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 the form R13 permits (815E, 1353B, 1953B, and 2365C) comply with the C-8 assessment of toxicity (CAT) recommended airborne screening level of 1.0 ug/m3 at the property line fence. Compared to the modeling report submitted in October, 2003, this report incorporates several revisions to stack parameters that were the result of stack testing, and the refinement of UTM coordinates.

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. As a result, modeling needed to be redone in order to correctly represent this new fenceline in the modeling analysis.

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 two emission points from previous modeling (242 and 232) have been removed from the model and emission point 231 has been relocated.

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 $\mu g/m^3$. This concentration occurred at a receptor located on the new 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 May XX, 2004:

ISC Input file	new_permit_2004_nfl.dat
ISC Output file	new_permit_2004_nfl.lst
BPIP Input file	new_permit_2004_nfl.bpi
BPIP Output file	new_permit_2004_nfl.bpo
Meteorological Data file	pkbiln96.asc

Table 1
Stack Parameters

Permit	Reg 29	Reg 29	Zone 17		Stack Diameter	Stack Height	Stack Flow	Stack Velocity	Stack Temp	Permit Annual C-8 Emissions	Permit Annual C-8 Emissions
Vent ID	Unit ID	Vent ID	UTM-E	UTM-N	ft	ft	ACFM	ft/sec	F	lb/yr	lb/hr
T6IZCE	TIV, E&F	699	442098	4346843	4	170	12,000	15.9	124	3,258	0.371918
T6IXE	TIV	697	442128	4346829	2.25	45	2,000	8.4	176	3	0.000342
T6IYE	TIF	694	442101	4346815	1.67	45	344	2.6	112	3	0.000342
T5HGE	THG	658	441928	4346757	1.5	63	6,478	61.1	142	94	0.010742
T5HIE	THI	652	441926	4346758	0.88	64	4,031	111.7	139	71	0.008059
C2DTE	CDT	231	441941	4346758	1.00	100	1,200	25.5	53 min	2,753	0.314
C1FSE	CFS	274	441790	4346744	0.65	110	667	33.5	41 min	1,327	0.15148
C1FKE	CFK	268	441774	4346753	0.27	72.5	100	28.7	110	300	0.034247
C3HP	CHP	276	441842	4346772	1.5	75	5,000	47.2	amb	0.16	0.000018
RO22EEF6	(Research)		442086	4346624	2.5	47	8836		80	12	0.00045
RO22EEF86	(Research)		442069	4346627	2	49	7540		80	0.3	0.00045
RO22EEF87	(Research)		442058	4346634	2	49	1885		80	3	0.00045
RO22EEF89	(Research)		442063	4346635	2	49	3770		80	0.6	0.00045

