the plant to prevent discharge of pentachloroplenol to the environment. Sentinel is registered with the EPA as a generator, but not as a treatment, storage, or disposal facility.

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RECOMMENDATIONS:

1. Sentinel should make a determination of the exact quantity of hazardous waste (K001-wastewater treatment sludges from wood preservation processes )which is stored at the facility at any given time.

2. If the quantity of hazardous waste is greater than 1,000 Kg, Sentinel should either apply for a permit as a RCRA storage facility; or, they should take steps to assure that the accumulation of hazardous wastes on-site never exceeds 1,000 Kg. (453.6 kg.)

APPROVED:

John R. Hixon, P.E.
Administrator

SUBMITTED:

Burt McCullough
Environmental Specialist

To Don 6-16-88

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
324 EAST ELEVENTH STREET
KANSAS CITY, MISSOURI - 64106

SEP 30 1982

Mr. Donald Farris
Secretary-Vice President
Sentinel Wood Treating, Inc.
Ava, Missouri 65608

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Sincerely yours,

Robert L. Morby
Chief, Waste Management Branch
Air and Waste Management Division

cc: David Bedan, Director
Waste Management Program, MDNR

MISSOURI DEPARTMENT OF NATURAL RESOURCES
1155 E. Cherokee St. Springfield, Missouri 65807 (417) 883-4033

1.300 Ava
Sentinel Wood Treating

April 18, 1979

Mr. Frank Rees, Manager
Sentinel, Inc.
Box 336
Ava, MO 65608

Dear Sir:

On April 17, 1979 an inspection was made of the waste treatment facilities and outfall point serving Sentinel Wood Treating of Ava, Missouri.

At that time, no major deficiencies were noted. It was noted that dredge work was being planned for the catch basin in the stream bed (just above the discharge point). It was also noted that work was progressing on the new treatment facility designed by Moore and Wolfinbarger.

Yours truly,

Larry Childress

Larry Childress, P.E.
Environmental Specialist III
Springfield Regional Office
Department of Natural Resources

LC/jo

NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

Facility: Sentinel Wood Treating, Inc.
P. O. Box 336
Douglas County
Ava, Mo. 65608

Permit No. MO-0085898

Owner: Sentinel Wood Treating, Inc.
P. O. Box 165
Ashland, Mo. 65010

Water source: Outfall by Grab
Date: 1/21/80 Time: @ 10 Am Collected by: FRun

Reporting Period: _____ 19 through _____ 19 .

Required Frequency of Monitoring: Minimum is once every three months.

RESULTS:

| Test | Date 1/21 | Date | Date | Units | Method |
|---|---|---|---|---|---|
| pH | 7.65 | | | S. U. | Electrode |
| COD | 5.34 | | | mg/l. | Dichromate Reflux. |
| Oil & Grease | .073 | | | mg/l. | Partition Grav. |
| Pentachlorophenol | | | | µg/l. | Chromatography |

Permitted final limits: pH= 6.0-9.0, COD= 0-20mg/l., Oil & grease= 0-15mg/l.
Pentachlorophenol= 0-3 µg/l.

Test for Pentachlorophenol by _____

Analysis by: M. L. Cowen, Bioanalyst; Signature of Analyst M L Cowen 1/21

Report Approved by: _____ Title: _____ Date _____

Quarterly report mailed to: Dept. of Natural Resources
Div. of Enviromental Quality
P. O. Box 1368
Jefferson City, Mo. 65101

NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

Permit No. MO-0085898

Owner: Sentinel, Inc.
Box 165
Ashland, Mo. 65010

Facility: Sentinel, Inc.
Box 336
Douglas County
Ava, Mo. 65608

Water source: Outfall by Grab
Date: 12/3/80 Time: @ 10 AM

Reporting Period: Dec. 1980

Results:

| Test | Minimum | Maximum | Average | Results | Units | Method |
|---|---|---|---|---|---|---|
| pH | | | | 7.53 | S.U. | Electrode |
| Oil & Grease | | | | 0.57 | mg/l. | Partition-Grav. |
| COD | | | | 4.72 | mg/l. | Dichromate Reflux. |
| Pentachlorophenol | | | | | g/l. | Chromatography |
| | | | | | | |

Remarks: Water for Penta to Environmental International

Analysis by: M L. Cowen Bioanalyst Date: 12/3/80

Report prepared & submitted by: _____

Report approved by: _____ Title: _____ Date: _____

Quarterly report mailed to: Dept. of Natural Resources
Division of Environmental Quality
Water Quality Program
P. O. Box 1368
Jefferson City, Mo. 65101
ATTN: Permit Section

NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

Permit No. MO-0085898

Owner: Sentinel, Inc.
Box 165
Ashland, Mo. 65010

Facility: Sentinel, Inc.
Box 336
Douglas County
Ava, Mo. 65608

Water source: Outfall by Grab
Date: 10-16-8 Time: @ 2PM

Reporting Period: Oct 1980, 4th Qtr.

Results:

| Test | Minimum | Maximum | Average | Results | Units | Method |
|---|---|---|---|---|---|---|
| pH | | | | 7.90 | S.U. | Electrode |
| Oil & Grease | | | | 0.15 | mg/l. | Partition-Grav. |
| COD | | | | 9.82 | mg/l. | Dichromate Reflux. |
| Pentachlorophenol | | | | | g/l. | Chromatography |
| | | | | | | |

Remarks: water to ABC Lab 10/16/80

Analysis by: W L Cowden Bioanalyst Date: 10-16-80

Report prepared & submitted by: _____

Report approved by: _____ Title: _____ Date: _____

Quarterly report mailed to: Dept. of Natural Resources
Division of Environmental Quality
Water Quality Program
P. O. Box 1368
Jefferson City, Mo. 65101
ATTN: Permit Section

ANALYTICAL BIO CHEMISTRY LABORATORIES, INC.
P.O. Box 1097 • Columbia, MO 65205 • (314) 474-8579

®

October 13, 1980

ANALYSIS RESULTS FOR: Sentinel Wood Treating
P.O.Box 336
Ava, Missouri 65608

| ABC Lab No. | Customer I.D. | ppb/Pentachlorophenol |
|---|---|---|
| 25845 | Water from Outfall 7/9/80 | 1.1 |
| 26245 | Water from Outfall 9/9/80 | 1.3 |
| 26103 | Water from Outfall 8/18/80 | 1.0 |

Michael Williams
Residue Supervisor

NPDES MONITORING REPORT FOR NON-DOMESTIC WASTEWATER DISCHARGES

Permit No. MO-0065898

Owner: Sentinel, Inc.
Box 165
Ashland, Mo. 65010

Facility: Sentinel, Inc.
Box 336
Douglas County
Ava, Mo. 65608

Water source: Outfall by Grab
Date: _____ Time: _____

Reporting Periods: July, Aug. & Sept. 1980- Third qtr.

Results:

| Test | Minimum | Maximum | Average | Results | Units | Method |
|---|---|---|---|---|---|---|
| pH | 7.0 | 7.9 | 7.5 | | S.U. | Electrode |
| Oil & Grease | 0.12 | 1.24 | 0.56 | | mg/l. | Partition-Grav. |
| COD | 1.54 | 18.03 | 10.44 | | mg/l. | Dichromate Reflux. |
| Pentachlorophenol | 1.0 | 1.3 | 1.1 | | (ppb) u g/l. | Chromatography |
| | | | | | | |

Remarks: Testing for Penta done by ABC Lab. , Columbia, Mo.

Analysis by: M. L. Cowen Bioanalyst Date: 10-14-80

Report prepared & submitted by: M. L. Cowen

Report approved by: Frank A. Rice Title: Mgr. Date: 10-14-80

Quarterly report mailed to: Dept. of Natural Resources
Division of Environmental Quality
Water Quality Program
P. O. Box 1368
Jefferson City, Mo. 65101
ATTN: Permit Section

NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

Permit No. MO-0085898

Owner: Sentinel, Inc.
Box 165
Ashland, Mo. 65010

Facility: Sentinel, Inc.
Box 336
Douglas County
Ava, Mo. 65608

Water source: Outfall by Grab
Date: 9-9-80 Time: @ 9:30 AM

Reporting Period: September

Results:

| Test | Minimum | Maximum | Average | Results | Units | Method |
|---|---|---|---|---|---|---|
| pH | | | | 7.0 | S.U. | Electrode |
| Oil & Grease | | | | 1.24 | mg/l. | Partition-Grav. |
| COD | | | | 1.54 | mg/l. | Dichromate Reflux. |
| Pentachlorophenol | | | | | g/l. | Chromatography |
| | | | | | | |

Remarks: WATER TO ABC Lab THIS DATE

Analysis by: W L Cowen Bioanalyst Date: 9/9/80

Report prepared & submitted by: _____

Report approved by: _____ Title: _____ Date: _____

Quarterly report mailed to: Dept. of Natural Resources
Division of Enviromental Quality
Water Quality Program
P. O. Box 1368
Jefferson City, Mo. 65101
ATTN: Permit Section

SENTINEL WOOD
TREATING CO., INC.

2095

4-30-82

Environmental
International, Inc

4-606

53 46

P.O. Box 7065
Springfield, MO 65801

# ENVIRONMENTAL INTERNATIONAL, INC.

ENVIRONMENTAL ENGINEERS, CONTRACTORS & LABORATORY

Telephone
(417) 869-9439

## INVOICE # 0235

DATE: April 28, 1982

NAME Sentinel Wood Products

ADDRESS Box 336

Ava, MO 65608

| QUAN. | DESCRIPTION | PRICE | AMOUNT |
|---|---|---|---|
| 1 | Moisture test (solids) | | $ 4.00 |
| 2 | Pentachlorophenol test | | 50.00 |
| | | Total amount due | $54.00 |

4-606
Waste Water Test.

54 59
Jan 19. 53 46

Please remit to: 1812 S. Franklin, Springfield, MO 65807

NET: 10 DAYS

Please pay from invoice - No statement sent

Discount · 1%- 10 days

1.5% Service Charge per month on all Past due Accounts

*Toxic & hazardous waste disposal & handling, environmental engineers, land reclamation, blasting engineers*

P.O. Box 7085
Springfield, MO 65801

# ENVIRONMENTAL INTERNATIONAL, INC.

ENVIRONMENTAL ENGINEERS, CONTRACTORS & LABORATORY

Telephone
(417) 869-9435

April 28, 1982

Mr. Scotty Rees
Sentinel Wood Products
Box 336
Ava, MO 65608

Dear Mr. Rees:

The following are the results of the testing performed in our laboratory of the waste sludge:

| Sample | Parameter | Results |
|---|---|---|
| waste sludge | solids | 76.66% |
| waste sludge | pentachlorophenol | .1864% (1864 ppm) |
| liquid | pentachlorophenol | .1621% (1621 ppm) |

Thank you for the opportunity to serve you.

Sincerely,

Donald R. Vassar
Lab Manager

DRV/lb

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

1.700 Ava

To Don 5-23-84
To Don 6-16-88
To Don 11-4-88

Mr. Donald Farris
Sentinel Wood Treating Co., Inc.
Ava, MO 65608

Dear Mr. Farris:

In accordance with the Federal Clean Water Act of 1977, on June 30, 1981, the State of Missouri was given authorization to administer the Federal Pretreatment Program as it applies to municipalities and industries within the State.

The purposes of the pretreatment program is to protect the wastewater treatment facility from receiving wastes which would interfere with the operation of the facility or pass through thus causing the beneficial uses of receiving stream to be affected. The program also protects the sludge that is generated from the wastewater treatment facility from being classified a hazardous waste.

Under the States program, the Department of Natural Resources will determine which cities will be required to develop and implement pretreatment programs. In a letter dated April 18, 1984, the Department of Natural Resources informed the City of Ava that no pretreatment program would be required. Based on this decision, the State of Missouri took responsibility of controlling industrial discharges to publically owned treatment works.

Please be advised the following effluent limitations and monitoring requirements are being placed on the discharge from Sentinel Wood Treating Co., Inc., to the City of Ava's wastewater treatment facility. Pentachlorophenol shall be limited to a concentration of 10µg/l Monthly Average and 25µg/l Daily Maximum. The discharge shall be sampled on a monthly basis with results of the analysis being submitted one copy to the City of Ava, and one copy to the Department of Natural Resources, Springfield Regional Office, 1155 East Cherokee, Springfield, Missouri 65807.

Should the facility be incapable of achieving the effluent limitations contained in this letter, it may be necessary to upgrade the pretreatment facilities.

Should you have any questions please contact the Springfield Regional Office at 883-4033.

Sincerely,

for Robert H. Hentges
Chief of Permit Section
Water Pollution Control Program

RHH/GSP/cg

cc Mr. Samuel Wolfinbarger, P.E.
The City of Ava, MO
Springfield Regional Office

To Ron 6-16-88

1.300 Ava
Sentinel Wood Treating

MISSOURI DEPARTMENT OF NATURAL RESOURCES
1155 E. Cherokee St. Springfield, Missouri 65807 (417) 883-4033

November 2, 1984

Mr. Frank S. Rees, Manager
Sentinel Wood Treating, Inc.
Ava, Missouri 65608

Dear Mr. Rees:

This letter is to confirm receipt of the discharge monitoring report for October from Sentinel Wood Treating, Inc. Please note Robert H. Hentges' letter outlining the monitoring requirements for pentachlorophenol instead of phenols. All future discharges should be analysed for pentachlorophenol.

Should you have any questions, please advise.

Sincerely,

Gregory S. Perkins, P.E.
Environmental Engineer
Springfield Regional Office
Department of Natural Resources

GSP:ek

cc: City of Ava

MISSOURI DEPARTMENT OF NATURAL RESOURCES
1155 E. Cherokee St. Springfield, Missouri 65807 (417) 883-4033

1.200 Ava

Ava

April 18, 1984

Honorable Lawrence Plaster, Mayor
City Hall
Ava, MO 65608

Dear Sir:

Please be advised, the Department has reviewed the industrial waste questionnaires submitted from Sentinel Wood Treating Co., Inc., and Emerson Electric. It has been determined that the city will not be required to develop a pretreatment program. However, due to the nature of Sentinel's discharge to the city's facility, the Department will place a discharge limitation on penta chlorophenol in the city's new NPDES permit. The limitations to be placed in the permit are 3.0 g/l Monthly Average and 7.5 g/l Daily Maximum.

The Department will also be placing discharge limitations and monitoring requirements on Sentinel Wood Treating Co., Inc.'s discharge to the city's wastewater facility. Under a separate letter to Sentinel Wood Treating Co., Inc. we will outline those requirements.

Should you have any questions, please advise.

Sincerely,

Gregory S. Perkins

Gregory S. Perkins, P.E.
Environmental Engineer
Springfield Regional Office
Department of Natural Resources

GSP/cg

cc Mr. Frank Dolan, WPCP
Sentinel Wood Treating Co., Inc.

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

1.700 Ava

Mr. Donald Farris
Sentinel Wood Treating Co., Inc.
Ava, MO 65608

Dear Mr. Farris:

In accordance with the Federal Clean Water Act of 1977, on June 30, 1981, the State of Missouri was given authorization to administer the Federal Pretreatment Program as it applies to municipalities and industries within the State.

The purposes of the pretreatment program is to protect the wastewater treatment facility from receiving wastes which would interfere with the operation of the facility or pass through thus causing the beneficial uses of receiving stream to be affected. The program also protects the sludge that is generated from the wastewater treatment facility from being classified a hazardous waste.

Under the States program, the Department of Natural Resources will determine which cities will be required to develop and implement pretreatment programs. In a letter dated April 18, 1984, the Department of Natural Resources informed the City of Ava that no pretreatment program would be required. Based on this decision, the State of Missouri took responsibility of controlling industrial discharges to publically owned treatment works.

Please be advised the following effluent limitations and monitoring requirements are being placed on the discharge from Sentinel Wood Treating Co., Inc., to the City of Ava's wastewater treatment facility. Pentachlorophenol shall be limited to a concentration of 10$\mu$g/l Monthly Average and 25$\mu$g/l Daily Maximum. The discharge shall be sampled on a monthly basis with results of the analysis being submitted one copy to the City of Ava, and one copy to the Department of Natural Resources, Springfield Regional Office, 1155 East Cherokee, Springfield, Missouri 65807.

Should the facility be incapable of achieving the effluent limitations contained in this letter, it may be necessary to upgrade the pretreatment facilities.

Should you have any questions please contact the Springfield Regional Office at 883-4033.

Sincerely,

for Robert H. Hentges
Chief of Permit Section
Water Pollution Control Program

RHH/GSP/cg

cc Mr. Samuel Wolfinbarger, P.E.
The City of Ava, MO
Springfield Regional Office

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

May 14, 1981

3.500 Douglas County
Sentinel Wood Treating, Inc.

Mr. Donald Farris
Sentinel, Inc.
Ava, Missouri 65608

Dear Mr. Farris:

As a result of the field investigation conducted by members of the Central and Springfield Regional Office Water Pollution Control staffs on May 11, 1981, we have concluded that an NPDES permit is no longer required for the Sentinel, Inc., Ava, Missouri facility. This is because of the elimination of the direct discharge by pretreatment and connection to the Ava sewer system. Proper operation of your collection and pretreatment systems must be maintained in the future to insure that direct discharges will not occur.

In addition although monitoring of the creek running though your property will no longer be required, the continuation of a monitoring program should insure compliance with the requirements of the SPCC plan for your facility. The work which has taken place at your facility in the last several years seems to have been in the best interest of the environment as well as all parties concerned.

Thank you for your hospitality during our visit, should you have any futher questions please advise.

Sincerely,

Robert H. Hentges
Chief of Permit Section
Water Pollution Control Program

RHH/RJL/ra
cc: Springfield Regional Office
Mike Thomas, EPA Region VII

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

.700 Ava

To Don 5-23-84
To Don 6-15-88
To Don 11-4-88

Mr. Donald Farris
Sentinel Wood Treating Co., Inc.
Ava, MO 65608

Dear Mr. Farris:

In accordance with the Federal Clean Water Act of 1977, on June 30, 1981, the State of Missouri was given authorization to administer the Federal Pretreatment Program as it applies to municipalities and industries within the State.

The purposes of the pretreatment program is to protect the wastewater treatment facility from receiving wastes which would interfere with the operation of the facility or pass through thus causing the beneficial uses of receiving stream to be affected. The program also protects the sludge that is generated from the wastewater treatment facility from being classified a hazardous waste.

Under the States program, the Department of Natural Resources will determine which cities will be required to develop and implement pretreatment programs. In a letter dated April 18, 1984, the Department of Natural Resources informed the City of Ava that no pretreatment program would be required. Based on this decision, the State of Missouri took responsibility of controlling industrial discharges to publically owned treatment works.

Please be advised the following effluent limitations and monitoring requirements are being placed on the discharge from Sentinel Wood Treating Co., Inc., to the City of Ava's wastewater treatment facility. Pentachlorophenol shall be limited to a concentration of 10µg/l Monthly Average and 25µg/l Daily Maximum. The discharge shall be sampled on a monthly basis with results of the analysis being submitted one copy to the City of Ava, and one copy to the Department of Natural Resources, Springfield Regional Office, 1155 East Cherokee, Springfield, Missouri 65807.

Should the facility be incapable of achieving the effluent limitations contained in this letter, it may be necessary to upgrade the pretreatment facilities.

Should you have any questions please contact the Springfield Regional Office at 883-4033.

Sincerely,

Ken Arnold

for Robert H. Hentges
Chief of Permit Section
Water Pollution Control Program

RHH/GSP/cg

cc Mr. Samuel Wolfinbarger, P.E.
The City of Ava, MO
Springfield Regional Office

MOORE & WOLFINBARGER
ENGINEERS — SURVEYORS

(417) 831-5225
312 Park Central East
Springfield, Missouri 65806

DIRECTORS
Howard G. Moore, P.E., R.L.S.
Richard L. Baker, P.E.
Gary G. Butcher, R.L.S.

May 18, 1989

Robert H. Hentges
Chief of Permit Section
Water Pollution Control Program
State of Missouri
Department of Natural Resources
P.O. Box 1368
Jefferson City, Missouri 65102

MW 1027.1

Re: Sentinel Industries, Inc.
Ava, Missouri
Effluent Limitations

Dear Mr. Hentges:

This letter is written at the request of Sentinel Industries, Inc. As you are aware, Sentinel Industries has analyzed water samples monthly as part of the requirements for meeting effluent limitations prior to discharging to the wastewater treatment facility in Ava, Missouri. Sentinel Industries has not discharged wastewater to the City wastewater treatment plant during the last three to four years, but has continued to collect and analyze water samples on a monthly schedule since 1984. Appendix A contains a compiled list of these results, and as shown from this data, there have been only three months since August of 1984 where the effluent requirements exceeded monthly limitations (10 ug/l), but not daily limitations (25 ug/l). The mean value for these samples is 4.10 ug/l with a standard deviation of 3.27 and a variance of 10.69.

Sentinel Industries has not treated any wood products at this site since 1982. Since that time, the plant operations have consisted of manufacturing office and yard furniture and related products.

Sentinel requests that any wastewater monitoring be eliminated because they are not discharging to the City wastewater treatment facility due to operational changes at their plant site. Sentinel Industries feels this monitoring of Prairie Creek is no longer necessary.

If you have any questions or comments, please feel free to contact me. Sentinel Industries would like a response to their request as soon as feasibly possible.

Sincerely,

M&W engineers-surveyors

Wendell L. Barner
Geologist

WLB/ach
E6/1027(2.1-.2)

Enclosure

cc/enc: Don Farris ✓
Frank S. Rees

| YEAR | MONTH | ug/l |
|---|---|---|
| 1984 | August | 3.0 |
| | September | 2.0 |
| | October | 1.7 |
| | November | 2.0 |
| | December | 7.5 |
| 1985 | January | 6.6 |
| | February | 7.5 |
| | March | 9.1 |
| | April | 5.1 |
| | May | 2.1 |
| | June | 6.15 |
| | July | 9.3 |
| | August | 5.7 |
| | September | 2.3 |
| | October | 2.5 |
| | November | 4.6 |
| | December | 0.9 |
| 1986 | January | 0.9 |
| | February | 4.3 |
| | March | 1.6 |
| | April | 2.1 |
| | May | 1.2 |
| | June | 1.1 |
| | July | <1.0 |
| | August | 1.0 |
| | September | 3.1 |
| | October | 0.15 |
| | November | 1.2 |
| | December | 3.7 |
| 1987 | January | 14.0 |
| | February | 4.8 |
| | March | 5.0 |
| | April | 14.0 |
| | May | 3.0 |
| | June | 3.6 |
| | July | 1.0 |
| | August | 13.0 |
| | September | 2.0 |
| | October | 5.2 |
| | November | 6.2 |
| | December | 1.5 |
| 1988 | January | 1.2 |
| | February | 4.5 |
| | March | 3.2 |
| | April | 3.4 |
| | May | 6.2 |
| | June | 0.8 |
| | July | 1.6 |
| | August | 4.6 |
| | September | 6.4 |
| | October | 7.6 |
| | November | 4.2 |
| | December | 2.8 |
| 1989 | January | 1.8 |
| | February | 2.0 |
| | March | 5.4 |
| | April | 2.4 |

Number of Samples = 57
Mean = 4.10 ug/l
Standard Deviation = 3.27
Variance = 10.69
Standard Error of the Mean = 0.43
Median Value = 3.15 ug/l
Range = 14.85

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

August 11, 1988

Mr. Donald Farris
Executive Vice President
Sentinel Industries, Inc.
P. O. Box 165
Ashland, MO 65010

Dear Mr. Farris:

RE: Sentinel Wood Treating, Inc.
Ava, MO

The Missouri Department of Natural Resources (MDNR) and Environmental Protection Agency (EPA) have reviewed your letter of July 15, 1988 and the status of Sentinel Wood Treating, Inc.

We concur with your conclusion that a part B application or closure plan is not required as previously requested by MDNR and EPA. Sentinel Wood Treating, Inc. will only be subject to the appropriate generator requirements.

If you have any questions, please call me at 314-751-3176.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

Daniel M. Tschirgi

Daniel M. Tschirgi, P.E., Chief
Hazardous Waste Permit Unit
Waste Management Program

DMT:jms

cc: Ms. Jane Ratcliff, EPA Region VII
Mr. Bob Stewart, EPA Region VII

**Vulcan CHEMICALS**
Division of Vulcan Materials Company

# MATERIAL SAFETY DATA SHEET

(ESSENTIALLY SIMILAR TO FORM OSHA-20)
SEE IMPORTANT NOTICE ON BOTTOM OF OTHER SIDE
24 Hour Emergency Phone (316) 524-5751

## I - PRODUCT IDENTIFICATION

MANUFACTURER'S NAME AND ADDRESS
Vulcan Materials Company, Chemicals Division, P. O. Box 7689, Birmingham, AL 35253-0689

| CHEMICAL NAME | CHEMICAL FORMULA |
|---|---|
| Pentachlorophenol | $C_6Cl_5OH$ |
| **TRADE NAME AND SYNONYMS** | **CHEMICAL FAMILY** |
| GIAZD® Penta, Block Penta, PCP | Chlorinated Phenol |
| **CAS REGISTRY NO.** | **DOT IDENTIFICATION NO.** |
| 87-86-5 | NA 2020 |

## II - HAZARDOUS INGREDIENTS

| MATERIAL OR COMPONENT | % (wt) | PEL (Units) |
|---|---|---|
| Pentachlorophenol | 90 | 0.5mg/m$^3$ |
| Other Chlorinated Phenols | 6 | |

## III - PHYSICAL DATA

| | | | |
|---|---|---|---|
| BOILING POINT (°F.) | 527°F (275°C) (decomposes) 588°F (309°C) | SPECIFIC GRAVITY ($H_2O$=1) | flake bulk density = 70#/ft$^3$ |
| VAPOR PRESSURE (mm Hg.) | 0.00020 (20°C) | PERCENT, VOLATILE BY VOLUME (%) | 0 |
| VAPOR DENSITY (AIR=1) | 9.2 | EVAPORATION RATE | N/A |
| SOLUBILITY IN WATER | 14ppm (20°C) | APPEARANCE AND ODOR | Light brown or tan solid; pungent odor when hot. |

## IV - FIRE AND EXPLOSION HAZARD DATA

| FLASH POINT (Method used) | FLAMMABLE LIMITS | Lower | Upper |
|---|---|---|---|
| N/A | N/A | | |

EXTINGUISHING MEDIA
N/A

SPECIAL FIRE FIGHTING PROCEDURES
Self-contained breathing equipment with full facepiece should be worn by personnel in the area.

