SUPPORT DOCUMENT
FOR AIR QUALITY GENERAL ORDER OF APPROVAL FOR: PERCHLOROETHYLENE DRY CLEANERS INCLUDING POTENTIAL APPROVAL CRITERIA

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Prepared by Washington State Department of Ecology
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EXECUTIVE SUMMARY

Ecology's Air Quality Program revised its Notice of construction rules (contained in Chapter 173-400 Washington Administrative Code) in Early 2005 to allow for the Establishment of General Orders of Approval. In the spring and early summer of 2006 an engineering team consisting of staff from Headquarters (HQ) evaluated the opportunity to utilize a General Order of Approval to permit perchloroethylene dry cleaners and determined there is a size class of the units which can be permitted under a General Order of Approval without causing any undesirable environmental impact.

Based on this analysis, Ecology determined that establishment of a General Order of approval for perchloroethylene dry cleaners purchasing less that 2100 gallons of perchloroethylene per year and using new, dry-to-dry cleaning equipment is reasonable and appropriate. Ecology engineering staff determined that units and operations meeting the criteria in Table 1, below, are appropriate for issuance of the General Order of Approval.

Table 1, Perchloroethylene Dry Cleaner Applicability Criteria

Criterion	Limitation
Dry cleaning machine design	New and used cleaning machines originally designed and constructed as non-vented, dry-to-dry equipment, equipped with refrigerated condenser (also known as 4th generation equipment)
Perchloroethylene purchase	2100 gallons or less per 12 month period
Location	Shall not be located in any building containing a residence.

In addition to the applicability criteria given above, the engineers also recommend that the machine design, emission monitoring, recordkeeping and reporting requirements included in WAC 173-400-075(7) and the Dec. 2005 proposed amendments to 40 CFR part 63, Subpart M, which are included in Section 8 below be included in this General Order of Approval.

Contents

1. INTRODUCTION

PURPOSE

The purpose of the analysis described in this document is to determine emission unit criteria and approval conditions within which a General Order of Approval is appropriate for perchloroethylene dry cleaning operations. In addition, a list of minimum requirements or applicability criteria will be developed to identify perchloroethylene dry cleaning operations that would qualify for coverage under the General Order of Approval.

BACKGROUND

Since 1972, Ecology has required a preconstruction review and permitting program for new sources that will emit pollutants to the air in the State of Washington. This review and permitting process is referred to as "New Source Review" by the state or the relevant local air quality control agency. Based on that review, the relevant agency issues an approval-to-construct and operates the new source. This "Notice of Construction Approval" contains pollutant emission limitations and operating requirements for the new source.

The typical process to obtain a site-specific, individual Notice of Construction air quality permit is described in "How to Apply for a Notice of Construction Air Quality Permit." http://www.ecy.wa.gov/biblio/ecy070121.html

Effective, February 10, 2005, Ecology revised its regulations to include the General Order of Approval as an alternative to the individual Notice of Construction permit. General Orders of Approval are intended to be a method for owners of commonly permitted, small emission sources to know, prior to committing to purchase and submitting an application to Ecology, what is necessary to comply with Washington's new source review requirement. A significant goal of issuing General Orders of Approval is to simplify the permitting process by reducing the regulatory and administrative burden on the applicant and Ecology. Use of General Orders should reduce the permit processing cost to both the applicant and Ecology.

Before this tool can be used, Ecology and each local air pollution control authority must develop and issue a General Order of Approval that applies to that industry or source group. The following analysis is part of the process to establish a General Order for one type of emissions unit within the jurisdiction of the Department of Ecology.

2. CONSIDERATIONS IN CHOOSING TO EVALUATE PERCHLOROETHYLENE DRY CLEANERS FOR A GENERAL ORDER OF APPROVAL

ASSUMPTIONS USED IN THIS ANALYSIS

The Ecology Air Quality Program management and the Engineering Team established the following criteria for the General Order of Approval determination. The criteria are intended to assist the engineering team complete the analysis within a reasonable expenditure of time and effort. These criteria are:

1. Best Available Control Technology (BACT) and Toxic Air Pollutant-BACT is the same as for a site specific approval issued during the time the engineering evaluation is developed (in this case 2006).
2. The emissions will not delay the attainment date for any area not in attainment nor will the emissions cause or contribute to the exceedance of any ambient air quality standard.
3. An emission unit size or type can not receive a General Order of Approval if the ambient air quality analysis indicates that a Tier 2 review would be required at any potential location
4. The General Order will assure a covered unit will comply with all applicable new source performance standards, national emissions standards for hazardous air pollutants, national emission standards for hazardous air pollutants for source categories, and emission standards adopted under the Washington State Clean Air Act.
5. The individual emission unit cannot cause the facility it is installed in to become subject to the Air Operating Permit program or be subject to Prevention of Significant Deterioration permitting.
6. Information content and analyses described in the technical analysis will be similar to that required in a permit application for this type of emission unit.

Assumptions 1, 2, 4, and 5, reflect the requirements of WAC 173-400-110, 112, 113, and 560 and are requirements for all new source review actions in Washington. Assumption 5 reflects specific requirements for General Orders of Approval found in WAC 173-400-560. Assumption 6 reflects the actuality that this analysis needs to evaluate a number of control options and generic emissions modeling prospectively rather than a permit application review's retrospective analysis.

