

## Chapter NR 469

### EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR HALOGENATED SOLVENT CLEANING OPERATIONS

NR 469.01	Applicability; purpose.	NR 469.073	Control device and operational requirements for continuous web cleaning machines.
NR 469.02	Definitions.	NR 469.077	Control device and operational requirements for remote reservoir continuous web cleaning machines.
NR 469.03	Batch cold cleaning machine standards.	NR 469.08	Alternative standards.
NR 469.04	Batch vapor and in-line cleaning machine standards.	NR 469.085	Facility-wide standards.
NR 469.05	Work and operational practice standards for batch vapor and in-line cleaning machines.	NR 469.09	Test methods.
NR 469.06	Operational requirements associated with control devices for batch vapor and in-line cleaning machines.	NR 469.10	Monitoring procedures.
NR 469.07	Idling emission limit standards for batch vapor and in-line cleaning machines.	NR 469.11	Recordkeeping requirements.
		NR 469.12	Reporting requirements.

**Note:** Corrections made under s. 13.93 (2m) (b) 7., Stats., Register, March, 1997, No. 495.

#### NR 469.01 Applicability; purpose. (1) APPLICABILITY.

(a) This chapter applies to each individual batch vapor, in-line vapor, in-line cold and batch cold solvent cleaning machine that uses any solvent containing methylene chloride (CAS No. 75-09-2), perchloroethylene (CAS No. 127-18-4), trichloroethylene (CAS No. 79-01-6), 1,1,1-trichloroethane (CAS No. 71-55-6), carbon tetrachloride (CAS No. 56-23-5) or chloroform (CAS No. 67-66-3), or any combination of these halogenated HAP solvents, in a total concentration greater than 5% by weight, as a cleaning or drying agent. The concentration of these solvents may be determined using Method 18 in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 484.04 (16), material safety data sheets, or engineering calculations. Wipe cleaning activities, such as using a rag containing halogenated solvent or a spray cleaner containing halogenated solvent are not covered under the provisions of this chapter.

**Note:** Wipe cleaning activities may be regulated by s. NR 423.03 (7).

(b) Except as noted in ch. NR 460 Appendix T, the provisions of ch. NR 460 apply to owners or operators of any solvent cleaning machine meeting the applicability criteria of par. (a).

(c) Except as provided in par. (e), the owner or operator of each solvent cleaning machine subject to this chapter that commences construction or reconstruction after November 29, 1993, shall achieve compliance with the provisions of this chapter, except for s. NR 469.085, immediately upon startup.

(d) Except as provided in par. (e), the owner or operator of each solvent cleaning machine subject to this chapter that commenced construction or reconstruction on or before November 29, 1993, shall achieve compliance with the provisions of this chapter, except for s. NR 469.085, no later than December 2, 1997.

(e) Each continuous web cleaning machine subject to this chapter shall be in compliance with the provisions of this chapter, except for s. NR 469.085, no later than December 2, 1999.

(f) If you are an owner or operator of an area source subject to this chapter, you are exempt from the obligation to obtain a permit under ch. NR 407, provided you are not required to obtain a permit under s. NR 407.01 (1) for a reason other than your status as an area source under this chapter. Notwithstanding the previous sentence, you shall continue to comply with the provisions of this chapter applicable to area sources.

(g) The compliance date for the requirements in s. NR 469.085 depends on the date that construction or reconstruction of the affected facility commences. For purposes of this paragraph, "affected facility" means all solvent cleaning machines, except solvent cleaning machines used in the manufacture and maintenance of aerospace products, solvent cleaning machines used in the manufacture of narrow tubing and continuous web cleaning

machines, located at a major source that are subject to the facility-wide limits in Table 8 of s. NR 469.085 (2) (b), and for area sources, "affected facility" means all solvent cleaning machines, except cold batch cleaning machines, located at an area source that are subject to the facility-wide limits in Table 8 of s. NR 469.085 (2) (b). The compliance dates for the requirements of s. NR 469.085 are as follows:

1. Each affected facility that was constructed or reconstructed on or before August 17, 2006, shall be in compliance with the provisions of this chapter no later than May 3, 2010.

2. Each affected facility that was constructed or reconstructed on or after August 17, 2006, shall be in compliance with the provisions of this chapter on May 3, 2007 or immediately upon startup, whichever is later.

(2) **PURPOSE.** This chapter is adopted under ss. 285.11, 285.13, 285.27 (2) and 285.65, Stats., to establish emission standards for halogenated HAP solvent cleaning operations in order to protect air quality.

**Note:** This chapter is based on the federal regulations contained in 40 CFR part 63 Subpart T, created December 2, 1994, as last revised on May 3, 2007.

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: am. (1) (a), (c) and (d), cr. (1) (e) to (g) Register December 2008 No. 636, eff. 1-1-09; **correction in (1) (b) made under s. 13.92 (4) (b) 7., Stats., Register February 2014 No. 698.**

**NR 469.02 Definitions.** For terms not defined in this section, the definitions contained in chs. NR 400 and 460 apply to the terms used in this chapter, with definitions in ch. NR 460 taking priority over definitions in ch. NR 400. In addition, the definitions in this section apply to the terms used in this chapter. If this section defines a term which is also defined in ch. NR 400 or 460, the definition in this section applies in this chapter rather than the definition in ch. NR 400 or 460.

(1) "Air blanket" means the layer of air inside the solvent cleaning machine freeboard located above the solvent/air interface. The centerline of the air blanket is equidistant between the sides of the machine.

(1m) "Air knife system" means a device that directs forced air at high pressure, high volume or a combination of high pressure and high volume through a small opening directly at the surface of a continuous web part. The purpose of this system is to remove the solvent film from the surfaces of the continuous web part.

(2) "Automated parts handling system" means a mechanical device that carries all parts and parts baskets at a controlled speed from the initial loading of soiled or wet parts through the removal of the cleaned or dried parts. Automated parts handling systems include, but are not limited to, hoists and conveyors.

(3) "Batch cleaning machine" means a solvent cleaning machine in which individual parts or a set of parts move through the entire cleaning cycle before new parts are introduced into the solvent cleaning machine. An open-top vapor cleaning machine is a type of batch cleaning machine. Solvent cleaning machines,

such as ferris wheel cleaners or cross-rod degreasers, that clean multiple batch loads simultaneously and are manually loaded are batch cleaning machines.

(4) "Carbon adsorber" means a bed of activated carbon into which an air-solvent gas-vapor stream is routed and which adsorbs the solvent on the carbon.

(5) "Clean liquid solvent" means fresh unused solvent, recycled solvent or used solvent that has been skimmed of oils or sludge and strained of metal chips or otherwise cleaned of soils.

(6) "Cleaning capacity" means, for a cleaning machine without a solvent/air interface, the maximum volume of parts that may be cleaned at one time. In most cases, the cleaning capacity is equal to the volume (length times width times height) of the cleaning chamber.

(7) "Cold cleaning machine" means any device or piece of equipment that contains or uses liquid solvent, into which parts are placed to remove soils from the surfaces of the parts or to dry the parts. Cleaning machines that contain and use heated, nonboiling solvent to clean the parts are classified as cold cleaning machines.

(8) "Colorimetric detector tube" means a glass tube, sealed prior to use, containing material impregnated with a chemical that is sensitive to one halogenated HAP compound and is designed to measure the concentration of that halogenated HAP compound in air.

(8m) "Combined squeegee and air-knife system" means a system consisting of a combination of a squeegee system and an air-knife system within a single enclosure.

(9) "Consumption" means the amount of halogenated HAP solvent added to the solvent cleaning machine.