UNUSUAL FIRE AND EXPLOSION HAZARDS Exposure to fire may cause decomposition and produce hydrogen chloride, chlorine, and chlorinated hydrocarbons.

## V - REACTIVITY DATA

| STABILITY | | | CONDITIONS TO AVOID |
|---|---|---|---|
| | UNSTABLE | | |
| | STABLE | X | None |

INCOMPATABILITY *(Materials to avoid)*
Strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Hydrogen chloride, chlorine, chlorinated hydrocarbons.

| HAZARDOUS POLYMERIZATION | | | CONDITIONS TO AVOID |
|---|---|---|---|
| | MAY OCCUR | | |
| | WILL NOT OCCUR | X | None |

VMC-3239

## VI - HEALTH HAZARD DATA

OSHA PERMISSIBLE EXPOSURE LIMIT 0.5mg/m$^3$ 8 hour time weighted average (29 CFR Part 1910.1000)

ACGIH: 0.5 mg/m$^3$ 8 hour TLV; 1.5 mg/m$^3$ 15 min STEL.

EFFECTS OF OVEREXPOSURE

INHALATION:
Causes irritation to respiratory tract. Good warning properties at 0.3mg/m$^3$ (coughing, sneezing). Painful at 1 mg/m$^3$. May cause damage to liver, kidney and central nervous system.

SKIN CONTACT/ABSORPTION:
The dust causes irritation and may lead to chloracne. In solution, toxic amounts can be absorbed through the skin. It may be harmful to the liver, kidney and central nervous system.

INGESTION:
Toxic - symptoms may include: headache, high fever, dizziness, declining mental alertness. Persons with decreased liver or kidney functions are more susceptible to toxic effects.

EYES:
Burning sensation and irritation; continuous exposure can lead to corneal injury.

EMERGENCY AND FIRST AID PROCEDURES

EYES AND SKIN Flush with flowing water 15 minutes or more. Wash with mild soap and water. Recommend doctor examination. Remove contaminated shoes and clothes.

INHALATION Remove from exposure to fresh air. Use artifical respiration, if breathing stops. Get medical attention.

INGESTION If conscious, induce vomiting followed by gastric lavage with water and use of a saline cathartic. Send for a physician immediately.

## VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Ventilate spill area. Use protective equipment when cleaning it up. Vacuum up dry penta and reuse if possible. Use inert absorbent for penta solution and put in non-leaking sealed containers. Toxic to fish and wildlife; do not allow to contaminate water.

WASTE DISPOSAL METHOD

Use hazardous waste landfill or EPA approved incineration. May have salvage valve; contact manufacturer.

## VIII - SPECIAL PROTECTION INFORMATION

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

| | |
|---|---|
| RESPIRATORY | Cannister dust filter, MSHA- or NIOSH-approved. None needed with adequate ventilation. |
| EYE | Safety glasses-goggles-face shield. Do not wear contact lenses. |
| SKIN | Solvent-resistent gloves, tightly woven full body covering. |
| OTHER | Rubber suit and boots, protective headgear. |

VENTILATION REQUIREMENTS

Sufficient to maintain below TLV and 90°F.

## IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Protect containers from weather and keep dry. Contain runoff from product storage area and dispose of according to regulations. EPA recommended TWA of 0.4mg/m$^3$ for manual dumping of containers. Periodic physical examinations are recommended.

OTHER PRECAUTIONS Keep dust and solution mist from contact with skin and eyes. Avoid breathing dust and mist. Report unusual health symptoms immediately.

DATE September 1982

VMC 3239

HOWARD G. MOORE COMPANY, INC.
CONSULTING ENGINEERS

2122 SOUTH STEWART
SPRINGFIELD, MISSOURI 65804
(417) 881-2110

May 23, 1977 HM-305

Mr. James P. Odendahl
Director of Staff
Missouri Department of Natural Resources
Division of Environmental Quality
Water Quality Program
P. O. Box 1368
Jefferson City, Missouri 65101

Re: Sentinel Wood Treating, Inc.
Ava, Missouri
N.P.D.E.S. Permit No. MO-0085898

Dear Mr. Odendahl:

Enclosed is an Application for Variance for the above referenced facility.

If you or your staff have any questions concerning the contents of this Application, please contact us.

Respectfully,

HOWARD G. MOORE COMPANY, INC.
CONSULTING ENGINEERS

Quentin Moore

Quentin Moore, E.I.T.

cc: Larry Childress
Springfield Regional Office

Enclosure ($25.00 check)

Missouri Clean Water Commission
P. O. Box 154
Jefferson City, Missouri 65101

## Application for Variance

Applicant's Name Sentinel Wood Treating, Inc. Date May 18, 1977

Address P. O. Box 336
(Street)

Ava Missouri 65608
(City) (State) (Zip)

Effluent to be discharged:

Volume (gal/day) There is not a direct discharge by Sentinel.

Average from June 30, 1975 to March 31, 1977

Estimated Strength (mg/l ~~B.O.D.~~ C.O.D.) 64.5 mg/l

Industrial Waste Components (mg/l) Oil and grease 14.5 mg/l
Pentachlorophenol 63.5 µg/l

Point of Discharge:

NW ¼, NW ¼, Sec. 11, T 26N, R 16W, County Douglas

Name of Receiving Stream Prairie Creek

Is discharge to an undefined water course? Yes _____ No X

Is discharge to a stream which is normally dry, except following rainfall? Yes _____ No X

Variances are temporary. Please furnish the following compliance schedule:

Date for submitting preliminary plans * January 1, 1978

Date for submitting detailed plans and specifications * March 1, 1978

Date construction will start * May 1, 1978

Date construction will be completed * August 1, 1978

Present facts to support your contention that compliance with the Clean Water Law and/or regulations would be unreasonable. (Use reverse side if necessary) See attachments

* These dates are dependent on the Soil Conservation Service schedule as referred to in the Top of the Ozarks Resource Conservation and Development project letter that is attached.

This application must be accompanied by a $25.00 filing fee in the form of a check, money order, or bank draft made payable to the State of Missouri.

K. N. Farris Agt. Sentinel

Applicants Signature

(owner or legally authorized representative)

In the four and one half years since the Conservation Department ran tests on Prairie Creek and found undesirable pollutants, there has been diligent effort by all parties concerned to eliminate that condition. Sentinel Wood Treating, Inc., at Ava, is and has been from the very beginning, eager to find the solution to their problems and has worked willingly with those agencies concerned in arriving at those solutions. It is apparent that no one wants to see Sentinel closed down for in the past it would have been the easy thing to do. The Department of Natural Resources has worked with Sentinel and allowed a certain amount of leeway in Sentinel's operation while the problems were delt with. This is greatly appreciated and has allowed a solution to be found; however, Sentinel is faced with being closed before the solution can be implemented.

In reviewing the time and efforts spent in the past, it seems that Sentinel has won the battle, but lost the war.

A chronological list of these past events is:

1-73 Conservation Department checked Prairie Creek below Sentinel and found undesirable amounts of wood treating pollutants. The Clean Water Commission and Sentinel Wood Treating were notified.

2-73 Sentinel replied to the Conservation Department outlining what they would do to relieve the pollution in Prairie Creek. Sentinel proposed to construct a small concrete dam across Prairie Creek on their property. Flow would be taken from a point below the water surface. Pollutants on the water surface would be pumped

out and recycled. Sumps would also be constructed along the West side of Prairie Creek in the vicinity of the treating plant. These proposed improvements would be complete in the fall of 1973.

8-73 Engineer retained by Sentinel on recommendation of Clean Water Commission. (7-73)

4-74 With the dam constructed Sentinel was advised by the Clean Water Commission that since the dam was a part of the waste treatment system they must have appropriate discharge permits.

8-74 Clean Water Commission took samples of Prairie Creek.

10-74 Letter to Sentinel from State Attorney General requesting action on pollution problem.

11-74 Telegram to Attorney General from Mayor of Ava supporting Sentinel Wood and their efforts to work out their problems.

12-74 Clean Water Commission discharge permit obtained by Sentinel.

1-75 Consulting Geologist performs geology investigation and determines that the pollution problem is caused from subsurface flow, through the penta and oil saturated soil, that seeps into Prairie Creek. (See attached report.)

6-75 A 30' x 40' drip pad was constructed at treating building to store freshly treated wood. The drip pad collects approximately 500 gallons of solution per week.

3-76 United States Soil Conservation Service was contacted about possible assistance.

5-76 City of Ava was contacted about receiving treated discharge from Sentinel.

6-76 Letter sent to Department of Natural Resources to inform them that Sentinel was waiting to hear replies from Soil Conservation Service

and City of Ava.

9-76 Field check by Soil Conservation Service.

9-76 Extension of time requested from Department of Natural Resources for Engineering Report. This extension was needed so that the Soil Conservation Service could formulate their plan.

10-76 Tentative approval was obtained from City of Ava to take Sentinel's discharge.

12-76 Sentinel's Preliminary Engineering Report sent to Department of Natural Resources.

12-76 Plan from Soil Conservation Service reviewed. Plan did not treat Sentinel's off-site water problem correctly. Reply sent to Soil Conservation Service outlining the possible solutions to off-site water entering Sentinel property.

1-77 A meeting was held to discuss the SCS plan. Those attending were SCS, DNR, EPA, Conservation Dept., Sentinel and Howard G. Moore Co., Inc.

2-77 Soil Conservation Service submitted revised copy of RC & D Measure Plan.

2-77 Revised Soil Conservation Service plan reviewed at meeting in Ava. Those attending were SCS, Conservation Dept., Sentinel and H.G. Moore Co.

3-77 A letter was received from City of Ava stating that before the City will take Sentinel's treated discharge, the RC & D Measure Plan must be implemented.

4-77 Letter of noncompliance sent to Sentinel from Department of Natural Resources.

4-77 Letter from Howard G. Moore Co., Inc., to Department of Natural Resources stating reasons of noncompliance:

1. SCS needed approval of their proposed plan from Washington.

2. City of Ava would not take Sentinel's treated discharge until SCS plan implemented.

4-77 Howard G. Moore Co., Inc. requested Soil Conservation Service to provide a construction schedule on RC & D Measure Plan.

4-77 Received word from Soil Conservation Service that funding for the RC & D Measure Plan would not be available in this fiscal year. Their fiscal year ends in October.

5-77 Conversation with Soil Conservation Service indicated that money for the RC & D Measure Plan would be available at beginning of next fiscal year. Soil Conservation Service said letter would be sent giving dates of funding and construction schedule. (Copy of said letter is attached.)

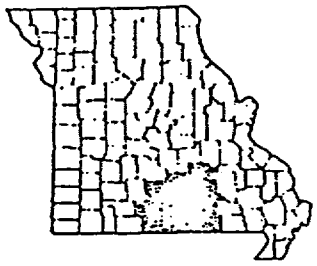
The Soil Conservation Service plan in conjunction with Sentinel's plans will provide a workable solution to the pollution to Prairie Creek at Sentinel's property. The circumstances that exist however require additional time to have the total project completed. Sentinel is prepared to implement their plan at once, but the City of Ava will not accept Sentinel's treated discharge until the Soil Conservation Service plan is implemented and the Soil Conservation Service plan cannot be implemented until after October, 1977, when funding is available. Sentinel does not have the financial capability to eliminate the surface and sub-surface water that flows onto their property. This is the reason that the Soil Conservation Service project is so critical to Sentinel's problem.

It should also be mentioned that the City of Ava has been identified in the Water Quality Management Basin Plan for White River Basin as a 201 Facilities Planning Area. Sentinel Wood Treating, Inc., is located within the City of Ava and is a part of the 201 Study Area.

The amount of time, effort and money that has been expended by the many people involved in this endeavor is about to be lost if Sentinel is closed. A variance, if granted, would give Sentinel the time needed to prove that they can operate their plant within the limits of the law.

TOP OF THE OZARKS
RESOURCE CONSERVATION AND DEVELOPMENT
PROJECT

TEXAS
HOWELL
DOUGLAS
WRIGHT



DENT
SHANNON
OREGON
OZARK

1437A South Highway 63
Houston, Missouri 65483



Mr. Jim Odendahl
Director of Staff
Missouri Department of
Natural Resources
P. O. Box 176
Jefferson City, Missouri 65101

Dear Sir:

We have been informed by the Soil Conservation Service that all RC&D funds for Missouri have been obligated for 1977 fiscal year. We have requested additional funds from Washington, but at this time we have not received any. It appears we will be unable to start construction on Prairie Creek Critical Area Treatment measure in Ava, Missouri for this fiscal year.

The fiscal year 1978 appropriation will be allocated on October 1, 1977. High priority has been set for Prairie Creek C.A.T. and invitations for bids should be mailed within the week after appropriations are received. However, due to the time required for awarding of the contract, it could be December before physical work will actually start on the project.

At this time we see no problems for this project being funded and under construction by December, 1977.

Sincerely,

Leon Rosch Jr.

Leon Rosch, Jr.
Chairman

cc: Howard G. Moore Co. Inc.
Lowell Hamilton, DC, SCS

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

May 16, 2000

Marilyn Alms
City of Ava
City Hall, PO Box 967
Ava, MO 65608

Dear Ms. Alms:

I have reviewed preliminary drawings for the road building project involving the Sentinel Wood property sent by Kerry Scott of Scott Consulting Engineers. There are several areas where the construction may encounter contaminated soil or groundwater. Although the risks can be managed, there are several areas where, in my opinion, soil and ground water sampling should be performed prior to beginning construction to verify the conditions.

As you know, the entire Sentinel property remains on the *Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Sites in Missouri.* Registry law requires the owner of a listed site to obtain permission from DNR prior to conducting work that constitutes a "substantial change in use" of the listed property. Your proposed right of way does not lie on the Sentinel property, technically the City does not require DNR approval for the vast majority of the proposed work. However, there are nevertheless some substantial risks that can and should be mitigated, and I am pleased to have an opportunity to make comments on the project.

Although the lagoon portion of the property is not currently in the Voluntary Cleanup Program, I am familiar with all the environmental investigations performed on the entire site. In the interest of efficiency, I will provide comments on the entire road project with respect to all areas of the Sentinel property. This eliminates the need for our Registry Unit to make comments separately on that portion of the site.

There are four areas of concern where construction acitivities could enounter contamination. These are listed below with suggested response actions for each area.

1. **North Border/Lagoon Boundary**

   For purposes of the road construction, the "lagoon parcel" includes the north frontage of the Sentinel property from the west edge of the property to a point just west of Culvert #3. The drawings appear to show the eastern edge of the lagoon parcel as a tick mark. No disturbance of soil should be allowed in the lagoon parcel on Sentinel property.

Please call me with any questions or comments at (573) 526-8916. I look forward to receiving a work plan.

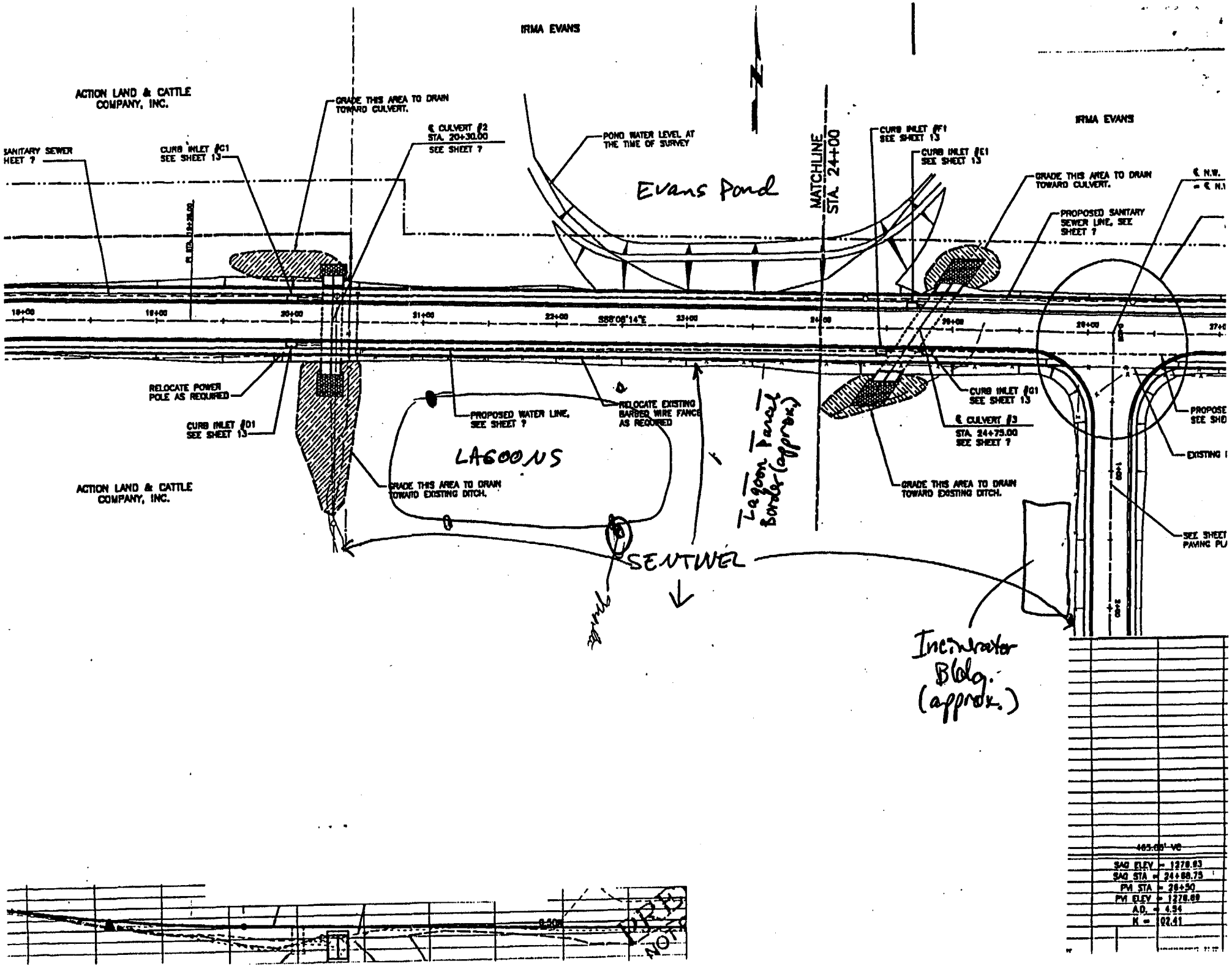
Sincerely,

Chris Cady

Chris Cady, Ph.D.
Environmental Specialist
Voluntary Cleanup Section

:cc
Attachment

cc: Kerry G. Scott, Scott Consulting Engineers
Don Farris, Sentinel
Tom Cason, Kingston Environmental
Shane Reed, EPA Region 7


IRMA EVANS
ACTION LAND & CATTLE COMPANY, INC.
GRADE THIS AREA TO DRAIN TOWARD CULVERT.
℄ CULVERT #2 STA. 20+30.00 SEE SHEET 7
POND WATER LEVEL AT THE TIME OF SURVEY
Evans Pond
MATCHLINE STA. 24+00
CURB INLET #F1 SEE SHEET 13
CURB INLET #E1 SEE SHEET 13
IRMA EVANS
GRADE THIS AREA TO DRAIN TOWARD CULVERT.
PROPOSED SANITARY SEWER LINE, SEE SHEET 7
SANITARY SEWER SHEET 7
CURB INLET #C1 SEE SHEET 13
RELOCATE POWER POLE AS REQUIRED
CURB INLET #D1 SEE SHEET 13
PROPOSED WATER LINE, SEE SHEET 7
RELOCATE EXISTING BARBED WIRE FENCE AS REQUIRED
LAGOONS
Lagoon Panel Border (approx.)
CURB INLET #G1 SEE SHEET 13
℄ CULVERT #3 STA. 24+75.00 SEE SHEET 7
GRADE THIS AREA TO DRAIN TOWARD EXISTING DITCH.
ACTION LAND & CATTLE COMPANY, INC.
GRADE THIS AREA TO DRAIN TOWARD EXISTING DITCH.
SEWER
Incinerator Bldg. (approx.)
SAG ELEV = 1278.83
SAG STA = 24+68.75
PVI STA = 26+50
PVI ELEV = 1278.89
K = 92.41

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

March 17, 2000

Mr. Tom Cason, President
Kingston Environmental Services
1600 SW Market
Lee's Summit, Missouri 64081

Re: Sentinel Wood Treating, Ava, Missouri

Dear Mr. Cason:

This letter represents my analysis of the results presented in your report entitled "Report of Findings", dated April 1999 regarding the above referenced site. I have organized the discussion on the basis of areas of concern, including the wood treatment area, incinerator area and the lagoon area.

**Wood Treatment Facility**

1. The Missouri Department of Health (DOH) has responded to our request for updated information on cleanup standards for polychlorinated dioxins and furans (PCDD/PCDFs - I will use the term "dioxins" interchangeably with the suite of PCDD/PCDFs including 2,3,7,8-TCDD). The method of using "toxic equivalency factors" (TEFs) to normalize all PCDD/PCDFs to 2,3,7,8-TCDD equivalents is still recommended. DOH still considers 1 part per billion (ppb) total dioxin equivalents to be a safe cleanup level for unrestricted property use. Cleanups have been done to higher target levels in Missouri, but only when levels above 1 ppb would not be exposed at the surface, and appropriate institutional controls such as restrictive covenants were in place to control future land use and prevent exposures. For example, a level of 10 ppb might be left in place under 18 inches of clean fill. However, DOH declined to provide generic CALM Tier 1 land use scenario B or C (commercial and industrial land use) values. If a commercial or industrial cleanup with a dioxin cleanup standard above 1 ppb was desired by Sentinel, the remedial action plan would require site-specific review and approval by DOH.

2. Dioxins were detected at locations S-3 and S-10 (1.3 and 22.3 ppb total equivalents respectively), confirming data the EPA obtained in the same area (1995, sample A, just north of Kingston sample S-10.) These levels will require remediation if the unrestricted use cleanup standard of 1 ppb is chosen. Since DOH has not determined Tier 1 commercial/industrial cleanup standards for dioxins, we would have to consult with them to determine whether the levels found could be left in place under a restricted use cleanup. I will discuss the issue with them if Sentinel decides to look at that option.

3. Pentachlorophenol and TPH were above cleanup standards in this area as well and require remediation for closure under any land use scenario. Further delineation of this contamination should be performed. However, some decisions about the remedial technique – such as removal versus capping in place – will have to be made by Sentinel before any further investigations can be designed. Comment #5 below regarding groundwater in this area will have an effect as well.

4. Why is TPH elevated at the S-6 location? This area appears to be a driveway without an obvious contaminant source.

5. There is no groundwater data for this part of the site. However, we learned some things from the temporary monitoring wells placed near the lagoons. The presence of groundwater at 4-6 ft. below ground surface suggests a high potential for ground water contamination with TPH and/or PCP around the treatment area and anywhere else on the site where products or waste were released onto the ground. Therefore, I am requesting shallow ground water investigation in the wood treatment area. The details of this investigation are open for discussion, but as an initial offering, I expect the investigation to include at least 3 wells, with at least one in the treatment vessel area or just down gradient where a potential contaminated soil source is located. The wells should be placed so as to provide gradient information and "background" sampling from the expected upgradient direction.

   If groundwater contamination is found in the wood treatment area, the acceptability of capping the contaminated soil in place will become less likely.

6. Other factors potentially affecting the cleanup of this area are the potential for contamination underneath the existing buildings and the migration of contaminants underneath buildings. While it may be premature at this point to prescribe borings through the building slabs, it should be kept in mind that this is a possibility in the future. If unrestricted use closure is Sentinel's goal, contamination cannot be left in place even under buildings, due to the requirement for restrictive covenants to ensure maintenance and nondisturbance of the foundations. This amounts to use restrictions which are incompatible with "unrestricted use" closure. Given the proximity of the existing buildings to the former treatment vessel, the high levels of contamination found in sample S-10, and the expected shallow depth of groundwater, it is likely that contamination exists under the buildings.

**Lagoon Area**

1. Both PCP and TPH were detected in the MW-3 well, which appears to be downgradient of the former lagoons. Although the report states that the TPH level (0.41 mg/L) exceeded the groundwater target concentration (GTARC), it does not actually exceed the 10 mg/L GTARC. However, PCP (at 180 ug/L) far exceeds the GTARC of 1 ug/L. I know of no source of PCP in the immediate area of MW-3, which suggests the source of the contamination is the former lagoons. Additional investigation is called for to determine the extent of the groundwater contamination and to clearly identify its source.