Assumption 3 reflects the criteria of the Tier 2 toxic air pollutant review process (WAC 173-460-090). A Tier 2 review is a site specific analysis of the impacts of toxic air pollutants from a known, existing facility on the surrounding community. A General Order of Approval is developed without a specific site in mind. A General Order of Approval is unable to incorporate the site specific considerations of the Tier 2 process. In order to reflect this limitation, the engineering team is including criteria related to the distance from the described units to property lines and buildings, hills, or other structures that affect ambient air quality concentrations.

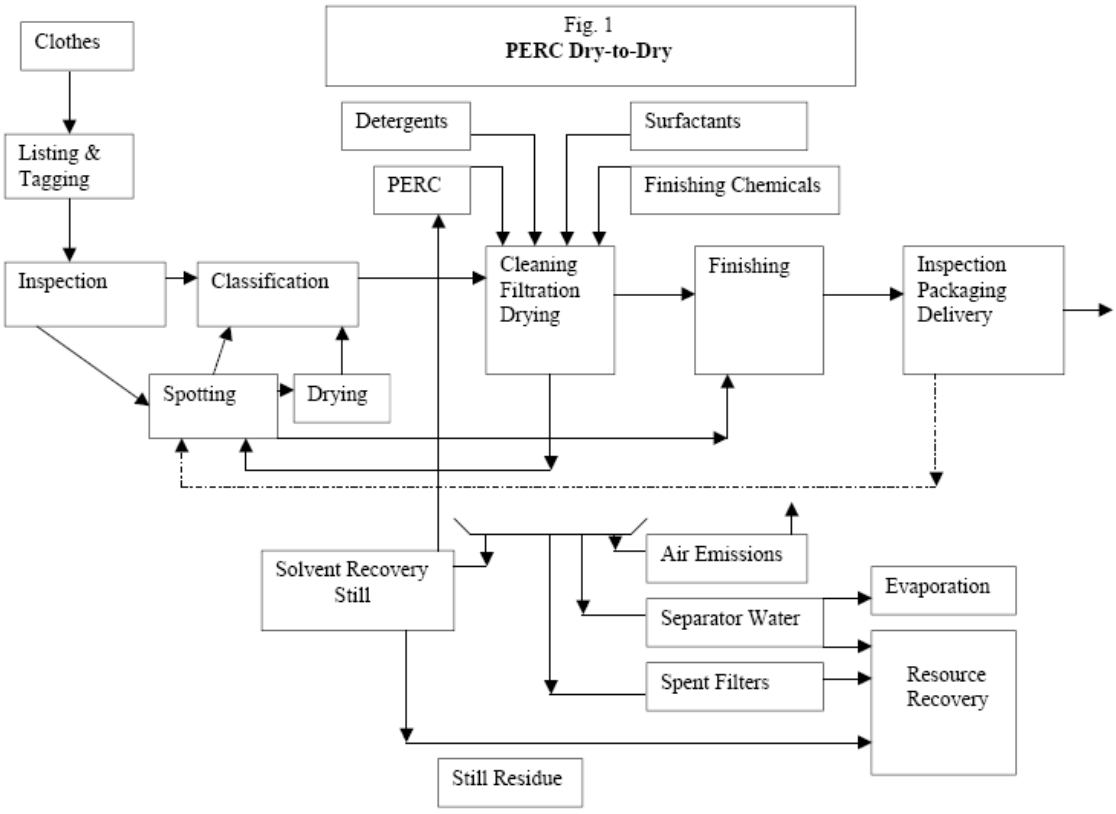
UNIT DESIGN AND CONSTRUCTION

The engineering team chose to consider only new, non-vented, dry-to-dry design perchloroethylene dry cleaning equipment in this evaluation. The principle reason for this decision is that state and federal air quality regulations governing perchloroethylene dry cleaning equipment preclude the new installation of any other design. New dry cleaning machines using

perchloroethylene which are sold in the United States are all designed to meet the requirements of applicable federal and state regulations, resulting in predictable and minimal emissions. The regulations governing dry cleaning equipment operations define a maximum size dry cleaning facility that does not require the owner/operator to obtain an Air Operating Permit.

Modern, perchloroethylene based dry cleaning machines meeting the requirements of the federal regulation are available as complete packages from multiple manufacturers. Used equipment meeting the design criteria are available on the market and are capable of meeting the same criteria as a new dry cleaning machine.

Figure 1. Flow chart for a dry-to-dry perchloroethylene dry cleaning system.



