WEYERHAEUSER CO – Pine Hill, AL

Ambient TRS Study

February 2001

DISTRIBUTION

*** J. Stoudenmier	Pine Hill
* J. Emerson	Pine Hill
*** K. Matthews	Pine Hill
** H. Larrimore	Pine Hill
*** L. Bagley	Pine Hill Sort 241
*** H. Davis	Pine Hill
*** M. Young	WTC 2G2
** V. Dallons	WTC 2G2
** L. Sakamoto	WTC 2G2
** M. Rast	Columbus Sort 153
* B. Crowell	CH 3D29
** W. Bryant	New Bern Sort 121
** B. Barkley	New Bern Sort 121
*** ES&T File Center (original data)	WTC 2G2
*** TIC	WTC TIC

*	Executive Summary Only
**	Report Body
***	Report Body with all Appendices

Weyerhaeuser

RESEARCH REPORT
Research & Development

x Technical Report
☐ Technical Note
☐ Trip Report
☐ Other

WEYERHAEUSER CO. – Pine Hill, AL
Ambient TRS Study – February 2001

Executive Summary

Overview

This report documents the results and findings of the first phase of an investigation to identify sources of TRS emission that have a ground level impact on the Weyerhaeuser's Pine Hill, Alabama pulp and paper complex. The first phase of the project, conducted in February, 2001, focused on establishing baseline conditions prior to construction and start-up of MACT condensate controls. The second phase of the project will seek to quantify reductions in TRS emissions resulting from installation of MACT condensate controls and identify opportunities of further TRS reduction.

Findings

The first phase of the study showed that:

- TRS release rates and ambient impacts are highly variable.
- Most of the ambient TRS is H_2S
- The ambient ground level H_2S was released to the atmosphere from:

- Polishing pond	30 - 2300 lb/hr	540 lb/hr Avg.	46%
- Polishing pond inlet	150 - 500 lb/hr	330 lb/hr Avg.	28%
- ASB	-	270 lb/hr Avg.	23%
- Pulp mill & power house	17 - 32 lb/hr	23 lb/hr Avg.	2%
- Clarifier	4.5 - 12.3 lb/hr	6.8 lb/hr Avg.	1%

- The polishing pond emission rate is influenced by wind speed.
- The likely source of TRS emissions from the clarifier and ASB are reduced sulfur compounds in the effluent.
- Sources and range of TRS compounds in the raw effluent were:

- Power & recovery	73 - 161 lb/hr	123 lb/hr Avg.	51%
- Recausticizing area	9 - 329 lb/hr	118 lb/hr Avg.	48%
- Pulp mill	0 - 7 lb/hr	3 lb/hr Avg.	1%
- Paper machines	0 - 0.5 lb/hr	0.1 lb/hr Avg.	0%

- H_2S is generated in the polishing pond.
- In mill equipment corrosion problems can be attributed to H_2S emissions from the wastewater treatment system.

DISTRIBUTION TO TECHNICAL INFORMATION CENTER	LOCATION TIC	AUTHOR (Name and Signature) Michael Young/Victor Dallons [signature]	DATE Nov. 27, 2001
		REVIEWED BY (Signature) [signature]	DATE 11/27/01
PROJECT NO. 721-9063		APPROVED BY (Signature) [signature]	DATE 11/30/01

Report Contents

This report contains:

- Executive Summary
- Contents
- Introduction/background
- Methods Overview
- Major Release Points
- Estimates of Emissions
  - ASB
  - Polishing Pond
  - Clarifier
  - Pulp Mill Area
- Waste Water Measurements
- In Mill Corrosion
- Appendices
  - A - Ambient H2S Measurement Locations and Readings
  - B - Summary of Ambient H2S Measurements by Location
  - C - Model output sheets
  - D - Process Wastewater TRS measurements
  - E - Effluent Treatment Wastewater TRS measurements
  - E - Production Summary

Introduction and Background

Overview

This report documents the results and findings of the first phase of an investigation to identify sources of TRS emission that have a ground level impact on the Weyerhaeuser's Pine Hill, Alabama pulp and paper complex.

Objectives

The overall objective of this project was to quantify decreases in ambient TRS concentrations in the area surrounding the Pine Hill pulp mill attributed to the installation of the condensate steam stripper and NCG thermal oxidizer for MACT compliance. This project is being conducted in two phases. The first phase of the project focused on establishing baseline conditions prior to construction and start-up of MACT related equipment. The second phase of the project will seek to quantify reductions in TRS emissions as a result of MACT equipment and identify other opportunities for further TRS reduction.

The first phase of the ambient TRS study includes several key objectives:

- Identity sources of ground level TRS emissions.
- Estimate TRS emission rates from the most culpable process areas.
- Establish the pre-MACT TRS release rate baseline.
- Identify key sources contributing to in mill corrosion.
- Document ambient TRS concentrations on the mill property.

Participants

The ambient TRS study was conducted at the Weyerhaeuser, Pine Hill, Alabama facility between February 6 and February 14, 2001. Michael Young of Weyerhaeuser EH&S measured ambient hydrogen sulfide (H_2S) concentrations and weather information. Lori Bagley and Jennifer Stoudenmier of Pine Hill collected daily wastewater samples from designated streams and also compiled associated production information.

Caveats

The methods used in this study to estimate TRS emissions only give approximate release rates. The methods make use of ambient TRS measurements to estimate the releases using an ambient dispersion screening model. The amount of TRS emissions estimated for any one location is impacted by weather conditions. Considerable judgment is used to select data sets taken during weather conditions where the models are valid and to isolate sources and attribute the emissions to them.

Methods

Methodology Overview

The following approach was used to achieve the objectives of this study:

- Identify sources and quantitate emissions of TRS
  - Identity TRS sources that have the greatest impact on in-mill ground level TRS concentrations.
  - Identify ambient TRS component.
  - Estimate TRS emission rates from the most culpable sources.
  - Measure TRS compounds in sewers to identify process sources of reduced sulfur compounds being released from effluent treatment systems.
- Document ambient TRS concentrations both inside the mill and along the mill's southern boundary (along Highway 10).
- Identify key sources contributing to in-mill corrosion.

A brief description of the methods used for each part of the study follows.

Identifying Emission Sources

Sources contributing to in-mill ground level ambient TRS were identified by measuring H2S concentrations, wind speed and direction at selected locations in the facility. These measurements were made twice daily over an 8 day period. The most culpable sources were indicated by high ambient TRS concentrations down wind of the source. The study focused on ground level fugitive sources of TRS that may have a potential for near mill ground level impact rather than on TRS emissions from stacks with good TRS dispersion and impact receptors well off site.

Ambient H2S concentrations were measured at selected locations on the mill site twice per day, early morning before the sun came up and early afternoon. Supplemental measurements took advantage of ideal wind and weather conditions in order to obtain additional source specific data. Maps of the mill data collection circuits can be found in **Appendix A** of this report. Original field measurements can also be found along with the maps.

H2S concentrations were measured with a Jerome 631X portable H_2S monitor. The Jerome also responds to MeSH, on about a 50% response, but reads out only as H_2S. Wind speed and direction were measured by hand held instrumentation at each location where the Jerome samples were taken.

Continued on next page

Methods, Continued

Emission fingerprinting

The components of the ambient TRS from selected sites were measured to better identify their source. A sample of ambient air was collected in a tedlar bag for analysis by gas chromatography with a flame-photometric detector. The analysis gave results for hydrogen sulfide, methyl mercaptan, dimethyl-sulfide, and dimethyldisulfide. The TRS profiles from each of these samples were compared to samples from other specific sources. (The analytical results from these tests were not of sufficient quality to be used.)

Quantifying emission rates

Emission rates from the most culpable ground level TRS sources were estimated using ambient dispersion modeling techniques. EPA's SCREEN Dispersion Model was used to determine the H_2S concentration at various distances from the source. The SCREEN model uses emission rates, associated physical information (source area, terrain type) and climatic data inputs (release height, wind speed, solar radiation level) to calculate ground level concentrations. The model's input parameters were tuned by matching model predictions with measured TRS concentrations at several locations downwind of the source.

Once the model was tuned, trial and error emission rate estimates were entered into the model until the results matched measured ambient TRS concentrations. The ambient TRS concentration data were selected to match the model assumptions for atmospheric stability. Only readings that did not include any confounding sources upwind from the sampling location were used. Only information for stable weather conditions was modeled. These conditions have low vertical mixing and predictable horizontal dispersion.

Continued on next page

Methods, Continued

Wastewater Analysis

Wastewater from selected sewers were collected twice per day for analysis of TRS components to identify process and other sources of reduced sulfur compounds being released from the effluent treatment systems. A portion of the samples were analyzed for: hydrogen sulfide (H_2S), methyl mercaptan (MeSH), dimethyl sulfide (DMS) and dimethyl disulfide (DMDS). Flow data was obtained for the corresponding streams from the mill.

Grab wastewater samples were collected from the following sources:

- Pulp Mill Sewer
- Power & Recovery Area Sewer (including the turpentine and evaporator areas)
- Recausticizing Area Sewer
- #1 and #2 Paper Machine and OCC Sewers
- Clarifier Inlet
- ASB Inlet and Outlet (ASB outlet has a step-fall aerator down to the pond)
- Polishing Pond Inlet

Source of TRS causing corrosion

Sources of TRS emissions causing corrosion of in-mill equipment were identified by measuring H2S concentrations in the vicinity of the identified equipment at various times. Wind direction and speed were also recorded. Sources up-wind of the corroding equipment were identified.

Major Release Points

Major release points

Sources contributing to in-mill ground level ambient TRS were identified by measuring H2S concentrations, wind speed and direction at selected locations throughout the facility. Mill maps with the raw data can be found in **Appendix A** and summarized in **Appendix B**.

The sources with the highest down-wind TRS concentrations during stable atmospheric conditions are shown in **Table 1**. Note that the concentrations for each source are affected by multiple variables including wind speed, atmospheric stability (vertical mixing and consistency of wind direction), terrain and structures, and distance between the source and measurement point.

Table 1 Average and Median ambient H2S concentration downwind from process areas

Process Area	Average H2S (ppb)	Median H2S (ppb)	Number of Measurements
Polishing pond inlet	9149	8167	6
ASB	3031	1752	10
Polishing ponds	1370	1400	29
Clarifier	819	210	7
Pulping	363	11	4
Recovery	56	12	4
Recausticizing	32	32	2
Paper machines	21	21	1
Ash Ponds	19	19	2
Equalization Basin	560	560	2

Estimates of Emissions

Methods

Atmospheric Conditions for good modeling

Emission rates from general process areas were estimated using back-modeling techniques described elsewhere in this report. The model used works only under ideal climatic conditions;

- Stable air flow with a minimum of vertical mixing in the air column (typically found during early morning or on a cloudy day
- Steady wind speeds of 5 to 15 mph.
- Steady wind direction
- Only one up-wind source that has a verified low background H_2S.

These conditions typify an atmospheric stability classification of "D." On occasion, data collected during atmospheric stability classification of "C " were also used. As it was impractical to predict when ideal climatic conditions may occur, many hours of data were collected to find the conditions that best fit the criteria for good modeling. The data sets that fit the criteria are listed in the discussion for modeling of each release area.

Calibration Check of Models

Back-modeling asks: what emission rate at the source would produce the ambient impact observed? The emission rate input to the model is adjusted until the predicted concentrations match the observed concentrations. When there are two or more concentrations measured at different distances from the source within a short time period, the model can be tuned for other parameters. Model input parameters are changed by trial and error until the predicted TRS concentration matches the measured values at both of the points modeled. The model inputs that can be manipulated are the source area and distance offsets and whether urban or rural conditions apply. Other parameters, such as wind speed and stability, and distance from the source were entered into the model as measured.

Clarifier Emissions

Clarifier emission modeling overview

The SCREEN model was calibrated to the clarifier emission source by adjusting the modeled distance from the source until predictions of ambient concentrations matched the measured values at two different points.

The clarifier sits in a depression on the mill site, with the ground rising rapidly about 20 ft in elevation around the south perimeter before it levels out. One of the measurement locations was taken at the top of the rise, the other some distance away. In calibrating the model, the best fit was obtained when the location of the source was modeled to be at the top of the rise rather than the actual clarifier location. The rise appears to funnel the emissions to the top before they began to disperse.

The back-model results for the ambient TRS measurements taken at the top of the rise were not used to estimate emission rates because the model was very sensitive to small changes in distances from the source at that location and exhibited excessive variability.

Modeling results

The conditions the clarifier emissions were modeled at and the modeling results are shown in **Table 2.** The TRS emissions from the clarifier varied between 4.5 and 12.3 lb/hr. Analysis of the TRS composition of a sample taken near the clarifier showed that the TRS emissions contained as much methyl mercaptan (MeSH) as H2S. The H2S monitor used in these studies has about a 50% response factor for MeSH. Therefore, the TRS emissions from the clarifier are approximately 33% higher than the values estimated in Table 2. The values in the Tables are direct Jerome readings.

Table 2 Clarifier Modeling Results

Date	Time	Wind speed mph	Stability Class	Distance from source ft	Measured H2S ppb	Predicted H2S Emission rate lb/hr
2/10	6:00	5.1	D	815	210	6.5
2/10	7:00	7.5	D	532	400	12.3
2/10	14:58	7.0	D	815	126	4.5
2/12	14:30	5.0	D	456	485	5.9
2/12	14:03	5.3	D	815	150	4.9

Discussion

Samples of water entering the clarifier and ASB systems indicated a loss of MeSH between 0 and 27 lb/day MeSH and a loss between 0 and 66 lb/day of DMDS. The only vector for TRS loss from waste water between the clarifier inlet and ASB inlet is through stripping to the air. The emission rates estimated by the ambient modeling were at the low end of the range of emission rate estimates made by taking the difference in TRS concentrations in the effluent entering and exiting the ASB system.

Clarifier TRS emission rates are likely impacted by short term fluctuations in effluent composition, TRS content, and pH.

ASB Emissions

ASB emission modeling overview

Only one set of data was suitable for modeling emissions from the ASB. Thus, the results reflect the emission rate for that brief period of time. The ASB could not be isolated to provide a second point to calibrate the model because of its close proximity to the polishing pond.

H2S concentrations were measured on February 9 at 15:20 along the north edge of the pond when the wind was blowing from the south. Only one set of measurements along the edge of the ASB was collected because the wind was from the south for a short window during the study period.

The pond was modeled in sections, each corresponding to an area directly downwind of aerators and the spaces between aerators. The TRS emissions were modeled as if they originated along the centerline of the ASB. The model results for each section were summed to estimate the total emissions from the ASB.

Modeling details

Table 3 shows the modeling details and results. The estimated TRS emissions for this time period were 270 lb/hr. Sulfide concentrations measured in water samples taken from the ASB inlet and outlet earlier in the day indicated a loss of 350 lb sulfides /day.

Table 3 ASB Modeling details

Zone	Down wind from aerator	Section Width ft	Measured H2S ppb	Back-modeled emissions lb/hr
1	Yes	200	2450	32
2	No	200	1400	18
3	Yes	150	4600	48
4	No	200	1400	18
5	Yes	150	2200	19
6	No	200	2400	31
7	Yes	150	5500	58
8	No	200	960	13
9	Yes	200	2500	33
Total				270

Polishing Pond Emissions

Overview

Modeling the polishing pond H_2S emissions was difficult and uncertain because of the pond's large area and the inability to take ambient H_2S emission measurements at long distances from the source. Because of the difficulty, the pond emissions were modeled using several approaches to bracket an estimated emission rate. One approach included times when the wind blew from the north or northwest. The other approach used the data collected when the winds blew from the east.

When the winds blew from the north/northwest, the polishing pond was modeled in 3 sections, each modeled as an area source. The areas modeled are shown in Figure 1. Area A modeled the emissions from the bulk of the pond. Area B modeled the emissions in the area to the west of the influent to the pond. The emissions from these 2 areas were summed together and reported as polishing pond emissions. Area C models the H_2S emissions at the influent of the pond. Area C emissions are emitted as the effluent exits from the step aerator and releases trapped gases.

When the wind blew from the east, the polishing pond was modeled as a single large area source.

Polishing Pond Modeling Areas

Figure 1 Modeled area for north to northwest winds

Continued on next page

Polishing Pond Emissions - continued

North Wind Modeling Details

Area A was modeled as an area source with a width of 2500 ft. The best fit with modeling point 6 and a point on Highway 11 was obtained when the emissions were assumed to come from 1660 feet from the edge of the pond when the wind was blowing from the north or northeast. (Appendix A shows location of numbered sampling points with respect to the source.)

Area B, was modeled as an area source with a width of 700 ft. The area could not be isolated to provide a second point to calibrate the model because of its close proximity to the ASB. The model used the same distance between source and measurement point as determined by the Area A model calibration. One ambient H2S concentration was taken on the south shore of the lagoon when the wind was blowing from the north.

Area C modeled TRS emissions released when effluent from the ASB discharged from the step-aerator into the polishing lagoon. The aerial photograph below shows that the discharge appeared to de-gas over an area about 300 ft across. Area C was modeled as an area source with a width of 90 m. The ambient emission concentration was measured at the south shore of the pond directly downwind of the step-aerator outfall when the wind was blowing from the north. The distance between point 11 and the source was assumed to be 120 m. The area could not be isolated to provide a second point to calibrate the model because of its close proximity to the ASB.

East Wind Modeling Details

The polishing pond was also modeled when the wind was blowing from the east. Two models were prepared, one for measurements taken at points 3 and 4, and the other taken at point 4 and another point taken southwest of the spoils area on the road that runs along the pond's western edge. The model input parameters were adjusted so that the back calculation gave the same emission rate for the paired points.

Continued on next page

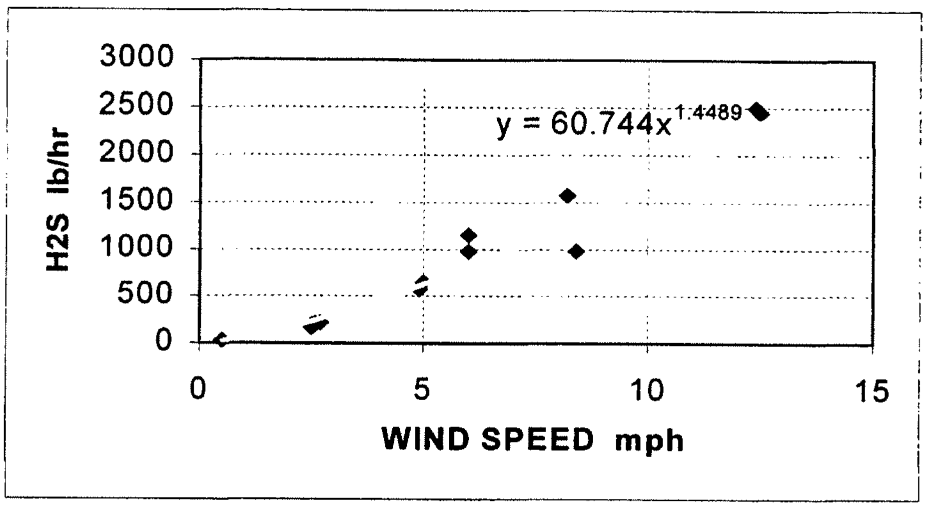
Polishing Pond Emissions - continue

Modeling results

Table 4 shows the data modeled and results. H2S emissions from the polishing pond ranged from 30 to 2400 lbs/hr and averaged about 540 lb/hr. H2S release from the polishing pond during the study period appeared to be in part related to the wind speed as shown if **Figure 2**. Emission rates during the study period were estimated by applying the relationship in figure 2 to the wind speeds recorded at the ambient monitoring station.

The modeling also showed that emissions from the pond were greatest in the area near the inlet to the pond. The effluent appears to de-gas as it exits the step re-aerator and enters the pond.

Figure 2 Polishing Pond Emission Rate as a Function of Wind Speed



Continued on next page

Polishing Pond Emissions - continued

Table 4 Polishing Pond Modeling Results

Date	Time	Point	Wind speed mph	Stability Class	Distance from source ft	Width ft	Measured H2S ppb	Predicted H2S Emissions lb/hr
Area A (East pond area)								
2/12	05:00	Hwy.	5	D	2600	2500	1100	500
2/11	5:30	Hwy.	1	D	2600	2500	150	30
2/10	5:44	6	8.4	D	1660	2500	1490	836
2/10	14:30	6	12.5	C	1660	2500	1617	2300
2/10	14:32	6	8.2	C	1660	2500	1533	1428
2/9	15:42	6	12.4	C	1660	2500	1667	2351
Area B (West pond area)								
2/12	13:46	11a	6.3	C	700	700	1400	147
Area C (Wastewater entrance to pond)								
2/12	13:14	11	6.6	C	390	300	16300	505
2/11	7:28	11	3.4	C	390	300	17000	148
West edge								
2/12	5:49	4	2.7	D	2000	2500	1144	217
2/12	5:54	3	2.6	D	5200	2500	450	210
2/9	8:30	4	6	C	850	2500	2925	980
2/9	8:45	4c	6	C	1650	2500	1700	1152
2/13	14:42	3	4.9	C	5200	2500	256	573
2/13	15:34	4	2.5	C	850	2500	1400	194
2/13	15:46	4c	2.5	C	1650	2500	640	163

Pulp Mill and Evaporator Area Emissions

Modeling overview

The pulp mill area includes emissions from the pulp mill, evaporators, turpentine and tall oil systems. The SCREEN model was calibrated to the pulp mill area ground level emissions for two different wind directions by adjusting the modeled distance from the source until predictions of ambient concentrations matched the measured values at three different points.

The pulp mill sits in a congested area, surrounded on several sides by buildings. The SCREEN model could reasonably predict the concentrations measured at three points when the urban modeling mode was used. The modeling was conducted when the wind blew from the North and NNW. The ambient conditions that allowed modeling occurred only on February 10.

Modeling results

The conditions the pulp mill area emissions were modeled at and the modeling results are shown in **Table 5.** The TRS emissions from the pulp mill area varied between 4.5 and 12.3 lb/hr.

Table 5 Pulp Mill, Power-house, and Evaporator Area Modeling Results

Date	Time	Point	Wind speed mph	Stability Class	Distance from source ft	Source Width ft	Measured H2S ppb	Predicted H2S Emission rate lb/hr
2/10	6:35	a	7.5	D	456	250	310	21
2/10	6:35	b	7.5	D	988	250	76	21
2/10	6:35	c	7.5	D	1520	250	36	20
2/10	15:05	d	10	D	330	500	240	30
2/10	15:05	d	10	D	456	500	174	32
2/10	15:05	d	10	D	1546	500	29	29
2/10	14:35	8	9.1	D	912	250	67	17

Waste Water Studies

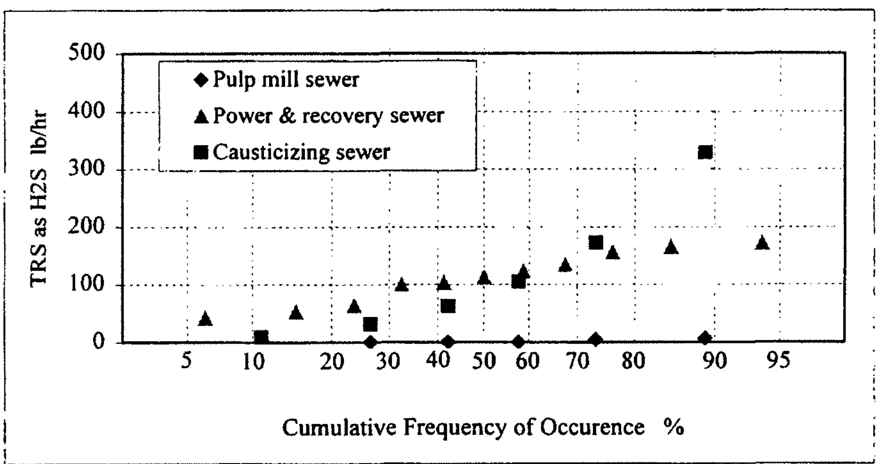
Overview

Samples of wastewater from various process areas entering and leaving the waste water treatment system were collected and analyzed for TRS compounds. The purpose of the sampling was to identify sources of TRS entering the wastewater treatment system and points of potential loss from the wastewater treatment system. The methods used, data collected and data reduction are contained in **Appendix D.**

TRS loading to Wastewater treatments system

Figure 3 shows that TRS loading to the sewer system is highly variable. Although the power and recovery sewer contained the most TRS on average, the causticizing area sewer TRS content was much more variable, and at times, added much more TRS to the effluent treatment system than the power and recovery sewer. The figure indicates that the TRS loading to the effluent system from the causticizing area was greater than 300 lb/hr for more than 10% of the time. However, the causticizing effluent passes through the ash settling pond where some equalization may take place.

Figure 3 Cumulative Frequency of Occurrence of TRS Entering Effluent Treatment System



Continued on next page

Waste Water Studies - continued

TRS Constituents

The TRS entering the sewer was made up mostly of sulfides, with smaller amounts of methyl mercaptan, methyl disulfide, and dimethyl disulfide. **Table 6** shows the composition of TRS in the sewers entering the effluent treatments system.

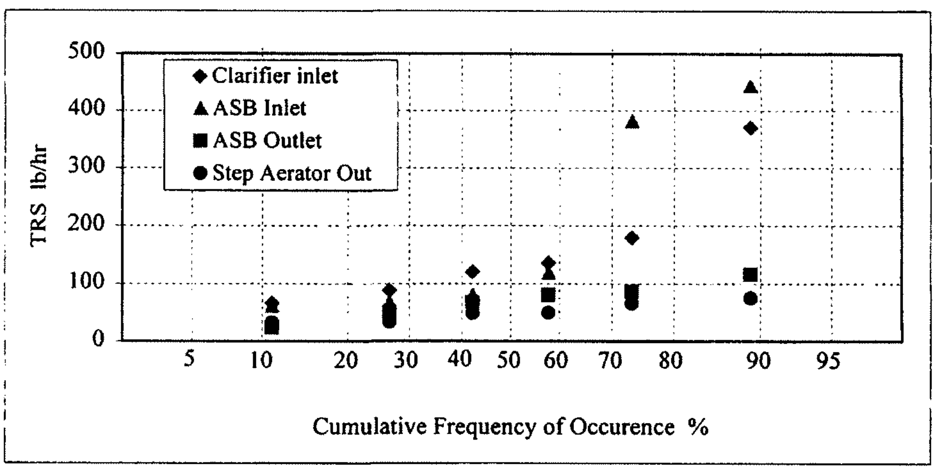
Table 6 TRS Constituents in Sewers.

Sewer	Average TRS lb/hr as H_2S	H2S %	MESH %	DMS %	DMDS %
Pulp mill sewer	3.4	73	0	0	27
Power and recovery sewer	123	70	18	5	6
Causticizing sewer	118	100	0	0	0

TRS flow through water treatment

The concentration of TRS compounds were measured at various points in the waste water treatment system. **Figures 4 and 5** show that TRS entering the effluent treatment system is highly variable, and much of the variability is dampened by the time it enters the polishing pond. It also shows that the amount of TRS compounds in the waste water decreases as it flows through the treatment system with the exception of an occasional increase at the ASB inlet. This increase results because the highly variable causticizer sewer enters the treatment system between the clarifier outlet and ASB inlet.

Figure 4 Cumulative Frequency of Occurrence of TRS At Various Points in the Waste Water Treatment System

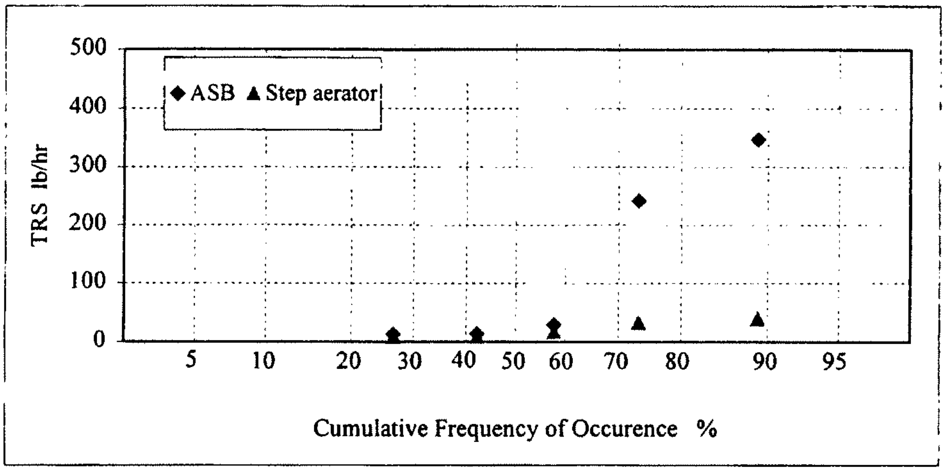


Continued on next page

Waste Water Studies - continued

TRS loss across ASB and Step Aerator

Figure 5 Cumulative Frequency of Occurrence of TRS loss across the ASB and Step Aerator.



In Mill Corrosion

Corrosion in mill

Field measurements indicate that the major area sources can produce a background of H_2S throughout the mill when winds come from the Northerly to Easterly directions. Table 7 below shows that there are also smaller sources in the mill where close-in corrosion potential is high.

