Department of Natural Resources Antigo Area Headquarters P.O. Box 310 Antigo, WI 54409

12/85



Interim Report

Groundwater Extraction Program Wausau, Wisconsin

Wausau Chemical Corporation

Wausau, Wisconsin

## Report



STS Consultants Ltd. Consulting Engineers

540 Lambeau Green Bay, Wisconsin 54303 (414) 494-9656

December 17, 1985

Department of Natural Resources P.O. Box 310 Antigo, Wisconsin 54409 Wis. Dept. of Natural Resources

DEC 18 1985

ANTIGO AREA HEADQUARTERS ANTIGO, WISCONSIN

Attention: Mr. Jack Saltes

STS Job 12776-B

RE: Wausau Chemical Corporation Groundwater Extraction Program

Gentlemen:

On behalf of Charne, Glassner, Tehan, Clancy and Taitelman, legal council to Wausau Chemical, we are submitting an interim report concerning the above referenced project. Five copies of the report are enclosed.

If you have any questions concerning this report, please feel free to contact us at your convenience.

Yours very truly,

STS CONSULTANTS LTD.

Mark D. Mullsop

Mark D. Millsop Environmental Geologist

Douglas J. Hermann, P.E. Vice President-Environmental Division

MDM/de

- 2 -

cc: Mr. R. Krueger (1)
Charne, Glassner, Tehan, Clancy
and Taitelman
211 West Wisconsin Avenue
Milwaukee, Wisconsin 53203

Mr. J. Cherwinka (1) Wausau Chemical Company P.O. Box 953 Wausau, Wisconsin 54401

Mr. Richard O'Hara (3) Department of Natural Resources Solid Waste Management Bureau P.O. Box 7921 Madison, Wisconsin 53707

Mr. Ed Kreul (1) Department of Natural Resources P.O. Box 818 Rhinelander, Wisconsin 54501

## Report

# Project

GROUNDWATER EXTRACTION PROGRAM - INTERIM REPORT

WAUSAU CHEMICAL CORPORATION WAUSAU, WISCONSIN

## Client

WAUSAU CHEMICAL COMPANY P.O. BOX 953 WAUSAU, WISCONSIN 54401

Project #

12776-B

Date

December, 1985



540 Lambeau Street Green Bay, Wisconsin 54303 (414) 494-9656

## TABLE OF CONTENTS

	Page No.
INTRODUCTION	1
PROCEDURES	2
<ul> <li>Soil Borings and Well Installations</li> <li>Soil Classification</li> <li>Groundwater Extraction, Treatment and Monitoring</li> </ul>	2 4 4
RESULTS	8
<ul> <li>Soils Exploration</li> <li>Extraction Program</li> <li>Efficiency</li> <li>Emissions</li> <li>Pumping Test</li> </ul>	8 8 11 13
CONCLUSIONS AND RECOMMENDATIONS	16
<ul> <li>Air Stripper Efficiency</li> <li>Air Emission</li> <li>Pumping Field Influence</li> <li>Recommendations</li> </ul>	16 16 17 17
GENERAL QUALIFICATIONS	20

APPENDICES

.

## LIST OF FIGURES

Figure	1	-	Extraction Wells	3
Figure	2	-	Extraction and Treatment of	
			Tetrachloroethylene	5
Figure	3	-	Well Installation Diagram	7

18

## LISTS OF TABLES

Table	1	-	Generalized Extraction and	
			Airstripper History	9
Table	2	_	Measured Perchloroethylene Concentrations	10
Table	3	-	Perchloroethylene Emissions from Airstripper	12
Table	4	-	Pumping Test Water Level Summary -	
			November 8, 1985	14

- 1 -

#### INTRODUCTION

The purpose of this report is to describe the soils and the extraction well installations at Wausau Chemical Corporation and to evaluate the effectiveness of the groundwater extraction program to date. This report includes soil boring logs, well installation diagrams and water quality data.

The Wausau Chemical Corporation is located on the east bank of the Wisconsin River at 2001 River Drive which is in the NW 1/4 of the NW 1/4 of Section 25, T29N, R7E of the City of Wausau, Marathon County, Wisconsin. For historical information concerning the tetrachloroethylene (perchloroethylene) spill at the site, please refer to the STS report dated April 3, 1985.

- 2 -

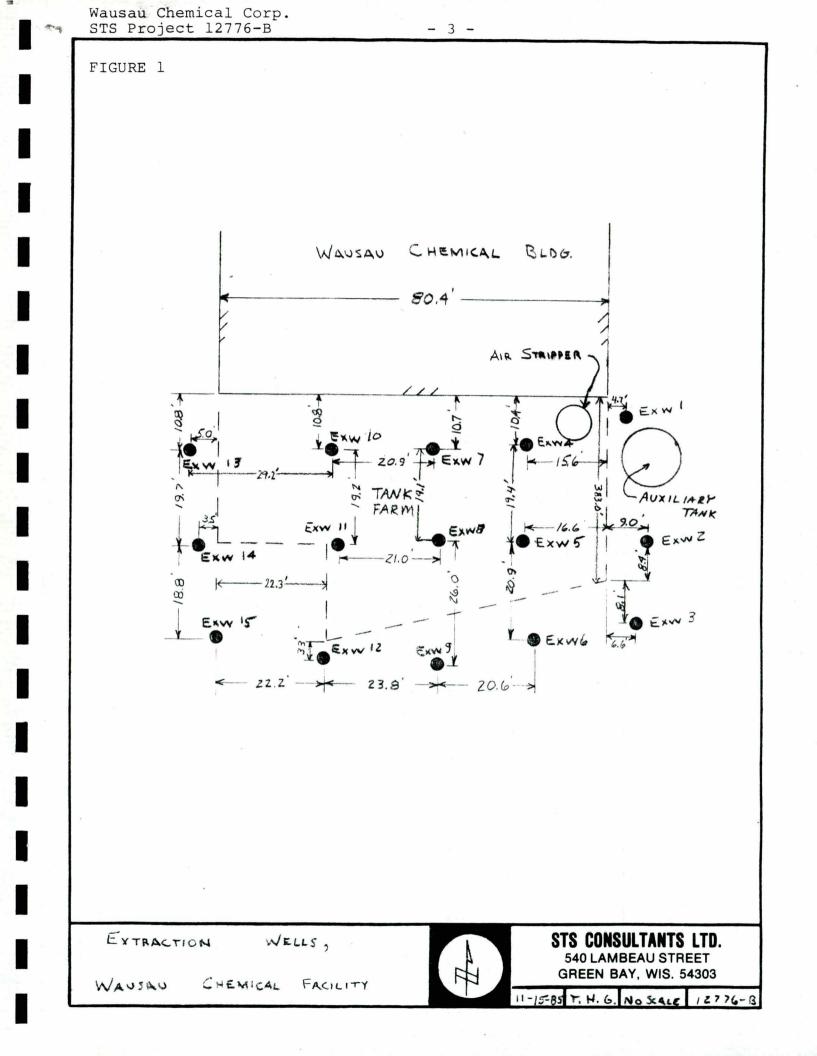
#### PROCEDURES

### Soil Borings and Well Installations

The new field exploration completed for this report consisted of 15 soil borings (B-1 to B-15) and groundwater extraction well installations in October, 1985, on or near the old tank farm at Wausau Chemical (Figure 1). All of the borings were drilled to a depth of 26.5 feet with the exception of B-7 which was drilled to a depth of 27.5 feet. The boring surface elevations and well elevations were surveyed with respect to Wausau City Datum, and are shown on the Soil Boring Logs and Well Installation Diagrams.

The soil borings were drilled to their respective depths with a truck-mounted CME rotary drilling rig. Solid-stem augers were used to advance the boreholes. The first 10 feet in each of the soil borings was not sampled. Below the 10 foot level, representative samples of the soils in the boreholes were obtained at 5 foot intervals by means of split-barrel sampling procedures in general accordance with ASTM Specification D 1586-67, "Standard Method for Penetration Tests and Split-Barrel Sampling of Soils". A brief description of this sampling procedure is included in Appendix A.

Groundwater extraction wells were installed in each of the soil borings. In order to install the extraction wells, a 6 inch steel casing was driven into the ground and then a roller bit and revert drilling mud were utilized. The wells were installed per the design specifications outlined in STS's October 10, 1985 letter to the Department of Natural Resources. Generally, the wells consist of 4 inch ID Schedule 40 threaded PVC pipe with a 10 foot long 0.15 inch slotted PVC well screen. The well screens are wrapped with a polypropylene filter (Poly-filter GB) with opening size #40 from Carthage Mills, Inc. Below the well screen is a 3 foot



solid PVC pipe which was installed to provide the minimum inlet head pressure needed for the submersible pumps.

- 4 -

The annulus around each of the well screens was backfilled with pea gravel. On-site sand was placed above the pea gravel and a bentonite powder seal was placed near the ground surface. After installation, the wells were developed by pumping and bailing. Well installation diagrams are included in Appendix A.

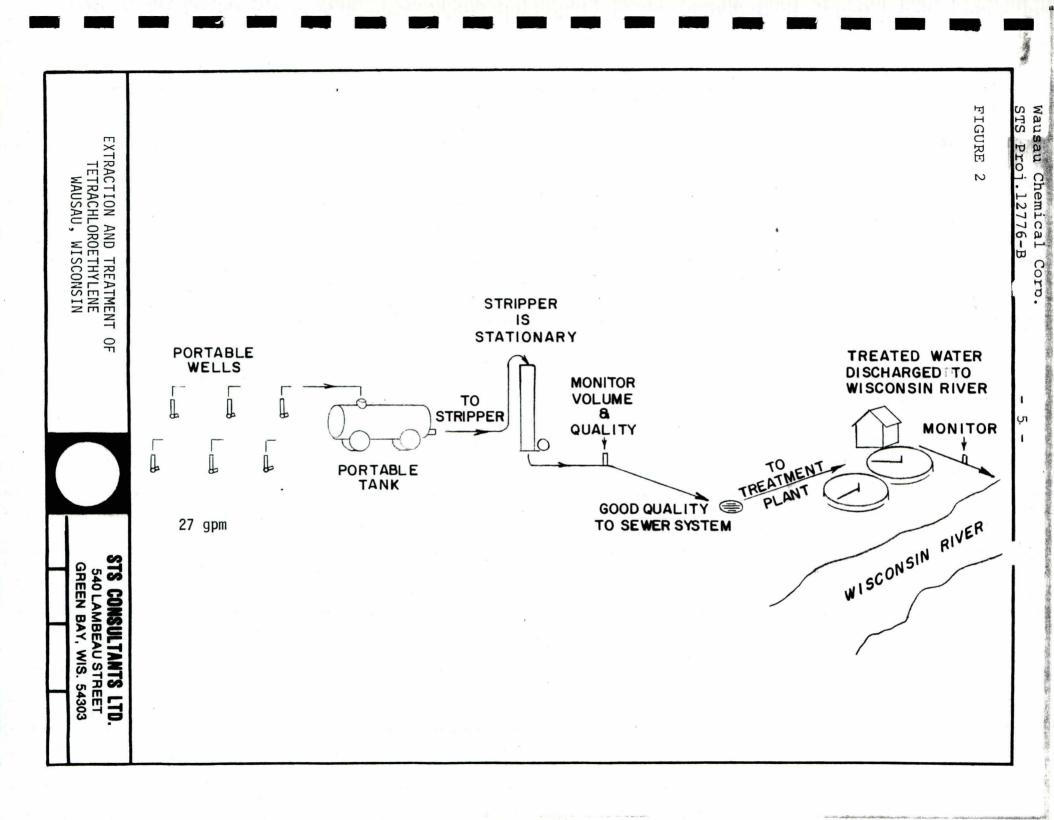
#### Soil Classification

Each of the soil samples recovered from the boreholes was examined by an experienced Soils Engineer to determine the major and minor soil components, degree of saturation, and any conspicuous lenses and seams. Then the soils were classified according to the Unified Soil Classification System. The capitalized symbol in parenthesis on the boring logs is the appropriate group symbol according to this classification scheme. A chart describing the Unified Soil Classification System is included in Appendix A.

Upon completion of the classification, the Engineer grouped the soil samples by type as shown on the Soil Boring Logs in Appendix A. Please note that the strata contact lines represent approximate boundaries between soil types, whereas changes in the soil types in situ may be gradual in both the horizontal and vertical directions.

## Groundwater Extraction, Treatment and Monitoring

The groundwater extraction and treatment system was installed per the recommendations in STS's April 4, 1985 report. Generally, the system consists of 6 submersible pumps installed in a cluster of 6 wells, an auxiliary tank, and an airstripper (Figure 2).

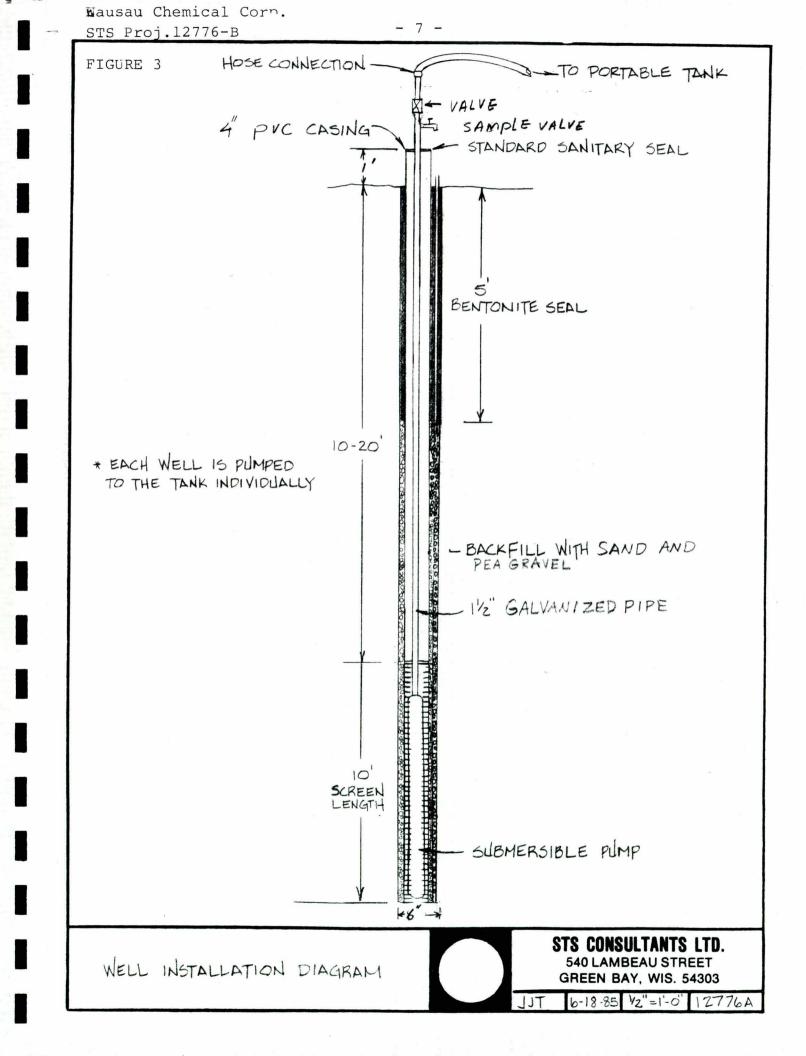


One-horsepower submersible pumps, with an estimated average pumping rate of 25 to 27 gpm, were installed in extraction wells 10, 11, 12, 13, 14 and 15 in mid-October, 1985. The pumps are connected to a galvanized steel pipe which is connected to a rubber hose at the top of the well (Figure 3). The extracted water is pumped through hoses to an auxiliary tank which is fitted with a 3-horsepower centrifugal pump. Then the water is pumped from the tank to the airstripper at a rate of approximately 145 gpm. After the water is treated for volatile organic compound removal in the airstripper, the water is discharged to the Wausau City Sewer. Any residual contamination remaining treated at the Wausau wastewater in fluent treatment plant in the activated treatment phase. effluent?

- 6 -

During the extraction program, periodic water analyses were performed. The water samples were obtained from the specially installed sample valves on the wells. These samples were analyzed by Zimpro Laboratory. When stable water quality is observed, extraction in a well cluster is terminated and the pumps are moved to a new well cluster. In addition, pumping rates, pumping duration and water levels are measured regularly.

The monitoring program also was undertaken to determine the contaminant level for the influent and effluent from the airstripper. The data obtained from that monitoring allowed calculation of the airstripper efficiency and, furthermore, it enabled discharge requirements to be evaluated. Thus, pumping rates could be adjusted as needed.



- 8 -

#### RESULTS

#### Soils Exploration

Fill was encountered near the surface in the borings; however, it can extend to a depth of 18 feet. The fill consists of medium dense to very dense sand with gravel. It is underlain by a fine to coarse sand with gravel extending to the termination depth of the borings. This strata's relative density ranged from very loose to dense. Soil Boring Logs are included in Appendix A.

#### Extraction Program

A generalized historical summary of the extraction and airstripping system is presented in Table 1. Thus far, there have been various minor problems described in Table 1. The first cluster of wells that was pumped included extraction wells 10, 11, 12, 13, 14 and 15. They were pumped until November 15 when the pumps were removed from wells 13, 14 and 15, and those three pumps were installed in wells 7, 8 and 9. Thus, the second cluster of wells consists of extraction wells 7, 8, 9, 10, 11 and 12. Due to unfavorable weather conditions and the Thanksgiving holiday in late November, well cluster 2 was not pumped during that period. However, pumping commmenced once again recently.

Efficiency - Prior to commencement of the Extraction Program, samples were gathered from extraction wells 5, 7, 10 and 15. Perchloroethylene concentrations for those wells are presented in Table 2. Perchloroethylene concentrations from samples gathered from wells 7, 10 and 15 on November 8 showed a marked decrease in measured concentration. Furthermore,

STS Job 12776-B

#### TABLE 1

#### GENERALIZED EXTRACTION AND AIRSTRIPPER HISTORY

- Date Activity
- Oct. 11 Stripper installation started
- Oct. 23 Attempted start-up. Blower would not stay on. Determined that motor/blower combination designed incorrectly. Blower people were to install new blower Monday, October 28, but didn't come in until October 30.
- Oct. 30 Started to run but breakers would not stay on.
- Oct. 31 Rewired ran about three hours mechanical operation checked out OK.
- Nov. 1 Ran approximately four hours
- Nov. 2 Ran approximately four and one-half hours
- Nov. 3 Ran approximately five hours
- Nov. 4 Ran approximately a 4-hour morning started again at Nov. 5 4 p.m. and ran all night and all day until 8 a.m., November 6.
- Nov. 7 Started Wells 10 and 11 only at 2 p.m. and ran until Nov. 8-9 system failed Friday night or Saturday morning due to snow storm. Everything froze up solid.
- Nov. 12 Thawed system out and restarted 4:30 p.m.
- Nov. 13 Ran Wells 10 and 11 only all day until 2 p.m., November 14.
- Nov. 14 Discussed water meter not working.
- Nov. 15 Changed pumps from Wells 13, 14 and 15 to 7, 8 and 9. Ran #11 for two hours only to get water level readings.
- Nov. 19 Could not start up. Lines were frozen.
- Nov. 20 Pulled pumps to remove check valves and thaw out lines. Installed heating tape on tank line valve and meter.

