

*****DRAFT*****

ISC Modeling Methodology and Results

Introduction

This report summarizes dispersion modeling that was completed for the DuPont Washington Works facility to demonstrate that the emission limits included in Permit Application 1823C for the Thermal Converter complies with the C-8 assessment of toxicity (CAT) recommended airborne screening level of 1.0 ug/m³ at the property line fence.

In 2003, the fenceline along the Ohio River was modified for site security purposes. A Security Vulnerability Assessment was conducted for the Washington Works facility in 2002. The assessment concluded that the fenceline along the riverbank needed to be relocated as a countermeasure to any adversary gaining access to the site. The current modeling analysis includes this new fenceline.

Emission Source Information

Table 1 shows the stack parameters used in the model as well as the locations and emission rates for each emission point. Note that an emission point from previous modeling (C3HP) has been removed from the model and emission point T7IME has been added.

Modeling Methodology

Dispersion and deposition modeling was performed using EPA's Industrial Source Complex 3 Model (ISC3), version 02035. 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. Concurrent upper air data from Wilmington, OH was used to calculate twice-daily mixing depths. 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 $0.299 \mu\text{g}/\text{m}^3$. 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 September XX, 2004:

ISC Input file	thermal_converter_2004.dat
ISC Output file	thermal_converter_2004.lst
BPIP Input file	thermal_converter_2004.bpi
BPIP Output file	thermal_converter_2004.bpo
Meteorological Data file	pkbiln96.asc

Table 1
Stack Parameters

Permit	Modeling	Zone 17	Stack Diameter	Stack Height	Stack Flow	Stack Velocity	Stack Temp	Permit Annual C-8 Emissions	Permit Annual C-8 Emissions
Vent ID	Vent ID	UTM-E	UTM-N	ft	ACFM	ft/sec	F	lb/yr	lb/hr
T6IZCE	699	442098	4346843	170	12,000	15.9	124	3,258	0.371918
T6IXE	697	442128	4346829	45	2,000	8.4	176	3	0.000342
T6IYE	694	442101	4346815	45	344	2.6	112	3	0.000342
T5HGE	658	441928	4346757	63	6,478	61.1	142	94	0.010742
T5HIE	652	441926	4346758	64	4,031	111.7	139	71	0.008059
C2DTE	231	441941	4346758	100	1,200	25.5	53 min	2,753	0.314
C1FSE	274	441790	4346744	110	667	33.5	41 min	1,327	0.15148
C1FKE	268	441774	4346753	72.5	100	28.7	110	300	0.034247
T7IME	662	442025	4346847	150	1788	21.4	86	0.0010	1.14E-07
RO22EEF6 (Research)	EEF6	442086	4346624	47	8836		80	12	0.00045
RO22EEF86 (Research)	EEF86	442069	4346627	49	7540		80	0.3	0.00045
RO22EEF87 (Research)	EEF87	442058	4346634	49	1885		80	3	0.00045
RO22EEF89 (Research)	EEF89	442063	4346635	49	3770		80	0.6	0.00045