Figure 1 - Building Plot Plan

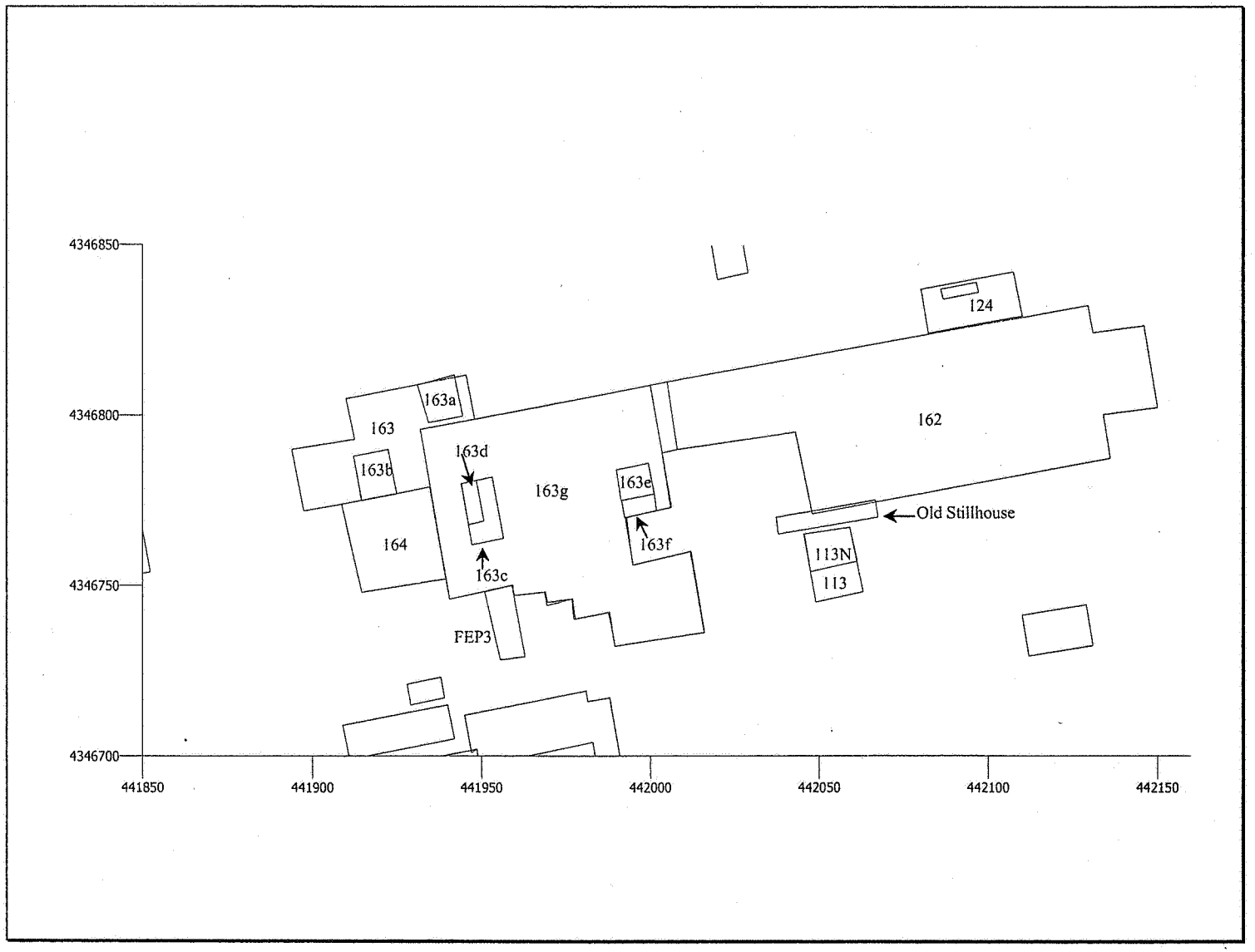

Figure 2
Building 162/163 Detail

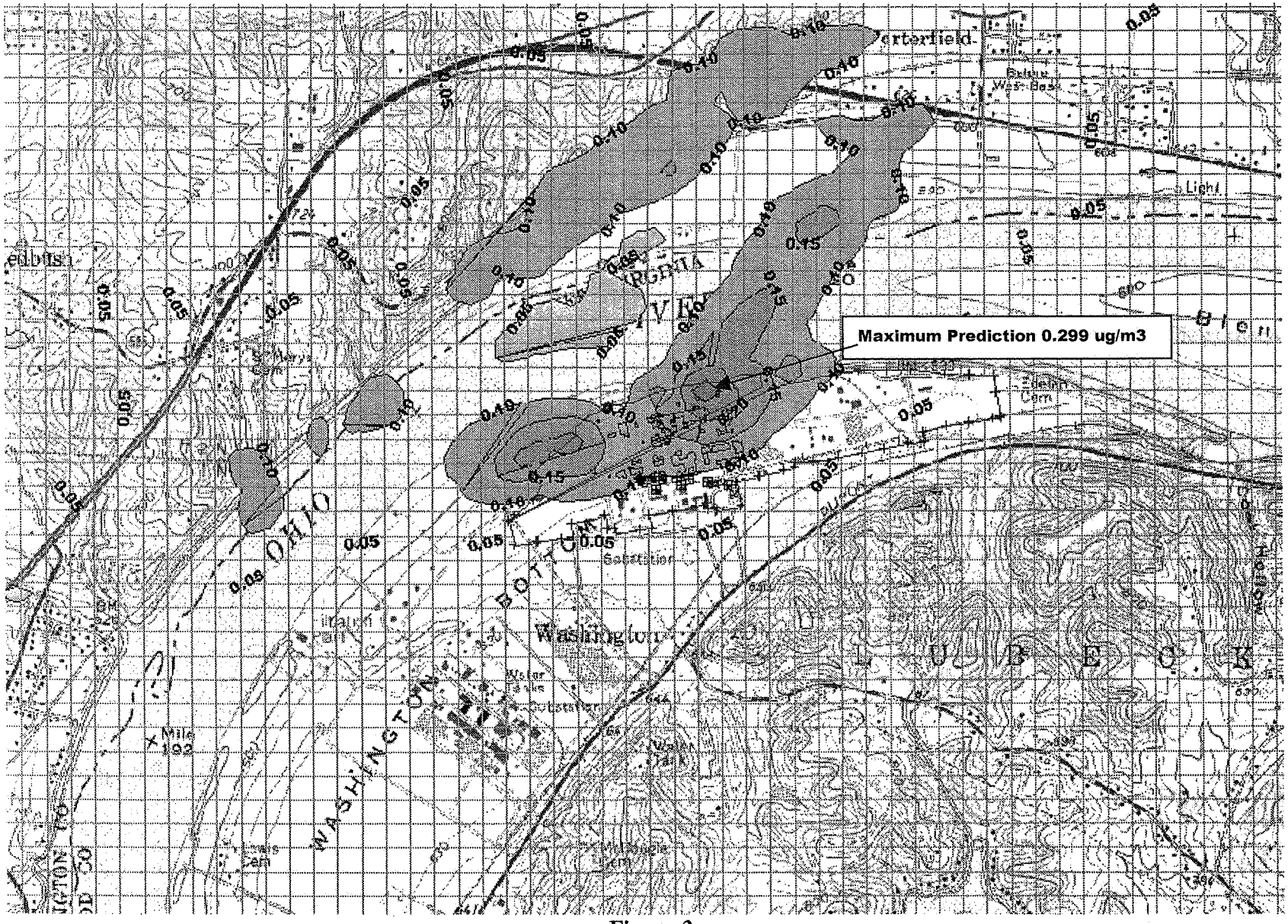

Figure 3
Predicted Annual Average Concentrations (μg/m^3)