Table 7 Corrosion: Significant Levels of TRS in Specific Areas in the Mill

Criteria: within source ambient boundaries, at source edge or within <10 foot downwind

Source	TRS Concentration Range – ppb (as H_2S)	TRS Constituents Estimation* Nominal GC Results
Powerhouse Sewer Flume	650 - 1800	Mostly MeSH, some H_2S
Evaporator Hotwell Area	900 – 4000	Almost all MeSH, small H2S, DMS
Turpentine Decant Area	800 – 2300	MeSH and DMS
Clarifier close-in Basin Area	2100 – 3900	About equal H_2S and MeSH
Clarifier Area Lift Stations	900 – 1800	About equal H_2S and MeSH
ASB Aerator Compressors	4000 - 5000	Almost all H_2S, small MeSH

* Tedlar bags sampled in these area submitted for GC analysis. TRS Concentration range measured by Jerome H_2S Monitor as H_2S.

Corrosion in the Paper Machine Building

The very humid environment inside the Paper Machine building causes equipment there to be susceptible to corrosion caused by TRS in the ambient air. TRS in the Paper Machine Building mostly comes from H2S emissions from the effluent treatment system.

The ASB and Polishing Pond have high H2S emission rates often capable of causing 500 to 1500 ppb concentrations throughout the paper and pulp mill region when winds come from the general N / NE direction.

- The Paper Machine Building is under constant negative pressure. A velocity of 375 ft/min of outside air into the building was measured at several open doorways.
- A typical 120 ft^2 door can move 45,000 cfm into the Machine building at this velocity
- The Paper Machine Building is 500 to 700 foot distance from the ASB thus allowing high concentrations of H_2S to enter the building with N / NE winds.
- 1000 ppb H_2S would equate to 5.7 lbs of H_2S entering the building in 24 hours from one 120 ft^2 doorway.

Recommendations

Overview

The following recommendations are intended to enhance the second part of this study by improving the ability to estimate TRS emission rates and to start gathering information that will be useful to engineer further reductions in TRS emissions. The first part of the study identified the major release points and quantified emission rates. Experience gained enables the second part of the study to focus on the areas needing the most study.

Optimize ambient H2S data collection

Take advantage of climatic conditions to maximize data collection for key sources. Enhance data collection by changing the daily round procedures for measuring ambient TRS concentrations to include collection of data at multiple points downwind of sources during the rounds when wind conditions allow. The data collection round will resume after the additional downwind samples are taken.

Relocate some of the data collection points to optimize back modeling. Include additional locations near key sources.

Areas that need better estimates of emissions are:

- ASB
- Different areas of the polishing pond
- Individual release points in the pulp mill area including evaporators, turpentine system, washer vents, and NCG system leaks.

ASB

Enhance collection of waste water data to better define emission rate variability and to collect information leading to recommendations to changes to the wastewater system to reduce H_2S generation.

1. Estimate the amount of sulfide generated in the ASB. Take additional water samples for sulfides at the inlet and outlet to characterize difference. Obtain additional data on ASB emission rate. Run mass balance to determine biological manufacture/destruction rate of H2S.

2. Collect BOD, soluble BOD, COD, ORP, DO,SO_4, pH and Alkalinity data at the inlet and outlet of the ASB system. H_2S generation in ASB systems are believed to be affected by soluble BOD and oxygen-reduction potential (ORP) in wastewater treatment systems. This information will be needed to evaluate how much additional aeration and/or BOD reduction may be needed to minimize H2S generation in the ponds.

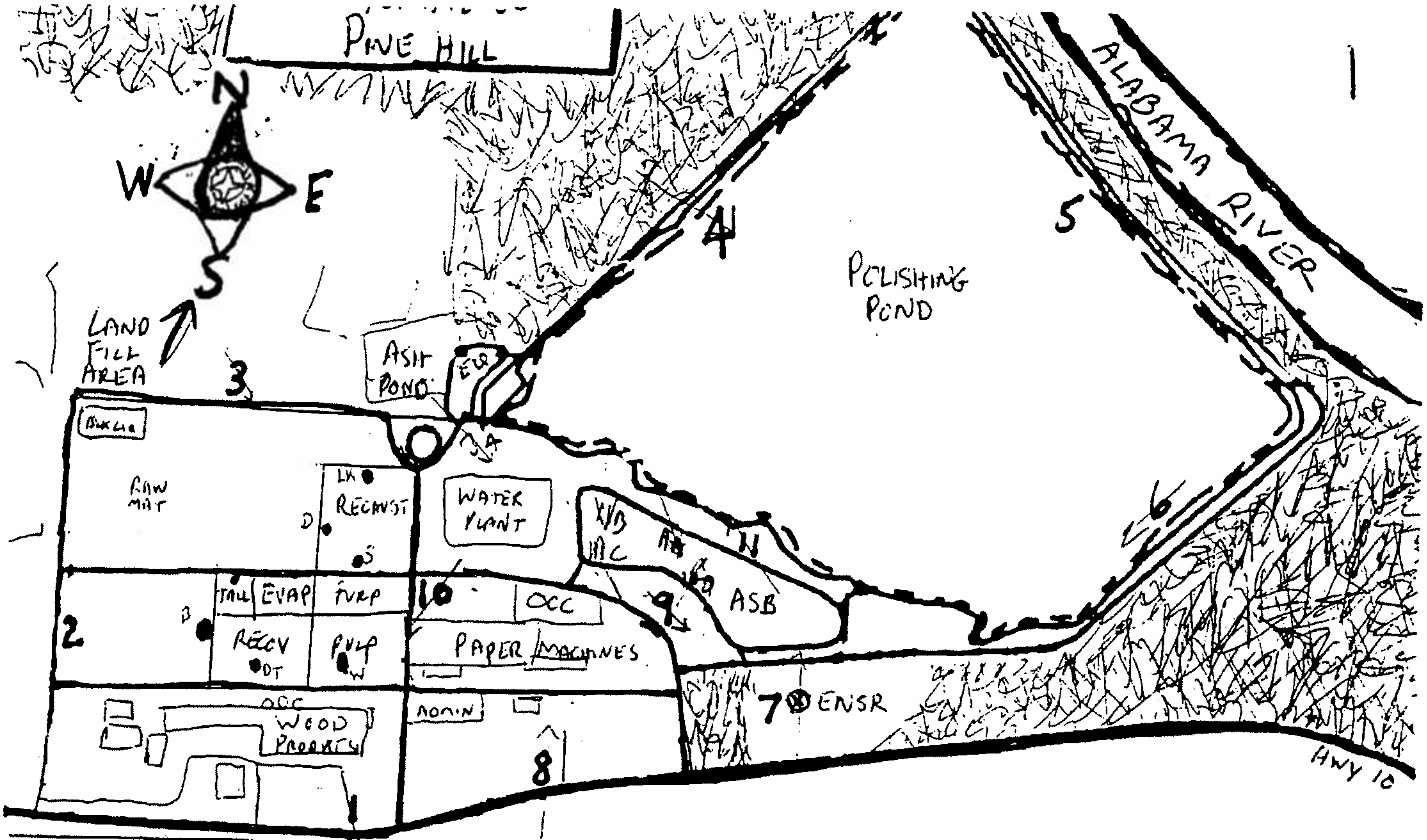
Continued on next page

Recommendations continued

Polishing pond	Collect wastewater samples at select locations in the polishing pond to better define where and how much H2S is generated in the pond. This information will be used to develop recommendations on how to reduce H2S generation and release form the polishing pond. Collect BOD, soluble BOD, COD, ORP, DO, pH and Alkalinity data at selected locations in the polishing pond. This data will be used to identify if, how much and where aeration may be needed in the polishing pond.
Process stream studies	Collect sufficient wastewater samples (greater than 8 samples per source) during the sample period to characterize the TRS loading and variability from the different process areas. Get better effluent flow rate information. Measure effluent flows for streams where flow are not normally measured.
Process	Conduct an audit of the pulping and re-caust areas to document what changes were made between the first and second phases of the study and to identify potential practices that lead to TRS to sewers or atmosphere.

Appendix A

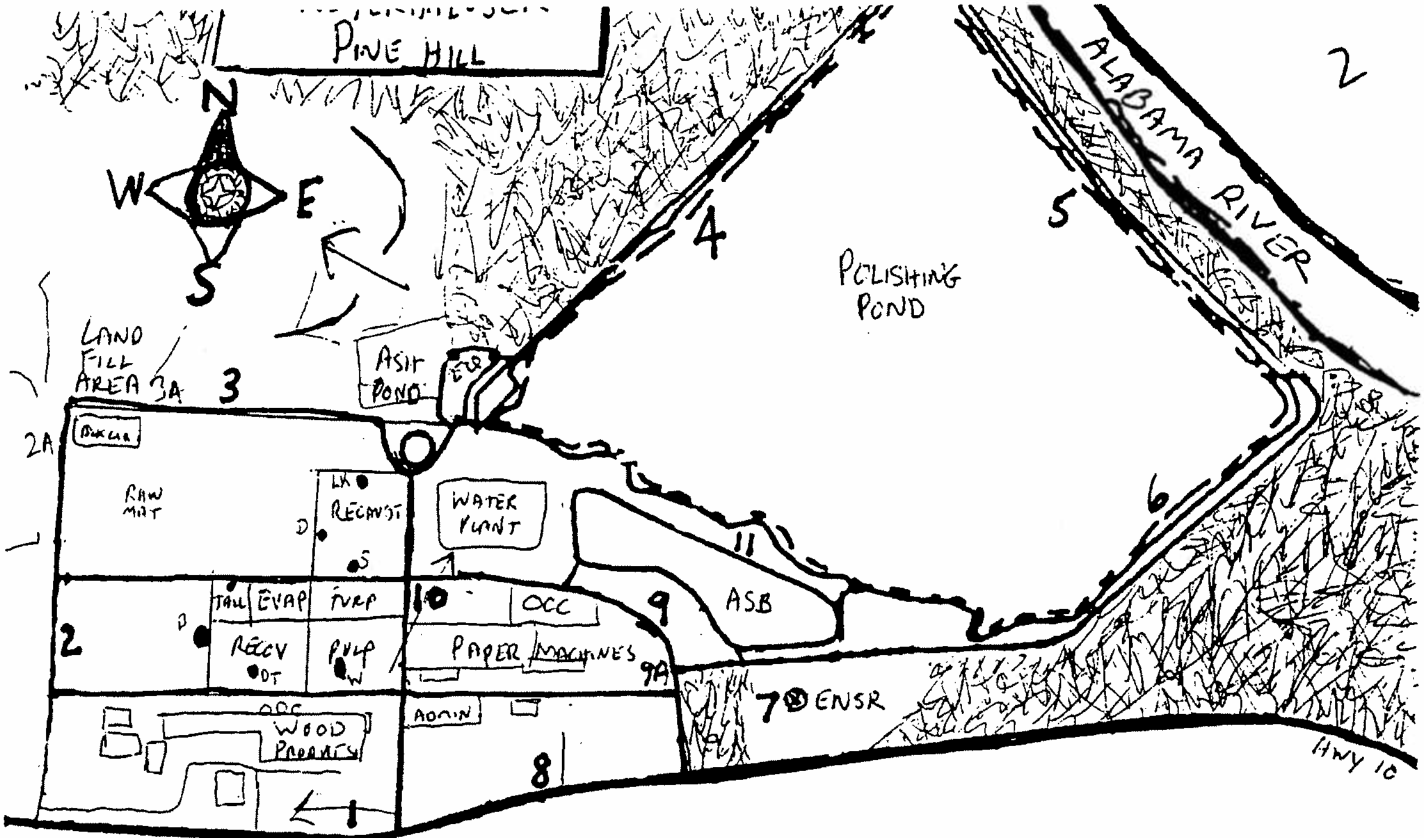
Ambient H2S Measurement Locations and Readings



#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	TEMP	COMMENTS — DATE: 2/7/01 ROUND: 1
3	0539	23	25	23	24	320	1.3	48	DARK, COOL, LIGHT WINDS
3A	0542	230	130	190	185	330	0	41	FROM N—NW
4	0551	12	13	12	12	300	0.6	36	NOT MUCH ODOR
5	0557	12	4	6	11	80	0.6	39	
6	0603	2	1	1	1	60	0	39	
7	0615	3	2	2	2	180	0	39	
11	0620	630	670	1430		100	0	39	
11A	0625	1100	1200	1300		320	0.5	40	
11B	0628	2100	1800	2100		360	0.5	40	
11C	0630	370	270	220		160		40	UPWIND ASB CAR EXHAUST FROM ROAD
11D	0632	6	6	6	6	210	0.5	39	
9	0639	6	5	4	5	120	0.4	39	
8	0646	1	2	1	1	180	0	38	
1	0650	5	3	3		320	0	38	
10	0656	650	530	100		60	0.4	41	
2									

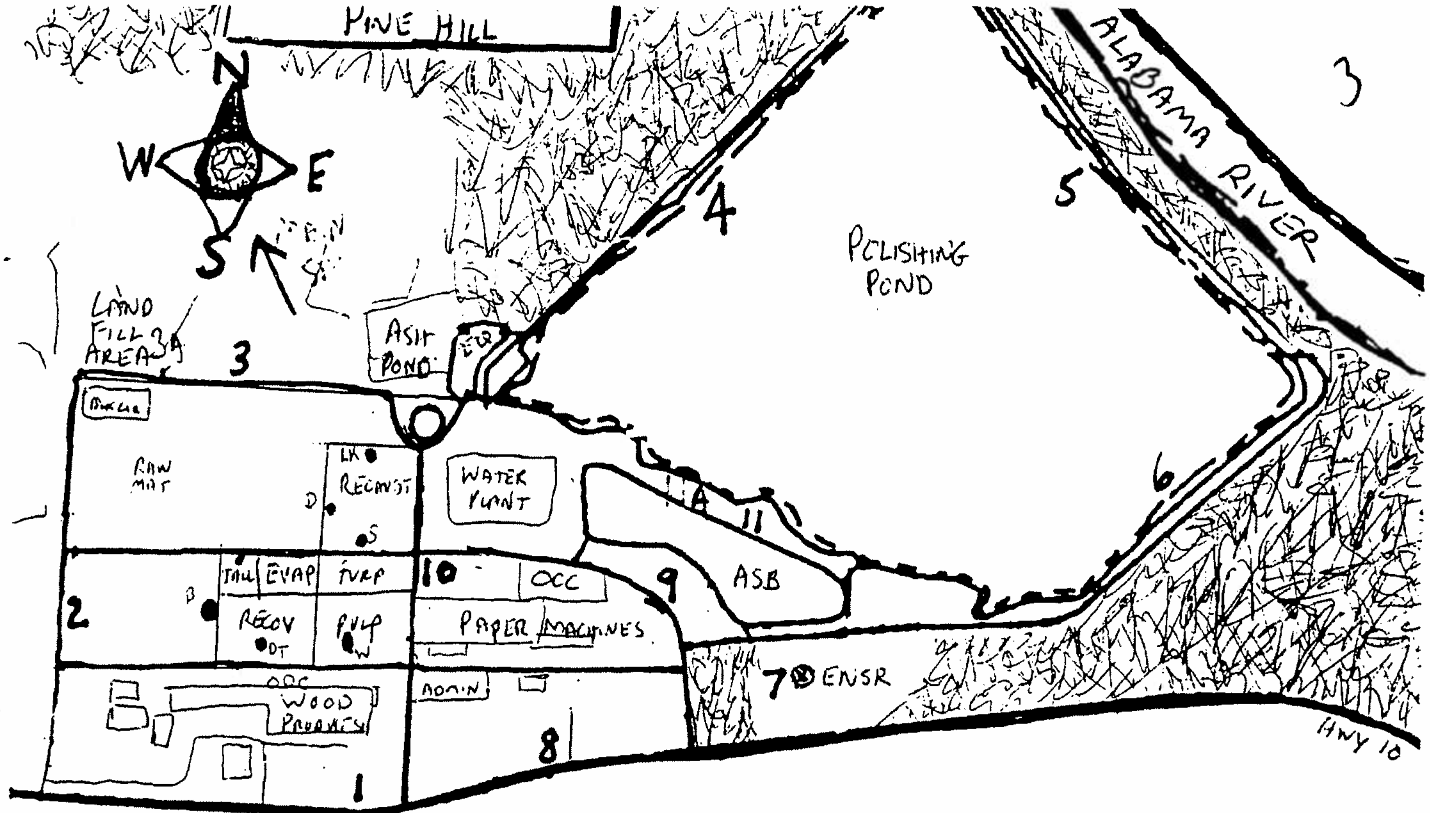
A1

GLADNEY-WY032441



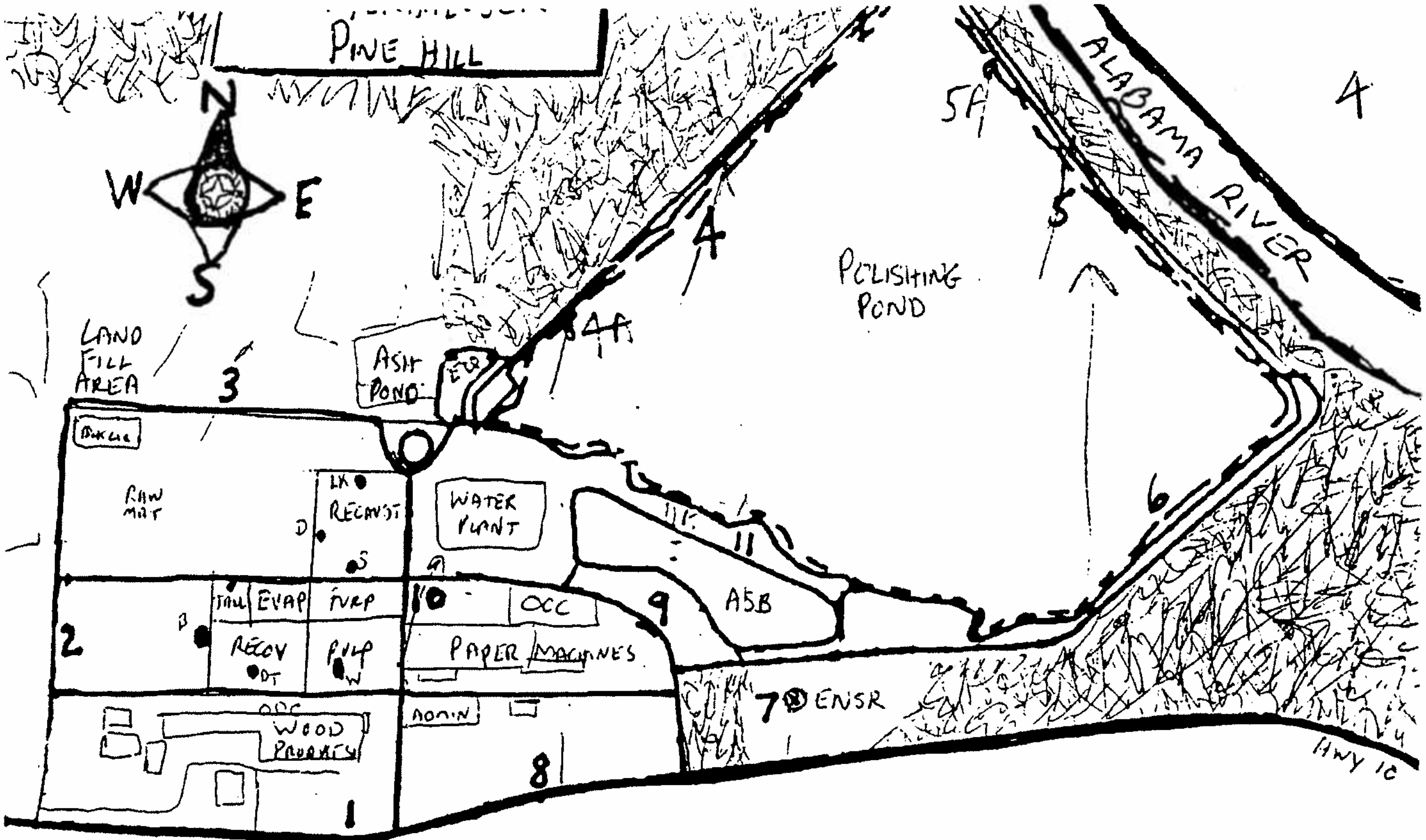
#	TIME	HYDROGEN SULFIDE ppb A	B	C	AVG	WIND DIR	MPH	°F	COMMENTS DATE: 2/8/01 ROUND: 1
3	5:30	210	190	130		330	0.1	48°	Thru Mill
3A	5:35	330	220	330		100	0.5	46	Smell slight ASB [illegible]
4	553	2	2	2		300	0.5	43	NO odor
5	0605	0	0	0		00	0	44	No wind, no odor
6	0611	2	3	190		00	0	43	No wind No Direction
7	0620	1500	980	1300		00	0	42	NO WIND, ASB Smell
11	0630	5800	7000	8600		60	2	47	Funky + Nasty
9	0644	2300	2800	2400		80	1.1	46	Sun [illegible] Smell
9A	0649	1700	2000	1400		80	1.0	46	Smell
10	0653	1280	1300	1700		200	1.0	46	Pulp Mill Smell
2	0700	170	180	180		120	0.5	47	
2A	0710	30	29	32		120	0.4	47	Mill Downwind
1	0717	170	230	180		90	0.2	47	
8		49	58	49		90	0.2	47	Clouds cover increasing

A2



#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	°F	COMMENTS DATE: 2/9/11 ROUND: 1
3A	[illegible]	102	[illegible]	81		200	0.2	50	COOL CALM CLEAR
3	0540	240	210	170		270	1.1	48	GROUND [illegible] SWIRLING
4	0545	18	16	19		290	[illegible]	[illegible]	MAIN STACK WIND
5	0550	0	5	4		0	0	46	STEADY FROM SE
6	0555	3	2	4		/	0	46	
7	0618	2	2	2		/	0.3	48	
11	0625	1900	2000	1900		/	0	51	
11A	0628	3300	3300	3100		/	0	51	
9	0633	18	11	16		/	0.4	50	
2	0644	34	58	58		/	0.5	51	
1	0652	2	2	2		/	0	51	[illegible] breaking up
8	0702	3	3	3		/	0	52	
7	[illegible]	30	22	25		\	0	52	

A3

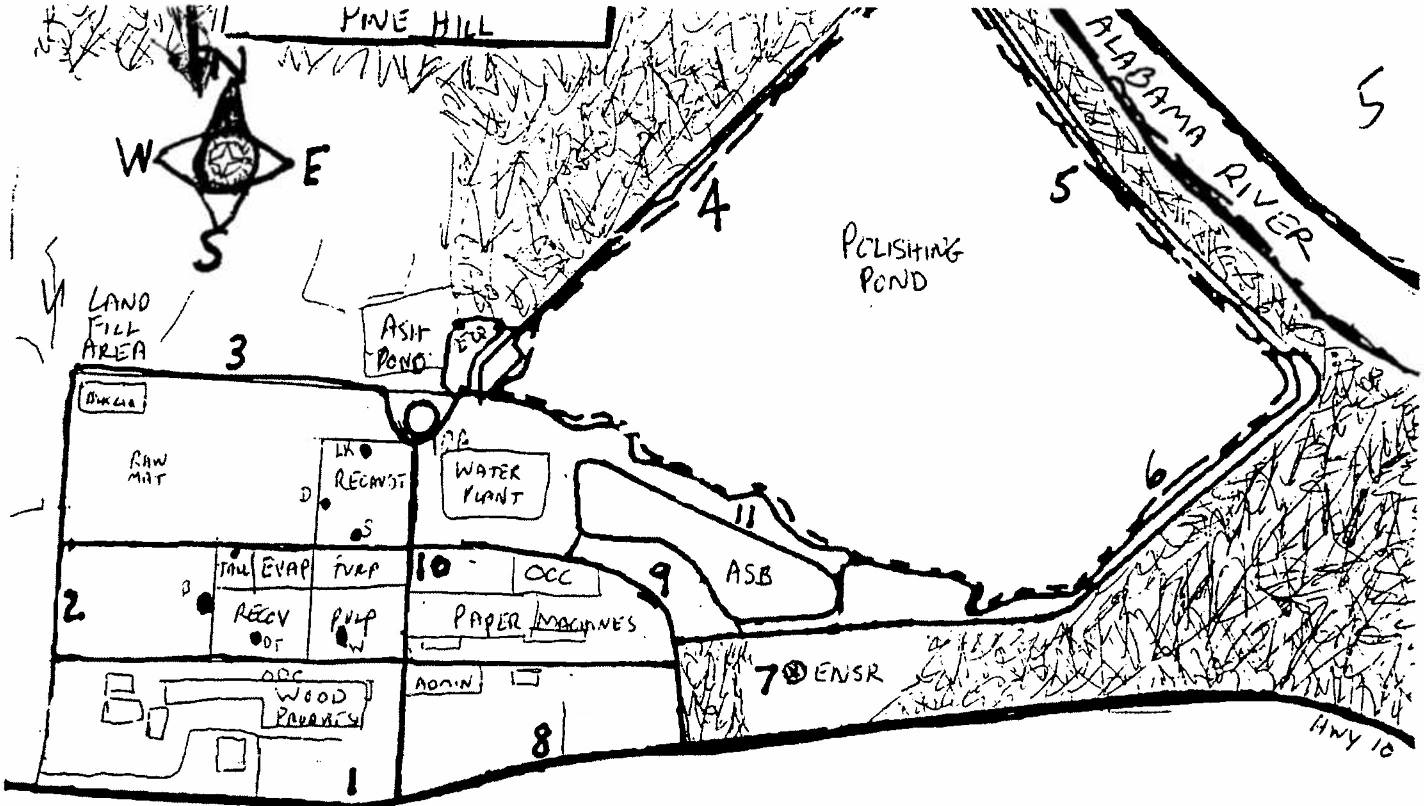


DATE: 2/9/01 ROUND: 2

#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH		COMMENTS
7	[illegible]	4	4			180	5.6	74	CLOUDY, VERY WINDY
11	1510	5100	2700	[illegible]		180	13.4	73	STEAM FROM [illegible]
11A	[illegible]	[illegible]	4000	4800		180	15.2	73	[illegible]
6	[illegible]	99	[illegible]	200		180	2.9	74	WIND STEADY FROM S
5	1542	1400	1600	1800		190	12.4	75	— SET FOR STUDY —
5A	1546	760	700	1200		200	10.0	74	
4	1555	4800	[illegible]	2900		200	9.6	74	FOUL!
4A	1600	700	2400	3200		200	8.7	74	
3	1603	7	5	4		190	7.5	74	
2	1607	4	3	3		200	7.0	73	
10	1609	12	5	5		190	2.9	73	
9	1613	3	5	5		180	1.6	74	
8	1615	3	3	2		180	2.2	75	

A4 28

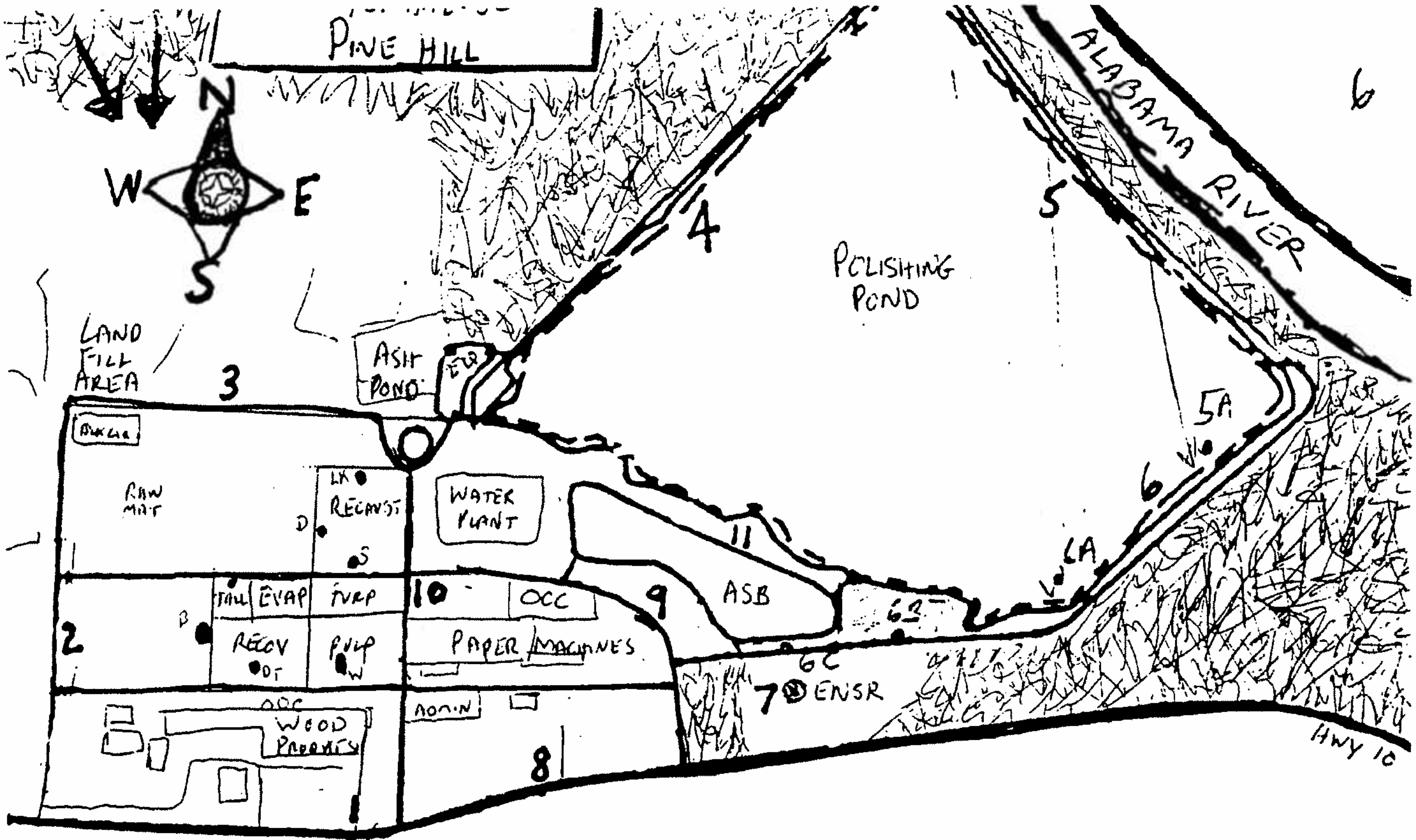
5



#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	T	COMMENTS ↓ DATE: 2/10/01 ROUND:
4	0533	0	0	0		N	1.4	47	THICK CLOUD [illegible]
5	0537	0	0	[illegible]		N	0.5	48	COOL – [illegible] – [illegible] –
6	[illegible]44	1900	1470	1[illegible]00		NW	8.1	46	MA[illegible]
7	0553	760	1500	1100		N-NW	2.4	46	[illegible]
9	0600	560	480	240		NW	1.8	47	
10H	06[illegible]	2300	3900	1460	2553	N	5.1	45	
10	0632	[illegible]	190	320	210	N	4.1	44	
3	0636	2	2	3		N	6.8	44	MPPY!
2	0640	3	2	2		N	6.4	44	
1	0648	10	6	11		N	5.5	45	