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N.C. Dry Cleaning Alternatives Study
October 2001

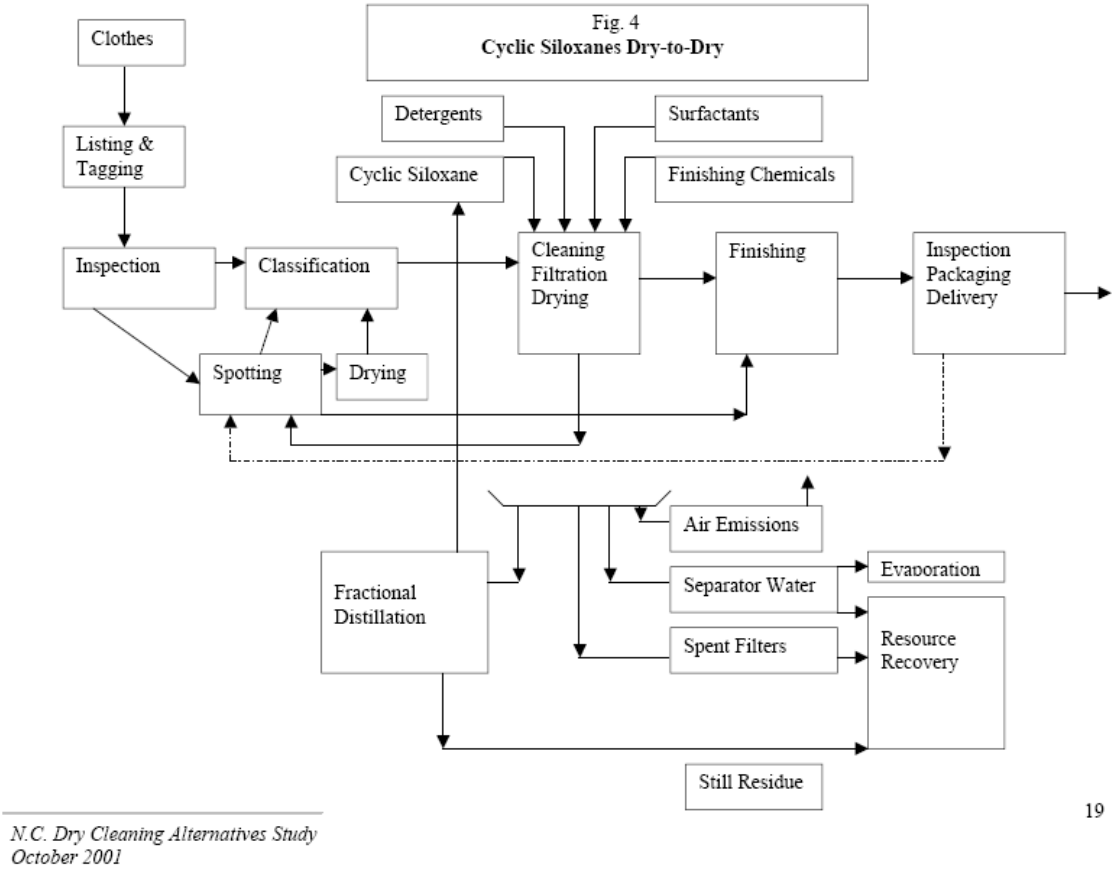
In addition to the dry cleaning machine, a dry cleaning operation often includes one or more water based cleaning machine and a small boiler which may supply hot water to the perchloroethylene cleaning machine and other steam needs for presses, water washing equipment, etc. These boilers may be electric or use fossil fuel. They are often smaller than the Department of Ecology's de minimis fossil fuel fired boiler size of 4 million Btu/hour heat input. Boilers that are above that size may qualify for coverage under the small natural gas fired boiler General Order of Approval.

ALTERNATIVE SOLVENTS

The engineering team considered extending this evaluation to dry cleaning machines using carbon dioxide, cyclic siloxanes and petroleum solvents. The evaluation indicates that dry cleaning equipment using carbon dioxide and cyclic siloxanes are not subject to Notice of Construction permitting under our current air quality rules. Flow charts of these processes are included below.