(9m) "Continuous web cleaning machine" means a solvent cleaning machine in which parts such as film, coils, wire and metal strips are cleaned at speeds typically in excess of 11 feet per minute. Parts are generally uncoiled, cleaned such that the same part is simultaneously entering and exiting the solvent application area of the solvent cleaning machine and then recoiled or cut. For the purposes of this chapter, all continuous web cleaning machines are considered to be a subset of in-line solvent cleaning machines.

(10) "Cover" means a lid, top or portal cover that shields the solvent cleaning machine openings from air disturbances when in place and is designed to be easily opened and closed without disturbing the vapor zone. Air disturbances include, but are not limited to, lip exhausts, ventilation fans and general room drafts. Types of covers include, but are not limited to, sliding, biparting and rolltop covers.

(11) "Cross-rod solvent cleaning machine" means a batch solvent cleaning machine in which parts baskets are suspended from cross-rods as they are moved through the machine. In a cross-rod solvent cleaning machine, parts are loaded semi-continuously, and enter and exit the machine through a single portal.

(12) "Downtime mode" means the time period when a solvent cleaning machine is not cleaning parts and the sump heating coils, if present, are turned off.

(13) "Dwell" means, for a solvent cleaning machine equipped with a superheated vapor system, the technique of holding parts within the superheated vapor zone of the solvent cleaning machine. For a solvent cleaning machine not equipped with a superheated vapor system, it means the technique of holding parts within the freeboard area but above the vapor zone of the solvent cleaning machine. Dwell occurs after cleaning to allow solvent to drain from the parts or parts baskets back into the solvent cleaning machine.

(14) "Dwell time" means the required minimum length of time that a part must dwell, as determined by s. NR 469.09 (4) or, for a solvent cleaning machine equipped with a superheated vapor system, by the manufacturer's specifications as required by s. NR 469.06 (2) (f) 2.

(15) "Emissions" means the amount of halogenated HAP solvent added to the machine, minus the amount of liquid halogenated HAP solvent removed from the machine and the amount of halogenated HAP solvent removed from the machine in the solid waste.

(16) "Equivalent control method" means an equivalent emission control technique or procedure as determined by the administrator.

(17) "Existing" means any solvent cleaning machine the construction or reconstruction of which was commenced on or before November 29, 1993. A machine, the construction or reconstruction of which was commenced on or before November 29, 1993, but did not meet the definition of a solvent cleaning machine on December 2, 1994 because it did not use halogenated HAP solvent liquid or vapor covered under this chapter to remove soils, becomes an existing source when it commences to use those liquid or vapor solvents. A solvent cleaning machine moved within a contiguous facility or to another facility under the same ownership, constitutes an existing machine.

(18) "Freeboard area" means, for a batch cleaning machine, the area within the solvent cleaning machine that extends from the solvent/air interface to the top of the solvent cleaning machine. For an in-line cleaning machine, it is the area within the solvent cleaning machine that extends from the solvent/air interface to the bottom of the entrance or exit opening, whichever is lower.

(19) "Freeboard height" means, for a batch cleaning machine, the distance from the solvent/air interface, as measured during the idling mode, to the top of the cleaning machine. For an in-line cleaning machine, it is the distance from the solvent/air interface to the bottom of the entrance or exit opening, whichever is lower, as measured during the idling mode.

(20) "Freeboard ratio" means the ratio of the solvent cleaning machine freeboard height to the smaller interior dimension (length, width or diameter) of the solvent cleaning machine.

(21) "Freeboard refrigeration device", also called a chiller, means a set of secondary coils mounted in the freeboard area that carries a refrigerant or other chilled substance to provide a chilled air blanket above the solvent vapor. A primary condenser capable of meeting the requirements of s. NR 469.06 (2) (a) is defined as both a freeboard refrigeration device and a primary condenser for the purposes of this chapter.

(22) "Hoist" means a mechanical device that carries the parts basket and the parts to be cleaned from the loading area into the solvent cleaning machine and to the unloading area at a controlled speed. A hoist may be operated by controls or may be programmed to cycle parts through the cleaning cycle automatically.

(23) "Idling mode" means the time period when a solvent cleaning machine is not actively cleaning parts and the sump heating coils, if present, are turned on.

(24) "Idling-mode cover" means any cover or solvent cleaning machine design that allows the cover to shield the cleaning machine openings during the idling mode. A cover that meets this definition may also be used as a working-mode cover if that definition is also met.

(25) "Immersion cold cleaning machine" means a cold cleaning machine in which the parts are immersed in the solvent when being cleaned. A remote reservoir cold cleaning machine that is also an immersion cold cleaning machine is considered an immersion cold cleaning machine for purposes of this chapter.

(26) "In-line cleaning machine" or "continuous cleaning machine" means a solvent cleaning machine that uses an automated parts handling system, typically a conveyor, to automatically provide a continuous supply of parts to be cleaned. These units are fully enclosed except for the conveyor inlet and exit portals. In-line cleaning machines may be either cold or vapor cleaning machines.

(27) “Leak-proof coupling” means a threaded or other type of coupling that prevents solvents from leaking during the filling or draining of solvent to and from the solvent cleaning machine.

(28) “Lip exhaust” means a device installed at the top of the opening of a solvent cleaning machine that draws in air and solvent vapor from the freeboard area and ducts the air and vapor away from the solvent cleaning area.

(29) “Monthly reporting period” means any calendar month in which the owner or operator of a solvent cleaning machine is required to calculate and report the solvent emissions from each solvent cleaning machine.

(30) “New” means any solvent cleaning machine the construction or reconstruction of which is commenced after November 29, 1993.

(31) “Open-top vapor cleaning machine” means a batch solvent cleaning machine that has its upper surface open to the air and boils solvent to create solvent vapor used to clean or dry parts.

(32) “Part” means any object that is cleaned in a solvent cleaning machine. Parts include discrete parts, assemblies, sets of parts and parts cleaned in a continuous web cleaning machine, including continuous sheets of metal or film.

(33) “Primary condenser” means a series of circumferential cooling coils on a vapor cleaning machine through which a chilled substance is circulated or recirculated to provide continuous condensation of rising solvent vapors and, thereby, create a concentrated solvent vapor zone.

(34) “Reduced room draft” means decreasing the flow or movement of air across the top of the freeboard area of the solvent cleaning machine to meet the specifications of s. NR 469.06 (2) (b). Methods of achieving a reduced room draft include, but are not limited to, redirecting fans or air vents to not blow across the cleaning machine, moving the cleaning machine to a corner where there is less room draft, and constructing a partial or complete enclosure around the cleaning machine.

(35) “Remote reservoir cold cleaning machine” means any device in which liquid solvent is pumped to a sink-like work area that drains solvent back into an enclosed container while parts are being cleaned, allowing no solvent to pool in the work area.

(35m) “Remote reservoir continuous web cleaning machine” means a continuous web cleaning machine in which there is no exposed solvent sump. In these units, the solvent is pumped from an enclosed chamber and is typically applied to the continuous web part through a nozzle or series of nozzles. The solvent then drains from the part and is collected and recycled through the machine, allowing no solvent to pool in the work or cleaning area.

(36) “Soils” means contaminants that are removed from the parts being cleaned. Soils include, but are not limited to, grease, oils, waxes, metal chips, carbon deposits, fluxes and tars.

(37) “Solvent/air interface” means, for a vapor cleaning machine, the location of contact between the concentrated solvent vapor layer and the air. This location of contact is defined as the mid-line height of the primary condenser coils. For a cold cleaning machine, it is the location of contact between the liquid solvent and the air.

(38) “Solvent/air interface area” means, for a vapor cleaning machine, the surface area of the solvent vapor zone that is exposed to the air. For an in-line cleaning machine, it is the total surface area of all the sumps. For a cold cleaning machine, it is the surface area of the liquid solvent that is exposed to the air.