A5

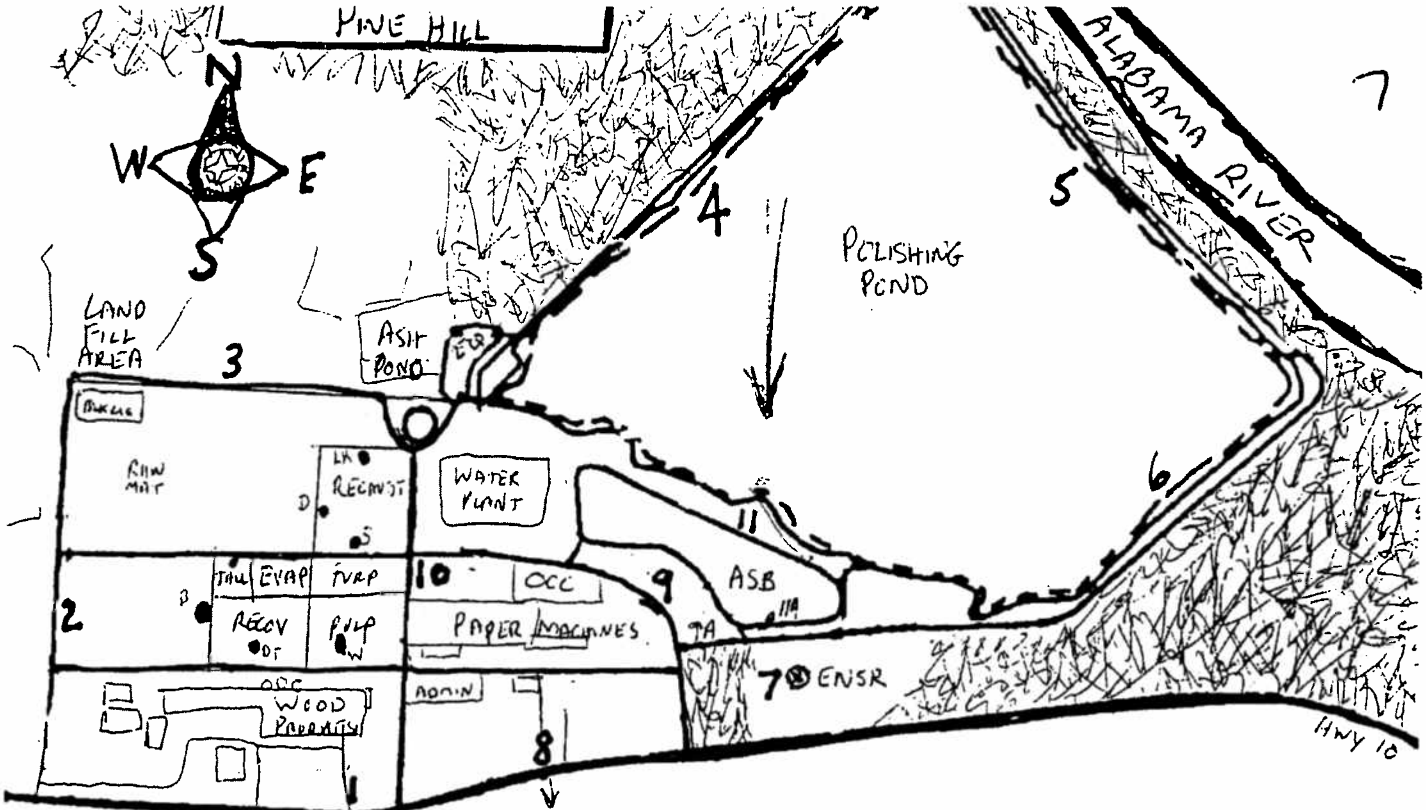
6



DATE: 2/10/01 ROUND: 2

#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	T	COMMENTS
1	1342	6	13	5		360	4.3	50	WINDS FROM N - BREEZY
2	1352	3	3	3		340	3.7	54	COOL - SUNNY - [illegible]
3	1358	3	2	3		360	5.5	50	WARMING UP [illegible] COOL
4	1402	3	3	3		340	5.1	50	[illegible]
5	1405	4	3	3		-	0.5	5[illegible]	
5A	1426	670	660	1600		360	1.0	49	OUTFALL SECTION
6	1430	1600	2200	1050		360	12.5	49	↓
6A	1432	1500	1200	1900		350	8.2	51	
6B	1434	1100	1100	860		—	0.5	52	[illegible]
6C	1436	1700	1330	1280		360	2.7	52	
7	1440	760	1300	1100		340	18.9	49	ENSR - FULL SUN
+ 11	1445	8300	11000	3600	4333	340	8.0	50	FUNKY [illegible] MAX
9	1450	160	170	570		350	7.6	50	
8	1453	111	20	71	67	390	9.1	51	
10	1458	88	111	180		330	7.0	51	WINDS [illegible] NW→W THEN N

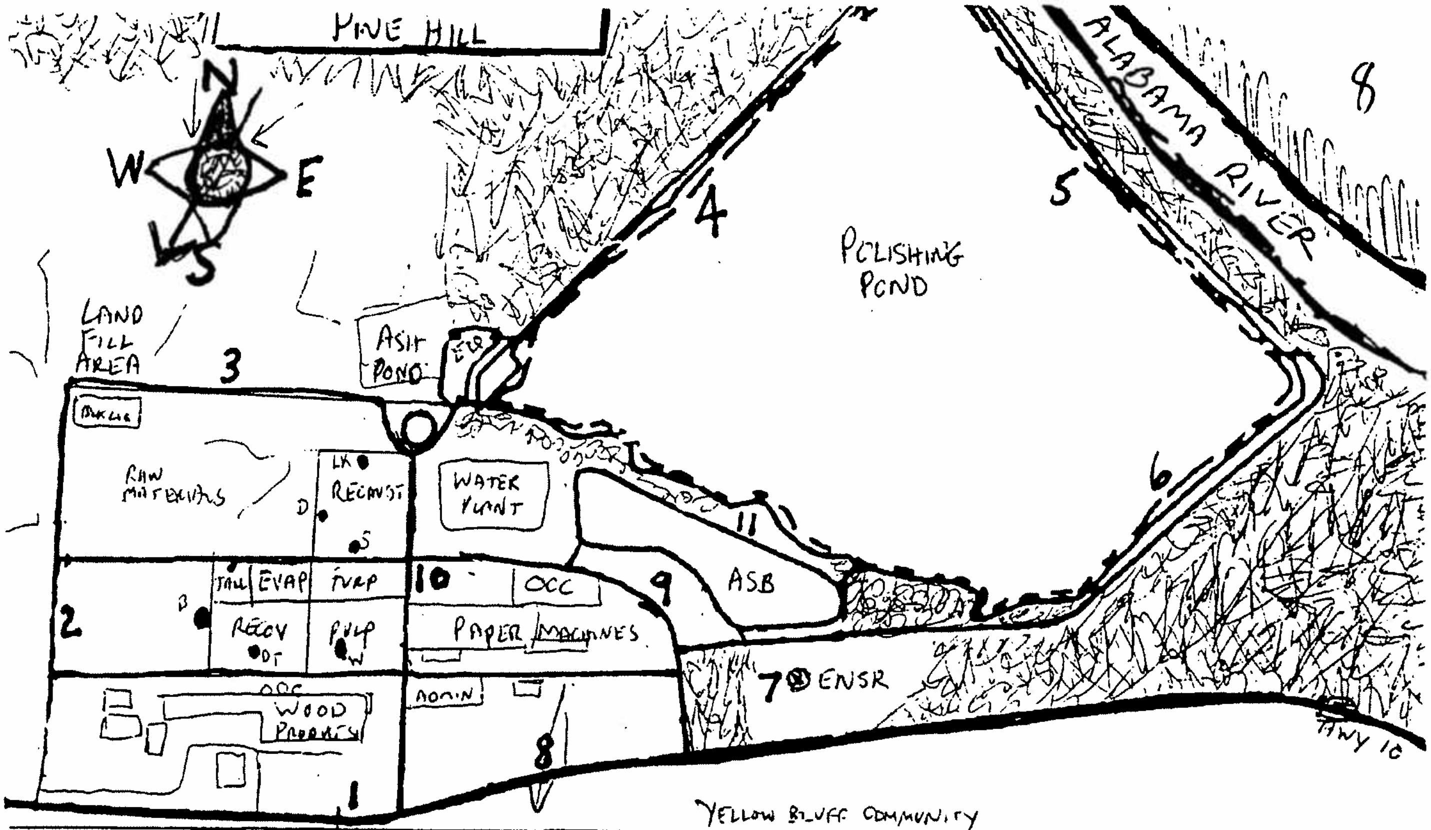
A6



DATE: 2/11/01 ROUND: 1

#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH		COMMENTS
6	0615	260	370	380		360	1.6	41	CLOUDY, COLD, LIGHT BREEZE
5	0620	7	7	6		360	0.4	41	MAIN PLUMES [illegible]
4	0625	7	7	6		360	0.4	41	WINDS STEADY FROM N
7	0721	274	320	680		360	0.9	38	WITH OCCASIONAL [illegible]
11A	0724	13000	13000			360	3.4	38	NASTY
11	0728	17000	—	—	—	—	—	—	CONSTANT [illegible] POINT
9	0734	200	140	570		360	1.0	38	
9A	0737	330	280	270		360	1.2	38	At GATE
10	0743	8	240	11		350	0.8	37	
3	0746	1	2	1		360	0.6	38	
2	0750	3	2	3		350	1.1	38	
1	0756	8	12	24	15	350	2.0	38	MILL SMELL
8	0800	26	38	39		310	2.7	38	MILL SMELL — PM

A7



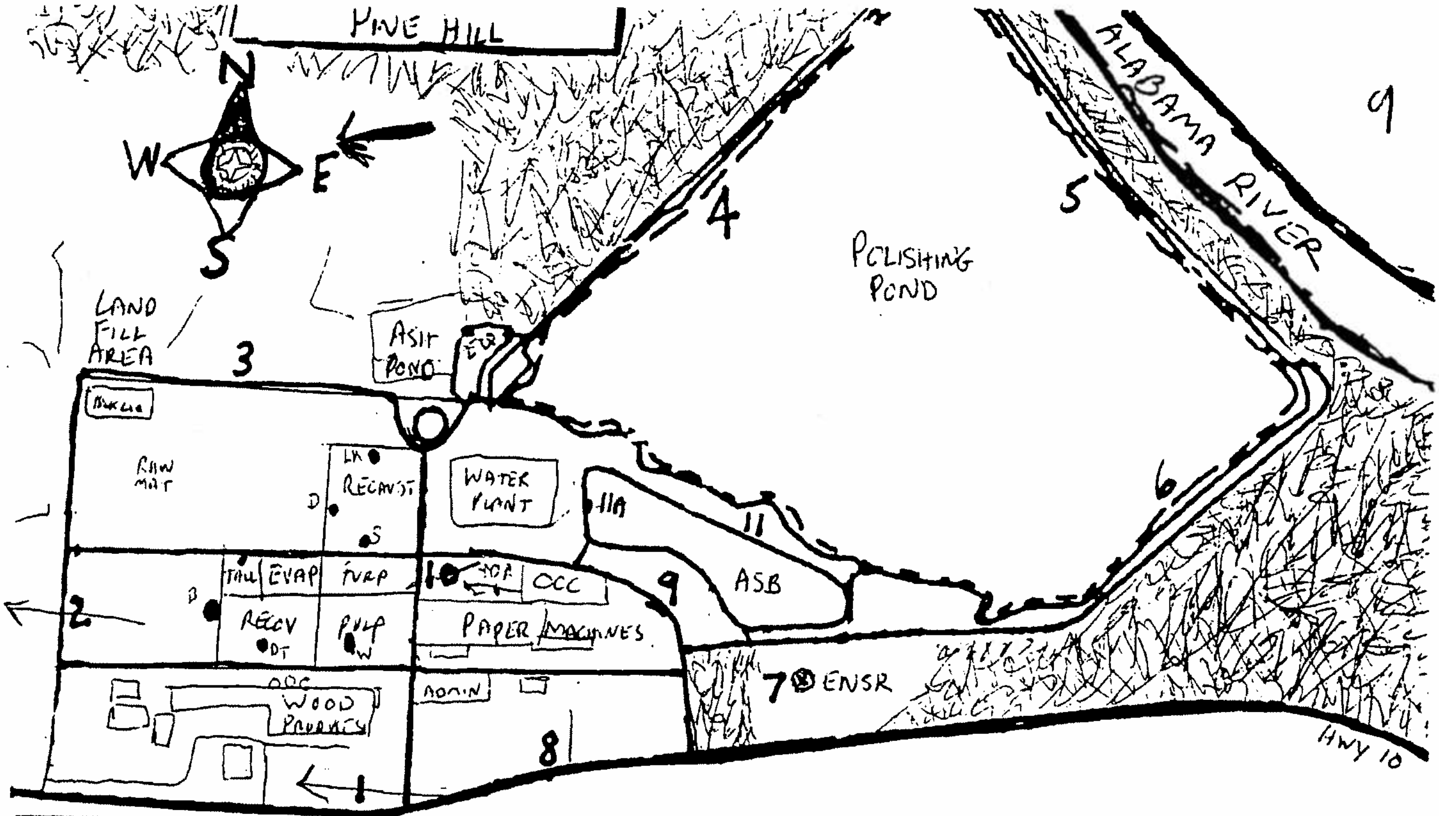
#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	T	COMMENTS
1	1345	6	5	5		10	7.5	54	HIGH THIN OVERCAST
2	1350	5	4	4		360	2.7	55	COOL WITH VARIABLE BREEZE
3	13-4	13	6	6		360	4.2	55	WIND FROM N/NE PREDOM.
4	1400	270	540	78		20	2.4	55	
5	1407	5	5	4		/	0.2	56	
6	1410	330	710	320		10	4.2	56	
7	1415	29	29	70		10	1.0	58	ENSR
11	1420	14200	9300	8100		350	5.4	55	BAD 14 PPM SUN BREAKING [illegible]
9	1425	820	1600	550		10	4.8	55	Smelly
8	1430	40	32	42		10	3.6	55	
10	1435	26	110	140		5	2.0	55	SLIGHT ODOR - [illegible] WINDS

DATE: 2/11/01 ROUND: 2

A8

GLADNEY-WY032448

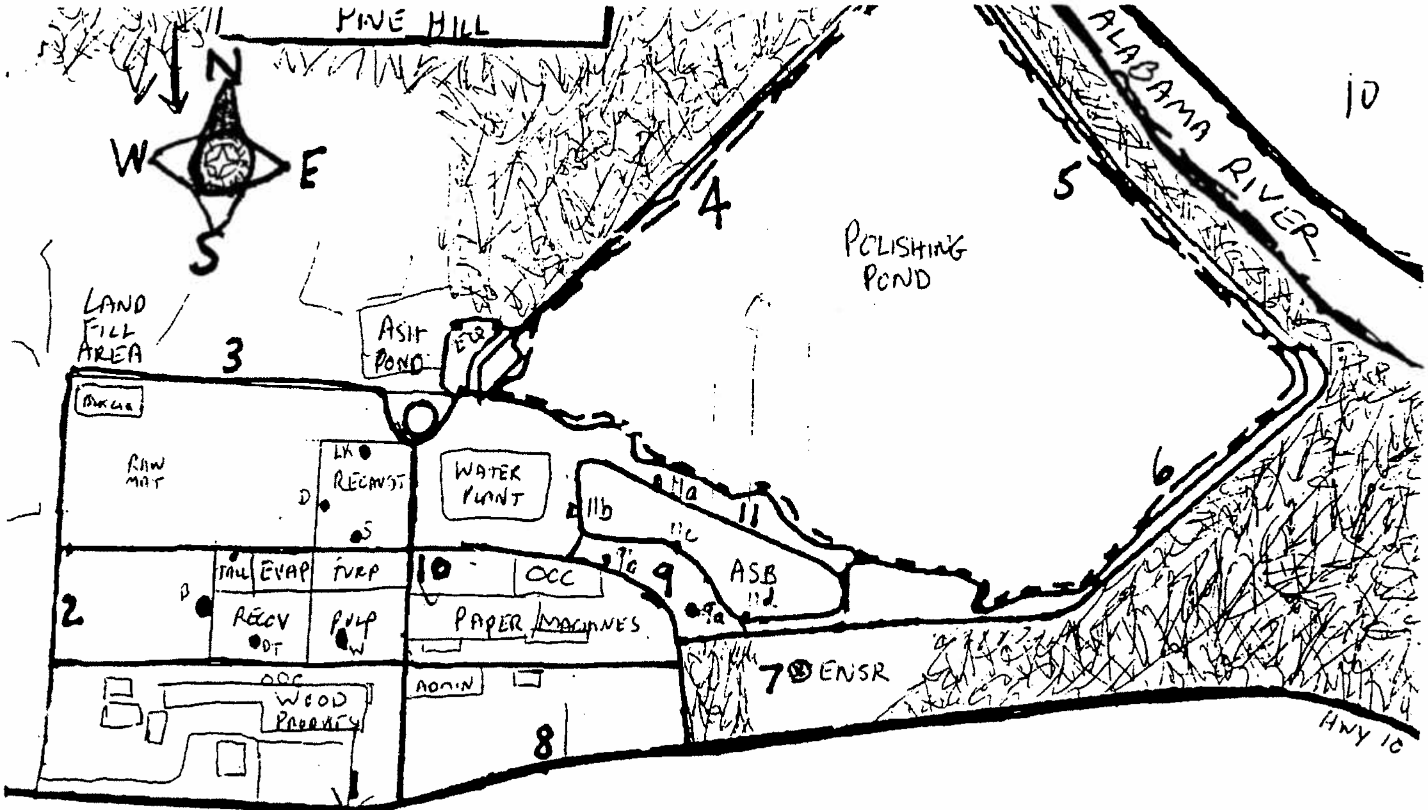
9



#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	T	COMMENTS ↓ DATE: 2/12/01 ROUND: 1
6	0534	630	450	[illegible]		[illegible]	2.5	52	WARMER, BREEZY
5	0540	8	8	7		—	0	54	WINDS FROM EAST
4	0549	1334	700	1400		E	2.7	55	SHIFTED FROM N
3	0554	450	390	500		80	2.6	55	ABOUT 0510
2	0605	12	12	12		[illegible]	3.9	55	HWY 10 WAS SMOKY
1	0613	13	14	12		90	0.7	55	AT MASS DRIVING IN
8	[illegible]	42	280	98		40	2.5	54	WIND SWITCHING NE
9	0628	1300	1090	920		90	3.5	54	
7	0632	360	350	350		80	1.6	55	pol pond odor
11	0636	460	500	320		80	1.5	55	
11A	0640	2400	4800	2500		80	3.0	54	NOT AS [illegible] NOW
10A	0642	260	420	640		90	2.4	54	
10	0646	440	490	550		80	2.9	54	

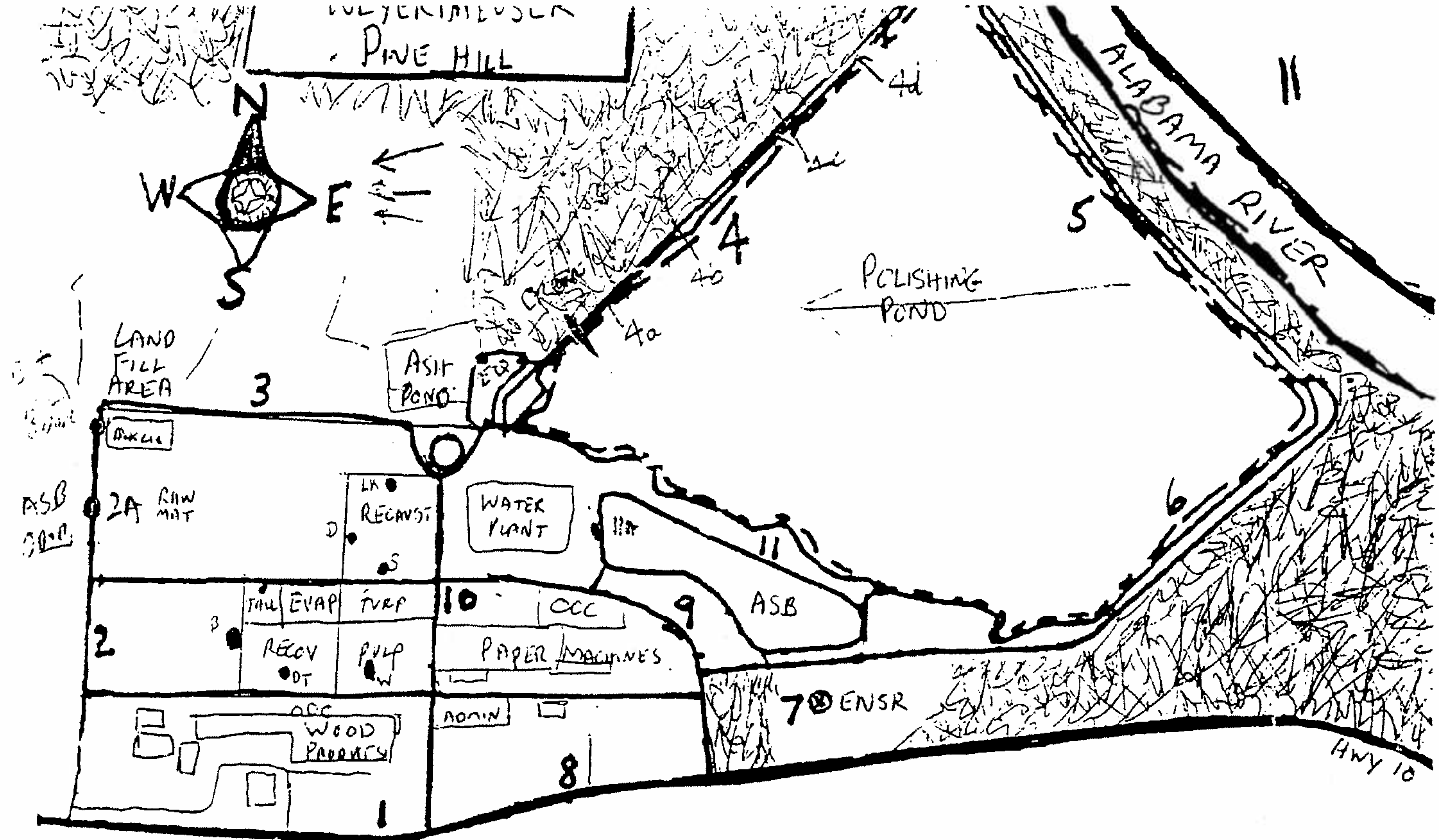
pg

10



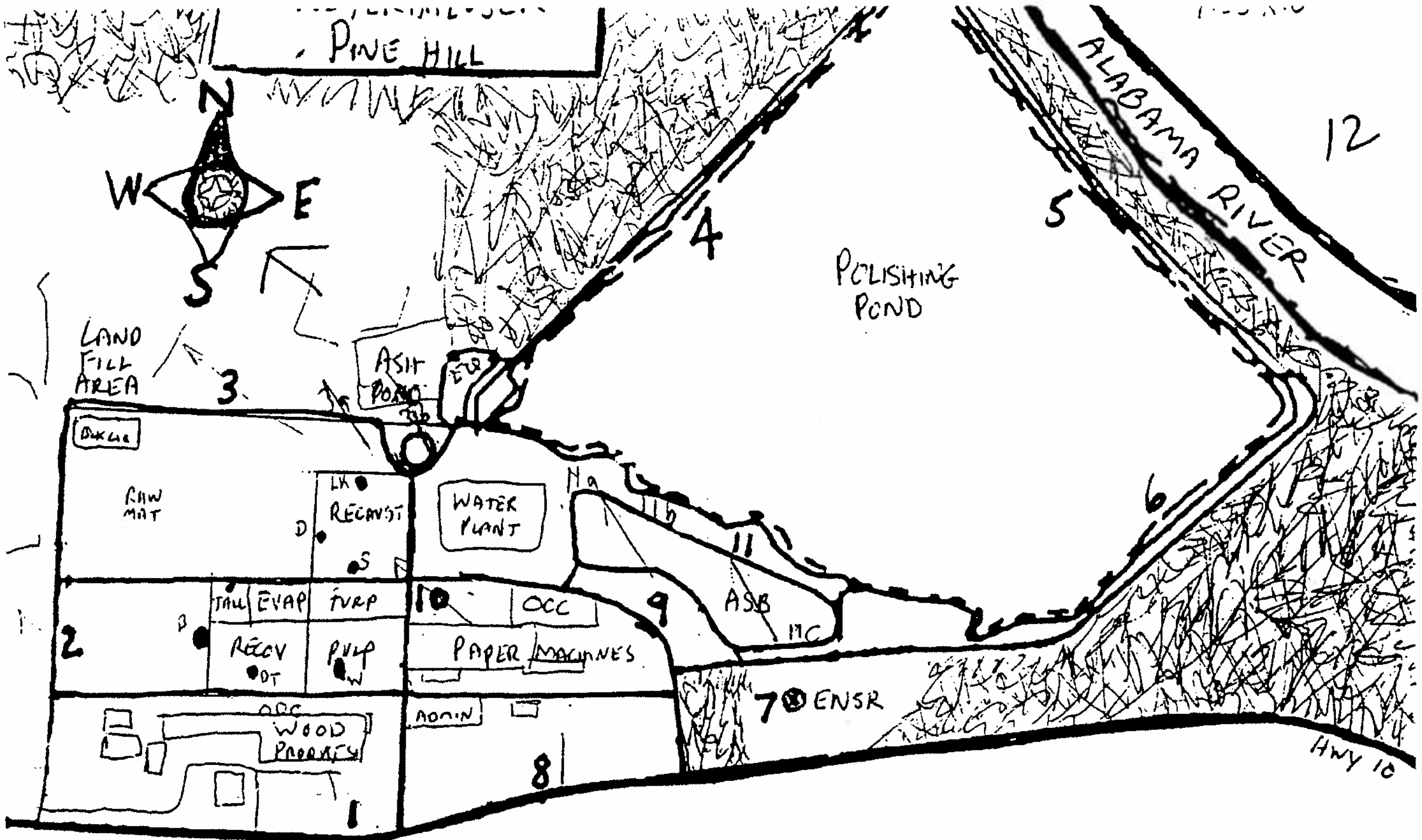
#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	T	COMMENTS DATE: 2/2/01 ROUND: 2
1	1300	130	130	[illegible]		N	5.6	68	WARMER, [illegible] N/N.
2	1309	5	5	4		NE	4.1	68	[illegible]
3	1313	2	4	3		N	4.1	68	[illegible]
4	1321	13	11	15		NE	3.8	69	MUSTY CLOUDY. [illegible]
5	1325	4	4	4		/	0.3	69	↓
6	1335	550	500	490	513	N	10.2	69	[illegible]
7	1340	600	980	970		N	2.7	68	[illegible]
→ 11	1343	12000	25000	12000	16,333	N	6.6	68	NASTY
11a	1346	1900	1100	1200		N	6.3	67	POL POND
11b	1348	2700	1800	2100		NE	3.2	67	
11c	1350	5800	15000	6100		N	8.0	67	
11d	1352	4100	2600	3900		N	7.0	68	
9a	1355	1400	550	1400		N	8.8	68	
9	1357	600	1500	1200		N	6.7	69	
9b	1359	1300	1700	1500		NE	2.0	69	
10	1403	150	130	170		N	5.3	70	
8									