Nov. 21 Started Wells 7, 8, 9 at 4 p.m. Ran until 4 p.m., November 22. Shut down to take out water meter (not working again - new meter).

Nov. 25 Meter repaired. Thanksgiving week - did not attempt to run due to cold and manpower shortage.

- 9 -

STS Project 12776-B

TABLE 2

## MEASURED PERCHLOROETHYLENE CONCENTRATIONS (PPM)

Sampling Date	5	E>	traction	Well 11	15	Stripper Influent	Stripper Effluent	Stripper Efficiency
10-3-85			144.0					
10-11-85	145.0	50.2			8.0			
10-30-85 <sup>1</sup>						4.6	0.3	93.5%
11-4-85 <sup>2</sup>						2.9	0.5	82.7%
11-8-85 <sup>3</sup>		11.0	5.6		0.1	6.2	0.6	90.3%
11-14-854			6.9	9.4		8.25	1.0	87.8%
11-22-85 <sup>6</sup>						5.8	0.7	87.9%
12-5-857	40.0	3.1	6.0		1.2			
<sup>1</sup> = Samples t	aken after	2 hours of p	oumping w	vells 12, 1	3, 14 and 1	15		

- 10

 $^2$  = Samples taken after 2 hours of pumping wells 11, 12, 13, 14, and 15

 $^3$  = Samples taken after 2 hours of pumping wells 10, 11, 13, 14 and 15

4 = Samples taken after 46 hours of pumping wells 10 and 11

<sup>5</sup> = Concentration not measured; value obtained by averaging concentrations measured in wells 10 and 11

 $^{6}$  = Samples taken after 16 hours of pumping wells 7, 8 and 9

<sup>7</sup> = Samples taken after 2-1/2 hours pumping wells 7 and 10.

- 11 -

samples gathered from those wells on December 5, 1985 show further decrease in concentration.

Airstripper influent and effluent samples were gathered on five occasions from late October to late November for perchloroethylene analysis. The influent concentrations ranged form 2.9 to 8.2 ppm, whereas effluent concentrations ranged from 0.3 to 1.0 ppm (Table 2). Airstripper efficiency calculated from the influent and effluent concentrations ranged from 82.7% to 93.5% and averaged 88.4%. Thus, an average of 88.4% of the perchloroethylene that is introduced into the airstripper is removed. The airstripper efficiency can be affected by many parameters such as influent concentration, temperature and humidity. More data is needed before trends or relationships between efficiency and associated parameters can be evaluated. However, at this point, it appears as if the airstripper is doing a more than adequate job. Efficiency may decrease with colder temperatures.

<u>Air Emissions</u> - Perchloroethylene emissions from the airstripper were calculated for the five dates that influent and effluent perchloroethylene concentrations were measured (Table 3). Perchloroethylene emission values in pounds per hour were obtained by multiplying 145 gallons per minute (auxiliary tank centrifugal pump pumping capacity) times 60 minutes times the measured influent perchloroethylene concentration in parts per million times 8.33 pounds per gallon times the calculated airstripper efficiency for that date. Perchloroethylene emissions ranged from 0.174 to 0.522 pounds per hour and averaged 0.357 pounds per hour. All of these values are much less than the maximum allowable perchloroethylene emission of 3 pounds per hour.

## TABLE 3

## PERCHLOROETHYLENE EMISSIONS FROM AIRSTRIPPER

Date	Actual Pounds/hour	Estimated Pounds/day
10-30-85	0.312	0.624
11-4-85	0.174	2.088
11-8-85	0.406	uncalculable *
11-14-85	0.522	7.308
11-22-85	0.369	5.904

 Variable pumping schedule; cannot calculate emission value from known data

ΙE	EMISS

Daily perchloroethylene emission was calculated by multiplying the pounds per hour value for that date by the amount of time the respective wells were pumped. These values are shown in Table 2 and they range from 0.624 to 7.308 pounds per day. These values and the average estimated pounds per day emission of 3.981 are much less than the maximum allowable limit of 15 pounds per day.

- 13 -

The extraction and airstripping system has been very successful in meeting the emissions requirements to date. It appears that the system could be pumped 24 hours per day without exceeding the daily 15 pounds per day limit. Water guality and pumping data on which all of the above calculations are based are included in Appendix B.

<u>Pumping Test</u> - On November, 8, 1985, a pumping test was conducted in well 11 to determine the radius of influence of the extraction wells. After steady state conditions were obtained, pumping wells 10 and 11 were shut off at 10:51 a.m. The wells recharged for approximately 1 hour before pump 11 was started again at 12:04 p.m. The pumping test results are presented in Table 4. Please refer to Figure 1 for the locations of the monitored wells.

Generally, the data show that after pumping well 11 had started, pumping well 10 was affected, pumping well 8 was affected very little, and pumping wells 5 and 2 were unaffected. A possible explanation for the increase in water levels after 39 minutes is gravity drainage in the water table aquifer. That is, after drawdown, the water in the unsaturated zone drained due to gravity and caused the water level to rise. The important aspect of the pumping test is that only wells 10 and 8 were affected by the pumping of well 11. Thus, we can assume that there is a well developed overlap in the cone of depressions between the extraction wells when pumping but yet the radius of influence is not so

## TABLE 4

PUMPING TEST WATER LEVEL SUMMARY, NOVEMBER 8, 1985

Time	Water	Well 11	The second se	ell 10		ell 8	the second secon	ell 5		ell 2
(min.)	Level	Elevation	Water Level	Elevation	Water Level	Elevation	Water Level	Elevation	Water Level	Elevation
01	20.8	1182.7	17.70	1185.4						
11	18.33	1185.17	17.5	1185.6						
16	18.1	1185.4	17.42	1185.68						
25	18.0	1185.5	17.42	1185.68						
38	17.96	1185.54	17.37	1185.73	16.25	1185.55	17.5	1185.7	13.9	1185.6
63	17.75	1185.75	17.25	1185.85	16.1	1185.7	17.4	1185.8	13.8	1185.7
0 <sup>2</sup>										
6	21.17	1182.33	17.37	1185.73	16.17	1185.63	17.58	1185.62	14.0	1185.5
11	21.25	1182.25	17.5	1185.60	16.42	1185.38	17.5	1185.7	13.92	1185.58
20	21.33	1182.17	17.54	1185.56		,				
39	21.42	1182.08	17.29	1185.81	16.33	1185.47	17.58	1185.62	13.83	1185.67

- 14 -

<sup>1</sup> = After steady state conditions were obtained, pumps 10 and 11 were shut off at 10:51 a.m. <sup>2</sup> = Pump 11 was started at 12:04 p.m.

Note: Water levels are measured in feet below top of casing and elevations are feet above mean sea level.

great that any of the wells should be eliminated. Water level data sheets for the pumping test and other water level measurements taken throughout October and November are included in Appendix B.

- 15 -

- 16 -

#### CONCLUSIONS AND RECOMMENDATIONS

The startup performance record for the extraction and treatment system at Wausau Chemical is quite good. Operations really have only been troubled by normal startup and freezing weather. The extraction and treatment system was not planned to operate in freezing weather. To date, approximately 800,000 gallons of water of have been collected and treated. The quality has been improved approximately 90% at pumping wells (7, 8, 9, 10, 11, 12, 13, 14 and 15). At unpumped wells within the radius of influence of these wells improvement is on the order of 70%. These conclusions are born out by test results tabulated below.

#### Perchloroethlyene Analysis

Well #	Startup Quality (ppm)	December 8 Quality (ppm)	Percent Cleanup
5	145.0	40.0	72%
7	50.2	3.1	94%
10	144.0	6.0	96%
15	8.0	1.25	848

#### Air Stripper Efficiency

Based upon tested influent and effluent water quality to the air stripper, it appears that 88% perchloroethlyene is removed on the average. From the data, it appears that cold temperatures will lower the efficiency.

#### Air Emissions

Based on influent and effluent concentration to the stripper, it appears that the emissions are in compliance with a maximum of 3 pounds per hour, 15 pounds per day standards. The

- 17 -

maximum recorded air discharge was 0.5 pounds per hour perchloroethlyene. For total volatile organic carbon compounds we expect that the above discharge values would increase approximately 20% to 30%.

Based on the above information, it appears that no exceedances of the air emissions standard have occurred.

### Pumping Field Influence

Based upon water levels recorded on November 8 during pumping of Well 11, specific capacities on the order of 10 gallons per minute per foot of drawdown were obtained. This pumping test also indicated that the radius of influence of a single pumping well may be on the order 20 to 40 feet. Based on this data, overlapping cones of depression occurred during simultaneous pumping of the well cluster.

#### Recommendations

The extraction and treatment design was not developed to operate in freezing conditions. Based upon this condition and the upcoming winter weather, we recommend that operations be <u>postponed until spring</u>. Any prolonged warm periods may allow startup providing the system can be reactivated without great difficulty. We recommend that check valves in each of the wells be removed to reduce freezing problems. However, check valve removal may cause reverse rotation of the motor windings which is discouraged by most manufacturers.

Periodic pumping of sand was observed during startup pumping of most wells. We recommend that the sand level in the auxiliary tank be monitored periodically so that sand levels do not rise above the auxiliary tank outlet.

- 18 -

During the initial operation, all wells were operated simultaneously with switching controlled by the lowest yield well. During the later stages of extraction from a given cluster, we recommend that each well be independently switched by the automatic flow control.

Considering the higher concentrations of perchloroethlyene encountered during startup for the program, we recommend that pumping activities be restricted to 12 hours per day until the concentration of influent water can be lowered to a suitable level allowing 24 hour operations. We recommend that the monitoring program be revised to collect the following data.

- 1. Influent and effluent samples should be taken simultaneously a few hours after startup of each well cluster and daily thereafter. Chemical analyses will be used to calculate the stripper efficiency and to determine compliance with air discharge limitations. The results of later stages of cluster pumping also will be used to determine whether or not pumps can be moved to the next cluster based on stabilization of the effluent water quality.
- To determine when pumps may be moved to a new cluster, we suggest that all individual wells be sampled before moving the pumps to identify stabilization water quality in the individual well.
- 3. Monitoring well B-3B should be sampled when the well cluster includes any of extraction wells 1, 2, 3, 4, 5, or 6 which will be within the zone of influence of the B-3B monitoring well.
- 4. When higher concentrations are encountered in the stripper effluent, we suggest weekly sampling of the Wausau wastewater treatment plant effluent. The effluent sample should be obtained in conjunction with high flow and high concentrations of the effluent from the stripper.

5. Groundwater elevations should be measured in all extraction and monitoring wells in the vicinity of the tank farm on a semi-weekly basis during pumping.

- 19 -

## - 20 -

## GENERAL QUALIFICATIONS

The analysis and recommendations submitted in this report are based on data obtained by Wausau Chemical. Our interpretation and recommendations are limited to the available data.

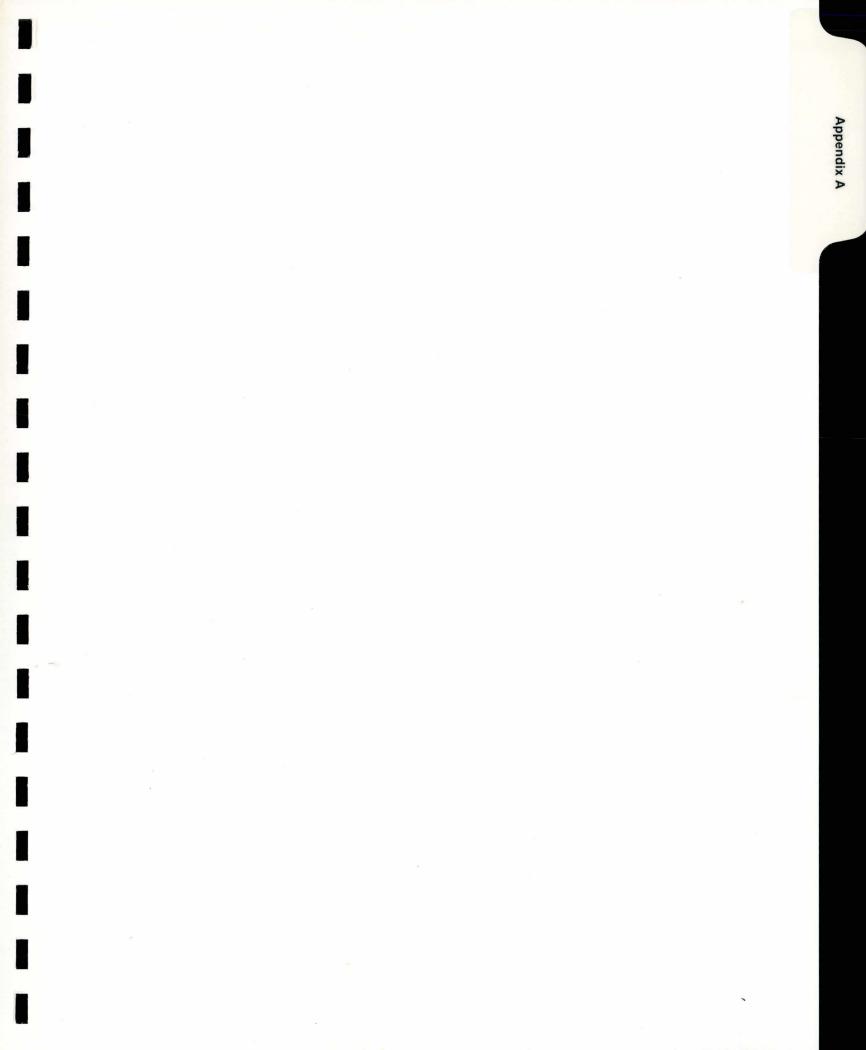
## APPENDICES

#### APPENDIX A

- Procedures Regarding Field Logs, Laboratory Data Sheets and Samples
- 2. Penetration Testing Procedure
- 3. General Notes
- 4. Unified Soil Classification System Chart
- 5. Soil Boring Logs
- 6. Extraction Well Installation Diagrams

### APPENDIX B

1. Chronological Water Quality, Water Level and Pumping Data



## PROCEDURES REGARDING FIELD LOGS,

### LABORATORY DATA SHEETS AND SAMPLES

In the process of obtaining and testing samples and preparing the report, procedures are followed that represent reasonable and accepted practice in the field of soil and foundation engineering.

Specifically, field logs are prepared during performance of the drilling and sampling operations which are intended to portray essentially field occurrences, sampling locations and other information.

Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by more experienced soils engineers, and differences between the field logs and the final logs exist.

The Engineer preparing the report reviews the field and laboratory logs, classifications and test data, and in his judgement in interpreting this data, may make further changes.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty (60) days and are then destroyed unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are no longer representative of the moisture conditions initially encountered, an inspection of these samples could recognize this factor.

It is common practice in the soil and foundation engineering profession that field logs and laboratory test data sheets not be included in engineering reports, because they do not represent the engineer's final opinion as to the appropriate descriptions for conditions encountered in the exploration and testing work. On the other hand, we are aware that perhaps certain contractors and subcontractors submitting bids or proposals on work might have an interest in studying these documents before submitting a bid or proposal. For this reason, the field logs will be retained in our office for inspection by all contractors submitting a bid or proposal. We would welcome the opportunity to explain any changes that have and typically are made in the preparation of our final reports, to the contractor or sub-contractors, before the firm submits its bid or proposal, and to describe how the information was obtained to the extent the contractor or subcontractor wishes. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

## PENETRATION TESTING PROCEDURE

The penetration testing procedure essentially followed ASTM Specification D 1586-67, "Standard Method for Penetration Tests and Split-Barrel Sampling of Soils". Briefly, the sampling procedure involved driving a 2-inch OD standard sampler 18 inches with a 140-pound hammer freefalling a distance of 30 inches. The number of blows required to drive the sampler the final foot was recorded as the Standard "N" Penetration. This N-value is used by Soils Engineers to estimate the strength and compressibility of the soil. After driving, the sampler was returned to the surface and opened. The length of sample (recovery) was measured and the soil was preliminarily classified according to type by a Soils Technician. A representative portion of each sample was then sealed in a glass jar, labeled, and returned to our laboratory for further examination and testing.

#### **GENERAL NOTES**

OS

HS

#### DRILLING & SAMPLING SYMBOLS:

- : Split Spoon 1 3/8" I.D., 2" O.D., unless SS
- otherwise noted
- Shelby Tube 2" O.D., unless otherwise noted ST : PA : Power Auger
- DB : Diamond Bit - NX: BX: AX
- AS Auger Sample
- æ Jar Sample
- VS Vane Shear

- Osterberg Sampler 3" Shelby Tube Hollow Stem Auger :
- WS Wash Sample
- FT Fish Tail : : **Rock Bit**
- RB BS **Bulk Sample**
- PM . Pressuremeter test - in situ

- Standard "N" Penetration:

Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch OD split spoon, except where noted.

#### WATER LEVEL MEASUREMENT SYMBOLS:

- WL Water Levei
- WCI : Wet Cave In
- DCI : Dry Cave In WS
- : While Sampling WD :
- While Drilling
- BCR: **Before Casing Removal** ACR: After Casing Removal
- AB : After Boring

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days observation, and additional evidence of ground water elevations must be sought.

#### **GRADATION DESCRIPTION & TERMINOLOGY:**

Coarse Grained or Granular Scils have more than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays or clayey silts if they are cohesive, and silts if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency, and their plasticity.