(39) “Solvent cleaning machine” means any device or piece of equipment that uses any halogenated HAP solvent liquid or vapor to remove soils from the surfaces of materials. Types of solvent cleaning machines include, but are not limited to, batch vapor, in-line vapor, in-line cold and batch cold solvent cleaning machines. Buckets, pails and beakers with capacities of 7.6 liters (2 gallons) or less are not considered solvent cleaning machines.

(40) “Solvent vapor zone” means, for a vapor cleaning machine, the area that extends from the liquid solvent surface to the level at which solvent vapor is condensed. This condensation level is defined as the midline height of the primary condenser coils.

(40m) “Squeegee system” means a system that uses a series of pliable surfaces to remove the solvent film from the surfaces of the continuous web part. These pliable surfaces, called squeegees, are typically made of rubber or plastic media, and need to be periodically replaced to ensure continued proper function.

(41) “Sump” means the part of a solvent cleaning machine where the liquid solvent is located.

(42) “Sump heater coils” means the heating system on a cleaning machine that uses steam, electricity or hot water to heat or boil the liquid solvent.

(42m) “Superheated part technology” means a system that is part of the continuous web process that heats the continuous web part either directly or indirectly to a temperature above the boiling point of the cleaning solvent. This could include a process step, such as a tooling die that heats the part as it is processed, as long as the part remains superheated through the cleaning machine.

(43) “Superheated vapor system” means a system that heats the solvent vapor, either passively or actively, to a temperature above the solvent’s boiling point. Parts are held in the superheated vapor before exiting the machine to evaporate the liquid solvent on them. Hot vapor recycle is an example of a superheated vapor system.

(44) “Vapor cleaning machine” means a batch or in-line solvent cleaning machine that boils liquid solvent generating solvent vapor that is used as a part of the cleaning or drying cycle.

(45) “Water layer” means a layer of water that floats above the denser solvent and provides control of solvent emissions.

**Note:** In many cases, the solvent used in batch cold cleaning machines is sold containing the appropriate amount of water to create a water cover.

(46) “Working mode” means the time period when the solvent cleaning machine is actively cleaning parts.

(47) “Working-mode cover” means any cover or solvent cleaning machine design that allows the cover to shield the cleaning machine openings from outside air disturbances while parts are being cleaned in the cleaning machine. A cover that is used during the working mode is opened only during parts entry and removal. A cover that meets this definition may also be used as an idling-mode cover if that definition is also met.

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: cr. (1m), (8m), (9m), (35m), (40m) and (42m), am. (32) Register December 2008 No. 636, eff. 1-1-09.

#### **NR 469.03 Batch cold cleaning machine standards.**

(1) Except as provided in sub. (4), each owner or operator of an immersion batch cold solvent cleaning machine shall comply with one of the following requirements:

(a) Employ a tightly fitting cover on the machine that shall be closed at all times except during parts entry and removal, and a water layer that has a minimum thickness of 2.5 centimeters (1.0 inch) on the surface of the solvent within the cleaning machine.

(b) Employ a tightly fitting cover on the machine that shall be closed at all times except during parts entry and removal, and a freeboard ratio of 0.75 or greater; and comply with the work and operational practices specified in sub. (3).

(2) Each owner or operator of a remote-reservoir batch cold solvent cleaning machine shall employ a tightly fitting cover over the solvent sump that shall be closed at all times except during the cleaning of parts and comply with the work and operational practices specified in sub. (3).

(3) Each owner or operator of a batch cold solvent cleaning machine complying with sub. (1) (b) or (2) shall comply with the work and operational practice requirements specified in pars. (a) to (i), as applicable.



(a) All waste solvent shall be collected and stored in closed containers. Each closed container may contain a device that allows pressure relief, but that device may not allow liquid solvent to drain from the container.

(b) If a flexible hose or flushing device is used, flushing shall be performed only within the freeboard area of the solvent cleaning machine.

(c) The owner or operator shall drain solvent cleaned parts for 15 seconds or until dripping has stopped, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while draining.

(d) The owner or operator shall ensure that the solvent level does not exceed the fill line.

(e) Spills during solvent transfer shall be wiped up immediately. The wipe rags shall be stored in covered containers meeting the requirements of par. (a).

(f) When an air- or pump-agitated solvent bath is used, the owner or operator shall ensure that the agitator is operated to produce a rolling motion of the solvent but not observable splashing against tank walls or parts being cleaned.

(g) The owner or operator shall ensure that, when the cover is open, the cold cleaning machine is not exposed to drafts greater than 40 meters per minute (132 feet per minute), as measured between one and 2 meters (3.3 and 6.6 feet) upwind and at the same elevation as the tank lip.

(h) Except as provided in par. (i), sponges, fabric, wood and paper products may not be cleaned.

(i) The prohibition in par. (h) does not apply to the cleaning of porous materials that are part of polychlorinated biphenyl (PCB) laden transformers if those transformers are handled throughout the cleaning process and disposed of in compliance with an approved PCB disposal permit issued in accordance with the Toxic Substances Control Act (15 USC 2605).

**(3m)** Each owner or operator subject to the requirements of sub. (3) (a) to (h) may request to use measures other than those described in sub. (3) (a) to (h). The owner or operator shall demonstrate to the department that the alternative measures will result in equivalent or better emissions control compared to the measures described in sub. (3) (a) to (h).

**Note:** For example, storing solvent and solvent-laden materials in an enclosed area that is ventilated to a solvent recovery or destruction device may be considered an acceptable alternative.

**(4)** Each owner or operator of an immersion batch cold cleaning machine that is not exempt under s. NR 423.03 (2) (a), (b), (c) or (h), but is exempt under s. NR 423.03 (2) (i), shall comply with one of the following requirements:

(a) Employ a tightly fitting cover on the machine that shall be closed at all times except during parts entry and removal, and a water layer that has a minimum thickness of 2.5 centimeters (1.0 inch) on the surface of the solvent within the cleaning machine; and comply with the work and operational practices specified in sub. (5).

(b) Employ a tightly fitting cover on the machine that shall be closed at all times except during parts entry and removal, and a freeboard ratio of 1.0 or greater; and comply with the work and operational practices specified in sub. (3).

**(5)** Each owner or operator of a batch cold solvent cleaning machine complying with sub. (4) (a) shall comply with the work and operational practices specified in pars. (a) to (d).

(a) Equip the machine with a facility for draining cleaned parts, with the drainage facility constructed so that parts are enclosed under the cover while draining, except that the drainage facility may be external for applications where an internal type cannot fit into the cleaning system.

(b) If used, supply a solvent spray that is a solid fluid stream, not a fine, atomized or shower type spray, at a pressure that does not cause splashing.

(c) Provide a permanent, conspicuous label, summarizing the operating requirements.

(d) Provide supervision or instruction adequate to ensure the operation is conducted in accord with all of the following:

1. Close the cover whenever parts are not being handled in the cleaner.

2. Drain the cleaned parts for at least 15 seconds or until dripping ceases.

3. Store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another person in such a way as to cause greater than 15% of the waste solvent, by weight, to evaporate into the ambient air during ozone season, s. NR 419.04 notwithstanding.

4. Repair solvent leaks immediately, or shut down the machine until the leaks are repaired.

**Note:** Subsections (4) and (5) contain pertinent language previously applicable under s. NR 423.03 (3) and now applicable under this chapter instead to owners and operators of immersion batch cleaning machines that use solvents that contain halogenated HAP compounds that are also VOCs.

