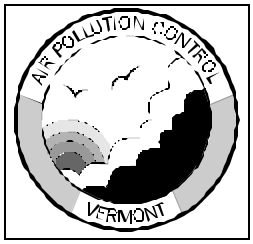


AIR POLLUTION CONTROL PERMIT APPLICATION REQUIREMENTS

(Revised 7/1/01)

Indirect Sources

STATE OF VERMONT
Agency of Natural Resources
Department of Environmental Conservation
Air Pollution Control Division
Building Three South
103 South Main Street
Waterbury, Vermont 05671-0402

(802) 241-3840
FAX: (802) 241-2590

http://www.anr.state.vt.us/dec/air

IMPORTANT - PLEASE READ BEFORE STARTING:

This outline is a general checklist of what constitutes the information necessary to submit an air pollution control permit application for a new or modified indirect source. **This outline is not a "fill-in-the-blanks" type form**; rather it is intended to give the applicant guidance as to what data the application needs to contain. This outline is intended to be used in conjunction with the state of Vermont Air Pollution Regulations (*Regulations*). The Division's Engineering Section may be available to meet with an applicant to discuss the project and permitting process. Please contact the Division for more information. Large new projects are strongly encouraged to arrange a pre-application meeting.

Prior to submitting the prepared application, one company official responsible for its submission must read, complete and sign the attached form (page 7) certifying the information contained in the application is complete and accurate to the best of his/her knowledge and granting access to the property to verify information. This form **must** be incorporated as part of the submitted application.

The indirect source permit application fee is $4,000 for both new or modified sources. Municipalities are exempt from the fee if the municipality **can not** recover its costs by charging a user fee to those who use the permitted services (e.g. parking capacity at an entertainment event (fair grounds) is not exempt since a user fee is charged for admission but parking capacity at a school is exempt since property taxes are not considered a user fee). In addition, pursuant to 32 V.S.A. §710 many governmental entities are exempt from the fees where funds for the project are authorized within the state capital construction act or where funds are authorized for a transportation related project within a general appropriation act.

1.0 Procedures

An indirect source is defined as a source which does not necessarily emit significant quantities of air contaminants itself, however, may contribute to an adverse air quality impact due to the large volumes of automotive activity that may be associated with the project. Examples of indirect sources include; highway projects, shopping malls, commercial/industrial parks, and recreational facilities like stadiums and ski areas. Due to a potential for significant air quality impact, large indirect sources meeting the thresholds specified under §5-503 of the *Vermont Air Pollution Control Regulations* ("*Regulations*") must be evaluated relative to the attainment and maintenance of the Ambient Air Quality Standards. Although there are many pollutants emitted from motor vehicles, indirect source reviews (with the exception of highway projects) typically focus on air quality impacts of carbon monoxide (CO) only. This is because CO is the most prevalent pollutant emitted by motor vehicles and its relatively stable nature allows it to be used in transport and dispersion modeling. The steps below describe the procedures to be followed:

Step1: The applicant determines the number of parking spaces needed for a project. The number of parking spaces is a function of size and use of the site, published parking factors, good engineering practice, and local ordinances. Proposed parking capacity or the increase in capacity is compared to thresholds in §5-503 of the *Regulations* to determine applicability for an indirect source permit. If applicable, proceed to Step 2.

Step 2: The applicant defines the trip generation rate. This may be a composite based on the weighted average of site use and ITE Trip Generation factors or an equivalent methodology approved in advance by the Vermont Agency of Transportation (VAOT).

Step 3: Using the trip generation rate, the applicant computes the peak one-hour and design hour traffic volumes from the proposed project in the full-build out year.

Step 4: The applicant establishes a trip distribution following VAOT approved methods.

Step 5: Using the trip distribution, the applicant creates a "grand" list of intersections affected by 15% or more of the project's traffic. AOT and the Division use this data to identify a "short" list of intersections to be analyzed further.

Step 6: For each intersection on the short list, the applicant determines the background Design Hour Volumes to be used at each intersection. (Typically 30 HH from nearby traffic counters).

