April 5, 2013

Attn:Jeffrey Lee, P.Eng., EP
Research Policy Analyst – Air
Environmental Policy
Town of Oakville jlee@oakville.ca

Re: HPAQB CALPUFF Model Ford Oakville Assembly Complex
Phase 2 of Peer Review
Novus File No. 12-0185 (draft)

Dear Jeffrey:

Novus was retained by the Town of Oakville to review the Oakville Health Protection Air Quality By-Law (HPAQB) application submitted by the Ford Motor Company of Canada Limited Oakville Assembly Complex and completed by Horizon Environmental.

This memo summarizes our review to evaluate the application and technical components of the assessment, considered Phase II of the peer review.

Review

We reviewed all of the application items provided by the proponent, Ford Motor Company of Canada Limited Oakville Assembly Complex. Information provided by the proponent meets requirements of the Oakville HPAQB. The summary of the application peer review is provided in Appendix A.

We reviewed the technical components of the air quality assessment provided by the proponent. Information provided meets the requirements of the Oakville HPAQB. A summary of the technical review is provided in Appendix B.

We reviewed the health risk assessment calculation that was performed in the study to confirm that the calculation has been performed in accordance with the HPAQB methods. No errors were found in the assessment.

Conclusions

The above comments summarize our review of the assessment, and we have no further outstanding questions regarding the application. Please contact us if you have any questions regarding our review.

Sincerely,
Novus Environmental Inc.

Xin Qiu, Ph.D., ACM, EP
Principal, Senior Air Quality Specialist

Appendix A –Application Checklist

Application Item	Elaboration of Application Item	Comments
1. Executive Summary	Provide a summary of the application: The proponent, the facility, the project, the conclusions and the bases for the assessment of the application.	Provided
2. Introduction	Background to the project.	Provided
3. Facility Description	The description must include the following items, together with a brief description of the basis for the information provided:	
3.1 Overview	Details of the nature of the facility, including what the facility produces.	Provided
3.2 Location	Provide facility address and at least two separate maps with: (i) the facility's general location in the town; and, (ii) details in the environs within 3 km of the facility (site). All maps must clearly identify the facility and its surroundings. The detailed map(s) should include nearby significant sources (e.g., highways, major roads) of FPM and precursors and sensitive receptors (e.g., health care facilities, schools and residential areas). All maps must be in UTM/WGS84 datum coordinates. These maps may be used to provide base maps for concentration and risk contour mapping results.	Address and both maps are provided. The map showing the surrounding 3 km identifies the nearby sensitive receptors.
3.3 Buildings	Provide drawings and other information to identify on-site or off-site buildings that could influence near field plume dispersion (building downwash). The building data must be consistent with that used in dispersion modelling to assess building downwash.	Provided are two drawings showing an aerial view of the onsite buildings and a 3-D depiction of the buildings in relation to the point sources.

Application Item	Elaboration of Application Item	Comments
3.4 Raw materials, Products and Processes	(i) Identify any raw materials that are relevant to estimating health-risk air pollutant air emissions; (ii) Identify all processes (including a simplified process flow diagram) that are relevant to the air contaminants emitted from the facility; (iii) Provide the maximum and average daily, monthly and annual process flow-through rates for any processes that may contribute to the major emission; (iv) Provide information on the variability of process rates on an annual basis; (v) Provide the hours of operation (hours/day, days/week, weeks/year) for average and maximum operational activity; (vi) Provide the relationship between the average and maximum process rate(s) and operating conditions/hours of operation; (vii) Provide information on the variability of production rates around the average; (viii) Set out the planned maintenance periods	The raw material, product and processes are provided for each of the three processes that were identified to have emissions (comfort and process heating, peak shave generators, vehicle body painting). A process flow diagram is provided for vehicle body painting. Details regarding flow-rates for the processes, variability of process rates on an annual basis and hours of operation for average and maximum operational activity were not provided. The relationship between average and maximum process rates/operating conditions, variability of production rates and planned maintenance periods were also not provided. However due to maximum/average FPM emission rates were essentially based on the comfort and process heating, peak shave generators and vehicle body painting, etc., the omission of detailed flow rates did not affect the results of the assessment.