Major Component Of Sample	Size Range	Descriptive Term(s) (Of Components Also Present in Sample)	Percent of Dry Weight
Boulders	Over 8 in. (200mm)	Trace	1 – 9
Cobbles	8 in. to 3 in. (200mm to 75mm)	Little	10 - 19
Gravel	3 in. to #4 sieve (75mm to 2mm)	Some	20 - 34
Sand	#4 to #200 sieve (2mm to .074mm)	And	35 - 50
Silt	Passing # 200 sieve (0.074mm to 0.005mm)		

Smaller than 0.005mm

CONSISTENCY OF COHESIVE SOILS:

Clay

#### **RELATIVE DENSITY OF GRANULAR SOILS:**

Unconfined Comp. Strength, Qu, tsf	Consistency	N - Blows/ft.	Relative Density
< 0.25	Very Soft	0 – 3	Very Loose
0.25 - 0.49	Soft	4 – 9	Loose
0.50 - 0.99	Medium (Firm)	10 - 29	Medium Dense
1.00 - 1.99	Stiff	30 - 49	Dense
2.00 - 3.99	Very Stiff	50 - 80	Very Dense
4.00 - 8.00	Hard	80+	Extremely Dense
>8.00	Very Hard		,

# UNIFIED SOIL CLASSIFICATION SYSTEM

				oup	<u> </u>					
	sjor divis	ions		bols	Typical names	Laboratory classification criteria				
	raction Size	Clean gravels (Little or no fines)		w	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_{U} = \frac{D_{60}}{D_{10}} \text{ greater than 4; } C_{c} = \frac{(D_{30})^{2}}{D_{10} \times D_{60}} \text{ between 1 and 3}$				
6	(More than half of material is <i>smaller</i> than No. 200 sieve) (More than half of material is <i>larger</i> than No. 200 sieve size) Sands (More than half of coarse fraction (More than half of coarse fraction Silts and clays Silts and clays (and clays Silts and clays Silts and clays Silts and clays (More than No. 4 sieve size)	Cle.	G	;Р	Poorly graded gravels, gravel- sand mixtures, little or no fines	Not meeting all gradation requirements for GW				
200 sieve siz	Gi Gi arger than N	Gravels with fines (Appreciable amount of fines)	GМ	d u	Silty gravels, gravel-sand-silt mixtures	$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} D_{0} \\ D_{10} \end{array} \end{array} \\ \begin{array}{c} C_{U} = \frac{D_{00}}{D_{10}} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} $				
srained soils er than No.	W)	Gravels (Apprecia	G	с	Clayey gravels, gravel-sand-clay mixtures	Above "A" line with P.1 between 4 and 7 are bor derline cases requiring us of dual symbols $D_{10} = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3				
Coarse- Starial is <i>lar</i> g	action size)	Clean sands (Little or no fines)	SI	w	Well-graded sands, gravelly sands, little or no fines	$ \begin{array}{cccc}                                  $				
n half of m	nds of coarse fr No. 4 sieve		SI	P	Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW				
(More tha	Se re than haif maller than	Sands with fines (Appreciable amount of fines)	SM	d u	Silty sands, sand-silt mixtures	Atterberg limits below "A" Limits plotting in hatched zone with P.I. between 4 and 7 are borderline case requiring use of dual sym bols.				
	(Mo is s	Sands w (Apprecial of fi	S	c	Clayey sands, sand-clay mix- tures	a       0       %       c       b       zone       with P.1. between 4         a       and 7       are       borderline       case         c       c       c       c       c       case         c       c       c       c       c       case         c       c       c       c       case       requiring use of dual sym         c       c       c       c       case       case       requiring use of dual sym         c       c       c       c       case       case       case       case         c       c       c       c       case       case       case       case       case         c       c       c       c       case       case       case       case       case         c       c       c       case       case <t< td=""></t<>				
	ş	1an 50)	MI	L .	Inorganic silts and very fine sands, rock flour, silty or clay- ey fine sands or clayey silts with slight plasticity					
<u></u> 30	material is <i>smaller</i> than No. 200 sieve) (More than half of material is <i>larger</i> than No. 200 sieve size) Clays Silts and clays (More than half of coarse fraction (More than half of coarse fraction (More than No. 4 sieve size)	d limit less ti	CL diun		Inorganic clays of low to me- dium plasticity, gravelly clays, sandy clays, silty clays, lean clays	For classification of fine-grained soils and fine fraction of coarse- grained soils. Atterberg Limits plotting in hatched area are borderline classi- CH				
oils <i>ller</i> than No.		(Liqui	oı	-	Organic silts and organic silty clays of low plasticity	40 symbols.				
Fin <del>e-gr</del> ained soils naterial is <i>smaller</i> :	s	ir than 50)	Mł	-	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	x         Equation of A-line:           PI=0.73 (LL - 20)           30           20				
	Silts and clay	l limit greate	СН		Inorganic clays of high plas- ticity, fat clays					
(More tha		(Liqui	он	•	Organic clays of medium to high plasticity, organic silts	4         CL-ML         ML and OL           0         10         20         30         40         50         60         70         80         90         100				
	Highly organic	soils	Pt		Peat and other highly organic soils	Liquid Limit Plasticity Chart				

C.	3		(	OWNER Wausau Chemical (	Corporation	LOG OI B-1	FBOR	ING N	UMBE	R				
			F	PROJECT NAME		ARCHIT	FECT-	ENG	INEER					
TS Cons	ultan	ts Lt	d.	Extraction Progra	m at Wausau Chemical									
ITE LO	CAT	ION								ONFINED	COMPRES	SIVE STRE	NGTH	
				Wausau, Wisconsir					1	2		3		5
		NCE							PLAST LIMIT		CONT	ATER TENT %	LIC	DUID
ELEVATION	SAMPLE TYPE	SAMPLE DISTANCE	٨		DESCRIPTION OF MATERIAL			UNIT DRY WT. LBS./FT <sup>3</sup>	10		) 3	10		∕∆ 50
ELEVATI	PIF	PLE	RECOVERY					E DR		STANDA	RD		+	+
	NAC	SAN	REC	SURFACE ELEVATION	1196.50			- NN	10			0 4	BLOWS /	г <b>г</b> . 50
5	1 S	s		No sampling								~	⊗45	
15				Brown medium to co of silt (approxime	oarse sand (SP) with gra ately 1 to 3%) - dense f	avel - trace to very dense								
	2 S	s	Щ					a						
0-0-														/
	3 S:	s											8	
2 <del>5</del>	1 S:	s	Ш								Ð	$\bigotimes^{3}$	8	
				End of Boring Boring advanced us To install 4" wel 24' long 6" cas Revert	sing solid-stem auger , 6" hole was drilled b sing and using roller bi	by pounding in t and mixed								
													~	
		Т	HE ST	RATIFICATION LINES REPRES	ENT THE APPROXIMATE BOUNDARY LI	NES BETWEEN SOIL TYPE	S. IN SITU	J, THE T	RANSITION	MAY B	E GRADU	JAL.		
∟ 1.0-	11.5	5' W	S		BORING STARTED 10-15-8	5	STS O	FFICE	540 L Green	ambea Bay	WI	54303		
L			BO	CR ACR	BORING COMPLETED 10-15-	85	DRAW	N BY	JJT	SHE	ET NO.	1	OF	1
					RIG CME 45 FOREMAN		APP'D		MG		JOB NO		776-B	

I

CD OWNER Waysau C						BORING NUMBER												
	5		Wausau Chemical Corpor PROJECT NAME		orporation						-ENGINEER							
STS Col	= nsult	ants	Ltd		Extraction Progra	m at Wausau Chen	nical			Gin								
SITE L	.00/	ATIC	N		-			1		ю	UNCON TONS/	FINED COMPR	ESSIVE STR	ENGTH				
					Wausau, Wisconsin						1	2	3	4	5			
			ш								PLASTIC	, , co	WATER	Li				
N		ш	ANC		SURFACE ELEVATION	DESCRIPTION OF M	ATERIAL		2		×-		•		$\Delta$			
DEPTH ELEVATION	NO.	TYPI	DIST	≿					۲W ۲	-	10	20	30	40	50			
DEPTH ELEVAT	SAMPLE NO.	SAMPLE TYPE	APLE	OVEF		*			UNIT DRY WT.	200	Ø	STANDARD PENETRATION	-	+	+			
$\triangleleft$	SAN	SAN	SAN	REC	SURFACE ELEVATION	196.6			NN		10	20	30	BLOWS	50			
					No sampling													
	-																	
5																		
10																		
	1	SS	T	Щ	Brown silty fine t	o coarse sand (	SM) with gravel	- moist	-				829		+			
				1	medium dense		, , , , , , , , , , , , , , , , , , ,						7					
			-	+						+			1		-			
15				$\mathbb{H}$									24					
	2	SS	Щ	Щ	Brown medium to co	arse sand (SP) w	vith gravel - m	oist -					⊗34					
					dense													
20																		
	3	SS		Π									\$	6				
		33	щ	-									1					
25-			_															
6.5	4	SS		Ш								<i>¥</i> :		⊗41				
					End of Boring		-								T			
					Boring advanced us	ing solid-stem a	uger											
					To install 4" well 24' long 6" cas	, 6" hole was dr ing and using ro	olled by pound oller bit and m	ing in ixed										
					Revert													
;																		
									1									
			-	E ST	RATIFICATION LINES REPRES		OUNDARY LINES BETWE	EN SOIL TYPES		-		MAY BE GRA	DUAL.		_			
vl 10-	-11.	5' 1	WS			BORING STARTED	ARTED 10-14-85 STS			E G	reen	Bay WI	II 54303					
VL				B	CR ACR	BORING COMPLETED	10-15-85		DRAWN BY	۲ J	JT	SHEET NO	D. 1	OF	1			
VL						RIG CME 45	FOREMAN JW		APP'D BY	M	G	STS JOB	NO. 127	76-B				
3-1183	-						UN			ľ	u l		141	10-B	-			

-

PROJUCT NAME Distriction Program at Mausau Chemical         ARCHITECT – ENGINEER           STB COALTION TO ELCOALTION Wousau, Misconsin         Image: Construction of the construc	63	1	OWNER Wausau Chemical (	Corporation	LOG OF	BORING	NUMBE	3		
BTO SOMULATE LOC         Extraction Program at Mausau Chemical           STEE LOCATION         Mausau, Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Miscons in         Image: Miscons in         Image: Miscons in         Image: Miscons in           Image: Mis		Ī	PROJECT NAME			CT-FNG	INFER			
Mausau, Misconsin         DESCRIPTION OF MATERIAL.         DESCRIPTION OF MATERIAL.           90 40 50         500 40	STS Consultants			um at Wausau Chemical						
Hussilv         Missons in         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material         Image: Construction of Material         Image: Construction of Material         Image: Construction of Material           Image: Construction of Material Material         Image: Construction of Material         Image: Construction of Material	SITE LOCATI	ION	5				O- UNCO	NFINED COMPRI	SSIVE STRE	NGTH
No         Sampling         DESCRIPTION OF MATERIAL         TO         TO <thto< th=""> <thto< th="">         TO         <t< td=""><td></td><td></td><td>Wausau, Wisconsir</td><td>1</td><td></td><td></td><td>1</td><td></td><td></td><td></td></t<></thto<></thto<>			Wausau, Wisconsir	1			1			
No         Sampling         DESCRIPTION OF MATERIAL         TO         TO <thto< th=""> <thto< th="">         TO         <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>PLAST</td><td>ic .</td><td>WATER</td><td>LIQUID</td></t<></thto<></thto<>							PLAST	ic .	WATER	LIQUID
1         SS         II         Srown medium to coarse sand (SP) with gravel - moist - medium dense to dense         III         SS         III         Srown medium to coarse sand (SP) with gravel - moist - medium dense to dense         IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	-	NCE						% со	NTENT %	
1         SS         II         Srown medium to coarse sand (SP) with gravel - moist - medium dense to dense         III         SS         III         Srown medium to coarse sand (SP) with gravel - moist - medium dense to dense         IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	4 VPE	IST A		DESCRIPTION OF MATERIAL		WT.	2.0	20	30 4	
1         SS         II         Srown medium to coarse sand (SP) with gravel - moist - medium dense to dense         III         SS         III         Srown medium to coarse sand (SP) with gravel - moist - medium dense to dense         IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	EPTI LEV/	VER/				DRY S./F			+	+ +
1         SS         II         Srown medium to coarse sand (SP) with gravel - moist - medium dense to dense         III         SS         III         Srown medium to coarse sand (SP) with gravel - moist - medium dense to dense         IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SAMF	SAMF	SURFACE ELEVATION	1196.9		LB				
In         In<		0, 1					10	20	30 4	
In         In<										
1       SS       Brown medium to coarse sand (SP) with gravel - moist - medium dense to dense         26       3       SS       Brown medium to coarse sand (SP) with gravel - moist - medium dense to dense         28       3       SS       SS       SS         28       4       SS       SS       SS       SS         29       3       SS       SS       SS       SS         29       3       SS       SS       SS       SS         20       3       SS       SS       SS       SS         29       3       SS       SS       SS       SS         29       3       SS       SS       SS       SS         20       3       SS       SS       SS       SS         20       3       SS       SS       SS       SS         20       3       SS       SS       SS       SS       SS         20       3       SS       SS       SS       SS       SS         21       SS       SS       SS       SS       SS       SS         22       SS       SS       SS       SS       SS       SS         23			No sampling			B-3         ARCHITECT-ENGINEER         Image: Standard of the standard of t				
1       SS       Image: SS       Image	5									
1       SS       Image: SS       Image										
1       SS       Image: SS       Image										
1       SS       Image: SS       Image										
Prown medium to coarse sand (SP) with gravel - moist -         16       2         2       55         3       55         26       5         26       5         3       55         10       End of Boring Boring advanced using solid-stem auger To install 4' well, 6'' hole was drilled by pounding in 24'' Revert         11       26         12       50''         11       9''         11       9''         10       9''         10       100, 6''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''         10       10, 10''	10									
15       2       SS       1         20       3       SS       1         25       4       SS       1         26       6       4       SS       1         26       6       4       SS       1         26       7       10 ng, 6° casing and using roller bit and mixed       33°         8       8       10 ng, 6° casing and using roller bit and mixed       1         9       1       10 ng, 6° casing and using roller bit and mixed       1         9       1       10 ng, 6° casing and using roller bit and mixed       1         9       1       10 ng, 6° casing and using roller bit and mixed       1         9       1       10 ng, 6° casing and using roller bit and mixed       1         9       1       1       1       1         10       1       10 ng, 6° casing and using roller bit and mixed       1         10       1       1       1       1         10       1       1	1 SS	S						8	28	
15       2       SS       1         20       3       SS       1         25       4       SS       1         26       6       4       SS       1         26       6       4       SS       1         26       7       10 ng, 6° casing and using roller bit and mixed       33°         8       8       10 ng, 6° casing and using roller bit and mixed       1         9       1       10 ng, 6° casing and using roller bit and mixed       1         9       1       10 ng, 6° casing and using roller bit and mixed       1         9       1       10 ng, 6° casing and using roller bit and mixed       1         9       1       10 ng, 6° casing and using roller bit and mixed       1         9       1       1       1       1         10       1       10 ng, 6° casing and using roller bit and mixed       1         10       1       1       1       1         10       1       1			Brown medium to co	barse sand (SP) with gra	vel - moist -					
2       SS			medium dense to de	ense						
2       3       SS       1         20       3       SS       1         25       4       SS       1         26.5       4       SS       1         26.5       4       SS       1         27       101, 6" casing advanced using solid-stem auger Boring advanced using solid-stem auger Revert       1       1         1       1       101, 6" casing and using roller bit and mixed Revert       1       1         THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN STUL THE TRANSITION MAY BE GRADUAL.         THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN STUL THE TRANSITION MAY BE GRADUAL.         WL 10-15' ND         BORING STARTED       10-14-85       STS OFFICE       540 Lambeau         WL       BOR A CR       BORING COMPLETED 10-14-85       DRAWN BY JJT       SHEET NO. 1       OF       1	15	-								
3       SS       43         25       4       SS         26-5       4       SS         Boring advanced using solid-stem auger       To install 4" well, 6" hole was drilled by pounding in 24' long, 6" casing and using roller bit and mixed         Revert       Revert         Image: the structure of the	2 SS	S H	<b>x</b> 7.	£	Т.			Q	\$ 29	
3       SS       43         25       4       SS         26-5       4       SS         Boring advanced using solid-stem auger       To install 4" well, 6" hole was drilled by pounding in 24' long, 6" casing and using roller bit and mixed         Revert       Revert         Image: the structure of the									$\backslash$	
3       SS       43         25       4       SS         26-5       4       SS         Boring advanced using solid-stem auger       To install 4" well, 6" hole was drilled by pounding in 24' long, 6" casing and using roller bit and mixed         Revert       Revert         Image: the structure of the						-				
25       4       SS       S3         26-5       4       SS       S3         80 ring advanced using solid-stem auger To install 4' well, 6" hole was drilled by pounding in 24' long, 6" casing and using roller bit and mixed Revert       S3         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: Stratification Lines Represent The APPROXIMATE BOUNDARY Lines Between Soil TYPES. IN SITU. The TRANSITION MAY BE GRADUAL         Image: S										X 43
26-5       4       SS       Image: SS<	3 55									
26-5       4       SS       Image: SS<										
26-5       4       SS       Image: SS<	25					1.				
End of Boring Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pounding in 24' long, 6" casing and using roller bit and mixed Revert       Image: Comparison of the second state of the second st	1 66								34	
The STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN SITU, THE TRANSITION MAY BE GRADUAL.         WL       BOR       ACR       BORING COMPLETED 10-14-85       STS OFFICE       540 Lambeau Green       Green       Bay WI       54303         WL       BOR       ACR       BORING COMPLETED 10-14-85       DRAWN BY       J.J.T       SHEET NO.       1       OF       1		-	-						× ×	
To install 4" well, 6" hole was drilled by pounding in 24' long, 6" casing and using roller bit and mixed Revert       Image: Comparison of the stand mixed of the stand mixed of the standard of the	·		End of Boring	ing colid stom augon						
WL       BCR       A CR       BORING COMPLETED 10-14-85       DRAWN BY       JJT       SHEET NO. 1       OF       1			To install 4" well	ing         dium to coarse sand (SP) with gravel - moist -         ense to dense         oring         dvanced using solid-stem auger         114" well, 6" hole was drilled by pounding in         ong, 6" casing and using roller bit and mixed         t						
WL       BCR       ACR       BORING STARTED       10-14-85       STS OFFICE       540 Lambeau Green Bay WI       54303			24' long, 6" ca Revert	sing and using roller b	it and mixed					
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1										
WL     10-15' WD     BORING STARTED     10-14-85     STS OFFICE     540 Lambeau Green     Started       WL     BCR     ACR     BORING COMPLETED     10-14-85     DRAWN BY     JJT     SHEET NO.     0F     1			>							
WL     BCR     ACR     BORING COMPLETED 10-14-85     STS OFFICE     Green     Bay     WI     54303		THE ST	RATIFICATION LINES REPRES	ENT THE APPROXIMATE BOUNDARY LIN	ES BETWEEN SOIL TYPES.	IN SITU, THE T			DUAL.	
JJT SHEELKO. 1 OF 1	wl 10-15' W	WD		BORING STARTED 10-14-85	5	STS OFFICE			54303	
	WL	BO	CR ACR	BORING COMPLETED 10-14-85	5 [	DRAWN BY		SHEET NO	1	OF ]
CME 45 CHEMAN JW MG STSTOP NO. 12776 P	WL _:3-1183			RIG CME 45 FOREMAN	JW	APP'D BY	MG	STS JOB N	0.	6-B

.

