



## **ISC Modeling Methodology and Results**

### **Introduction**

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

### **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 one emission point (276) has been added. This emission point had been erroneously omitted from the previous modeling.

### **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  $0.848 \mu\text{g}/\text{m}^3$ . This concentration occurred at a receptor located on the plant fenceline north of the plant.

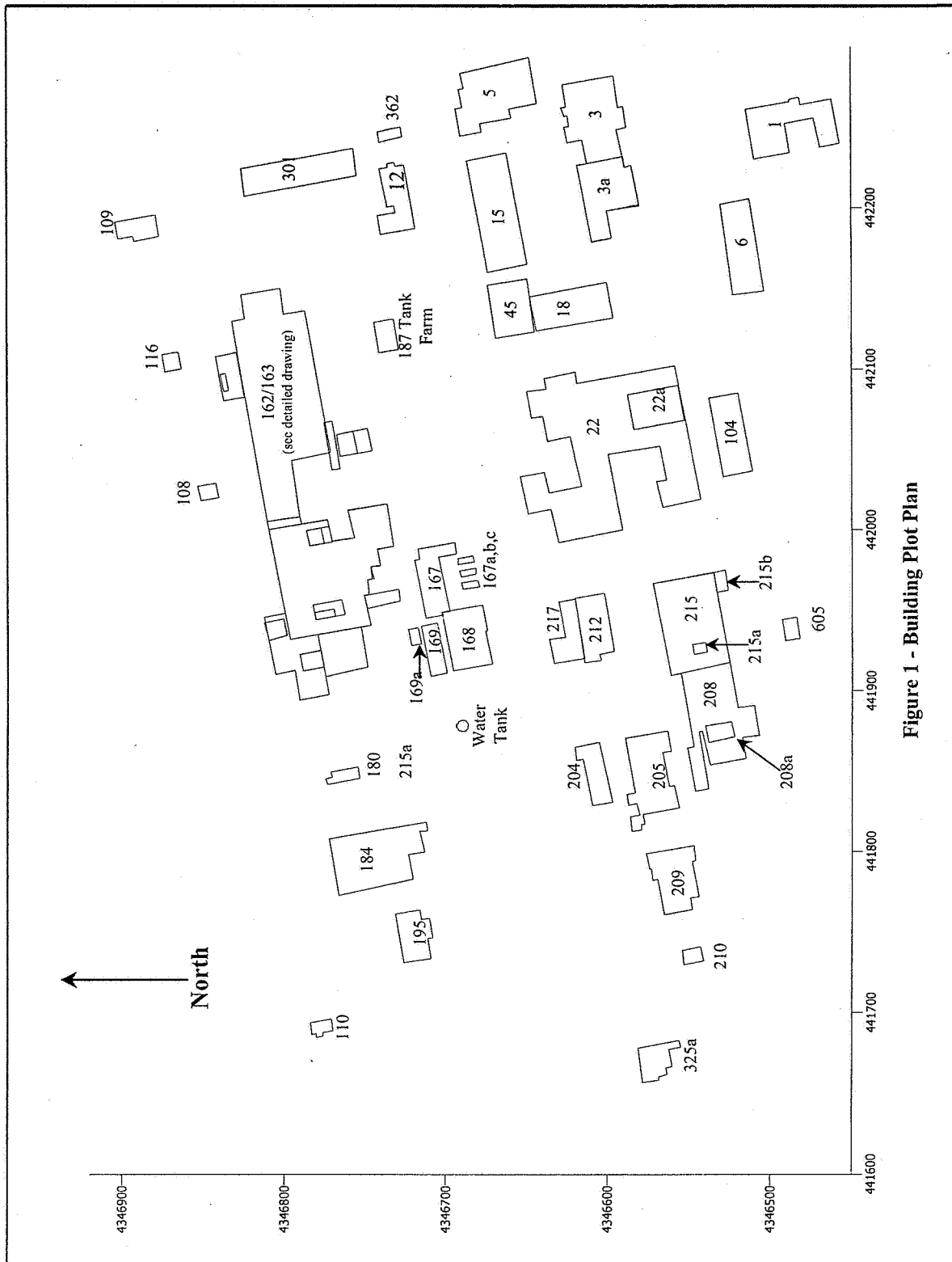
## Electronic Files

This report and the following electronic files were transmitted by email to Chris Arrington at WVDAQ on April 30, 2004:

|                          |                 |
|--------------------------|-----------------|
| ISC Input file           | permit_2003.dat |
| ISC Output file          | permit_2003.lst |
| BPIP Input file          | permit_2003.bpi |
| BPIP Output file         | permit_2003.bpo |
| Meteorological Data file | pkbiln96.asc    |

**Table 1**  
**Stack Parameters**

| Permit    | Reg 29   | Reg 29 | Unit ID  | Vent ID | Zone 17 |         | Stack Diameter | Stack Height | Stack Flow | Stack Velocity | Stack Temp | 2003                              | 2003                              |
|-----------|----------|--------|----------|---------|---------|---------|----------------|--------------|------------|----------------|------------|-----------------------------------|-----------------------------------|
|           |          |        |          |         | UTM-E   | UTM-N   |                |              |            |                |            | Permit Annual C-8 Emissions lb/yr | Permit Annual C-8 Emissions lb/hr |
| Vent ID   |          |        |          |         |         |         | ft             | ft           | ACFM       | ft/sec         | F          |                                   |                                   |
| T6IZCE    |          |        | TIV, E&F | 699     | 442098  | 4346843 | 4              | 170          | 12,000     | 15.9           | 124        | 3,258                             | 0.3719                            |
| T6IXE     |          |        | TIV      | 697     | 442128  | 4346829 | 2.25           | 45           | 2,000      | 8.4            | 176        | 3                                 | 0.0003                            |
| T6IYE     |          |        | TIF      | 694     | 442101  | 4346815 | 1.67           | 45           | 344        | 2.6            | 112        | 3                                 | 0.0003                            |
| T5HGE     |          |        | THG      | 658     | 441928  | 4346757 | 1.5            | 63           | 6,478      | 61.1           | 142        | 94                                | 0.0107                            |
| T5HIE     |          |        | THI      | 652     | 441926  | 4346758 | 0.88           | 64           | 4,031      | 111.7          | 139        | 71                                | 0.0081                            |
| C2DTE     |          |        | CDT      | 231     | 441953  | 4346766 | 0.67           | 92           | 510        | 24.4           | 148        | 1,562                             | 0.1783                            |
| C2DWE     |          |        | CDW      | 232     | 441952  | 4346776 | 0.67           | 99           | 710        | 33.9           | 128        | 1,562                             | 0.1783                            |
| C2EHE     |          |        | CEH      | 242     | 441945  | 4346746 | 0.5            | 114.5        | 1,048      | 89.0           | 117        | 2,232                             | 0.2548                            |
| C1FSE     |          |        | CFS      | 274     | 441790  | 4346744 | 0.65           | 110          | 400        | 20.4           | 149        | 2,575                             | 0.2939                            |
| C1FKE     |          |        | CFK      | 268     | 441774  | 4346753 | 0.27           | 72.5         | 100        | 28.7           | 110        | 300                               | 0.0342                            |
| C3HP      |          |        | CHP      | 276     | 441842  | 4346772 | 1.5            | 75           | 5,000      | 47.2           | amb        | 0.16                              | 0.000018                          |
|           |          |        |          |         |         |         |                |              |            |                |            |                                   |                                   |
|           |          |        |          |         |         |         |                |              |            |                |            |                                   |                                   |
|           |          |        |          |         |         |         |                |              |            |                |            | Est.                              |                                   |
|           |          |        |          |         |         |         |                |              |            |                |            | Actual                            |                                   |
|           |          |        |          |         |         |         |                |              |            |                |            | lb/yr                             |                                   |
| 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                           |