I recognize that the "lagoon parcel" is not currently enrolled in the VCP, but groundwater contamination has apparently migrated onto the subject parcel from the lagoons. Referring to my letter of October 29, 1998, we cannot consider this an "offsite source" in the traditional sense because the sites are owned by the same party, who is also the party responsible for the contamination. Therefore, to close the subject site under the VCP, groundwater contamination would have to be pulled back through hydraulic control or remediated so it is not affecting the subject parcel. I have attempted up to this point to exclude the lagoon parcel from consideration and requests for investigation since it is not enrolled in the program, but the data you have presented indicate that a complete investigation of the plume will probably require permanent monitoring wells on both parcels. I believe the VCP-enrolled parcel probably cannot be investigated thoroughly without doing work on both parcels.

Given the confirmed groundwater contamination, its distance from the presumed source area, and the potential for widespread contamination, including impact beyond the Sentinel property lines, I suggest that future groundwater investigation be designed considering the area as a whole. Delineation of the plume both horizontally and vertically, and determination of its rate of movement should be performed without regard to the property boundaries. Further, the installation of recovery well(s) on the lagoon parcel to establish hydraulic control of the plume may be necessary in order to free the VCP-enrolled parcel from contamination and thereby receive closure for that parcel.

I suggest that the next phase of the groundwater investigation include approximately six permanent monitoring wells around the south and east sides of the lagoon, as well as an upgradient well in the area of MW-1. One or more should be deep wells (completed in bedrock), possibly downgradient of the MW-3 temporary well. The new wells should be subjected to a monitoring plan (i.e. quarterly sampling) to gather data over time on the groundwater elevation, gradient and contaminant levels.

Again, I am presenting this for your evaluation with the expectation that a detailed plan will be developed after further discussion. The exact number, location and depth of the wells should of course be determined by considering the surface contours, subsurface geology and hydrology, and site history. I am currently consulting with the Division of Geology and Land Survey to get more detailed information on the subsurface conditions in the area. I will inform you of any relevant information they can provide.

2. My review of all the available information on the site has raised several new questions. EPA's Site Inspection Report (ca. 1993) states that the boiler for steaming the wood was located near the lagoons. It is not shown on any maps I currently have. I was under the impression that the entire wood treatment system was located between the existing retail buildings at the south end of the property. Apparently I may not have a complete understanding of the system. How did the wastewater reach the ponds? If parts of the process were located near the ponds, which parts? Please provide a sketch of the entire system, including any piping for steam or wastes, the wastewater treatment system, and any changes or new equipment that was added later in the site's history. Historic site plans or

photos would also be helpful if available. Does Sentinel have access to any photos of the site during the period of operation that may assist in determining areas of concern? Our photographic records are limited to those of the EPA and DNR inspections after wood treating operations ceased. The one exception is an aerial photograph provided by the city's consulting engineer dated 1980.

**Incinerator Area**

1. The sampling results indicated elevated levels of arsenic in surface soils surrounding the incinerator. The levels range from 6.5 to 39 mg/kg. Arsenic background levels sometimes exceed the cleanup standards of 11 to 14 mg/kg; however, in this area of the state, background arsenic in surface soil typically ranges from 2 to 7 mg/kg (Geochemical Survey of Missouri, Tidball, 1984). Therefore, remediation will be required to reach acceptable levels.

   Chromium and copper did not exceed any of the CALM soil target concentrations.

**General Issues**

1. As you know, the Voluntary Cleanup Program has the tools to help voluntary parties reach commercial/industrial closures at contaminated sites and receive certification of completion from DNR.

   Despite the important considerations to be dealt with, such as groundwater, in principle I see no reason why the portion of the Sentinel property currently enrolled in the VCP could not be remediated and for closure under the VCP as either unrestricted-use or restricted-use property.

   That said, it will be important for Sentinel to understand the ramifications of selecting restricted use cleanup standards (commercial/industrial, or CALM land use scenarios B and C) as opposed to unrestricted use standards. These requirements include:
   - A Restrictive Covenant in the property chain of title restricting land use
   - If engineered controls such as caps are used, requirements for maintenance and inspection and a prohibition against disturbance
   - Future monitoring by DNR, such as inspections to ensure the Restrictive Covenant provisions are being met, to be funded by a one-time "monitoring fee" ranging from $5000-$15,000
   - Potential for financial penalties if the covenants are violated and the site owner does not return to compliance in a reasonable time after notification of the problem, provided for by an Institutional Control Contract between the site owner and the department

   These are standard provisions in CALM Appendix E. It will be helpful at this point for Sentinel to consider what level of cleanup versus the level of use restrictions and future maintenance requirements it can accept for the site. A cleanup to unrestricted use standards will of course preclude the above controls.

2. As you may know, the Registry law has been amended to allow sites reaching not only "residential" (unrestricted use), but also commercial/industrial cleanup standards, to achieve Registry Class V, essentially removal from the Registry. However, if any monitoring and maintenance is necessary – such as for engineered caps over contamination left in place – the site would most likely go no farther than Class IV, (Properly Closed – requires continued management). That "continued management" would be provided for under the VCP's institutional controls as described above, which are generally compatible with the requirements of the Registry law. Therefore, it is still possible for Sentinel to effect a change in the Registry status of the site, and, in fact, the options are now greater.
3. A qualitative ecological risk assessment must be performed for the site using the checklist in Appendix F of CALM.

4. As you know, CALM has provisions for public participation in cleanup and redevelopment decisions. These requirements are site-specific as outlined in Appendix E. The requirements generally increase with restricted use cleanups. This site is one step ahead of most in that the city government and at least some adjacent landowners are already aware of and involved with the site. At this time it is premature to decide on a course of action since remedial action plans have not been developed. However, Sentinel should be aware that public participation activities may be necessary as we go forward.

I suggest that Sentinel formulate a plan for further investigation and remediation of the site based on the above comments and Sentinel's plans for future use of the site. I have tried to keep the above requests general in nature to allow for further discussion during formulation of that plan. Please contact me at (573) 526-8916 when you are ready to discuss the next phase of work.

As always, we appreciate Sentinel's willingness to proceed with investigation of the site. I am sure that both the Ava community and the environment will benefit from the investigation and cleanup of the site as soon as it can be accomplished.

Sincerely,

HAZARDOUS WASTE PROGRAM

Chris Cady

Chris Cady, Ph.D.
Environmental Specialist
Voluntary Cleanup Section

CC:ph

c: Mr. Don Farris, Sentinel Industries Inc., P.O. Box 165, Ashland, Missouri 65010

Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

October 1, 1999

Kerry G. Scott, P.E.
Scott Consulting Engineers
550 St. Louis St.
Springfield, MO 65806

Re: Storm Sewer Installation at Sentinel Wood Treating

Dear Mr. Scott:

We have received your letter of September 1, 1999 regarding the proposed installation of two storm sewers across the east side of the Sentinel Wood property. As you know, the DNR has placed the Sentinel Wood property on the *Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri ("The Registry")*. The *Registry* is maintained by the Missouri Department of Natural Resources (DNR) pursuant to the Missouri Hazardous Waste Management Law, Section 260.440, RSMo and implementing regulations, 10 CSR 25-10.010.

In accordance with Section 260.465(1), RSMo, the property owner must obtain approval from the director prior to moving any contaminated material, or changing the use of the *Registry* site in any way. *Registry* regulations require change in use requests to be evaluated by the director to determine if the change results in:

1. Spread of contamination

2. Increased human exposure to the hazardous materials

3. Increased adverse environmental impacts

4. Making potential remedial actions to correct the problems at the site more difficult to undertake or complete.

We have reviewed the proposed plan for the storm sewers to determine whether the proposed construction would result in any of the four conditions listed above. The proposed locations are in a relatively uncontaminated portion of the property. Overall, the DNR does not consider this project to be a substantial change of use, provided that several conditions are met in order

to prevent any potential problems. Therefore, a formal Change in Use request will not be necessary. Our comments and the aforementioned conditions are discussed below.

The primary contaminants of concern at the site are a petroleum solvent similar to diesel fuel, which was used as a solvent for the pentachlorophenol wood treatment compound (PCP or "penta"). During the time period when the plant operated, technical grade pentachlorophenol commonly contained chlorinated dioxins and furans as impurities. Sampling at the site has detected residues of all these contaminants in the soil.

Based on the site's history and on sampling performed by the Environmental Protection Agency and by Sentinel's own consultants, the primary areas of concern at the site are the former lagoons at the north end of the site and the area around the former treatment equipment at the south end. The area where you have proposed to install the storm drains was reportedly used only for treated wood storage. Therefore, we do not expect heavy contamination to be present in the soil in that area. As a point of comparison, several soil borings have been done in the west storage area on the west side of the creek. No contamination was encountered that would represent a significant threat to construction workers or the environment if the soil was excavated in that area. If the same conditions are present on the east side of the creek, the installation of the storm drains should not present any problems with regard to contaminated soil. However, please be advised that no subsurface soil sampling has been performed in the east storage yard thus far. Therefore, we cannot guarantee that no contamination will be encountered.

If any contaminated soil is encountered, the city and its contractors should be prepared with a contigency plan to control worker exposure, prevent releases to the environment, and properly sample and dispose of any contaminated materials. Much of the contamination at Sentinel occurs in the parts per million and parts per billion range and is therefore not detectable by eye. However, if larger releases occurred in the east storage yard, you may encounter noticeable residues below the surface. Should you encounter any hydrocarbon solvent odors or discolored soil while excavating, work should cease until a qualified environmental contractor can sample the soil to determine the identity, rate and extent of the contamination. Potentially contaminated soil should be stockpiled on plastic sheeting and securely covered with plastic to prevent further releases. If excess soil is generated as a result of the culvert installation, it should be reused onsite or tested to determine whether it meets DNR's clean fill standards. Again, we do not expect that you will encounter these conditions in the east yard area.

The aforementioned sampling in the west storage yard in early 1999 revealed black material of uncertain origin just below the surface. The material did not have petroleum hydrocarbons or PCP above levels of concern. The samples were not analyzed for dioxins and furans because PCP was not detected and the dioxins and furans were therefore not likely to be present. This black material may have originated from several sources, including: residue of naturally occurring coal deposits, historic use of coal or coal cinders as fill material, or spills or drips of wood pitch waste. The material has not been clearly identified at this time. In any case, no contaminants of concern have yet been detected at levels requiring cleanup in the west storage

yard. However, you may encounter this black material in the east storage yard where you propose to install the storm drains.

We recommend consulting with Sentinel and their environmental consultants regarding the potential for encountering contaminated soil in the proposed storm drain locations.

A ground water interception system was installed in the late 1970s to prevent contaminated shallow ground water from entering the creek onsite. Please refer to the enclosed drawing for a description of the system. The drain tiles were installed along both sides of the creek from the north end of the site to a treatment system at the south end. The treatment system has been dismantled. It appears that the proposed drains would intersect the ground water collection system on the east side of the creek. Since Sentinel is still in the process of investigating the site, we have not discussed with them any possible future uses of this system for monitoring or remediation of the site. However, disturbance or removal of the system would probably constitute a Change in Use due to its potential effects on ground water. Therefore, at a minimum, further analysis would be necessary before DNR would support removal or disturbance of the ground water collection system. From our perspective, it would be advisable to keep the system intact when installing the storm drains.

In conclusion, the DNR has no objection to the installation of storm sewers, provided 1) a contingency plan is in place to control worker exposure, prevent releases to the environment, and properly sample and dispose of any contaminated materials, in the event that contamination is encountered, 2) the ground water collection system is not disturbed without further study, 3) soil is not be removed from the site without testing.

We would be pleased to discuss any of the above comments further in order to assist the City of Ava with the project. Please contact me at (573) 526-8916 with any questions or comments. As I indicated during our recent phone conversations, if requested we would be happy to meet with the city and Sentinel to assist in moving the project forward.

Sincerely,

Chris Cady

Chris Cady, Ph.D.
Environmental Specialist
Cleanup Section

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

September 8, 2000

Mr. Donald Farris
President
Sentinel Wood Treating
PO Box 165
Ashland, MO 65010

RE: Sentinel Wood Treating Site

Dear Mr. Farris:

As you are aware, the Sentinel Wood Treating site is listed on the *Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri (Registry)*. In accordance with Section 260.445 RSMo. 1986, the Missouri Department of Natural Resources (DNR) must annually assess or reassess the classification of each site listed on the *Registry*.

A five-member voting committee, made up of representatives from the DNR's Division of Geology and Land Survey, Hazardous Waste Program (HWP), Public Drinking Water Program, Environmental Services Program, and the Missouri Department of Health, met on
August 30, 2000, to complete this task for each site. Each classification was determined in accordance with criteria contained in 260.445 and 260.450 RSMo. 1986, and Title 10, Division 25, Chapter 10 of the Code of State Regulations [10 CSR 25-10.010].

The purpose of this letter is to inform you that the site will appear in the 2000 *Registry* Annual Report as a Class II, as required by 10 CSR 25-10.010. Petitions for changes or modifications in site classification may be made, pursuant to Section 260.460.

Should you have any interest in conducting actions to either lower the classification of the site, or remediate the site in order to have it removed from the *Registry*, we would be happy to discuss these matters. We recommend that such actions be conducted under the oversight of the HWP staff in order to ensure that activities completed will have the desired outcome.

The Registry Unit would also like to take this opportunity to ensure that you are aware of the requirements imposed by the *Registry* listing of the property.

When a site is placed on the *Registry*, the history of the property as a hazardous waste disposal area is filed with the Recorder of Deeds. When the DNR finds that a site on the *Registry* has been properly cleaned up or closed with no evidence of potential adverse environmental impact, the site will be removed from the *Registry*, and this will also be filed with the Recorder of Deeds. These actions notify any purchasers of the property that the site is or has been on the *Registry*.

Sites listed on the *Registry* are subject to certain restrictions. The use of the site may not change substantially without the written approval of the director of the DNR. Section 260.465(1), RSMo, states that:

> "No person may substantially change the manner in which an abandoned or uncontrolled hazardous waste disposal site on the registry prepared and maintained by the department pursuant to section 260.440 is used without the written approval of the director."

Approval of changes in ownership is not required; however, the law and regulations require that early in the negotiation process, prior to the sale, the seller must notify the buyer that the site is listed on the *Registry*. Changes of ownership must be reported to the department within 30 days after the transfer of title. At that time, the seller must provide a notarized statement, signed by the buyer, to the department. The document should state that the buyer is aware that the site is on the *Registry*, and that restrictions are associated with *Registry* listing. Title 10, Division 25, Chapter 10 of the Code of State Regulations [10 CSR 25-10.010(3)(B)3] states,

> "The seller, within thirty (30) days after the transfer of title, shall notify the department in writing of the transfer. At that time the seller shall also provide to the department a notarized statement signed by the buyer, which states that the buyer has received and read the information, specified in paragraph (3)(B)1 and 2 of this rule and that the buyer understands s/he may be assuming liability for any remedial action at the site; provided, however, the sale, conveyance or transfer of property shall not absolve any person responsible for site contamination, including the seller, of liability for any remedial action at the site."

In accordance with 260.465(4), RSMo, penalties may be sought for a violation of the aforementioned statutes. Section 260.465(4), RSMo, states,

> "If the department has reason to believe that the provisions of this section have been violated, or are in imminent danger of being violated, it may institute a civil action in any court of competent jurisdiction for injunctive relief to prevent such violation and for the assessment of a civil penalty not to exceed one thousand dollars per day for each day of the violation."

If you would like more information as to the reason for your site's classification or have questions concerning the *Registry* or related issues, please contact me at (573) 751-8629.

Sincerely,

HAZARDOUS WASTE PROGRAM

Hannah Martin

Hannah Martin
Environmental Specialist

HM:cj

# Kingston Environmental Services

An 8(a) American Indian Owned Company

June 13, 2000

Mr. Don Farris
Sentinel Industries, Inc.
P.O. Box 165
Ashland, MO 65010

Dear Don:

I am attaching a copy of the Memorandum from the DNR Divison of Geology and Land Survey concerning the geology of the Ava Site and our report of April 1999. In essence, the DNR is in general agreement with our findings, but has offered different opinions on a couple of issues including limestone vs. dolomite and coal smut vs. waste charcoal. The initial issues concerning registration of temporary monitoring wells has been resolved. If you have any questions, please call me.

Sincerely,

Tom Cason, Ph.D.
President

attachment (1)

1600 SW Market St.
Lee's Summit, Missouri 64081
816-524-8811 Fax: 816-525-5027

6200 Uptown Blvd. NE, Suite 220
Albuquerque, New Mexico 87110
505-830-3961 Fax: 505-884-5969

www.kingstonenv.com info@kingstonenv.com

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

June 7, 2000

Mr. Tom Cason, President
Kingston Environmental Services
1600 SW Market
Lee's Summit, Missouri 64081

Re: DGLS Report, Sentinel Wood Treating, Ava, MO

Dear Mr. Cason:

Enclosed is the promised copy of the report from our Division of Geology and Land Survey on the Sentinel site. Let me know if you have any questions or comments.

Sincerely,

Chris Cady

Chris Cady, Ph.D.
Environmental Specialist
Voluntary Cleanup Section

:cc

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

**MEMORANDUM**

DATE: March 31, 2000

TO: Chris Cady, Environmental Specialist III
Voluntary Cleanup Section, HWP, DEQ

FROM: Myrna Rueff, Geologist
Environmental Geology Section, GSP, DGLS

March 31, 2000
pag 1 of 3

SUBJECT: Report of Findings, Environmental Investigation Conducted at Former Sentinel Wood Treatment Site Ava, Missouri

LOCATION: 36° 57' 45" N Latitude, 92° 39' 57" W Longitude, W ½, NE ¼, NW ¼, Sec. 11, T. 26 N., R. 16 W., Ava, Missouri 7 ½ Minute Quadrangle

As per your request, the Geological Survey Program (GSP) has reviewed the subject document and has the following comments for your consideration.

**SPECIFIC COMMENTS**

Comment 1. Section 3.2, Temporary Groundwater Monitoring Wells; Lagoon Area, page 7, paragraph one. Temporary wells greater than 10 feet in depth are regulated under the Missouri Well Driller's Law. Under this law, registration and abandonment reports for temporary wells are to be submitted to the Wellhead Protection Section, DGLS. The Section has no records indicating that these procedures were followed. A letter from the Wellhead Protection Section will be sent to Kingston Environmental Services, Inc. advising them of these requirements.

Comment 2. Section 3.2, Temporary Groundwater Monitoring Wells; Lagoon Area, page 7, paragraph two. The shallow groundwater intercepted by the temporary monitoring wells described in this section is present at the soil/bedrock contact. The upper-most bedrock below the site is the Ordovician-age Jefferson City Dolomite. This thin bedded dolomite is relatively impermeable vertically

(acts as a leaky confining unit) except for the upper 1 to 2 feet of rock where extensive weathering has produced a relatively permeable condition in a horizontal direction. If future permanent groundwater monitoring wells are planned (to intercept horizontal flow through the upper weathered Jefferson City Dolomite) they should be installed at least to the top of and possibly a short distance (1 to 2 feet) into, competent bedrock which is approximately 17 to 18 feet below ground surface.

Comment 3. Section 4.1, Site Geology, page 8, paragraph one. In this paragraph the weathered rock is described as "limestone". Because the parent rock is the Jefferson City Dolomite, this weathered rock is more likely to be dolomite than limestone.

Comment 4. Section 4.1 Site Geology, page 8, paragraph one. This section on site geology does not include a discussion of karst, although it is identified as being karst in the 1993 Site Inspection Report (Appendix 1). Although sinkholes (surface expression of karst terrain) are not observable in the immediate area, local karst features have been identified. Losing stream conditions have been identified in Prairie Creek approximately 1 mile below the City of Ava sewage disposal lagoon. Tributaries of Prairie Creek have also been classified as losing in this area. A reported catastrophic sinkhole collapse occurred near Ava in valley alluvial sediments. Small springs found on the hillsides probably emerge from the upper weathered Jefferson City Dolomite where it is exposed on valley slopes.

Comment 5. Section 4.1, Site Geology, page 8, paragraph three. The Geological Survey Program (GSP) agrees with the conclusion, based upon data compiled during this investigation, that shallow site groundwater appears to be moving to the southeast. Previous dye tracing performed by the GSP suggests that deep regional groundwater movement is also to the southeast. Surface and bedrock topography slope to the south. The direction of deep groundwater movement may be influenced by the Mansfield Fault, which is an extension of the Bolivar-Mansfield Fault System. According to McCracken (1971), the Mansfield Fault may continue or be present as en echelon faulting across Douglas and Ozark Counties. The Jefferson City Dolomite and the underlying Roubidoux Formation may be influenced by this faulting

The City of Ava Municipal Well Numbers 4 and 5 are located southeast of the Sentinel Wood site. These wells are 1005 and 805 feet, respectively, in depth and obtain water from the lower, more productive portion of the Ozark Aquifer (Gasconade to the upper Eminence formations). In wells 4 and 5 the Jefferson City and Roubidoux formations are cased-off. Construction requirements are

normally more stringent, for example longer casing lengths and pressure grouting, for municipal wells than for private wells. However, if contaminants migrate into the subsurface via vertical bedrock fractures, caused by faulting, local karst features or poorly-constructed wells, the potential exists, however remote, that public water sources could be impacted.

Comment 6. Section 5.0, Conclusions, page 15, paragraph two. The explanation provided for the unnaturally dark color of the soil at the former treated wood storage area is attributed to "coal smut". Coal smut generally occurs in areas where coal deposits of Pennsylvanian age are present. This is not the case in south central Missouri. According to the 1993 Site Inspection Report, waste charcoal from the on-site water purification system was observed near the former treated wood storage area. This may be a more likely explanation for the unnaturally dark stained soils.

A file search for the Sentinel Wood site produced three documents you may wish to review and include in your file. Copies of these documents are included herein. If you have questions concerning these comments, please do not hesitate to call (573) 368-2132.

MLR/lh

Attachments: 3

Orig: Sentinal Wood Treating Inc., P.O. Box 336, Ava, Mo. 65608
cc: CWC

BB

WASTE TREATMENT WORKS-ENGINEERING GEOLOGIC REPORT
Missouri Geological Survey and Water Resources
Box 250, Rolla, Missouri 65401 (314) 364-1752

1. Project Sentinal Wood Treating County Douglas Date _____
2. Owner Sentinal Wood Treating Inc. Address P.O. Box 336, Ava, Missouri 65608
3. Location NE ¼ NW ¼ NW ¼, sec. 11, T. 26N., R. 16W., Quad Ava
4. Site investigation requested by Clean Water Commission
5. Is this original X or repeat _____ investigation; when _____
6. Type of waste - domestic-industrial X, toxic _____
7. Sketch and/or brief location description

Plant located on Hwy 14, west edge of Ava, Missouri.

(To be filled in where applicable by the geologist making the investigation)

8. It is recommended that this site be geologically accepted X, rejected _____
relocated _____, rejected unless remedial work is performed _____
9. Is stream in which effluent discharges gaining? Yes If losing, explain _____
_____
10. Is there any danger to groundwater supplies? none could be seen If yes, what _____
_____
11. Topography: flat _____, moderate slope X, steep slope _____
On: Prairie _____, hilltop _____, hillslope X, narrow ravine _____
broad valley _____, floodplain _____, terrace _____
12. Type and condition of bedrock Jefferson City dolomite.
_____
13. Type and engineering characteristics of soil Silty clay surface soil underlain by gravelly clay, underlain by residual clay (CH).
_____
14. Depth of excavation should not exceed _____ feet or an elevation of _____
15. If on floodplain, what effect on flood water _____
_____

(over)

16. Suggested remedial treatment:

Compaction_____, dirt pad_____, artificial sealant_____

diversion of subsurface flow_____, rock excavation_____, discharge point_____

Explanation:

These lagoons are already in use. The east cell (water storage cell) had a small amount of leakage at the base of the east levee. Mr. Reese plans to repair this levee.

17. The site should be revisited by an Engineering Geologist:

during construction_____, after construction_____, not necessary_____

Remarks:

At the time of inspection the receiving stream flowed from the plant to the city lagoon (1½ miles). The stream had the appearance of a gaining stream - willow trees along the banks, fat clay along the stream channel, and a well defined channel. There could be some water loss into shallow gravel deposits present in the stream, but this is a local loss and water should reappear downstream.

The lagoon appears to be holding. There are some iron stained seeps coming out of the banks of the stream channel east of the cells. This water is thought to be a local groundwater seep and not connected to the cells. It could originate in the lake located directly north of the cells. Fat yellow clays are exposed along the channel. These clays come from weathering of the dolomite and are impermeable.

Water is pumped out of the waterholding cell for irrigation and spraying of wood stock on the plant site.

THIS REPORT IS VALID ONLY AT THE ABOVE LOCATION AND BECOMES INVALID ONE YEAR AFTER THE DATE OF ISSUANCE.

Missouri Geological Survey report by John W. Whitfield, 10-10-74
John W. Whitfield, Geologist — Date

I (owner and/or engineer) hereby certify that recommendations contained in this report were complied with during construction.

_____
Signature — Date

NOTE: After construction is completed the owner or his legal representative is to sign in the place provided and return to the Missouri Clean Water Commission, P.O. Box 154, Jefferson City, Missouri 65101.

FOR FILE ONLY

BB

ADDENDUM TO THE SENTINEL WOOD LAGOON

DOUGLAS COUNTY, MISSOURI

LOCATION: NW¼, NE¼, NW¼, Sec. 11, T. 26 N., R. 16 W., Ava Quadrangle. (north site, Bus. Hwy. 57)

Upper east lagoon leaking penta into stream at a single concentrated seepage point on 2 August 1978. This some 20 feet downstream of the interceptor east draining pipe that is installed upslope of lagoons. This interceptor pipe is upslope of a clay dam used to block off seep water coming downslope under lagoons. There is also a clay dike supposedly compacted to bedrock on the east side of the lagoon (west of the stream channel).