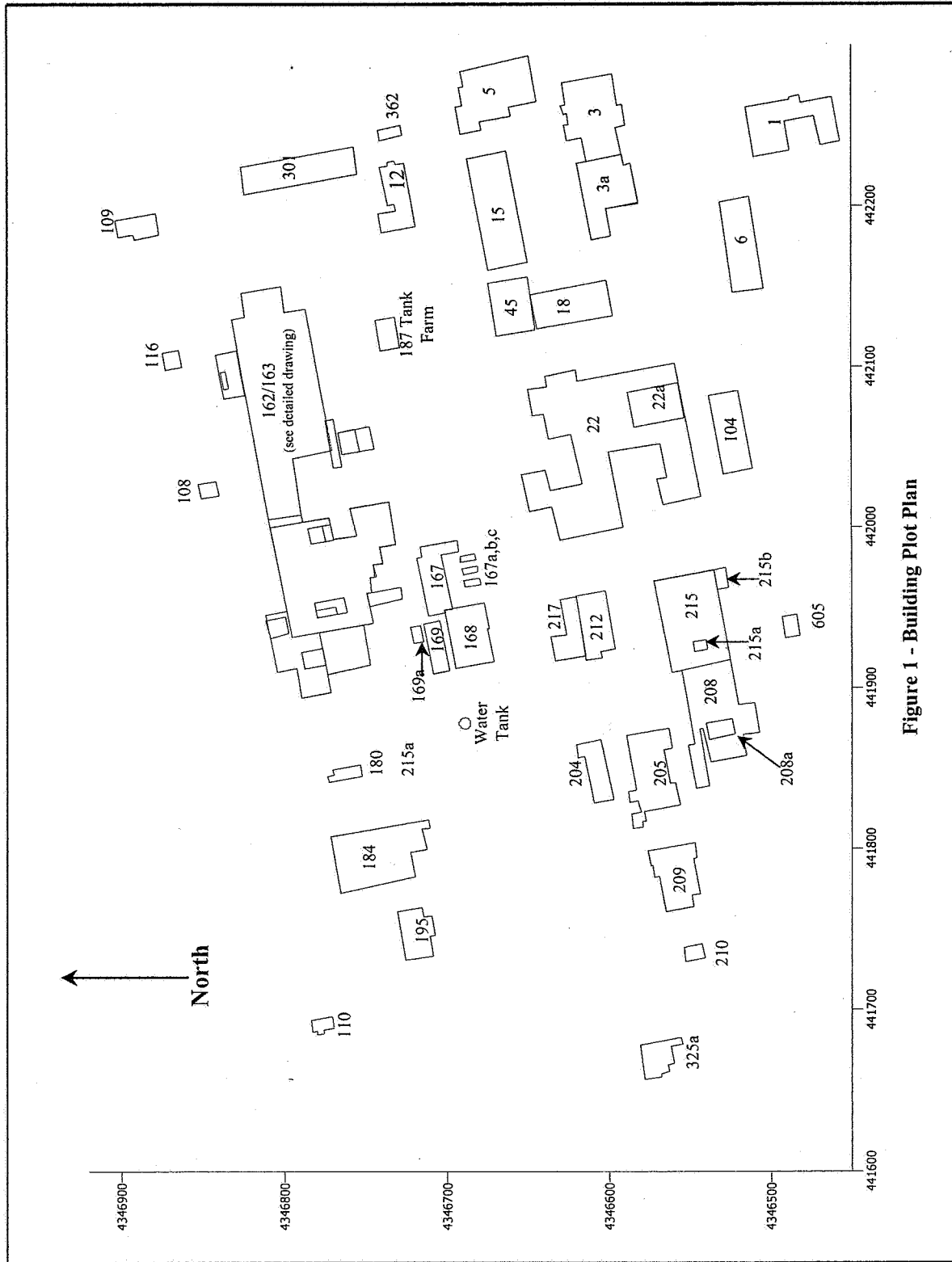


Figure 1 - Building Plot Plan

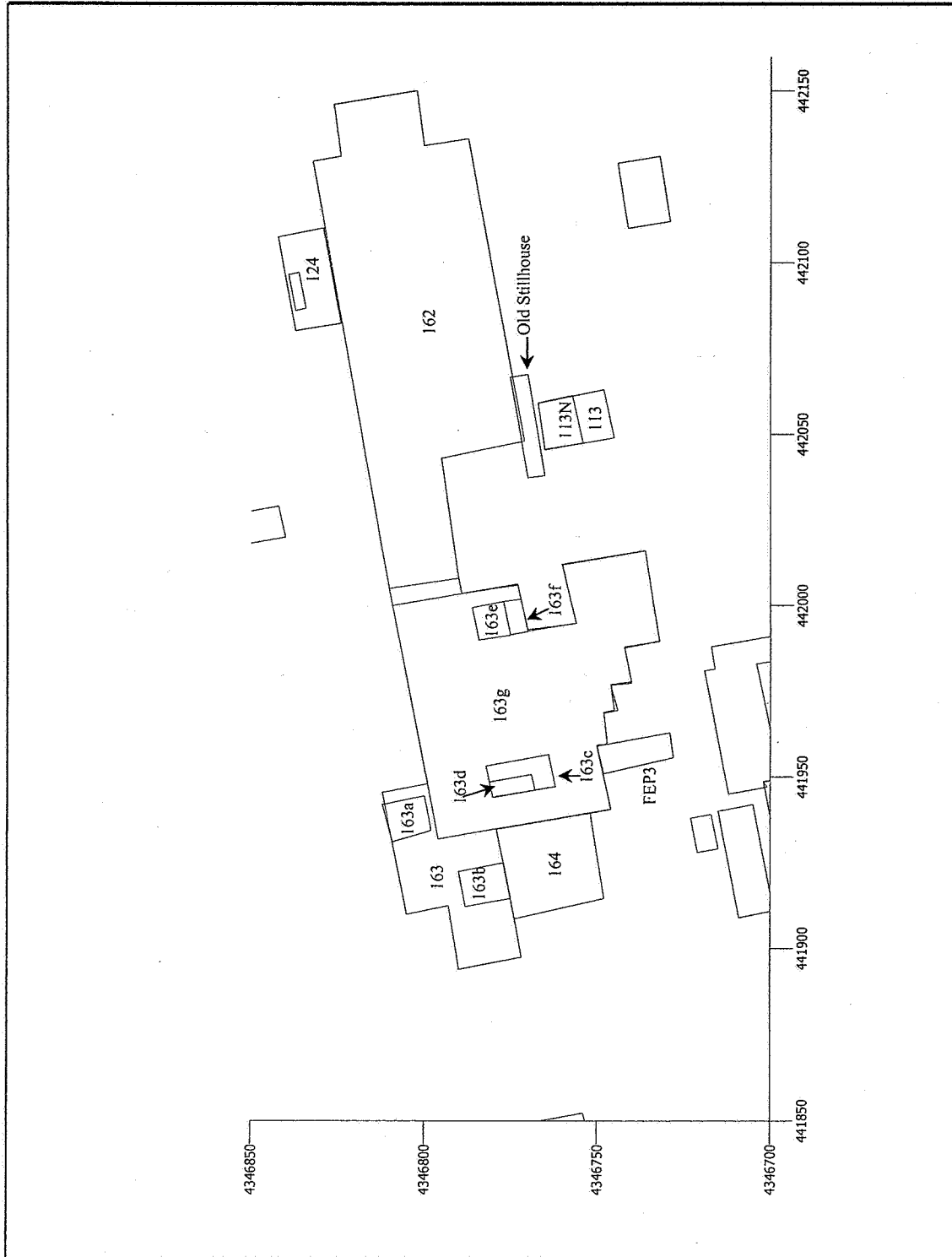


Figure 2
