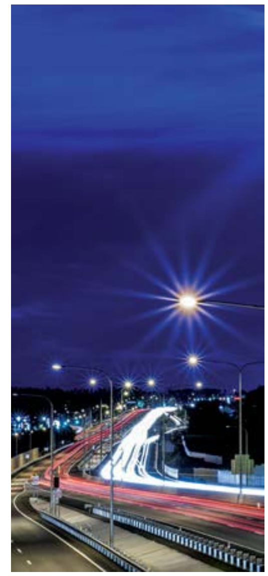

Air Quality Modeling Protocol

CWM Chemical Services, LLC
Model City, NY

GHD | 2055 Niagara Falls Boulevard Niagara Falls New York 14304 USA
080335 | Report No 9 | February 2017

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1. Introduction

This document details the proposed air quality dispersion modeling protocol to be used in order to demonstrate that the CWM Chemical Services, LLC (CWM) Model City Facility (Facility or Site) is in compliance with the provisions of 6 NYCRR Part 212.

The CWM facility is an existing commercial hazardous waste treatment, storage, and disposal facility (TSDF) located in Model City, Niagara County, New York. CWM is proposing to expand the facility to include the new RMU-2 area. The area encompassed by the proposed RMU-2 area is approximately 43.5 acres and will contain a total of six cells. The proposed waste area of RMU-2 is approximately 38.5 acres. The RMU-2 project also includes the replacement of existing facultative (Fac) ponds, namely Fac Ponds 3 and 8. Fac Pond 8 has been closed in accordance with the Part 373 Permit. RMU 2 will include the areas currently occupied by Fac Ponds 3 and 8. Proposed Fac Pond 5 will be constructed to replace the storage capacity for treated wastewater lost by the closure of Fac Ponds 3 and 8.

The CWM facility and proposed RMU-2 area are located in an attainment zone for all pollutants with the exception of ozone (since it is located in the Ozone Transport Region), and is currently permitted under NYSDEC Air State Facility Permit No. 9-2934-00022/00233. The facility will continue to hold an Air State Facility Permit since CWM is proposing to cap potential emissions below the Title V thresholds for all pollutants.

The CWM Model City Facility will consist of the following upon expansion:

- <u>CWM Model City Facility</u>: Existing Landfill Areas (SLF1-6, SLF-7, SLF-10, SLF-11, SLF-12, RMU-1) including leachate standpipes, Stabilization Facility, Aqueous Water Treatment Facility (AWTF), Facultative Pond ½, and Facultative Pond 3 (to be closed).
- <u>Proposed RMU-2 Area</u>: RMU-2 Area including leachate standpipes and Facultative Pond 5.

NYSDEC has requested that CWM demonstrate compliance with 6 NYCRR Part 212 for the existing facility as well as the proposed RMU-2 area.

The modeling protocol has been developed based on the following documentation:

- DAR-10/NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis (May 9, 2006)
- Appendix W of 40 CFR Part 51, USEPA (November, 2005)
- Ambient Monitoring Guidelines for PSD, USEPA (May 1997)
- New Source Review Workshop Manual, USEPA (Draft, October, 1990)

2. Facility Overview

2.1 Facility Description

The CWM Model City Facility is located within the Erie-Niagara Region in the western section of New York State. The facility is situated on the boundary between the Towns of Lewiston and Porter in Niagara County. All hazardous waste management units are located within the Town of Porter.

The facility's operations are authorized by a RCRA hazardous waste permit issued by NYSDEC and a TSCA (PCB) Approval issued by USEPA. The facility uses a number of processes for the proper storage, treatment and disposal of a variety of liquid and solid organic and inorganic hazardous waste and industrial non-hazardous waste. Storage, treatment and disposal capabilities include an aqueous waste treatment system, which includes phase separation, oxidation/reduction, neutralization, solids precipitation and filtration, biological treatment and carbon filtration. The treated effluent is stored in a facultative (fac) pond, qualified and discharged pursuant to the facility's State Pollutant Discharge Elimination System (SPDES) Permit. Other operations include waste stabilization; secure landfilling of approved solid waste, including PCBs; solvent and fuel blending processes; RCRA and TSCA container storage and transfer; landfill leachate collection, storage and treatment. As a RCRA permitted TSDF, CWM is subject to the hazardous waste regulations in 6 NYCRR Parts 370-376. This includes several regulations focused on minimizing the release of hazardous waste contaminants to the air: 373-2.28, Air Emission Standards for Equipment Leaks, and 373-2.29, Air Emission Standards for Tanks, Containers and Surface Impoundments.