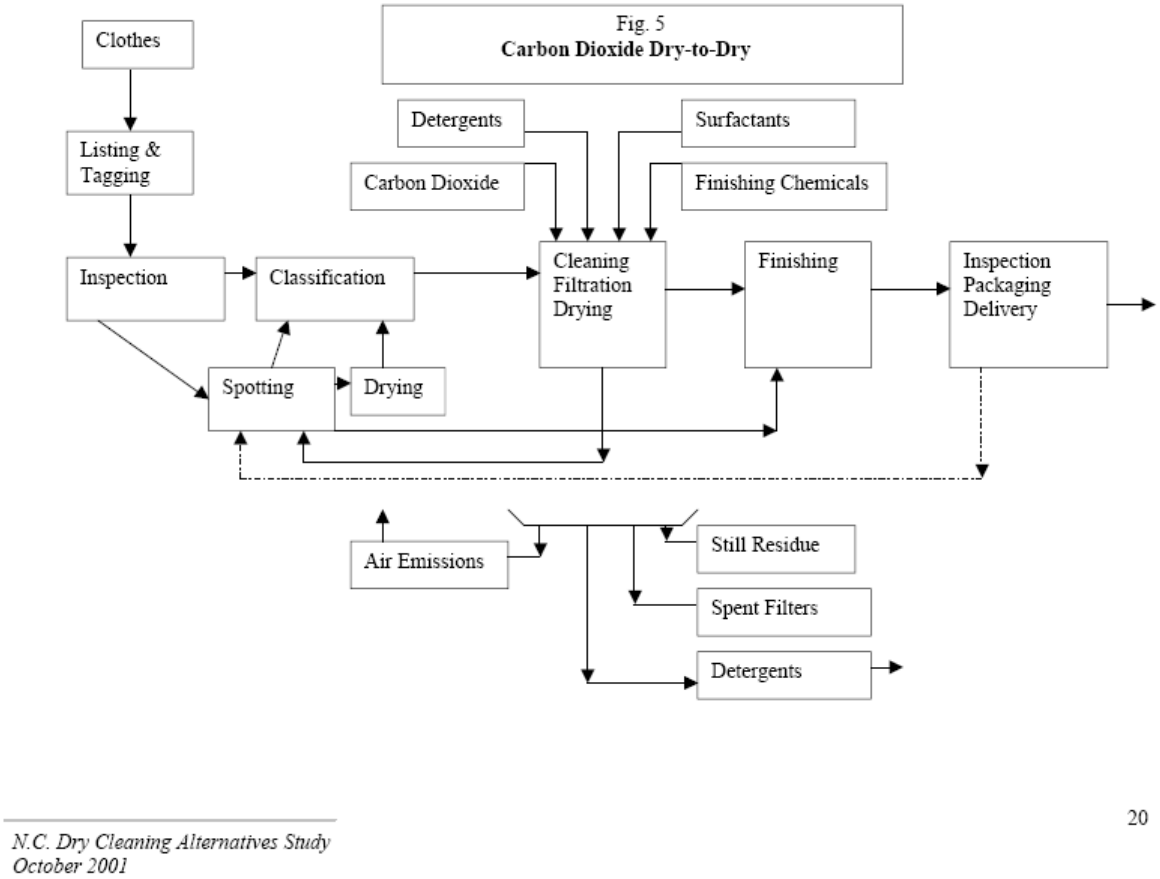
The following diagrams are provided for informational purposes to show the similarities between the overall cleaning processes. The use of cyclic siloxanes uses equipment similar to that used for conventional hydrocarbon dry cleaning or with aliphatic glycol ethers.

Figure 2. Flow chart for a cyclic siloxane based dry cleaning system.



This process also requires a small boiler to provide heat to the system to operate the still, and to heat the air during the drying step.

Figure 3. Flow chart for a carbon dioxide based dry cleaning system.



This process does not need a small boiler to operate, but does operate at high pressures and as such requires careful maintenance. When necessary to separate the carbon dioxide from residues, the carbon dioxide can be vented to the atmosphere. However, care must be taken to prevent suffocation of individuals near the discharge point.

Dry cleaning equipment using petroleum solvents are subject to operating requirements contained in WAC 173-460-060(2) and emit volatile organic compounds. As such it was determined to not be appropriate to include petroleum solvents in this General Order of Approval.

3. POLLUTANTS OF CONCERN

IDENTIFICATION OF POLLUTANTS EMITTED

Perchloroethylene is the only air pollutant emitted by perchloroethylene dry cleaning equipment. It is a listed Class A toxic air pollutant. EPA has determined that perchloroethylene is not a volatile organic compound regulated as a precursor to ozone formation.

EPA and the South Coast Air Quality Management District have both fond that most perchloroethylene lost in the dry cleaning process is lost with the spent filters and with muck residues. These losses amount to about 2.5 kg/100 kg of clothes cleaned. Typical 3rd generation machines are able to clean about 400 lb of clothing per gallon of perchloroethylene. 4th and 5th generation equipment is currently capable of cleaning up to 700 lb/gallon. The equipment proposed below as BACT meets the standard for what is considered to be 4th generation equipment.

4. DETERMINATION OF BEST AVAILABLE CONTROL TECHNOLOGY

State law and rule[1] defines BACT as "an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under the Washington Clean Air Act emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each pollutant."

Ecology has chosen to implement the "top-down" process to determine what BACT is for notice of construction reviews. In the 'top-down" analysis process, the applicant lists and ranks all potential pollutant control options from highest level of control (lowest emission rate) to the lowest (highest emission rate). Next those emission control options that are technically infeasible are removed from the list of available controls. The highest level of control remaining is considered technically feasible to implement on the emission unit. When that level of control is either proposed by an applicant, it is accepted as BACT with no further analysis involved. An applicant may choose to demonstrate that the highest level of emissions control is not financially feasible (not cost effective) to implement or has adverse environmental or energy impacts. In this case the applicant evaluates the economic, environmental and energy impacts of the next most stringent level of control until a level of control is demonstrated to be economically feasible.

In the case of this General Order of Approval Technical analysis document, there is no identified applicant. Thus, Ecology is responsible for providing this BACT technology analysis comparing the economic feasibility of several of the available emission control options available as add-on emission control technologies as part of our process to determine what BACT should be for perchloroethylene drycleaners purchasing up to 2100 gallons/year.

In the specific case of identifying BACT for perchloroethylene dry cleaning equipment, BACT is defined in rule. WAC 173-460-030(2)(c) exempts a number of types of emitting equipment, including perchloroethylene drycleaners, from the NOC and ambient air quality impact requirements to WAC 173-460. There is one proviso that goes with this exemption. That

[1] RCW 70.94.030(7) and WAC 173-400-030(12)

proviso is that the operation must meet the control technology requirements in WAC 173-460-060. This section references the perchloroethylene drycleaner requirements in WAC 173-400-075(7) as the control technology to follow. Thus BACT and T-BACT are defined for us to follow.