Step 7: VAOT provides, or the applicant determines, the Regional Growth Rate Factor for background traffic.

Step 8: The applicant identifies and quantifies traffic generated by any nearby project already approved by Act 250 or local planning bodies which hasn't been accounted for in the base design hour volumes or regional growth factor.

Step 9: At each intersection on the short list, the applicant performs a Level of Service (LOS) analysis using design hour background volumes scaled to account for regional growth + design hour trips generated by the proposed project + any other approved projects' (identified in Step 8) design hour traffic. The LOS analysis can incorporate roadway and signalization improvements only if VAOT feels that they are appropriate and will be able to be completed in the near future.

Step 10: The applicant ranks each of the short list intersections based on LOS. If same LOS, then rank is assigned based on volume and then by degree of delay, etc. Intersections rated at a Level of Service A, B, or C are not required to be reviewed further.

Step 11: For those intersections with an overall intersection LOS which is determined to be D or worst, the applicant performs a screening analysis using the latest approved dispersion and emission estimating models and the traffic volumes used in Step 9. The three worst intersections (only LOS D-F) are analyzed to demonstrate that the future build condition will not violate the one and eight hour CO Ambient Air Quality Standards. If violations are predicted, the applicant will analyze the three next worst intersections, etc. until no violations are predicted.

The dispersion model will predict the highest one-hour average CO impact. A background concentration value is then added to this predicted impact and compared to the one-hour standard. To demonstrate compliance with the eight-hour standard, multiply the model's one-hour average impact by a persistence factor of 0.6 and then add the eight-hour background concentration. Compare the result to the eight-hour ambient air quality standard.

Step 12: If violations are predicted, the applicant, with approval from the appropriate regulatory bodies, may consider mitigation measures including, but not limited to the following: traffic network improvements, perform ambient air monitoring to define back ground concentrations and/or the persistence factor, revise the project's scale, or perform refined modeling using actual on-site meteorological data.

2.0 Application Content

1. Executive summary

2. Name of the proposed project

3. Name and address of owner or parent corporation (if commercial/industrial park - list of other owners within the park besides the developer and their addresses)

4. Name, telephone and fax numbers of air quality and traffic consultant(s) and owner's contact(s)

5. Project address and mailing address (if different)

6. Attach maps and drawings showing:

   - Scaled drawing of the source's site plan, detailing parking spaces, exits and entrances, building lots, building dimensions, on-site roads, driveways (if applicable), etc.

   - Maps and drawings of road network, trip distributions, turning movements, and drawings of modeled intersections with queues and receptors. Provide descriptions and drawings of any roadway mitigation measures, if proposed.

7. Description of project. Include the following:

   - overview of the existing site...what's there now?

   - general overview of the project...what's proposed?

   - site use expressed as square footage (e.g. 4,000 ft^2 retail space, 2,000 ft^2 industrial)

   - site use expressed as percent of total site (e.g. 40% commercial space, 50% industrial)

   - the number of lots or parcels at the site and number of parking spaces in each parcel

   - total number of existing, future, and net increase parking spaces

8. Discuss methodology used to quantify trip generation rates. Provide documentation, sample calculations, assumptions, etc., in good engineering form. Provide ITE's *Trip Generation* values and compare and discuss.

9. Provide trip distribution schematics which clearly show turning movements expressed both numerically and as percentages. Discuss methodology and assumptions used to generate distribution.

10. Define and discuss the design hour traffic volumes to be used at each intersection, e.g. 30th highest hour. Provide table describing the top 100 hours of near-by continuous count station's data.

11. Define and discuss regional growth rate for background traffic. Identify and discuss impacts of traffic generated by near-by projects already approved by Act 250 which have not been accounted for in the base design hour volumes of regional growth.

12. Provide and discuss results of level of service analyses. List intersections starting with worst LOS/degree of delay/highest volumes. Future build-volumes must be used to rank the intersections.