Application Item	Elaboration of Application Item	Comments
3.5 Emission Sources and Processes	(i) Identify all sources (point, fugitive/area, line etc.) at the facility. (ii) Include drawings of the facility and other information (text) to allow identification of all sources and processes at the facility. (iii) Include a table with the identification/ID code, SCC codes and the annual average and maximum emissions of health-risk air pollutants for each source.	This section of the report describes the three processes in detail and discusses which processes cause which emissions, and how the emission rates were determined. Drawings and/or tables identifying each individual source are not provided in this section, but are discussed in other sections.
3.6 Emission Control Equipment and Procedures and Emissions Monitoring	(i) Summarise all relevant existing emission control devices (on stacks/vents) and emission or pollution prevention practices. (ii) Associate each device/measure with pollutants emitted and emission sources. (iii) Indicate the control efficiency for each device/practice. (iv) Indicate all continuous emission monitoring (CEM) and other monitoring to determine the effectiveness or efficacy of emission control(s).	This section identifies how/when natural gas and diesel fuel usage is monitored and identifies emission control technology used for the vehicle body painting odour and VOC emissions, as well as its efficiency.
3.7 Identification and Quantification of Substances Released to Air	(i) Identify all health-risk air pollutants that would be emitted (proposed facilities) or are emitted (existing facilities) above major emission levels – be sure to include relevant speciated VOCs and directly emitted FPM. (ii) Quantify the average and worst-case rates of daily and annual emissions during operations and the operating conditions that lead to these emissions. (iii) Indicate the methods used to estimate emissions and provide detailed calculations and scenario descriptions.	Provided – This section discusses how emissions used in the modelling were developed and what data was used to develop the emissions.
4. Evaluation		

Application Item	Elaboration of Application Item	Comments
4.1 Modelling Approach and Model Selection	The full model report, and electronic files with all model inputs and outputs, are to be provided as supporting material to the application – see below.	Provided
4.2 Model Inputs	Indicate that an electronic file with all model inputs and outputs has been provided (see below).	Provided
4.2.1 Facility Emissions Estimate Requirements / Estimation Methods (same as ESDM)	Summarise/tabulate (previously defined) emission scenarios and operating conditions that give rise to: (i) average and worst-case annual emission rates, (ii) frequency with which emissions within 90% of the worst-case emissions levels may occur (as per s.3.2.1.2) (iii) variability around the average emission rates	Provided – Details regarding stack parameters and emission rates are provided in table format for both average and worst-case annual emissions scenarios and the frequency with which emission within 90% of the worst-case emissions levels may occur is discussed. Variability in stack parameters is also discussed.
4.2.2 Meteorological Data Background Concentrations (ozone, NH_3, FPM), Chemistry Model(s) Used Species Modelled, Grids, Special Receptors Identified	Refer to the model input checklist provided in the Appendix 6.5. Deviations from defaults must be fully explained.	Full details regarding the meteorological inputs are provided. There were no deviations from the default settings recommended by the Town of Oakville.
4.3 Model-Predicted FPM Concentrations		Presents results for both total facility induced concentrations and cumulative concentrations. Discusses results for the facility induced concentrations, impacts at on-site sensitive receptors and the cumulative concentrations in regards to the guideline and National Ambient Air Quality Standard (NAAQS) and Canadian Ambient Air Quality Standards (CAAQS).

Application Item	Elaboration of Application Item	Comments
5. Mapping	Present these as: a) Model numerical outputs must be provided in the form of Summary Values tables as described earlier. b) For FPM, provide concentration contour maps of appropriate scale(s) showing concentration contours within the affected airshed (also identifying the boundaries of Oakville - co-ordinates will be supplied by the Town), for each emission scenario, for: I. the TFI FPM concentration, AND, II. the cumulative FPM concentration when the TFI concentrations and the background FPM concentration are added, resulting in a total of four (4) maps and four (4) values. The following are suggested levels for concentration contours: • ≤ 0.2 µg m^{-3} increments for the annual predictions of FPM concentrations. Concentration contour maps should be superimposed on suitable base maps (base maps which also show the locations of sensitive receptors) and locations of maxima (as per the Summary Values table). In providing the concentration isopleths for the worst-case scenario, applicants should indicate (as per s.3.3.3) the frequency with which emissions will be within 90-100% of the worst-case emissions levels.	Numerical outputs of the model are provided by year in tabular form. All four plots are provided and discussion regarding the 0.2 µg/m^3 threshold and how the guideline is met, affected areas and sensitive receptors is also given. The boundaries of the Town of Oakville are not clear. The frequency with which emissions will be within 90-100% of the worst-case emissions levels would occur is discussed.