**(6)** Each owner or operator of a new batch cold cleaning machine shall comply with the initial notification reporting requirements as described in s. NR 469.12 (1). Each owner or operator of a batch cold cleaning machine shall comply with the initial statement of compliance reporting requirements as described in s. NR 469.12 (2). No further reporting or recordkeeping is required.

**(7)** Each owner or operator of a batch cold cleaning machine shall submit an initial notification report as described in s. NR 469.12 (1) and an initial statement of compliance as described in s. NR 469.12 (2).

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: r. (1) (c), (2) (b) and (4) (c), am. (3) (intro.) and (h), cr. (3) (i), (3m) and (7) Register December 2008 No. 636, eff. 1-1-09; corrections in (2) and (3) (intro.) made under 13.92 (4) (b) 1. and 7., Stats., Register December 2008 No. 636.

#### **NR 469.04 Batch vapor and in-line cleaning machine standards.**

**(1)** Except as provided in s. NR 469.08 for all cleaning machines, each owner or operator of a solvent cleaning machine subject to the provisions of this chapter shall ensure that each existing or new batch vapor or in-line solvent cleaning machine subject to the provisions of this chapter conforms to the design requirements specified in pars. (a) to (g). The owner or operator of a continuous web cleaning machine shall comply with the requirements of s. NR 469.073 or 469.077, as appropriate, in lieu of complying with this paragraph.

**Note:** Owners and operators of batch vapor and in-line cleaning machines should also refer to ss. NR 469.05 and 469.06.

(a) Each cleaning machine shall be designed or operated to meet one of the following requirements:

1. Equip the cleaning machine with an idling and downtime mode cover, as described in s. NR 469.05 (1) (a), that may be readily opened or closed, that completely covers the cleaning machine openings when in place, and is free of cracks, holes and other defects.

2. Use reduced room draft as described in s. NR 469.06 (2) (b).

(b) Each cleaning machine shall have a freeboard ratio of 0.75 or greater.

(c) Each cleaning machine shall have an automated parts handling system capable of moving parts or parts baskets at a speed of 3.4 meters per minute (11 feet per minute) or less from the initial loading of parts through removal of cleaned parts.

(d) Each vapor cleaning machine shall be equipped with a device that shuts off the sump heat if the sump liquid solvent level drops to the sump heater coils. This requirement does not apply to a vapor cleaning machine that uses steam to heat the solvent.

(e) Each vapor cleaning machine shall be equipped with a vapor level control device that shuts off sump heat if the vapor

level in the vapor cleaning machine rises above the height of the primary condenser.

(f) Each vapor cleaning machine shall have a primary condenser.

(g) Each cleaning machine that uses a lip exhaust shall be designed and operated to route all collected solvent vapors through a properly operated and maintained carbon adsorber that meets the requirements of s. NR 469.06 (2) (g).

(2) Except as provided in s. NR 469.08, each owner or operator of an existing or new batch vapor cleaning machine shall comply with either par. (a) or (b).

(a) Each owner or operator of a batch vapor cleaning machine with a solvent/air interface area of 1.21 square meters (13 square feet) or less shall comply with the requirements specified in either subd. 1. or 2.

1. Employ one of the control combinations listed in Table 1 or other equivalent methods of control determined using the procedures in sub. (4).

**Table 1. Control Combinations for Batch Vapor Solvent Cleaning Machines With a Solvent/Air Interface Area of 1.21 Square Meters (13 Square Feet) or Less**

Option	Control Combinations
1	Working-mode cover, freeboard ratio of 1.0, superheated vapor.
2	Freeboard refrigeration device, superheated vapor.
3	Working-mode cover, freeboard refrigeration device.
4	Reduced room draft, freeboard ratio of 1.0, superheated vapor.
5	Freeboard refrigeration device, reduced room draft.
6	Freeboard refrigeration device, freeboard ratio of 1.0.
7	Freeboard refrigeration device, dwell.
8	Reduced room draft, dwell, freeboard ratio of 1.0.
9	Freeboard refrigeration device, carbon adsorber.
10	Freeboard ratio of 1.0, superheated vapor, carbon adsorber.

**Note:** Unlike most of the control techniques available for complying with this rule, carbon adsorbers are not considered to be a pollution prevention measure. Use of such units may impose additional cost and burden for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds have to be disposed of as hazardous waste. When making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

2. Demonstrate that the solvent cleaning machine can achieve and maintain an idling emission limit of 0.22 kilograms per hour per square meter (0.045 pounds per hour per square foot) of solvent/air interface area as determined using the procedures in s. NR 469.09 (1).

**Note:** Owners and operators who choose to comply with an idling emission limit should also refer to s. NR 469.07.

(b) Each owner or operator of a batch vapor cleaning machine with a solvent/air interface area greater than 1.21 square meters (13 square feet) shall comply with the requirements specified in either subd. 1. or 2.

1. Employ one of the control combinations listed in Table 2 or other equivalent methods of control determined using the procedures in sub. (4).

**Table 2. Control Combinations for Batch Vapor Solvent Cleaning Machines With a Solvent/Air Interface Area Greater Than 1.21 Square Meters (13 Square Feet)**

Option	Control Combinations
1	Freeboard refrigeration device, freeboard ratio of 1.0, superheated vapor.
2	Dwell, freeboard refrigeration device, reduced room draft.
3	Working-mode cover, freeboard refrigeration device, superheated vapor.
4	Freeboard ratio of 1.0, reduced room draft, superheated vapor.
5	Freeboard refrigeration device, reduced room draft, superheated vapor.
6	Freeboard refrigeration device, reduced room draft, freeboard ratio of 1.0.
7	Freeboard refrigeration device, superheated vapor, carbon adsorber.

**Note:** Unlike most of the control techniques available for complying with this rule, carbon adsorbers are not considered to be a pollution prevention measure. Use of such units may impose additional cost and burden for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds have to be disposed of as hazardous waste. When making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

2. Demonstrate that the solvent cleaning machine can achieve and maintain an idling emission limit of 0.22 kilograms per hour per square meter (0.045 pounds per hour per square foot) of solvent/air interface area as determined using the procedures in s. NR 469.09 (1).

**Note:** Owners and operators who choose to comply with an idling emission limit should also refer to s. NR 469.07.

(3) Except as provided in s. NR 469.08 for all cleaning machines, each owner or operator of an in-line cleaning machine shall comply with par. (a) or (b), as appropriate. The owner or operator of a continuous web cleaning machine shall comply with the requirements of s. NR 469.073 or 469.077, as appropriate, in lieu of complying with this section.

(a) Each owner or operator of an existing in-line cleaning machine shall comply with the requirements specified in either subd. 1. or 2.

1. Employ one of the control combinations listed in Table 3 or other equivalent methods of control determined using the procedures in sub. (4).

**Table 3. Control Combinations for Existing In-line Solvent Cleaning Machines**

Option	Control Combinations
1	Superheated vapor, freeboard ratio of 1.0.
2	Freeboard refrigeration device, freeboard ratio of 1.0.
3	Dwell, freeboard refrigeration device.
4	Dwell, carbon adsorber.

**Note:** Unlike most of the control techniques available for complying with this rule, carbon adsorbers are not considered to be a pollution prevention measure. Use of such units may impose additional cost and burden for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds have to be disposed of as hazardous waste. When making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

2. Demonstrate that the solvent cleaning machine can achieve and maintain an idling emission limit of 0.10 kilograms per hour per square meter (0.021 pounds per hour per square foot) of solvent/air interface area as determined using the procedures in s. NR 469.09 (1).

**Note:** Owners and operators who choose to comply with an idling emission limit should also refer to s. NR 469.07.

(b) Each owner or operator of a new in-line cleaning machine shall comply with the requirements specified in either subd. 1. or 2.

1. Employ one of the control combinations listed in Table 4 or other equivalent methods of control determined using the procedures in sub. (4).