G	7	]		1	D <b>WNER</b> Wausau Chemical C	orporation		LOG OF B B-4	ORING	NUM	BER				
PROJECT NAME		ARCHITECT				SINE	ER	÷.							
STS Con	- nsulta	ants	Ltd		Extraction Progra	m at Wausau Chemi	ical								
SITE L	OCA	ATIC	N							6	UNCONFINE TONS/FT	D COMPRES	SIVE STRE	NGTH	
					Wausau, Wisconsin				_		1	2	3	4	5
											PLASTIC	CON	ATER TENT %	LIC	
~			SAMPLE DISTANCE				TEDIAL				×		•		-~
TIO	9	YPE	IST/			DESCRIPTION OF MA	TERIAL	,	La V		0.000	20 3	30 4	40 5	50
DEPTH ELEVATION	SAMPLE NO	SAMPLE TYPE	E	VERY		£			l Unit dry wt. Lbs./Ft³			-	+	+	+
	AMP	AMP	AMP	Э Ш	SURFACE ELEVATION 11	199.8							10	BLOWS /	
$\sim$	00	S	S	-					+		10	20 3	30 4	40 9	50
					No sampling										
-															
5				÷											
10															
10	1	SS	П	щ	Fill: grayish brow gravel - moist - m	n silty fine to	coarse sand	(SM) - some				& <sup>23</sup>			+
		55	Щ		gravel - moist - m	edium dense			·			×,			+
15			× .		Brown medium to co	arse sand (SP) a	nd gravel -	moist -		9					
	2	SS	П	Щ	medium dense to de	inse								45	
	-		Щ	-											
20		1										/			
	3	SS	TT	Щ							×	6			
	-		щ	-							Ĩ				
25											1				
6.5	4	SS	Π	Щ							\$ 10				
	-		Ч	+											+
					End of Boring	ing colid star a									
					Boring advanced us To install 4" well	, 6" hole was dr	illed by pou	nding in							
_					26' long, 6" ca Revert	sing and using r	oller bit an	d mixed				-			
					Reverc										
					¥										
			ТН	E S	RATIFICATION LINES REPRES	ENT THE APPROXIMATE BO	UNDARY LINES BET	NEEN SOIL TYPES. IN	N SITU, THE	TRANS	ITION MAY	BE GRAD	UAL.	I	_
	w∟ 10-15' WD				BORING STARTED	10 <b>-9</b> -85	S	TS OFFICI		0 Lamb een Ba		5/30	3	_	
wL 10	0-15	), M	0					1		u	een Da	y ni	5450.		
WL 1(	0-15	5. M		в	CR ACR	BORING COMPLETED	10-8-85	D	RAWN BY			HEET NO.	9	OF	

R	17			1	OWNER Wausau Chemical Corporation	LO	B-5	RING	NUMBE	R			
	6			F	PROJECT NAME	AR	CHITECT	-ENG				-	
STS Co	► nsul	tants	Ltd		Extraction Program at Wausau Chemical			2110					
SITE				1				<b></b>	O- UNC	ONFINE	D COMPRESS	VE STREN	GTH
			4 K R		Wausau, Wisconsin				1 TON:		2 3	4	5
								1	+		++		+
		ŀ	CE		•				PLAS	%	CONTE	NT %	LIQU
NO		L M	SAMPLE DISTANCE		DESCRIPTION OF MATERIAL	-9		Е.	×		•		
DEPTH ELEVATION	NO	TYF	DIS	₹				V W	10	2	20 30	4(	) 50
DEPTH ELEVAT	SAMPLE NO.	SAMPLE TYPE	APLE	OVE	SURFACE ELEVATION 1199.8			UNIT DRY WT. LBS./FT <sup>3</sup>	Ŕ		ARD	1	BLOWS / F
$\triangleleft$	SAN	SAN	SAN	REC	SURFACE ELEVATION 1199.8			N N	10		20 30	4(	
<u> </u>				T									
	1												
					No sampling								
-5-													
	1	-											
											1		
10													
10	-1	SS		$\Pi^{+}$	Fill: brown fine to coarse sand (SP) -	some gravel	-		3		┼──┼		
	<u> </u>	- 33	Щ	Щ	moist - loose	Some graver			× ×				
										1			
											$\searrow$		
15					Brown medium to coarse sand (SP) with g	gravel - mois	t -						14
	2	SS			medium dense to dense								$\otimes$
				1									
					1						/		
20-													
	3	SS							8	"			
				щ					Ĩ				
-25													
26.5	4	SS		Π			a)		\$	10			
20.5				4					Ť				
					End of Boring								
					Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled 26' long, 6" casing and using roller	by pounding	in						
					26' long, 6" casing and using roller	bit and mix	ed						
-					Revert								
		à											
												9 <b>0</b>	
				E ST	TRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY	LINES BETWEEN SO	DIL TYPES. IN S	ITU, THE				AL.	
WL .	10-1	5' V	VD		BORING STARTED 10-8-	85	STS	OFFICE	540 l Green		eau y WI	54303	
VVL													
WL				B	CR ACR BORING COMPLETED 10-9	-85	DRA	WN BY	JJT		EET NO. S JOB NO.		OF

<b>R</b> R	OWNER Wausau Chemical (	Corporation	LOG OF B-	BORING	NUM	BER			
	PROJECT NAME			ECT-EN	GINE	R			
TS Consultants Ltd.	Extraction Progra	am at Wausau Chemical							
ITE LOCATION	•				6	UNCONFINE	ED COMPRES	SIVE STREN	GTH
	Wausau, Wisconsin	,P				1	2	3 4	5
щ					Ľ	LASTIC	CON	ATER TENT %	LIQUID
0. STAN	SURFACE ELEVATION 1	DESCRIPTION OF MATERIA	L	NT.		<b>X</b>	20 3	• 30 40	
SAMPLE NO. SAMPLE TYPE SAMPLE DISTAL	VENT			DRY	1.'F	+	+	30 40 +	0 50
SAMF SAMF	SURFACE ELEVATION 1	196.50		UNIT DRY WT.	<u>۳</u>	STAN PENE		30 40	<b>blows</b> / ft. ) 50
						T			1
	No sampling								
5									
	×								
10									
1 SS	1								
	Ц								· ×
	Brown fine to coa	rse sand (SP) with gra	avel - moist -						
15	medium dense to v	ery dense	inorse						
2 SS	Т			-				1	
20								/	
3 SS 1	I						278		
	- 1						1/		
	1								
25						/			
6.5 4 SS						13 Ø			
	1 N .	÷ <sup>4</sup>							-
	End of Boring Boring advanced up	sing solid-stem auger							
	To install 4" well	sing solid-stem auger I, 6" hole was drilled asing and using rolled	by pounding in						
	Revert	asing and using roller	r bit and mixed						
	STRATIFICATION LINES REPRES	ENT THE APPROXIMATE BOUNDAR		T	54	) Lamb	eau		
"L 10-15' WS	<b>BOD</b>		4-85	STS OFF	ce Gro	een Ba	y WI	54303	
L	BCR ACR	BORING COMPLETED 10-1		DRAWN E			HEET NO.		OF ]
/L		RIG CME 45 FOREM	an jw	APP'D BY	MG	ST	S JOB NO	<sup>0.</sup> 12776	C D

G	2			0	OWNER Wausau Chemical C	orporation		<b>OF BO</b> B-7	RING	NUMB	ER			
		1		F	PROJECT NAME		ARCH	HITECT	-ENG	INEEF	7			
STS Cons	sulta	ants	Ltd.		Extraction Progra	m at Wausau Chemical								
SITE LC	DCA	TIC	N							O H	CONFINE NS/FT	D COMPRES	SIVE STREN	атн
					Wausau, Wisconsin						1	2	3 4	5
										PLA	ISTIC	w	ATER	LIQUI
			NCE									CON	TENT %	LIMIT
LION		TYPE	STAI			DESCRIPTION OF MATERIAL		,	M.		x	20 3	30 40	
ELEVATION	SAMPLE NO	E H	SAMPLE DISTANCE	ERV					UNIT DRY WT. LBS./FT <sup>3</sup>	ļ'	t		30 4( +	) 50
	MPL	SAMPLE .	MPL	20		1100 60			LBS			RATION		BLOWS / FT
	SA	SA	SA	ᇣ	SURFACE ELEVATION	1199.60			5	1	0	20 3	0 40	50
										1 a.				
					No sampling							•		
5														
10														
	T	SS	$\Pi^{\dagger}$	ΠŤ	Fill; grayish, brow	n silty fine sand (SM) -	- trace grave	el -		Q1/6"				
	A	55	щ	Щ	moist - very loose	)				× 1/6"				
					Fill: brown fine t	co medium sand (SM-SP) -	little grave	- 1-		$\left  \right\rangle$				
1.5					trace silt - loose	2	Jere gran							
15	-		$\mathbf{T}$	П		а 8				16				
	2	SS	Ш	Щ						Q				
	1	-	1	1							1			
					Brown medium to co	parse sand (SP) and grav	/el - moist -	-						
20	_		+	-	medium dense to de	ense							22	
	3	SS											$\otimes^{32}$	
												1		
25														
	-										/	-		
7.5	4	SS									⊗24			
					End of Boring									
					Boring advanced us	ing solid-stem auger , 6" hole was drilled by	, nounding in							
					26' long, 6" ca	sing and using roller bi	it and mixed	l I						
					Revert									
										а.				
														8
			тн	EST	TRATIFICATION LINES REPRES	ENT THE APPROXIMATE BOUNDARY LIN	ES BETWEEN SOIL T	YPES. IN S	ITU, THE	TRANSITI	ON MAY	BE GRAD	UAL.	
/L 10-	-15	5' W	S			BORING STARTED 10-3-85	;	STS	OFFICE	540 Gree	Lambe an Bay	eau / WT	54303	
/L				в	CR ACR	BORING COMPLETED 10-8-85		DRA	WN BY	JJT	1	EET NO.		OF ·
VL						50551411		APF	D BY		ST	S JOB NO	). 1277f	
						CME 45 FOREMAN	JW			MG	+		12776	i-B

BL:3-1183

R	2	]		0	OWNER Wausau Chemical (	Corporation		LOG OF	BORING	NUME	ER				
		ų.		F	PROJECT NAME			ARCHIT	ECT-EN	GINEE	R				
STS Co	⊨ nsuli	ants	Lto	1.	Extraction Progra	m at Wausau Chemi	cal			A161 C.895					
SITE L	00	ATIC	N							P H	NCONFINE	D COMPRES	SIVE STR	ENGTH	
					Wausau, Wisconsin	í					1	2	3	4	5
										PL	ASTIC WIT %		ATER TENT %	LK	QUID
No.			NCE		SURFACE ELEVATION 1							CON	TENT %	LIN	IIT %
DEPTH ELEVATION	NO.	γPE	ISTA			DESCRIPTION OF MAT	TERIAL		UNIT DRY WT.		<b>X</b>	20 3	30	40	Z\ 50
DEPTH ELEVAI	LEN	SAMPLE TYPE	ED	<b>ERV</b>					DRY		+	+	+	+	+
	SAMPLE	AMP	AMPI	COV						Ě		RATION		BLOWS	/ FT.
X	S	S	S	æ	SUNTAGE ELEVATION	199.5					10	20 3	30	40	50
					No sampling										
5													1.1		
						8									
10			π					-		2					+
	1	SS	Ш	Щ	Fill: grayish brow	wn silty fine sand	(SM) - trace	gravel	_	$\bigotimes^2$					
					moist - very loos	e to loose	() 01400	3. 2. 2.							
16															
15			Π							5					
	2	SS	Ш	Щ						\$					
										· · ·				+	┢
					Brown silty fine	to coarse sand (SM	1) and gravel	- moist	-						
20					medium dense							21			
	3	SS	Ш	_								Ø		-	
					. W							ľ			
					Brown medium to co	barse sand (SP) an	d gravel - mo	ist -		1	1	1			t
25			П	щ	medium dense	· · ·				~		8			
26.5	4	SS	Ш	_	an and a start of the second						$\otimes$				
					End of Boring Boring advanced us	sing solid-stem au	Iger								
					To install 4" well	l, 6" hole was dri asing and using ro	lled by pound	ing in							
					Revert	ising and using ro	iner bit and i	inixed						1	
												×			
														a.,	
					,										
													-		
				3											
			TH	IE S	TRATIFICATION LINES REPRES	ENT THE APPROXIMATE BOU	NDARY LINES BETWEE	N SOIL TYPES	3. IN SITU, TH				UAL.		
vl 1	0-1	5' W	ID			BORING STARTED	10-10-85		STS OFFIC		Lambe en Bay	eau / WI	54303	3	
VL				В	CR ACR	BORING COMPLETED	10-10-85		DRAWN B	′ ЈЈТ	зн	EET NO.	1	OF	1
NL						RIG CME 45	DREMAN JW		APP'D BY	MG	ST	S JOB NO	<sup>D.</sup> 1277		

R	3				DWNER Wausau Chemical Corporation	LOG OF B-	г <b>вон</b> .9	ling	NUMB	ER				
		Y		F	PROJECT NAME	ARCHIT	ECT-	-ENG	INEE	२				
STS Co					Extraction Program at Wausau Chemical									
SITE L	.0C	ΑΤΙΟ	DN						С ų	CONFINE	D COMPRE	SSIVE STR	ENGTH	
				<b>_</b>	Wausau, Wisconsin					1 <del> </del>	2	3	4	5
			E						PL Lik	STIC	CON	ATER	LH	OU
Ň		ш ш	LANC		DESCRIPTION OF MATERIAL		ĺ	<u> </u>		×		<b>•</b>		-2
DEPTH Elevation	NO.	TγP	DIS	ž				ΓΥ ΈΓ		0	20	30	40	5(
DEPTH ELEVAT	SAMPLE NO.	MPLE	MPLE	<u>S</u>	DESCRIPTION OF MATERIAL SURFACE ELEVATION 1196.2			UNIT DRY WT. LBS./FT <sup>3</sup>		STAN	DARD	1	BLOWS	+
$\triangleleft$	SA	SAI	SAI	Ë	SURFACE ELEVATION 1196.2			5				30		50
														-
					No sampling								Ì	
-5				ŀ										
-10												1		
	1	SS		_	······································		+					<u>†</u>	<u> </u>	+
				۲	Brown medium to coarse sand (SP) and grave	el - trace sili	t							
					(approximately 1 to 3%) - moist			i	-					
15														
	2	SS												
				ľ							- ·			
-20	-		$\mathbf{T}$	-										
	3	SS	Щ	_										
							Ì							
-25												1		
26.5	4	SS	Π				1							
				╈	· · · · · · · · · · · · · · · · · · ·						+		·	┢
					End of Boring Boring advanced using solid-stem auger									
·					To install 4" well, 6" hole was drilled by 24' long, 6" casing and using roller b	pounding in	1							ļ
					Revert	it and mixed								
									i			ĺ		
]												1		
												ľ		1
													ŀ	
											<u> </u>		L	L
WL ]	0_10	5'W		_ 31	RATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LIN		T		540	Lambe	eau			
	-1:	J W			BORING STARTED 10-13-8		┼──		Gree	en Bay	/ WI			
WL				B(	CR ACR BORING COMPLETED 10-13-8	55 	DRAW	VN BY	JJT	_	EET NO.		OF	
WL					RIG CME 45 FOREMAN	JW	APP	BY	MG	ST	S JOB N	0		

			OWNER Wausau Chemical (	Corporation	LOG O	F BORING	NUN	BER				
5	4		PROJECT NAME	X		TECT-EN	GINF	ER				
S Consu	Itants L	.td.	Extraction Progra	um at Wausau Chemical								
TE LOC	ATIO	N					6	UNCON	FINED CON	PRESSIVE STR	ENGTH	
			Wausau, Wisconsir	l				1	2	3	4	5
								PLASTIC	1	WATER CONTENT %	- I	IQUID WIT %
	LOI	NCH								CONTENT %		
D.	PE /	SIA	8	DESCRIPTION OF MATERIAL		L N S		<b>X-</b>	20	20		<b>∼</b>
ELEVATION MPLE NO.		ERV				AFT /				30	40	50
ELEVATIO	MPI	COV	SURFACE ELEVATION 1	199.8		UNIT DRY WT.		$\bigotimes p$		DN .	BLOWS	/ FT.
S I	IS I	N H	SURFACE ELEVATION I	199.0		5	-	10	20	30	40	50
			No sampling									
5												
								7				
0				· · · · · · · · · · · · · · · · · · ·								
1	SS	ΙШ	Fill: brown fine	to coarse sand (SP) - some	gravel -			&		~		
_			little dark brown	buried topsoil - moist -	loose							
											-	
5 2							+				+	
	SS		Fill: brown fine very dense	to coarse sand (SP) and gra	avel – moist	-						
- 3	SS	╦╋	very dense									1
							+	+			+	1/
9			Brown medium to co	oarse sand (SP) some grave	– moist –							
4	SS		dense	( , , , , , , , , , , , , , , , , , , ,	<i>i</i> .						Ø	6
5		┱╢╌┥								1	12	
5 5	SS			-					-	6	\$	
_												
			End of Boring Boring advanced us	sing solid-stem auger								
_			To install 4" well	, 6" hole was drilled by p	ounding in							
			26' long, 6" ca Revert	ising and using roller bit	and mixed							
							V					
						2						
							<u> </u>					
		THE S	TRATIFICATION LINES REPRES	ENT THE APPROXIMATE BOUNDARY LINES	BETWEEN SOIL TYP	ES. IN SITU, THI						
10-1	5' WD	)		BORING STARTED 10-2-85		STS OFFIC			mbeau Bay V	VI 5430	3	
		В	CR ACR	BORING COMPLETED 10-2-85		DRAWN BY			SHEET		OF	1
4				BIG SOBELLAN		APP'D BY			STS			
1192				RIG CME 45 FOREMAN JI	1		M	; [	313 30	в NO. 127	76-B	

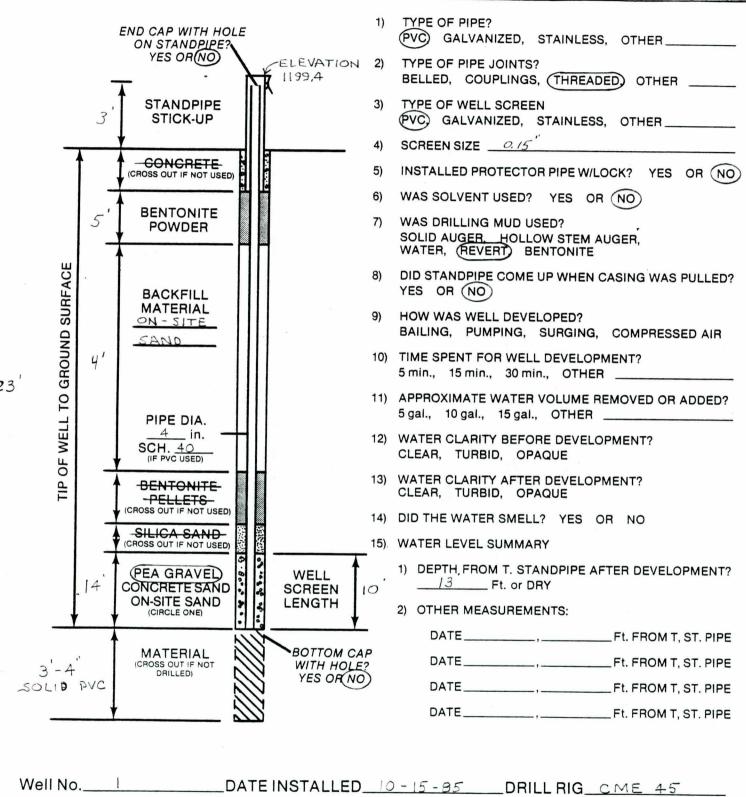
R	2			1	O <b>WNER</b> Wausau Chemical C	orporation		DF BORIN	IG I	NUMBI	ER			
	0	<b>I</b>		F	PROJECT NAME		ARCHI	ITECT-E	NG	INEEF				
STS Co				Ι.	Extraction Progra	m at Wausau Chemical								
SITE L	LOC	ATIC	DN								CONFINED	COMPRESSIVE	STRENGTH	
					Wausau, Wisconsin							2 3	4	5
					*					PLA	STIC	CONTENT	* LI	
7			ANCE								<			~
H ATIOI	NO.	LYPE	1SIC			DESCRIPTION OF MATERIAL		TW	:13	1		20 30	40	50
DEPTH ELEVATION	SAMPLE	SAMPLE TYPE	PLE	VER	SURFACE ELEVATION			DRY	LBS./FT <sup>3</sup>	6		+		+
	SAM	SAM	SAM	RECC	SURFACE ELEVATION	200.1			LE	1	STAND PENET	RATION 10 30	BLOWS	/ FT 50
<u> </u>													40	T
					No sampling									
5	я.													
												-		
_														
10			-	+ +		• •								1
	1	SS			Fill: brown silty gravel - moist -	fine sand (SM) - trace	roots - trace			8 <sup>5</sup>				
					graver - moist -	oose								
									_					
15	_			Н						2				
	2	SS		Щ	Brown fine to coa	se sand (SP) and grave	- trace silt			Q				
					(approximately 1 t	to 3%) - moist - very lo	ose to medium							
20					dense						$\backslash$			
20				П							/	22		
	3	SS	Ш	Щ								8		
												/		
25 -											1			
	4	SS	П	П							2.7			
6.5	-		Щ	+							8			+
					End of Boring									
					Boring advanced us	ing solid-stem auger				_				
					26' long, 6" ca	, 6" hole was drilled t sing and using roller t	oit and mixed							
					Revert	S State Stat								
	-													
			τŀ	IE S	TRATIFICATION LINES REPRES	ENT THE APPROXIMATE BOUNDARY LI	NES BETWEEN SOIL TY	PES. IN SITU,	THE .	TRANSITIO	ON MAY	BE GRADUAL		<u></u>
VL						BORING STARTED 10-12-8	5	STS OF	FICE		Lambe n Bav	au WI 54	303	-
VL				в	CR ACR	BORING COMPLETED 10-13-	85	DRAWN	BY	JJT		EET NO. 1	OF	-
VL						210	1998 - 1998 - 1998 - 1998 - 1998 - 1999 - 19	APP'D B	Y		STS	JOB NO.		-
3-1183						CME 45	JW			MG	1 313	1 1	2776-B	