AID



#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	T	COMMENTS (DATE: 2/13/11, ROUND: 1)
1	1425	2	2	2		90	1.7	57	HEAVY OVERCAST, FOGGY, MISTY, [illegible]
2	1432	2	3	3		90	3.8	59	MILL "SMOKING" [illegible] WEATHER
2a	1433	130	120	160		90	3.6	57	WINDS LIGHT AND VARIABLE FROM E
2b	1436	210	290	120		90	0.2	57	POOR MIXING DAY
3	1442	230	230	310		80	4.9	57	POL POND / [illegible] BASIN
10	1450	[illegible]	[illegible]	670		90	3.4	57	ASB STINK VERY HIGH FOR [illegible]
11	1455	12000	13000	19000		90	2.6	59	P.U.
11A	1459	6800	3100	4100		100	3.0	59	STANKY
9	1501	140	200	333		100	2.4	58	
7	1505	26	29	20		100	1.0	60	ENSR STATION SITE
8	1510	6	4	6		90	0.3	60	
4	1534	1700	1300	1200		90	2.4	60	
4a	1540	930	910	1600		90	2-3	60	POND-O-RAMA
4b	1543	1100	1260	1700		↓	↓	↓	↓
4c	1546	580	530	810					
4d	1548	44	80	30		↓	↓	↓	
[illegible]	1550	8	6	8		90	0.9	60	[illegible]
6	1552	54	31	77		[illegible]	1.0	60	

A 11

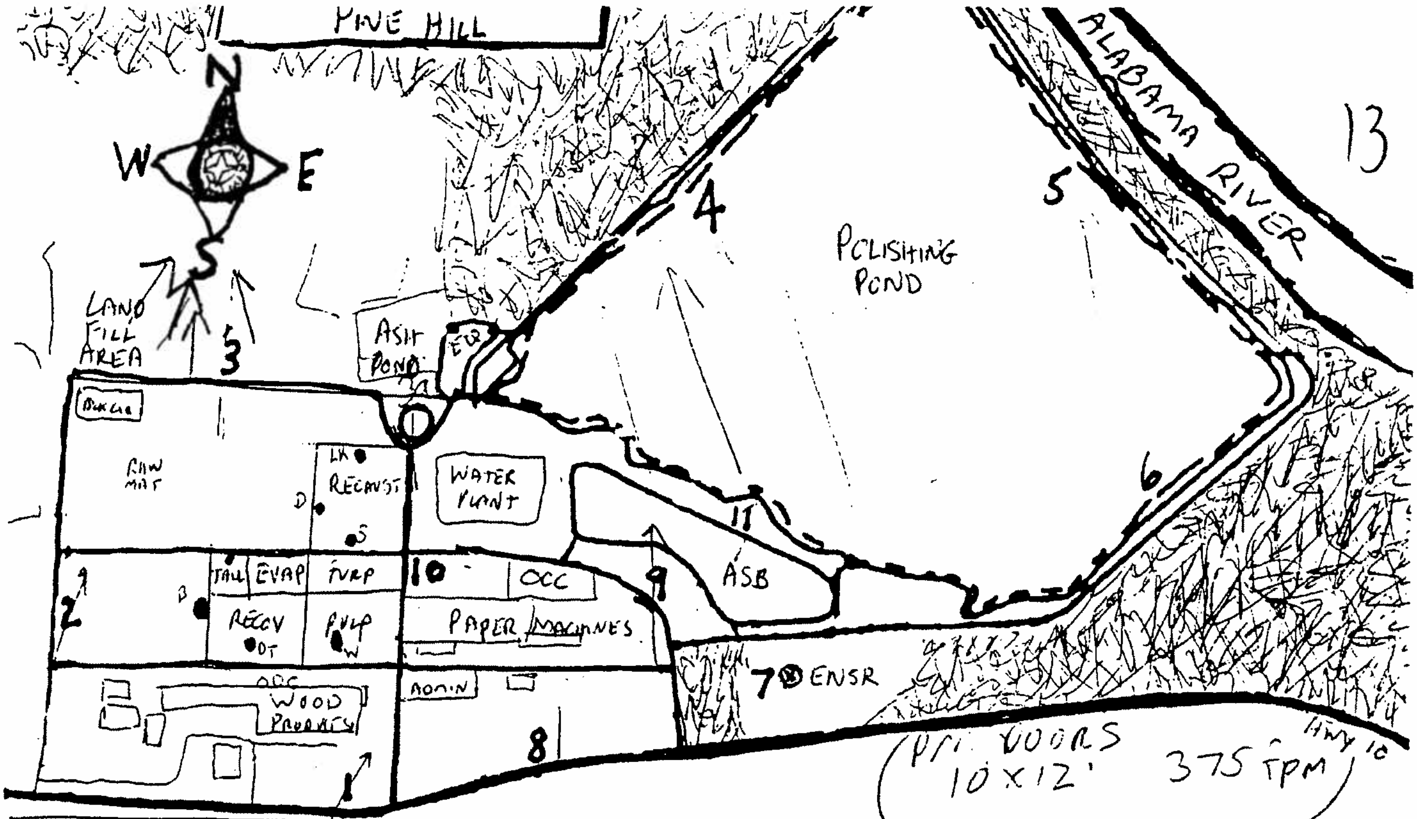


#	TIME	HYDROGEN SULFIDE ppb A	B	C	AVG	WIND DIR	MPH	#	COMMENTS — DATE: 2/14/01 ROUND: 1
6	0541	6	3	4		0	0	63	FOG, MISTY, CLOUDY
5	0549	3	4	3		0	0	63	W/ SHOWERS
4	0556	1500	1600	1500		120	3.2	63	NO GROUND WIND
1	0622	5	3	3		0	0	63	SLIGHT BREEZE FROM SE
2	0628	3	4	4		120	1.1	63	PLUMES HITTING GROUND
3	0633	100	17	21		120	0.8	62	H2S ODOR
3a	0637	18	18	20		140	0.8	62	KILN PLUME RECAUST ODOR AT GROUND
3b	0640	640	900	910		140	0.6	62	CLEAR
10	0645	21	49	38		130	0.6	62	
11a	0648	2300	2500	2400		140	1.8	62	1ST SECTION
11b	0651	1400	15000	3900		140	0.6	62	MID SECTION
11	0654	2900	2800	3200		140	0.9	62	LAST SECTION
1C	0656	26	6	8		140	3.2	63	
7	0700	8	7	7		150	0.8	63	ENSR STATION
9	0705	12	4	4		150	0.5	63	TRUCK EXHAUST - LOW MIX
8	0707	4	4	4		150	2.3	63	

AK

GLADNEY-WY032452

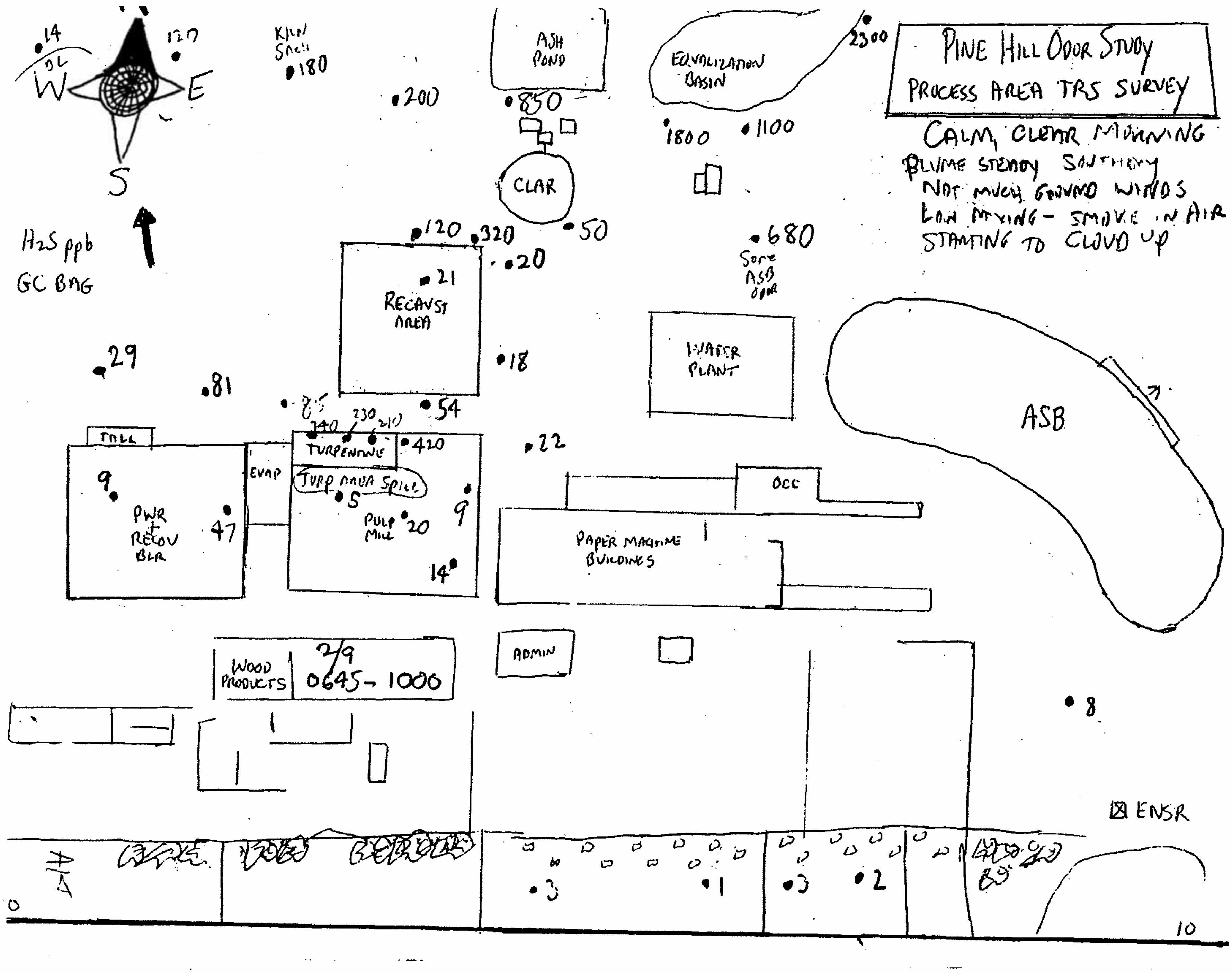
13



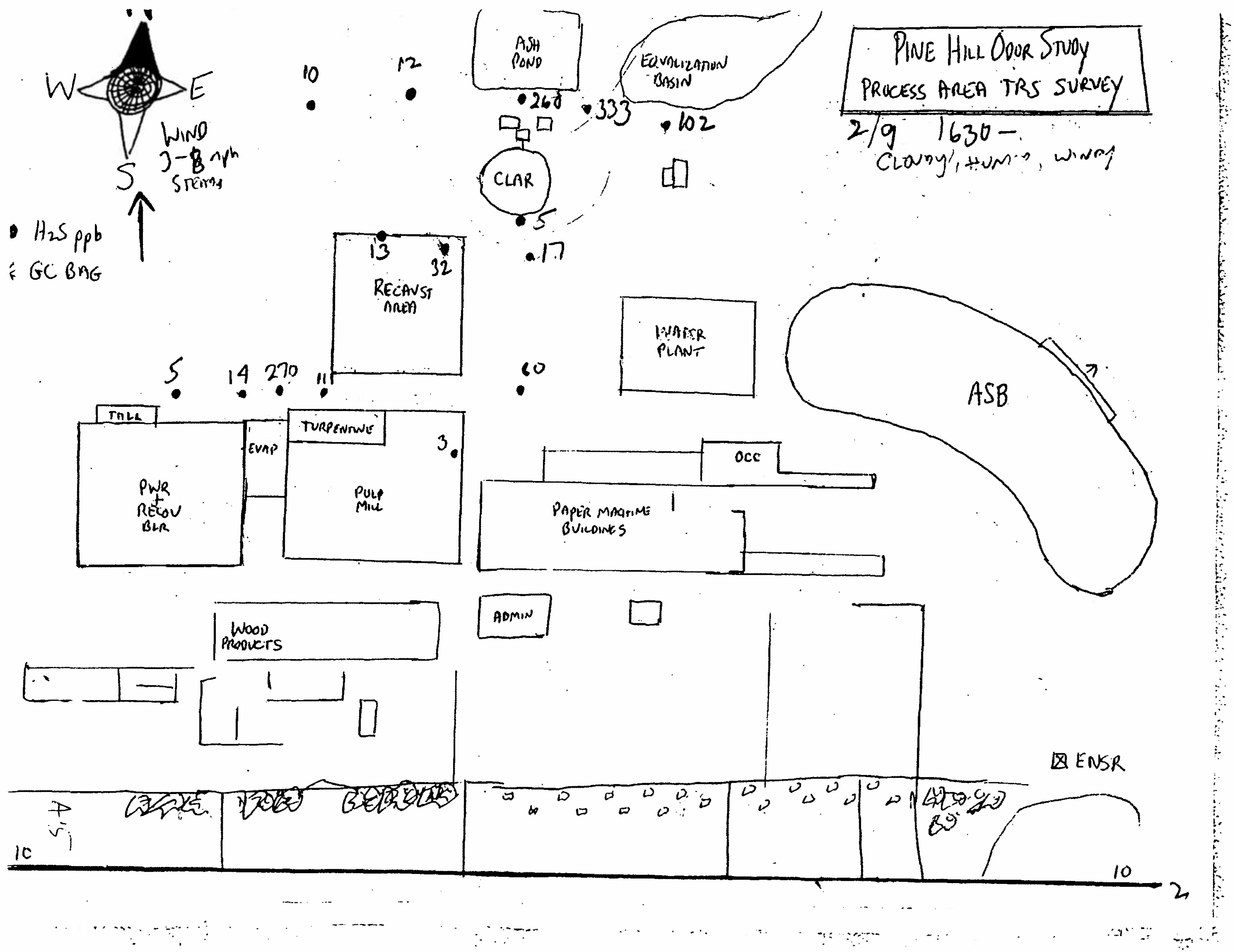
#	TIME	HYDROGEN SULFIDE PPB A	B	C	AVG	WIND DIR	MPH	T	COMMENTS / DATE: 2/14/01 ROUND: 2
1	1431	4	5	4		200	1.0	78	WARM [illegible] CLOUDY
2	1437	4	4	4		190	3.4	78	WINDS VARIABLE [illegible]
3	1441	170	110	180		180	2.6	79	H_2S Smell — SUN BREAK
3a	1444	380	530	340		180	6.3	78	STRONG [illegible]
★4a	1448	2900	1800	2400		160	5.8	76	NASTY PP [illegible] + ASB [illegible]
4	1452	2400	2400	2300		160	4.2	78	DRAINS ASB ODOR
5	1456	1900	2200	3000		160	4.8	77	FAIRLY STRONG
6	1469	11	7	7		0	0	77	
7	1502	4	4	3		180	0.5	78	
11	1506	14000	13800	12000	13267	190	6.6	78	
9	1512	4	4	4		180	0.8	78	
8	1516	3	4	3		190	1.4	78	
10	1519	24	22	18		170	1.0	78	

.35 S

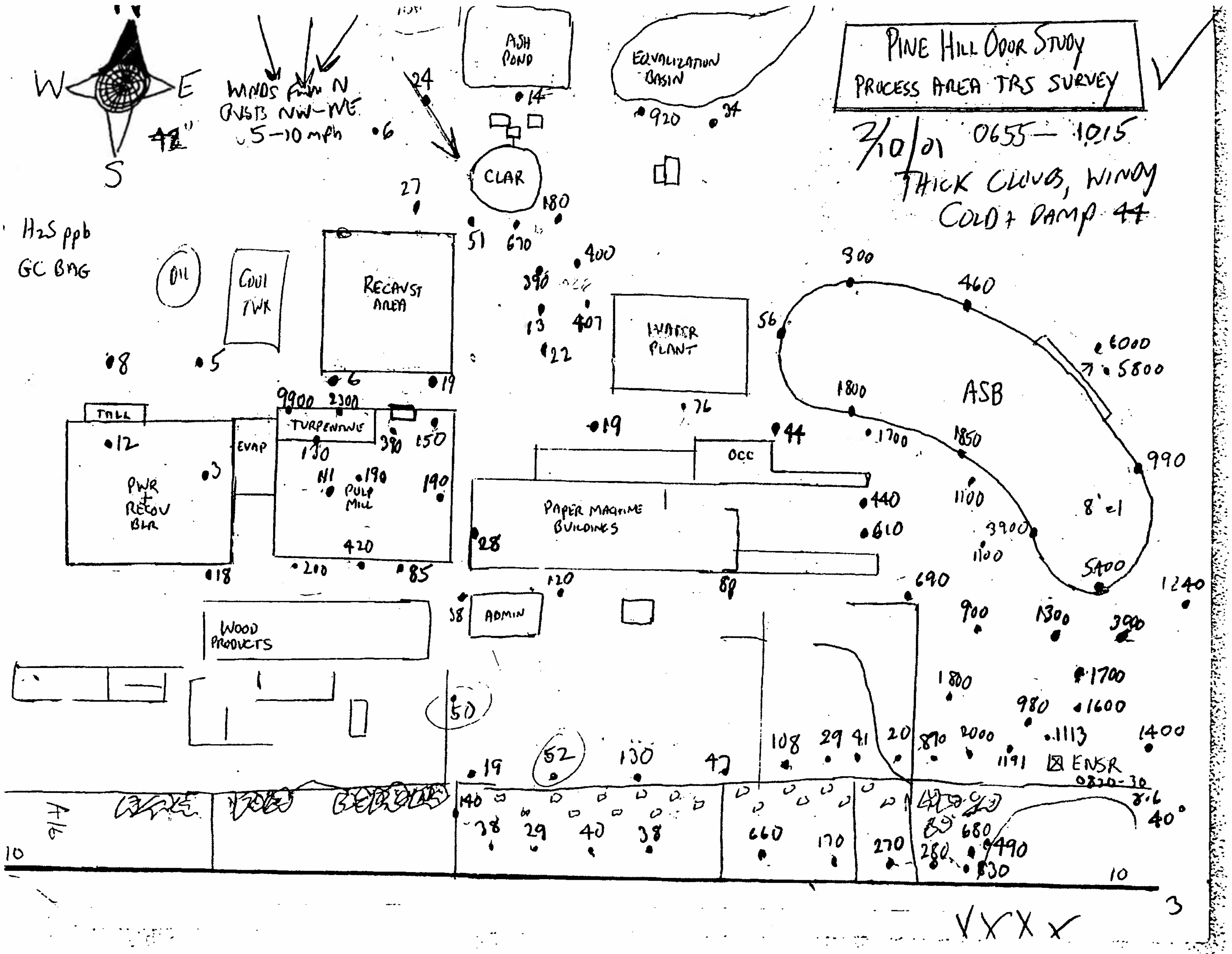
A13

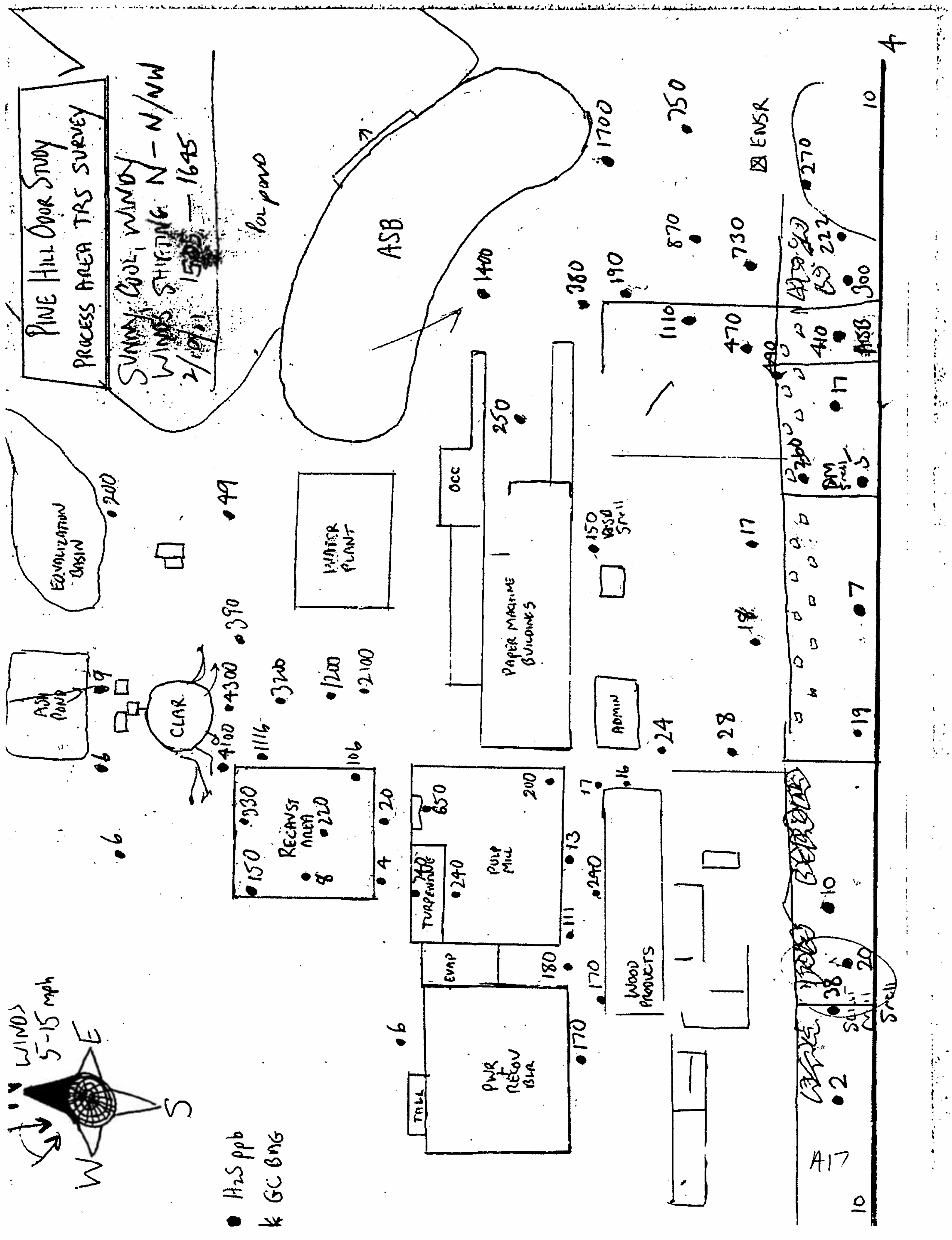


GLADNEY-WY032454

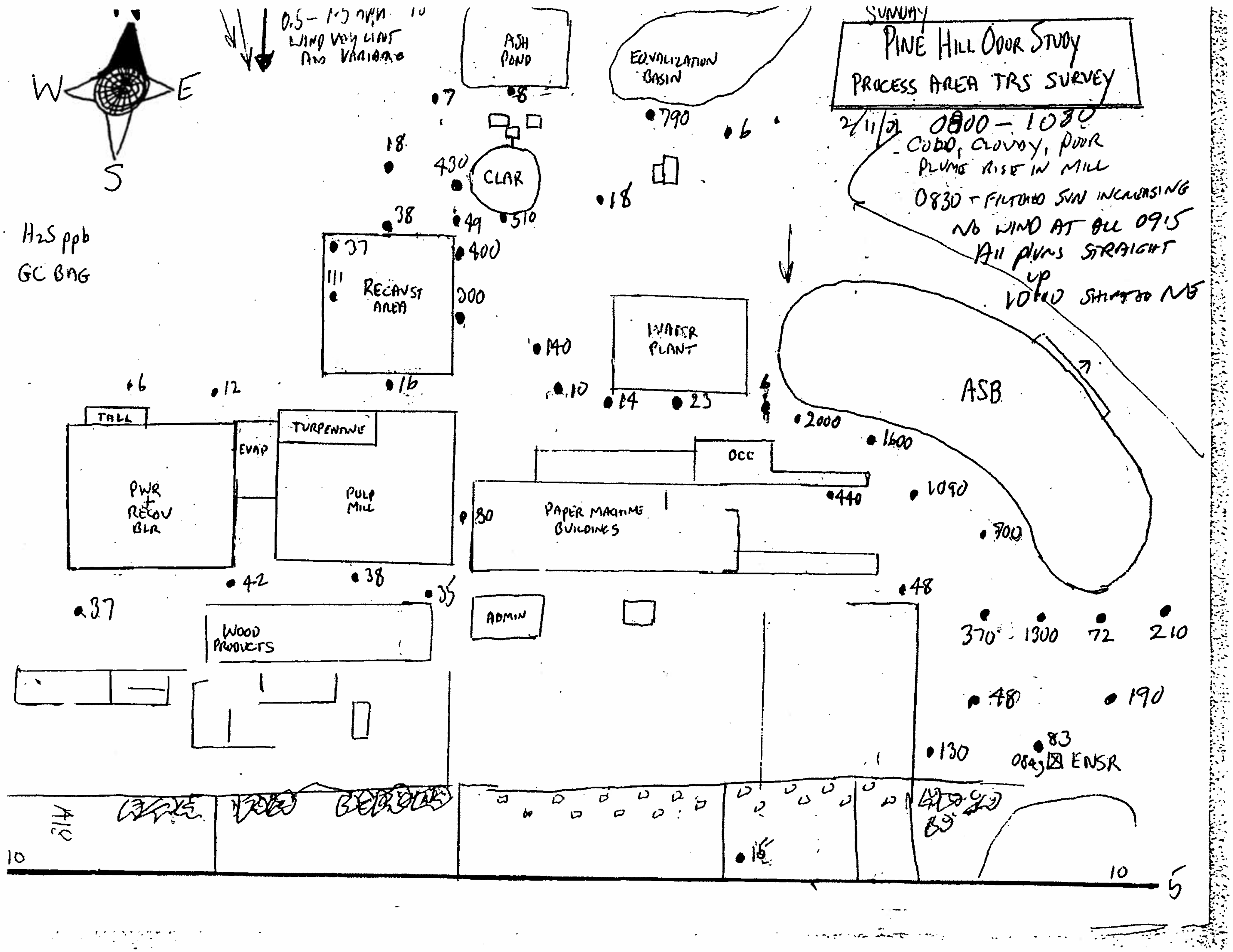


PINE HILL ODOR STUDY
PROCESS AREA TRS SURVEY
2/9 1630 –
CLOUDY, HUMID, WINDY
W
E
S
WIND
3-8 mph
STEADY
H2S ppb
GC BAG
10
12
ASH POND
EQUALIZATION BASIN
268
333
102
CLAR
5
17
13
32
RECAUST AREA
WATER PLANT
ASB
5
14
270
11
60
TALL
EVAP
TURPENTINE
3
PWR + RECOV BLR
PULP MILL
OCC
PAPER MACHINE BUILDINGS
ADMIN
WOOD PRODUCTS
ENSR
10
10


PINE HILL ODOR STUDY
PROCESS AREA TRS SURVEY
7/10/01 0655 — 10:15
THICK CLOUDS, WINDY
COLD + DAMP 44
WINDS from N
GUSTS NW-NE
5-10 mph
W
E
S
H2S ppb
GC BAG
ASH POND
EQUALIZATION BASIN
CLAR
RECAUST AREA
COOL TWR
OIL
WATER PLANT
ASB
OCC
PAPER MACHINE BUILDINGS
TURPENTINE
PULP MILL
EVAP
PWR + RECOV BLR
TALL
ADMIN
WOOD PRODUCTS
ENSR
A16