I suspect leakage under ~~this~~ The lagoon dike likely through upper weathered Jefferson City bedrock fractures that concentrate the flow to a single point seepage outlet. Supposedly, there is an east-west clay dam downslope of these lagoons that would keep seepage from moving away from the lagoons.

Plans are to fill these lagoons with dirt and a compacted crushed lime layer to reduce incoming seepage. A rigidly lined (concrete) pit is being built in the main plant area to catch runoff and spilled penta for reuse in the plant process.

Dr. J. Hadley Williams, Chief
Applied Engineering & Urban Geology
Geology & Land Survey
August 4, 1978

[redacted]egional Office
[redacted]on Road
[redacted]s, Missouri 63119
[redacted]9-1313

[redacted]ingfield Regional Office
[redacted]55 East Cherokee
Springfield, Missouri 65807
417-883-4033

Macon Regional Office
131 North Rollins
P.O. Box 489
Macon, Missouri 63552
816-385-2129

MISSOURI CLEAN WATER COMMISSION
1014 Madison Street
P.O. Box 154
Jefferson City, Missouri 65101
314-751-3241

Kansas City Regional Office
615 East 13th Street
Kansas City, Missouri 641C
816-274-6675

Poplar Bluff Regional Offic
946 Lester Street
Poplar Bluff, Missouri 639
314-785-9460

Jefferson City Regional Off
1014 Madison Street
P.O. Box 154
Jefferson City, Missouri 6
314-751-3241

MEMORANDUM

TO 1.200 Ava FROM Charles L. Kroeger

SUBJECT Report on watershed surveilance DATE Jan. 13, 197

On January 3, 1975, I investigated sixteen possible stormwater contaminant sources in Ava, Missouri. Pictures were taken to stress the severity of several of the sources. The following is a summary of the points and areas investigated:

1. Watershed above Sentinel Wood Treating Company-Sec. 2, T26N, R13W
No large dairy operations were observed in the watershed area above Sentinel. The investigation disclosed that only a few cattle were grazing in the area.

2. Milk processing corporations-SW¼, SE¼, SW¼, Sec. 12 & SE¼, SE¼, NW¼, Sec. 11
Both Carnation and Kraft Milk Product Corporations have limited their operations to transfer stations for bulk milk transporting. Milk can operations no longer exist at these locations.

3. City of Ava - Bulk Storage Facilities
Mr. Neil Stillings informed me that the city has built retention basins around their tanks at the present location. They are making provisions for retention basins at the proposed relocation site for the tanks.

4. Sentinel Wood-SW¼, NE¼, NW¼, Sec. 11
It was noted that the aerator was not in operation on the retention basin at Sentinel. Later in the day, an employee was observed collecting the floating solution from the basin and placing it in barrels.

5. Standard Oil Products Storage Tanks - Picture #1
SW¼, NW¼, NE¼, Sec. 11
Undiked Storage Facilities. Two of the hoses were noted to be leaking. Petroleum products were reaching the roadside ditch. Mr. Heinlein is the manager of the Ava Oil Distributor Company which owns the tanks. He stated that he had discussed the matter of a retention dike with the Standard Oil Company. They hope to construct an earthen dike or other type of basin for spill retention.

6. Standard Station - Picture #2
NW¼, SW¼, NE¼, Sec. 11
Mr. Howard Howerton is the leasee. The owner is Ava Oil Distributors. A substantial amount of old oil was seen in a wet weather spring area behind the service station. Attendents stated that it was from years past and that oil is now stored in milk cans and hauled off. It would be washed down stream with any substantial rainfall. A problem exists with buried oil tanks and a wet weather spring. It would appear that continuous [illegible]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

NOV 14 1997

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Don Farris
Sentinel Industries Inc.
P.O. Box 165
Ashland, Mo 65010

Dear Mr. Farris:

RE: Former Sentinel Wood Treating Site located in Ava, Missouri.

On August 5th and 6th, 1997, the U.S. Environmental Protection Agency (EPA) collected soil and water samples from the above referenced site. The soil and water samples were collected in order to determine if any significant levels of pentachlorophenol and associated compounds are located at this site and to determine if any additional actions are warranted.

Enclosed, for your information, is a copy of the validated Analysis Request Report for activity AZXYD. As required by Section 104 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), EPA is providing this data to you as an owner of property sampled.

Also enclosed are tables which summarize the data in a more readily understandable format. A map with these tables describe where the samples were taken. As expected, high levels of pentachlorophenol were found at the subsurface where the lagoons used to be located. Lower levels of pentachlorophenol were found in both surface soil and water samples taken from other locations of the site.

EPA is in the process of having these results reviewed by the Agency for Toxic Substances and Disease Registry (ATSDR) to determine if the levels of pentachlorophenol and/or other contaminants are at or above levels of concern for this particular site and what adverse health effects may be associated with these contaminates. This review will also assist in making the determination if any additional sampling, site security, or removal actions are needed. Until this review is complete, EPA recommends that unnecessary contact with potentially contaminated soil be avoided. We also recommend against digging into the subsurface (especially the lagoon area) where the highest levels of pentachlorophenol exist.

In addition to the health consultation from ATSDR, a formal report will be prepared which describes in detail the sampling which was done in August 1997. I will send both of these reports to you when they have been completed. I expect these reports to be done by late December 1997. Please contact me at (913) 551-7818 if you have any questions regarding this data.

Sincerely,

Donald F. Hamera, On Scene Coordinator
Emergency Response and Removal

Enclosures: Analytical Data for AZXYD, data tables, map showing sample locations

cc: Jerry Foster, Missouri Department of Natural Resources (w/encl)
Missouri Department of Health (w/encl)
City of Ava, Missouri (w/encl)
Douglas County Health Department (w/encl)

**Sample Results Summary**
**Sentinel Wood Treating Site, Ava, MO**
**August 1997**

| Analyte | Surface Soil Metals Concentrations (mg/kg or ppm) Sample H |
|---|---|
| Silver | 2.0 U |
| Aluminum | 1,500 |
| Arsenic | 62 |
| Barium | 240 |
| Beryllium | 1.0 U |
| Cadmium | 1.0 U |
| Cobalt | 10 U |
| Chromium | 41 |
| Copper | 39 |
| Iron | 4,900 |
| Manganese | 160 |
| Nickel | 8.0 U |
| Lead | 25 |
| Antimony | 12 U |
| Selenium | 1.0 U |
| Thallium | 2.0 U |
| Vanadium | 10 U |
| Zinc | 280 |
| Calcium | 130,000 |
| Magnesium | 84,000 |
| Sodium | 1000 U |
| Potassium | 1000 U |

[1]BGS = Below Ground Surface

**Data Qualifiers:**
U = Analyte not detected. Value represents the sample detection limit.

## Sample Results Summary
## Sentinel Wood Treating Site, Ava, MO
## August 1997

| Compound | Water Sample Concentration (µg/L) | | | | |
|---|---|---|---|---|---|
| | I Upstream Creek | J Downstream Creek | K Groundwater Diversion | Munucipal Well #4 | Field Blank |
| Semivolatile Compounds | | | | | |
| Pentachlorophenol | 0.56 | 0.36 | 1.10 | 0.0036 | 0.0038 |
| Bis(2-ethylhexyl) phthalate | 7 | 44 | 29 | 5 U | 5 U |

**Data Qualifiers:**
U = Analyte not detected. Value represents the sample detection limit.

## Sample Results Summary
## Sentinel Wood Treating Site, Ava, MO
## August 1997

| Compound | Soil/Sediment Sample Pentachlorophenol Concentration (mg/kg or ppm) | | | | |
|---|---|---|---|---|---|
| | A1 Surface | A2 6-12 In. BGS[1] | A3 2-5 Ft. BGS[1] | B Surface | C Surface |
| Pentachlorophenol | 1.90 | 25.0 J | 2.5 | 4.30 | 1.90 |
| | F2 4-6 Ft. BGS[1] | H Surface | I Upstream Sediment | J Downstream Sediment | |
| Pentachlorophenol | 11,000 | 1.90 | 1.0 | 1.5 | |

[1]BGS = Below Ground Surface

**Data Qualifiers:**
U = Analyte not detected. Value represents the sample detection limit.
J = Concentration given is estimated.

| Compound | Soil/Lagoon Subsurface Sample Concentration (µg/kg or ppb) Sample F2 (4-6 Ft. BGS[1]) |
|---|---|
| **Semivolatile Compounds** | |
| Pentachlorophenol | 11,000 |
| 2-Meylnapthalene | 2,200 |
| Fluorene | 440 |
| Phenanthrene | 1600 |
| **Volatile Compunds** | |
| Toluene | 18 |
| Ethyl benzene | 15 |
| Acetone | 210 J |
| Methylethyl ketone | 26 J |
| Xylenes (total) | 120 |

[1]BGS = Below Ground Surface

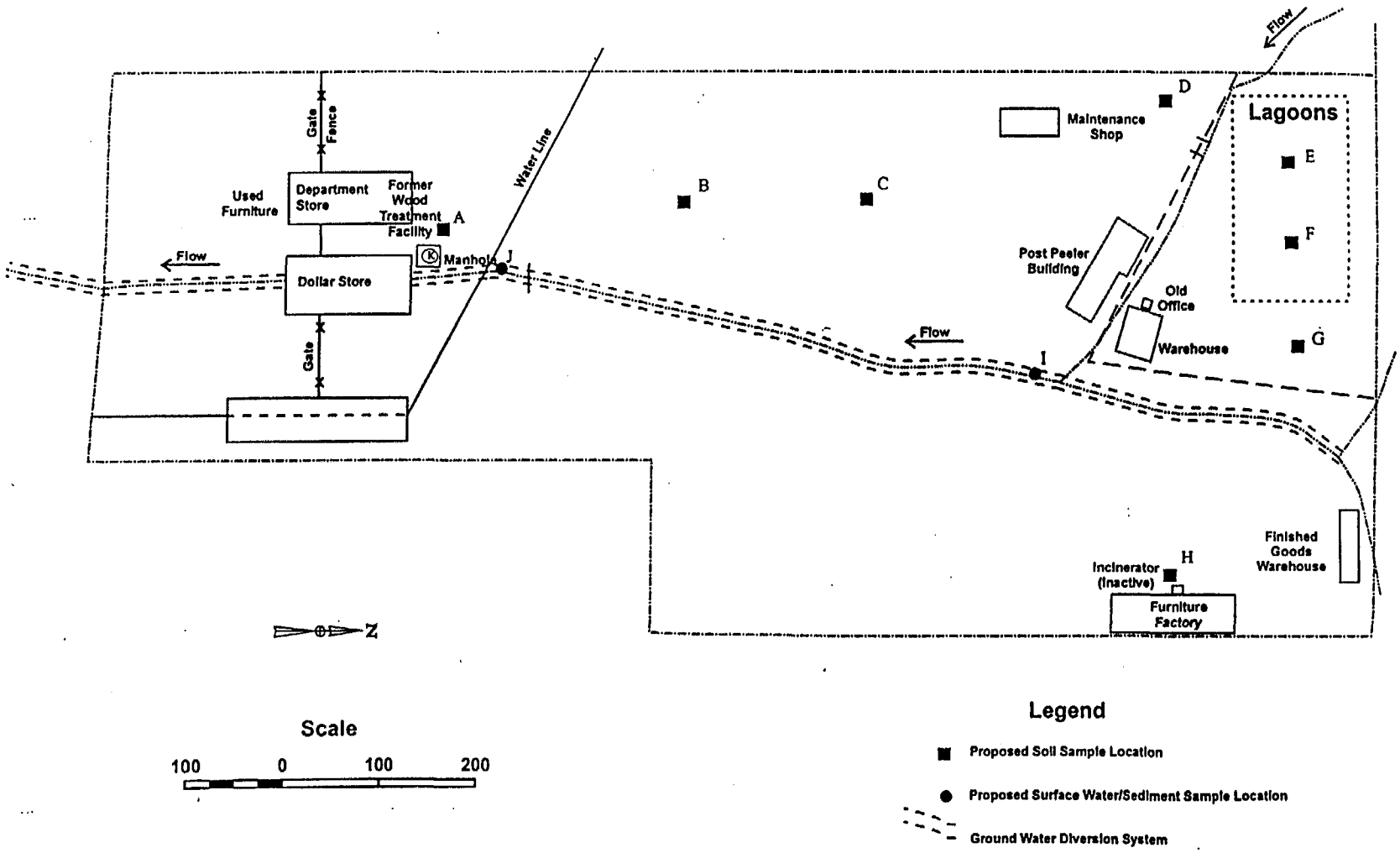
**Data Qualifiers:**
J = Concentration given is estimated.

## Sample Results Summary
## Sentinel Wood Treating Site, Ava, MO
## August 1997

| Compound | Soil Sample Concentration (ng/kg or parts per trillion) | | | |
|---|---|---|---|---|
| | A1 Surface | A3 2-5 Ft. BGS[1] | F1 Surface | F2 4-6 Ft. BGS[1] |
| 2,3,7,8-TCDD Total Equivalents | 4,730 J | 270 | 32.6 | 10300 |
| 2,3,7,8-dibenzo-p-dioxin (rapid screen) | 27.6 | 1.0 U | 1.0 U | 1.0 U |
| 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin | 157,000 J | 4,200 | 1,080 | 449,000 J |
| octachlorodibenzo-p-dioxin | 1,100,000 J | 185,000 J | 5,560 | 3,480,000 J |
| 2,3,7,8-tetrachlorodibenzo-p-furan | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| octachlorodibenzo-p-furan | 81,200 | 3,480 | 542 | 270,000 J |
| 1,2,3,7,8-pentachlorodibenzo-p-furan | 69.2 | 5.0 U | 5.0 U | 24.6 |
| 1,2,3,4,7,8-hexachlorodibenzo-p-furan | 1,850 | 49.7 | 16.9 | 4,550 |
| 1,2,3,6,7,8-hexachlorodibenzo-p-furan | 817 | 15.8 | 6.15 | 5.0 U |
| 1,2,3,7,8,9-hexachlorodibenzo-p-furan | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| 2,3,4,6,7,8-hexachlorodibenzo-p-furan | 519 | 5.0 U | 5.1 | 5.0 U |
| 1,2,3,4,6,7,8-heptachlorodibenzo-p-furan | 26,800 | 816 | 248 | 59,800 |
| 1,2,3,4,7,8,9-heptachlorodibenzo-p-furan | 2,240 | 85.2 | 31.9 | 7,370 |
| 1,2,3,7,8-pentachlorodibenzo-p-dioxin | 582 | 5.87 | 5.0 U | 5.0 U |
| 1,2,3,4,7,8-hexachlorodibenzo-p-dioxin | 1,680 | 5.0 U | 17.4 | 5.0 U |
| 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin | 4,960 | 157 | 50.1 | 8,710 |
| 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin | 3,300 | 59.1 | 33.5 | 5.0 U |
| 2,3,7,8-pentachlorodibenzo-p-furan | 113 | 5.0 U | 5.0 U | 147 |

[1]BGS = Below Ground Surface

**Data Qualifiers:**
U = Analyte not detected. Value represents the sample detection limit.
J = Concentration given is estimated.




**Sentinel Wood Treating**
**Ava, Missouri**
**Attachment A: Site Sketch**

ANALYSIS REQUEST REPORT

FOR ACTIVITY: AZXYD

HAMERA, DON 10/16/97 12:24:03

* FINAL REPORT

FY: 97 ACTIVITY: AZXYD DESCRIPTION: SENTINEL WOOD TREATING LOCATION: AVA MISSOURI

STATUS: ACTIVE TYPE: SAMPLING - IN HOUSE ANALYSIS PROJECT: L30

LABO DUE DATE IS 10/ 6/97. REPORT DUE DATE IS 11/ 4/97.

INSPECTION DATE: 8/ 6/97 ALL SAMPLES RECEIVED DATE: 08/07/97

ALL DATA APPROVED BY LABO DATE: 09/18/97 FINAL REPORT TRANSMITTED DATE: 10/14/97

EXPECTED LABO TURNAROUND TIME IS 60 DAYS EXPECTED REPORT TURNAROUND TIME IS 90 DAYS

ACTUAL LABO TURNAROUND TIME IS 42 DAYS ACTUAL REPORT TURNAROUND TIME IS 69 DAYS.

SITE CODE: YD SITE: SENTINEL WOOD TREATING

| SAMP. NO. | QCC | M | DESCRIPTION | SAMPLE STATUS | # | CITY | STATE | AIRS/ STORET LOC NO | SECT | LAYER | BEG. DATE | BEG. TIME | END. DATE | END. TIME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | | S | A1 0-2" | 1 | | AVA | MISSOURI | | | | 08/05/97 | 13:30 | / / | : |
| 002 | | S | A1 0-2" | 1 | | AVA | MISSOURI | | | | 08/05/97 | 13:30 | / / | : |
| 003 | | S | A2 6-12" | 1 | | AVA | MISSOURI | | | | 08/05/97 | 14:35 | / / | : |
| 004 | | S | A2 6-12" | 1 | | AVA | MISSOURI | | | | 08/05/97 | 14:35 | / / | : |
| 005 | | S | B 0-2" | 1 | | AVA | MISSOURI | | | | 08/05/97 | 13:35 | / / | : |
| 006 | | S | B 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 13:40 | / / | : |
| 007 | | S | C 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 13:30 | / / | : |
| 008 | | S | C 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 13:45 | / / | : |
| 009 | | S | D 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 15:15 | / / | : |
| 010 | | S | D 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 15:15 | / / | : |
| 011 | | S | E 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 15:30 | / / | : |
| 012 | | S | E 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 15:30 | / / | : |
| 013 | | S | F1 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 15:45 | / / | : |
| 014 | | S | F1 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 15:45 | / / | : |
| 015 | | S | F 4-6 FEET | 1 | | AVA | MISSOURI | | | | 08/06/97 | 10:00 | / / | : |
| 016 | | S | F 4-6 FEET | 1 | | AVA | MISSOURI | | | | 08/06/97 | 10:00 | / / | : |
| 017 | | S | G 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 16:00 | / / | : |
| 018 | | S | G 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 16:00 | / / | : |
| 019 | | S | H 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 16:15 | / / | : |
| 020 | | S | H 0-2 " | 1 | | AVA | MISSOURI | | | | 08/05/97 | 16:15 | / / | : |
| 021 | | S | I | 1 | | AVA | MISSOURI | | | | 08/05/97 | 18:00 | / / | : |
| 022 | | S | J | 1 | | AVA | MISSOURI | | | | 08/05/97 | 16:10 | / / | : |
| 023 | | S | A 2-5 FEET | 1 | | AVA | MISSOURI | | | | 08/06/97 | 08:55 | / / | : |

| SAMP. NO. | QCC | M | DESCRIPTION | SAMPLE STATUS | # | CITY | STATE | AIRS/ STORET LOC NO | SECT | LAY-ER | BEG. DATE | BEG. TIME | END. DATE | END. TIME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 024 | | S | A 2-5 FEET | 1 | AVA | | MISSOURI | | | | 08/06/97 | 08:55 | / / | : |
| 025 | | S | WASTEPILE #1 (SOUTH) | 1 | AVA | | MISSOURI | | | | 08/05/97 | 17:40 | / / | : |
| 026 | T | W | TRIP BLANK | 1 | AVA | | MISSOURI | | | | 08/04/97 | : | / / | : |
| 101 | | W | I SURFACE | 1 | AVA | | MISSOURI | | | | 08/05/97 | 18:00 | / / | : |
| 102 | | W | J SURFACE | 1 | AVA | | MISSOURI | | | | 08/05/97 | 16:10 | / / | : |
| 103 | | W | K SURFACE | 1 | AVA | | MISSOURI | | | | 08/05/97 | 15:00 | / / | : |
| 104 | | W | MUNI WELL #4 400 FEET | 1 | AVA | | MISSOURI | | | | 08/05/97 | 15:50 | / / | : |
| 105 | I | W | FIELD BLANK | 1 | AVA | | MISSOURI | | | | 08/06/97 | 11:10 | / / | : |

# EXPLANATION OF CODES AND INFORMATION ON ANALYSIS REQUEST DETAIL REPORT

## SAMPLE INFORMATION:

SAMP. NO. = SAMPLE IDENTIFICATION NUMBER (A 5-DIGIT NUMBER WHICH IN COMBINATION WITH THE ACTIVITY NUMBER AND QCC, PROVIDES AN UNIQUE NUMBER FOR EACH SAMPLE FOR IDENTIFICATION PURPOSES)

QCC = QUALITY CONTROL CODE (A ONE-LETTER CODE USED TO DESIGNATE SPECIFIC QC SAMPLES. THIS FIELD WILL BE BLANK FOR ALL NON-QC OR ACTUAL SAMPLES):
- B = CAL INCREASED CONCENTRATION FOR A LAB SPIKED DUP SAMPLE
- D = MEASURED VALUE FOR FIELD DUPLICATE SAMPLE
- F = MEASURED VALUE FOR FIELD BLANK
- G = MEASURED VALUE FOR METHOD STANDARD
- H = TRUE VALUE FOR METHOD STANDARD
- K = CAL INCREASED CONCENTRATION FOR FIELD SPIKED DUP SAMPLE
- L = MEASURED VALUE FOR A LAB DUPLICATE SAMPLE
- M = MEASURED VALUE FOR LAB BLANK
- N = MEASURED CONCENTRATION OF FIELD SPIKED DUPLICATE
- P = MEASURED VALUE FOR PERFORMANCE STANDARD
- R = CAL INCREASED CONCENTRATION RESULTING FROM LAB SPIKE
- S = MEASURED CONCENTRATION OF LAB SPIKED SAMPLE
- T = TRUE VALUE OF PERFORMANCE STANDARD
- W = MEASURED CONCENTRATION OF LAB SPIKED DUPLICATE
- Y = MEASURED CONCENTRATION OF FIELD SPIKED SAMPLE
- Z = CAL INCREASED CONCENTRATION RESULTING FROM FIELD SPIKE
- 1 = MEASURED VALUE OF FIRST SPIKED REPLICATE
- 2 = MEASURED VALUE OF SECOND SPIKED REPLICATE
- 3 = MEASURED VALUE OF THIRD SPIKED REPLICATE
- 4 = MEASURED VALUE OF FOURTH SPIKED REPLICATE
- 5 = MEASURED VALUE OF FIFTH SPIKED REPLICATE
- 6 = MEASURED VALUE OF SIXTH SPIKED REPLICATE
- 7 = MEASURED VALUE OF SEVENTH SPIKED REPLICATE

M = MEDIA CODE (A ONE-LETTER CODE DESIGNATING THE MEDIA OF THE SAMPLE):
- A = AIR
- H = HAZARDOUS WASTE/OTHER
- S = SOLID (SOIL, SEDIMENT, SLUDGE)
- T = TISSUE (PLANT & ANIMAL)
- W = WATER (GROUND WATER, SURFACE WATER, WASTE WATER, DRINKING WATER)

DESCRIPTION = A SHORT DESCRIPTION OF THE LOCATION WHERE SAMPLE WAS COLLECTED

AIRS/STORET LOC. NO. = THE SPECIFIC LOCATION ID NUMBER OF EITHER OF THESE NATIONAL DATABASE SYSTEMS, AS APPROPRIATE

DATE/TIME INFORMATION = SPECIFIC INFORMATION REGARDING WHEN THE SAMPLE WAS COLLECTED
- BEG. DATE = DATE SAMPLING WAS STARTED
- BEG. TIME = TIME SAMPLING WAS STARTED
- END DATE = DATE SAMPLING WAS COMPLETED
- END TIME = TIME SAMPLING WAS COMPLETED
- NOTE: A GRAB SAMPLE WILL CONTAIN ONLY BEG. DATE/TIME
  A TIMED COMPOSITE SAMPLE WILL CONTAIN BOTH BEG AND END DATE/TIME TO DESIGNATE DURATION OF SAMPLE COLLECTION

OTHER CODES
- V = VALIDATED

## ANALYTICAL RESULTS/MEASUREMENTS INFORMATION:

COMPOUND = MGP (MEDIA-GROUP-PARAMETER) CODE AND NAME OF THE MEASURED CONSTITUENT OR CHARACTERISTIC OF EACH SAMPLE

UNITS = SPECIFIC UNITS IN WHICH RESULTS ARE REPORTED:
- C = CENTIGRADE (CELSIUS) DEGREES
- CFS = CUBIC FEET PER SECOND
- GPM = GALLONS PER MINUTE
- IN = INCHES
- I.D. = SPECIES IDENTIFICATION
- KG = KILOGRAM
- L = LITER
- LB = POUNDS
- MG = MILLIGRAMS (1 X 10-3 GRAMS)
- MGD = MILLION GALLONS PER DAY
- MPH = MILES PER HOUR
- MV = MILLIVOLT
- M/F = MALE/FEMALE
- M2 = SQUARE METER
- M3 = CUBIC METER
- NA = NOT APPLICABLE
- NG = NANOGRAMS (1 X 10-9 GRAMS)
- NTU = NEPHELOMETRIC TURBIDITY UNITS
- PC/L = PICO (1 X 10-12) CURRIES PER LITER
- PG = PICOGRAMS (1 X 10-12 GRAMS)
- P/CM2 = PICOGRAMS PER SQUARE CENTIMETER
- SCM = STANDARD CUBIC METER (1 ATM, 25 C)
- SQ FT = SQUARE FEET
- SU = STANDARD UNITS (PH)
- UG = MICROGRAMS (1 X 10-6 GRAMS)
- UMHOS = MICROMHOS/CM (CONDUCTIVITY UNITS)
- U/CC2 = MICROGRAMS PER 100 SQUARE CENTIMETER
- U/CM2 = MICROGRAMS PER SQUARE CENTIMETER
- 1000G = 1000 GALLONS
- +/- = POSITIVE/NEGATIVE
- # = NUMBER