67	]		OWNER Wausau Chemical	Corporation	LOG OF B-1	BORING	NUM	BER			
	ų.		PROJECT NAME	-	ARCHITE	CT-ENG	INE	ER			
STS Consult	ants L	.td.	Extraction Progra	am at Wausau Chemical							
SITE LOC	ATIO	N					6	UNCONFI	NED COMPRES	SIVE STREN	тн
			Wausau, Wisconsi	1				1	2	3 4	5
	÷							PLASTIC	, w	ATER TENT %	LIQUID
		SAMPLE DISTANCE							CON	TENT %	LIMIT %
DEPTH ELEVATION APLE NO.	ЪЕ	STAN		DESCRIPTION OF MATERIAL		UNIT DRY WT. LBS./FT <sup>3</sup>		X			^
DEPTH ELEVAT APLE NO	1					RY V		10	20 3	30 40	50
ELEVATI SAMPLE NO	SAMPLE TYPE	UPL NPL				IT D		ST.	ANDARD	1 1	BLOWS / FT.
SAI	SAI	SAL	SURFACE ELEVATION	1196.5		NN		10		40	
			No sampling								
-5											
5											
10		_			the second s						
1	SS		Fill: brown siltv	fine to medium sand (S	M) and gravel -					& <sup>33</sup>	
			trace topsoil - m	oist - medium dense							
5											
2	SS	Т	8 .	а <sup>14</sup>							Ø
2	22	Щ					-			<u>├</u>	
			Brown medium to c	oarse sand (SP) and gra	vel - moist -						
			dense to very den	se							
0-											
3	SS					1 5				37	
		-									
			×								
									~		
5	SS		-			2				⊗36	
.5 4	33	4								8	
			End of Boring			×					
			Boring advanced u	sing solid-stem auger							
			To install 4" wel	l, 6" hole was drilled asing and using roller	by pounding in						
			Revert	asing and using rotter	bit and mixed						
									~		
		THE	STRATIFICATION LINES REPRE	SENT THE APPROXIMATE BOUNDARY L	INES BETWEEN SOIL TYPES.	IN SITU, THE				UAL.	
L 10-1	5' WS	S		BORING STARTED 10-13-	85	STS OFFICE		40 Lam reen E	nbeau Bay WI	54303	
L	_		BCR ACR			DRAWN BY	J	JT	SHEET NO.	1	OF
/L			÷	RIG CME 45 FOREMAL	N JW	APP'D BY	м	G	STS JOB N	o. 12776	5-B
3-1183					and the second se						

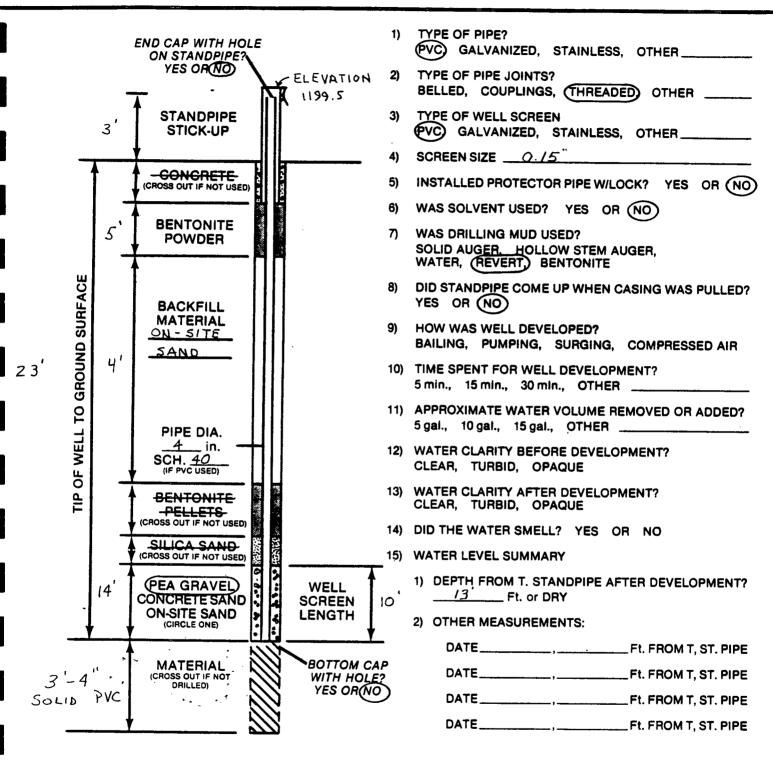
R	12			OWNER Wausau Chemical	Corporation	LOG OF B B-13	URING	NOWB	CK				
	6			PROJECT NAME		ARCHITEC			3	- House and the			a.
STS Co	⊾ nsu!	tante			am at Wausau Chemical								
SITE L								Ю- <u>и</u>	CONFINE	COMPRES	SIVE STRE	NGTH	
				Wausau, Wisconsi	n			то	ns/ft <sup>1</sup>	2	3		5
							-		+		+	<del> </del>	
			ы	SURFACE ELEVATION					IT %	CON	ATER	LIQ	UID T %
NC		ш	LAN		DESCRIPTION OF MATERIAL				×	4			2
DEPTH ELEVATION	NO.	TYP	DIS				FT <sup>3</sup>	1	0 2	20 3	80 4	0 5	0
DEPTH ELEVAT	PLE	PLE	PLE				DR 3S./	×	STAND				
	SAMPLE NO.	SAMPLE TYPE	BECC	SURFACE ELEVATION	1196.6		UNIT DRY WT. LBS./FT <sup>3</sup>				0 4	BLOWS / I	
													0
				No sampling									
				1									
5											- 40		
10													
10			$\mathbf{n}$										_
	1	SS	Щ	1									
				Brown medium to c	coarse sand (SP) and gra	vel - moist -							
				medium dense to v	very dense								/
15			-l-										/
	2	SS										846	
							>			/	-		
20			-						130				
	3	SS	Iμ						Ø <sup>13</sup>				
25									13				
26.5	4	SS						2	8	5			
						-							
				End of Boring	using colid stom suger								
				To install 4" wel	using solid-stem auger 11, 6" hole was drilled b	y pounding in	÷.,						
				25' long, 6" c Revert	casing and using roller b	oit and mixed	1.1						
				Revert									
				*									
												-	
										-			
					8								
	-												
_													
				-									
			THE	STRATIFICATION LINES REPRE	SENT THE APPROXIMATE BOUNDARY LI	NES BETWEEN SOIL TYPES. II	N SITU, THE	_			UAL.		
wl 1	0-1	5' W	D	Å	BORING STARTED 10-10-	85 s	TS OFFICE		Lambe en Bay	eau / WI	54303	3	
WL			I	BCR ACR	BORING COMPLETED 10-10-	85 D	RAWN BY	JJT		EET NO.	1	OF	1
WL					RIG CME 45 FOREMAN		PP'D BY		ere	JOB NO			1
1:3-1183					CME 45	JW		MG	1 318	JUB NC	. 1277	6-B	

R	R				<b>)WNER</b> Wausau Chemical C	orporation		BORING	A NUME	BER				
	0	4		P	ROJECT NAME			ECT-EN	GINEE	R	••••••			-
STS Co	⊨ nsult	ants	Ltd.		Extraction Progra	m at Wausau Chemical								
SITE L	00/	ATIC	N						P #	NCONFINE	D COMPRES			
				-	Wausau, Wisconsin	· · · · · · · · · · · · · · · · · · ·			-	1	2	3	4	5
			ш						PL	ASTIC MIT %	CONT	ATER		iQi Mi
N		ш	ANC			DESCRIPTION OF MATERIAL				×		<b>-</b>		1
DEPTH ELEVATION	NO.	SAMPLE TYPE	SAMPLE DISTANCE	2				UNIT DRY WT.	<u>,</u>	10	20 3	30 4	40 9	5
DEPTH ELEVAT	SAMPLE NO.	APLE	APLE	OVE	SURFACE ELEVATION 1			IT DR	RS.		DARD	1	BLOWS /	+
$\times$	SAI	SAN	SAN		SURFACE ELEVATION 1	196.3		N				10 4		5
					No sampling									
-					no samping					×				
- 5														
10														
	1	SS		Щ										T
					Brown medium to co medium dense to ve	barse sand (SP) and gravel -	moist -							
						•							/	1
15	2	SS	$\Pi$	П				-					43	
	_		Щ	-									Ø <sup>43</sup>	
-20												×		
	3	SS	T	П						813				
											o 1			
		_				e - 1	e							
25	_			п						12				
26.5	4	SS	Щ	-						8				+
					End of Boring									
					Boring advanced us	ing solid-stem auger , 6" hole was drilled by pou								
					8' long, 6" cas	, 6" hole was drilled by pou sing and using roller bit and	nding in mixed							
					Revert	×								
												a.		
											- %			
												-		
			тн	E ST	RATIFICATION LINES REPRES	ENT THE APPROXIMATE BOUNDARY LINES BET	WEEN SOIL TYPE	S. IN SITU, TH	E TRANSI	ION MAY	BE GRAD	UAL.		1
WL						BORING STARTED 10-10-85		STS OFFI		Lambe en Bay	au / WI	54303		-
				BC	CR ACR	BORING COMPLETED 10-10-85		DRAWN B	3. 1. 1.		EET NO.		OF	-
WL														

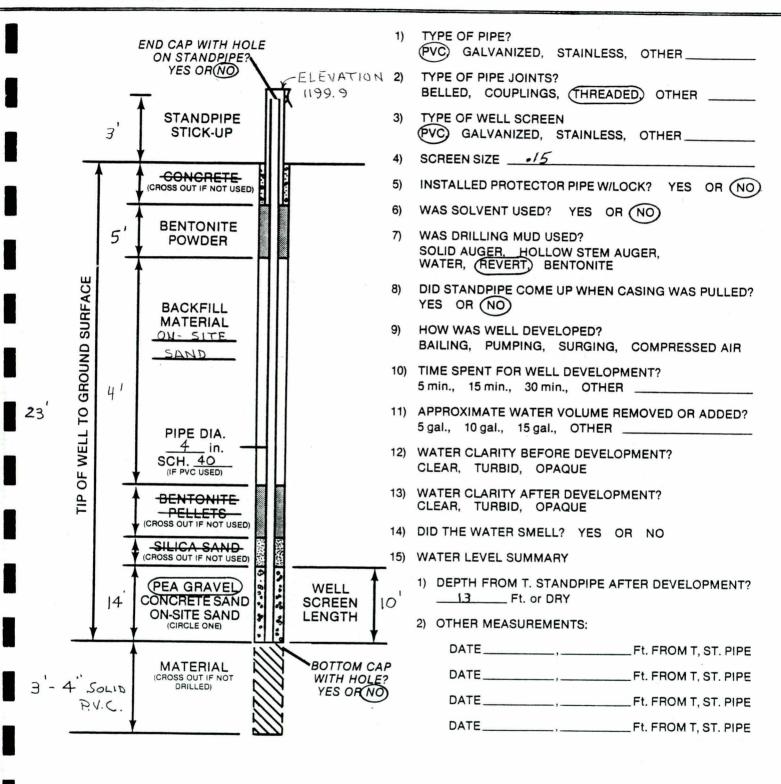
					OWNER Wausau Chemical Corporation	LOG O	-15	ING	NUME	BER				
				Ī	PROJECT NAME	ARCHI		-ENG	INEE	R				
STS Co				1.	Extraction Program at Wausau Chemical			1.4						
SITE	-00	ATIC	NC		-				С ų	NCONFINE	ED COMPRE	ESSIVE STR	ENGTH	
			T		Wausau, Wisconsin					1	2	3	4	5
	- 5								PL	ASTIC MIT %		WATER NTENT %		IQU MIT
z			ANCE		DESCRIPTION OF MATERIAL					x		<b></b>		-^
DEPTH ELEVATION	NO.	TYPE	DIST	7	DESCRIPTION OF MATERIAL			Y WT FT <sup>3</sup>		10	20	30	40	50
DEPTH ELEVAT	SAMPLE NO.	SAMPLE TYPE	IPLE	OVER				UNIT DRY WT. LBS./FT <sup>3</sup>		STAN	DARD		-+	+
$\times$	SAN	SAN	SAN	REC	SURFACE ELEVATION 1196.2			INN				30	BLOW:	50
														Τ
					No sampling									
5														
					x									
10														
10	1	SS	IT									27		-
	1	22	Ш								Ø			
					Brown silty fine to coarse sand (SP) and grave	1 - trace								
15					silt (approximately 1 to 3%) - moist - medium dense	aense to								
	2	SS		Π									>	
			Щ	-										
												V		
20											1	1		
	3	SS		Π							\$24			
25				-										
25				111				- 1			11		1	1
	4	SS		Щ						(	\$20			
	4	SS			End of Boring						820			
	4	SS			End of Boring Boring advanced using solid-stem auger						\$ <sup>20</sup>			
	4	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	4	SS			Boring advanced using solid-stem auger	nding in mixed					\$20			
	4	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	-	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	-	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					\$20			
	-	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					\$20			
	-	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	4	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	-	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	4	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	4	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	4	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	4	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	nding in mixed					820			
	4	SS			Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and Revert	mixed	ES. IN SIT	U, THE 1	FANSITI		8	DUAL		
26.5	4		ТН		Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and	mixed	1	U, THE T	540	ION MAY Lambe	BE GRAC			
26.5	-		ТН	IE ST	Boring advanced using solid-stem auger To install 4" well, 6" hole was drilled by pour 5' long, 6" casing and using roller bit and Revert RATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETW	mixed	1	FFICE	540	Lambe	BE GRAC	54303	0F	



DRILLER JOHN WRIT	DRILL CREW	DAVID WONCH	_
JOB/CLIENT	CHEMICAL	STS JOB No12776 - B	_

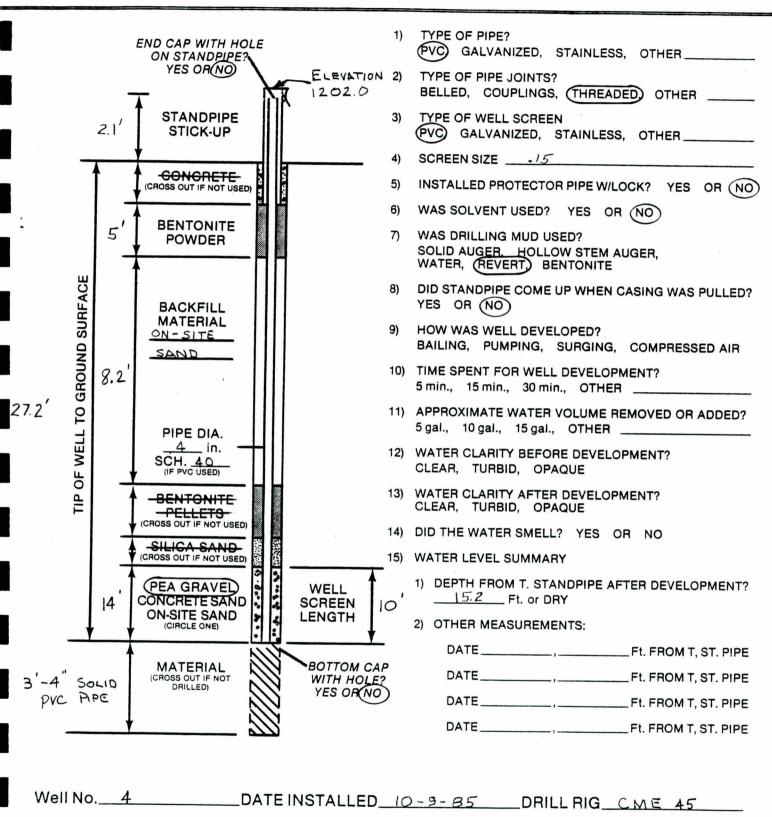


Well No. 2DATE INSTALLED	10-15-85 DRILL RIG CME 45	_
DRILLER JOHN WRIGHT DRILLO	REW DAVID WONCH-	_
JOB/CLIENT WAUSAU CHEMICAL	STS JOB No. <u>12776 - B</u>	-