Application Item	Elaboration of Application Item	Comments
6. Health Risk Assessment	Assessments of the public health effects due to the increment caused by the proposed (or existing facility) are required if an affected airshed is formed as a result of facility emissions within the boundaries of the town. Results are to be presented as described in Section 3.4. For health-risk, provide contour maps of appropriate scale(s) showing risk contours at 1 per 100,000 premature death increments based on the annual predictions of risk within the affected airshed for the average and maximal emission scenario, for: i. the TFI risk, AND, ii. the cumulative risk when the TFI concentrations and the background concentrations are added (using the background risk file). The boundaries of Oakville should be clearly identified based on co-ordinates that will be supplied by the town. Risk contour maps should be superimposed on suitable base maps which show the locations of sensitive receptors and locations of maxima (as per the Summary Values Table). In providing the health risk assessment for the worst-case scenario, applicants should indicate (as per s.3.4.1 & s.3.4.2) the frequency with which emissions within 90-100% of the worst-case emissions levels may occur.	Both the numerical and graphical procedure for the health risk assessment are discussed in the report. Numerical results are provided in tabular form. All four plots are provided showing the Total Facility Induced (TFI) and cumulative risk for average and maximal emissions scenarios. The boundaries of Oakville are not clear in the imagery. The frequency with which emissions within 90% of the worst-case emission levels may occur is also discussed.

Application Item	Elaboration of Application Item	Comments
7. Appraisal	Appraise any measures available to the facility that would reduce risks to public health (if an affected airshed is created within the boundaries of the town), including the costs and other implications of implementing such measures, including: 1. List existing emission control technologies. 2. List all additional control technologies that could be used. 3. List any existing emission mitigation plans. 4. List any potential additional emission mitigation techniques. 5. Eliminate any technically-infeasible options and provide the basis for the elimination of the option. 6. Appraise the effectiveness of the remaining control technologies and mitigation techniques. 7. Determine costs (capital and annual operating) and the control effectiveness of remaining control technologies and mitigation techniques. Indicate which control technologies and mitigation techniques will be implemented and provide the rationale for the choice of technologies and techniques.	Three existing emissions control technologies at the facility are discussed. The majority of the emissions at the assessed off-site receptors are attributed to the heating operations of the facility. Additional mitigation measures planned for the Ford plant are discussed, focusing on the natural gas combustion and peak shave generators which do not currently have emissions controls. Plans regarding timing for implementation, amount of emission reductions achieved and cost of the mitigation are also discussed.
8. Additional Information	An applicant may wish to supply additional information if: it seeks an approval on the basis that the public interest favours allowing the major emission of the facility to occur.	Additional information regarding recent improvements to the plant resulting in reduced natural gas and energy consumption, resulting in improved emissions are discussed.

Appendix B –Modelling Files

We have reviewed the input and output files for the CALPUFF modelling, and compared them to results presented in the report as well as the provided excel spreadsheet in which the results were processed. We understand the folders titled 'fpm0408max', 'fpm0408avg', 'soa0408max' and 'soa0408avg' were the runs performed to determine the total facility induced and cumulative concentrations. Runs were also performed to determine impacts at the onsite sensitive receptor, as well as for the peak shave generators and a 'tall stack and RTO' cases at sensitive receptors. The review focused on the runs used to determine the total facility induced and cumulative FPM concentrations. We completely checked the model results made to the values presented in the report and provided excel spreadsheet. In addition, random checks were performed on both the original input and output files in every scenario folder to ensure the consistency between report and modelling files. The table below provides an example of the provided input, modelling logs (LST files) and the output files reviewed.

Table 1: Example of CALPUFF Modelling Files *

Parameter	Description	File Examples	Folder
Input files	By year, one file for each facility induced fpm, facility fpm including background and NO_3	2004.inp; 2004bk.inp; 2004no3.inp	fpm0408avg fpm0408max soa0408avg soa0408max
LST Files	Run summary	2004.LST 2004bk.LST 2004NO3.LST	
Output Files	RANK(0) files listing predicted concentration at every receptor	RANK(0)_PM2.5_8784HR_CONC_2004.DAT RANK(0)_PM2.5_8784HR_CONC_2004BK.DAT RANK(0)_NO3_8784HR_CONC_2004.DAT	
	Excel Post-Processing Spreadsheet	Table_out_20120923_V2.xls Table_out_20120923_V4.xls	

*Note: Due to a large number of files in the project, only selected filenames as examples were listed in Table 1