DATA QUALIFIERS = SPECIFIC CODES USED IN CONJUNCTION WITH DATA VALUES TO PROVIDE ADDITIONAL INFORMATION ON THE REPORTED RESULTS, OR USED TO EXPLAIN THE ABSENCE OF A SPECIFIC VALUE:
- BLANK = IF FIELD IS BLANK, NO REMARKS OR QUALIFIERS ARE PERTINENT. FOR FINAL REPORTED DATA, THIS MEANS THAT THE VALUES HAVE BEEN REVIEWED AND FOUND TO BE ACCEPTABLE FOR USE.
- I = INVALID SAMPLE/DATA - VALUE NOT REPORTED
- J = THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED QUANTITY
- K = ACTUAL VALUE OF SAMPLE IS < VALUE REPORTED
- L = ACTUAL VALUE OF SAMPLE IS > VALUE REPORTED
- M = DETECTED BUT BELOW THE LEVEL OF REPORTED VALUE FOR ACCURATE QUANTIFICATION
- O = PARAMETER NOT ANALYZED
- U = THE MATERIAL WAS ANALYZED FOR, BUT WAS NOT DETECTED. THE ASSOCIATED NUMERICAL VALUE IS THE SAMPLE DETECTION LIMIT.

| COMPOUND | UNITS | 001 | | 002 | | 003 | | 004 | | 005 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SD02 DIOXIN, 2378-TETRACHLORODIBENZO-P, RAPI | NG/GM | 0.0276 | | | | | | | | | |
| SD04 DIOXIN, 2378-TCD-TOTAL EQUIVALENTS | UG/KG | 4.73 | J | | | | | | | | |
| SD10 DIOXIN, 1234678-HEPTACHLORODIBENZO-P- | NG/KG | 157000 | J | | | | | | | | |
| SD22 DIOXIN, OCTACHLORODIBENZO-P | NG/KG | 1100000 | J | | | | | | | | |
| SD23 FURAN, 2378-TETRACHLORODIBENZO | NG/KG | 1.00 | U | | | | | | | | |
| SD31 FURAN, OCTACHLORODIBENZO | NG/KG | 81200 | | | | | | | | | |
| SD32 FURAN, 12378-PENTACHLORODIBENZO | NG/KG | 69.2 | | | | | | | | | |
| SD34 FURAN, 123478-HEXACHLORODIBENZO | NG/KG | 1850 | | | | | | | | | |
| SD35 FURAN, 123678-HEXACHLORODIBENZO | NG/KG | 817 | | | | | | | | | |
| SD36 FURAN, 123789-HEXACHLORODIBENZO | NG/KG | 5.00 | U | | | | | | | | |
| SD37 FURAN, 234678-HEXACHLORODIBENZO | NG/KG | 519 | | | | | | | | | |
| SD38 FURAN, 1234678-HEPTACHLORODIBENZO | NG/KG | 26800 | | | | | | | | | |
| SD39 FURAN, 1234789-HEPTACHLORODIBENZO | NG/KG | 2240 | | | | | | | | | |
| SD40 DIOXIN, 12378-PENTACHLORODIBENZO-P | NG/KG | 582 | | | | | | | | | |
| SD41 DIOXIN, 123478-HEXACHLORODIBENZO-P | NG/KG | 1680 | | | | | | | | | |
| SD42 DIOXIN, 123678-HEXACHLORODIBENZO-P | NG/KG | 4960 | | | | | | | | | |
| SD43 DIOXIN, 123789-HEXACHLORODIBENZO-P | NG/KG | 3300 | | | | | | | | | |
| SD45 FURAN, 23478-PENTACHLORODIBENZO | NG/KG | 113 | | | | | | | | | |
| SS01 PHENOL, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS02 CARBAZOLE | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS04 CHLOROPHENOL, 2- | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS05 DICHLOROBENZENE,1,3-, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS06 DICHLOROBENZENE,1,4- | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS08 DICHLOROBENZENE,1,2-, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS09 CRESOL, ORTHO(2-METHYLPHENOL) | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |

| COMPOUND | UNITS | 001 | | 002 | | 003 | | 004 | | 005 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS11 CRESOL, PARA (4 METHYLPHENOL) | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS12 N NITROSODIPROPYLAMINE | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS13 HEXACHLOROETHANE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS14 NITROBENZENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS15 ISOPHORONE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS16 NITROPHENOL,2- | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS17 DIMETHYLPHENOL,2,4, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS20 DICHLOROPHENOL, 2,4- | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS21 TRICHLOROBENZENE,1,2,4, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS22 NAPHTHALENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS23 CHLOROANILINE,4- | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS24 HEXACHLOROBUTADIENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS25 PHENOL,4-CHLORO-3-METHYL | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS26 METHYLNAPHTHALENE, 2- | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS28 TRICHLOROPHENOL,2,4,6 | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS29 TRICHLOROPHENOL,2,4,5 | UG/KG | 840 | K | | | 8700 | K | | | 1700 | K |
| SS30 CHLORONAPHTHALENE, 2- | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS31 NITROANILINE,2- | UG/KG | 840 | K | | | 8700 | K | | | 1700 | K |
| SS32 PHTHALATE, DIMETHYL, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS33 ACENAPHTHYLENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS34 NITROANILINE,3- | UG/KG | 840 | K | | | 8700 | K | | | 1700 | K |
| SS35 ACENAPHTHENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS36 DINITROPHENOL,2,4, BY GC/MS | UG/KG | 840 | K | | | 8700 | K | | | 1700 | K |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 001 | | 002 | | 003 | | 004 | | 005 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS37 NITROPHENOL,4- | UG/KG | 840 | K | | | 8700 | K | | | 1700 | K |
| SS38 DIBENZOFURAN | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS39 DINITROTOLUENE,2,4, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS40 DINITROTOLUENE,2,6- | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS41 PHTHALATE, DIETHYL, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS42 ETHER, 4-CHLOROPHENYL PHENYL | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS43 FLUORENE, GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS44 NITROANILINE,4- | UG/KG | 840 | K | | | 8700 | K | | | 1700 | K |
| SS45 PHENOL,4,6-DINITRO-2-METHYL | UG/KG | 840 | K | | | 8700 | K | | | 1700 | K |
| SS46 N-NITROSODIPHENYLAMINE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS47 ETHER, 4-BROMOPHENYL PHENYL | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS48 HEXACHLOROBENZENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS49 PENTACHLOROPHENOL, BY GC/MS | UG/KG | 1900 | | | | 25000 | J | | | 4300 | |
| SS50 PHENANTHRENE, BY GC/MS | UG/KG | 330 | K | | | 6700 | J | | | 660 | K |
| SS51 ANTHRACENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS52 PHTHALATE, DI-N-BUTYL-, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS53 FLUORANTHENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS54 PYRENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS55 PHTHALATE, BUTYL BENZYL | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS56 DICHLOROBENZIDINE, 3,3' | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS57 ANTHRACENE, BENZO(A), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS58 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS59 CHRYSENE, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS60 PHTHALATE, DI-N-OCTYL-, BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS61 FLUORANTHENE, BENZO(B), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS62 FLUORANTHENE, BENZO(K), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |

| COMPOUND | UNITS | 001 | | 002 | | 003 | | 004 | | 005 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS63 PYRENE, BENZO(A), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS64 PYRENE, INDENO(1,2,3-CD) | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS65 ANTHRACENE, DIBENZO(A,H), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SS66 PERYLENE,BENZO(G,H,I), BY GC/MS | UG/KG | 330 | K | | | 3500 | K | | | 660 | K |
| SV03 CHLOROMETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV04 BROMOMETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV05 VINYL CHLORIDE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV06 CHLOROETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV07 METHYLENE CHLORIDE (DICHLOROMETHANE) | UG/KG | | | 20 | K | | | 19 | K | | |
| SV08 DICHLOROETHYLENE,1,1, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV09 DICHLOROETHANE,1,1, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV11 CHLOROFORM, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV12 DICHLOROETHANE,1,2, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV13 TRICHLOROETHANE,1,1,1-, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV14 CARBON TETRACHLORIDE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV15 BROMODICHLOROMETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV16 DICHLOROPROPANE,1,2, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV17 BENZENE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV18 DICHLOROPROPYLENE,TRANS-1,3 | UG/KG | | | 10 | K | | | 10 | K | | |
| SV19 TRICHLOROETHYLENE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV20 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV21 DIBROMOCHLOROMETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV22 TRICHLOROETHANE,1,1,2-, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV24 BROMOFORM, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV25 TETRACHLOROETHYLENE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |
| SV26 TOLUENE, BY GC/MS | UG/KG | | | 10 | K | | | 10 | K | | |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 001 | 002 | | 003 | 004 | | 005 |
|---|---|---|---|---|---|---|---|---|
| SV27 TETRACHLOROETHANE,1,1,2,2, BY GC/MS | UG/KG | | 10 | K | | 10 | K | |
| SV28 CHLOROBENZENE, BY GC/MS | UG/KG | | 10 | K | | 10 | K | |
| SV29 ETHYL BENZENE, BY GC/MS | UG/KG | | 10 | K | | 10 | K | |
| SV30 ACETONE, BY GC/MS | UG/KG | | 10 | K | | 10 | K | |
| SV31 CARBON DISULFIDE, BY GC/MS | UG/KG | | 10 | K | | 10 | K | |
| SV32 METHYL ETHYL KETONE | UG/KG | | 10 | K | | 10 | K | |
| SV34 HEXANONE, 2- | UG/KG | | 10 | K | | 10 | K | |
| SV35 4-METHYL-2-PENTANONE(MIBK) | UG/KG | | 10 | K | | 10 | K | |
| SV36 STYRENE, BY GC/MS | UG/KG | | 10 | K | | 10 | K | |
| SV37 XYLENES, TOTAL, BY GC/MS | UG/KG | | 10 | K | | 10 | K | |
| SV43 DICHLOROETHYLENE, 1,2-, TOTAL | UG/KG | | 10 | K | | 10 | K | |
| Z201 SAMPLE NUMBER | NA | 001 | 002 | | 003 | 004 | | 005 |
| Z202 ACTIVITY CODE | NA | AZXYD | AZXYD | | AZXYD | AZXYD | | AZXYD |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 006 | 007 | | 008 | 009 | | 010 |
|---|---|---|---|---|---|---|---|---|
| SS01 PHENOL, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS02 CARBAZOLE | UG/KG | | 340 | K | | 330 | K | |
| SS03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS04 CHLOROPHENOL, 2- | UG/KG | | 340 | K | | 330 | K | |
| SS05 DICHLOROBENZENE,1,3-, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS06 DICHLOROBENZENE,1,4- | UG/KG | | 340 | K | | 330 | K | |
| SS08 DICHLOROBENZENE,1,2-, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS09 CRESOL, ORTHO(2-METHYLPHENOL) | UG/KG | | 340 | K | | 330 | K | |
| SS10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS11 CRESOL, PARA-(4-METHYLPHENOL) | UG/KG | | 340 | K | | 330 | K | |
| SS12 N-NITROSODIPROPYLAMINE | UG/KG | | 340 | K | | 330 | K | |
| SS13 HEXACHLOROETHANE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS14 NITROBENZENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS15 ISOPHORONE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS16 NITROPHENOL,2- | UG/KG | | 340 | K | | 330 | K | |
| SS17 DIMETHYLPHENOL,2,4, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS20 DICHLOROPHENOL, 2,4- | UG/KG | | 340 | K | | 330 | K | |
| SS21 TRICHLOROBENZENE,1,2,4, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS22 NAPHTHALENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS23 CHLOROANILINE,4- | UG/KG | | 340 | K | | 330 | K | |
| SS24 HEXACHLOROBUTADIENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS25 PHENOL,4-CHLORO-3-METHYL | UG/KG | | 340 | K | | 330 | K | |
| SS26 METHYLNAPHTHALENE, 2- | UG/KG | | 340 | K | | 330 | K | |
| SS27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS28 TRICHLOROPHENOL,2,4,6 | UG/KG | | 340 | K | | 330 | K | |

| COMPOUND | UNITS | 006 | 007 | | 008 | 009 | | 010 |
|---|---|---|---|---|---|---|---|---|
| SS29 TRICHLOROPHENOL,2,4,5 | UG/KG | | 850 | K | | 840 | K | |
| SS30 CHLORONAPHTHALENE, 2- | UG/KG | | 340 | K | | 330 | K | |
| SS31 NITROANILINE,2- | UG/KG | | 850 | K | | 840 | K | |
| SS32 PHTHALATE, DIMETHYL, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS33 ACENAPHTHYLENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS34 NITROANILINE,3- | UG/KG | | 850 | K | | 840 | K | |
| SS35 ACENAPHTHENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS36 DINITROPHENOL,2,4, BY GC/MS | UG/KG | | 850 | K | | 840 | K | |
| SS37 NITROPHENOL,4- | UG/KG | | 850 | K | | 840 | K | |
| SS38 DIBENZOFURAN | UG/KG | | 340 | K | | 330 | K | |
| SS39 DINITROTOLUENE,2,4, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS40 DINITROTOLUENE,2,6- | UG/KG | | 340 | K | | 330 | K | |
| SS41 PHTHALATE, DIETHYL, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS42 ETHER, 4-CHLOROPHENYL PHENYL | UG/KG | | 340 | K | | 330 | K | |
| SS43 FLUORENE, GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS44 NITROANILINE,4- | UG/KG | | 850 | K | | 840 | K | |
| SS45 PHENOL,4,6-DINITRO-2-METHYL | UG/KG | | 850 | K | | 840 | K | |
| SS46 N-NITROSODIPHENYLAMINE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS47 ETHER, 4-BROMOPHENYL PHENYL | UG/KG | | 340 | K | | 330 | K | |
| SS48 HEXACHLOROBENZENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS49 PENTACHLOROPHENOL, BY GC/MS | UG/KG | | 1900 | | | 840 | K | |
| SS50 PHENANTHRENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS51 ANTHRACENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS52 PHTHALATE, DI-N-BUTYL-, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS53 FLUORANTHENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS54 PYRENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |

| COMPOUND | UNITS | 006 | | 007 | | 008 | | 009 | | 010 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS55 PHTHALATE, BUTYL BENZYL | UG/KG | | | 340 | K | | | 330 | K | | |
| SS56 DICHLOROBENZIDINE, 3,3' | UG/KG | | | 340 | K | | | 330 | K | | |
| SS57 ANTHRACENE, BENZO(A), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS58 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS59 CHRYSENE, BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS60 PHTHALATE, DI-N-OCTYL-, BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS61 FLUORANTHENE, BENZO(B), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS62 FLUORANTHENE, BENZO(K), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS63 PYRENE, BENZO(A), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS64 PYRENE, INDENO(1,2,3-CD) | UG/KG | | | 340 | K | | | 330 | K | | |
| SS65 ANTHRACENE, DIBENZO(A,H), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS66 PERYLENE,BENZO(G,H,I), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SV03 CHLOROMETHANE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV04 BROMOMETHANE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV05 VINYL CHLORIDE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV06 CHLOROETHANE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV07 METHYLENE CHLORIDE (DICHLOROMETHANE) | UG/KG | 25 | K | | | 15 | K | | | 15 | K |
| SV08 DICHLOROETHYLENE,1,1, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV09 DICHLOROETHANE,1,1, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV11 CHLOROFORM, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV12 DICHLOROETHANE,1,2, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV13 TRICHLOROETHANE,1,1,1-, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV14 CARBON TETRACHLORIDE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV15 BROMODICHLOROMETHANE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV16 DICHLOROPROPANE,1,2, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |
| SV17 BENZENE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | K |

| COMPOUND | UNITS | 006 | | 007 | | 008 | | 009 | | 010 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SV18 DICHLOROPROPYLENE,TRANS-1,3 | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV19 TRICHLOROETHYLENE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV20 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV21 DIBROMOCHLOROMETHANE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV22 TRICHLOROETHANE,1,1,2-, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV24 BROMOFORM, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV25 TETRACHLOROETHYLENE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV26 TOLUENE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV27 TETRACHLOROETHANE,1,1,2,2, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV28 CHLOROBENZENE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV29 ETHYL BENZENE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV30 ACETONE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV31 CARBON DISULFIDE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV32 METHYL ETHYL KETONE | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV34 HEXANONE, 2- | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV35 4-METHYL-2-PENTANONE(MIBK) | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV36 STYRENE, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV37 XYLENES, TOTAL, BY GC/MS | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| SV43 DICHLOROETHYLENE, 1,2-, TOTAL | UG/KG | 10 | K | | | 10 | K | | | 10 | U |
| Z201 SAMPLE NUMBER | NA | C06 | | 007 | | 008 | | 009 | | 010 | |
| Z202 ACTIVITY CODE | NA | AZXYD | | AZXYD | | AZXYD | | AZXYD | | AZXYD | |

ANALYSIS REQUEST DETAIL REPORT  ACTIVITY: 7-A2XYD  VALIDATED YES

| COMPOUND | UNITS | 011 | 012 | 013 | 014 | 015 |
|---|---|---|---|---|---|---|
| SD02 DIOXIN, 2378-TETRACHLORODIBENZO-P, RAPI | NG/GM | | | 0.00100 U | | 0.00100 U |
| SD04 DIOXIN, 2378-TCD TOTAL EQUIVALENTS | UG/KG | | | 0.0526 | | 10.3 |
| SD10 DIOXIN, 1234678-HEPTACHLORODIBENZO-P- | NG/KG | | | 1080 | | 449000 |
| SD22 DIOXIN, OCTACHLORODIBENZO-P | NG/KG | | | 5560 | | 580000 J |
| SD23 FURAN, 2378-TETRACHLORODIBENZO | NG/KG | | | 1.00 U | | 1.00 U |
| SD31 FURAN, OCTACHLORODIBENZO | NG/KG | | | 542 | | 270000 J |
| SD32 FURAN, 12378-PENTACHLORODIBENZO | NG/KG | | | 5.00 U | | 24.6 |
| SD34 FURAN, 123478-HEXACHLORODIBENZO | NG/KG | | | 16.9 | | 4550 |
| SD35 FURAN, 123678-HEXACHLORODIBENZO | NG/KG | | | 6.15 | | 5.00 U |
| SD36 FURAN, 123789-HEXACHLORODIBENZO | NG/KG | | | 5.00 U | | 5.00 U |
| SD37 FURAN, 234678-HEXACHLORODIBENZO | NG/KG | | | 5.10 | | 5.00 U |
| SD38 FURAN, 1234678-HEPTACHLORODIBENZO | NG/KG | | | 248 | | 59800 |
| SD39 FURAN, 1234789-HEPTACHLORODIBENZO | NG/KG | | | 31.9 | | 7370 |
| SD40 DIOXIN, 12378-PENTACHLORODIBENZO-P | NG/KG | | | 5.00 U | | 5.00 U |
| SD41 DIOXIN, 123478-HEXACHLORODIBENZO-P | NG/KG | | | 17.4 | | 5.00 U |
| SD42 DIOXIN, 123678-HEXACHLORODIBENZO-P | NG/KG | | | 50.1 | | 8710 |
| SD43 DIOXIN, 123789-HEXACHLORODIBENZO-P | NG/KG | | | 33.5 | | 5.00 U |
| SD45 FURAN, 23478-PENTACHLORODIBENZO | NG/KG | | | 5.00 U | | 147 |
| SS01 PHENOL, BY GC/MS | UG/KG | 340 K | | 350 K | | 430000 K |
| SS02 CARBAZOLE | UG/KG | 340 K | | 350 K | | 430000 K |
| SS03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS | UG/KG | 340 K | | 350 K | | 430000 K |
| SS04 CHLOROPHENOL, 2- | UG/KG | 340 K | | 350 K | | 430000 K |
| SS05 DICHLOROBENZENE,1,3-, BY GC/MS | UG/KG | 340 K | | 350 K | | 430000 K |
| SS06 DICHLOROBENZENE,1,4- | UG/KG | 340 K | | 350 K | | 430000 K |
| SS08 DICHLOROBENZENE,1,2-, BY GC/MS | UG/KG | 340 K | | 350 K | | 430000 K |
| SS09 CRESOL, ORTHO(2-METHYLPHENOL) | UG/KG | 340 K | | 350 K | | 430000 K |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 011 | | 012 | | 013 | | 014 | | 015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS11 CRESOL, PARA-(4-METHYLPHENOL) | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS12 N NITROSODIPROPYLAMINE | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS13 HEXACHLOROETHANE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS14 NITROBENZENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS15 ISOPHORONE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS16 NITROPHENOL,2- | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS17 DIMETHYLPHENOL,2,4, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS20 DICHLOROPHENOL, 2,4- | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS21 TRICHLOROBENZENE,1,2,4, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS22 NAPHTHALENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS23 CHLOROANILINE,4- | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS24 HEXACHLOROBUTADIENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS25 PHENOL,4-CHLORO-3-METHYL | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS26 METHYLNAPHTHALENE, 2- | UG/KG | 340 | K | | | 350 | K | | | 2200000 | |
| SS27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS28 TRICHLOROPHENOL,2,4,6 | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS29 TRICHLOROPHENOL,2,4,5 | UG/KG | 860 | K | | | 870 | K | | | 1100000 | U |
| SS30 CHLORONAPHTHALENE, 2- | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS31 NITROANILINE,2- | UG/KG | 860 | K | | | 870 | K | | | 1100000 | U |
| SS32 PHTHALATE, DIMETHYL, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS33 ACENAPHTHYLENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS34 NITROANILINE,3- | UG/KG | 860 | K | | | 870 | K | | | 1100000 | U |
| SS35 ACENAPHTHENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | U |
| SS36 DINITROPHENOL,2,4, BY GC/MS | UG/KG | 860 | K | | | 870 | K | | | 1100000 | U |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 011 | | 012 | | 013 | | 014 | | 015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS37 NITROPHENOL,4- | UG/KG | 860 | K | | | 870 | K | | | 1100000 | K |
| SS38 DIBENZOFURAN | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS39 DINITROTOLUENE,2,4, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS40 DINITROTOLUENE,2,6- | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS41 PHTHALATE, DIETHYL, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS42 ETHER, 4-CHLOROPHENYL PHENYL | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS43 FLUORENE, GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | |
| SS44 NITROANILINE,4- | UG/KG | 860 | K | | | 870 | K | | | 1100000 | K |
| SS45 PHENOL,4,6-DINITRO-2-METHYL | UG/KG | 860 | K | | | 870 | K | | | 1100000 | K |
| SS46 N-NITROSODIPHENYLAMINE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS47 ETHER, 4-BROMOPHENYL PHENYL | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS48 HEXACHLOROBENZENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS49 PENTACHLOROPHENOL, BY GC/MS | UG/KG | 860 | K | | | 870 | K | | | 1100000 | |
| SS50 PHENANTHRENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 1600000 | J |
| SS51 ANTHRACENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS52 PHTHALATE, DI-N-BUTYL-, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS53 FLUORANTHENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS54 PYRENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS55 PHTHALATE, BUTYL BENZYL | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS56 DICHLOROBENZIDINE, 3,3' | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS57 ANTHRACENE, BENZO(A), BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS58 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS59 CHRYSENE, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS60 PHTHALATE, DI-N-OCTYL-, BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS61 FLUORANTHENE, BENZO(B), BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS62 FLUORANTHENE, BENZO(K), BY GC/MS. | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 011 | | 012 | | 013 | | 014 | | 015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS63 PYRENE, BENZO(A), BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS64 PYRENE, INDENO(1,2,3-CD) | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS65 ANTHRACENE, DIBENZO(A,H), BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SS66 PERYLENE,BENZO(G,H,I), BY GC/MS | UG/KG | 340 | K | | | 350 | K | | | 430000 | K |
| SV03 CHLOROMETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV04 BROMOMETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV05 VINYL CHLORIDE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV06 CHLOROETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV07 METHYLENE CHLORIDE (DICHLOROMETHANE) | UG/KG | | | 19 | K | | | 18 | K | | |
| SV08 DICHLOROETHYLENE,1,1, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV09 DICHLOROETHANE,1,1, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV11 CHLOROFORM, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV12 DICHLOROETHANE,1,2, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV13 TRICHLOROETHANE,1,1,1-, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV14 CARBON TETRACHLORIDE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV15 BROMODICHLOROMETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV16 DICHLOROPROPANE,1,2, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV17 BENZENE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV18 DICHLOROPROPYLENE,TRANS-1,3 | UG/KG | | | 10 | K | | | 11 | K | | |
| SV19 TRICHLOROETHYLENE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV20 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV21 DIBROMOCHLOROMETHANE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV22 TRICHLOROETHANE,1,1,2-, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV24 BROMOFORM, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV25 TETRACHLOROETHYLENE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |
| SV26 TOLUENE, BY GC/MS | UG/KG | | | 10 | K | | | 11 | K | | |