The Model City Facility began operations in 1971 as Chem-Trol Pollution Services, Inc. Activities included fuels blending of waste oils, distillation of spent solvents, aqueous waste treatment, and land disposal. In 1973, the stock of Chem-Trol was purchased by SCA Services, Inc. The Chem-Trol name was retained until late 1978 at which time the corporate name changed to SCA Chemical Waste Services, Inc., and in 1981, was renamed SCA Chemical Services, Inc.

In October 1984, WM Acquiring Corp., owned jointly by Waste Management, Inc. (WMI), and Genstar, Inc., acquired SCA Services, Inc., of which SCA Chemical Services, Inc. was a subsidiary. Through a corporate reorganization in October 1986, SCA Chemical Services, Inc. became a wholly owned subsidiary of Chemical Waste Management, Inc. (CWM), itself majority-owned by Waste Management, Inc. In July 1988, the corporate name SCA Chemical Services, Inc. was changed to CWM Chemical Services, Inc. CWM Chemical Services, Inc., became a limited liability company in January 1998 and became CWM Chemical Services, LLC. CWM Chemical Services, LLC, is the owner and operator of the Model City Facility.

The fuels blending tanks and solvent distillation operation were eliminated in the 1980s. The Aqueous Treatment facility continues to operate. The following summarizes the closed and active landfill units at the Facility:

Landfill Area	Years of Operation	Status
SLF 1-6	1971-1978	Closed
SLF 7	1978-1983	Closed
SLF 10	1982-1984	Closed
SLF 11	1984-1990	Closed
SLF 12	1990-1994	Closed
RMU-1	1994-2015	Closed (Nov. 2016)

It should be noted that the Facility's current active landfill (RMU-1) has reached its capacity and received its final volume of hazardous wastes on November 12, 2015. From 1997 through 2013, final cover was constructed over the waste area of RMU-1 (approximately 31.8 acres) in accordance with the Part 373 Permit. A minimum of 12-inches of intermediate soil cover was installed over the remaining active area (approximately 7.7 acres) in 2015. In accordance with the

Part 373 Permit, RMU-1 was completely closed by November 6, 2016 through the installation of final cover over the remaining 7.7 acres.

2.2 Land Use Classifications

The Model City Facility is located in a predominantly rural area on the border between the Towns of Lewiston and Porter. The surrounding area is undeveloped and sparsely populated, with an average of one person per 2 acres of land.

The nearest population concentrations are the Village of Lewiston (population 2,701; 2010 census), approximately 7 miles to the southwest; the Village of Youngstown (population 1,935; 2010 census), approximately 3 miles to the northwest and the Hamlet of Ransomville (population 1,419; 2010 census), approximately 2 miles to the east. Land use in the vicinity of the Model City Facility is primarily residential, agricultural, government services and military.

2.3 Topography

The topography around the Proposed Site is relatively flat. The base elevation of the Site is approximately 320 feet AMSL. However, the topography of the surrounding land ranges from approximately 308 feet AMSL to 338 feet AMSL.

3. Modeling Methodology

The modeling will be performed using the most recent executable versions of the USEPA AERMOD modeling system. At the time of the preparation of this protocol the modeling system consists of the following components; however, should revised versions of the modeling system be released by the USEPA subsequent to this protocol, the revised versions will be used instead.

- AERMET, version 15181
- AERSURFACE, version 13016
- AERMAP, version 11103
- AERMOD, version 16216r (Note that the modeling will be run under AERMOD version 15181 in order to match the meteorological data provided by NYSDEC)
- BPIP-PRIME, version 04274

Modeling will be facilitated using the Lakes Environmental graphical user interface AERMOD View (version 9.1.0).

3.1 Modeled Compounds

CWM is proposing a facility-wide annual emission cap for each of the high toxicity air contaminant (HTAC) compounds listed in Table 2 of 6 NYCRR Part 212-2.2, with the exception of polycyclic organic matter (POM) and polychlorinated biphenyls (PCBs). Therefore, the modeling demonstration will include a comparison of the maximum modeled ground-level concentration for POM and PCBs with each of their respective short-term guidance concentrations (SGCs) and annual guideline concentrations (AGC) presented in the NYSDEC DAR-1 policy document. For modeling purposes, PCB emission rates will be broken down into two proportions:

i. PCBs containing an Aroclor number of 1242 or less (PCB<=1242)

ii. PCBs containing an Aroclor number of greater than 1242 (PCB>1242)

CWM is also proposing to model the following non-HTAC compounds that potentially exceed an annual emission rate of 100 lb/year:

- Xylenes
- Toluene
- Methylene Chloride
- Methyl ethyl ketone

The maximum modeled ground-level concentration for the non-HTAC compounds listed above will also be compared with the SGC and AGC values presented in the NYSDEC DAR-1 policy document.

Emission rates for POM, PCBs, and the aforementioned non-HTAC compounds will be presented in the final modeling report.