Since operational standards and to an extent emission standards are defined, the only permitting choice is whether to limit the types of dry-to-dry equipment designs that are acceptable.

CONTROL TECHNOLOGIES CONSIDERED

The following list of control technologies were considered in this evaluation. The basic choice was with the variation in control on venting allowed under the regulation.

Table 4-1 Control Technologies

Control technologies evaluated		
Dry-to-dry vented machines with refrigerated condenser (aka 3rd generation)	Dry-to-dry non-vented machine with refrigerated condenser (aka 4th generation)	Dry-to-dry non-vented machine with refrigerated condenser and carbon canister (aka 5th generation)
Alternative solvents		

Alternative solvents

There are a number of alternative solvents available to replace perchloroethylene for dry cleaning clothes. Equipment is available for sale that uses carbon dioxide, cyclic siloxanes, aliphatic glycols, water, or hydrocarbon solvents instead. BACT determinations do not require the replacement of one process with another simply because one is inherently less polluting than the other. The choice of process technology is left to the project applicant, and will be done so in this case.

Product literature indicates that equipment using cyclic siloxanes, aliphatic glycols or hydrocarbon solvents use equipment identical or very similar in design to equipment used with conventional hydrocarbon solvents (i.e. Stoddard solvent). This equipment differs significantly from that used with perchloroethylene. Similarly machines based on carbon dioxide are very different due to the need to contain liquid carbon dioxide and recover the carbon dioxide for re-use in the machine.

As part of this BACT evaluation, it must be noted that at this time, dry cleaning equipment that makes use of carbon dioxide or cyclic siloxanes is not required to apply for and receive a Notice of Construction approval. Carbon dioxide is an air pollutant, but is currently regulated only for emissions from fossil fueled power plants. Cyclic siloxanes are also air contaminants, but current toxicology literature indicates that they do not have any deleterious or toxic effects. Thus they also appear to be entirely exempt from regulation. As such it appears that dry cleaning equipment proposing to use cyclic siloxanes for the cleaning solvent are exempt from permitting requirements.

Water based dry cleaning technologies do not make use of perchloroethylene or emit any other regulated air pollutant. As such, use of this equipment would not require a permit to install either.

Aliphatic glycols and hydrocarbon solvents are subject to regulation under other regulations. Hydrocarbon solvent dry cleaning equipment has differing approval criteria in WAC 173-460-060. Aliphatic glycols are a group of chemicals that product literature and other information from the dry cleaning industry indicate are primarily made up of ethylene glycol and related compounds. Several of these glycol compounds are listed as TAPs. The viability of this alternative solvent was not evaluated further.

As discussed above, while alternate dry cleaning solvents are available, they use different equipment and chemicals than perchloroethylene based dry cleaning machines. This proposed General Order is specific to perchloroethylene based dry cleaning equipment.

Machine design options

All of the other equipment listed in Table 4-1 is allowed by state and federal regulation. The minimum level of machine design required by Washington regulation and federal rules is the vented, dry-to-dry design with refrigerated condenser. Information collected by EPA and used in developing its 2005 proposed amendments and risk analysis indicates that nationally, most new dry cleaning machines purchased are of the non-vented design. In extreme situations such as in Los Angeles and New York City, the non-vented design with both the refrigerated condenser and carbon canister are being installed as required by local regulation. As a state, California is also proposing to ban the use of perchloroethylene in dry cleaning operations, though a proposed rule is not yet available.

Information developed by EPA for the residual risk analysis indicates that the cost difference between the vented and non-vented designs is minimal. The real cost difference comes from the reduced solvent loss from the non-vented machines, resulting in less solvent to be purchased. EPA estimates these machines emit about 2.7 kg/100 kg of clothing laundered, with 2.5 kg/100 kg of clothing lost from the disposal of spent filter cartridges and still bottoms.

The same EPA information indicates that the addition of the carbon canister (5^{th} generation machine) adds considerably to the cost of the machine with a very small savings in perchloroethylene loss. While the preamble to the proposed amendments to 40 CFR 63, Subpart M indicates this equipment is proposed for new dry cleaning machines installed in mixed commercial residential buildings to reduce the concentration of perchloroethylene in residential spaces, the proposed rule language does not include that criteria.

SELECTED BACT

The use of any machine designed and operated as a non-vented, dry-to-dry design with refrigerated condenser is determined to be BACT.

5. AMBIENT IMPACT ANALYSIS

COMPLIANCE WITH NATIONAL AMBIENT AIR QUALITY STANDARDS

All notice of construction applications are required to be evaluated for their ambient air quality impacts. "Ambient air" means the surrounding outside air, the air outside of buildings to which the public has access. In other words this is the air we all breathe.

The federal government has established National Ambient Air Quality Standards for 6 common air pollutants. Ecology has adopted these standards with minor changes and also has one additional ambient air quality standard that applies in Washington. All new and modified sources of air pollution in Washington are required to demonstrate that the project will not cause or contribute to an exceedence of one or more of these ambient air quality standards.