**Table 4. Control Combinations for New In-line Solvent Cleaning Machines**

Option	Control Combinations
1	Superheated vapor, freeboard refrigeration device.
2	Freeboard refrigeration device, carbon adsorber.
3	Superheated vapor, carbon adsorber.

**Note:** Unlike most of the control techniques available for complying with this rule, carbon adsorbers are not considered to be a pollution prevention measure. Use of such units may impose additional cost and burden for a number of reasons. First, carbon adsorption units are generally more expensive than other controls listed in the options. Second, these units may present cross-media impacts such as effluent discharges if not properly operated and maintained, and spent carbon beds have to be disposed of as hazardous waste. When making decisions about what controls to install on halogenated solvent cleaning machines to meet the requirements of this rule, all of these factors should be weighed and pollution prevention measures are encouraged wherever possible.

2. Demonstrate that the solvent cleaning machine can achieve and maintain an idling emission limit of 0.10 kilograms per hour per square meter (0.021 pounds per hour per square foot) of solvent/air interface area as determined using the procedures in s. NR 469.09 (1).

**Note:** Owners and operators who choose to comply with an idling emission limit should also refer to s. NR 469.07.

(4) Upon written application, the administrator may approve the use of equipment or procedures after they have been satisfactorily demonstrated to be equivalent, in terms of reducing emissions of methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride or chloroform to the atmosphere, to those prescribed for compliance within a specified paragraph of this chapter. The application shall contain a complete description of the equipment or procedure and the pro-

posed equivalency testing procedure and the date, time and location scheduled for the equivalency demonstration.

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: am. (1) (intro.), (d), (2) (a) 1., (b) 1., (3) (intro.), (a) 1. and (b) 1., cr. (4) Register December 2008 No. 636, eff. 1-1-09.

**NR 469.05 Work and operational practice standards for batch vapor and in-line cleaning machines.** Except as provided in s. NR 469.08 for all cleaning machines, each owner or operator of an existing or new batch vapor or in-line solvent cleaning machine shall meet all of the following required work and operational practices, as applicable. The owner or operator of a continuous web cleaning machine shall comply with the requirements of s. NR 469.073 or 469.077, as appropriate, in lieu of complying with this section.

(1) Control air disturbances across the cleaning machine openings by incorporating the control equipment or techniques in par. (a) or (b).

(a) Covers to each solvent cleaning machine shall be in place during the idling mode, and during the downtime mode unless either the solvent has been removed from the machine or maintenance or monitoring is being performed that requires the covers to not be in place.

(b) A reduced room draft as described in s. NR 469.06 (2) (b) shall be used.

(2) The parts baskets or the parts being cleaned in an open-top batch vapor cleaning machine may not occupy more than 50% of the solvent/air interface area unless the parts baskets or parts are introduced at a speed of 0.9 meters per minute (3 feet per minute) or less.

(3) Any spraying operations shall be done within the vapor zone or within a section of the solvent cleaning machine that is not directly exposed to the ambient air, such as a baffled or enclosed area.

(4) Parts shall be oriented so that the solvent drains from them freely. Parts having cavities or blind holes shall be tipped or rotated before being removed from any solvent cleaning machine unless an equally effective approach has been approved by the department.

(5) Parts baskets or parts may not be removed from any solvent cleaning machine until dripping has stopped.

(6) During startup of each vapor cleaning machine, the primary condenser shall be turned on before the sump heater.

(7) During shutdown of each vapor cleaning machine, the sump heater shall be turned off and the solvent vapor layer allowed to collapse before the primary condenser is turned off.

(8) When solvent is added or drained from any solvent cleaning machine, the solvent shall be transferred using threaded or other leakproof couplings and the end of the pipe in the solvent sump shall be located beneath the liquid solvent surface.

(9) Each solvent cleaning machine and associated controls shall be maintained as recommended by the manufacturers of the equipment or using alternative maintenance practices that have been demonstrated to the department's satisfaction to achieve the same or better results as those recommended by the manufacturer.

(10) Each operator of a solvent cleaning machine shall complete and pass the applicable sections of the test of solvent cleaning procedures in Table 5 if requested during an inspection by the department.

(11) Waste solvent, still bottoms and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but that device may not allow liquid solvent to drain from the container.

(12) Sponges, fabric, wood and paper products may not be cleaned.

(13) If the solvent cleaning machine is not exempt under s. NR 423.03 (2) (a), (b), (d), (e) or (h), but is exempt under s. NR 423.03 (2) (i), it may not be operated so as to allow water to be visually detectable in solvent exiting the water separator.

(14) If the solvent cleaning machine is not exempt under s. NR 423.03 (2) (a), (b), (d), (e), (f) or (h), but is exempt under s. NR 423.03 (2) (i), a permanent conspicuous label, summarizing the work and operational practices specified in subs. (1) to (9) and (11) to (13), shall be provided.

**Table 5. Test of Solvent Cleaning Procedures**

<i>General Questions</i>	
_____	1. What is the maximum allowable speed for parts entry and removal? A. 8.5 meters per minute (28 feet per minute). B. 3.4 meters per minute (11 feet per minute). C. 11 meters per minute (36 feet per minute). D. No limit.
_____	2. How do you ensure that parts enter and exit the solvent cleaning machine at the speed required in the regulation? A. Program on computerized hoist monitors speed. B. Can judge the speed by looking at it. C. Measure the time it takes the parts to travel a measured distance.
_____	3. Identify the sources of air disturbances. A. Fans. B. Open doors. C. Open windows. D. Ventilation vents. E. All of the above.
_____	4. What are the three operating modes? A. Idling, working and downtime. B. Precleaning, cleaning and drying. C. Startup, shutdown, off. D. None of the above.
_____	5. When may parts or parts baskets be removed from the solvent cleaning machine? A. When they are clean. B. At any time. C. When dripping stops. D. Either A or C is correct.
_____	6. How must parts be oriented during cleaning? A. It does not matter as long as they fit in the parts basket. B. So that the solvent pools in the cavities where the dirt is concentrated. C. So that solvent drains from them freely.

_____	7. During startup, what must be turned on first, the primary condenser or the sump heater? A. Primary condenser. B. Sump heater. C. Turn both on at same time. D. Either A or B is correct.
_____	8. During shutdown, what must be turned off first, the primary condenser or the sump heater? A. Primary condenser. B. Sump heater. C. Turn both off at same time. D. Either A or B is correct.
_____	9. In what manner must solvent be added to and removed from the solvent cleaning machine? A. With leak proof couplings. B. With the end of the pipe in the solvent sump below the liquid solvent surface. C. So long as the solvent does not spill, the method does not matter. D. A and B.
_____	10. What must be done with waste solvent and still and sump bottoms? A. Pour down the drain. B. Store in closed container. C. Store in a bucket. D. A or B.
_____	11. What types of materials are prohibited from being cleaned in solvent cleaning machines using halogenated HAP solvents? A. Sponges. B. Fabrics. C. Paper. D. All of the above.

*Control Device Specific Questions*

[ ] *Freeboard Refrigeration Device*

_____	1. What chilled air blanket temperature must the freeboard refrigeration device achieve? A. Below room temperature. B. 10°C (50°F). C. Below the solvent boiling point. D. No greater than 30% of the solvent's boiling point, in °F.
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[ ] *Working-Mode Cover*

_____	2. When may a cover be open? A. While parts are in the cleaning machine. B. During parts entry and removal. C. During maintenance. D. During measurements for compliance purposes. E. A and C.
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- F. B, C, and D.
- \_\_\_\_\_ 3. Covers must be maintained in what condition?
  - A. Free of holes.
  - B. Free of cracks.
  - C. So that they completely seal cleaner opening.
  - D. All of the above.
- [ ] *Dwell*
- \_\_\_\_\_ 4. When no superheated vapor is used, where must the parts be held for the appropriate dwell time?
  - A. In the vapor zone.
  - B. In the freeboard area above the vapor zone.
  - C. Above the cleaning machine.
  - D. In the immersion sump.