Since the proposed PM-10 emission increase is less than 15 TPY, in accordance with NYSDEC's CP-33, no further modeling for PM is currently proposed. In addition, a scaling-up of the 2009 air dispersion modeling results for particulate matter (based on potential emissions of PM-10 and PM-2.5 with RMU-2 area included) at a maximum rate of 500,000 tons of waste received and disposed in RMU-2 demonstrate that there are no exceedances of any ambient air quality standards for PM-10 or PM-2.5 (refer to Table 1 for a scaling analysis of the PM modeling results from 2009).

3.2 Facility Source Inventory

The Section provides a summary of sources proposed for the modeling evaluation. A summary of the source inventory parameters is provided in Table 2. A plan site view of all emission sources is provided as Figure 1. It should be noted that the AWTF is not included in the modeling since tanks with the potential to contain > 500 ppm organics are already equipped with carbon canisters to control VOCs and/or PCBs from working and breathing losses.

3.2.1 Existing Landfill Areas

The following closed landfill areas will be included in the modeling analysis:

- SLF 1-6
- SLF-7
- SLF-10
- SLF-11
- SLF-12
- RMU-1

Emissions for each of the landfill areas were calculated in the Air State Facility Permit Application and are based on the following:

- Landfill cover diffusion

- Barometric pumping
- Evaporation from leachate collection standpipes

Source inventory parameters for the existing landfill areas are provided in Table 2.

3.2.2 Future Landfill Areas

The following proposed landfill areas will be included in the modeling analysis:

- RMU-2

Emissions for the RMU-2 area were calculated in the Air State Facility Permit Application and are based on the following:

- Landfill cover diffusion
- Barometric pumping
- Evaporation from leachate collection standpipes
- Active face emissions

Source inventory parameters for the RMU-2 area are provided in Table 2.

3.2.3 Stabilization Facility

Emissions from the stabilization facility were calculated in the Air State Facility Permit Application and are based on a maximum value of 150,000 tons/year processed material. There are two baghouses that exhaust from the stabilization facility. Source inventory parameters for the stabilization facility are provided in Table 2.

3.2.4 Facultative Ponds

In order to obtain an estimate of emissions from the facultative ponds, one-half of the detection limit was assumed for each compound for a sample collected on December 2, 2015. Emissions from the facultative ponds were calculated using the mass balance approach presented as Equation 5-30 in the USEPA document *Air Emissions Models for Waste and Wastewater*, dated November 1994. PCB emissions from the ponds were estimated assuming a concentration of 200 nanograms per liter (SPDES permit limit for internal outfall prior to discharge to the pond).

Source inventory parameters for the facultative ponds are provided in Table 2.

3.3 Modeling Input Parameters

The model will be run using the "regulatory default" mode, which specified the use of the following options:

- Stack-tip downwash-reduces effective stack height when plume exit velocity is less than 1.5 times the wind speed
- Plume buoyancy induces dispersion-increases the dispersion coefficient to account for the vertical movement of the plume
- Calms processing

- Allow missing meteorological data
- Elevated terrain

Source specific input parameters will be entered into the Source Pathway of the model.

3.4 Building Downwash Analysis

Any Site structures that may impact the emission sources, with respect to influencing building downwash, will also be included and considered. Direction specific building dimensions will be calculated utilizing BPIP-PRIME.

3.5 Meteorological data

The Site does collect meteorological tower data. However, the 2011-2015 Niagara Falls International Airport surface and profile meteorological data, as provided by the NYSDEC, was used in the analysis. Meteorological data from Niagara Falls, New York was utilized as representative meteorological data for the Facility as Niagara Falls, New York and the Facility have similar weather patterns. The Niagara Falls, New York meteorological station is also in the closest proximity to the Facility compared to other stations with similar weather patterns and land use.

The surface and profile meteorological data was processed using the USEPA AERMET version 15181 according to standard USEPA methods for air dispersion modeling.

3.6 Modeled Receptors

For each pollutant, a multi-tier, uniform Cartesian grid centered on the CWM Model City Facility will be established.

Distance from CWM Facility	***Receptor Node Spacing***
Up to 1 km	70 m
1 km to 2 km	200 m
2 km to 10 km	500 m

A property boundary receptor grid will be established along the property boundary of the CWM Model City Facility with a spacing of 20 m to capture the maximum property boundary concentration.

All receptors located within the CWM Model City Facility property boundary will be removed, as the site is fenced and public access is prohibited.

The need to evaluate elevated receptors within two (2) km of the CWM Model City Facility, such as rooftops, balconies and similar areas with public access, is not anticipated.