The engineering team used an air quality plume dispersion model to determine whether the ambient impacts from a proposed project will be acceptable. The dispersion model predicts the ambient air concentrations of the various air pollutants caused by the project. The engineering team compared the results of the model with the ambient standards to see if the project will cause or contribute to an exceedance of the standard.

The table below presents the National Ambient Air Quality Standards (NAAQS) and Washington State Ambient Air Quality Standards (AAQS) for Class II Areas.

Table 5-1

National Ambient Air Quality Standards				
Pollutant	Averaging Time	National		Washington State AAQS
		Primary	Secondary	
Particulate	Annual	50 $\mu g/m^3$	50 $\mu g/m^3$	50 $\mu g/m^3$
	24-hr	150 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
Sulfur Dioxide	Annual	0.03 ppm	----	0.02 ppm
	24-hr	0.14 ppm	----	0.10 ppm
	3-hr	----	0.50 ppm	----
	1-hr	----	----	0.40 ppm[2]
Carbon Monoxide	8-hr	9 ppm	9 ppm	9 ppm
	1-hr	35 ppm	35 ppm	35 ppm
Nitrogen Dioxide	Annual	0.05 ppm	0.05 ppm	0.05 ppm

Dry cleaning machines do not emit any of the above pollutants so no further evaluation was performed.

[2] 0.25 ppm not to be exceeded more than two times in any 7 consecutive days

TOXIC AIR POLLUTANT IMPACTS ANALYSIS FOR A PERCHLOROETHYLENE DRY CLEANING MACHINE

While perchloroethylene is regulated by Ecology as a Class A toxic air pollutant, WAC 173-460-030(2)(c) exempts dry cleaning operations meeting the criteria of WAC 173-400-075(7) (through reference in WAC 173-460-060((1)) from any further requirements for compliance with WAC 173-460.

As a result of this exemption from the requirements to model ambient air quality impacts, none was performed.

However, in order to protect individuals from potential toxic or carcinogenic effects from long term exposure, we propose to include the criteria in proposed amendments to 40 CFR 63, Subpart M that were proposed Dec. 21, 2005. A number of these criteria have been proposed as a result of an EPA residual health risk analysis based on a continuous, 70 year duration exposure to estimated concentrations of perchloroethylene in the ambient air and a residence's inside air resulting from the operation of dry cleaning machines of various designs. One of these criteria establish that new perchloroethylene dry cleaner shall be established in a building with a residence is not allowed to emit perchloroethylene. This can be interpreted as no dry cleaning machine is allowed or only what is known as "Generation 5" machines are allowed. This evaluation is proposing to simply not allow the dry cleaning facility from being located in a building with a residence.

6. DISPERSION MODELING

As noted in the previous section, no dispersion modeling is required by rule and as a result, none was performed for this proposed General Order of Approval.

7.0 REGULATORY REQUIREMENTS

There are a number of regulations that apply to the installation and operation of the small boilers proposed for coverage under this General Order of Approval. The following is a listing of those requirements. Some of these requirements result in notification, monitoring, and reporting requirements. There are also requirements related to periodic payment of fees and reporting of emissions. The Engineering Team recommends that these requirements be included in the text of the General Order of Approval so the applicant understands what is expected once coverage is granted.

TITLE 70 RCW, CHAPTER 70.94, "WASHINGTON CLEAN AIR ACT"

70.94.152 (3) requires that any order that is adopted under this chapter shall be in accord with this chapter, or the applicable ordinances, resolutions, rules, and regulations adopted under this chapter.

70.94.152 (7) requires that any features, machines, or devices that are the subject of an order shall be maintained and operated in good working order.

70.94.152 (10) requires that any notice of construction approval issued under (3) above shall include a determination that the source will achieve best available control technology (BACT).

STATE REGULATIONS

WAC 173-400-075(7) contains requirements for the installation and operation of perchloroethylene dry cleaning machines.

WAC 173-400-99 through 104, these sections deal with the source registration program. Section 100 defines which facilities are subject to the registration program and payment of periodic registration fees.

WAC 173-400-105, Subsection (1) relates to submittal of annual emission inventory information. Subsection (2) relates to the ability of Ecology to request emissions testing. Subsection (3) relates to site access by agency personnel at reasonable times to ascertain compliance or investigate complaints.

WAC 173-400-110, Requires application for, and receipt of a Notice of construction approval unless the project is exempt from permitting under WAC 173-400-110(4) or (5).

WAC 173-400-110, Subsection (5) (d) Exemption threshold table has the following exemption limits requiring new source review for criteria pollutants:

Total particulate matter (PM)	= 1.25 tons per year
Particulate matter less than 10 microns (PM_{10})	= 0.75 tons per year
Carbon monoxide (CO)	= 5.00 tons per year
Nitrogen oxides (NOx)	= 2.00 tons per year
Sulfur oxides (SO_2)	= 2.00 tons per year
Volatile Organic Compounds (VOC)	= 2.00 tons per year
Lead (Pb)	= 0.005 tons per year

Chapter 173-460 WAC “New Sources of Toxic Air Pollutants” regulates perchloroethylene emissions from dry cleaning equipment, but exempts this equipment from the requirements to determine ambient air quality impacts perchloroethylene dry cleaners when meeting equipment design and operation criteria defined in the rule. These operations are instead required to meet a defined control technology and other requirements contained in WAC 173-400-075(7).

