

ISC Modeling Methodology and Results

Introduction

This report summarizes dispersion modeling that was completed in support of anticipated updates to R13 permits 1953A and 2365B at the DuPont Washington Works site.

Emission Source Information

Table 1 shows the stack parameters used in the model and Table 2 shows the locations and emission rates for each emission point. Note that two emission points from previous modeling (242 and 163-E-11) have been removed from the model and emission point 163-E-26 has been relocated.

Modeling Methodology

Dispersion and deposition modeling was performed using EPA's Industrial Source Complex 3 Model (ISC3), version 02035, provided by Trinity Consultants. All modeling was done in accordance with the procedures in EPA's Guideline on Air Quality Models (40 CFR Part 51, Appendix W). The EPA regulatory default options and rural dispersion coefficients were selected in the model.

The APFO emission sources were evaluated for downwash effects from surrounding buildings. EPA's Building Profile and Input Program (BPIP) was used to provide wind direction specific building parameters. All buildings on the site were evaluated to determine if they could potentially impact the stack by causing building downwash effects. Plot plans showing the location of buildings included in the model are shown in Figures 1 and 2. (The buildings included in the model are identical to the list submitted under Consent Order GWR-2001-019).

A 100-meter grid extending out 4,000 meters from the source was used. In addition, discrete receptors with 100-meter spacing were placed on the plant property line. Terrain elevations were imported from electronic files obtained from the U.S. Geological Survey using the "highest" method to assign an elevation to each receptor.

One year of on-site meteorological data (1996) was analyzed. The data was processed by Trinity consultants, using Wilmington, Ohio for the upper air data. The precipitation data used is from the Parkersburg, West Virginia airport. Missing data and measured wind speeds of less than 1 m/s were treated consistent with the recommendations made in EPA's On-site Meteorological Program Guidance for Regulatory Modeling. An anemometer height of 10 meters was used for the modeling.

Modeling Results

An averaging time of one year was used to determine the annual average ground level concentrations over the entire receptor grid. A contour plot of these concentrations is shown in Figure 3. The maximum annual average ground-level concentration predicted by the model was $0.410 \mu\text{g}/\text{m}^3$. This concentration occurred at a receptor located on the plant fenceline north of the plant.

Electronic Files

This report and the following electronic files were transmitted by email to Chris Arrington at WVDAQ on January 28, 2004:

ISC Input file	PermitAmendments.dat
ISC Output file	PermitAmendments.lst
BPIP Input file	PermitAmendments.bpi
BPIP Output file	PermitAmendments.bpo
Meteorological Data file	pkbiln96.asc

Table 1
Stack Parameters

Stack Name	Emission Point ID	Reg 29 Vent ID	Diameter (ft)	Diameter (m)	Height (ft)	Height (m)	Flow Rate (acfm)	Velocity (ft/s)	Velocity (m/s)	Temperature (F)	Temperature (K)
815E (815D) Deep Bed Scrubber	T61ZCE	699	4	1.22	170	51.8	21,000	27.9	8.5	124	324
815E (815D) D1 Cooler	T61XE	697	1.67	0.51	45	13.7	2,000	15.2	4.6	66	292
815E (815D) D3 Cooler	T61YE	694	1.67	0.51	45	13.7	2,000	15.2	4.6	66	292
1353B (1353A) Dryer 2	164-5E	652	1.96	0.60	70	21.3	9,800	54.1	16.5	200	366
1353B (Pre-Existing) Dryer 1	164-2E	658	1.63	0.50	68	20.7	2,800	22.4	6.8	300	422
1953A (614A) Dryer 1	163-E-26	231	1	0.31	100	30.5	3100	65.8	20.1	131	328
2365B (2365A) Dryer	C1FSE	274	0.69	0.21	110	33.5	880	39.2	12.0	130	328
2365B (2365A) Filter/Receiver	C1FKE	268	0.27	0.08	72.5	22.1	100	29.1	8.9	110	316
Semiworks Applic	Research		2.5	0.76	47	14.3	8,836	30	9.1	80	300