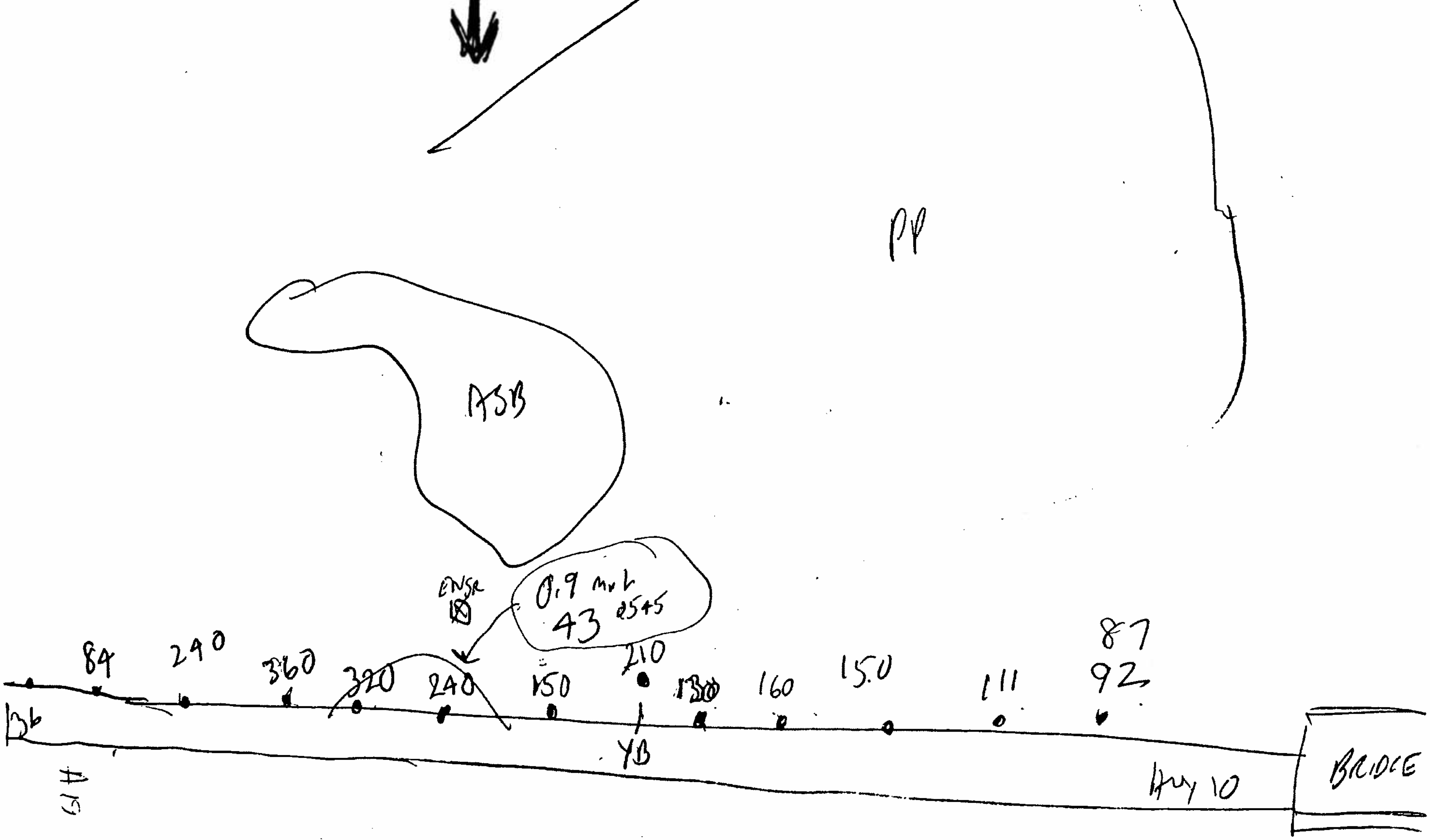
PINE HILL ODOR STUDY
PROCESS AREA TRS SURVEY
SUNNY, COOL, WINDY
WINDS SHIFTING N - N/NW
POL POND
ASB
ENSR
EQUALIZATION BASIN
WATER PLANT
OCC
PAPER MACHINE BUILDINGS
ADMIN
CLAR
ASH POND
RECAUST AREA
PULP MILL
TURPENTINE
EVAP
WOOD PRODUCTS
PWR + RECOV BLR
DM SPILL
A17
WINDS 5-15 mph
E
S
W
H2S ppb
GC BAG

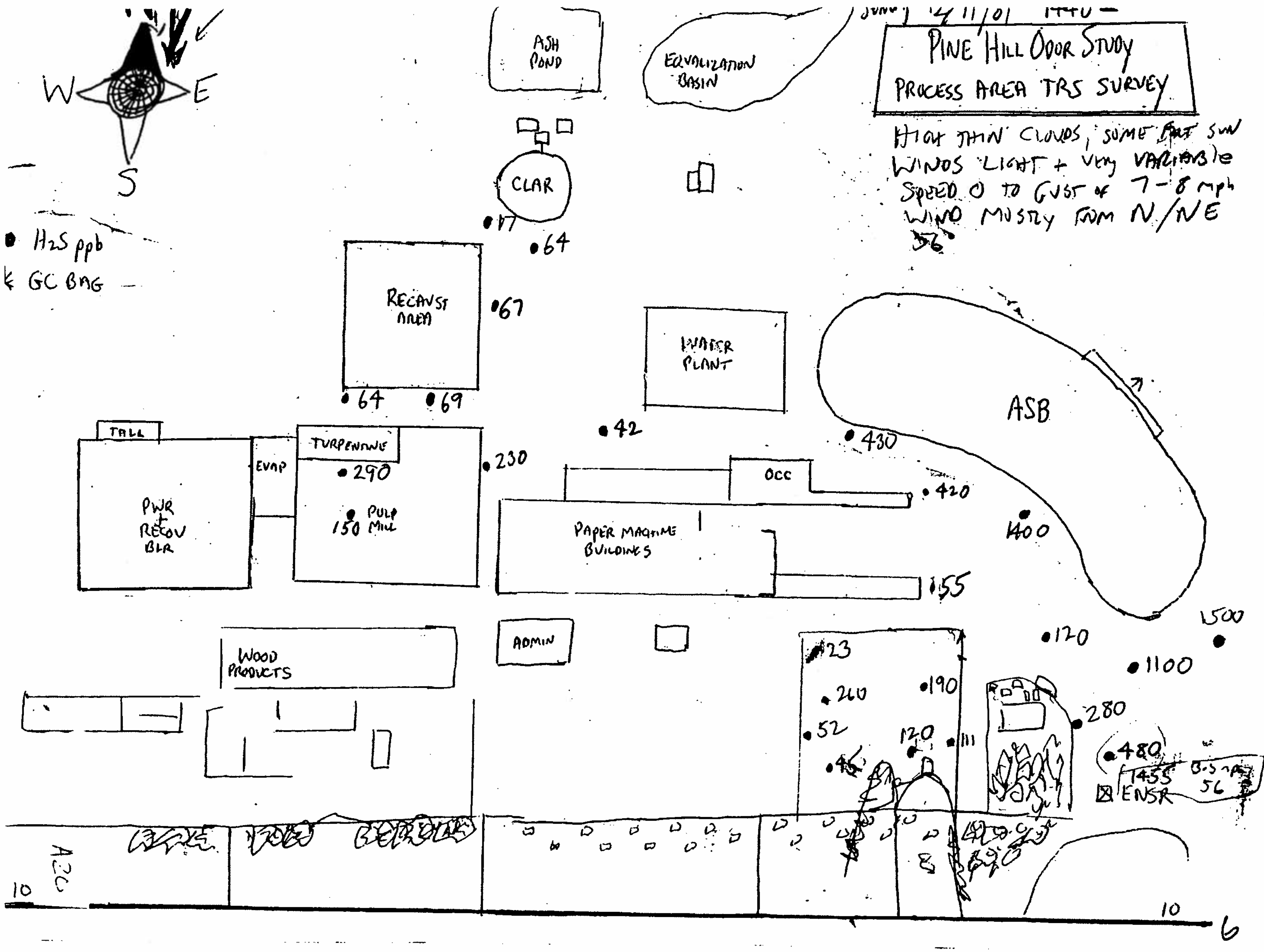

SUNDAY
PINE HILL ODOR STUDY
PROCESS AREA TRS SURVEY
2/11/01 0800 – 1030
COLD, CLOUDY, POOR
PLUME RISE IN MILL
0830 – FILTERED SUN INCREASING
NO WIND AT ALL 0915
ALL PLUMES STRAIGHT UP
WIND SHIFTED NE
0.5 – 1.0 mph
WIND VERY LIGHT
AND VARIABLE
W
E
S
H2S ppb
GC BAG
ASH POND
EQUALIZATION BASIN
CLAR
RECAUST AREA
WATER PLANT
ASB
TALL
PWR + RECOV BLR
EVAP
TURPENTINE
PULP MILL
OCC
PAPER MACHINE BUILDINGS
ADMIN
WOOD PRODUCTS
ENSR
7
8
790
6
18
430
18
38
49
510
37
111
400
200
140
16
6
12
10
24
23
2000
1600
1090
700
440
80
42
38
35
37
48
370
1300
72
210
48
190
83
130
16
10
10
5

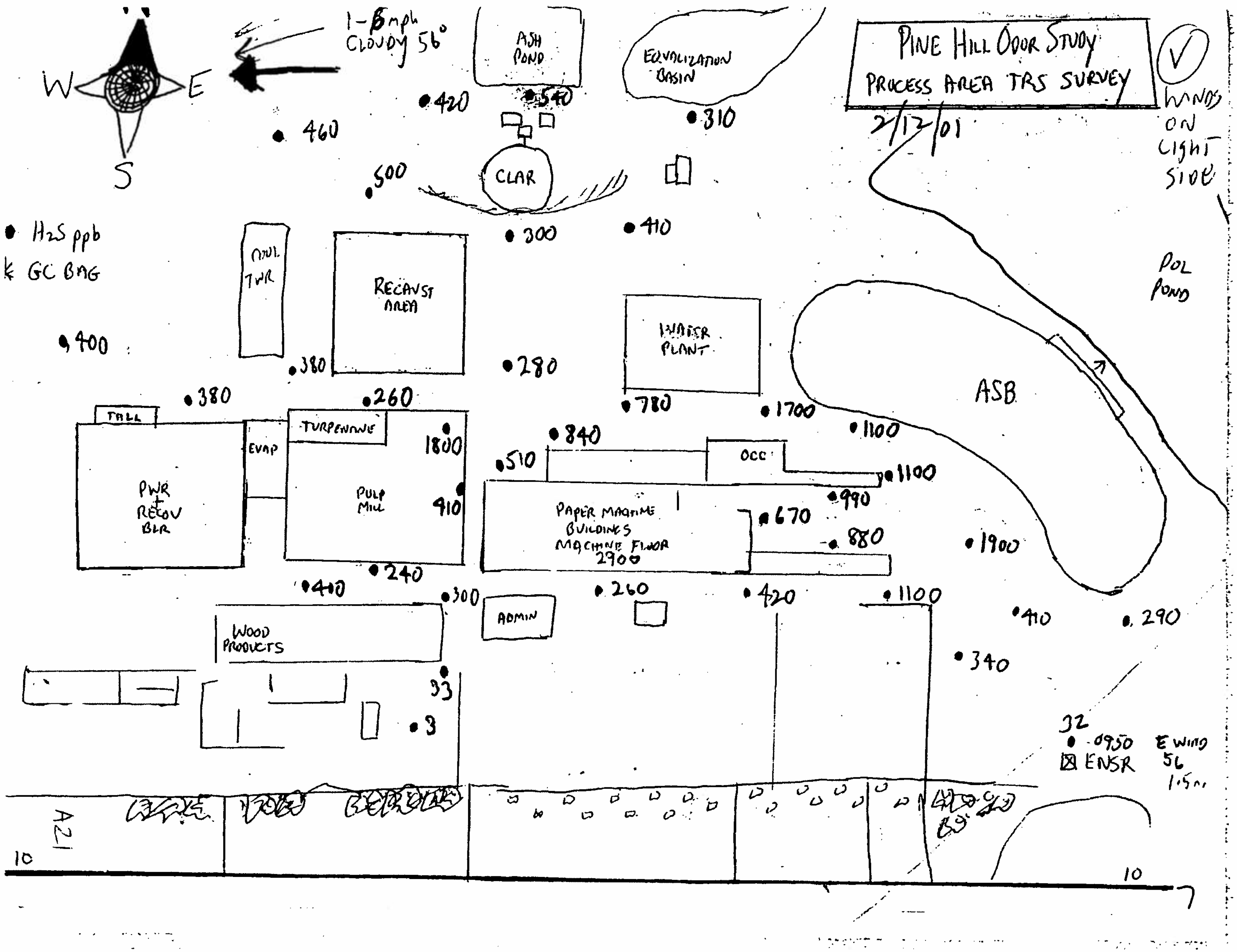
HWY 10 ODOUR CHECK

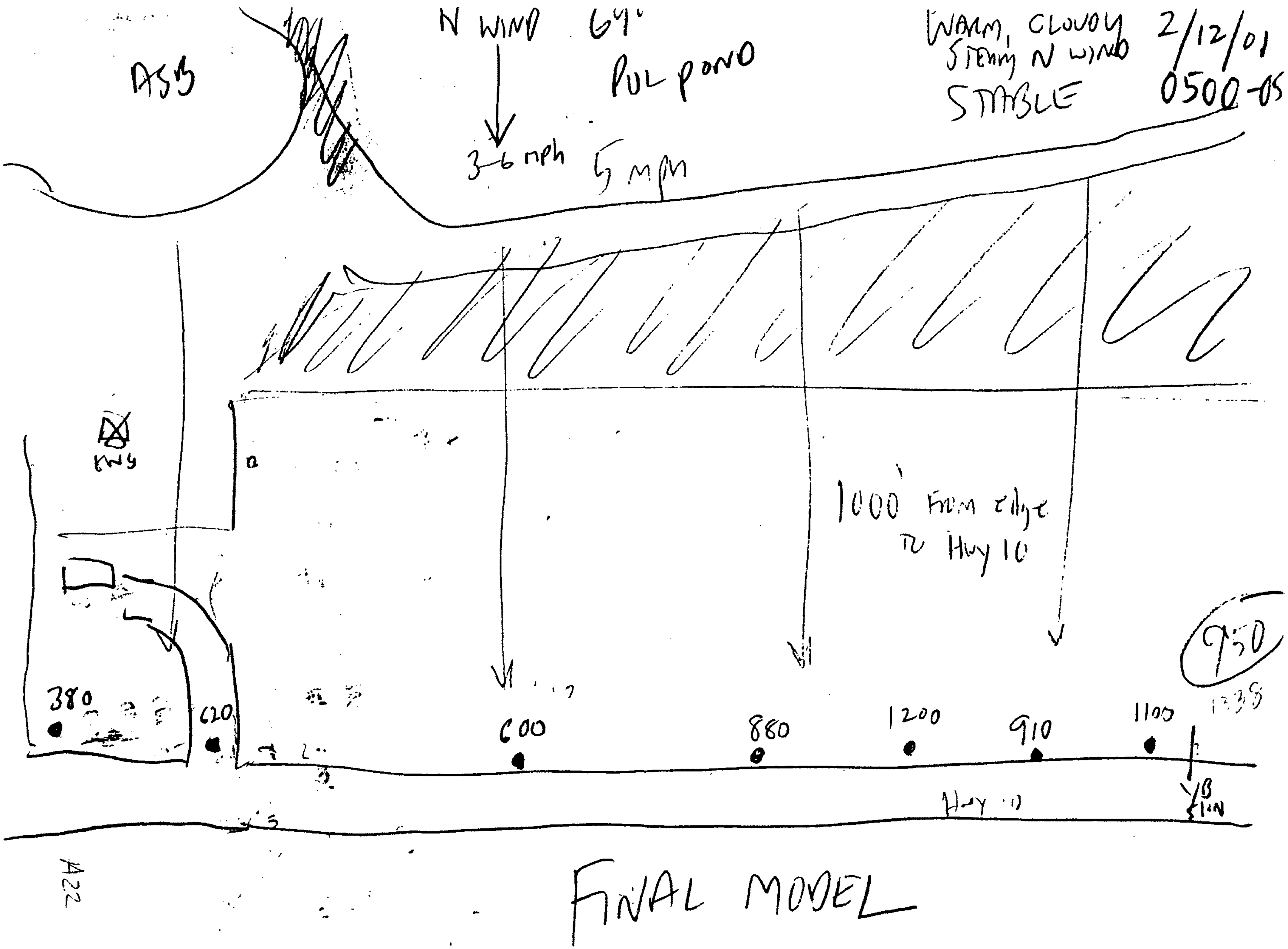
2/11
0520 TO
0555

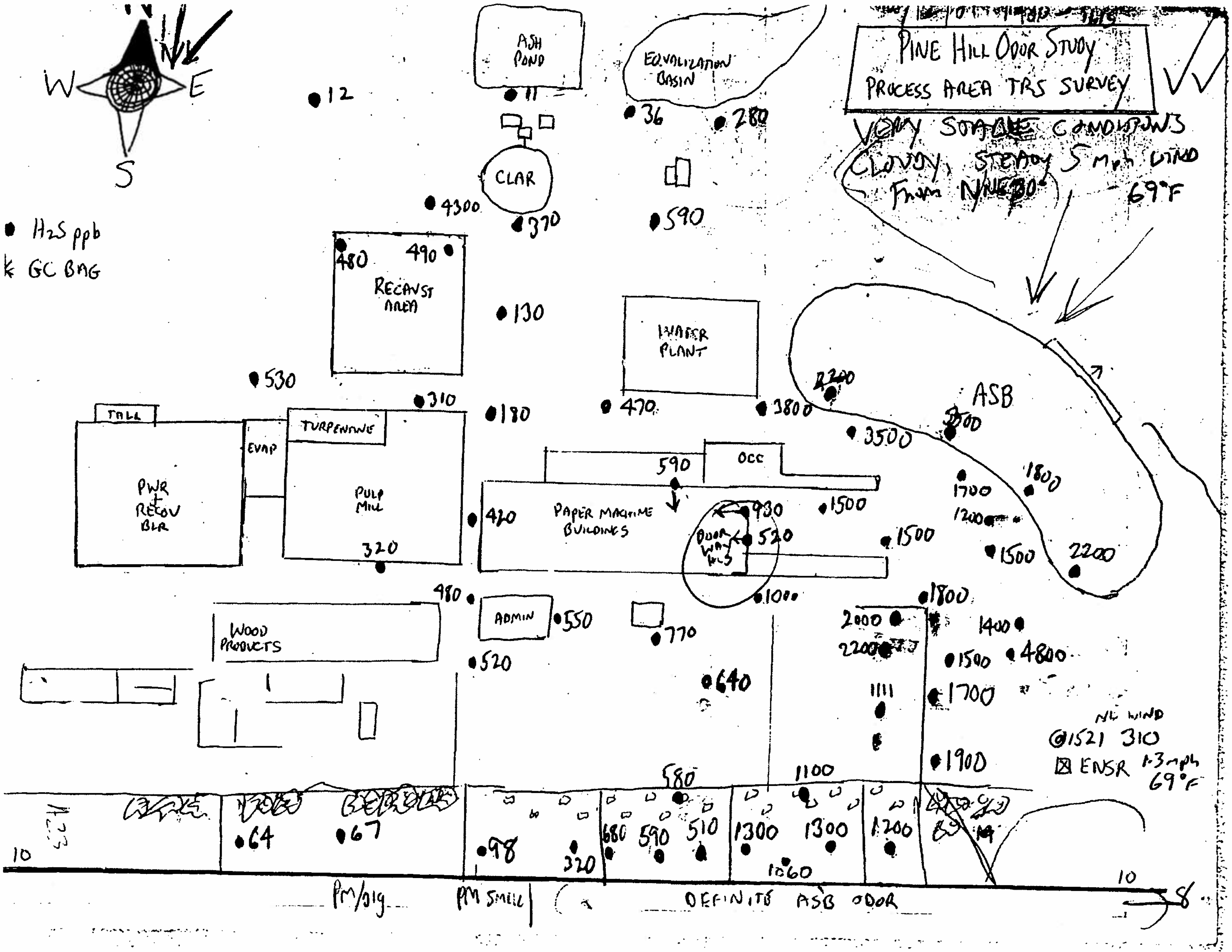
NOTICEABLE ODOUR
DRIVING IN AT 0455
ALONG HIGHWAY
STARTING AT BRIDGE



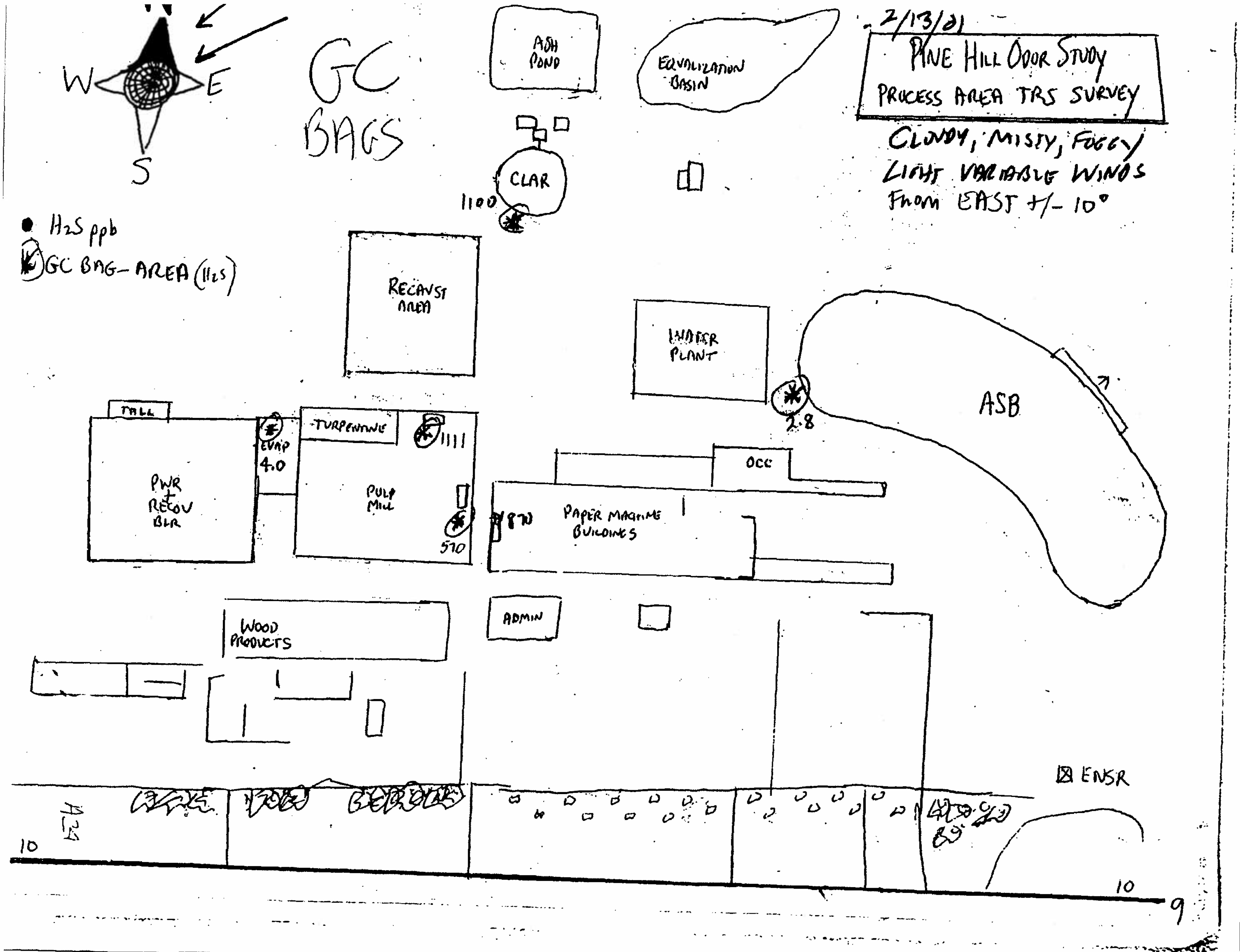

4/11/01 1440
PINE HILL ODOR STUDY
PROCESS AREA TRS SURVEY
HIGH THIN CLOUDS, SOME SUN
WINDS LIGHT + VERY VARIABLE
SPEED 0 TO GUST OF 7-8 mph
WIND MOSTLY FROM N/NE
W
E
S
H2S ppb
GC BAG
ASH POND
EQUALIZATION BASIN
CLAR
RECAUST AREA
WATER PLANT
ASB
TALL
EVAP
TURPENTINE
PWR + RECOV BLR
PULP MILL
PAPER MACHINE BUILDINGS
OCC
ADMIN
WOOD PRODUCTS
ENSR
A20
17
64
67
64
69
42
430
230
290
150
420
400
155
120
1100
1500
23
260
190
52
120
111
46
280
480
1455
0-5 mph
56
10
10
6


PINE HILL ODOR STUDY
PROCESS AREA TRS SURVEY
2/12/01
WINDS ON LIGHT SIDE
1-8 mph
CLOUDY 56°
W
E
S
H2S ppb
GC BAG
ASH POND
EQUALIZATION BASIN
CLAR
POL POND
ASB
RECAUST AREA
WATER PLANT
OCC
PAPER MACHINE BUILDINGS MACHINE FLOOR 2900
TURPENTINE
PULP MILL
EVAP
PWR + RECOV BLR
TALL
ADMIN
WOOD PRODUCTS
420
540
310
460
500
300
410
400
380
280
780
1700
1100
260
840
510
1800
410
1100
990
670
880
1900
240
410
300
260
420
1100
410
290
340
33
3
32
0950
ENSR
E WIND 56
A21
10
10


ASB
N WIND 64°
3-6 mph
PUL POND
5 mph
WARM, CLOUDY
STEADY N WIND
STABLE
2/12/01
0500-05
KW9
1000' from edge to Hwy 10
950
380
620
600
880
1200
910
1100
Hwy 10
1/8 MIN
A22
FINAL MODEL



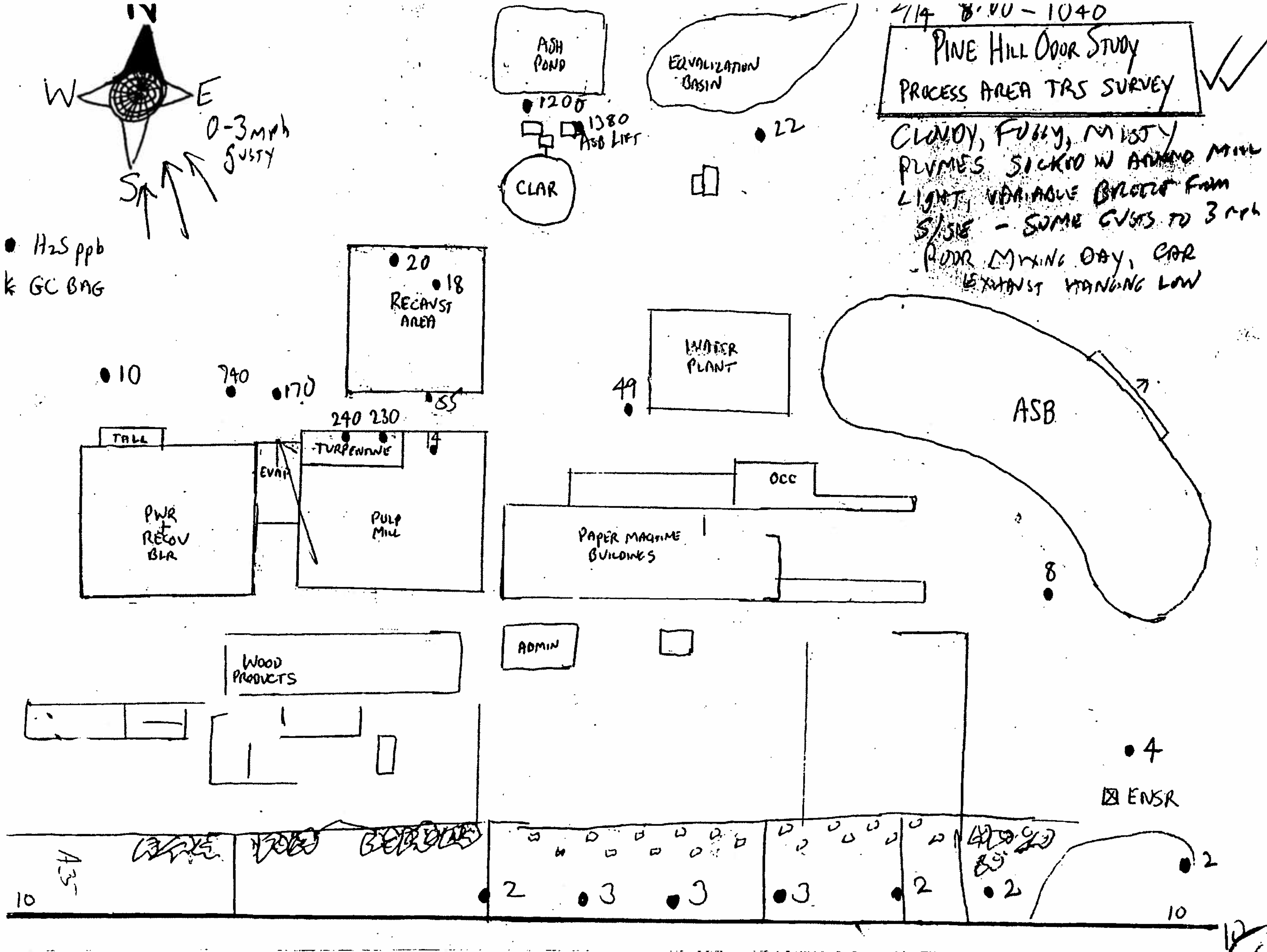
PINE HILL ODOR STUDY
PROCESS AREA TRS SURVEY
VERY STABLE CONDITIONS
CLOUDY, STEADY 5 mph WIND
From NNE 30°
69°F
H2S ppb
GC BAG
W
E
S
ASH POND
EQUALIZATION BASIN
CLAR
RECAUST AREA
WATER PLANT
ASB
TALL
EVAP
TURPENTINE
PULP MILL
PWR + RECOV BLR
OCC
PAPER MACHINE BUILDINGS
ODOR WAS
ADMIN
WOOD PRODUCTS
NE WIND
@1521 310
ENSR 1-3 mph
69°F
PM/dig
PM SMELL
DEFINITE ASB ODOR
12
11
36
280
4300
370
590
480
490
130
530
310
180
470
3800
2200
3500
1800
1700
1200
1500
420
930
520
320
480
550
770
1000
1800
2000
2200
1400
4800
520
640
1700
1900
580
1100
64
67
98
320
680
590
510
1300
1300
1200
1060
10
10