FEDERAL REGULATIONS

40 Code of Federal Regulations (CFR), Part 63, Subpart M - National Perchloroethylene Air Emission Standards for Dry Cleaning Facilities. This National Emission Standard for Hazardous Air Pollutants (NESHAP) applies to all perchloroethylene dry cleaning operations. The rule prescribes equipment design, operation monitoring and recordkeeping standards for new and existing dry cleaning equipment. The rule defines how large a dry cleaning operation is a major source subject to permitting under the Air Operating Permit program..

A proposal to amend this standard was published on Dec. 21, 2005. New dry cleaners constructed, modified, or reconstructed after that date are required to comply with the amended requirements at time of start-up (40 CFR 63.320(b)(2)). Additional requirements are contained in that proposal which will affect permissible locations, the machine design criteria, process monitoring and recordkeeping requirements of dry cleaning machines covered by this proposed General Order of Approval.

40 CFR 63 Subpart A – contains a number of operational and reporting requirements. All appear to be included in Subpart M.

8.0 RECOMMENDED OTHER APPROVAL CONDITIONS

APPROVAL CONDITIONS COPIED FROM WAC 173-400-075(7)

This listing is proscriptive on both the source to follow and the permitting authority to include in a Notice of construction approval.

- Dry-to-dry machines purchasing up to 2100 gallons perchloroethylene per 12 month period
- **Operation and maintenance records**
  - Each dry cleaning facility must keep an operations and maintenance record that is available upon request.
  - The information in the operations and maintenance record must be kept on-site for five years.
  - The operations and maintenance record must contain the following information:
    - Inspection: The date and result of each inspection of the dry cleaning system. The inspection must note the condition of the system and the time any leaks were observed.
    - Repair: The date, time, and result of each repair of the dry cleaning system.
  - Refrigerated condenser information. If you have a refrigerated condenser, enter this information:
  - The air temperature at the inlet of the refrigerated condenser;
  - The air temperature at the outlet of the refrigerated condenser;
  - The difference between the inlet and outlet temperature readings; and
  - The date the temperature was taken.
  - A record of the volume of perchloroethylene purchased each month must be entered by the first of the following month;
  - A record of the total amount of perchloroethylene purchased over the previous twelve months must be entered by the first of each month;
  - All receipts of perchloroethylene purchases; and
  - A record of any pollution prevention activities that have been accomplished.
- **General operations and maintenance requirements.**
  - Drain cartridge filters in their housing or other sealed container for at least twenty-four hours before discarding the cartridges.

- Close the door of each dry cleaning machine except when transferring articles to or from the machine.
- Store all perchloroethylene, and wastes containing perchloroethylene, in a closed container with no perceptible leaks.
- Operate and maintain the dry cleaning system according to the manufacturer's specifications and recommendations.
- Keep a copy on-site of the design specifications and operating manuals for all dry cleaning equipment. (3) Shall prevent air drawn into the dry cleaning machine when the door of the machine is open from passing through the refrigerated condenser.
- Keep a copy on-site of the design specifications and operating manuals for all emissions control devices.
- Route the perchloroethylene gas-vapor stream from the dry cleaning system through a refrigerated condenser.

❖ **Inspection**

- The owner or operator must inspect the dry cleaning system at a minimum of once per week
- An inspection must include an examination of these components for condition and perceptible leaks:
  - Hose and pipe connections, fittings, couplings, and valves;
  - Door gaskets and seats;
  - Filter gaskets and seats;
  - Pumps;
  - Solvent tanks and containers;
  - Water separators;
  - Muck cookers;
  - Stills;
  - Exhaust dampers; and
  - Cartridge filter housings.
- The dry cleaning system must be inspected while it is operating.
- The date and result of each inspection must be entered in the operations and maintenance record at the time of the inspection.

❖ **Repair**

- Leaks must be repaired within twenty-four hours of detection if repair parts are available.
- If repair parts are unavailable, they must be ordered within two working days of detecting the leak.
- Repair parts must be installed as soon as possible, and no later than five working days after arrival.
- The date and time each leak was discovered must be entered in the operations and maintenance record.
- The date, time, and result of each repair must be entered in the operations and maintenance record at the time of the repair.

❖ **Requirements for systems with refrigerated condensers**

- A dry cleaning system using a refrigerated condenser must meet all of the following requirements:

- Outlet air temperature.
  - Each week the air temperature sensor at the outlet of the refrigerated condenser must be checked.
  - The air temperature at the outlet of the refrigerated condenser must be less than or equal to 45°F (7.2°C) during the cool-down period.
  - The air temperature must be entered in the operations and maintenance record manual at the time it is checked.
  - The air temperature sensor must meet these requirements:
    - An air temperature sensor must be permanently installed on a dry-to-dry machine
    - The air temperature sensor must be accurate to within 2°F (1.1°C).
    - The air temperature sensor must be designed to measure at least a temperature range from 32°F (0°C) to 120°F (48.9°C); and
    - The air temperature sensor must be labeled "RC outlet."
  - Inlet air temperature.
    - Each week the air temperature sensor at the inlet of the refrigerated condenser installed on a washer must be checked.
    - The inlet air temperature must be entered in the operations and maintenance record at the time it is checked.
    - The air temperature sensor must meet these requirements:
      - An air temperature sensor must be permanently installed on a washer at the inlet of the refrigerated condenser.
      - The air temperature sensor must be accurate to within 2°F (1.1°C).
      - The air temperature sensor must be designed to measure at least a temperature range from 32°F (0°C) to 120°F (48.9°C).
      - The air temperature sensor must be labeled "RC inlet."