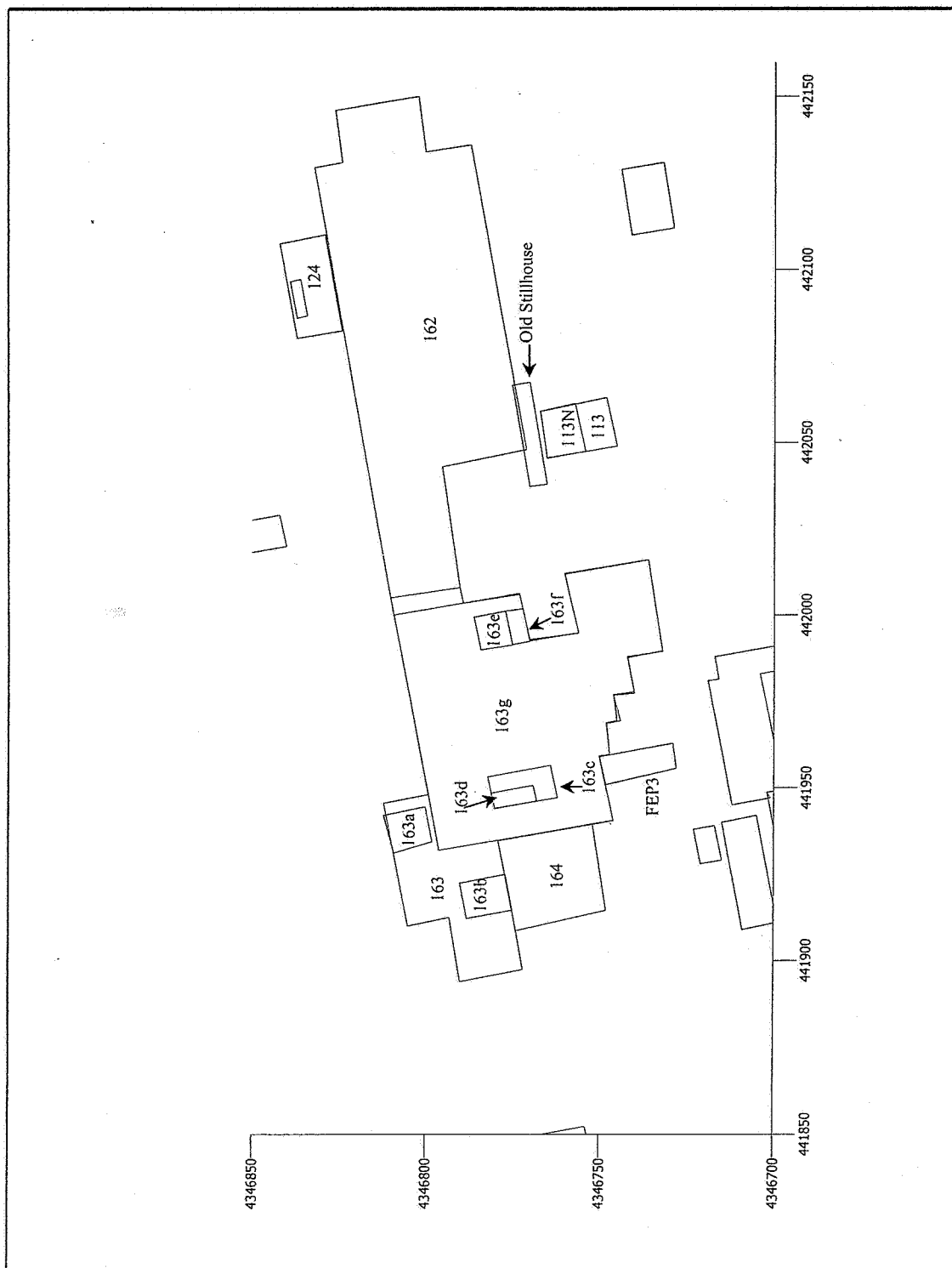


Figure 2  
Building 162/163 Detail