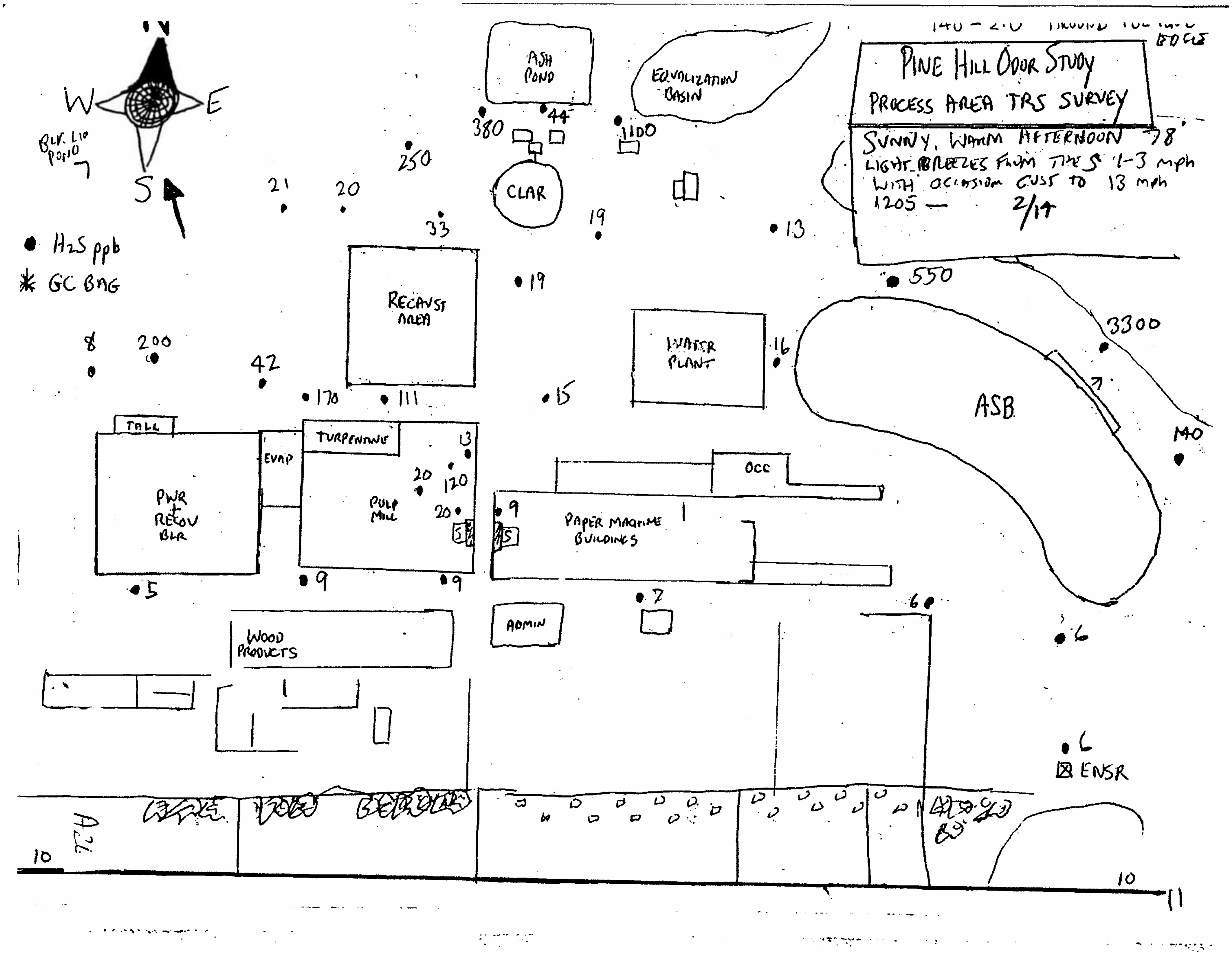

2/13/01
Pine Hill Odor Study
Process Area TRS Survey
Cloudy, Misty, Foggy/
Light Variable Winds
From East +/- 10°
W
E
S
GC
BAGS
H2S ppb
GC Bag- Area (H2S)
Ash Pond
Equalization Basin
CLAR
1100
Recaust Area
Water Plant
ASB
2.8
Tall
PWR + Recov Blr
Evap
4.0
Turpentine
1111
Pulp Mill
570
870
Paper Machine Buildings
OCC
Admin
Wood Products
ENSR
A24
10
10
9

7/14 8:00 – 1040

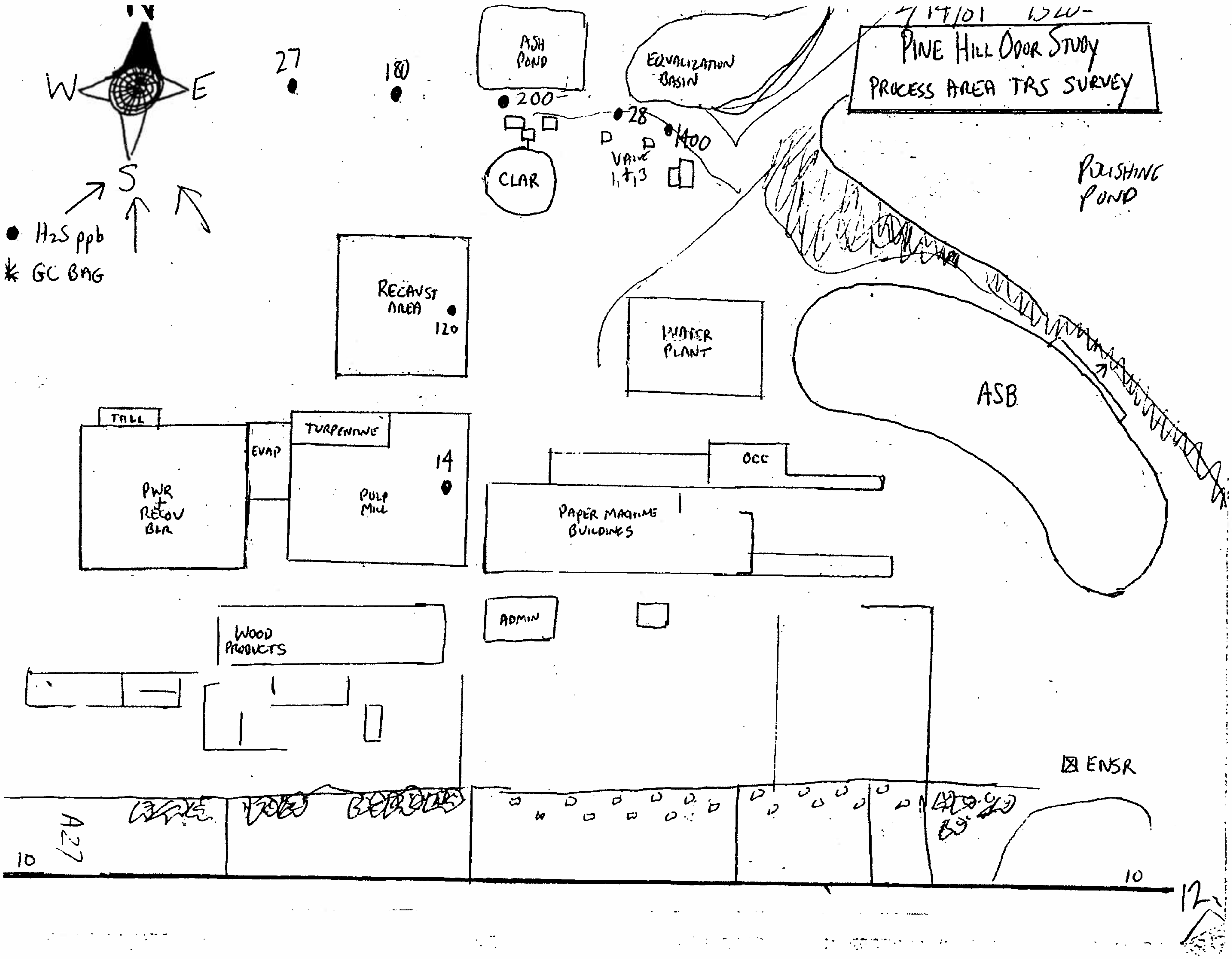
PINE HILL ODOR STUDY
PROCESS AREA TRS SURVEY

CLOUDY, FOGGY, MISTY
PLUMES SICKED IN AROUND MILL
LIGHT, VARIABLE BREEZE FROM S/SE – SOME GUSTS TO 3 mph
POOR MIXING DAY, CAR EXHAUST HANGING LOW





GLADNEY-WY032466

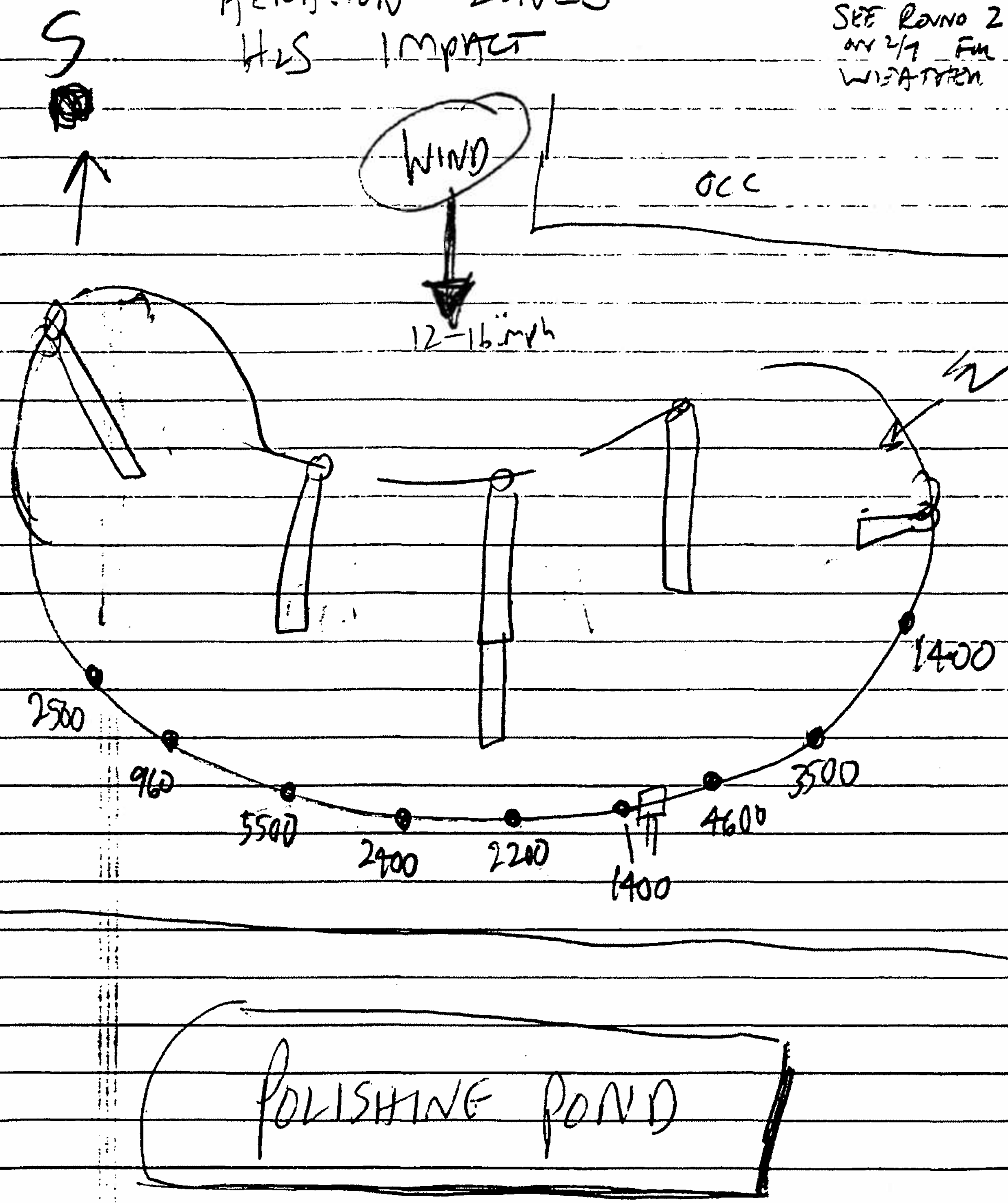


GLADNEY-WY032467

2/9 1520

SEE RONNO 2 ON 2/7 FM WEATHER

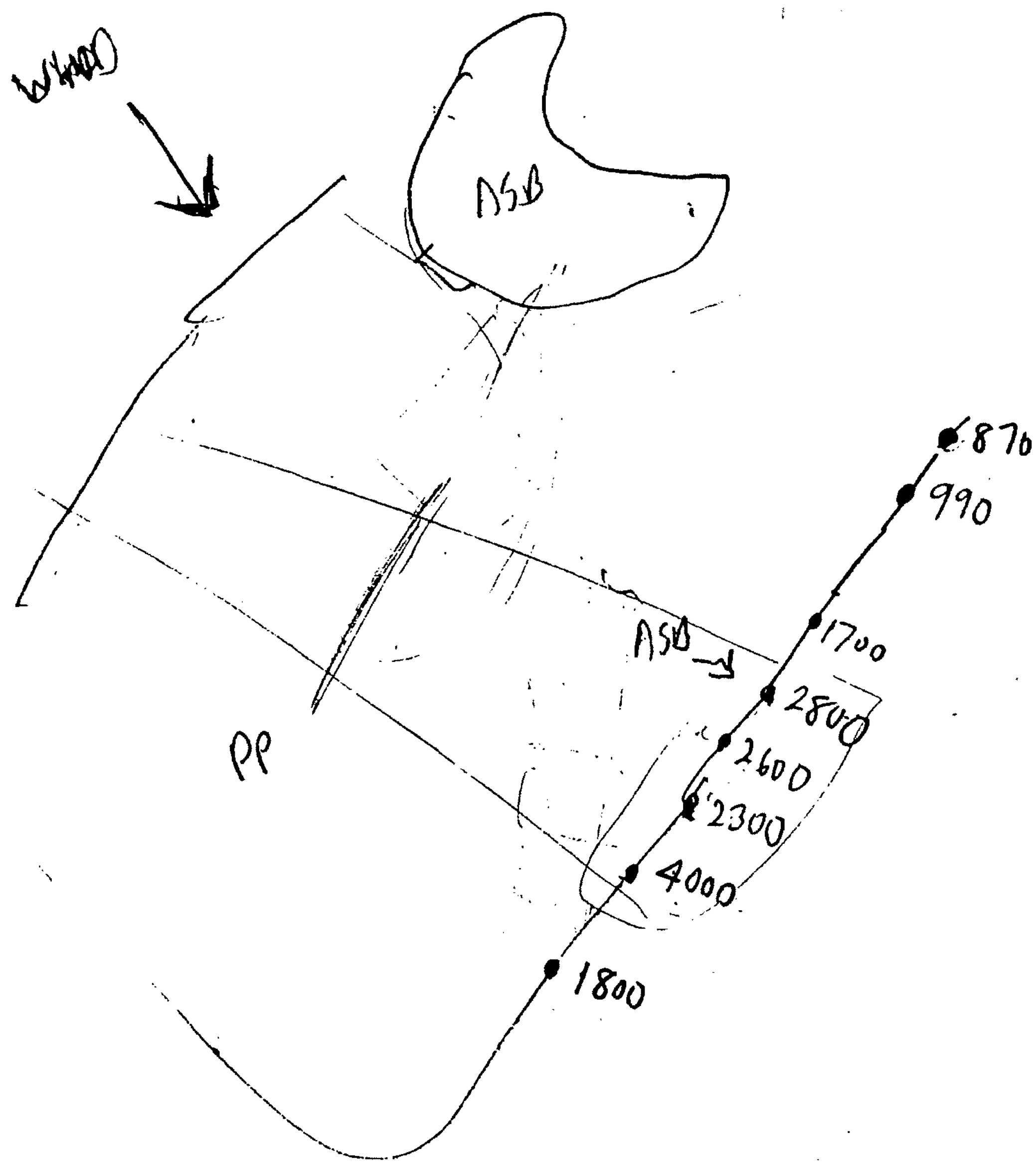
AERATION ZONES
H_2S IMPACT



2/9 8:30 AM - 8:44

CLOUDY E/SE
WINDY
LOOPING PLUMES
6.0 mph
60° F

STABLE!



CROSS PP/ less ASB

BEST POLISHING POND
EDGE READINGS

A29

Appendix B

Summary of Ambient H2S Measurements by Location

Table B1 H2S concentrations measured down-wind of the Polishing Ponds

Site ID #	Date	Time	H2S measured, ppb			Avg. H2S ppb	Wind direction	Wind Speed mph	Air Temp °F
11a	9-Feb	15:13	3000	4000	4800	3933	180	15.2	73
5	14-Feb	14:56	1900	2200	3000	2367	160	4.8	77
4a	14-Feb	14:38	2900	1800	2400	2367	160	5.8	78
11b	12-Feb	13:48	2700	1800	2100	2200	NE	3.2	67
4a	9-Feb	16:00	700	2400	3200	2100	200	8.7	74
6	10-Feb	5:44	1900	1470		1685	nw	8.1	46
5	9-Feb	15:42	1400	1800	1800	1667	190	12.4	75
6	10-Feb	14:30	1600	2200	1050	1617	350	12.5	49
6a	10-Feb	14:32	1500	1200	1900	1533	350	8.2	51
6c	10-Feb	14:36	1700	1330	1280	1437	350	2.7	52
4	13-Feb	15:34	1700	1300	1200	1400	90	2.4	60
11a	12-Feb	13:46	1900	1100	1200	1400	N	6.3	67
4B	13-Feb	15:43	1100	1260	1700	1353	90	2.3	60
4A	13-Feb	15:40	930	910	1600	1147	90	2.3	60
4	12-Feb	5:49	1334	700	1400	1145	90	2.7	55
5a	10-Feb	14:26	670	660	1600	977	360	11.0	49
7	12-Feb	13:40	600	980	970	850	N	2.7	68
4C	13-Feb	15:46	580	530	810	640	90	2.3	60
6	12-Feb	13:35	550	500	490	513	N	10.2	69
6	11-Feb	14:10	330	710	320	453	10	4.2	56
7	12-Feb	6:32	360	350	350	353	80	1.6	55
6	11-Feb	6:15	210	370	380	320	360	1.6	41
4D	13-Feb	15:48	44	80	30	51	90	2.3	60
7	11-Feb	14:15	29	29	70	43	10	1.0	56

Table B2 H2S concentrations measured down-wind of the Polishing Pond Inlet

Site ID #	Date	Time	H2S measured, ppb			Avg. H2S ppb	Wind direction	Wind Speed mph	Air Temp °F
11	12-Feb	13:43	12000	25000	12000	16333	N	6.6	68
11	13-Feb	14:55	12000	13000	19000	14667	90	2.6	59
11	11-Feb	14:20		9300	8100	8700	350	5.4	55
11	10-Feb	14:45	8300	11000	3600	7633	340	8.0	50
11	8-Feb	6:30	5800	7000	8600	7133	60	2.0	47
11	12-Feb	6:36	460	500	320	427	80	1.5	55

Table B3 H2S concentrations measured down-wind of the ASB

Site ID #	Date	Time	H2S measured, ppb			Avg. H2S ppb	Wind direction	Wind Speed mph	Air Temp °F
11	14-Feb	15:06	14000	13800	12000	13267	190	6.6	78
11	9-Feb	15:10	5100	2700		3900	180	13.4	73
9	8-Feb	6:44	2300	2800	2400	2500	80	1.0	46
11a	14-Feb	6:48	2300	2500	2400	2400	140	1.8	62
9	12-Feb	6:28	1300	1090	920	1103	90	3.5	54
10	13-Feb	14:50	340	620	690	550	90	3.4	57
9	10-Feb	14:50	160	170	570	300	350	7.6	50
9	13-Feb	15:01	140	200	333	224	100	2.4	58

Table B4 H2S concentrations measured down-wind of the Clarifier

Site ID #	Date	Time	H2S measured, ppb			Avg. H2S ppb	Wind direction	Wind Speed mph	Air Temp °F
10a	10-Feb		2300	8900	1460	4220	n	5.1	45
3b	14-Feb	6:40	640	9	900	516	140	0.8	62
3a	14-Feb	14:44	380	530	340	417	180	6.3	78
10	10-Feb	6:32	120	190	320	210	n	4.1	44
10	12-Feb	14:03	150	130	170	150	N	5.3	70
10	10-Feb	14:58	88	111	180	126	330	7.0	51
10	11-Feb	14:35	26	110	140	92	5	2.0	55

Table B5 H2S concentrations measured down-wind of the Recovery Area

Site ID #	Date	Time	H2S measured, ppb			Avg. H2S ppb	Wind direction	Wind Speed mph	Air Temp °F
3	14-Feb	14:41	170	110	180	153	180	2.6	79
2	12-Feb	6:05	12	12	12	12	90	3.9	55
2	13-Feb	14:32	2	3	3	3	90	3.8	57

Table B6 H2S concentrations measured down-wind of the Pulp Mill Area

Site ID #	Date	Time	H2S measured, ppb			Avg. H2S ppb	Wind direction	Wind Speed mph	Air Temp °F
10	8-Feb	6:53	1280	1300	1700	1427	200	1.0	46
1	11-Feb	7:56	8	12	24	15	350	2.0	38
10	9-Feb	16:09	12	5	5	7	190	2.9	73
1	14-Feb	6:22	5	3	3	4	0	3.2	68

Table B7 H2S concentrations measured down-wind of the Recausticizing Area

Site ID #	Date	Time	H2S measured, ppb			Avg. H2S ppb	Wind direction	Wind Speed mph	Air Temp °F
3	14-Feb	6:33	100	17	21	46	120	1.1	62
3a	14-Feb	6:37	18	18	20	19	140	0.8	67

Appendix C

Model Output Sheets

Clarifier Ambient H2S Modeling

1 10-11-** 14:34:01

```
 *** SCREEN-1.1 MODEL RUN ***
 *** VERSION DATED  88300 ***

PineHill Clarifier, Feb10, 06:10-06:30

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =     AREA
   EMISSION RATE (G/S)    =    .8150
   SOURCE HEIGHT (M)      =      .01
   LENGTH OF SIDE (M)     =    61.00
   RECEPTOR HEIGHT (M)    =     6.00
   IOPT (1=URB,2=RUR)     =     2


BUOY. FLUX =      .00 M**4/S**3;  MOM. FLUX =      .00 M**4/S**2.

*** STABILITY CLASS  4 ONLY ***
*** 10-METER WIND SPEED OF   2.3 M/S ONLY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC              U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
   (M)    (UG/M**3)    STAB  (M/S)  (M/S)    (M)    HT (M)  Y (M)   Z (M)  DWASH
-------  ----------   ----  -----  -----  ------   ------  ------  ------  -----
   249.    297.2         4     2.3    2.3   729.6       .0    31.4    10.3    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      297.2          249.        0.

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

1 10-11-**
12:31:51

```
 *** SCREEN-1.1 MODEL RUN ***
 *** VERSION DATED  88300 ***

PineHill Clarifier, Feb10, 07:00-10:15

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =     AREA
   EMISSION RATE (G/S)    =    1.550
   SOURCE HEIGHT (M)      =      .01
   LENGTH OF SIDE (M)     =    61.00
   RECEPTOR HEIGHT (M)    =     6.00
   IOPT (1=URB,2=RUR)     =     2


BUOY. FLUX =      .00 M**4/S**3;  MOM. FLUX =      .00 M**4/S**2.

*** STABILITY CLASS  4 ONLY ***
*** 10-METER WIND SPEED OF   3.3 M/S ONLY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
162.	567.4	4	3.3	3.3	1072.0	.0	25.6	7.1	NO

```
 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ***************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ***************************************
```

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	567.4	162.	0.

```
***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

1 10-11-**
13:32:10

```
 *** SCREEN-1.1 MODEL RUN ***
 *** VERSION DATED  88300 ***

PineHill Clarifier, 10Feb, 14:58, Point 10

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE          =     AREA
   EMISSION RATE (G/S)  =    .5620
   SOURCE HEIGHT (M)    =      .01
   LENGTH OF SIDE (M)   =    61.00
   RECEPTOR HEIGHT (M)  =     1.00
   IOPT (1=URB,2=RUR)   =     2


BUOY. FLUX =      .00 M**4/S**3;  MOM. FLUX =      .00 M**4/S**2.

*** STABILITY CLASS  4 ONLY ***
*** 10-METER WIND SPEED OF   3.1 M/S ONLY ***

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
249.	178.0	4	3.1	3.1	992.0	.0	31.4	10.3	NO

```
 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************
```

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	178.0	249.	0.

```
***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```


GLADNEY-WY032478

1 10-11-**
12:40:39

```
 *** SCREEN-1.1 MODEL RUN ***
 *** VERSION DATED  88300 ***

PineHill Clarifier, 12Feb, 14:30-16:18

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =     AREA
   EMISSION RATE (G/S)    =    .7500
   SOURCE HEIGHT (M)      =      .05
   LENGTH OF SIDE (M)     =    61.00
   RECEPTOR HEIGHT (M)    =     1.00
   IOPT (1=URB,2=RUR)     =     2


BUOY. FLUX =     .00 M**4/S**3;  MOM. FLUX =     .00 M**4/S**2.

*** STABILITY CLASS  4 ONLY ***
*** 10-METER WIND SPEED OF   2.3 M/S ONLY ***

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST     CONC              U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
   (M)   (UG/M**3)    STAB  (M/S)  (M/S)   (M)    HT (M)   Y (M)   Z (M)  DWASH
 -------  ----------  ----  -----  -----  ------  ------  ------  ------  -----
   139.    688.9        4     2.3    2.3   736.0      .0    24.0     6.2    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION          MAX CONC    DIST TO   TERRAIN
  PROCEDURE          (UG/M**3)    MAX (M)    HT (M)
 --------------     -----------   -------   -------
SIMPLE TERRAIN        688.9         139.        0.