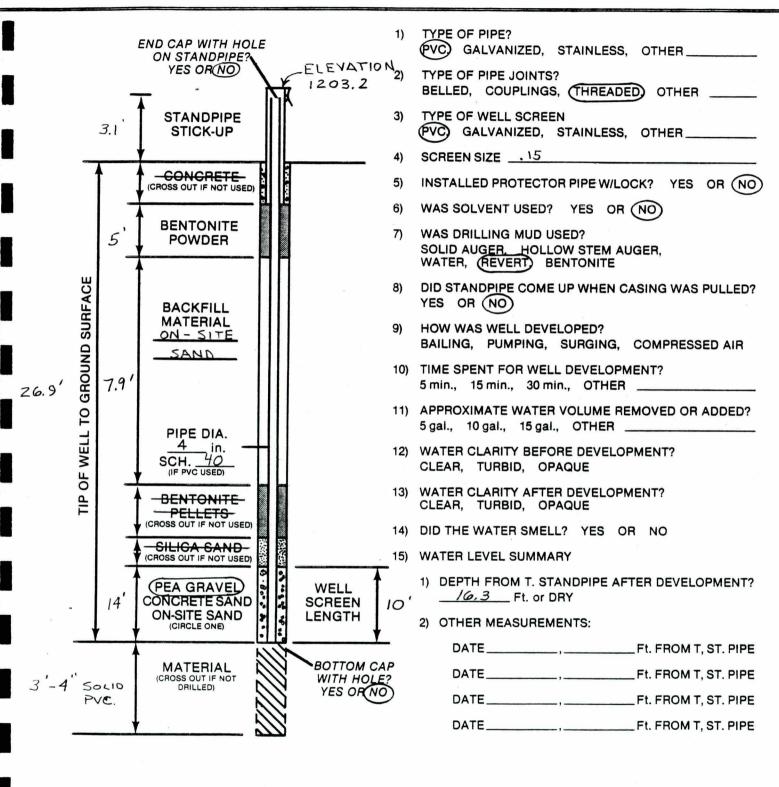
Well No. <u>3</u>	DATE INSTALLED 10-14-85 DRILL RIG CME 45
DRILLER JOHN	WRIGHT DRILL CREW DAVID WONCH
JOB/CLIENT	USAU CHEMICAL STSJOBNO. 12776-B

#### FIELD WELL INSTALLATION DIAGRAM



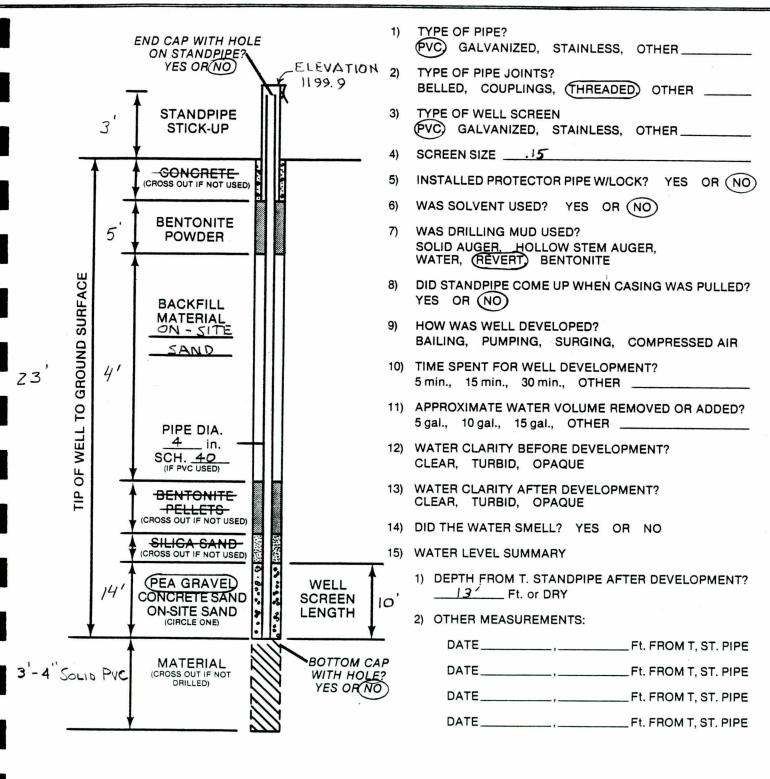
DRILLER JOHN WRIGHT DRILL CREW DAVID WONCH

JOB/CLIENT WAUSAU CHEMICAL STSJOB NO. 12776 - B

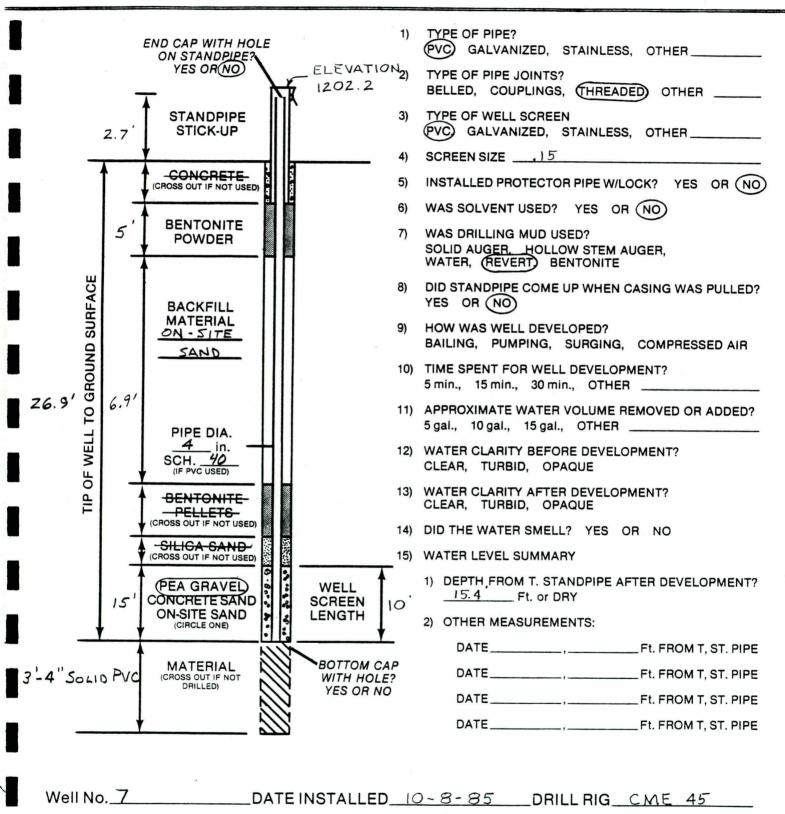


Well NoDATE	INSTALLED 10-9-85 DRILL RIG CME 45	
DRILLER JOHN WRIGHT	DRILL CREW DAVID WONCH	
JOB/CLIENT <u>WAUSAU</u> CHEN FW: 1-983	STS JOB NO. 12776 - B	

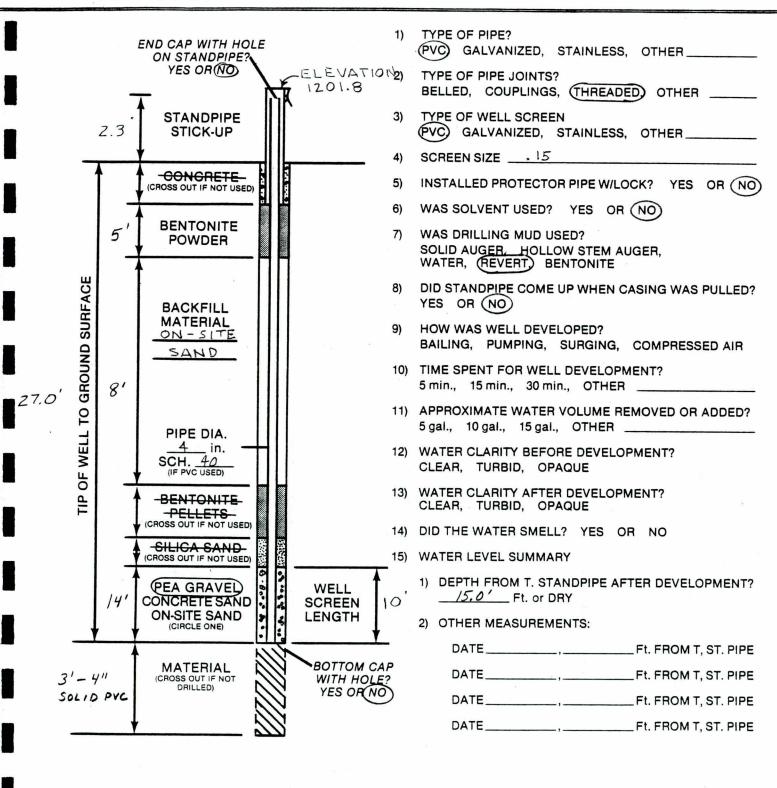




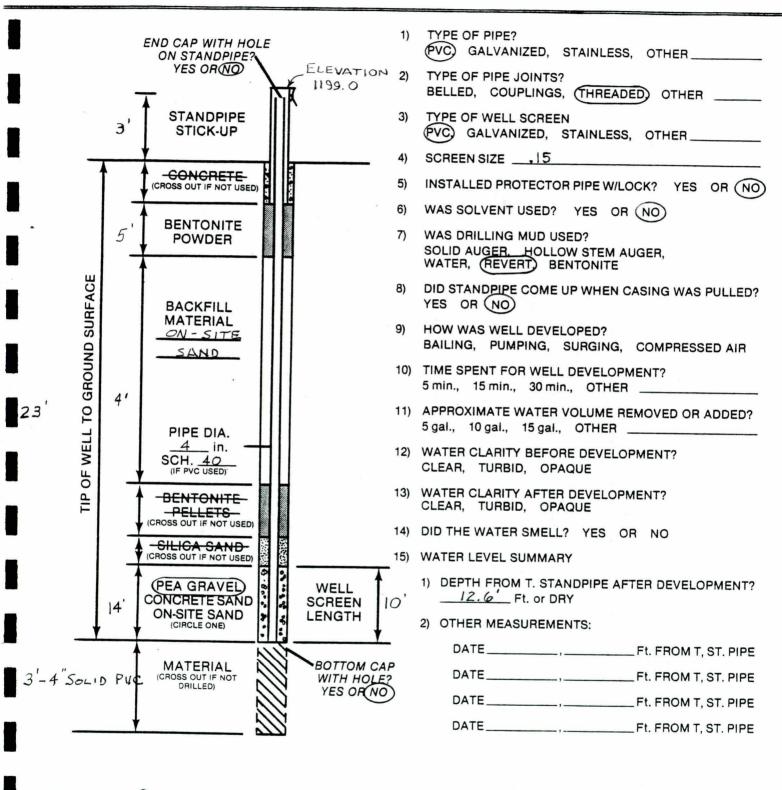
Well No. 6 DATE INSTALLED 1	<u>0 - 14 - 85</u> DRILL RIG <u>CME 45</u>
DRILLER JOHN WRIGHT DRILL CRI	EW DAVID WONCH
JOB/CLIENT <u>NAUSAU CHEMICAL</u> FW: 1-983	STS JOB No2766 - B



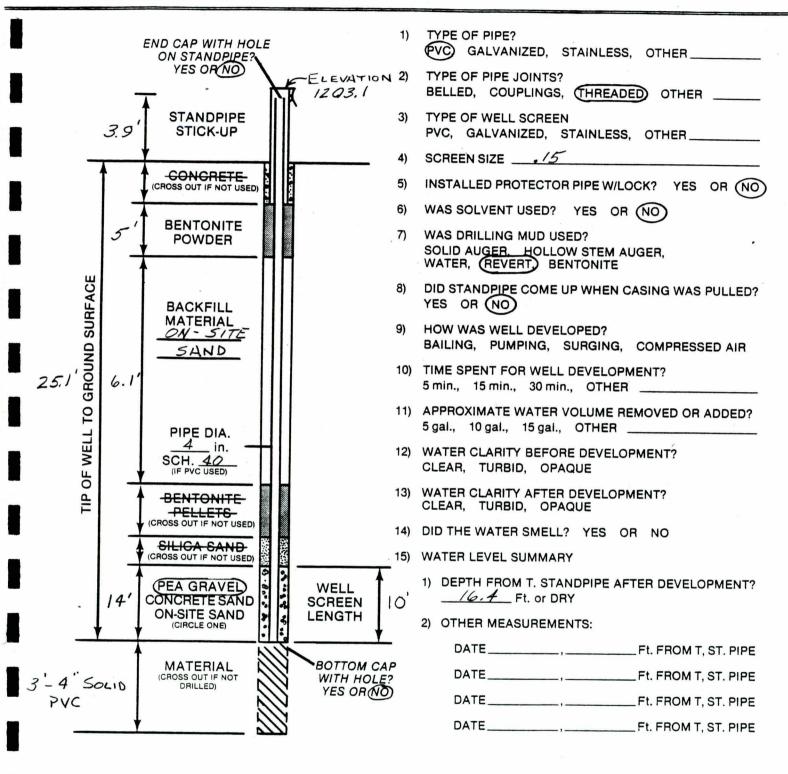
DRILLER JOHN WRIGHT DRILL CREW	DAVID WONCH
JOB/CLIENT WAUSAU CHENNICAL	STS JOB NO12776 - B



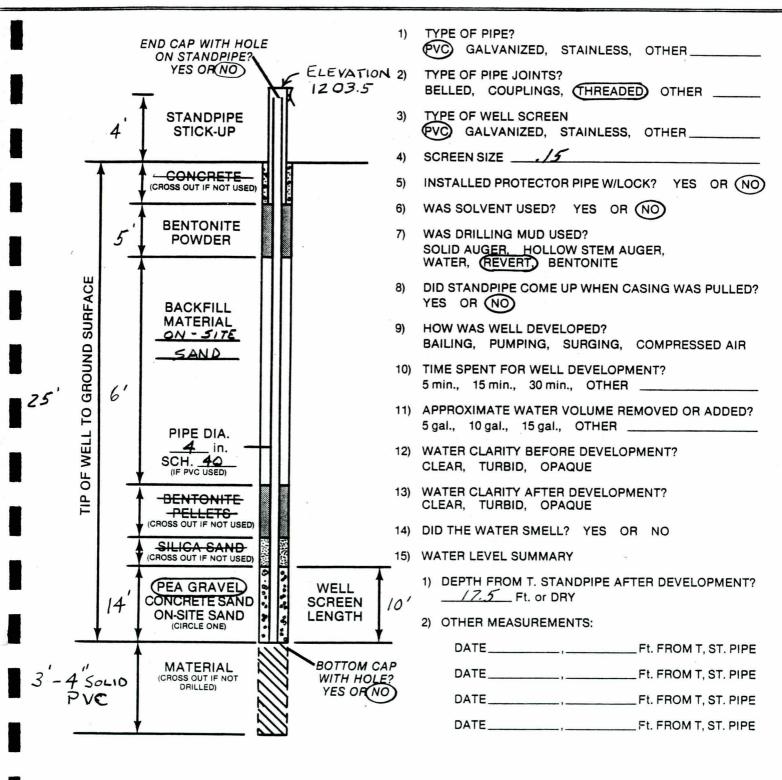
Well No	DATE INSTALLED_10 - 1	10-85 DRILL RIG CMIE 45	
DRILLER JOHN	NRIGHT DRILL CREW	DAVID WONCH	
JOB/CLIENT <u>Wausa</u> FW: 1-983	U CHEMICAL	STS JOB NO. 12776 - B	



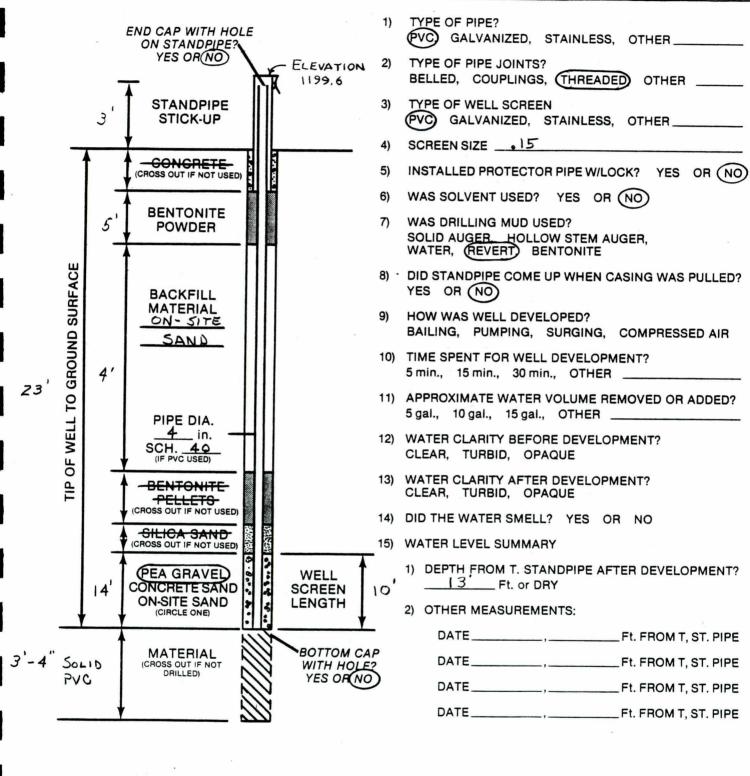
Well No. 9 DATE INSTALLED /0 -	<u>13-85</u> DRILL RIG <u>CME 45</u>
DRILLER JOHN WRIGHT DRILL CREW	DAVID WONCH
JOB/CLIENT MAUSAU CHEMICAL	STS JOB No. 12776 - B



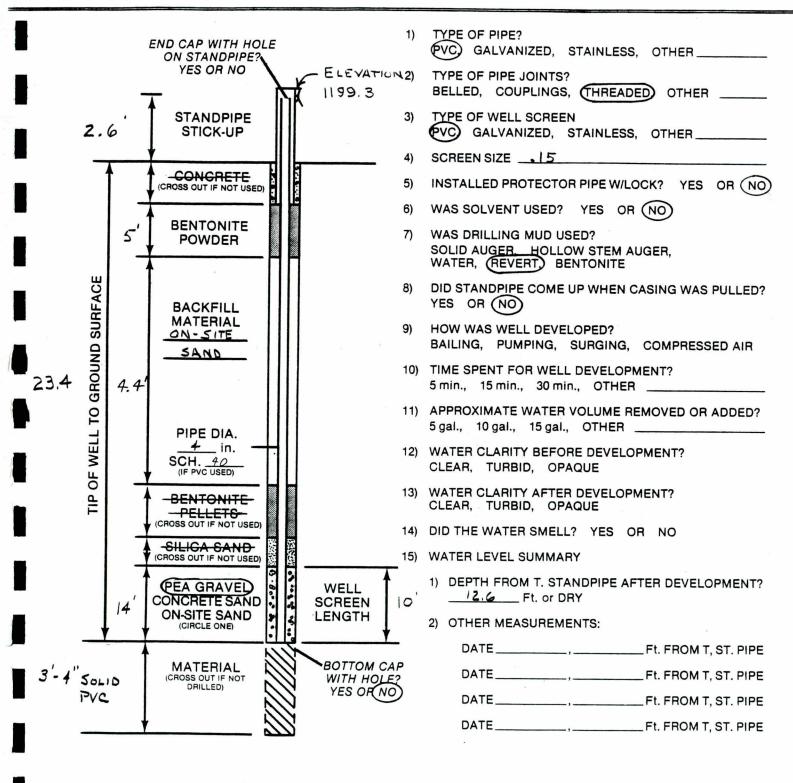
Well No. <u>/O_A</u> DATE INSTALLED <i>10 - 1</i>	11-85 DRILL RIG <u>CME 45</u>
DRILLER JOHN WRIGHT DRILL CREW	DAVID WONCH
JOB/CLIENT WAUSAU CHEMICAL	STS JOB No <i>12776 - B</i>