Table 2
Stack Locations and Emission Rates

Stack Name	Emission Point ID	Reg 29 Vent ID	Stack Location UTM-E	Stack Location UTM-N	Elevation (m)	APFO Allowable Emission Rate (lb/yr)	APFO Allowable Emission Rate (g/s)
815E (815D) Deep Bed Scrubber	T61ZCE	699	442091	4346836	195	3,258	4.69E-02
815E (815D) D1 Cooler	T61XE	697	442129	4346836	194	3	4.32E-05
815E (815D) D3 Cooler	T61YE	694	442104	4346822	195	3	4.32E-05
1353B (1353A) Dryer 2	164-5E	652	441920	4346767	198	94	1.35E-03
1353B (Pre-Existing) Dryer 1	164-2E	658	441923	4346756	198	70.6	1.02E-03
1953A (614A) Dryer 1	163-E-26	231	441941	4346758	201	2754	3.96E-02
2365B (2365A) Dryer	C1FSE	274	441787	4346744	200	1,327	1.91E-02
2365B (2365A) Filter/Receiver	C1FKE	268	441774	4346753	196	360	5.18E-03
Semiworks Applic	RESEARCH		442086	4346624	190	16	2.29E-04

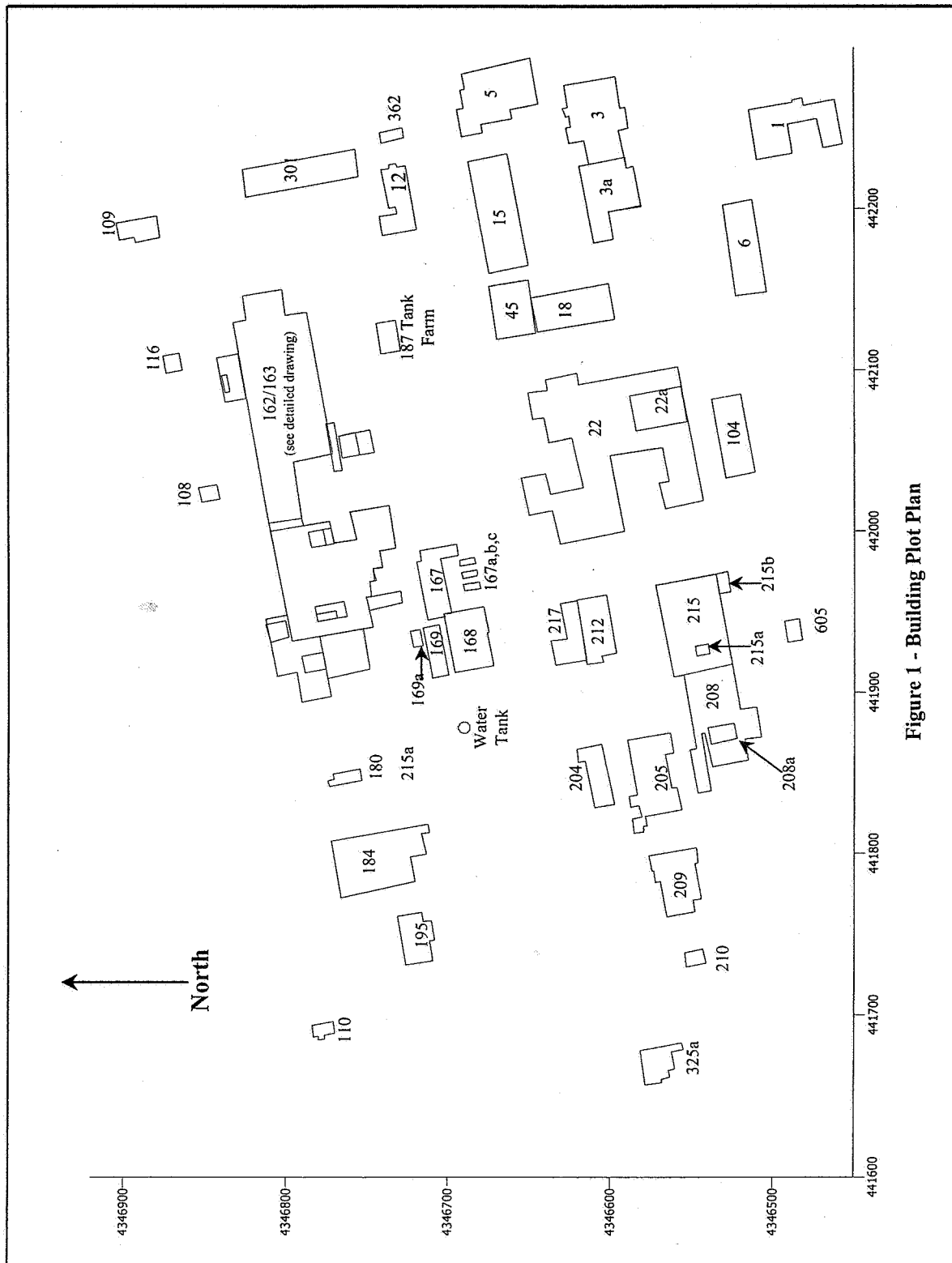


Figure 1
Building Plot Plan
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1/28/04