APPROVAL CONDITIONS COPIED FROM PROPOSED AMENDMENT TO 40 CFR 63, SUBPART M

Most of the proposed changes are already in the Ecology requirements. Additional requirements related to the usage of new dry-to-dry machines are as follows:

- Vapor leak means a perchloroethylene vapor concentration exceeding 25 parts per million by volume (50 parts per million by volume as methane) as indicated by a halogenated hydrocarbon detector or perchloroethylene gas analyzer.

- Design of the dry cleaning machine shall prevent air drawn into the dry cleaning machine when the door of the machine is open from passing through the refrigerated condenser.
- Design of the dry cleaning machine shall route the air-perchloroethylene gas-vapor stream contained within each dry cleaning machine through a refrigerated condenser and pass the air-perchloroethylene gas-vapor stream from inside the dry cleaning machine drum through a carbon adsorber or equivalent control device immediately before the door of the dry cleaning machine is opened. The carbon adsorber must be desorbed in accordance with manufacturer's instructions.
- The owner or operator of a dry cleaning system shall inspect the system weekly for perceptible leaks while the dry cleaning system is operating. Inspection with a halogenated hydrocarbon detector or perchloroethylene gas analyzer also fulfills the requirement for inspection for perceptible leaks.
- The owner or operator of a dry cleaning system shall inspect the components listed for vapor leaks monthly while the component is in operation.
- The owner/operator shall conduct the inspections of the dry cleaning equipment using a halogenated hydrocarbon detector or perchloroethylene gas analyzer that is operated according to the manufacturer's instructions. The operator shall place the probe inlet at the surface of each component interface where leakage could occur and move it slowly along the interface periphery.
- The owner or operator shall eliminate any emission of perchloroethylene from any dry cleaning system that is installed after December 21, 2005 and that is located in a building with a residence.
- The dates when the dry cleaning system components are inspected for leaks and the name or location of dry cleaning system components where leaks are detected.

OTHER APPROVAL CONDITIONS

The engineering team recommends these conditions in order to prevent various future regulatory problems. In the case of the first of the following recommendations, the condition assures that the applicant under a General Order installs the boiler specified in the application and not a boiler that does not meet all of the criteria in the approval criteria.

- The dry cleaning machine installed and operated shall be the same as the dry cleaning machine described in the application.
- The provisions of this General Order of Approval are severable and, if any provision of this authorization, or application of any provisions of this authorization to any circumstance, is held invalid, the application of such provision to their circumstances, and the remainder of this authorization, shall not be affected thereby.
- The applicant is required to comply with applicable rules and regulations pertaining to air quality, and conditions of operation imposed upon issuance of this order. Any violation of applicable state and/or federal air quality rules and regulations or of the terms of this approval shall be subject to the sanctions provided in Chapter 70.94 RCW. Authorization under this Order may be modified, suspended, or revoked in whole or part for cause including, but not limited to, the following:
  a. Violation of any terms or conditions of this authorization;

b. Obtaining this authorization by misrepresentation or failure to disclose fully all relevant facts.

9. RECOMMENDED APPLICABILITY CRITERIA AND EMISSION LIMITATIONS

The previous discussion shows that it is reasonable to develop and issue a General Order of Approval for natural gas fueled package boilers between 4 and 50 MMBtu/hr heat input rate.

Recommended Applicability Criteria

Table 9-1

Criterion	Limitation
Dry cleaning machine design	New and used cleaning machines originally designed and constructed as non-vented, dry-to-dry equipment, equipped with refrigerated condenser (also known as 4th generation equipment)
Perchloroethylene purchase	2100 gallons or less per 12 month period
Location	Shall not be located in any building containing a residence.

Recommended Emission limitations, monitoring, recordkeeping and reporting requirements

The monitoring, recordkeeping and reporting requirements in WAC 173-400-075 plus additional requirements derived from the amendments to 40 CFR 63, Subpart M proposed Dec. 21, 2005 are shown above.

10.0 ABBREVIATIONS AND ACRONYMS

BACT	Best Available Control Technology
CFR	Code of Federal Regulations
CO	carbon monoxide
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
^{o} F	degrees Fahrenheit
hr/yr	hours per year
NMOC	non-methane organic compound
NOC	Notice of Construction
NO_X	oxides of nitrogen

NSPS	New Source Performance Standard
PERCHLOROETHYLENE	Perchloroethylene (tetrachloroethylene)
PC	pre-chamber
PM_{10}	particulate matter with an aerodynamic diameter of 10 micrometers or less
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gage (above or below ambient pressure)
SO_2	sulfur dioxide
VOC	volatile organic compound
WAC	Washington Administrative Code
%	percent
ppmv	parts per million, volume