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

1 10-11-** 13:34:50

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill Clarifier, 12Feb, 14:03, zpoint 10

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/S)	=	.6120
SOURCE HEIGHT (M)	=	.05
LENGTH OF SIDE (M)	=	61.00
RECEPTOR HEIGHT (M)	=	6.00
IOPT (1=URB,2=RUR)	=	2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 2.4 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

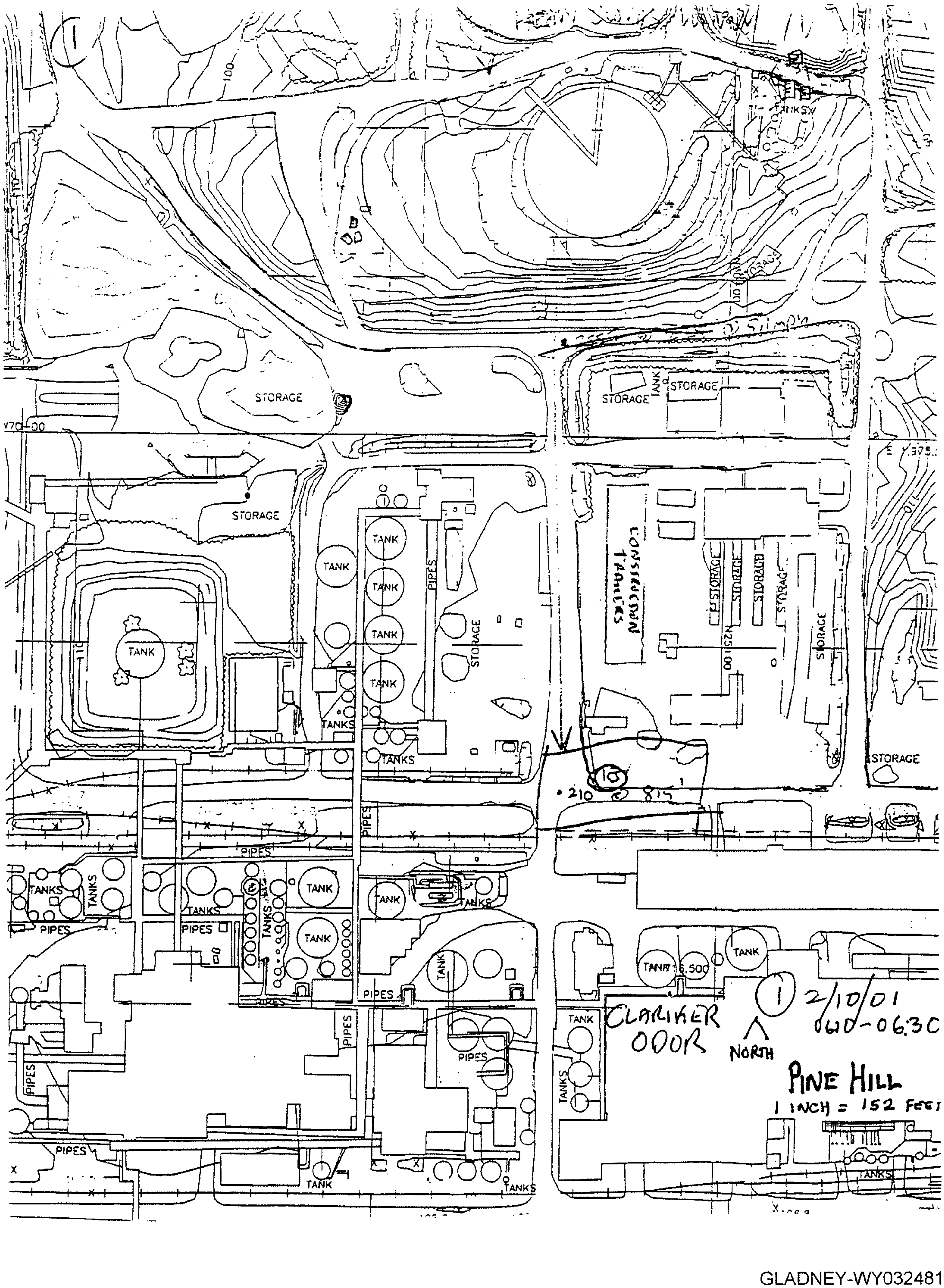
DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
249.	212.0	4	2.4	2.4	768.0	.0	31.4	10.3	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

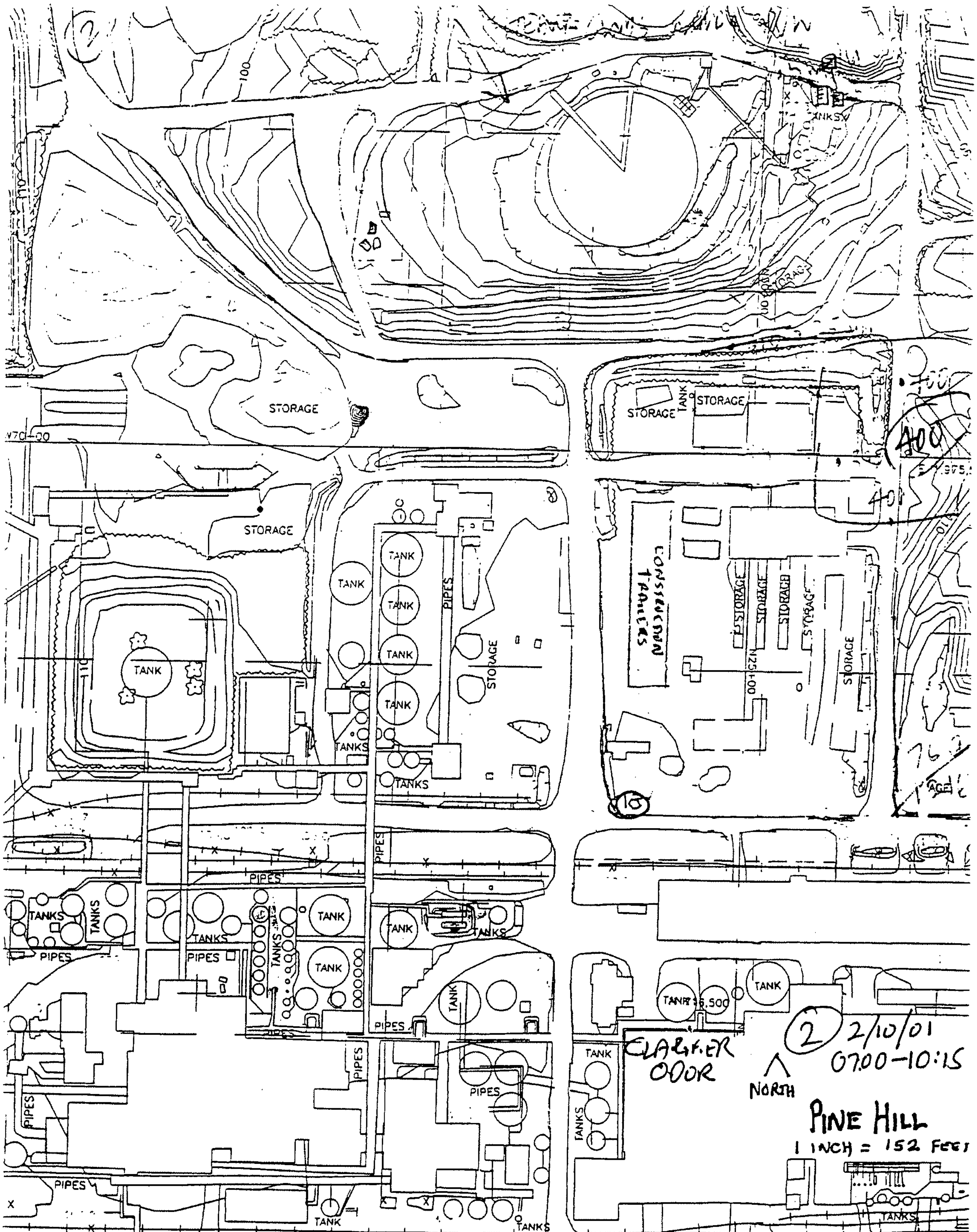
****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

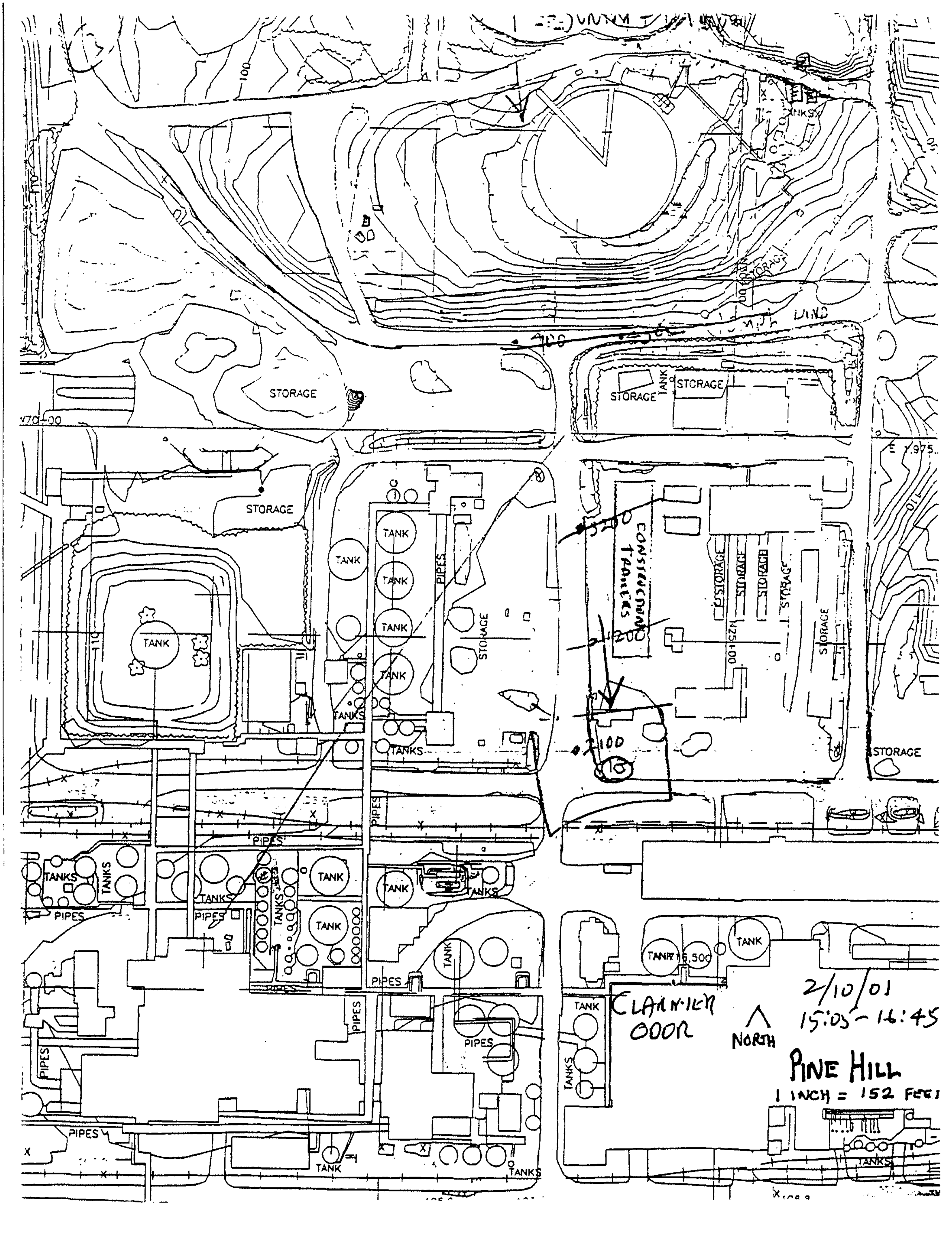
CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	212.0	249.	0.

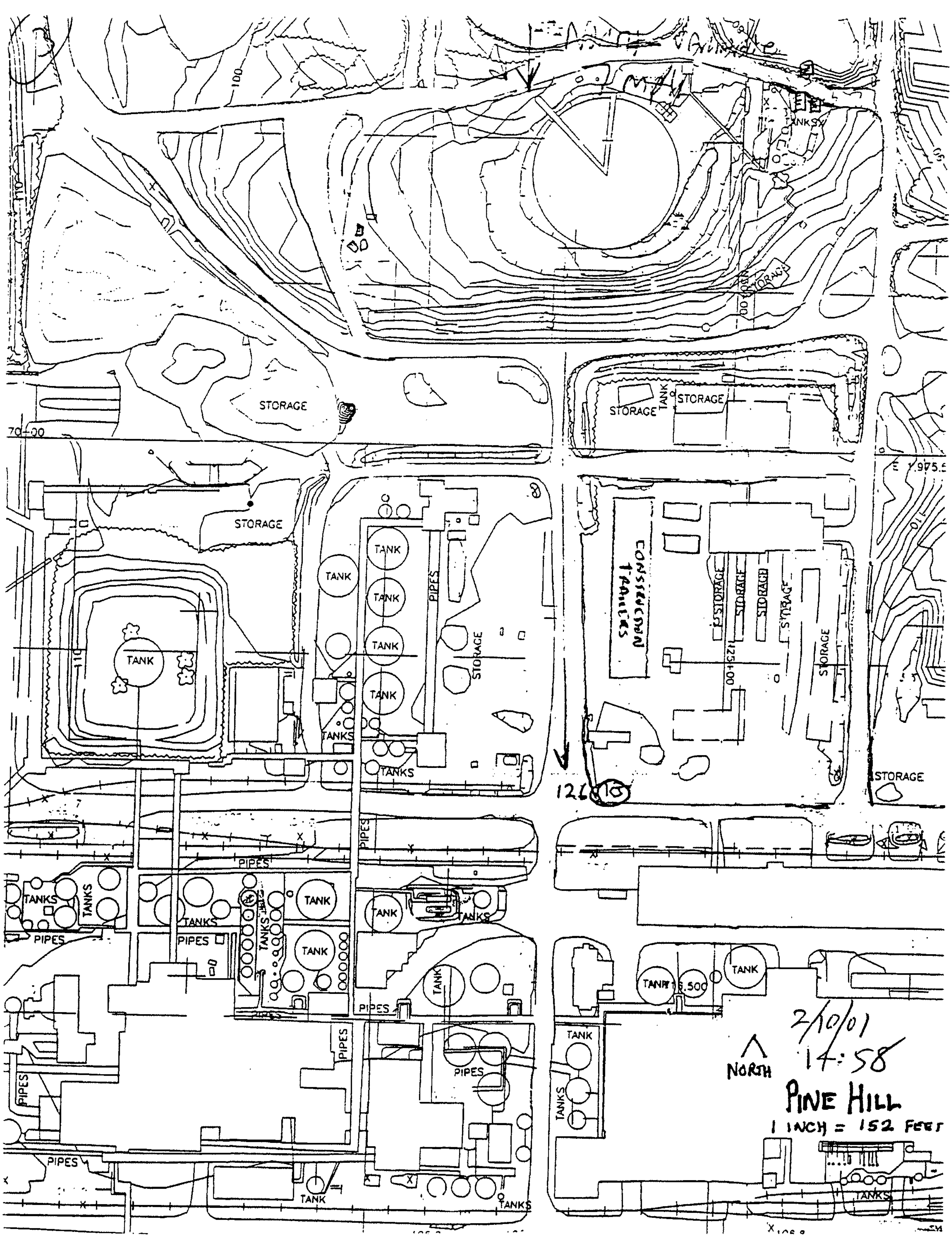
****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****



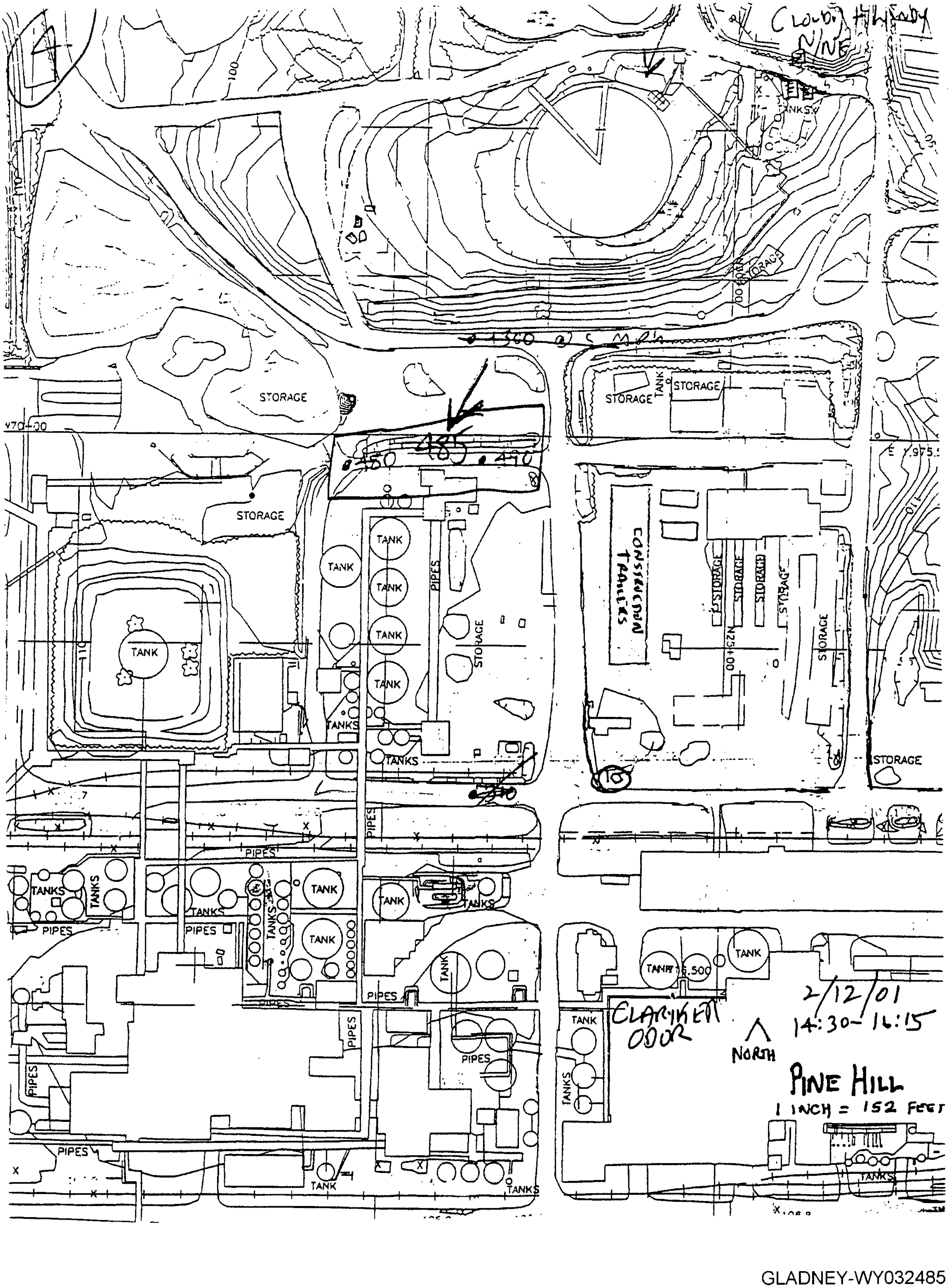
STORAGE
TANK
TANKS
PIPES
TANKSW
CONSTRUCTION TRAILERS
CLARIFIER ODOR
NORTH
2/10/01
PINE HILL
1 INCH = 152 FEET


STORAGE
TANK
PIPES
TANKS
CONSTRUCTION TRAILERS
400
CLARIFIER ODOR
2
2/10/01
07:00-10:15
NORTH
PINE HILL
1 INCH = 152 FEET

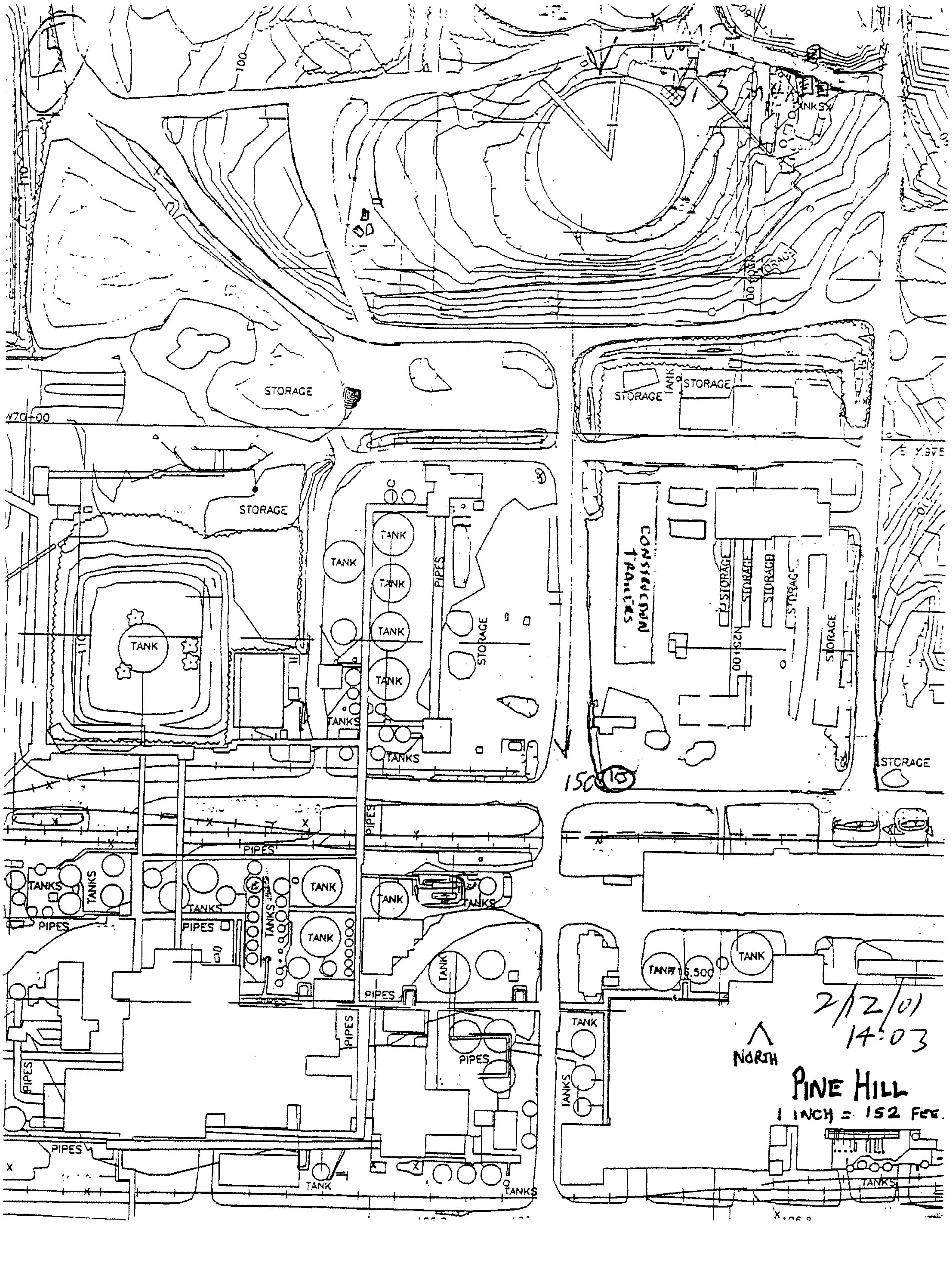

STORAGE
STORAGE
TANK
STORAGE
STORAGE
TANK
TANK
TANK
TANK
TANK
PIPES
STORAGE
CONSTRUCTION TRAILERS
STORAGE
STORAGE
STORAGE
STORAGE
STORAGE
N25+00
TANKS
TANKS
STORAGE
PIPES
PIPES
TANKS
TANKS
TANK
TANK
TANKS
TANK
PIPES
TANK
TANK
TANK
TANK
PIPES
PIPES
PIPES
PIPES
TANK
TANKS
TANKS
TANKS
110
100
CLARNICAL ODOR
NORTH
2/10/01
15:05 - 16:45
PINE HILL
1 INCH = 152 FEET



GLADNEY-WY032484



GLADNEY-WY032485


STORAGE
TANK
TANKS
PIPES
N70+00
N25+00
CONSTRUCTION TRAILERS
2/12/01
14:03
NORTH
PINE HILL
1 INCH = 152 FEE.

ASB Ambient H2S Modeling

1 10-05-**
16:14:19
*** SCREEN- MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill ASB, 9-Feb @1520, 180wind - Zone . 9

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSIO RATE (G/S) = 4.1
SOURCE HEIGHT (M) = 0.3
LENGTH OF SIDE (M) = 61
RECEPT HEIGHT (M) = 0.9
IOPT (1=URB,2 = 2

BUOY. FLUX = 0 M**4/S**3 MOM. FLUX = 0 M**4/S**2.

*** STABILIT CLASS 4 ONLY ***
*** 10-METE WIND SPEED OF 6.3 M/S ONLY ***

****
*** SCREEN DISCRET DISTANC ***
****

*** TERRAIN HEIGHT OF 0 M ABOVE STACK BASE USED FOR FOLLOWI DISTANC

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT	SIGMA (M)	SIGMA Y	(M)	Z	(M)	DWASH
61	3538	4	6.3	6.3	2003.2	0.3	18.5		3 NO			

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH= MEANS NO BUILDIN DOWNW USED
DWASH= MEANS HUBER-S DOWNW USED
DWASH= MEANS SCHULM DOWNW USED
DWASH= MEANS DOWNW NOT APPLICA X<3*LB

****
*** SUMMAR OF SCREEN MODEL RESULTS ***
****

CALCULA PROCED	MAX (UG/M**3)	CONC MAX	DIST (M)	TO HT	TERRAIN (M)
SIMPLE	TERRAIN	3538	61	0	

****
** REMEMB TO INCLUDE BACKGR CONCEN **
****

1 10-05-**
16:10:55
*** SCREEN- MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill ASB, 9-Feb @1520, 180wind - Zone 7

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSIO RATE (G/S) = 7.3
SOURCE HEIGHT (M) = 0.3
LENGTH OF SIDE (M) = 45.8
RECEPT HEIGHT (M) = 0.9
IOPT (1=URB,2 = 2

BUOY. FLUX = 0 M**4/S**3 MOM. FLUX = 0 M**4/S**2.

*** STABILIT CLASS 4 ONLY ***
*** 10-METE WIND SPEED OF 6.3 M/S ONLY ***

****
*** SCREEN DISCRET DISTANC ***
****

*** TERRAIN HEIGHT OF 0 M ABOVE STACK BASE USED FOR FOLLOWI DISTANC

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT	SIGMA (M)	SIGMA Y	(M)	Z	(M)	DWASH
61	7741	4	6.3	6.3	2003.2	0.3	15.1	3 NO				

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH= MEANS NO BUILDIN DOWNW USED
DWASH= MEANS HUBER-S DOWNW USED
DWASH= MEANS SCHULM DOWNW USED
DWASH= MEANS DOWNW NOT APPLICA X<3*LB

****
*** SUMMAR OF SCREEN MODEL RESULTS ***
****

CALCULA PROCED	MAX (UG/M**3)	CONC MAX	DIST (M)	TO HT	TERRAIN (M)
SIMPLE	TERRAIN	7741	61	0	

****
** REMEMB TO INCLUDE BACKGR CONCEN **
****

GLADNEY-WY032489

1 10-05-**
16:10:55
*** SCREEN- MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill ASB, 9-Feb @1520, 180wind - Zone . 7

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSIO RATE (G/S) = 7.3
SOURCE HEIGHT (M) = 0.3
LENGTH OF SIDE (M) = 45.8
RECEPT HEIGHT (M) = 0.9
IOPT (1=URB,2 = 2

BUOY. FLUX = 0 M**4/S**3 MOM. FLUX = 0 M**4/S**2.

*** STABILIT CLASS 4 ONLY ***
*** 10-METE WIND SPEED OF 6.3 M/S ONLY ***

****
*** SCREEN DISCRET DISTANC ***
****

*** TERRAIN HEIGHT OF 0 M ABOVE STACK BASE USED FOR FOLLOWI DISTANC

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT	SIGMA (M)	SIGMA Y	(M)	Z	(M)	DWASH
61	7741	4	6.3	6.3	2003.2	0.3	15.1		3 NO			

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH= MEANS NO BUILDIN DOWNW USED
DWASH= MEANS HUBER-S DOWNW USED
DWASH= MEANS SCHULM DOWNW USED
DWASH= MEANS DOWNW NOT APPLICA X<3*LB

****
*** SUMMAR OF SCREEN MODEL RESULTS ***
****

CALCULA PROCED	MAX (UG/M**3)	CONC MAX	DIST (M)	TO HT	TERRAIN (M)
SIMPLE	TERRAIN	7741	61	0	

****
** REMEMB TO INCLUDE BACKGR CONCEN **
****

1 10-05-**
16:09:26
*** SCREEN- MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill ASB, 9-Feb @1520, 180wind - Zone . 6

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSIO RATE (G/S) = 3.9
SOURCE HEIGHT (M) = 0.3
LENGTH OF SIDE (M) = 61
RECEPT HEIGHT (M) = 0.9
IOPT (1=URB,2 = 2

BUOY. FLUX = 0 M**4/S**3 MOM. FLUX = 0 M**4/S**2.

*** STABILIT CLASS 4 ONLY ***
*** 10-METE WIND SPEED OF 6.3 M/S ONLY ***

****
*** SCREEN DISCRET DISTANC ***
****

*** TERRAIN HEIGHT OF 0 M ABOVE STACK BASE USED FOR FOLLOWI DISTANC

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT	SIGMA (M)	SIGMA Y	(M)	Z	(M)	DWASH
61	3365	4	6.3	6.3	2003.2	0.3	18.5		3 NO			

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH= MEANS NO BUILDIN DOWNW USED
DWASH= MEANS HUBER-S DOWNW USED
DWASH= MEANS SCHULM DOWNW USED
DWASH= MEANS DOWNW NOT APPLICA X<3*LB

****
*** SUMMAR OF SCREEN MODEL RESULTS ***
****

CALCULA PROCED	MAX (UG/M**3)	CONC MAX	DIST (M)	TO HT	TERRAIN (M)
SIMPLE	TERRAIN	3365	61	0	

****
** REMEMB TO INCLUDE BACKGR CONCEN **
****

GLADNEY-WY032491

1 10-05-**
16:08:03
*** SCREEN- MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill ASB, 9-Feb @1520, 180wind - Zone . 5

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSIO RATE (G/S) = 2.9
SOURCE HEIGHT (M) = 0.3
LENGTH OF SIDE (M) = 45.8
RECEPT HEIGHT (M) = 0.9
IOPT (1=URB,2 = 2

BUOY. FLUX = 0 M**4/S**3 MOM. FLUX = 0 M**4/S**2.

*** STABILIT CLASS 4 ONLY ***
*** 10-METE WIND SPEED OF 6.3 M/S ONLY ***

****
*** SCREEN DISCRET DISTANC ***
****

*** TERRAIN HEIGHT OF 0 M ABOVE STACK BASE USED FOR FOLLOWI DISTANC

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT	SIGMA (M)	SIGMA Y	(M)	Z	(M)	DWASH
61	3075	4	6.3	6.3	2003.2	0.3	15.1		3 NO			

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH= MEANS NO BUILDIN DOWNW USED
DWASH= MEANS HUBER-S DOWNW USED
DWASH= MEANS SCHULM DOWNW USED
DWASH= MEANS DOWNW NOT APPLICA X<3*LB

****
*** SUMMAR OF SCREEN MODEL RESULTS ***
****

CALCULA PROCED	MAX (UG/M**3)	CONC MAX	DIST (M)	TO HT	TERRAIN (M)
SIMPLE	TERRAIN	3075	61		0

****
** REMEMB TO INCLUDE BACKGR CONCEN **
****

1 10-05-**
16:06:43
*** SCREEN- MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill ASB, 9-Feb @1520, 180wind - Zone . 4

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSIO RATE (G/S) = 2.3
SOURCE HEIGHT (M) = 0.3
LENGTH OF SIDE (M) = 61
RECEPT HEIGHT (M) = 0.9
IOPT (1=URB,2 = 2

BUOY. FLUX = 0 M**4/S**3 MOM. FLUX = 0 M**4/S**2.