ANALYSIS RLQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 011 | 012 | | 013 | 014 | | 015 |
|---|---|---|---|---|---|---|---|---|
| SV27 TETRACHLOROETHANE,1,1,2,2, BY GC/MS | UG/KG | | 10 | K | | 11 | K | |
| SV28 CHLOROBENZENE, BY GC/MS | UG/KG | | 10 | K | | 11 | K | |
| SV29 ETHYL BENZENE, BY GC/MS | UG/KG | | 10 | K | | 11 | K | |
| SV30 ACETONE, BY GC/MS | UG/KG | | 10 | K | | 11 | K | |
| SV31 CARBON DISULFIDE, BY GC/MS | UG/KG | | 10 | K | | 11 | K | |
| SV32 METHYL ETHYL KETONE | UG/KG | | 10 | K | | 11 | K | |
| SV34 HEXANONE, 2- | UG/KG | | 10 | K | | 11 | K | |
| SV35 4-METHYL-2-PENTANONE(MIBK) | UG/KG | | 10 | K | | 11 | K | |
| SV36 STYRENE, BY GC/MS | UG/KG | | 10 | K | | 11 | K | |
| SV37 XYLENES, TOTAL, BY GC/MS | UG/KG | | 10 | K | | 11 | K | |
| SV43 DICHLOROETHYLENE, 1,2-, TOTAL | UG/KG | | 10 | K | | 11 | K | |
| Z201 SAMPLE NUMBER | NA | 011 | 012 | | 013 | 014 | | 015 |
| Z202 ACTIVITY CODE | NA | AZXYD | AZXYD | | AZXYD | AZXYD | | AZXYD |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: /-AZXYD

| COMPOUND | UNITS | 016 | 017 | 018 | 019 | | 020 |
|---|---|---|---|---|---|---|---|
| SM01 SILVER, TOTAL, BY ICAP | MG/KG | | | | 2.0 | U | |
| SM02 ALUMINUM, TOTAL, BY ICAP | MG/KG | | | | 1500 | | |
| SM03 ARSENIC, TOTAL, BY ICAP | MG/KG | | | | 62 | | |
| SM04 BARIUM, TOTAL, BY ICAP | MG/KG | | | | 240 | | |
| SM05 BERYLLIUM, TOTAL, BY ICAP | MG/KG | | | | 1.0 | U | |
| SM06 CADMIUM, TOTAL, BY ICAP | MG/KG | | | | 1.0 | U | |
| SM07 COBALT, TOTAL, BY ICAP | MG/KG | | | | 10 | U | |
| SM08 CHROMIUM, TOTAL, BY ICAP | MG/KG | | | | 41 | | |
| SM09 COPPER, TOTAL, BY ICAP | MG/KG | | | | 39 | | |
| SM10 IRON, TOTAL, BY ICAP | MG/KG | | | | 4900 | | |
| SM11 MANGANESE, TOTAL, BY ICAP | MG/KG | | | | 160 | | |
| SM13 NICKEL, TOTAL, BY ICAP | MG/KG | | | | 8.0 | U | |
| SM14 LEAD, TOTAL, BY ICAP | MG/KG | | | | 25 | | |
| SM15 ANTIMONY, TOTAL, BY ICAP | MG/KG | | | | 12 | U | |
| SM16 SELENIUM, TOTAL, BY ICAP | MG/KG | | | | 1.0 | U | |
| SM18 THALLIUM, TOTAL, BY ICAP | MG/KG | | | | 2.0 | U | |
| SM19 VANADIUM, TOTAL, BY ICAP | MG/KG | | | | 10 | U | |
| SM20 ZINC, TOTAL, BY ICAP | MG/KG | | | | 280 | | |
| SM21 CALCIUM, TOTAL, BY ICAP | MG/KG | | | | 130000 | | |
| SM22 MAGNESIUM, TOTAL, BY ICAP | MG/KG | | | | 84000 | | |
| SM23 SODIUM, TOTAL, BY ICAP | MG/KG | | | | 1000 | U | |
| SM24 POTASSIUM, TOTAL, BY ICAP | MG/KG | | | | 1000 | U | |
| SS01 PHENOL, BY GC/MS | UG/KG | | 340 K | | 330 | K | |
| SS02 CARBAZOLE | UG/KG | | 340 K | | 330 | K | |
| SS03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS | UG/KG | | 340 K | | 330 | K | |
| SS04 CHLOROPHENOL, 2- | UG/KG | | 340 K | | 330 | K | |

| COMPOUND | UNITS | 016 | 017 | | 018 | 019 | | 020 |
|---|---|---|---|---|---|---|---|---|
| SS05 DICHLOROBENZENE,1,3-, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS06 DICHLOROBENZENE,1,4- | UG/KG | | 340 | K | | 330 | K | |
| SS08 DICHLOROBENZENE,1,2-, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS09 CRESOL, ORTHO(2-METHYLPHENOL) | UG/KG | | 340 | K | | 330 | K | |
| SS10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS11 CRESOL, PARA-(4-METHYLPHENOL) | UG/KG | | 340 | K | | 330 | K | |
| SS12 N-NITROSODIPROPYLAMINE | UG/KG | | 340 | K | | 330 | K | |
| SS13 HEXACHLOROETHANE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS14 NITROBENZENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS15 ISOPHORONE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS16 NITROPHENOL,2- | UG/KG | | 340 | K | | 330 | K | |
| SS17 DIMETHYLPHENOL,2,4, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS20 DICHLOROPHENOL, 2,4- | UG/KG | | 340 | K | | 330 | K | |
| SS21 TRICHLOROBENZENE,1,2,4, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS22 NAPHTHALENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS23 CHLOROANILINE,4- | UG/KG | | 340 | K | | 330 | K | |
| SS24 HEXACHLOROBUTADIENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS25 PHENOL,4-CHLORO-3-METHYL | UG/KG | | 340 | K | | 330 | K | |
| SS26 METHYLNAPHTHALENE, 2- | UG/KG | | 340 | K | | 330 | K | |
| SS27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS28 TRICHLOROPHENOL,2,4,6 | UG/KG | | 340 | K | | 330 | K | |
| SS29 TRICHLOROPHENOL,2,4,5 | UG/KG | | 850 | K | | 830 | K | |
| SS30 CHLORONAPHTHALENE, 2- | UG/KG | | 340 | K | | 330 | K | |
| SS31 NITROANILINE,2- | UG/KG | | 850 | K | | 830 | K | |
| SS32 PHTHALATE, DIMETHYL, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |

| COMPOUND | UNITS | 016 | 017 | | 018 | 019 | | 020 |
|---|---|---|---|---|---|---|---|---|
| SS33 ACENAPHTHYLENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS34 NITROANILINE,3- | UG/KG | | 850 | K | | 830 | K | |
| SS35 ACENAPHTHENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS36 DINITROPHENOL,2,4, BY GC/MS | UG/KG | | 850 | K | | 830 | K | |
| SS37 NITROPHENOL,4- | UG/KG | | 850 | K | | 830 | K | |
| SS38 DIBENZOFURAN | UG/KG | | 340 | K | | 330 | K | |
| SS39 DINITROTOLUENE,2,4, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS40 DINITROTOLUENE,2,6- | UG/KG | | 340 | K | | 330 | K | |
| SS41 PHTHALATE, DIETHYL, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS42 ETHER, 4-CHLOROPHENYL PHENYL | UG/KG | | 340 | K | | 330 | K | |
| SS43 FLUORENE, GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS44 NITROANILINE,4- | UG/KG | | 850 | K | | 830 | K | |
| SS45 PHENOL,4,6-DINITRO-2-METHYL | UG/KG | | 850 | K | | 830 | K | |
| SS46 N-NITROSODIPHENYLAMINE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS47 ETHER, 4 BROMOPHENYL PHENYL | UG/KG | | 340 | K | | 330 | K | |
| SS48 HEXACHLOROBENZENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS49 PENTACHLOROPHENOL, BY GC/MS | UG/KG | | 1900 | | | 830 | K | |
| SS50 PHENANTHRENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS51 ANTHRACENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS52 PHTHALATE, DI-N-BUTYL-, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS53 FLUORANTHENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS54 PYRENE, BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS55 PHTHALATE, BUTYL BENZYL | UG/KG | | 340 | K | | 330 | K | |
| SS56 DICHLOROBENZIDINE, 3,3' | UG/KG | | 340 | K | | 330 | K | |
| SS57 ANTHRACENE, BENZO(A), BY GC/MS | UG/KG | | 340 | K | | 330 | K | |
| SS58 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS | UG/KG | | 340 | K | | 330 | K | |

| COMPOUND | UNITS | 016 | | 017 | | 018 | | 019 | | 020 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS59 CHRYSENE, BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS60 PHTHALATE, DI-N-OCTYL-, BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS61 FLUORANTHENE, BENZO(B), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS62 FLUORANTHENE, BENZO(K), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS63 PYRENE, BENZO(A), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS64 PYRENE, INDENO(1,2,3-CD) | UG/KG | | | 340 | K | | | 330 | K | | |
| SS65 ANTHRACENE, DIBENZO(A,H), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SS66 PERYLENE,BENZO(G,H,I), BY GC/MS | UG/KG | | | 340 | K | | | 330 | K | | |
| SV03 CHLOROMETHANE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV04 BROMOMETHANE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV05 VINYL CHLORIDE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV06 CHLOROETHANE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV07 METHYLENE CHLORIDE (DICHLOROMETHANE) | UG/KG | 17 | K | | | 14 | K | | | 15 | U |
| SV08 DICHLOROETHYLENE,1,1, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV09 DICHLOROETHANE,1,1, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV11 CHLOROFORM, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV12 DICHLOROETHANE,1,2, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV13 TRICHLOROETHANE,1,1,1-, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV14 CARBON TETRACHLORIDE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV15 BROMODICHLOROMETHANE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV16 DICHLOROPROPANE,1,2, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV17 BENZENE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV18 DICHLOROPROPYLENE,TRANS-1,3 | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV19 TRICHLOROETHYLENE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV20 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |
| SV21 DIBROMOCHLOROMETHANE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | U |

| COMPOUND | UNITS | 016 | | 017 | | 018 | | 019 | | 020 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SV22 TRICHLOROETHANE,1,1,2-, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV24 BROMOFORM, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV25 TETRACHLOROETHYLENE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV26 TOLUENE, BY GC/MS | UG/KG | 18 | | | | 10 | K | | | 10 | K |
| SV27 TETRACHLOROETHANE,1,1,2,2, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV28 CHLOROBENZENE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV29 ETHYL BENZENE, BY GC/MS | UG/KG | 15 | | | | 10 | K | | | 10 | K |
| SV30 ACETONE, BY GC/MS | UG/KG | 210 | J | | | 10 | K | | | 10 | K |
| SV31 CARBON DISULFIDE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV32 METHYL ETHYL KETONE | UG/KG | 26 | J | | | 10 | K | | | 10 | K |
| SV34 HEXANONE, 2- | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV35 4-METHYL-2-PENTANONE(MIBK) | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV36 STYRENE, BY GC/MS | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| SV37 XYLENES, TOTAL, BY GC/MS | UG/KG | 120 | | | | 10 | K | | | 10 | K |
| SV43 DICHLOROETHYLENE, 1,2-, TOTAL | UG/KG | 12 | K | | | 10 | K | | | 10 | K |
| ZZ01 SAMPLE NUMBER | NA | 016 | | 017 | | 018 | | 019 | | 020 | |
| ZZ02 ACTIVITY CODE | NA | AZXYD | | AZXYD | | AZXYD | | AZXYD | | AZXYD | |

| COMPOUND | UNITS | 021 | | 022 | | 023 | | 024 | | 025 |
|---|---|---|---|---|---|---|---|---|---|---|
| SB02 CHRYSOTILE, BULK | :% | | | | | | | | | :0 |
| SB03 AMOSITE, BULK | :% | | | | | | | | | :0 |
| SB04 CROCIDOLITE, BULK | :% | | | | | | | | | :0 |
| SB05 TREMOLITE, BULK | :% | | | | | | | | | :0 |
| SB06 ACTINOLITE, BULK | :% | | | | | | | | | :0 |
| SB07 ANTHOPHYLLITE, BULK | :% | | | | | | | | | :0 |
| SD02 DIOXIN, 2378-TETRACHLORODIBENZO-P, RAPI | :NG/GM | | | | | :0.00100 | U | | | |
| SD04 DIOXIN, 2378-TCD TOTAL EQUIVALENTS | :UG/KG | | | | | :0.270 | J | | | |
| SD10 DIOXIN, 1234678-HEPTACHLORODIBENZO-P | :NG/KG | | | | | :4200 | | | | |
| SD22 DIOXIN, OCTACHLORODIBENZO-P | :NG/KG | | | | | :185000 | J | | | |
| SD23 FURAN, 2378-TETRACHLORODIBENZO | :NG/KG | | | | | :1.00 | U | | | |
| SD31 FURAN, OCTACHLORODIBENZO | :NG/KG | | | | | :3480 | | | | |
| SD32 FURAN, 12378-PENTACHLORODIBENZO | :NG/KG | | | | | :5.00 | U | | | |
| SD34 FURAN, 123478-HEXACHLORODIBENZO | :NG/KG | | | | | :49.7 | | | | |
| SD35 FURAN, 123678-HEXACHLORODIBENZO | :NG/KG | | | | | :15.8 | | | | |
| SD36 FURAN, 123789-HEXACHLORODIBENZO | :NG/KG | | | | | :5.00 | U | | | |
| SD37 FURAN, 234678-HEXACHLORODIBENZO | :NG/KG | | | | | :5.00 | U | | | |
| SD38 FURAN, 1234678-HEPTACHLORODIBENZO | :NG/KG | | | | | :816 | | | | |
| SD39 FURAN, 1234789-HEPTACHLORODIBENZO | :NG/KG | | | | | :85.2 | | | | |
| SD40 DIOXIN, 12378-PENTACHLORODIBENZO-P | :NG/KG | | | | | :5.87 | | | | |
| SD41 DIOXIN, 123478-HEXACHLORODIBENZO-P | :NG/KG | | | | | :5.00 | U | | | |
| SD42 DIOXIN, 123678-HEXACHLORODIBENZO-P | :NG/KG | | | | | :157 | | | | |
| SD43 DIOXIN, 123789-HEXACHLORODIBENZO-P | :NG/KG | | | | | :59.1 | | | | |
| SD45 FURAN, 23478-PENTACHLORODIBENZO | :NG/KG | | | | | :5.00 | U | | | |
| SS01 PHENOL, BY GC/MS | :UG/KG | :410 | K | :510 | K | :370 | K | | | |
| SS02 CARBAZOLE | :UG/KG | :410 | K | :510 | K | :370 | K | | | |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 021 | 022 | 023 | 024 | 025 |
|---|---|---|---|---|---|---|
| SS03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS04 CHLOROPHENOL, 2- | UG/KG | 410 K | 510 K | 370 K | | |
| SS05 DICHLOROBENZENE,1,3-, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS06 DICHLOROBENZENE,1,4- | UG/KG | 410 K | 510 K | 370 K | | |
| SS08 DICHLOROBENZENE,1,2-, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS09 CRESOL, ORTHO(2-METHYLPHENOL) | UG/KG | 410 K | 510 K | 370 K | | |
| SS10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS11 CRESOL, PARA-(4-METHYLPHENOL) | UG/KG | 410 K | 510 K | 370 K | | |
| SS12 N-NITROSODIPROPYLAMINE | UG/KG | 410 K | 510 K | 370 K | | |
| SS13 HEXACHLOROETHANE, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS14 NITROBENZENE, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS15 ISOPHORONE, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS16 NITROPHENOL,2- | UG/KG | 410 K | 510 K | 370 K | | |
| SS17 DIMETHYLPHENOL,2,4, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS20 DICHLOROPHENOL, 2,4- | UG/KG | 410 K | 510 K | 370 K | | |
| SS21 TRICHLOROBENZENE,1,2,4, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS22 NAPHTHALENE, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS23 CHLOROANILINE,4- | UG/KG | 410 K | 510 K | 370 K | | |
| SS24 HEXACHLOROBUTADIENE, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS25 PHENOL,4-CHLORO-3-METHYL | UG/KG | 410 K | 510 K | 370 K | | |
| SS26 METHYLNAPHTHALENE, 2- | UG/KG | 410 K | 510 K | 370 K | | |
| SS27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS | UG/KG | 410 K | 510 K | 370 K | | |
| SS28 TRICHLOROPHENOL,2,4,6 | UG/KG | 410 K | 510 K | 370 K | | |
| SS29 TRICHLOROPHENOL,2,4,5 | UG/KG | 1000 K | 1300 K | 940 K | | |
| SS30 CHLORONAPHTHALENE, 2- | UG/KG | 410 K | 510 K | 370 K | | |

| COMPOUND | UNITS | 021 | | 022 | | 023 | | 024 | | 025 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SS31 NITROANILINE,2- | UG/KG | 1000 | K | 1300 | K | 940 | K | | | | |
| SS32 PHTHALATE, DIMETHYL, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS33 ACENAPHTHYLENE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS34 NITROANILINE,3- | UG/KG | 1000 | K | 1300 | K | 940 | K | | | | |
| SS35 ACENAPHTHENE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS36 DINITROPHENOL,2,4, BY GC/MS | UG/KG | 1000 | K | 1300 | K | 940 | K | | | | |
| SS37 NITROPHENOL,4- | UG/KG | 1000 | K | 1300 | K | 940 | K | | | | |
| SS38 DIBENZOFURAN | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS39 DINITROTOLUENE,2,4, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS40 DINITROTOLUENE,2,6- | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS41 PHTHALATE, DIETHYL, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS42 ETHER, 4-CHLOROPHENYL PHENYL | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS43 FLUORENE, GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS44 NITROANILINE,4- | UG/KG | 1000 | K | 1300 | K | 940 | K | | | | |
| SS45 PHENOL,4,6-DINITRO-2-METHYL | UG/KG | 1000 | K | 1300 | K | 940 | K | | | | |
| SS46 N-NITROSODIPHENYLAMINE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS47 ETHER, 4-BROMOPHENYL PHENYL | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS48 HEXACHLOROBENZENE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS49 PENTACHLOROPHENOL, BY GC/MS | UG/KG | 1000 | K | 1500 | | 2500 | | | | | |
| SS50 PHENANTHRENE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS51 ANTHRACENE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS52 PHTHALATE, DI-N-BUTYL-, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS53 FLUORANTHENE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS54 PYRENE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS55 PHTHALATE, BUTYL BENZYL | UG/KG | 410 | K | 510 | K | 370 | K | | | | |
| SS56 DICHLOROBENZIDINE, 3,3' | UG/KG | 410 | K | 510 | K | 370 | K | | | | |

| COMPOUND | UNITS | 021 | | 022 | | 023 | | 024 | | 025 |
|---|---|---|---|---|---|---|---|---|---|---|
| SS57 ANTHRACENE, BENZO(A), BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS58 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS59 CHRYSENE, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS60 PHTHALATE, DI-N-OCTYL-, BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS61 FLUORANTHENE, BENZO(B), BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS62 FLUORANTHENE, BENZO(K), BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS63 PYRENE, BENZO(A), BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS64 PYRENE, INDENO(1,2,3-CD) | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS65 ANTHRACENE, DIBENZO(A,H), BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SS66 PERYLENE,BENZO(G,H,I), BY GC/MS | UG/KG | 410 | K | 510 | K | 370 | K | | | |
| SV03 CHLOROMETHANE, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV04 BROMOMETHANE, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV05 VINYL CHLORIDE, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV06 CHLOROETHANE, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV07 METHYLENE CHLORIDE (DICHLOROMETHANE) | UG/KG | 18 | K | 34 | K | | | 27 | K | |
| SV08 DICHLOROETHYLENE,1,1, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV09 DICHLOROETHANE,1,1, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV11 CHLOROFORM, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV12 DICHLOROETHANE,1,2, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV13 TRICHLOROETHANE,1,1,1-, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV14 CARBON TETRACHLORIDE, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV15 BROMODICHLOROMETHANE, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV16 DICHLOROPROPANE,1,2, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV17 BENZENE, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV18 DICHLOROPROPYLENE,TRANS-1,3 | UG/KG | 12 | K | 17 | K | | | 11 | K | |
| SV19 TRICHLOROETHYLENE, BY GC/MS | UG/KG | 12 | K | 17 | K | | | 11 | K | |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 021 | | 022 | | 023 | 024 | | 025 |
|---|---|---|---|---|---|---|---|---|---|
| SV20 DICHLOROPROPYLENE,CIS-1,3, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV21 DIBROMOCHLOROMETHANE, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV22 TRICHLOROETHANE,1,1,2-, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV24 BROMOFORM, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV25 TETRACHLOROETHYLENE, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV26 TOLUENE, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV27 TETRACHLOROETHANE,1,1,2,2, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV28 CHLOROBENZENE, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV29 ETHYL BENZENE, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV30 ACETONE, BY GC/MS | UG/KG | 12 | K | 39 | K | | 58 | K | |
| SV31 CARBON DISULFIDE, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV32 METHYL ETHYL KETONE | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV34 HEXANONE, 2- | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV35 4-METHYL-2-PENTANONE(MIBK) | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV36 STYRENE, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV37 XYLENES, TOTAL, BY GC/MS | UG/KG | 12 | K | 17 | K | | 11 | K | |
| SV43 DICHLOROETHYLENE, 1,2-, TOTAL | UG/KG | 12 | K | 17 | K | | 11 | K | |
| ZZ01 SAMPLE NUMBER | NA | 021 | | 17 | K | 023 | 024 | | 025 |
| ZZ02 ACTIVITY CODE | NA | AZXYD | | AZXYD | | AZXYD | AZXYD | | AZXYD |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 026 F | | 101 | | 102 | | 103 | | 104 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WS21 PENTACHLOROPHENOL, BY GC/EC | UG/L | | | 0.560 | | 0.360 | | 1.10 | | 0.0056 | |
| WS01 PHENOL, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS04 CHLOROPHENOL, 2- | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS09 CRESOL, ORTHO(2-METHYLPHENOL) | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS11 CRESOL, PARA-(4-METHYLPHENOL) | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS12 N-NITROSODIPROPYLAMINE | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS13 HEXACHLOROETHANE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS14 NITROBENZENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS15 ISOPHORONE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS16 NITROPHENOL,2- | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS17 DIMETHYLPHENOL,2,4, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS20 DICHLOROPHENOL, 2,4- | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS22 NAPHTHALENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS23 CHLOROANILINE,4- | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS24 HEXACHLOROBUTADIENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS25 PHENOL,4-CHLORO-3-METHYL | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS26 METHYLNAPHTHALENE, 2- | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS28 TRICHLOROPHENOL,2,4,6 | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS29 TRICHLOROPHENOL,2,4,5 | UG/L | | | 20 | U | 20 | U | 20 | U | 20 | U |
| WS30 CHLORONAPHTHALENE, 2- | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS31 NITROANILINE,2-(ORTHO) | UG/L | | | 20 | U | 20 | U | 20 | U | 20 | U |
| WS32 PHTHALATE, DIMETHYL, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 026 F | | 101 | | 102 | | 103 | | 104 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WS33 ACENAPHTHYLENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS34 NITROANILINE,3- | UG/L | | | 20 | U | 20 | U | 20 | U | 20 | U |
| WS35 ACENAPHTHENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS36 DINITROPHENOL,2,4, BY GC/MS | UG/L | | | 20 | U | 20 | U | 20 | U | 20 | U |
| WS37 NITROPHENOL,4- | UG/L | | | 20 | U | 20 | U | 20 | U | 20 | U |
| WS38 DIBENZOFURAN | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS39 DINITROTOLUENE,2,4, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS40 DINITROTOLUENE,2,6- | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS41 PHTHALATE, DIETHYL, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS42 ETHER, 4-CHLOROPHENYL PHENYL | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS43 FLUORENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS44 NITROANILINE,4- | UG/L | | | 20 | U | 20 | U | 20 | U | 20 | U |
| WS45 PHENOL,4,6-DINITRO-2-METHYL | UG/L | | | 20 | U | 20 | U | 20 | U | 20 | U |
| WS46 N-NITROSODIPHENYLAMINE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS47 ETHER, 4-BROMOPHENYL PHENYL | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS48 HEXACHLOROBENZENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS49 PENTACHLOROPHENOL, BY GC/MS | UG/L | | | 20 | U | 20 | U | 20 | U | 20 | U |
| WS50 PHENANTHRENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS51 ANTHRACENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS52 PHTHALATE, DI-N-BUTYL-, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS53 FLUORANTHENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS54 PYRENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS55 PHTHALATE, BUTYL BENZYL | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS56 DICHLOROBENZIDINE, 3,3' | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS57 ANTHRACENE, BENZO(A), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS58 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS | UG/L | | | 7 | | 44 | | 29 | | 5 | U |

| COMPOUND | UNITS | 026 F | | 101 | | 102 | | 103 | | 104 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WS59 CHRYSENE, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS60 PHTHALATE, DI-N-OCTYL-, BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS61 FLUORANTHENE, BENZO(B), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS62 FLUORANTHENE, BENZO(K), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS63 PYRENE, BENZO(A), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS64 PYRENE, INDENO(1,2,3-CD) | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS65 ANTHRACENE, DIBENZO(A,H), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WS66 PERYLENE,BENZO(G,H,I), BY GC/MS | UG/L | | | 5 | U | 5 | U | 5 | U | 5 | U |
| WW40 CHLOROMETHANE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW41 BROMOMETHANE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW42 VINYL CHLORIDE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW43 CHLOROETHANE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW44 METHYLENE CHLORIDE (DICHLOROMETHANE) LD | UG/L | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U |
| WW45 DICHLOROETHYLENE, 1,1- BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW46 DICHLOROETHANE, 1,1- BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW48 CHLOROFORM, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW49 DICHLOROETHANE, 1,2- BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW50 TRICHLOROETHANE, 1,1,1- BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW51 CARBON TETRACHLORIDE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW52 BROMODICHLOROMETHANE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW53 DICHLOROPROPANE, 1,2- BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW54 BENZENE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW55 TRICHLOROETHYLENE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW56 DICHLOROPROPYLENE, CIS 1,3- BY GC/MS LD | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW57 DIBROMOCHLOROMETHANE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW58 TRICHLOROETHANE, 1,1,2- BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |