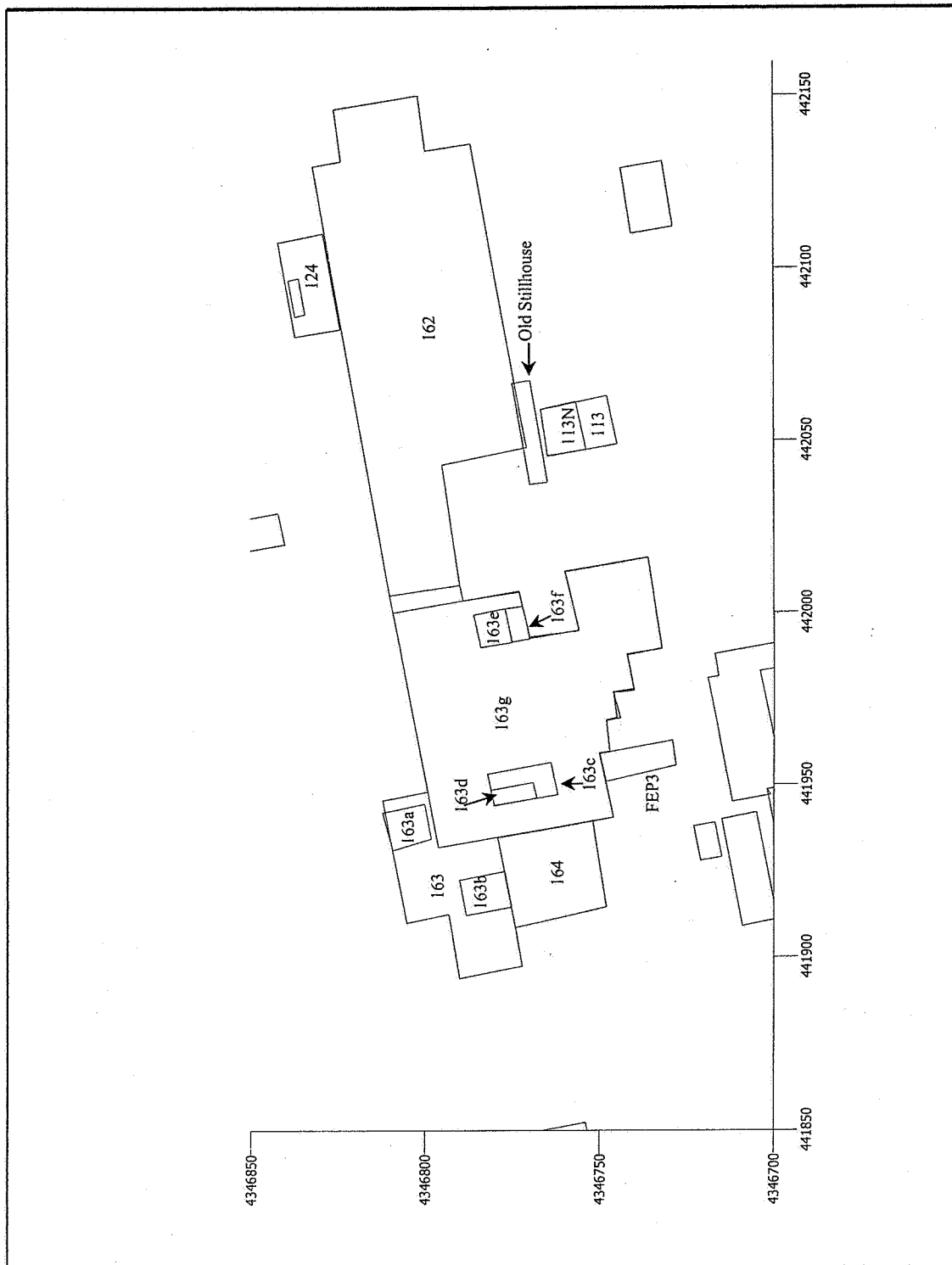


Figure 2
Building 162/163 Detail

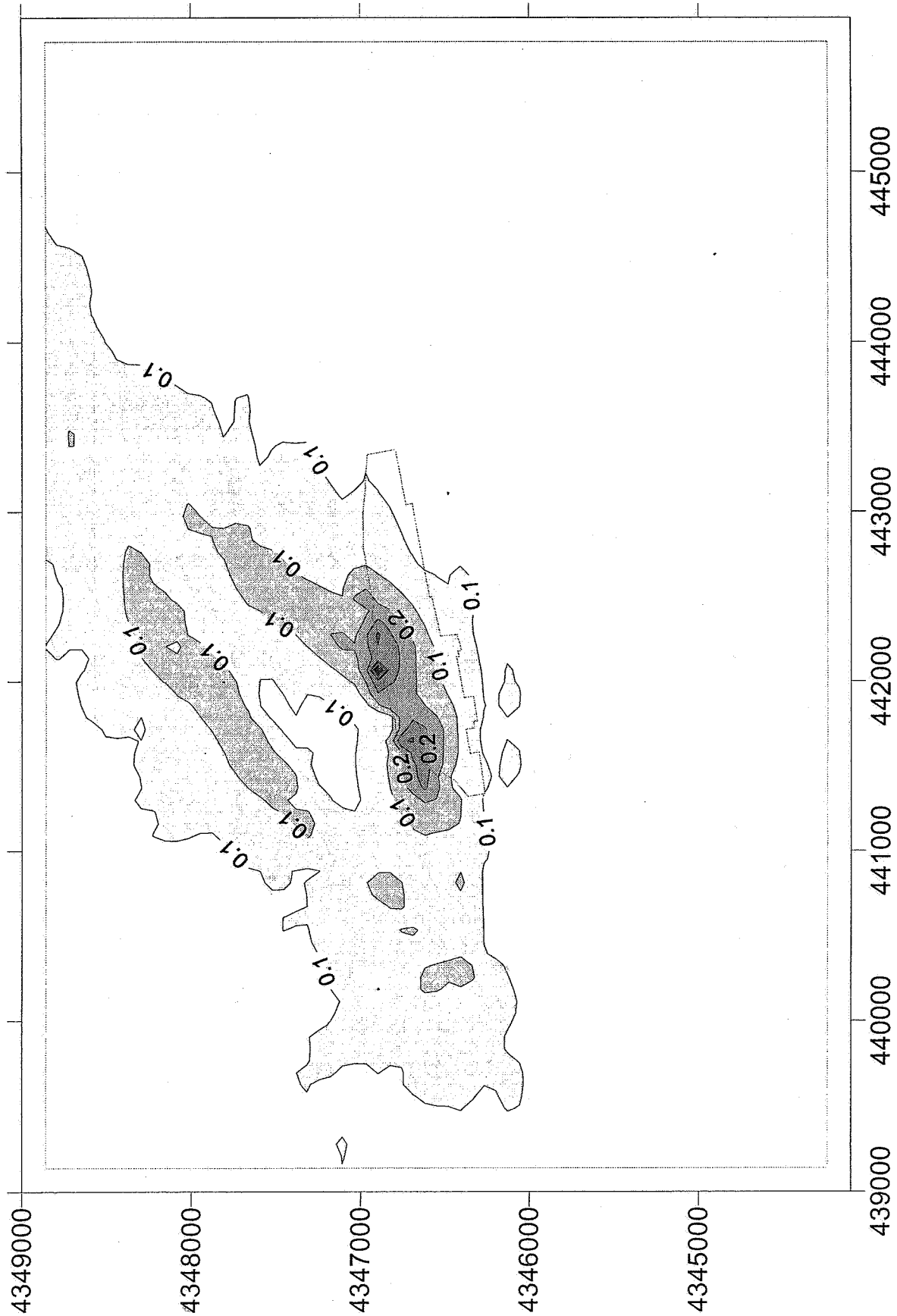


Figure 3
Predicted Annual Average Concentrations ($\mu\text{g}/\text{m}^3$)