13. Provide and discuss inputs and outputs, models, conditions, and results for dispersion modeling. Provide input and output files in hard copy and on computer disk. Include any unzipping instructions, file names, etc.

14. Provide the results for each intersection in a table which includes the predicted impact, background concentration, resultant, standard, and description of any necessary mitigation measure, e.g. " RT 100/Rt 2 - unsignalized with a new left turn lane".

15. Provide a schedule for the proposed project which includes major construction related milestones.

3.0 Modeling Guidance

Emission rates of CO from motor vehicles vary as a result of several factors, some of which include: vehicle operation, type of vehicle, age and maintenance of vehicle, and ambient conditions. These factors are combined with other factors as input into the U.S. EPA *Mobile Source Emissions Model*, as revised, in order to develop composite emission rates that reflect the typical mix of motor vehicles operating in the county or region. Applicants must use the latest version of *Mobile* available at the time of application.

The *Mobile* model contains a large database of vehicle emission rate data collected by the U.S. EPA. *Mobile* predicts both a composite "free" flow and idling emission rate. The composite emission rate accounts for the variation in emissions produced by any given mix of motor vehicles as they accelerate, coast, decelerate, along the roadways. *Mobile* adjusts base CO emission rates for the year of analysis, type and age of vehicle, altitude, hot start/cold start percentages, operating temperature, ambient temperature, vehicle speed, and whether or not the state has an inspection/maintenance program.

Idle emission rates can be calculated directly from the exhaust emission factors from *Mobile* run with an input speed of 2.5 miles per hour. The predicted exhaust emission factor for CO will be in units "gram per mile". To convert these gram per mile emissions to idle emission factors in units "gram per hour", the applicant should multiply the emission factor by the speed (2.5 mph). The speed of 2.5 mph is chosen because it contains a conservative measure of idle time in the *Mobile* model. These predicted emission rates reflect the circumstances expected for the future build scenario. The free flow and idle composite emission rates are used as input in *CAL3QHC* dispersion model.

Table 1, below, summarizes some of the input options that the applicant should be concerned with when running the *Mobile* model for sources located in Vermont.

Table 1: *Mobile* Inputs Options

Year of Analysis: One year after project completion. Full build-out can not exceed 5 yrs from submittal of application.

Vehicle Mix:

AGE: National Average

TYPE: National Default Mix

Type of Road Conditions	%Cold Start Non-Catalyst Equipped	%Hot Start Catalyst Equipped	%Cold Start Catalyst Equipped
Large Areas	20	27	20
Rural or Expressway	0	0	0
Parking lots	100	0	100
Rush Hour (1HH)	50	10	50

Region: Low altitude

Vehicle Speed: Variable (use speed limit or observed data)

Ambient Temperature: 20 °F

I/M & LEV Program: IMFLAG = 1 (No I/M Program assumed)

ATPFLG = 2 (No credit for OBD tests – not available until Mobile 6)
(No credit for pressure tests since not being implemented)

ATP Descriptive Input Record (Required if ATPFLG =2)

Start Year:	97 (1997)
First & Last Model Years:	68 20 (1968 to 2020 model year vehicles)
Vehicles Covered by Program:	2222 (LDGV, LDGT1, LDGT2, HDGV all covered by program)
Program Type:	2 (test & repair)
Frequency of Inspection:	1 (annual)
Compliance Rate:	096 (96% compliance rate)
Inspections Performed:	12111111 (Catalyst check only)

REGION = 4 (Included in Scenario Description Record – low altitude, CA LEV Program w/ start year other than 1994 model year &/or specific I/M program not assumed)

LEV Program Parameter Record (Required if REGION = 4)

Start Year:	00 (2000 model year vehicles)
I/M Program:	1 (No I/M program assumed)
LDGT2 Vehicles included:	2 (LDGT2 covered by program starting 2004)

The emission rates generated by the *Mobile* model represent the emissions from motor vehicles approaching and departing intersections. The applicant must locate the line sources or queues by plotting there locations on an x-y Cartesian grid that depicts the geometry of the roadway intersection. Receptors are located along each line source. Receptors must be located perpendicular to the line source emission strengths at the beginning, middle, and end of the vehicle queues, and at a standard distance of 5 meters from the queue of traffic. The 5 meter setback results in receptors generally located in the vicinity of sidewalks. For intersections with long approaches, it is recommended that receptors be located at 5, 10, 25, and 50 meters from the intersection corner. More receptors can be located if a sensitive location is identified. The single receptor exhibiting the highest maximum concentration is used for comparison with the AAQS. A standard receptor height of 1.5 meters or approximately five feet above grade is used.