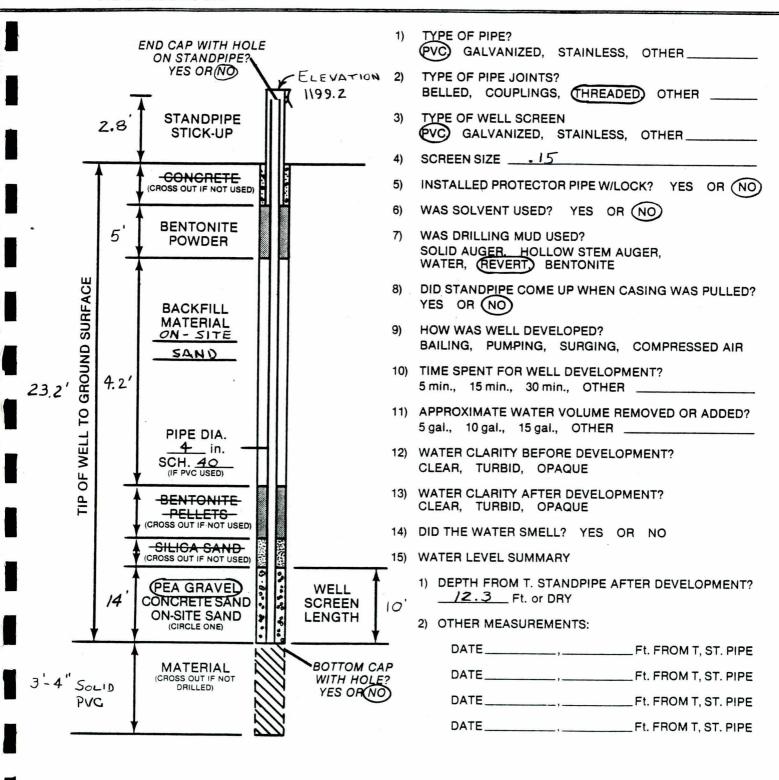
Well No I DATE INSTALLED/Q	-13-85 DRILL RIG CME 45
DRILLER JOHN WRIGHT DRILL CREW	DAVID WONCH
JOB/CLIENT WAUSAU CHEMICAL	STS JOB NoZ776 - B



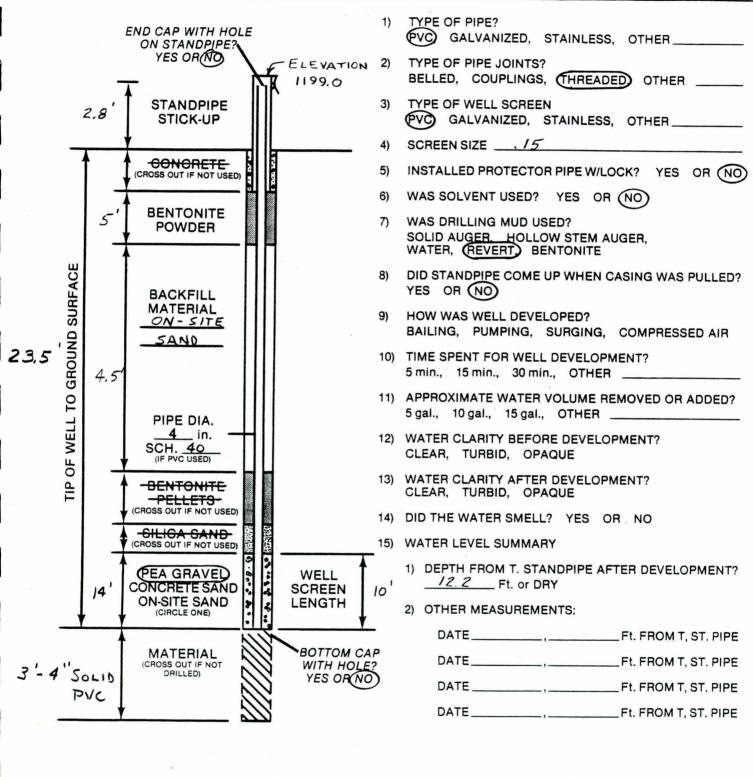
Well No. /2DATE INSTALLED /0 -	13-85 DRILL RIG CME 45
DRILLER JOHN WRIGHT DRILL CREW _	DAVID WONCH
JOB/CLIENT WAUSAU CHENILCAL FW: 1-983	STS JOB No <i>  2 7 76 - B</i>



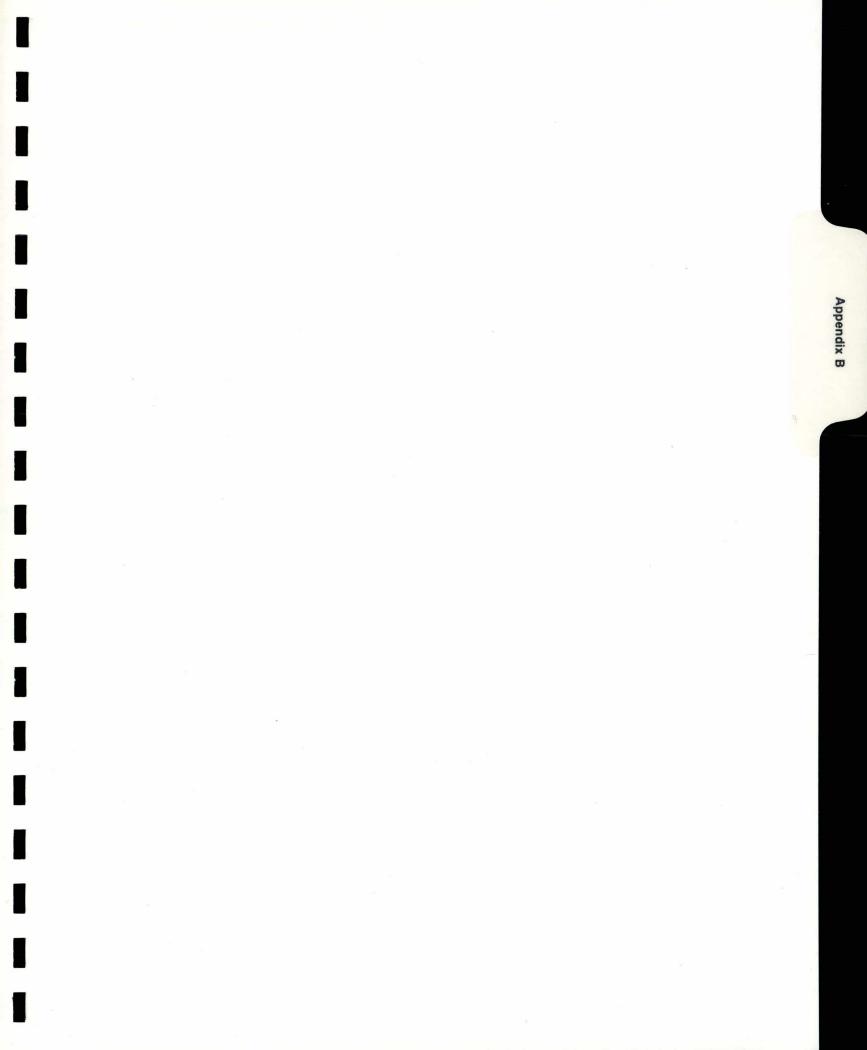
Well No. 13 DATE INSTALLED 10 -	10-85 DRILL RIG CME 45
DRILLER JOHN WRIGHT DRILL CREW	DAVID WONCH
JOB/CLIENT WAUSAU CHEMICAL	STS JOB No <u>12 776 - B</u>



Well No. 14 DATE INSTALLED 10	- 10 - 85 DRILL RIG <u>CME 45</u>
DRILLER JOHN WRIGHT DRILL CREW	DAVID WONCH
JOB/CLIENT WAUSAU CHEMICAL FW: 1-983	STS JOB No <i>1722.6 - B</i>



Well No. 15	DATE INSTALLED <u>10 - 11 - 85</u> DRILL RIG <u>CNIE</u> 45	
DRILLER JOHN	WRIGHT DRILLCREW DAVID WONCH	
JOB/CLIENT FW: 1-983	VAUSAU CHEMICAL STSJOBNO. 12776-B	



RELEIVED AUT 4.000



November 4, 1985

Mr. Jim Cherwinka Wausau Chemical Corp. P.O. Box 953 Wausau, WI 54401

Dear Mr. Cherwinka:

The composite well and stripper effluent samples taken October 30, 1985 were analyzed according to EPA Method 601. The results are listed below.

	Wells	(2-15)
	Composite	Stripper Effluent
Perc (mg/l)	4.6	Ø.3
Analytical No.	14614	14615

If you have any questions, please call.

Sincerely,

ZIMPRO INC.

Mary C. Christie Heuser

Mary C. Christie Heuser Instrumentation Chemist

MCCH/ls

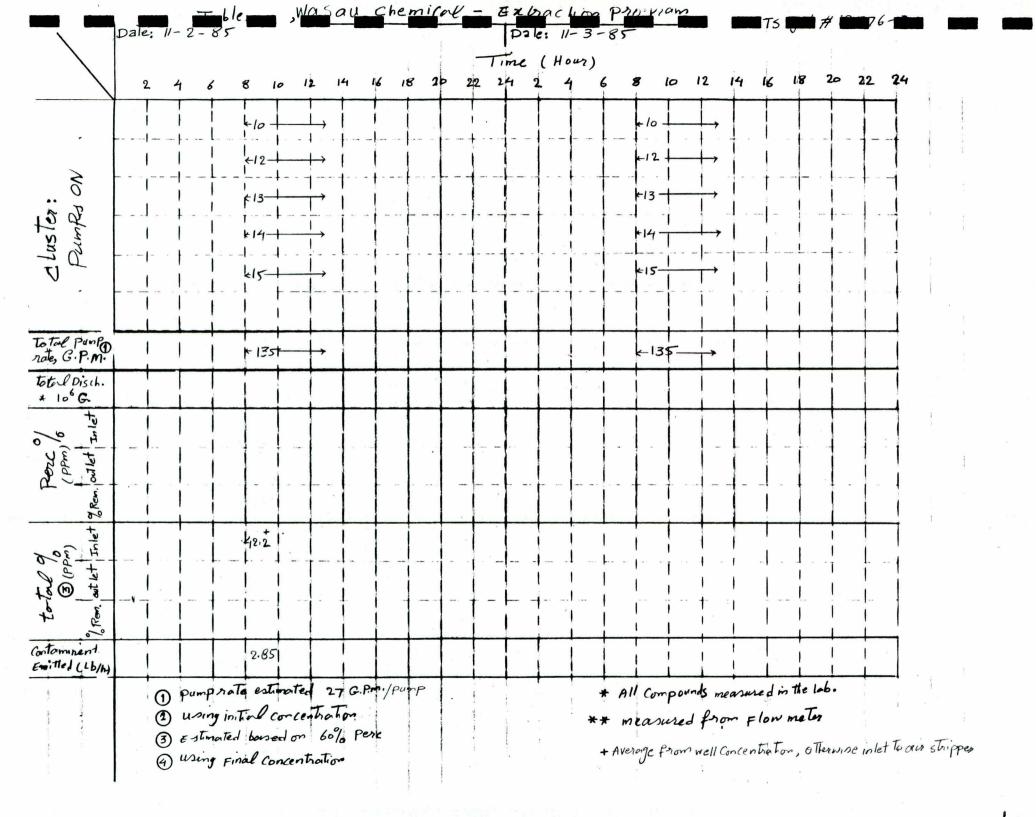
cc: J.W. Barr J.R. Salkowski

MILLIARY HOAD ROTHSCHILD, WISCONSIN 54474 HULLIARIA CHARTER AND HULLISTAD

	10-30-85	, Wasa	y che	mile	l-E	pale:			nam		T5 🛒	#	76-
Dane;	10- 50 - 05					me (H			ł				
2	4 6 8 1	0 12 14	1 16 1	8 20	1	1	4 6	8	10 1	2 14	66 18	20 2	2 24
	12+												
	¢/3+												
NO 1													
Pumpa	↓ 5→						1					1	
Zluster: Pumpa							Ì						
										-			
Total Pumpo rates G.P.M.	1 108		-	++			1						
total Disch.				╉╍╍╂									
* 10 <sup>6</sup> G	4.6			╉╼╌┼							+ +		
1 H O	.3				a in the in			-		- + -		`	
Ren. callet	93								+			-	20. 0 2 <sup>1</sup>
		· ·							+		$\frac{1}{1}$		
0 t+ Intet		· · · · ·								- [-	. 1 1 .	+	
at 1 − 1 − 1 − 0 − 0 − 0 − 0 − 0 − 0 − 0 −	·				- + -						1 - i-		
le Rem													
Contormandert. Empitted QLb/h)	.38												
	1) pump rate est.	mention 27	G. P	P	•			All C	mpound	s measur from F	ed in the low met	- 	8
	(3) E stimated bass	don 60%	Perk					mica	-surles				-
	( using Final Co	ncentration			A sector		ļ.				ļ		

.

						х Т,	T	<b>/</b> ) ^	-		oans Ja	Lenger	2776-	1.5 B	na		Te: 4/ -
					Time:				Times			•	Times				
-5-00-04 (Million - 6-0	w.L.	Т. F.C.	B. F.C.	on Voff	w.L.	T. F.C.	B. F.C.	1019	w.L.	T. F.C.	B. F.C.	101	w.L.	T. P.C.	B. F.C.	0% 16 FF	Comment - Techi Na-
12	161 101/2"									1							
Į I	17'4';	11		off										1			shows pumping
12	'3' , //		•					- 0									were done on
XII	13' '?'						-										11-2-85 and
. J	13' c ''		3 														11-3-85 and 3.shauss on
S	18 1				•		:										11-4-85
	<u>117</u>	-1	+				↓ +				-						
			mete diny				meter dirg				v met ading	te		Flon Re	s meta ading	-	All The OFF PUMPS
		_					-, ·								2		mere done manunly to motich The certificate
																	to montch The cantingrad pump 2 submercible pump.
>		-	•			-			•			I		e V	5 <b>1</b>	-	
EXV				1	•										* (	ł	•
		τ, ž	a •					İ				1				ł	
	•				t	*						۰ †					
	1			t		а <sup>в</sup>		+				+		8		ł	
+	ا دهدا چه	ant is a	i in	- <del>-</del>	n, bebr	e na statut (statut (statut)) na statut (statut)				-i							T.F.C: Top Floot Cont sot at



	Date: 1	1- 4-	ble 85		,W/0	50	2 (1	Che	mi	col	-	Ex P2		- Tim 1-5-			orro	m			T5 -	,	#	76	-	
	2	4 6	క	10	12		4	6 1	8 :	10	212	ime 241	( } 1	10007	6	8	l	6 I	2	14	16	18	20	22.	24	1
			  4-	14		10	15:30	10		+	+														,	
2		  -	¢I	2-	→   		*														+	-		1-	->	
ea: 1 Rs on		i   +!	'r	13⊥ ↓	→  		. +	/2						1	Ī											
Ctusles: Pumps c		+ - +		10 62	$\rightarrow$		+ 	13			+									↓ ↓						
V			t l	15+			+ 	15			ļ.			1							-	 	-		- >	2 1 3
ate, G.P.M.	<u> </u>		*	1351-	→			++											   		1					
Disch.	-			Ì																						and a state of the
Perc 10 (PPM) 0 cullet Inlet	-				2A 2A												-						-4			
6 Rem					83					-				-		- †	- 1					1				
( PPM) ( PPM)	1			); 	1.8										Í F-				-			   .		-		
to lor (G Ren, aut			-		-						     	-	 -↓ .↓		+			-	 † -= 		1					
ntominent mitted (Lb/h)	·			i	27	-							1			1	1		+   							-
	2	pump Usin	y inition	0 co	-cef	hah	on.		-P					4							ed in the low m			and the second se		
		) esting ) using							a surface of the surface of the	The second s	Change and C			ł	A	ł.	-		1		y rap	a l	4		1	is shipp

Job # 4 185 Time: CONTANTINE: 9:00 Time: 10:00 am Times 11 00 Am AR. W.L. T. B. F.C. F.C. 01/088 W.L. T. F.C. ONJ IOPF T. B. F.C. F.C. T. B. F.C. F.C. ON/ 108F VI.L. Comment - Tech. No. W.L. F.C. 74 221 1111 OPA 18 1" 23 ĴŦ₽ DN L4 84 SN. 2D *6*, ÓN 20 Uri-50 Ç't 0N 6 134 F 15 151 15'  $\mathcal{L}$ 50 GFF 16" SN 1/2" 1 8" 134 15\* 16' ON/F 131 5" 10 mm Sample Kellen 12' ON 15" al: 341-Gu OFF 01 at 12:0000. 13. 1.31 17' VN 15 ON 26(-8F1-1"  $\mathbf{O}$ In 2.988 m Jen 16' 131 121 16' 15 ĴΝ SN 13 (1,1) 211 Chi 61000 2" 211 Out 0.5 10m \*÷ 15'44 Flow meter  $\mathcal{B}$ Flow meter plow meter Flow meter Rendiny Reading Reading Reading Levels Turn or at 8. Am SM 9 Timo offant 1: 3'û Non-working 86 tuells 6 <u>}</u>  $\boldsymbol{\times}$ 2 н Э 13'\$6' T.F.C: Top Floot for J Stevens \$117

- chemical Focility Job # 12775-3 STS Time: 2.00 AR Times Time: Times WL. T. B. F.C. F.C. W.L. T. B. ON/ F.C. F.C. P.C. JOPP W.L. F.C. F.C. JOPP W.L. F.C. F.C. JOPP Comment - Tech. No. ON OFF 1 E. 22 ZZ', 10 ÓN ON 17. 120 ON 11 OFF is 13 ON 8.00 AmON OFF .... ON XB 16 11:30 pm OPP ON 711 Or E 13' 3.30 Pm ON 14 ON an 54 2" 15 B' いちち <u>CN</u> X OFF A 24 Contras & wask's Flow meter Flow meter Plow meter FLOW meter untill wed 11-6-85 Rending Reading Reading Realing 8.00 Am 3 × 1 lag 1 T.F.C : Top Floot for sot at Futton Floot for T