| COMPOUND | UNITS | 026 F | | 101 | | 102 | | 103 | | 104 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WW59 BROMOFORM, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW60 TETRACHLOROETHYLENE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW61 TOLUENE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW62 TETRACHLOROETHANE, 1,1,2,2- BY GC/MS, L | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW63 CHLOROBENZENE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW64 ETHYLBENZENE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW65 ACETONE, BY GC/MS LDL | UG/L | NA | I | NA | I | NA | I | NA | I | NA | I |
| WW66 CARBON DISULFIDE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | |
| WW67 METHYL ETHYL KETONE (2-BUTANONE) LDL | UG/L | NA | I | NA | I | NA | I | NA | I | NA | I |
| WW68 HEXANONE, 2- BY GC/MS LDL | UG/L | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| WW69 4-METHYL-2-PENTANONE (MIBK) BY GC/MS LD | UG/L | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| WW70 STYRENE, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW71 XYLENES, TOTAL, BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW72 DICHLOROPROPYLENE, TRANS 1,3- BY GC/MS | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW75 DICHLOROBENZENE, 1,4- (PARA) BY GC/MS L | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW76 DICHLOROBENZENE, 1,3- (META) BY GC/MS L | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW77 DICHLOROBENZENE, 1,2- (ORTHO) BY GC/MS | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW78 DICHLOROETHYLENE, 1,2- (TRANS) BY GC/MS | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW79 DICHLOROETHYLENE, 1,2- (CIS) BY GC/MS L | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW80 BROMOCHLOROMETHANE BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW81 DIBROMOETHANE, 1,2-(EDB), BY GC/MS LDL | UG/L | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| WW82 DIBROMO-3-CHLOROPROPANE, 1,2-, BY GC/MS | UG/L | NA | I | NA | I | NA | I | NA | I | NA | I |
| ZZ01 SAMPLE NUMBER | NA | 026 | | 101 | | 102 | | 103 | | 104 | |
| ZZ02 ACTIVITY CODE | NA | AZXYD | | AZXYD | | AZXYD | | AZXYD | | AZXYD | |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: 7-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 105 F | | | | |
|---|---|---|---|---|---|---|
| WQ21 PENTACHLOROPHENOL, BY GC/EC | UG/L | 0.0038 | | | | |
| WS01 PHENOL, BY GC/MS | UG/L | 5 | U | | | |
| WS03 ETHER,BIS(2-CHLOROETHYL), BY GC/MS | UG/L | 5 | U | | | |
| WS04 CHLOROPHENOL, 2- | UG/L | 5 | U | | | |
| WS09 CRESOL, ORTHO(2-METHYLPHENOL) | UG/L | 5 | U | | | |
| WS10 ETHER,BIS(2-CHLOROISOPROPYL), BY GC/MS | UG/L | 5 | U | | | |
| WS11 CRESOL, PARA-(4-METHYLPHENOL) | UG/L | 5 | U | | | |
| WS12 N-NITROSODIPROPYLAMINE | UG/L | 5 | U | | | |
| WS13 HEXACHLOROETHANE, BY GC/MS | UG/L | 5 | U | | | |
| WS14 NITROBENZENE, BY GC/MS | UG/L | 5 | U | | | |
| WS15 ISOPHORONE, BY GC/MS | UG/L | 5 | U | | | |
| WS16 NITROPHENOL,2- | UG/L | 5 | U | | | |
| WS17 DIMETHYLPHENOL,2,4, BY GC/MS | UG/L | 5 | U | | | |
| WS19 METHANE, BIS(2-CHLOROETHYOXY), BY GC/MS | UG/L | 5 | U | | | |
| WS20 DICHLOROPHENOL, 2,4- | UG/L | 5 | U | | | |
| WS22 NAPHTHALENE, BY GC/MS | UG/L | 5 | U | | | |
| WS23 CHLOROANILINE,4- | UG/L | 5 | U | | | |
| WS24 HEXACHLOROBUTADIENE, BY GC/MS | UG/L | 5 | U | | | |
| WS25 PHENOL,4-CHLORO-3-METHYL | UG/L | 5 | U | | | |
| WS26 METHYLNAPHTHALENE, 2- | UG/L | 5 | U | | | |
| WS27 HEXACHLOROCYCLOPENTADIENE, BY GC/MS | UG/L | 5 | U | | | |
| WS28 TRICHLOROPHENOL,2,4,6 | UG/L | 5 | U | | | |
| WS29 TRICHLOROPHENOL,2,4,5 | UG/L | 20 | U | | | |
| WS30 CHLORONAPHTHALENE, 2- | UG/L | 5 | U | | | |
| WS31 NITROANILINE,2-(ORTHO) | UG/L | 20 | U | | | |
| WS32 PHTHALATE, DIMETHYL, BY GC/MS | UG/L | 5 | U | | | |

| COMPOUND | UNITS | 105 | F | | | | |
|---|---|---|---|---|---|---|---|
| WS33 ACENAPHTHYLENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS34 NITROANILINE,3- | UG/L | 20 | U | | | | |
| WS35 ACENAPHTHENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS36 DINITROPHENOL,2,4, BY GC/MS | UG/L | 20 | U | | | | |
| WS37 NITROPHENOL,4- | UG/L | 20 | U | | | | |
| WS38 DIBENZOFURAN | UG/L | 5 | U | | | | |
| WS39 DINITROTOLUENE,2,4, BY GC/MS | UG/L | 5 | U | | | | |
| WS40 DINITROTOLUENE,2,6- | UG/L | 5 | U | | | | |
| WS41 PHTHALATE, DIETHYL, BY GC/MS | UG/L | 5 | U | | | | |
| WS42 ETHER, 4-CHLOROPHENYL PHENYL | UG/L | 5 | U | | | | |
| WS43 FLUORENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS44 NITROANILINE,4- | UG/L | 20 | U | | | | |
| WS45 PHENOL,4,6-DINITRO-2-METHYL | UG/L | 20 | U | | | | |
| WS46 N-NITROSODIPHENYLAMINE, BY GC/MS | UG/L | 5 | U | | | | |
| WS47 ETHER, 4-BROMOPHENYL PHENYL | UG/L | 5 | U | | | | |
| WS48 HEXACHLOROBENZENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS49 PENTACHLOROPHENOL, BY GC/MS | UG/L | 20 | U | | | | |
| WS50 PHENANTHRENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS51 ANTHRACENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS52 PHTHALATE, DI-N-BUTYL-, BY GC/MS | UG/L | 5 | U | | | | |
| WS53 FLUORANTHENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS54 PYRENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS55 PHTHALATE, BUTYL BENZYL | UG/L | 5 | U | | | | |
| WS56 DICHLOROBENZIDINE, 3,3' | UG/L | 5 | U | | | | |
| WS57 ANTHRACENE, BENZO(A), BY GC/MS | UG/L | 5 | U | | | | |
| WS58 PHTHALATE, BIS(2-ETHYLHEXYL), BY GC/MS | UG/L | 5 | U | | | | |

| COMPOUND | UNITS | 105 | F | | | | |
|---|---|---|---|---|---|---|---|
| WS59 CHRYSENE, BY GC/MS | UG/L | 5 | U | | | | |
| WS60 PHTHALATE, DI-N-OCTYL-, BY GC/MS | UG/L | 5 | U | | | | |
| WS61 FLUORANTHENE, BENZO(B), BY GC/MS | UG/L | 5 | U | | | | |
| WS62 FLUORANTHENE, BENZO(K), BY GC/MS | UG/L | 5 | U | | | | |
| WS63 PYRENE, BENZO(A), BY GC/MS | UG/L | 5 | U | | | | |
| WS64 PYRENE, INDENO(1,2,3-CD) | UG/L | 5 | U | | | | |
| WS65 ANTHRACENE, DIBENZO(A,H), BY GC/MS | UG/L | 5 | U | | | | |
| WS66 PERYLENE,BENZO(G,H,I), BY GC/MS | UG/L | 5 | U | | | | |
| WW40 CHLOROMETHANE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW41 BROMOMETHANE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW42 VINYL CHLORIDE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW43 CHLOROETHANE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW44 METHYLENE CHLORIDE (DICHLOROMETHANE) LD | UG/L | 2 | U | | | | |
| WW45 DICHLOROETHYLENE, 1,1- BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW46 DICHLOROETHANE, 1,1- BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW48 CHLOROFORM, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW49 DICHLOROETHANE, 1,2- BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW50 TRICHLOROETHANE, 1,1,1- BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW51 CARBON TETRACHLORIDE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW52 BROMODICHLOROMETHANE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW53 DICHLOROPROPANE, 1,2- BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW54 BENZENE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW55 TRICHLOROETHYLENE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW56 DICHLOROPROPYLENE, CIS 1,3- BY GC/MS LD | UG/L | 1 | U | | | | |
| WW57 DIBROMOCHLOROMETHANE, BY GC/MS LDL | UG/L | 1 | U | | | | |
| WW58 TRICHLOROETHANE, 1,1,2- BY GC/MS LDL | UG/L | 1 | U | | | | |

ANALYSIS REQUEST DETAIL REPORT ACTIVITY: Y-AZXYD VALIDATED DATA

| COMPOUND | UNITS | 105 F | | | | |
|---|---|---|---|---|---|---|
| WW59 BROMOFORM, BY GC/MS LDL | UG/L | 1 | U | | | |
| WW60 TETRACHLOROETHYLENE, BY GC/MS LDL | UG/L | 1 | U | | | |
| WW61 TOLUENE, BY GC/MS LDL | UG/L | 1 | U | | | |
| WW62 TETRACHLOROETHANE, 1,1,2,2- BY GC/MS, L | UG/L | 1 | U | | | |
| WW63 CHLOROBENZENE, BY GC/MS LDL | UG/L | 1 | U | | | |
| WW64 ETHYLBENZENE, BY GC/MS LDL | UG/L | 1 | U | | | |
| WW65 ACETONE, BY GC/MS LDL | UG/L | NA | I | | | |
| WW66 CARBON DISULFIDE, BY GC/MS LDL | UG/L | 1 | U | | | |
| WW67 METHYL ETHYL KETONE (2-BUTANONE) LDL | UG/L | NA | I | | | |
| WW68 HEXANONE, 2- BY GC/MS LDL | UG/L | 5 | U | | | |
| WW69 4-METHYL-2-PENTANONE (MIBK) BY GC/MS LD | UG/L | 5 | U | | | |
| WW70 STYRENE, BY GC/MS LDL | UG/L | 1 | U | | | |
| WW71 XYLENES, TOTAL, BY GC/MS LDL | UG/L | 1 | U | | | |
| WW72 DICHLOROPROPYLENE, TRANS 1,3- BY GC/MS | UG/L | 1 | U | | | |
| WW75 DICHLOROBENZENE, 1,4- (PARA) BY GC/MS L | UG/L | 1 | U | | | |
| WW76 DICHLOROBENZENE, 1,3- (META) BY GC/MS L | UG/L | 1 | U | | | |
| WW77 DICHLOROBENZENE, 1,2- (ORTHO) BY GC/MS | UG/L | 1 | U | | | |
| WW78 DICHLOROETHYLENE, 1,2- (TRANS) BY GC/MS | UG/L | 1 | U | | | |
| WW79 DICHLOROETHYLENE, 1,2- (CIS) BY GC/MS L | UG/L | 1 | U | | | |
| WW80 BROMOCHLOROMETHANE BY GC/MS LDL | UG/L | 1 | U | | | |
| WW81 DIBROMOETHANE, 1,2-(EDB), BY GC/MS LDL | UG/L | 1 | U | | | |
| WW82 DIBROMO-3-CHLOROPROPANE, 1,2-, BY GC/MS | UG/L | NA | I | | | |
| ZZ01 SAMPLE NUMBER | NA | 105 | | | | |
| ZZ02 ACTIVITY CODE | NA | AZXYD | | | | |

ACTIVITY AZXYD SENTINEL WOOD TREATING

THE PROJECT LEADER SHOULD CIRCLE ONE - STORET, AIRS, OR ARCHIVE.

CIRCLE ONE: STORET AIRS ARCHIVE

FINAL DATA REPORT APPROVED BY PROJECT LEADER ON 10/16/97 12:24:03 BY _____.

127 S.W. Second Avenue
P.O. Box 967
Ava, MO 65608
Phone: 417 683 3036

# CITY OF AVA, MISSOURI

July 12, 2000

AIDC
Irma Evans
Don Farris
John Sutton

Dear Property-owners:

The city has been notified by EPA that they will have representatives in Ava over the next two weeks doing environmental site assessment on your property through the Brownfield Targeted Assessment assistance program, called the BTA. This is the project for which the city obtained an access agreement from you to enter your property.

The week of July 17 employees of EPA will be here to determine what locations the test sampling will be done. The week of July 24 there will be an environmental assessment firm doing the actual test drilling.

More information about this Brownfield program may be obtained from:

EPA Region 7
Kansas City, KS 66101
Toll free Environmental Action Line 800 223 0429 Ext. 7988.

Respectfully,

Marilyn

Marilyn Alms

Cc: B.J. Evans

# Health Consultation

420 NW 12TH

SENTINEL WOOD TREATING COMPANY INCORPORATED

AVA, DOUGLAS COUNTY, MISSOURI

CERCLIS NO. MOD029684438

MAY 19, 1998

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Services
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia

## Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR TOLL FREE at
1-800-447-1544
or
Visit our Home Page at: http://atsdr1.atsdr.cdc.gov:8080/

# HEALTH CONSULTATION

420 NW 12TH

SENTINEL WOOD TREATING COMPANY INCORPORATED

AVA, DOUGLAS COUNTY, MISSOURI

CERCLIS NO. MOD029684438

Prepared by:

Missouri Department of Health
Environmental Public Health
Under a Cooperative Agreement with
Agency for Toxic Substances and Disease Registry

# STATEMENT OF ISSUES AND BACKGROUND

## STATEMENT OF ISSUES

The Environmental Protection Agency (EPA), through the Agency for Toxic Substances and Disease Registry (ATSDR) regional office, has requested the Missouri Department of Health (DOH) to complete a health consultation for the Sentinel Wood Treating site. This health consultation will examine the contaminant and exposure levels at this site and determine whether further assessment or a removal action are warranted.

## BACKGROUND

The Sentinel Wood Treating, Incorporated site, Ava, Douglas County, Missouri is the location of a former pressure wood treating operation that used pentachlorophenol (PCP) in its wood-treating process. Approximately 15 acres in size, the site is on the north side of Missouri Highway 14 in a mixed industrial, agricultural, and commercial area of the city (1). Highway 14 is the major thoroughfare through the city, and the area around the site has had numerous new commercial developments in the past few years.

The Sentinel Wood Treating facility treated wood with PCP from 1959 to approximately 1978. Sludge from the wood-treating process was burned in the boiler at the pressure treating operation or deposited in three lagoons on the northern edge of the site (see Figure 1) (1). Most of the sludge was burned in the boiler, but some remained in the lagoons, which were closed in 1978-79 when pressure-treating wood operations ceased at the Sentinel property (1,2).

In 1975, the company started manufacturing hog houses and later, in 1980, portable and/or outdoor wood furniture from CCA- (copper, chromium, and arsenic) treated lumber. Although the CCA lumber was treated off site, the sawdust and scrap wood from the manufacturing was burned in an on-site incinerator. In the late 1980s, Sentinel Industries ceased all operations at the site and sold all but the 3 acres containing the lagoon area. In December 1995, Sentinel Industries bought back the 12 acres sold previously and resumed sole ownership of the site (3).

On February 5, 1998, personnel of the Missouri Department of Health (DOH) and the Douglas County Health Department conducted a site visit. There are nine buildings on the site. All of the pressure treatment equipment has been removed and the buildings are used for businesses or storage. Three buildings on the southern portion of the site face the highway and house commercial operations. Of these three, the building farthest to the west is the former location of the wood treatment facility. Access to the southern edge of the site is limited by a chain-link

fence and locked gates at the buildings on the southern boundary. There is also a chain-link fence on the eastern boundary and a barbed-wire fence around the northern and western boundary of the site (See Figure 1). The delivery personnel, possibly store personnel, the few renters of the remaining (storage) buildings, and a maintenance person are the only people expected to have contact with the site. Infrequent site exposure is expected on their part. Only the maintenance person is expected to have activity in the lagoon area.

Two unnamed streams converge at the northern edge of the property, then converge with a stream from the west into a stream that flows across the property, under the highway, through a sparsely populated residential area and a city park into Prairie Creek. Reportedly, all residents within 1 mile of the site are on city water, and no private wells within the city limits are still in use (3).

## Site Investigations

In 1984, the Missouri Department of Natural Resources conducted a Preliminary Assessment of the site. The assessment report discussed the remaining pressure-treating equipment on site; the sludge remaining in the equipment; the elaborate groundwater diversion, interception, and collection system; and the treatment system used before the water is discharged to the city sewer. The report also discussed visual observations of the operation, including the fact that the stream running through the property showed no evidence of adverse effects caused by Sentinel (2).

In January 1993, a focused Site Inspection was conducted to obtain and analyze environmental samples, to investigate human and environmental exposure to hazardous substances, and to test the hypotheses that hazardous substances are buried on site. Samples were taken of the buried lagoon material, sediment of the stream running through the site, the nearest municipal well (approximately 500 feet east of the lagoon), and background samples. PCP was found in the lagoon subsurface soil (4-6 feet deep) at a maximum concentration of 6,300 parts per million (ppm). It was the only contaminant found above ATSDR's Environmental Media Evaluation Guides (EMEGs) or DOH's Any-Use Soil Level (ASL) in the lagoon subsurface soil. Phenanthrene (660 ppm) and 2-methylnaphthalene (1,100 ppm) were also detected (1), but no EMEG or ASL value exists for them.

Sediment samples, including background and duplicates, were taken from the stream flowing through the site. The only contaminant found at elevated levels was magnesium, which was detected at a level of 40,000 ppm (52,000 ppm for a duplicate sample) in the stream off site and downgradient from the site. This sample was taken 5 feet south of the drain culvert after it goes under the highway. The level of magnesium may be somewhat affected by drainage from the highway, since sediment samples taken onsite contained only 1,800 and 3,200 ppm of magnesium (1).

Samples were also taken of the municipal wells to see if the site had affected the area groundwater. Analyses indicated no site contaminants in the city well (1).

In June 1997, a Removal Assessment was conducted to locate any areas of surface soil, surface water, or sediment contamination and to determine whether off-site migration of PCP has impacted city wells. Limited investigation of the subsurface soils was also conducted to determine the vertical extent of PCP and other contaminants. Samples were taken of surface and subsurface soil, sediment, bulk waste, surface water, and groundwater.

Contaminants found above ATSDR's EMEGs or DOH's ASLs in the lagoon subsurface soil (4-6 feet deep) and their maximum concentration included PCP (11,000 ppm), 2-methylnapthalene (2,200 ppm), and phenanthrene (1,600 ppm). PCP was detected in surface soil, but not at a level above DOH's ASL. The only surface soil sample analyzed for metals was taken from the former furnace location (see Figure 1). It contained 62 ppm arsenic, which is above DOH's ASL. A surface soil sample taken from the location of the former wood treatment facility and a subsurface soil sample taken from the lagoon contained 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)toxicity equivalents of 4.73 parts per billion (ppb) and 10.3 ppb, respectively.

PCP was found in the diversion ditch at a concentration of 1.1 ppb, which is slightly above the maximum contaminant level (MCL) for PCP of 1.0 ppb. Bis (2-ethylhexyl) phthalate (a.k.a. di (2-ethylhexyl) phthalate) was detected in surface water upstream of the site, on site, and downstream of the site (7 ppb, 29 ppb, 44 ppb, respectively) (see Figure 1). Each of these concentrations was above the MCL, but below the child EMEG for intermediate exposure (the most conservative EMEG available). PCP was detected in the city well but at a level that was below that detected in the field blank. The bulk sample was analyzed for asbestos and tested negative (3).

## DISCUSSION

### Soil:

The Sentinel Wood Treating site subsurface soil is contaminated with pentachlorophenol (PCP) at a level above the Agency for Toxic Substances and Disease Registry's (ATSDR's) Environmental Media Evaluation Guides (EMEGs) and the Missouri Department of Health's (DOH's) Any-Use Soil Levels (ASLs). EMEGs are guidelines used to determine if there is a need to further investigate exposure to a chemical for its possible health effects. Levels below the EMEG are unlikely to pose a health threat. An ASL is a health-based value that represents the maximum concentration of a chemical that will always be acceptable in the soil, regardless of future land use.

In addition, subsurface soil contains TCDD toxicity equivalents (TEQs) above DOH's level of concern. TCDD is one chemical in a large class of compounds known as chlorinated

dibenzodioxins. Another closely related class of compounds is chlorinated dibenzofurans. The site was found to be contaminated with chemicals from both of these classes. TCDD is considered to be the most toxic chemical in these classes. To assess the health impact of these chemicals, the toxicity of each compound was converted to TCDD TEQs . This conversion involves toxicity equivalent factors (TEFs). TEFs represent the toxicity of the individual compound in comparison to the toxicity of TCDD. For each chemical, its TEF is multiplied by the concentration of the chemical. The products for each of the individual chemicals are then summed and the total can be compared to TCDD toxicity alone. DOH considers a level over one part per billion (ppb) TCDD TEQs in surface soil to be of health concern.

There do not appear to be any current on-site activities that would lead to exposure from subsurface soil. This contamination represents a potential future threat if digging were to occur, which could lead to dermal contact with contaminated soil, along with incidental ingestion and inhalation of the contaminated soil. The PCP-contaminated subsurface soil, however, poses the potential for groundwater contamination.

Surface soil is contaminated with arsenic and TCDD TEQs at concentrations above those of a health concern. Surface soil sampling for these contaminants has been very limited. To fully characterize the threat to public health posed by these contaminants in surface soil, a more thorough sampling needs to be conducted.

Current exposure to surface soil appears to be infrequent occupational exposure.

Water:

PCP was found at a level slightly above the EPA Maximum Contaminant Level (MCL) in a diversion ditch on-site. An MCL is the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. DOH considers concentrations above the MCL to be of health concern. PCP was well below the MCL in the sample taken downstream and off site.

Bis (2-ethylhexyl) phthalate was found to increase in concentration between upstream and downstream surface water samples. Concentrations in each of the samples were above the MCL, but below the most conservative EMEG for the site.

There is no known on-site exposure to surface water. The on-site surface water is from a stream and not expected to be used as a potable water source. Therefore, little future exposure is expected from this stream.

Although a slight amount of PCP was detected in Municipal Well #4, sampling indicates that, thus far, the public water supply does not seem to be affected by site contaminants at levels of health

concern. PCP-contaminated subsurface soil does remain at the site and could lead to future groundwater contamination.

**Sediment:**

Magnesium was found at an elevated level in off-site sediment. The sediment was in a drainage ditch from the site, but is not expected to be site related. Magnesium is an essential element in human, animal and plant nutrition (4). Exposure to sediment with elevated magnesium levels is not expected to be occurring. If exposure was to occur, no health effects would be expected since calculated potential intakes are below the level needed to maintain magnesium balance in the body (4). The human body excretes excessive magnesium as a normal function unless there is a major kidney malfunction (4).

**PCP toxicity:**

Short-term exposures to large amounts of PCP or long-term exposure to low levels can harm the liver, kidneys, blood, lungs, nervous system, immune system, and gastrointestinal tract. Direct contact with PCP can irritate the skin, eyes, and mouth. The International Agency for Research on Cancer has determined that PCP is possibly carcinogenic to humans (5).

**Arsenic toxicity:**

High levels of inorganic arsenic ($\geq$ 60 ppm) in food or water can be fatal. Arsenic damages many tissues including nerves, stomach and intestines, and skin. Lower levels of exposure to inorganic arsenic may cause nausea, vomiting and diarrhea, decreased production of red and white blood cells, abnormal heart rhythm, blood vessel damage, and a "pins and needles" sensation in the hands and feet. Long-term exposure may lead to a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, or torso. Direct skin contact may cause redness and swelling. The U. S. Department of Health and Human Services has determined that arsenic is a known carcinogen (6).

**TCDD and related compounds toxicity:**

Since the toxicity of all TCDD-like compounds is compared to TCDD toxicity in this health consultation, only TCDD toxicity will be discussed. TCDD (dioxin) has been associated with a wide variety of adverse health effects. Chloracne is the most noted health effect in people exposed to relatively large amounts of TCDD. Chloracne is a severe skin disease that usually occurs on the face and upper body. It is characterized by lesions and follicular hyperkeratosis (comedones) similar to acne. It is, however, more disfiguring than common acne, and often lasts for years after initial exposure. The levels of exposure at this site are lower than those historically associated with chloracne. Thus, chloracne is not expected to be experienced by persons exposed to TCDD at this site.

TCDD exposure has also been associated with liver damage, immune system damage, adverse reproductive effects, and cancer. These effects have mostly been observed in animal studies, or in studies where individuals were exposed occupationally to TCDD (and probably to other chemicals which were also thought to cause health problems). Changes in blood and urine that may indicate liver damage have been observed in people. Alterations in the ability of the liver to metabolize hemoglobin, lipids, sugar, and protein have been reported in people exposed to relatively high concentrations of TCDD. A slight increase in the risk of diabetes and abnormal glucose tolerance tests has been observed in some studies of people exposed to TCDD (7).