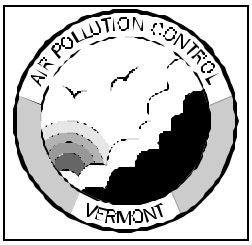
Prevailing meteorological conditions substantially affect how line source emissions are dispersed. The primary meteorological factors included in *CAL3QHC* are wind speed, wind direction, and the stability of the atmosphere. Typically, meteorological parameters are input into the dispersion model so as to represent normal winter time conditions. Wind speed is usually maintained at one meter per second (2.2 mph). An analysis of concentration versus wind angle in 10^{o} increments is conducted for each receptor. The wind angle which maximizes the concentration at the receptor under the various scenario conditions is used for the final calculation. Atmospheric stability is a measure of the turbulence or mixing potential of the atmosphere. Typically, stability class D (neutral conditions) is used in urban surroundings and stability class E is used for rural surroundings. Land areas are classified using the Auer (1978) techniques. A mixing height of 1000 meters should be assumed.

Another factor related to atmospheric stability is surface roughness. Surface roughness is a measure of the initial ground level turbulence into which the exhaust plume will be released and is affected by the height and number of buildings (or local topography) as well as the turbulent wake of vehicular traffic. A surface roughness of 325 centimeters should be assumed for an urban area while 175 cm should be assumed for rural areas. The applicant is referred to Table 1 in EPA's *CAL3QHC (v.2) User's Manual*. A persistence factor of 0.6 has been identified as appropriate for Vermont and can be used to convert peak one-hour concentrations into a peak eight-hour concentrations. Table 2 below summarizes the meteorological parameters typically used in an indirect source evaluation for sources located in Vermont.

Table 2 - Summary of Meteorological Parameters

Wind Direction	Variable direction which maximizes CO concentrations at the receptor in 10^{o} increments.
Wind Speed	1 meter per second
Stability Class	D (Urban) or E (Rural)
Mixing Height	1000 meters
Surface Roughness	325 cm (Urban), 175 cm (Rural)
Persistence Factor	0.6 (Used throughout Vermont)

Background CO concentrations reflect CO levels attributable to sources not specifically incorporated into the dispersion model and represent emissions in the vicinity of the receptor. Examples of sources contributing to the background concentration include: emissions from vehicles on nearby roadways, but not immediately adjacent to the study site; emissions from nearby industrial or residential heating systems; and natural sources. Background levels are of greatest concern in urbanized areas where the density of other sources may contribute significantly to the total concentrations at a receptor. As recommended by the U.S. EPA in the absence of local monitoring data, background levels of 3.0 and 1.5 parts per million (ppm) are to be used for the one hour and eight hour averaging periods, respectively.



CERTIFICATION OF INFORMATION ACCURACY

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on information and belief formed after reasonable inquiry, the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

_____ _____

(Signature) *(Date)*

_____ _____

(Print Name) *(Title)*

CONSENT FOR ACCESS TO PROPERTY

I recognize that by signing this application, I am giving consent to employees of the State of Vermont to enter the subject property for the purpose of obtaining information relevant to the processing of this application. I also understand that by acceptance of a Permit, I agree to allow representatives of the State of Vermont access to the properties covered by the Permit, at reasonable times, for the purpose of ascertaining compliance with the Permit and with Vermont environmental and health statutes and regulations.

_____ _____

(Signature) *(Date)*

_____ _____

(Print Name) *(Title)*