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: am. (intro.) and (10) Register December 2008 No. 636, eff. 1-1-09.

**NR 469.06 Operational requirements associated with control devices for batch vapor and in-line cleaning machines.** Each owner or operator of a solvent cleaning machine complying with s. NR 469.04 (2) or (3) or s. NR 469.073 or 469.077 shall comply with the requirements specified in this section.

(1) Conduct monitoring of each control device used to comply with s. NR 469.04 as provided in s. NR 469.10.

(2) Determine during each monitoring period whether each control device used to comply with these standards meets the requirements specified in pars. (a) to (k).

(a) If a freeboard refrigeration device is used to comply with these standards, the owner or operator shall ensure that the chilled air blanket temperature, in °F, measured at the center of the air blanket, is no greater than 30% of the solvent's boiling point.

(b) If a reduced room draft is used to comply with these standards, the owner or operator shall comply with the following requirements:

1. Ensure that the flow or movement of air across the top of the freeboard area of the solvent cleaning machine or within the solvent cleaning machine enclosure does not exceed 15.2 meters per minute (50 feet per minute) at any time as measured using the procedures in s. NR 469.10 (4).
2. Establish and maintain the operating conditions under which the wind speed was demonstrated to be 15.2 meters per minute (50 feet per minute) or less as described in s. NR 469.10 (4).

(c) If a working-mode cover is used to comply with these standards, the owner or operator shall comply with the following requirements:

1. Ensure that the cover opens only for part entrance and removal and completely covers the cleaning machine openings when closed.
2. Ensure that the working-mode cover is maintained free of cracks, holes and other defects.

(d) If an idling-mode cover is used to comply with these standards, the owner or operator shall comply with the following requirements:

1. Ensure that the cover is in place whenever parts are not in the solvent cleaning machine and completely covers the cleaning machine openings when in place.
2. Ensure that the idling-mode cover is maintained free of cracks, holes and other defects.

(e) If dwell is used to comply with these standards, the owner or operator shall comply with the following requirements:

1. Determine the appropriate dwell time for each type of part or parts basket, or determine the maximum dwell time using the most complex part type or parts basket, as described in s. NR 469.09 (4).
2. Ensure that, after cleaning, each part is held in the solvent cleaning machine freeboard area above the vapor zone for the dwell time determined for that particular part or parts basket, or for the maximum dwell time determined using the most complex part type or parts basket.

(f) If a superheated vapor system is used to comply with these standards, the owner or operator shall comply with the following requirements:

1. Ensure that the temperature of the solvent vapor at the center of the superheated vapor zone is at least 5.6°C (10°F) above the solvent's boiling point.
2. Ensure that the manufacturer's specifications for determining the minimum proper dwell time within the superheated vapor system is followed.
3. Ensure that parts remain within the superheated vapor for at least the minimum proper dwell time.

(g) If a carbon adsorber in conjunction with a lip exhaust or other exhaust internal to the cleaning machine is used to comply with these standards, the owner or operator shall comply with the following requirements:

1. Except as provided in subd. 4., ensure that the concentration of organic solvent in the exhaust from the carbon adsorber does not exceed 100 parts per million of any halogenated HAP compound as measured using the procedure in s. NR 469.10 (5). If the halogenated HAP solvent concentration in the carbon adsorber exhaust exceeds 100 parts per million, the owner or operator shall adjust the desorption schedule or replace the disposable canister, if not a regenerative system, so that the exhaust concentration of halogenated HAP solvent is brought below 100 parts per million.
2. Ensure that the carbon adsorber bed is not bypassed during desorption.
3. Ensure that the lip exhaust is located above the solvent cleaning machine cover so that the cover closes below the lip exhaust level.
4. For each batch vapor or in-line vapor cleaning machine that is not exempt under s. NR 423.03 (2) (a), (b), (d), (e) or (h), but is exempt under s. NR 423.03 (2) (i), ensure that the concentration of organic solvent in the exhaust from the carbon adsorber does not exceed 25 parts per million of solvent as measured using the procedure in s. NR 469.10 (5). If the solvent concentration in the carbon adsorber exhaust exceeds 25 parts per million, the owner or operator shall adjust the desorption schedule or replace the disposable canister, if not a regenerative system, so that the exhaust concentration of solvent is brought below 25 parts per million.

**Note:** Subdivision 4. contains pertinent language previously applicable under s. NR 423.03 (4) (c) 4. and (5) (c) 2., and now applicable under this chapter instead, to owners and operators of batch vapor cleaning machines and in-line vapor cleaning machines that use solvents that contain halogenated HAP compounds that are also VOCs.

(h) If a superheated part system is used to comply with the standards for continuous web cleaning machines in s. NR 469.073, the owner or operator shall ensure that the temperature of the continuous web part is at least 10 degrees Fahrenheit above the solvent boiling point while the part is traveling through the cleaning machine.

(i) If a squeegee system is used to comply with the continuous web cleaning requirements of s. NR 469.073 (3) (c) or 469.077 (2) (a), the owner or operator shall comply with the following requirements:

1. Determine the appropriate maximum product throughput for the squeegees used in the squeegee system, as described in s. NR 469.09 (6).



2. Conduct the weekly monitoring required by s. NR 469.10 (1) (c). Record the results required by s. NR 469.11 (1) (f).

3. Calculate the total amount of continuous web product processed since the squeegees were replaced and compare to the maximum product throughput for the squeegees.

4. Ensure squeegees are replaced at or before the maximum product throughput is attained.

5. Redetermine the maximum product throughput for the squeegees if any solvent film is visible on the continuous web part immediately after it exits the cleaning machine.

(j) If an air knife system is used to comply with the continuous web cleaning requirements of s. NR 469.073 (3) (c) or 469.077 (2) (a), the owner or operator shall comply with the following requirements:

1. Determine the air knife parameter and parameter value that demonstrate to the department's satisfaction that the air knife is properly operating. An air knife is properly operating if no visible solvent film remains on the continuous web part after it exits the cleaning machine.

2. Maintain the selected air knife parameter value at the level determined in s. NR 469.04 (1).

3. Conduct the weekly monitoring required by s. NR 466.10 (1) (c).

4. Redetermine the proper air knife parameter value if any solvent film is visible on the continuous web part immediately after it exits the cleaning machine.

(k) If a combination squeegee and air knife system is used to comply with the continuous web cleaning requirements of s. NR 469.073 (3) (c) or 469.077 (2) (a), the owner or operator shall comply with the following requirements:

1. Determine the system parameter and value that demonstrate to the department's satisfaction that the system is properly operating.

2. Maintain the selected parameter value at the level determined in s. NR 469.04 (1).

3. Conduct the weekly monitoring required by s. NR 469.10 (1) (c).

4. Redetermine the proper parameter value if any solvent film is visible on the continuous web part immediately after it exits the cleaning machine.

(3) If any of the requirements of sub. (2) are not met, determine whether an exceedance has occurred using the criteria in pars. (a) and (b).

(a) An exceedance has occurred if the requirements of sub. (2) (b) 2., (c) 1., (d) 1., (e), (f) 2. or 3. or (g) 2. or 3. have not been met.