3.7 Terrain Considerations

Although the topography of the region is relatively flat, the effects of terrain will be considered as part of the modeling analyses. Elevations above mean sea level corresponding to the base elevation of the CWM Model City Facility will be assigned to all structures and sources modeled.

The digital terrain data will be extracted from Multi-Resolution Land Characteristics (MRLC) Consortium viewer (https://www.mrlc.gov/viewerjs/). The data is available in the World Geodetic

System (WGS84) at 1/9th arc second resolution in a geoTIFF format. The geoTIFF format is converted to the USGS DEM format (30 m resolution) before processing using the AERMAP executable.

4. Conclusion

The results of this analysis will be clearly summarized in tables and figures that will consist of the following information:

- Controlling predicted concentrations
- Locations of controlling predicted concentrations
- Time(s) of controlling predicted concentrations (for short-term averages)
- Comparison to the appropriate standards

Wherever possible other descriptive information regarding the modeling results (e.g., proximity of controlling concentrations to notable land features) will be provided.

A hardcopy of the model output file for the controlling year for each pollutant/averaging time combination will be submitted. In addition, a CD will be provided which will contain all pertinent input and output files, as well as all supporting data files and executables necessary to reproduce the modeling results.

Two copies of this modeling protocol will be sent to the NYSDEC Region 9 Division of Environmental Permits for distribution to the appropriate NYSDEC personnel for technical review.

Table 1

Scaling of PM Concentrations from 2009 Modeling Analysis
CWM Chemical Services, LLC
Model City, New York

	Current PTE (TPY)	Modeling Emission Rate	Scaling Ratio
PM10	12.21	3.62	3.38
PM2.5	7.03	2.43	2.89

	Maximum 24-hour PM-10 GLC				
	Primary GLC[1] (µg/m^3)	Secondary GLC[2] (µg/m^3)	Scaling Factor (3.38) (µg/m^3)	Scaling Factor (3.38) (µg/m^3)	Primary and Secondary (µg/m^3)
Modeled Concentration	13.67	11.9	46	40	150

Maximum 24-hour PM-2.5 GLC				
Primary GLC[1] (µg/m^3)	Secondary GLC[2] (µg/m^3)	Scaling Factor (2.89) (µg/m^3)	Scaling Factor (2.89) (µg/m^3)	Primary and Secondary (µg/m^3)
9.73	8.57	28.2	24.8	35

[1] The maximum 24-hour primary ground level concentration (GLC) is also referred to as the High First High (H1H) concentration. At each receptor, the model calculates the highest GLC. The H1H value represents the maximum of the highest GLCs calculated.
[2] The maximum 24-hour secondary ground level concentration (GLC) is also referred to as the High Second High (H2H) concentration. At each receptor, the model calculates the second highest GLC. The H2H value represents the maximum of the second highest GLCs calculated.

	Maximum Annual PM-10 GLC (µg/m^3)	Scaling Factor (3.38) (µg/m^3)	Primary (µg/m^3)	Secondary (µg/m^3)
Modeled Concentration	1.33	4.49	NA	NA

Maximum Annual PM-2.5 GLC (µg/m^3)	Scaling Factor (2.89) (µg/m^3)	Primary (µg/m^3)	Secondary (µg/m^3)
1.1	3.18	12.0	15.0

Table 2

Summary of Modeling Input Parameters
CWM Chemical Services, LLC
Model City, New York

Table 2A: Point Sources

Source Identifier	*Source Name*	*Source Type*	*Exit Height (m)*	*Exit Diameter Actual (m)*	*Exit Temperature Actual (K)*	*Exit Temperature Modeled (K)*	*Actual Flow Rate (ACFM)*	*Actual Flow Rate (Am^3/s)*	*Exit Velocity (m/s)*
BH1	Stabilization Baghouse #1	Point	15.24	2.44	Ambient	0	9.00E+04	4.25E+01	9.08
BH2	Stabilization Baghouse #2	Point	9.14	1.32	Ambient	0	5.00E+04	2.36E+01	17.24

Table 2B: Area Sources

Source Identifier	*Source Name*	*Source Type*	*Height (m)*	*Total Area Actual (m^2)*
SLF1-6	SLF 1-6 Landfill	Area	2.7	75,676
SLF-7	SLF-7 Landfill	Area	4.2	45,325
SLF-10	SLF-10 Landfill	Area	4.4	27,923
SLF-11	SLF-11 Landfill	Area	6.8	104,004
SLF-12	SLF-12 Landfill	Area	8.0	89,436
RMU-1	RMU-1 Landfill	Area	16.8	191,619
RMU-2	RMU-2 Landfill	Area	18.3	176,038
FP1/2	Facultative Pond 1/2	Area	0.0	18,590.1
FP5	Facultative Pond 5	Area	0.0	31,603.2

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