IN THE STREET STREET

	-					xTs,	anter -	<b>/</b>	o		STS J	cherrer ob # 1	2776-	1.5	nta i		11-5-85
L	Tin	ne: V.	00 a Af	m.	Time:	10:50	Ann AR	2	Times	1 00.	AMA	R	Time:	12:0	10 AR		
	w.i.	Т. F.C.	B. F.C.	ON /off	w.L.	T. F.C.	F.C.	1088	w.L.	T. F.C.	B F.C.	01/01	Time: W.L.	T.   F.C.	B. F.C.	01/ 68F	Connent - Techi Nor
0	2230			DN.	17.2'	1		CFF				an	1 221		1	a	
11	21			31	20'			(i==	H .				2]			CN	
EI E	1.		×	Civ	1601		1.	ON	16',,,			ΩN	165.			ON	
13	18' 8"			av	16%			au	Ę.	195		ON	16.			ON	
	18. 04			GN	16'			OW	16'			ŚN	15.' 6"			a	Composite
15	17' 小"			ÕŃ	15'			ON	Fj' O'			ON	15'			<i>div</i>	Ingut sample
9	14'0'	Flow	mete	ż			meter				u me idirg	ter	-6	Flon	, met		O 3.900m
8	16'									1.00	~~ · · · y			145	ading		taken at
	16'4									2							5:30 am.
26	17'				~	-				-					•,	-	Continuoust
XS	17'							ţ	·				•			ł	works or
4	17'   0"		3 	Ī								Ť		·			11-5-85
3	14											ŧ					UnTill 8:00Am of 11-6-85
2	14'							1									T.F.C : Top Floot Con.
-#	U		1.10	- 1 L													I.F.C: Top Floor Crit

						xT.	T-	<b>/</b> )^	° <b>****</b> * 7	+	Сана В Т 5 Ј	chemics	2776-	1.5 B	na I	к и		5-	<b>1</b>
	Tin	re: l'i	NE		Time:				Time:				Time:				(/	-)	00
	wl.	Т. F.C.	B. F.C.	on loff	w.L.	T. F.C.	B. F.C.	1/18	w.L.	T. F.C.	B. F.C.	101/ 1089	w.L.	T. F.C.	B. F.C.	ON/ 6ff	Comm	nt -	Tech. Nor
10	23:			CN					1								8		
ll	20' 5"			an															
512	16			ON															
13	(30"		2	0FF															
14	13'7			ÖFF	2				•								, 12	,	)
15	13' 4'			Ú F#													la jai		
		Flow	mete	Ł		Flow Rea	meter			Plor	y me iding	t.		Flo.	u met	24	-		
			<b>,</b>					-		1.20	, any			Re	ading	-			
										• • •									
					i								}			]			)
× ×				· †		•		Į.		_		-	•	5		ł			
			, ,	ŧ		×		Ì	*							ł			
	•			Ī															*
				Ť				4				+				ł	T.F.C :	TOPE	hat Cari
#		···	(* )					ł				+						sat a	T

		The		Wasa	au	Che	mil	ol.	- 2	XU	sac	im	Ph	Deric	an		-	TS	The second	1	76-	-	
	Dale: 11	-6-85				di .	-		1	Da	e:	1-7-	85	\ \	1			12		1	10	1	
			1						-	me	( H 0	42)											
	2 -	4 8 8	10	12 1	4	16 1	8 2	P 2	2 2	+ :					0 1	2	4 1	k I	8	6	2	24	
	10			-	1					t	t						10					1	
				2	ļ								-									1	
	// 1			-					Ī								1					I I	
8		111-								<b> </b>											↓		
1:	12	1 7	ļ		1				!		ļ												
etus les Pumpa	131	+			1					<b>i</b>	†	81 V			ł					-		1	
pumps					L									L				Ì	[				
ti u	14									1													
			-+-		+	+			+													$\mathbf{F}$	
	-13					I	111 A.A. 11. 320			]							it.						•
total Penpo	150										1				1				1		1	1	
and the second se	150				-				<u> </u>	ļ			_					ļ	ļ				
# 10° G												4. 											
te	1	3.	.9					- ,															
H H	-	i -   -	-+-		-		5							-						+			
Pro Pro	i									1											Ì		
g Ren.						<b>F</b>								1	Ť.			Í	1	1	-	1	
		i -   -		_	ļ	ļ		ļ							ļ			¦	! 1	ļ		4	
9 1) + Inlet	1		ľ						÷.,				l					1	1				
	•	†		- †	1										1	<b>†</b> - 1			1. 1	Ì		1	
	,				Ĺ				1		ļ				!				Ĺ.	!		]	
12 5									1						!			Ì	ļ	ļ			
100		+ + +					TR2	-			+							1			+		
Tel (Lb/h)																		÷.,					
	the second s	pumprata	estina	Tec 21	G.P.	·/pu	p		-	1		-	Al	Com	pound	k med	sure	1 m 1	te lab		1		
		using inition				Í	1855 -					*				from				1 1			
	3	E-stimated be	and	50 60%	Per	*							A	herag	e fro	n wel	Conce	Tra	10.0	These	ine	inter to	ourst
	Í	using Final	Conce	nthatio								t				X. P							
	9		3						1	1			1		)	5 L		1 1	1	6.	1 0'		

.

cha 1.5 Te: 11-6-05 STS TO # 127 2: 50 Gm Times Time: & 30 am. Time: Time: W.L. T. B. ON W.L. T. B. ON W.L. T. B. ON T. B. ON T. B. ON T. B. ON F.C. F.C. LOPP W.L. F.C. F.C. LOPP Comment - Tech. Non 18 13 NF 13 8 00 ON 13 16 14 0 17 13 315 3 9 112 3.7 ppm 13 16 Sample 10:00 -11 7 12 21. Congernite 10 11" 17 34 A. 5" Another Sample from 13 Wall #60 only 13 Flow meter Flow meter Reading plow meter Flow meter 9 Rending 8 13.1 PPM Reading Reading 16 16' 81 24 0 16 16' 7 14 17 11' Ś 5 6.1 16' 14 2 12 13 \*1 T.F.C: Top Floot Con set at 13

Dele: 11-7-85 Time: & Warn. Time: 3TS Job# 12776-B Times W.L. T. B. ON W.L. T. B. ON W.L. T. B. ON Comment - Toch. Nor ail 13 13 5 Pumps off 13 14 4 pince 3: 10/pm 11-6-85 13 NX-12 ١B flotal well #10 ~ 11 only at 3. ng n 9 17 11 8 17 101 3 Flow meter Flow meter 13 Plow meter Flow meter 9 Rending Reading Reading Reading 16 8 Ô 16 5 14 3  $\mathbf{x}$ 17 5 Ľ 11. 13 T.F.C: Top Floot for: - E.r . F. Man Floot Con.

Zimpro Results by Telephone Samples of 11-8-85: PPB Compound Influent Efflent Reich I rethere 6230 .646 Well # (Pere only) 11.000 5550 10 15 120 in the

	Date	: //-	10	ble:		,W		a v	he		ol		₫ x		-0	P1	27	an		5	T5 -	J06;	# 12	277	6-B	
			0-2						1			8	ime	( H o		00									•	
	2	. 4	6	8	1	0 1	2 1	¥ .	6 1	8 1		22 1	4	2 4	6		3	10	12	14	16	18	20	22	24	
	10	+		+		$\rightarrow$	10	<b>↓</b> →−		 	10	 	ļ			>	shu	off	die .	to Sno	r dri	f+				
			l 	<u> </u> 	· · · ·				-		- 11	t · · ·					shu	Hoff	duet	Sno	no dre	A+			-	2 6 21 5
- õ			L	ļ		Γ.			•		L		<b>_</b>											_		
- 0	'	1	- 1	i			13	$\rightarrow$			2		1						i		1		ļ	•	1	
cluster: 1 Pumpa	1	Ì	Ì	т 1			1 14	L,	t l			 	1		Ī			1	i	1		1.	· }· -		i	
DE	1						15		È	[				• • •						1				ļ	1	
U .			İ	1		 			l L –	 		Ĺ_•.	 						1	I,	1	1	1	1		
			- ]	ļ		1						l .	1						1	1	1	I	1	1		
To Tal Punpo rate, G. P. M.								1				1	-					!	1	I	+	+	+	<u>.</u>	_	
Statement and the statement of the state				+				ļ			<u> </u>	ļ	ļ						1	İ			-			
tot l Disch. * 10°G.			1	1		1							ļ					1		ļ			i			
s iet	1	1	I	i			1	5.55	weil	17			1		1			[	1	1	1	1	1			
1 2 0 C	-	- 1			× - >			0.12	well	i5			-		I	-	-		1	Ļ		-	+	ł	1	
Perc (PPm)		Ì		]	-						_	L _						ļ			1.			1		
Z Ren.		1										ļ	Ì.									4	1			
t.	1		1		•			*9			1		<u> </u>					1			1	+	+	-	-	
0 0 1	+		-				 	<b>.</b>				-			F			( 7 ~ ~	-		1.	1	-	Ļ	-	
et tet		i						1.098				ļ						l	1	ł		1	i			
fren.								92				T -		1		1		1	1 1			I	1		1	
Contominant	+								 									 	!		1	+	+	_ <u>+</u>	-	
Emitted (Lb/h)								•97										ļ 	1	-	İ					a.
<b>)</b>		1	oump.	rate	esti	notec	27	G.P.	r:/pu.	P		-	č.							asure				·	ĩ	
			using	initio	n c	or ce.	hah	Pen			1			Į.	**	m	easi	ired	fro	Fl	on m	reter	1,			
			sting						Louis I			-	3	i i					1	Conce	· · ·	100	1			To A
		9	J	Fina	- (0)	ILE III						1			++	Limi	Ted b	y mo	X. P	mpiñ	y Co	pacij	5%	150 6	°P <b>n</b>	

		7	able		,w	C	au	he		ol	2	E,		ac7	<b>1</b> 0	p	3	an		5	T5 -	Job;	# 12	770	6-B	
$\mathbf{i}$	DaTe: 1	1-10 -	85									•		: //		85			,		(					
	0				. / •		4	16	18	20	22	Tim 24	د 1	(H)	ć .	,	8	10	12	14	16	18	20	22	24	
	2	4 6					+	1	+	+				. 4		۶ ۱	+	+	1	+	16 1	+			_	1.4
		i l			İ		ļ	i	Ì	ļ	i			i						ļ.		1	į			
					ا+	÷.				-	· + ·	1-	-		** ***		1		-	1			-   -	1-	-1	,
No.		-1	L!					ļ	<b> </b>		4-	_ <u> </u> _						Ì			+		 		-	1
dlusica:1 Pumps ON	Í			4	4	st.	Ē,	Í	IN	la			0	P.A	1	h	P	16	ì	15,	bo	i	1	I	i	
n R C	1			2	U	2		1						1		The second secon		1	I	1	-	i	1	1	1	
Pri La		+			+		ļ	• • •	r	6	1	dT	-				<u> </u>			1			-1		1	
U	1	1							Ì	4	211	f Y "	2	_ ·				İ.	I	1			1	I		
	1	1 1		1							1	i		1					Ì	I		İ	Ì	1		
Tal Punp		+						┼──	+	+	+		$\dashv$			ļ	+	<del>.</del>	<u> </u>	<u> </u>	<del> </del>	+	÷		_	
te, G. P.m.	1						Ĺ						Ì								İ.	1	ŀ			
10°G											Ì	Ì				1			1		ĺ	1	1			ж.
10 6 to										+	+	+	-+			ļ			+		<del> </del>	+			_	
H 10	_	1		l		÷.											-				L.	1	1			
(PPm) (PPm)	1							-				Ì								(	4	1		1		
ć	F	'i I			-	-	ļ 1				-		-		··· ·		<u>+</u> -	†	.		4 . 1	1	1.	j -	1	
- 2 Rei	1				+		Ĺ			1			_					1			 	1	i_	-	1	
o m) Inlet		i i		1	·			1		!	i	j	ì	!		1	i	1	Î.	1	1	1				
de to	1	1	⊧	ь	- 1		1 			1-	1		- 	 i	-	 	1	Î	÷.	1 -		1	Ť.	L	- 1	
et @							1		1	1 -	 	-	-+			ł	! 	ļ	1	1	! 	I,	1	a la	-	
Le "Rem							) 	1		i	1	1	I			!	1	1	i .	i	ł	1			1	
tominent		1		+			1	!	1	1		1	T			 	1	1	+^ 1	1		-+		1		
itted (Lb/h)							!	<u> </u>		į_	4		$\rightarrow$			ļ	<u>i</u>	Ì	<u>.</u>	1	L	. <u></u>	<u> </u>			
	()	pump	nole	est.	nated	27 T T	- G.P.1 -	n./pu	-P	1.	3									asure						
-		usin Estm	y Initio	have Co	J m	60%	Per	c		1					* )	+ m	easi	ired	fro	r Fl	own	ne los	-+ <b>1</b> .		<b>.</b>	+
		using						-		1										Conce						10
	e	, J	1							1					++	t Limi	Ted b	y mo	×. P	mpiñ	y Co	pacit	50	150 6	;pm	

.

	DaT	-; //	- 12 -	- 85	e:		, <u> </u>		au	,		ene					- 13-	-85	0	an		4	ST5	Job	#1	277	6-B
$\backslash$		2	4	,	8		12		4	16	18	20	212	Tim 24	2	( H a	(2			10	12	14	16	18	20	22	24
		-	1		1-	10	-+			10	+		1		$-\hat{\dagger}$				<b> </b>	+	1	+	-		+		-
4		 	 		1_		+						· + ·		_				<b> </b>	· 							1
		1	i	1		İ	I			"	1	-	+		-				<del> </del> _	<u> </u>	+		+		- <del> </del>		->
No No			-  	1		-+-	- 1			†						~ .					1		†-	- -	· • • • • • • • • • • • • • • • • • • •		1
Pumpa o			+		1	- +		• • •				-	-		-	· · ·			-	-1	!	4		1			
Ser 1			 	j	 _	 	ļ												L	1	-		1				1
J			i	1	1	I				Ì	1			j	1					1	í	i		İ			Ì
			Ē	1	1	+-	-			1 .	1		ţ-								1	1	i	i.		т.	•
Tal Punka			Ļ	+	+		-+				+	+	+	+	+					+		<u> </u>	+				
G.P.M.			 +	ļ			_			-					Ì	a							Ĺ				
Disch.				!	1					1				ļ								ļ		!	1		
ict			1		1	T	1				1		$\uparrow$		1					1		1	+			+	
4 9			1 -		1 -	ł						- -		-					-		- e	+ -	+ -		-		- 1
(PPm)			ļ	-	-				1 -	-		· · ·	-  -	_	_					ļ			_	Ì	1.		_
2 Rew									a.					1		-					-		ļ	l	1		Ì
m) Inlet					I	ŀ					I			1	1					1			1	1			7
4			1		· <b> </b> · · ·	.   	- † -				.	-	•							1	+ ~	Ì-	.   .	1	-	1	
()				÷			<u>.</u>	.					+ -	-	-	··					! + ~~		ļ	. [	! .		
°, Ren.																					Ì	ĺ			4		
minent thed GLb/h)														1						1		1		1	I	1	
		0	pum	prot	le es	Tim	Ted	27	G.P.	· /pu	P	+	-		+			Al	Com	Down	to me	dans.	edin	the L	-6-	-	
			un	y ini	The	do	ceft	nah	'n		[	·		and a second second			*				fro						
		3	Esta	noted	bours	ad a	m	60%	Per	¥							-	A	erage	fro	wel	Conc	mtra	Tion,	other	ine,	inlet.
1		Ð	usin	9 Fir	ial C	once	nho	Tion			*			1 1					1		1		•	9	5 of		5

Sample takon 1:15pm 11-14-85 Well #: #10 #1 9400 #10+11 Composte 1040

D	aTe;	11- 14	Готь I 1 - 8	e:	,w		bu		e n	- n	Ľ	2			- 15-		7	aw		5	T5	Job ;	<i>#</i> 12	776	-B
	2	4	6	1. 	10	12	14	16	18	20	24		me	5	( <i>r</i> <sup>1</sup> )			10	12	14	16	18	20	22	24
	0		1	1-		1	1	+	+-	+	-+			<u>}</u>		<u> </u>	+	1	1	+-	+	+	+	+	1
			Ì	<u> </u>		4	1	- <b> </b>			-+								-	1			.  _		-
	/+	+			+	+	7							5							Ì		1		Ì
8	1		1	!	+ 	1	1		-	1						†					Ţ		1	-	1
2-		+ -	4	¦	ŧ	-									i		-	ì	1	.		-	÷-	-	-
Lun	 	1		 	 	ļ.	1													 -	1		 	1	1
Pumpa C	1		1	Ì	1										h .	1			1	1	1		1	I	
			1	-	+				-		- †					t		+-	Í.		Ì.	1		1	-
		1				<u> </u>	1	1	1_	-	-								1	1	-	_	$\downarrow$		1
G.P.M.																									
Disch.			T	1			T	T	T	1						1			Ī		1	1	1	1	1
* <del>6</del>			+			╂──	+	+	+	+	-+						-		+	<u> </u>		-	+		_
F						1												Ì							
outet	1		Ì					Ì												l			i		
s l	- F	1	1	-	-		ł	+ -		-				'			+-	1	-		-	1	1 - 1	j.	ł
+ % Rei		+	+	<u> </u>			Ļ	<u> </u>	-	-	-+		11			Ì	ŀ		+		1		Ì		-
(PPm) let Inlet	1				ľ	İ					١					1	1		1		1	1	1		
ent kt	i	Ţ	Ī.		1	1	1			-		_			1			1	+ -	1		1	1	1	
	1-		+			1	ł				- +					ţ	T.		t	- (	1	l		-	1.
°, Ree	_ <b>_</b>	İ					1	1							! 	 	<u> </u>	ļ	 +	<u>i</u>		<u>.</u>	<u> </u>		_
a (Lb/h)	1					1.0												ļ	ļ	1		ŧ	!	Į.	
	10	pum	prot	e est	mate	2	7 G.P.	1./00	-P	-					i	+ Al	1 Com	Down	ts ma	asure	ed in	the lat	6.	1	-
ŝ	2	UNI	ny ini	tinde	orle	that	hon	ł			See 12			1						m Fl				-	t
	3	Est	mated	bosse	don	60	lo Pe	ne	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						-	+ A	vernje	fro	n wel	Conce	mha	For, o	There	ise, i	nlet -
	G	usir)	y Fin	al Co	ncent	hatio	~	5 92														.placiz			

then na Time: 1:35 8 m Time: 7.05 gm 2:35pm Time: 3.05 gm 3:35pm DeTe: Time: 10:30 11-15-85 Andy Forenbe WL. T. B. ON W.L. T. B. ON W.L. T. B. ON T. B. ON W.L. T. B. ON F.C. F.C. LOPP W.L. F.C. P.C. LOPP Comment 10/7 10 Sistem T35 Emi 17' " 20 20' bo' 001 11 #11 20' 5" 10" Gre 10" 13.41 12 , TIS 131 41 - the attend 13' 14 Б 12' OFP 11 11-16- 85 9 12! Flow meter Flow meter 11-17-85 Plow meter Flow meter 611 Rendiny . Reading Reading Reading 8 160 11-18-55 11-19-85 sTourt pups 4' 10,11 at 10:35 7,8,9 at 11:30 . 5×5 71 04 3 2 64 T.F.C: Top Floot for

575 Job # 12 776-B Date: 11-21-85 D36: 11-22-85 Time (Haus) 20 22 24 12 14 16 18 6 Shit down Nelo 789 to remore wate meter, meter Ś (Composite) Wells not working. cluster: Pumpa c Watar pumpel on this sheet not registered Total Perpo í 5th Poisch. + 10 G ~ (ren) (ren) Composite Sample (welts 7, 8, 9) taken 8:15 a.m. 11-23-85 Porc 27 In fluent Effluent J. B. 5800 700 Œ romand Emitted GLONY 1) pump note estimated 27 GPM / pump + All Compounds nearned in the Labo 1 using in Fall concentration \* + measured from Flow meter 3 5-stilated band on 60% Pest: Artinge from well Concentration, otherwise, inlet To Ainstrippe ( using Final Concentration · limited by main pumping copicit of 150 GPA.