(b) An exceedance has occurred if the requirements of sub. (2) (a), (b) 1., (c) 2., (d) 2., (f) 1. or (g) 1. have not been met and the condition is not corrected within 15 days of detection. Adjustments or repairs shall be made to the solvent cleaning system or control device to reestablish required levels. The parameter shall be remeasured immediately upon adjustment or repair and demonstrated to be within required limits.

(4) The owner or operator shall report all exceedances and all corrections and adjustments made to avoid an exceedance as specified in s. NR 469.12 (7).

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: am. (intro.), (2) (intro.) and (g) (intro.), cr. (2) (h) to (k) Register December 2008 No. 636, eff. 1-1-09.

**NR 469.07 Idling emission limit standards for batch vapor and in-line cleaning machines.** Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the idling emission limit standards in s. NR 469.04 (2) (a) 2. or (b) 2. or (3) (a) 2. or (b) 2. shall comply with the requirements specified in this section.

(1) Conduct an initial performance test to comply with the following requirements:

(a) Demonstrate compliance with the applicable idling emission limit.

(b) Establish parameters that will be monitored to demonstrate compliance. If a control device is used that is listed in s. NR 469.06 (2), then the requirements for that control device as listed in s. NR 469.06 (2) shall be used unless the owner or operator can demonstrate to the department's satisfaction that an alternative strategy is equally effective.

(2) Conduct the periodic monitoring of the parameters used to demonstrate compliance as described in s. NR 469.10 (6).

(3) Operate the solvent cleaning machine within parameters identified in the initial performance test.

(4) If any of the requirements in subs. (1) to (3) are not met, determine whether an exceedance has occurred using the following criteria:

(a) If using a control device listed in s. NR 469.06 (2), the owner or operator shall comply with the appropriate parameter values in s. NR 469.06 (2) and the exceedance delineations in s. NR 469.06 (3) (a) and (b).

(b) If using a control device not listed in s. NR 469.06 (2), the owner or operator shall indicate whether the exceedance of the parameters that are monitored to determine the proper functioning of this control would be classified as an immediate exceedance or whether a 15 day repair period would be allowed. This information shall be submitted to the department for approval.

(5) The owner or operator shall report all exceedances and all corrections and adjustments made to avoid an exceedance as specified in s. NR 469.12 (7).

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97.

**NR 469.073 Control device and operational requirements for continuous web cleaning machines.** Except as provided in ss. NR 469.077 and 469.08 for remote reservoir continuous web cleaning machines, each owner or operator of a continuous web cleaning machine shall comply with subs. (1) to (4) for each continuous web cleaning machine.

(1) Except as provided in sub. (2), install, maintain and operate one of the following control combinations on each continuous web cleaning machine:

(a) For each existing continuous web cleaning machine, the following control combinations are allowed:

1. Superheated vapor or superheated part technology and a freeboard ratio of 1.0 or greater.

2. Freeboard refrigeration device and a freeboard ratio of 1.0 or greater.

3. Carbon adsorption system meeting the requirements of s. NR 469.06 (2) (g).

(b) For each new continuous web cleaning machine, the following control combinations are allowed:

1. Superheated vapor or superheated part technology and a freeboard refrigeration device.

2. A freeboard refrigeration device and a carbon adsorber meeting the requirements of s. NR 469.06 (2) (g).

3. Superheated vapor or superheated part technology and a carbon adsorber meeting the requirements of s. NR 469.06 (2) (g).

(2) If a carbon adsorber system can be demonstrated to the department's satisfaction to have an overall solvent control efficiency (capture efficiency and removal efficiency) of 70% or greater, this system is equivalent to the options in this section.

(3) In lieu of complying with the provisions of s. NR 469.04 (1), the owner or operator of a continuous web cleaning machine shall comply with the following provisions:

(a) Each cleaning machine shall meet one of the following control equipment or technique requirements:

1. An idling and downtime mode cover, as described in s. NR 469.05 (1) (a), that may be readily opened or closed; that com-

pletely covers the cleaning machine openings when in place and is free of cracks, holes and other defects. A continuous web part that completely occupies an entry or exit port when the machine is idle is considered to meet this requirement.

2. A reduced room draft as described in s. NR 469.06 (2) (b).

3. Gasketed or leakproof doors that separate both the continuous web part feed reel and take-up reel from the room atmosphere if the doors are checked according to the requirements of s. NR 469.06 (2) (c).

4. A cleaning machine that is demonstrated to the department's satisfaction to be under negative pressure during idling and downtime and is vented to a carbon adsorption system that meets the requirements of either s. NR 469.06 (2) (g) or sub. (2).

(b) Each continuous web cleaning machine shall have a free-board ratio of 0.75 or greater unless that cleaning machine is a remote reservoir continuous web cleaning machine.

(c) Each cleaning machine shall have an automated parts handling system capable of moving parts or parts baskets at a speed of 3.4 meters per minute or less from the initial loading of parts through removal of cleaned parts, unless the cleaning machine is a continuous web cleaning machine that has a squeegee system or air knife system installed, maintained and operated on the continuous web cleaning machine meeting the requirements of s. NR 469.06.

(d) Each vapor cleaning machine shall be equipped with a device that shuts off the sump heat if the sump liquid solvent level drops to the sump heater coils. This requirement does not apply to a vapor cleaning machine that uses steam to heat the solvent.

(e) Each vapor cleaning machine shall be equipped with a vapor level control device that shuts off sump heat if the vapor level in the vapor cleaning machine rises above the height of the primary condenser.

(f) Each vapor cleaning machine shall have a primary condenser.

(g) Each cleaning machine that uses a lip exhaust or any other exhaust within the solvent cleaning machine shall be designed and operated to route all collected solvent vapors through a properly operated and maintained carbon adsorber that meets the requirements of either s. NR 469.06 (2) (g) or sub. (2).

**(4)** In lieu of complying with the provisions of s. NR 469.05, the owner or operator of a continuous web cleaning machine shall comply with the following provisions:

(a) Control air disturbances across the cleaning machine openings by incorporating one of the following control equipment or techniques:

1. Covers to each solvent cleaning machine shall be in place during the idling mode and during the downtime mode unless either the solvent has been removed from the machine or maintenance or monitoring is being performed that requires the covers in place. A continuous web part that completely occupies an entry or exit port when the machine is idle is considered to meet this requirement.

2. A reduced room draft as described in s. NR 469.06 (2) (b).

3. Gasketed or leakproof doors or covers that separate both the continuous web part feed reel and take-up reel from the room atmosphere if the doors are checked according to the requirements of s. NR 469.06 (2) (c).

4. A cleaning machine that is demonstrated to the department's satisfaction to be under negative pressure during idling and downtime and is vented to a carbon adsorption system that meets either the requirements of s. NR 469.06 (2) (g) or sub. (2).

(b) Any spraying operations shall be conducted in a section of the solvent cleaning machine that is not directly exposed to the ambient air, such as a baffled or enclosed area of the solvent cleaning machine, or within a machine having a door or cover that meets the requirements of par. (a) 3.

(c) During startup of each vapor cleaning machine, the primary condenser shall be turned on before the sump heater.

(d) During shutdown of each vapor cleaning machine, the sump heater shall be turned off and the solvent vapor layer allowed to collapse before the primary condenser is turned off.

(e) When solvent is added to or drained from any solvent cleaning machine, the solvent shall be transferred using threaded or other leak proof couplings, and the end of the pipe in the solvent sump shall be located beneath the liquid solvent surface.

(f) Each solvent cleaning machine and associated controls shall be maintained as recommended by the manufacturers of the equipment or using alternative maintenance practices that have been demonstrated to the department's satisfaction to achieve the same or better results as those recommended by the manufacturer.

(g) Waste solvent, still bottoms, sump bottoms and waste absorbent materials used in the cleaning process for continuous web cleaning machines shall be collected and stored in waste containers. The closed containers may contain a device that would allow pressure relief, but would not allow liquid solvent to drain from the container.