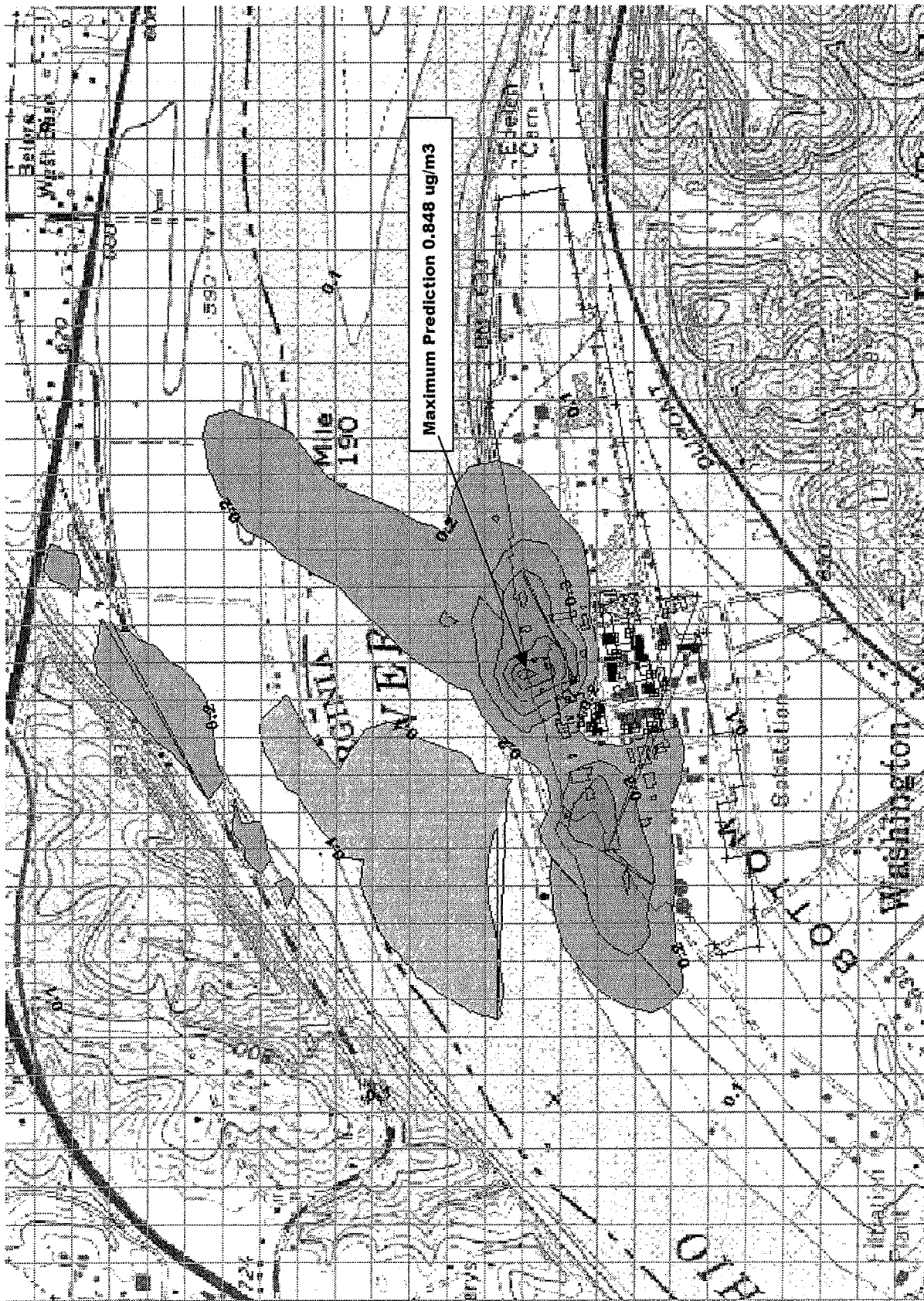


Figure 3  
 Predicted Annual Average Concentrations (µg/m<sup>3</sup>)