In many species of animals, the immune system appears to be extremely sensitive to TCDD. At relatively low levels, TCDD weakens the immune system and causes a decrease in the system's ability to fight foreign substances such as bacteria and viruses. Exposure to TCDD can cause reproductive damage and birth defects in animals, including altered levels of sex hormones in both sexes, and reduced production of sperm. In addition, bleeding, skeletal deformities, kidney defects, weakened immune responses, impaired reproductive system development, and learning and behavioral impairments have been observed in offspring of animals exposed to TCDD (7).

The U.S. Department of Health and Human Services has determined that it is reasonable to expect TCDD to cause cancer. The International Agency for Research on Cancer has determined that TCDD can cause cancer in people. Finally, the Environmental Protection Agency has determined that TCDD is a possible human carcinogen when considered apart from other dioxins and furans (7).

## CONCLUSIONS

1. The Sentinel Wood Treating site has subsurface soil contaminated with pentachlorophenol (PCP) and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalents (TEQs) at levels of health concern; however, current exposure is very unlikely. The PCP-contaminated subsurface soil does present the potential for groundwater contamination.

2. The site has had limited surface soil sampling for metals and TCDD TEQs. Sampling has shown arsenic and TCDD TEQs to be present at levels of health concern. Current exposure to on-site contaminated surface soil appears to be limited. Surface soil contamination could represent a potential threat due to on-site dust and dust migrating off site, resulting in an inhalation exposure to contaminants. Until the surface soil is better characterized, it will be very difficult to determine its full impact to public health.

3. It appears that surface water and the public water supply do not pose a significant threat to public health at this time. There was, however, a very small amount of PCP detected in Municipal Well #4. PCP-contaminated subsurface soil could lead to contamination of the groundwater.

4. The site appears to be secure.

## RECOMMENDATIONS

1. Based upon current information, it appears a Removal Action is necessary due to the TCDD TEQs and arsenic in surface soil, along with the TCDD TEQs and PCP in subsurface soil. Although current exposures are limited, future exposures could occur, depending on use of the site. In addition, PCP contaminated subsurface soil could contaminate the groundwater.

2. Conduct further soil sampling to determine the extent of arsenic and dioxin contamination in surface and subsurface soil.

3. Place restrictions on any on-site soil disturbance (e.g., digging).

4. Investigate on-site groundwater to determine if it has been contaminated.

5. Continue to monitor the public water supply to ensure it does not become contaminated with PCP.

6. Maintain site security to prevent unnecessary exposure to on-site contaminants.

Preparers of the Report: Arthur Busch, Scott Clardy, Brian Quinn, Missouri Department of Health.

Attachments: Figure 1, Sentinel Wood Treating Site Map
Table 1, Sentinel Wood Treating Site Maximum Contaminant Levels of Public Health Concern (by Media) and Health Comparison Values

## CERTIFICATION

The Sentinel Wood Treating Company, Inc. Health Consultation was prepared by the Missouri Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

Technical Project Officer, SPS, SSAB, DHAC

The Superfund Site Assessment Branch of the Division of Health Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

Chief, SPS, SSAB, DHAC

## REFERENCES

1. CDM Federal Programs Corporation. Site Inspection Report for Site Assessment Activity at The Sentinel Wood Treating Site, Ava, Missouri. September 27, 1993.

2. Missouri Department of Natural Resources. Preliminary Assessment, Sentinel Wood Treating Company, Ava, Missouri. June 1984.

3. Ecology and Environment, Inc. Memorandum: Removal Assessment: Sentinel Wood Treating Site, Ava, Missouri. December 23, 1997.

4. National Academy of Sciences, Drinking Water and Health, Safe Drinking Water committee, Washington D.C., 1977, pp. 262-263.

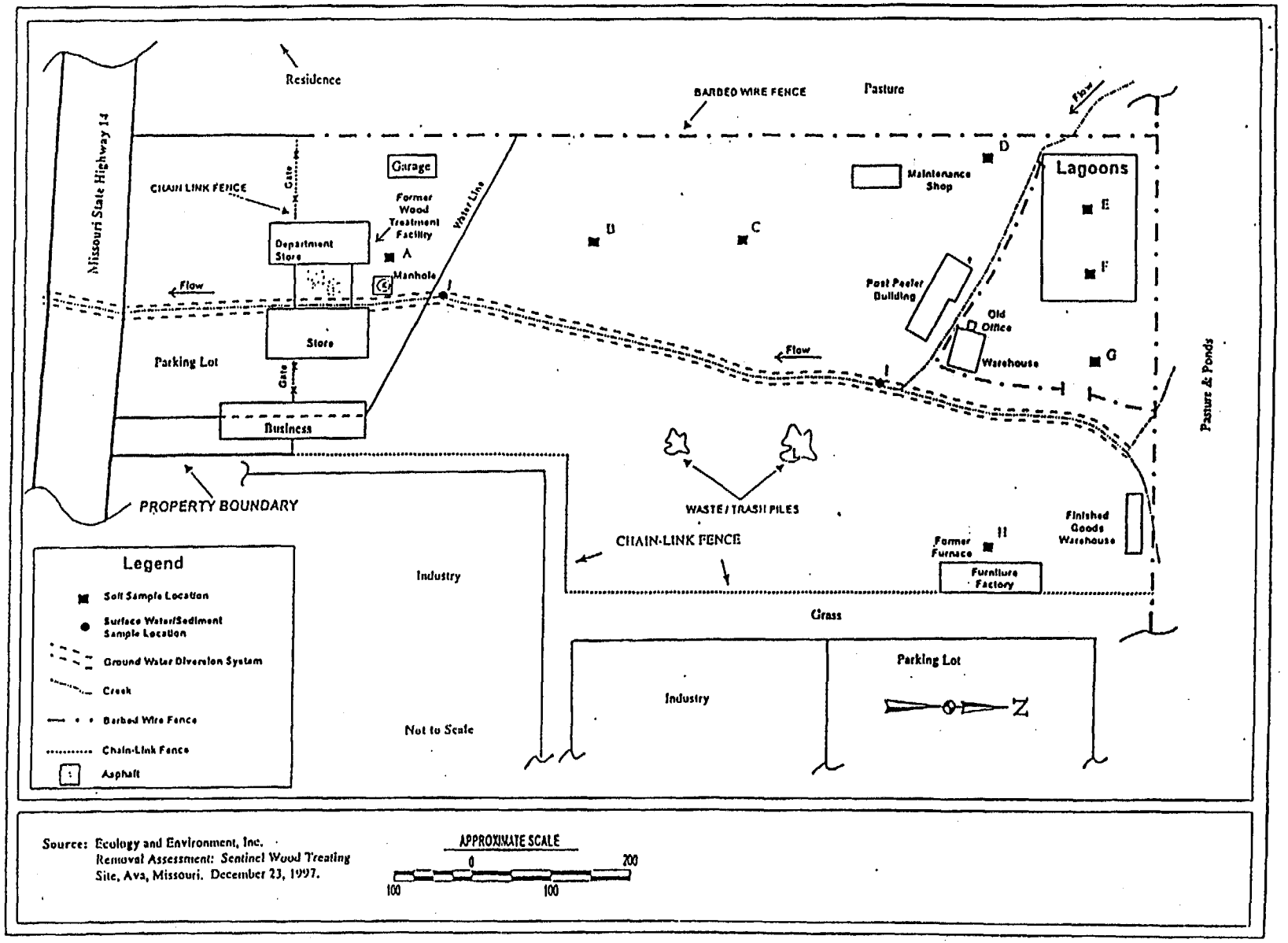
5. Agency for Toxic Substances and Disease Registry. Fact sheet for Pentachlorophenol. Atlanta: ATSDR, September 1995.

6. Agency for Toxic Substances and Disease Registry. Fact sheet for Arsenic. Atlanta: ATSDR, April 1993.

7. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Chlorinated Dibenzo-p-dioxins, Update, Draft for Public Comment. Atlanta: ATSDR, September 1997.

# Figure 1

## Sentinel Wood Treating Site Map



# Table 1

## Sentinel Wood Treating Site Maximum Contaminant Levels of Public Health Concern (by Media) and Health Comparison Values

All values in parts per million (ppm)

| Contaminant | Media | Maximum Detected Value | Health Comparison Value |
|---|---|---|---|
| Pentachlorophenol | Subsurface Soil | 11,000 | 42* |
| 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin Toxicity Equivalents | Subsurface Soil | 0.0103 | 0.001** |
| | | | |
| Arsenic | Surface Soil | 62 | 11* |
| 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin Toxicity Equivalents | Surface Soil | 0.00473 | 0.001** |
| | | | |
| Pentachlorophenol | Surface Water | 0.0011 | 0.001*** |
| Bis (2-ethylhexyl) phthalate (a.k.a. di (2-ethylhexyl) phthalate) | Surface Water | 0.044 | 0.006***, 4.0**** |

* Missouri Department of Health Any-Use Soil Level
** Missouri Department of Health Level of Concern
*** Environmental Protection Agency Maximum Contaminant Level
**** Agency for Toxic Substances and Disease Registry Environmental Media Evaluation Guide for drinking water

UNCONTROLLED HAZARDOUS WASTE SITE INVESTIGATION

Preliminary Assessment
Sentinel Wood Treating Company
P. O. Box 336
Ava, Missouri 65608
417/683-4145
EPA ID# MOD029684438
MDNR #01435

On May 1, 1984, Charles Kroeger, Environmental Specialist with the Hazardous Waste Management Program, Springfield Regional Office, inspected the Sentinel Wood Treating Company in Ava, Missouri. Sentinel appears on the ERRIS list. File review of the Water Pollution Control Program files on Sentinel was performed on May 31 - April 1, and completed on May 5, 1984.

Sentinel previously pressure treated wood products with pentachlorophenol. The company has been at the Ava site since 1959 and has had close contact with environmental agencies since about 1970. They are now manufacturing all-season outdoor furniture made from CCA treated lumber. The lumber is treated off site.

Sentinel is presently involved in the state pretreatment program and has, in the past, had an NPDES permit for the discharge from the water collection system. Water now is discharged, after treatment, to the Ava municipal sewer system.

Mr. Frank Rees, manager of the Ava plant, was interviewed at the time of the investigation. He can be contacted at the plant address or phone listed above.

Mr. Rees indicated that no pressure treating has been performed for approximately one and one-half years. The building housing the treating equipment is locked limiting access and exposure to any pentachlorophenol remaining on site. Future plans are indefinite but may include abandonment of the pressure treating operation, removal of the equipment and construction of a furniture factory on site. All but about two barrels of K001 sludge have been removed from the treatment tanks. The remainder is intended for removal in the future. No other waste penta material is stored on site.

Sentinel Wood Treating, Incorporated is located one-half mile east of the junction of Highways 14 and 5 in Douglas County, Missouri. The legal description is NW¼, NW¼, Sec. 11, T26N, R16W. Sentinel Wood Treating is incorporated with K. W. Farris as president and the corporation owns the property on which the plant is located.

The Ava plant is situated in a commercial/manufacturing section of town. A stream flowing through the plant is estimated to drain approximately 300 acres. The stream flows through a residential area, though sparsely populated, then through a city park. The stream flow below the park is supplemented by the discharge from the Ava lagoon system before entering a losing portion of upper Prairie Creek.

During the investigation, Mr. Rees advised me of the present status of the facilities and the wastes on site, answered questions concerning past disposal and environmental concerns and accompanied me on a tour of the treatment area.

Sludge from the pressure treating process was formerly deposited in three lagoons on the property. These lagoons were closed out in 1978-79. The water from the lagoons went through the on site treatment system then into the city sewers. Most of the sludge from the lagoon was burned in the boiler at the pressure treating operation. Some remained in the lagoon and was covered over, however, it is within the ground water collection system. Some sludge remains in the tanks of the treatment process. Two loads of waste sludge have been removed from the treatment tanks. These were manifested and transported to B.H.S. (copy of manifest attached).

Sentinel constructed an elaborate ground water diverson, interception and collection system in the late 1970's. Water from the system is pumped to a treatment facility which includes charcoal filtration, prior to being discharged to the city sewers. This system is designed to catch any water that might carry leachate from the plant site. An engineering company is presently working on additions or improvements to this pretreatment system.

One small drainage catch basin downslope from the treatment area retains surface flow and would catch any spillage. The water is periodically pumped to the treatment system or can be discharged via elbowed pipes to the creek. The soil in this area was stained with what appeared to be pentachlorophenol.

The drainage through the property and the stream below showed no evidence of adverse affects caused by Sentinel. There were hundreds of minnows in the stream and crayfish were observed in the oil effluent catch basin on the Sentinel property.

A copy of the implemented plan to control ground water, a site map, and a flow chart of the water treatment process are attached.

Sentinel Wood Treating is presently manufacturing furniture with CCA treated lumber. Determination may need to be made regarding toxicity problems associated with sawdust and scrap from CCA. Leaching of chemicals from this type of lumber is said to be reduced but may merit further investigation. Sawdust and scrap lumber are presently being incinerated. It is not, however, a state approved incinerator and possibly has never been inspected. A commercial type is to be utilized if the business expands.

If and when the pressure treating section is removed to make the land available for other use, a closure plan may need to be submitted which would include decontamination of equipment and the removal of contaminated soil.

## APPENDICES

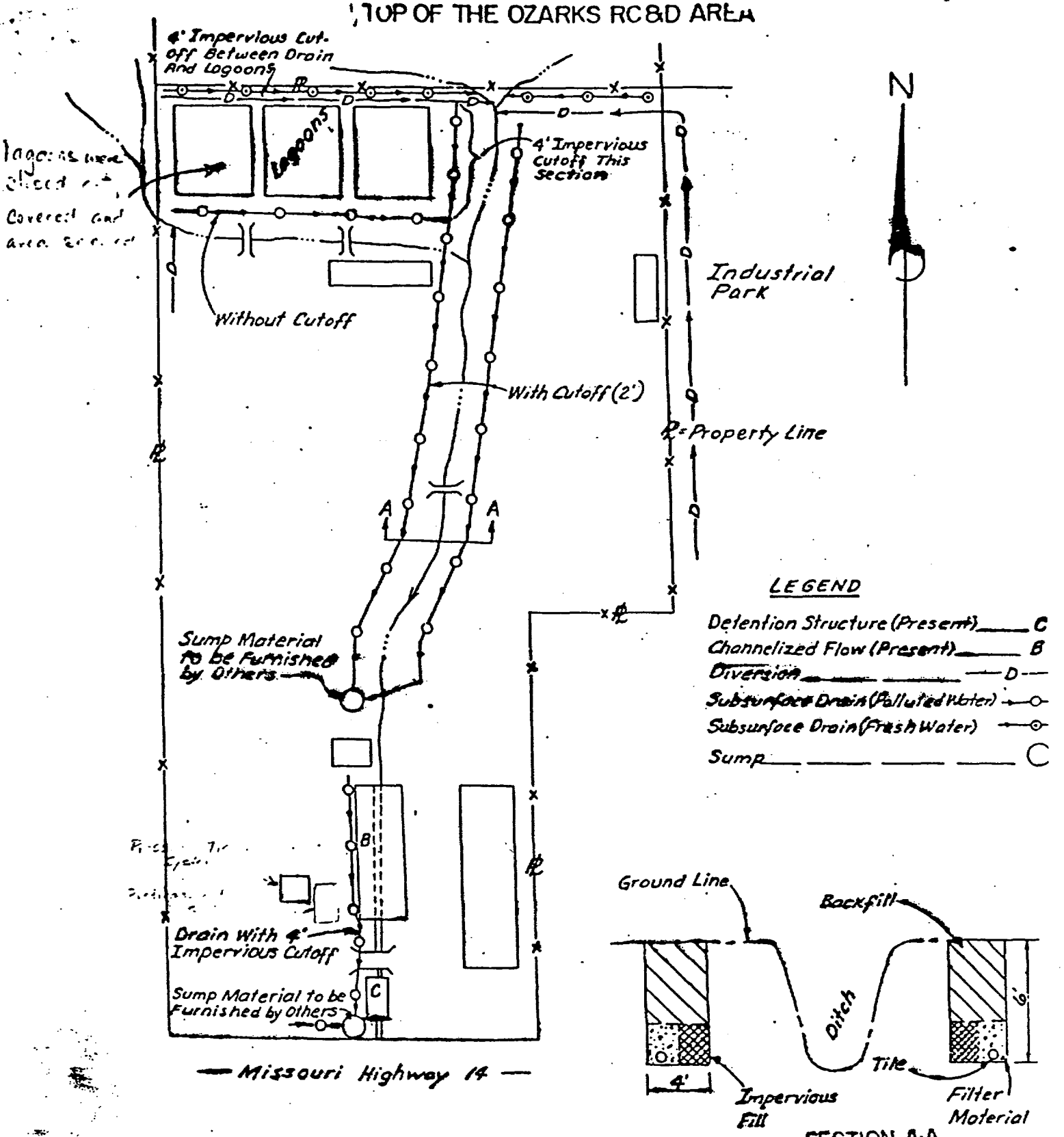
| | |
|---|---|
| Attachment #1 | RC&D Site Map |
| Attachment #2 | Photographs of ditch through Sentinel |
| Attachment #3 | Topographic map |
| Attachment #4 | Flow chart of penta and water at Sentinel |
| Attachment #5 | List of References |
| Attachment #6 | Manifest on second shipment of K001 waste |
| Attachment #7 | EPA form 2070-12 |

SUBMITTED BY:

Charles L. Kroeger
Environmental Specialist
Hazardous Waste Management Program
Mo. Department of Natural Resources

APPROVED BY:

John R. Nixon, P.E.
Administrator
Springfield Regional Office
Mo. Department of Natural Resources




SECTION A-A
SKETCH OF DRAIN & CUTOFF

SITE MAP

200 100 0 200

Scale in Feet

US DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FEBRUARY 1977

EXHIBIT D

Form D NR H.W.G. - 10
HAZARDOUS WASTE MANIFEST DOCUMENT
OURI DEPARTMENT OF NATURAL RESOURCES
P. O. Box 1368, Jefferson City, Missouri 65102 314-751-3241

| Generator I.D. No. | Waste I.D. No. | Shipment No. |
|---|---|---|
| h 435 | | 002 |

1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

| | Identification | Address | Telephone No. | Date Shipped or Rec'd. |
|---|---|---|---|---|
| 1. Generator<br>ntinel Wood Treating, Inc. | Generator I.D. No.<br>21435<br>MOD029684436 | P.O. Box 336<br>Ava, Missouri, 65608 | (417)683-4145 | 5-1-84 |
| 2. Transporter<br>ology and Environmental Systems Inc. | Transporter No.<br>H 1337<br>MOD980850986 | P.O. Box 4151<br>Springfield, Missouri, 65808 | (417)882-3802 | 5-1-84 |
| 3. Treatment, Storage or Disposal Facility<br>Bob's Home Service, Inc. | T,S,D, Facility Permit No.<br>7219901 MO<br>MOD068521228 | Route 1, Box 116F<br>Wright City, MO. 63390 | (314)745-3371 | 5-1-84 |

| 4. Proper DOT Shipping Name | DOT Hazard Class | DOT Label Required or Exceptions | Quantity | Units* | Weight (If applicable) |
|---|---|---|---|---|---|
| Waste Pentachlorophenol Mixture NA2020 | ORM-E | Hazardous Waste | 2 drums | 1 2 3 (4) 5 | |

*Circle one: 1. tons; 2. gallons; 3. cubic yds; 4. drums - 55 gallon; or 5. Pounds

5.

| Immediate Emergency Response Information | 24-hour emergency telephone numbers |
|---|---|
| In the event of a spill, contact the National Response Center, U. S. Coast Guard, 800-424-8802 | Chemtrec 800-424-9300 |

SPECIAL HANDLING INSTRUCTIONS: ontain and prevent spill: wear protective clothing.

Item 6.

| Placards Provided or Affixed | |
|---|---|
| | |
| | |

| Shipper's Check List | | | |
|---|---|---|---|
| | DOT Labels Applied and Secure | | DOT Auth. Containers |
| | Proper DOT Name on all Packages | | Checked for Proper Sealing |
| | Air Cargo Only | | Peligro Label Applied |

7. GENERATOR CERTIFICATION. This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources.

erator's Signature Jerry Hudson Date 5-1-84

2

e completed by the transporter

8. TRANSPORTER CERTIFICATION. This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment:

sporter's Signature Ronald B. Varian Date 5-1-84 Cell 05/04/84-126

3

9. TSDF CERTIFICATION. This is to certify acceptance of the hazardous waste for treatment, storage or disposal.

F Signature Michael D Gill Date 5-1-84

BH5 0539

Department Final Copy

MDNR Form 0 NR H.W.G. 1 0 (7)

# HAZARDOUS WASTE MANIFEST DOCUMENT

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

| Generator I.D. No. | Waste I.D. No. | Shipment No. |
|---|---|---|
| 0 1 2 3 5 | 0 0 1 | 0 0 1 |

Part 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

| Name | Identification | Address | Telephone No. | Date Shipped or R |
|---|---|---|---|---|
| Item 1. Generator<br>Sentinel Wood Treating, Inc. | Generator I.D. No.<br>01435<br>MOD029684438 | P.O. Box 336,<br>Ava, MO 65608 | (417) 683-4145 | 11-23-8 |
| Item 2. Transporter<br>Environmental International, Inc. | Transporter No.<br>H1121<br>MOT300010238 | 1812 S. Franklin<br>Springfield, MO 65807 | (417) 869-9439 | |
| Item 3. Treatment, Storage or Disposal Facility<br>Bob's Home Service | T.S.D. Facility Permit No.<br>7219901 MO<br>MOD068521228 | Route 1, Box 116F,<br>Wright City, MO 63390 | (314) 745-3158 | |

| Item 4. Proper DOT Shipping Name | DOT Hazard Class | DOT Label Required or Exceptions | Quantity | Units | Weight If applic |
|---|---|---|---|---|---|
| Waste Pentachlorophenol Mixture NA2020 | ORM-E | None | 2 | 1 2 3 4 5 | #1000 |

*Circle one: 1. tons; 2. gallons; 3. cubic yds; 4. drums - 55 gallon; or 5. Pounds

Item 5.

| Immediate Emergency Response Information | 24-hour emergency telephone numbers |
|---|---|
| In the event of a spill, contact the National Response Center, U. S. Coast Guard, 800-424-8802 | Chemtrec 800-424-9300 |
| SPECIAL HANDLING INSTRUCTIONS: Contain and transport to approved facility. | |

Item 6. Placards Provided or Affixed

Shipper's Check List

| | | | |
|---|---|---|---|
| | DOT Labels Applied and Secure | | DOT Au Contain |
| | Proper DOT Name on all Packages | | Checked Proper Sealing |
| | Air Cargo Only | | Peligro Applied |

Item 7. GENERATOR CERTIFICATION. This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources.

Generator's Signature [signature] Date 11-23-82

Part 2

To be completed by the transporter

Item 8. TRANSPORTER CERTIFICATION. This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment:

Transporter's Signature [signature] Date 11-24-82

Part 3

Item 9. TSDF CERTIFICATION. This is to certify acceptance of the hazardous waste for treatment, storage or disposal.

TSDF Signature _____ Date _____

EXHIBIT C

COPY OF ARTICLES OF INCORPORATION

We, the undersigned, being natural persons of the age of twenty-one years or more and subscribers to the shares of the corporation to be organized pursuant hereto, for the purpose of forming a corporation under "The General and Business Corporation Act of Missouri," Chapter 351, R. S. Mo. 1949, do hereby adopt the following Articles of Incorporation:

ARTICLE ONE

The name of the corporation is:

The Sentinel Wood Treating, Inc.

ARTICLE TWO

The address of its initial registered office in the State of Missouri is: Ashland,

and the name of its initial registered agent at such address is: Floyd Farris

ARTICLE THREE

The aggregate number of shares which the corporation shall have authority to issue shall be:

Three Hundred (300) common stock
without par value

The preferences, qualifications, limitations, restric-

COPY OF ARTICLES OF INCORPORATION (Continued)

tions, and the special or relative rights in respect to the shares of each class are as follows:

none

ARTICLE FOUR

The number of shares to be issued before the corporation shall commence business is:

150 Shares, no par stock having a total value of ($19,897.10).

Dollars ($ ) has been paid up in lawful money of the United States, and/or Dollars ($ 19,897.10) has been paid up in property, in payment for shares of the corporation; an itemized description of such property, together with the cash value and location of each item thereof is as follows:

ARTICLE FIVE

The names and places of residence of the shareholders and the number of shares of each class subscribed by each are:

Definite Addresses in Cities and Thickly Populated Territory

| Names | Residences | No. of Shares Preferred | Common |
|---|---|---|---|
| Floyd Farris | Ashland, Mo. | | 50 no par |
| Keith W. Farris | Ashland, Mo. | | 50 no par |
| Cedric W. Farris | Mountain Grove, Mo. | | 50 no par |

COPY OF ARTICLES OF INCORPORATION (Continued)

ARTICLE SIX

The number of directors to be elected at the first meeting of the shareholders is three (3)

ARTICLE SEVEN

The duration of the corporation is perpetual

ARTICLE EIGHT

This corporation is formed for the following purposes:

To carry on a general treating of wood products of alltypes, to mill, buy and sell lumber of any type or description, to buy timber or timber land for the purpose of supply or for profit, to operate trucks for the purpose of hauling either supplies and commodities for the Corporation or for others, to manufactor, wholesale or retail wood, or related products, or to engage in any lawful business.

IN WITNESS WHEREOF, we have hereunto set our hands this 23rd day of April , 1957.

Floyd E. Farris

Keith W. Farris

Cedric W. Farris