

APPENDIX C

METEOROLOGICAL DATA PRE-PROCESSING

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Acronyms and Abbreviations

| Acronym/ Abbreviation | Definition |
|----------------------------------|---|
| AERMET | AERMOD meteorological preprocessor |
| AERMOD | American Meteorological Society/Environmental Protection Agency Regulatory Model |
| ASCII | American Standard Code for Information Interchange |
| CDPHE | Colorado Department of Public Health and Environment |
| EDS | Explosives Destruction System |
| km | kilometer(s) |
| MPHRA | Multiple Pathway Health Risk Assessment |
| PCAPP | Pueblo Chemical Agent-Destruction Pilot Plant |
| PCD | Pueblo Chemical Depot |
| QA | quality assurance |

C METEOROLOGICAL DATA PREPROCESSING

The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) model utilizes two meteorological data files: (1) a file of surface boundary layer parameters (.sfc), and (2) a file of profile variables including wind speed, wind direction, and turbulence parameters (.pfl). These two meteorological input file types are generated by the AERMOD meteorological preprocessor program (AERMET). Both of these meteorological input files are sequential ASCII files, and AERMOD automatically recognizes the format generated by AERMET as the default format. AERMOD processes all available meteorological data in the specified input file, by default.

A surface meteorological monitoring station (PCD02) has been in operation at the Pueblo Chemical Depot (PCD), near the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP), since December 1997. The station is located in the northern portion of the PCD, approximately 2 kilometers (km, 1.2 miles) west-northwest of the PCAPP and approximately 1.8 km (1.1 miles) north-northwest of the Explosives Destruction System (EDS). The PCD02 site coordinates are:

- latitude: 38° 21' 21.6" N
- longitude: 104° 19' 50.9" W
- elevation: 1,440 m above mean sea level

There are multiple meteorological towers sited around PCD. The meteorological data from the PCD02 meteorological tower is most representative because it most accurately characterizes the transport and dispersion of pollutants from the PCAPP and EDS sources to the areas where the maximum concentrations are anticipated to occur.

Upper air data are needed to determine the mixing height for use in the air dispersion model. Upper air data are available from Fort Carson and Denver, Colorado, and from Dodge City, Kansas. Upper air data collected from the Denver station (Station 23062) are considered the most representative of the conditions around the PCAPP due to the station location relative to the mountains. Therefore, upper air data collected from the Denver station was used to create the meteorological data input files.

Six years of meteorological data were assessed, with the data a composite of the 1998-2000 meteorological data set applied in the 2008 Multiple Pathway Health Risk Assessment (MPHRA) and more recent 2008-2010 PCD meteorological data. The Colorado Department of Public Health and Environment (CDPHE) considered assessment of 5 or more years of meteorological data as a more accurate data set for MPHRA assessment. As such, CDPHE requested the most recent set of PCD02 tower data to replace or enhance the 1998-2000 meteorological data set, applied to the 2008 MPHRA. For the updated/enhanced data set, the most recent raw meteorological data (and corresponding quality assurance [QA] and audit records) from the PCD02 tower (2001-2012) were requested by and provided to CDPHE, who performed QA on the data set and made adjustments, consistent with CDPHE practices (Bechtel, 2013; CDPHE, 2014; CDPHE, 2012). After QA, CDPHE deemed the 2008-2010 suitable for addition to the 1998-2000 meteorological data set, to provide 6 years of data for analysis. CDPHE processed the accepted site surface data, and collected the corresponding upper air sounding data, which they processed through the AERMET pre-processor. CDPHE provided the AERMET output [surface (.sfc) and profile (.pfl) files for 1998-2000 and 2008-2010] for direct input to the AERMOD model.

C.1 References

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- CDPHE, 2014. Correspondence (Pueblo Chemical Depot 2008-2013 Met Data Review_July 2014.docx), From: Nancy D. Chick, Environmental Protection Specialist, Air Pollution Control Division, Colorado Department of Public Health and Environment, To: George A. Fenton, Senior Research Scientist, Battelle, Date: July 14, 2014.
- CDPHE, 2012. Ambient Air Pollution and Meteorological Monitoring Guidance by The Colorado Air Pollution Control Division, Technical Services Program, Air Pollution Control Division, Colorado Department of Public Health and Environment, October 2012.