*** STABILIT CLASS 4 ONLY ***
*** 10-METE WIND SPEED OF 6.3 M/S ONLY ***

****
*** SCREEN DISCRET DISTANC ***
****

*** TERRAIN HEIGHT OF 0 M ABOVE STACK BASE USED FOR FOLLOWI DISTANC

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT	SIGMA (M)	SIGMA Y	(M)	Z	(M)	DWASH
61	1985	4	6.3	6.3	2003.2	0.3	18.5		3 NO			

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH= MEANS NO BUILDIN DOWNW USED
DWASH= MEANS HUBER-S DOWNW USED
DWASH= MEANS SCHULM DOWNW USED
DWASH= MEANS DOWNW NOT APPLICA X<3*LB

****
*** SUMMAR OF SCREEN MODEL RESULTS ***
****

CALCULA PROCED	MAX (UG/M**3)	CONC MAX	DIST (M)	TO HT	TERRAIN (M)
SIMPLE	TERRAIN	1985	61	0	

****
** REMEMB TO INCLUDE BACKGR CONCEN **
****

1 10-05-**
15:55:05

```
***      SCREEN- MODEL   RUN      ***
***      VERSION DATED      88300 ***

PineHill  ASB,      9-Feb @1520,  180wind  -      Zone       3

SIMPLE   TERRAIN INPUTS:
SOURCE TYPE      =        AREA
EMISSIO RATE     (G/S)    =            6.1
SOURCE HEIGHT    (M)      =            0.3
LENGTH  OF       SIDE     (M)     =              45.8
RECEPT HEIGHT    (M)      =            0.9
IOPT     (1=URB,2 =              2

BUOY.    FLUX     =            0 M**4/S**3 MOM.     FLUX     =           0 M**4/S**2.

***      STABILIT CLASS          4 ONLY     ***
***      10-METE  WIND    SPEED   OF          6.3 M/S      ONLY     ***

********************************
***      SCREEN  DISCRET DISTANC ***
********************************

***      TERRAIN HEIGHT  OF             0 M      ABOVE    STACK    BASE     USED     FOR      FOLLOWI DISTANC

DIST     CONC     U10M     USTK     MIX      HT       PLUME    SIGMA    SIGMA
(M)      (UG/M**3) STAB    (M/S)    (M/S)    (M)      HT       (M)      Y        (M)      Z        (M)      DWASH
-------  -------  ----     -----    -----    -----    -----    -----    -----    -----
     61     6468         4      6.3       6.3    2003.2      0.3      15.1        3 NO

DWASH= MEANS    NO       CALC     MADE     (CONC    =        0.0)
DWASH= MEANS    NO       BUILDIN  DOWNW    USED
DWASH= MEANS    HUBER-S  DOWNW    USED
DWASH= MEANS    SCHULM   DOWNW    USED
DWASH= MEANS    DOWNW    NOT      APPLICA  X<3*LB

**************************************
***      SUMMAR  OF       SCREEN  MODEL   RESULTS ***
**************************************

CALCULA MAX      CONC     DIST     TO       TERRAIN
PROCED  (UG/M**3) MAX     (M)      HT       (M)
-------  -------  -----   -----
SIMPLE   TERRAIN     6468       61        0

**************************************************
**       REMEMB  TO       INCLUDE BACKGR  CONCEN **
**************************************************
```

1 10-05-**
15:52:50
*** SCREEN- MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill ASB, 9-Feb @1520, 180wind - Zone . 2

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSIO RATE (G/S) = 2.3
SOURCE HEIGHT (M) = 0.3
LENGTH OF SIDE (M) = 61
RECEPT HEIGHT (M) = 0.9
IOPT (1=URB,2 = 2

BUOY. FLUX = 0 M**4/S**3 MOM. FLUX = 0 M**4/S**2.

*** STABILIT CLASS 4 ONLY ***
*** 10-METE WIND SPEED OF 6.3 M/S ONLY ***

****
*** SCREEN DISCRET DISTANC ***
****

*** TERRAIN HEIGHT OF 0 M ABOVE STACK BASE USED FOR FOLLOWI DISTANC

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT	SIGMA (M)	SIGMA Y	(M)	Z	(M)	DWASH
61	1985	4	6.3	6.3	2003.2	0.3	18.5	3 NO				

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH= MEANS NO BUILDIN DOWNW USED
DWASH= MEANS HUBER-S DOWNW USED
DWASH= MEANS SCHULM DOWNW USED
DWASH= MEANS DOWNW NOT APPLICA X<3*LB

****
*** SUMMAR OF SCREEN MODEL RESULTS ***
****

CALCULA PROCED	MAX (UG/M**3)	CONC MAX	DIST (M)	TO HT	TERRAIN (M)
SIMPLE	TERRAIN	1985	61	0	

****
** REMEMB TO INCLUDE BACKGR CONCEN **
****

GLADNEY-WY032495

1 10-05-**
15:51:33
*** SCREEN- MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill ASB, 9-Feb @1520, 180wind - Zone . 1 (east corner 1/9)

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSIO RATE (G/S) = 4
SOURCE HEIGHT (M) = 0.3
LENGTH OF SIDE (M) = 61
RECEPT HEIGHT (M) = 0.9
IOPT (1=URB,2 = 2

BUOY. FLUX = 0 M**4/S**3 MOM. FLUX = 0 M**4/S**2.

*** STABILIT CLASS 4 ONLY ***
*** 10-METE WIND SPEED OF 6.3 M/S ONLY ***

****
*** SCREEN DISCRET DISTANC ***
****

*** TERRAIN HEIGHT OF 0 M ABOVE STACK BASE USED FOR FOLLOWI DISTANC

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT	SIGMA (M)	SIGMA Y	(M)	Z	(M)	DWASH
61	3451	4	6.3	6.3	2003.2	0.3	18.5		3 NO			

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH= MEANS NO BUILDIN DOWNW USED
DWASH= MEANS HUBER-S DOWNW USED
DWASH= MEANS SCHULM DOWNW USED
DWASH= MEANS DOWNW NOT APPLICA X<3*LB

****
*** SUMMAR OF SCREEN MODEL RESULTS ***
****

CALCULA PROCED	MAX (UG/M**3)	CONC MAX	DIST (M)	TO HT	TERRAIN (M)
SIMPLE	TERRAIN	3451	61	0	

****
** REMEMB TO INCLUDE BACKGR CONCEN **
****

Polishing Pond Ambient H2S Modeling

10-04-**
13:29:53

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***
Area A - 1
Pine Hill Pol Pond Emissions, HWY 10, 12Feb @ 05:00, 360wind

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 53.00
SOURCE HEIGHT (M) = .30
LENGTH OF SIDE (M) = 610.00
RECEPTOR HEIGHT (M) = 2.00
IOPT (1=URB,2=RUR) = 2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 2.2 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
790.	1559.	4	2.2	2.2	704.0	.3	185.0	26.5	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	1559.	790.	0.

****

10-04-**
13:30:20

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

Area A - 2

Pine Hill Pol Pond Emissions pt# 6, 10Feb, 05:44, 320wind

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 119.0
SOURCE HEIGHT (M) = .30
LENGTH OF SIDE (M) = 610.00
RECEPTOR HEIGHT (M) = 1.00
IOPT (1=URB,2=RUR) = 2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 3.6 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
506.	3362.	4	3.6	3.6	1152.0	.3	169.1	18.5	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	3362.	506.	0.

****

1 10-04-**
13:30:20

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

Neal A 3

Pine Hill Pol Pond Emissions pt# 6, 10Feb, 05:44, 320wind

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 119.0
SOURCE HEIGHT (M) = .30
LENGTH OF SIDE (M) = 610.00
RECEPTOR HEIGHT (M) = 1.00
IOPT (1=URB,2=RUR) = 2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 3.6 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
506.	3362.	4	3.6	3.6	1152.0	.3	169.1	18.5	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	3362.	506.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

10-04-**
13:30:55

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

Area A - 4
Pine Hill Pol Pond Emissions pt# 6, 10Feb, 14:30, 320wind

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 178.0
SOURCE HEIGHT (M) = .30
LENGTH OF SIDE (M) = 610.00
RECEPTOR HEIGHT (M) = 1.00
IOPT (1=URB,2=RUR) = 2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 5.6 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
506.	3233.	4	5.6	5.6	1792.0	.3	169.1	18.5	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	3233.	506.	0.

****

1 10-04-**
13:31:24

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

Area A-5

Pine Hill Pol Pond Emissions pt# 6, 10Feb, 14:32, 350wind

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 112.0
SOURCE HEIGHT (M) = .30
LENGTH OF SIDE (M) = 610.00
RECEPTOR HEIGHT (M) = 1.00
IOPT (1=URB,2=RUR) = 2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 3.7 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
506.	3078.	4	3.7	3.7	1184.0	.3	169.1	18.5	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	3078.	506.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

10-04-**
13:32:05

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

Area B-41
Pine Hill Pol Pond Emissions pt# 11 A, 12Feb @13:40, 360wind

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 13.00
SOURCE HEIGHT (M) = .30
LENGTH OF SIDE (M) = 210.00
RECEPTOR HEIGHT (M) = 6.70
IOPT (1=URB,2=RUR) = 2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 2.8 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
210.	2014.	4	2.8	2.8	896.0	.3	62.2	8.9	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	2014.	210.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

1 10-04-**
13:29:03

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***
Aera C-1

Pine Hill Pol Pond Emissions pt# 11, 12Feb @13:44, 360wind

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 69.00
SOURCE HEIGHT (M) = .30
LENGTH OF SIDE (M) = 75.00
RECEPTOR HEIGHT (M) = 6.70
IOPT (1=URB,2=RUR) = 2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 3.0 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	.2325E+05	4	3.0	3.0	944.0	.3	24.4	4.7	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	.2325E+05	100.	0.

****

Pulp Mill and Evaporator Area Ambient H2S Modeling

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

Pulp Mill Pt a, b, c 7.5 mph

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 2.640
SOURCE HEIGHT (M) = 1.00
LENGTH OF SIDE (M) = 76.00
RECEPTOR HEIGHT (M) = 1.00
IOPT (1=URB,2=RUR) = 1

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 3.3 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
140.	337.8	4	3.3	3.3	1072.0	1.0	38.6	19.2	NO
300.	101.8	4	3.3	3.3	1072.0	1.0	61.2	40.2	NO
436.	54.93	4	3.3	3.3	1072.0	1.0	79.5	57.4	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	337.8	140.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

PULP mILL D ON 2/10, 15:05

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 3.780
SOURCE HEIGHT (M) = 1.00
LENGTH OF SIDE (M) = 152.00
RECEPTOR HEIGHT (M) = 1.00
IOPT (1=URB,2=RUR) = 1

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 4.5 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
91.	439.0	4	4.5	4.5	1430.4	1.0	48.5	12.6	NO
140.	252.5	4	4.5	4.5	1430.4	1.0	55.4	19.2	NO
471.	43.93	4	4.5	4.5	1430.4	1.0	99.2	61.7	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	439.0	91.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

10-18-**
09:31:37

*** SCREEN-1.1 MODEL RUN ***
*** VERSION DATED 88300 ***

PineHill PulpMill-PwrHse Area Emissions / 10Feb,14:53,point8

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = AREA
EMISSION RATE (G/S) = 2.370
SOURCE HEIGHT (M) = 1.00
LENGTH OF SIDE (M) = 23.00
RECEPTOR HEIGHT (M) = 1.00
IOPT (1=URB,2=RUR) = 1

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***
*** 10-METER WIND SPEED OF 4.1 M/S ONLY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
278.	104.6	4	4.1	4.1	1312.0	1.0	47.0	37.4	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	104.6	278.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

Appendix D

Process Wastewater TRS Measurements

Process Wastewater TRS Measurements

FEBRUARY 6	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
PULP MILL (TRS as H2S)	2	9.7	0.55	1.9	ND	0.0	ND	0.0	2.4	8.1	7.3
POWER & RECOVERY	4.3	9.8	52	177.2	16	54.5	1.3	4.4	6	20.4	237.1
CAUST AREA TO ASH POND, then ASB	1.5	12.9	330	172.1	ND	0.0	0.68	0.4	2.3	1.2	173.1
# 1 PM	2.9	6.9	ND	0.0	ND	0.0	ND	0.0	ND	0.0	0.0
# 2 PM	2.5	7.1	ND	0.0	ND	0.0	ND	0.0	0.42	1.0	0.7
OCC	-		0.88	-	ND	-	ND	-	ND	-	-
ASH POND OVERFLOW	-		-	-	-	-	-	-	-	-	-
EQ POND DECANT	-		20	-	1.7	-	0.36	-	1.5	-	-
CSSC HOTWELL	-		-	-	-	-	-	-	-	-	-
KRAFT HOTWELL	-		37	-	69	-	5.2	-	29	-	-
TOTAL LBS / HR				351		55		5		31	418

ALL FLOWS TO CLARIFIER EXCEPTING THE ASH POND OVERFLOW (includes Caust Area)

Process Wastewater TRS Measurements

FEBRUARY 7

	FLOW	pH	H2S		MESH		DMS		DMDS		TRS as H2S
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
PULP MILL	2	8.2	10	7.0	ND	0.0	ND	0.0	ND	0.0	7.0
POWER & RECOVERY	4.8	8.5	15	25.0	4.6	1.2	28	46.7		0.0	48.7
CAUST AREA TO ASH POND, then ASB	1.5	12.6	630	328.6	ND	0.0	ND	0.0	ND	0.0	328.6
# 1 PM	3	7.1	-	-	-	-	-	-	-	-	-
# 2 PM	2.5	7.6	-	-	-	-	-	-	-	-	-
OCC	-	-	-	-	-	-	-	-	-	-	-
ASH POND OVERFLOW	-	-	-	-	-	-	-	-	-	-	-
EQ POND DECANT	-	-	-	-	-	-	-	-	-	-	-
CSSC HOTWELL	-	-	-	-	-	-	-	-	-	-	-
KRAFT HOTWELL	-	-	-	-	-	-	-	-	-	-	-
TOTAL LBS / HR				361		1		47		0	384

(Headers for all rows after PULP MILL read "TRS" instead of "TRS as H2S".)

ALL FLOWS TO CLARIFIER EXCEPTING THE ASH POND OVERFLOW (includes Caust Area)

Process Wastewater TRS Measurements

FEBRUARY 8

	FLOW	pH	H2S		MESH		DMS		DMDS		TRS as H2S
PULP MILL	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	2	6.7	0.72	0.5	ND	0.0	ND	0.0	ND	0.0	0.5
	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
POWER & RECOVERY	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	4.2	8.5	84	122.7	12	17.5	3.2	4.7	7	10.2	145.9
	FLOW	pH	H2S		MESH		DMS		DMDS		H2S
CAUST AREA TO ASH POND, then ASB	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	1.5	12.3	120	62.6	1.4	0.7	ND	0.0	1.8	0.9	63.8
	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
# 1 PM	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	3.2	7.2	-	-	-	-	-	-	-	-	-
	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
# 2 PM	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	2.5	6.4	-	-	-	-	-	-	-	-	-
	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
OCC	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-
	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
ASH POND OVERFLOW	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-
	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
EQ POND DECANT	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-
	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
CSSC HOTWELL	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-
	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
KRAFT HOTWELL	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-
	TOTAL LBS / HR			186		18		5		11	210

ALL FLOWS TO CLARIFIER EXCEPTING THE ASH POND OVERFLOW (includes Caust Area)

Process Wastewater TRS Measurements

FEBRUARY 9

	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
PULP MILL (TRS as H2S)	2	8.3	ND	0.0	ND	0.0	ND	0.0	ND	0.0	0.0
POWER & RECOVERY	4.4	8.4	70	107.1	25	38.2	4	6.1	6.5	9.9	147.7
CAUST AREA TO ASH POND, then ASB	1.5	12.6	17	8.9	ND	0.0	ND	0.0	ND	0.0	8.9
# 1 PM	3.1	6.4	-	-	-	-	-	-	-	-	-
# 2 PM	2.5	7.1	-	-	-	-	-	-	-	-	-
OCC	-	-	-	-	-	-	-	-	-	-	-
ASH POND OVERFLOW	-	-	-	-	-	-	-	-	-	-	-
EQ POND DECANT	-	-	-	-	-	-	-	-	-	-	-
CSSC HOTWELL	-	-	-	-	-	-	-	-	-	-	-
KRAFT HOTWELL	-	-	-	-	-	-	-	-	-	-	-
TOTAL LBS / HR				116		38		6		10	157

ALL FLOWS TO CLARIFIER EXCEPTING THE ASH POND OVERFLOW (includes Caust Area)

Process Wastewater TRS Measurements

FEBRUARY 12

	FLOW	pH	H2S		MESH		DMS		DMDS		TRS as H2S
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
PULP MILL	2	8.4	7.3	5.1	ND	0.0	ND	0.0	ND	0.0	5.1
POWER & RECOVERY	5.1		64	113.5	18.6	33.0	1.7	3.0	6.7	11.9	149.6
CAUST AREA TO ASH POND, then ASB	1.5	12.6	200	104.3	ND	0.0	ND	0.0	ND	0.0	104.3
# 1 PM	3.2	6.6	ND	0.0	ND	0.0	ND	0.0	ND	0.0	0.0
# 2 PM	2.5	7.1	ND	0.0	ND	0.0	0.16	0.1	0.42	0.4	0.3
OCC	-	-	ND	-	0.1	-	ND	-	0.2	-	-
ASH POND OVERFLOW	-	-	-	-	-	-	-	-	-	-	-
EQ POND DECANT	-	-	-	-	-	-	-	-	-	-	-
CSSC HOTWELL	-	-	2.1	-	ND	-	ND	-	1.6	-	-
KRAFT HOTWELL	-	-	34	-	33	-	3.8	-	69	-	-
	TOTAL LBS / HR			223		33		3		12	259

ALL FLOWS TO CLARIFIER EXCEPTING THE ASH POND OVERFLOW (includes Caust Area)

Process Wastewater TRS Measurements

FEBRUARY 13

PULP MILL	FLOW	pH	H2S		MESH		DMS		DMDS		TRS as H2S
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	2	8.4	0.64	0.4	ND	0.0	ND	0.0	0.18	0.1	0.5

POWER & RECOVERY	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	5.5		21	40.2	11.3	21.6	1.2	2.3	8.3	15.9	69.3

CAUST AREA TO ASH POND, then ASB	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	1.5	12.7	60	31.3	ND	0.0	ND	0.0	ND	0.0	31.3

# 1 PM	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	3.3	6.4	-	-	-	-	-	-	-	-	-

# 2 PM	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	2.5	7.1	-	-	-	-	-	-	-	-	-

OCC	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-

ASH POND OVERFLOW	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-

EQ POND DECANT	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-

CSSC HOTWELL	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-

KRAFT HOTWELL	FLOW	pH	H2S		MESH		DMS		DMDS		TRS
	MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	LBS/HR
	-	-	-	-	-	-	-	-	-	-	-

TOTAL LBS / HR	72	22	2	16	101

ALL FLOWS TO CLARIFIER EXCEPTING THE ASH POND OVERFLOW (includes Caust Area)

Appendix E

Effluent Treatment System Water Phase TRS Measurements

Effluent Treatment System Wastewater TRS Measurements

FEBRUARY 6

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS as H2S	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
18.2	9.0	8.8	55.7	1.5	9.5	0.3	2.0	8.4	53.2	19.0	82.1

CLAR

Ash Pond (including Caustizising) wastewater

ASB

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
17.2	11.0	19.0	113.6	0.9	5.4	ND	0.0	ND	0.0	19.9	118.0

	H2S LB/HR	MESH LBS/HR	DMS LBS/HR	DMDS LBS/HR	Total TRS LBS/HR
delta across ASB	-29.9	-3.0	0.0	0.0	-32.3

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
17.2	8.7	14.0	83.7	0.4	2.4	ND	0.0	ND	0.0	14.4	85.7

Step Aeration

	H2S LB/HR	MESH LBS/HR	DMS LBS/HR	DMDS LBS/HR	Total TRS LBS/HR
delta across step aeration	-17.9	-2.4	0.0	0.0	-19.9

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
17.2		11.0	65.8	ND	0.0	ND	0.0	ND	0.0	11.0	65.8

TO POLISH POND

	H2S LB/HR	MESH LBS/HR	DMS LBS/HR	DMDS LBS/HR	Total TRS LBS/HR
TOTAL LOSS ACROSS ASB + STEP OUTFALL	-47.8	-5.4	0.0	0.0	-52.2

Effluent Treatment System Wastewater TRS Measurements

FEBRUARY 7

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS as H2S PPM	Total TRS as H2S LBS/HR
17.5	8.7	5.3	32.2	ND	0.0	ND	0.0	5.6	34.1	10.9	43.6

CLAR

Ash Pond (including Caustizising) wastewater

ASB

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
16.5	10.8	60.0	344.2	1.8	10.3	0.5	2.9	4.2	24.1	66.5	362.0
delta across ASB			-241.0		-7.6		-2.9		-13.8		-253.1

Step Aeration

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
16.5	8.5	18.0	103.3	0.5	2.7	ND	0.0	1.8	10.3	20.3	108.9
delta across step aeration			-40.2		-2.7		1.4		0.0		-41.7

Polishing Pond

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
16.5		11.0	63.1	ND	0.0	0.2	1.4	1.8	10.3	13.0	67.2
TOTAL LOSS ACROSS ASB + STEP OUTFALL			-281.1		-10.3		-1.5		-13.8		-294.8

Effluent Treatment System Wastewater TRS Measurements

FEBRUARY 8

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS as H2S PPM	Total TRS as H2S LBS/HR
18.4	8.2	55.0	351.9	0.8	5.0	0.7	4.4	1.6	10.2	58.1	361.4

CLAR

Ash Pond (including Caustizising) wastewater

ASB

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
17.4	9.5	7.6	46.0	0.9	5.4	0.3	1.9	2.4	14.5	11.2	56.2
delta across ASB			12.1		-5.4		-1.9		-5.4		4.9

Step Aeration

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
17.4	8.6	9.6	58.1	ND	0.0	ND	0.0	1.5	9.1	11.1	61.1
delta across step aeration			-8.5		0.0		0.0		-9.1		-11.5

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
17.4		8.2	49.6	ND	0.0	ND	0.0	ND	0.0	8.2	49.6
TOTAL LOSS ACROSS ASB + STEP OUTFALL			3.6		-5.4		-1.9		-14.5		-6.6

Polishing Pond

Effluent Treatment System Wastewater TRS Measurements

FEBRUARY 9

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS as H2S PPM	Total TRS as H2S LBS/HR
18.5	8.1	7.5	48.2	0.4	2.4	1.2	7.7	12.0	77.2	21.1	79.6

CLAR

Ash Pond (including Caustizising) wastewater

ASB

FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
17.5	10.2	68.0	413.8	2.4	14.6	0.8	4.9	1.7	10.3	72.9	431.4

	H2S LB/HR	MESH LBS/HR	DMS LBS/HR	DMDS LBS/HR	Total TRS LBS/HR
[illegible] across ASB	-34[illegible]8	-11.6	-4.9	0.0	-358.6

Step Aeration

[illegible]	[illegible]	[illegible]M	LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
17.5	7.7	11.0	66.9	0.5	3.0	ND	0.0	1.7	10.3	13.2	72.8

	H2S LB/HR	MESH LBS/HR	DMS LBS/HR	DMDS LBS/HR	Total TRS LBS/HR
[illegible]elta across [illegible] aeration	-33.5	-3.0	0.0	-10.3	-39.4

-0.5

Polishing Pond

[illegible] MGD	[illegible]	H2S [illegible]M	H2S LB/HR	MESH PPM	MESH LBS/HR	DMS PPM	DMS LBS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
17.5		5.5	33.5	ND	0.0	ND	0.0	ND	0.0	5.5	33.5

TOTAL LOSS ACROSS ASB + STEP OUTFALL

H2S	MESH	DMS	DMDS	Total TRS
-380.3	-14.6	-4.9	-10.3	-397.9

Effluent Treatment System Wastewater TRS Measurements

FEBRUARY 12

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS as H2S	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
19.3	8.4	16.0	107.4	4.7	31.5	0.8	5.6	5.3	35.6	26.8	147.5

CLAR

Ash Pond (including Caustizising) wastewater

ASB

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
18.3	10.3	5.2	33.1	0.7	4.3	0.4	2.8	3.3	21.0	9.6	44.9
delta across ASB			-12.7		-1.0		-2.8		-21.0		-21.9

Step Aeration

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
18.3	7.9	3.2	20.4	0.5	3.4	ND	0.0	ND	0.0	3.7	23.1
delta across step aeration			12.7		-3.4		0.0		0.0		10.0

Polishing Pond

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
18.3		5.2	33.1	ND	0.0	ND	0.0	ND	0.0	5.2	33.1

TOTAL LOSS ACROSS ASB + STEP OUTFALL				
0.0	-4.3	-2.8	-21.0	-11.9

Effluent Treatment System Wastewater TRS Measurements

FEBRUARY 13

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS as H2S	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
19.8	8.2	7.3	50.3	1.0	6.9	0.4	3.0	4.0	27.5	12.7	66.5

CLAR

Ash Pond (including Caustizising) wastewater

ASB

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
18.8	10.1	8.0	52.3	0.3	2.2	ND	0.0	4.0	26.1	12.3	62.8
delta across ASB			-13.7		2.6		6.5		-26.1		-17.2

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
18.8	7.8	5.9	38.6	0.7	4.8	1.0	6.5	ND	0.0	7.6	45.7
delta across step aeration			9.8		-4.8		-6.5		0.0		2.7

Step Aeration

FLOW	pH	H2S		MESH		DMS		DMDS		Total TRS	
MGD		PPM	LB/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR	PPM	LBS/HR
18.8		7.4	48.4	ND	0.0	ND	0.0	ND	0.0	7.4	48.4
TOTAL LOSS ACROSS ASB + STEP OUTFALL			-3.9		-2.2		0.0		-26.1		-14.4

Polishing Pond

Effluent Treatment System Wastewater TRS Measurements

AVERAGE FROM FEB 6 TO FEB 13

	FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH BS/HR	DMS PPM	DMS BS/HR	DMDS PPM	DMDS LBS/HR	otal TRS as H2S PPM	otal TRS as H2S LBS/HR
	18.6	8.4	16.7	107.6	1.7	9.2	0.7	3.8	6.2	39.6	24.8	130.1
	Max			351.9		31.5		7.7		77.2		
	Min			32.2		0.0		0.0		10.2		

CLAR

Ash Pond (including Caustizising) wastewater

ASB	FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH BS/HR	DMS PPM	DMS BS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
	17.6	10.3	28.0	167.2	1.2	7.1	0.5	2.1	3.1	16.0	32.1	179.2
	Max			413.8		14.6		4.9		26.1		
	Min			33.1		2.2		0.0		0.0		
delta across ASB				-105.3		-4.3		-1.0		-11.1		-113.0
			Max	12.1		2.6		6.5		0.0		
			Min	-346.8		-11.6		-4.9		-26.1		

Step Aeration	FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH BS/HR	DMS PPM	DMS BS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
	17.6	8.2	10.3	61.8	0.5	2.7	1.0	1.1	1.7	5.0	11.7	66.2
			Max	103.3		4.8		6.5		10.3		
			Min	20.4		0.0		0.0		0.0		
delta across step aeration				-12.9		-2.7		-0.9		-3.2		-16.6
			Max	12.7		0.0		1.4		0.0		
			Min	-40.2		-4.8		-6.5		-10.3		

TO POLISH POND	FLOW MGD	pH	H2S PPM	H2S LB/HR	MESH PPM	MESH BS/HR	DMS PPM	DMS BS/HR	DMDS PPM	DMDS LBS/HR	Total TRS PPM	Total TRS LBS/HR
	17.6		8.1	48.9		0.0	0.2	0.2	1.8	1.7	8.4	49.6
			Max	65.8		0.0		1.4		10.3		
			Min	33.1		0.0		0.0		0.0		
TOTAL LOSS ACROSS ASB + STEP OUTFALL				-118.3		-7.1		-1.8		-14.3		-129.6

Appendix F

Production Summary

Mill Production During the Study

Below is a basic summary of mill production during the study test period.

Summary of Mill Production

Feb 6 to Feb 13 Study Test Period

2001 Date	# 1 Digester Rate ODT/day	# 2 Digester Rate ODT/day	Recovery Boiler Firing Rate #bls/min	Lime Kiln Solids Fired ODT/hr	#'s 1 and 2 Evaporator Liquor Flowrates gpm	# 1 Paper Machine Rate MDT/hr	# 2 Paper Machine Rate MDT/hr
Feb 6	1049	638	2120	28	2204	68	40
Feb 7	1305		1479	26	2118	71	39
Feb 8	1242	650	1981	24	2120	79	38
Feb 9	1277	642	2781	26	2323	82	
Feb 10	1301	650	2855	27	2300	80	38
Feb 11	1336	650	2750	30	2303	80	39
Feb 12	1359	650	2881	29	2281	76	39
Feb 13	1337	650	2773	28	2303	79	40
Average	1276	647	2453	27	2245	77	39