Building 162/163 Detail

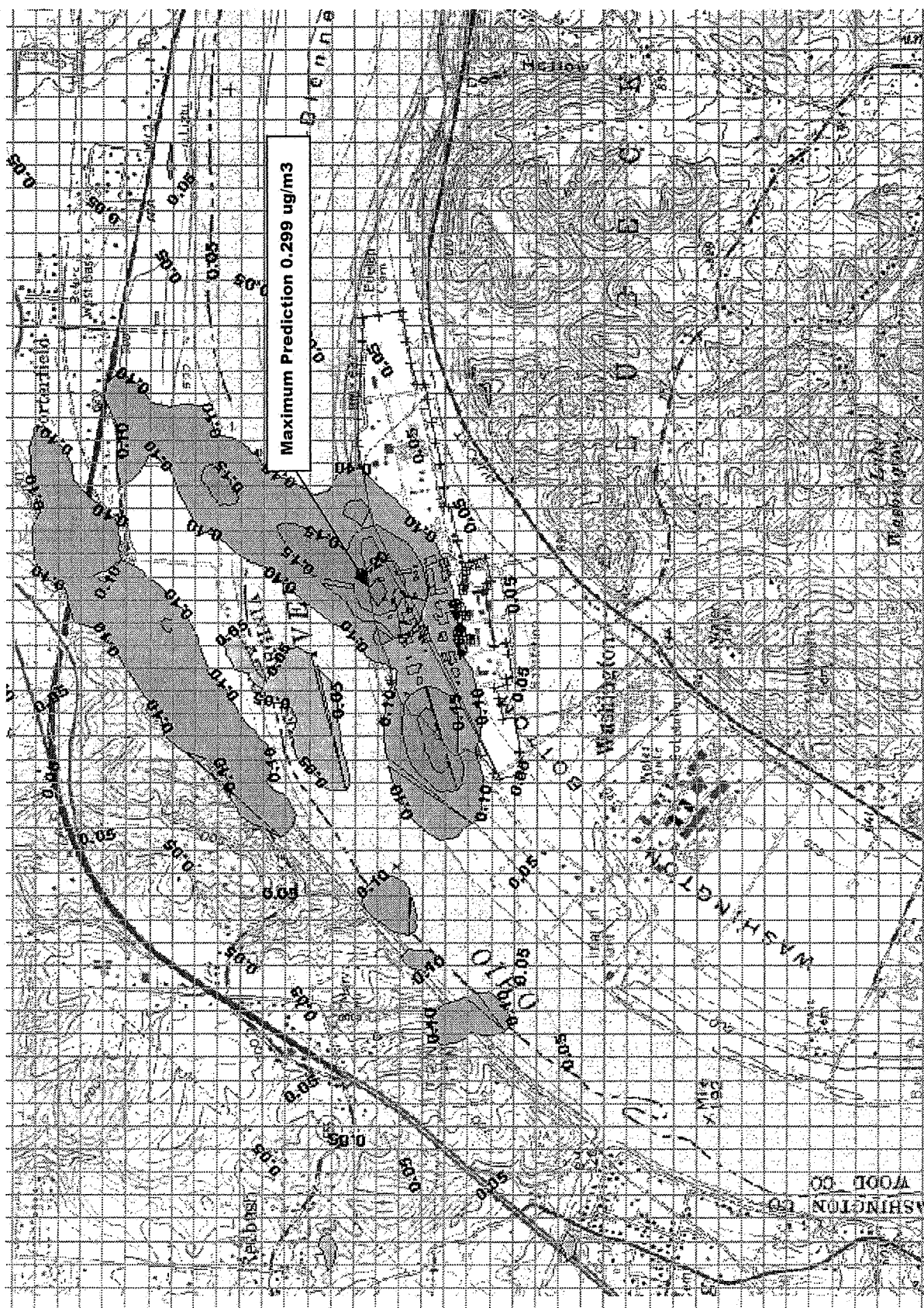


Figure 3
Predicted Annual Average Concentrations ($\mu\text{g}/\text{m}^3$)