(h) Except as provided in par. (i), sponges, fabric, wood, and paper products may not be cleaned.

(i) The prohibition in par. (h) does not apply to absorbent materials that are used as part of the cleaning process of continuous web cleaning machines, including rollers and roller covers.

**History:** CR 07-105: cr. Register December 2008 No. 636, eff. 1-1-09.

**NR 469.077 Control device and operational requirements for remote reservoir continuous web cleaning machines.** Except as provided in s. NR 469.08, each owner or operator of a remote reservoir continuous web cleaning machine shall comply with subs. (1) to (3).

**(1)** Except as provided in sub. (2), install, maintain and operate one of the following controls on each new remote reservoir continuous web cleaning machine.

(a) Superheated vapor or superheated part technology.

(b) A carbon adsorber meeting the requirements of s. NR 469.06 (2) (g).

(c) If a carbon adsorber system can be demonstrated to the department's satisfaction to have an overall solvent control efficiency (capture efficiency and removal efficiency) of 70% or greater, this system is equivalent to the options in pars. (a) and (b).

**(2)** In lieu of complying with the provisions of s. NR 469.04 (1), the owner or operator of a remote reservoir continuous web cleaning machine shall comply with the following provisions:

(a) Each cleaning machine shall have an automated parts handling system capable of moving parts or parts baskets at a speed of 3.4 meters per minute or less from the initial loading of parts through removal of cleaned parts, unless the cleaning machine is a continuous web cleaning machine that has a squeegee system or air knife system installed, maintained and operated on the continuous web cleaning machine meeting the requirements of s. NR 469.06.

(b) Each vapor cleaning machine shall be equipped with a device that shuts off the sump heat if the sump liquid solvent level drops to the sump heater coils.

(c) Each vapor cleaning machine shall be equipped with a vapor level control device that shuts off sump heat if the vapor level in the vapor cleaning machine rises above the height of the primary condenser.

(d) Each vapor cleaning machine shall have a primary condenser.

(e) Each cleaning machine that uses a lip exhaust or any other exhaust within the solvent cleaning machine shall be designed and operated to route all collected solvent vapors through a properly operated and maintained carbon adsorber that meets the requirements of either s. NR 469.06 (2) (g) or 469.073 (2).

(3) In lieu of complying with the provisions of s. NR 469.05, the owner or operator of a remote reservoir continuous web cleaning machine shall comply with the following provisions:

(a) Any spraying operations shall be conducted in a section of the solvent cleaning machine that is not directly exposed to the ambient air, such as a baffled or enclosed area of the solvent cleaning machine, or in a machine having a door or cover that meets the requirements of s. NR 469.073 (4) (a) 3.

(b) During startup of each vapor cleaning machine, the primary condenser shall be turned on before the sump heater.

(c) During shutdown of each vapor cleaning machine, the sump heater shall be turned off and the solvent vapor layer allowed to collapse before the primary condenser is turned off.

(d) When solvent is added to or drained from any solvent cleaning machine, the solvent shall be transferred using threaded or other leak proof couplings, and the end of the pipe in the solvent sump shall be located beneath the liquid solvent surface.

(e) Each solvent cleaning machine and associated controls shall be maintained as recommended by the manufacturers of the equipment or using alternative maintenance practices that have been demonstrated to the department's satisfaction to achieve the same or better results as those recommended by the manufacturer.

(f) Waste solvent, still bottoms, sump bottoms and waste absorbent materials used in the cleaning process for continuous web cleaning machines shall be collected and stored in waste containers. The closed containers may contain a device that would allow pressure relief, but would not allow liquid solvent to drain from the container.

(g) Except as provided in par. (h), sponges, fabric, wood and paper products may not be cleaned.

(h) The prohibition in par. (g) does not apply to absorbent materials that are used as part of the cleaning process of continuous web cleaning machines, including rollers and roller covers.

**History:** CR 07-105: cr. Register December 2008 No. 636, eff. 1-1-09; correction in (intro.) made under 13.92 (4) (b) 7., Stats., Register December 2008 No. 636.

**NR 469.08 Alternative standards. (1)** As an alternative to meeting the requirements in ss. NR 469.04 to 469.07, each owner or operator of a batch vapor or in-line solvent cleaning machine may elect to comply with the requirements of this section. An owner or operator of a solvent cleaning machine who elects to comply with this section shall comply with the requirements specified in par. (a) or (b).

(a) If the cleaning machine has a solvent/air interface, the owner or operator shall comply with both of the following requirements:

1. Maintain a log of solvent additions and deletions for each solvent cleaning machine.

2. Ensure that the emissions from each solvent cleaning machine are equal to or less than the applicable emission limit presented in Table 6 as determined using the procedures in s. NR 469.09 (2) and (3).

(b) If the cleaning machine is a batch vapor cleaning machine and does not have a solvent/air interface, the owner or operator shall comply with all of the following requirements:

1. Maintain a log of solvent additions and deletions for each solvent cleaning machine.

2. Ensure that the emissions from each solvent cleaning machine are equal to or less than the appropriate limits as described as follows:

a. For cleaning machines with a cleaning capacity, as reported in s. NR 469.12 (4) (c), that is less than or equal to 2.95 cubic meters (104 cubic feet), the emission limit shall be determined using either Table 7 or equation 1. If using Table 7, and the cleaning capacity of the cleaning machine falls between 2 cleaning capacity sizes, then the lower of the 2 emission limits applies.

b. For cleaning machines with a cleaning capacity, as reported in s. NR 469.12 (4) (c), that is greater than 2.95 cubic meters (104 cubic feet), the emission limit shall be determined using equation 1.

$$EL = 330 \times (\text{Vol})^{0.6} \quad (\text{Equation 1})$$

where:

EL is the 3-month rolling average monthly emission limit (kilograms/month)

Vol is the cleaning capacity of the solvent cleaning machine (cubic meters)

**Note:** Equation 1 requires the use of metric units. Multiply cubic feet by 0.02832 to obtain cubic meters. Multiply kilograms by 2.2046 to obtain pounds.

(2) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with sub. (1) shall demonstrate compliance with the applicable 3-month rolling average monthly emission limit on a monthly basis as described in s. NR 469.09 (2) and (3).

(3) If the applicable 3-month rolling average emission limit is not met, an exceedance has occurred. All exceedances shall be reported as required in s. NR 469.12 (7).

(4) As an alternative to meeting the requirements in ss. NR 469.04 to 469.077, each owner or operator of a continuous web cleaning machine may demonstrate an overall cleaning system control efficiency of 70% or greater using the procedures in s. NR 469.09 (7). This demonstration may be made for either a single cleaning machine or for a solvent cleaning system that contains one or more cleaning machines and ancillary equipment, such as storage tanks and distillation units. If the demonstration is made for a cleaning system, the facility shall identify any modifications required to the procedures in s. NR 469.09 (7) and they shall be approved by the department.

**Table 6. Emission Limits for Batch Vapor and In-line Solvent Cleaning Machines With a Solvent/Air Interface**

Solvent Cleaning Machine	3-Month Rolling Average Monthly Emission Limit kg/m <sup>2</sup> /month (lb/ft <sup>2</sup> /month)
Batch vapor solvent cleaning machines	150 (30.7)
Existing in-line solvent cleaning machines	153 (31.4)
New in-line solvent cleaning machines	99 (20.2)

**Table 7. Emission Limits for Cleaning Machines Without a Solvent/Air Interface<sup>1,2</sup>**

Cleaning capacity (cubic meters)	3-Month rolling average monthly emission limit (kilograms/month)	Cleaning capacity (cubic meters)	3-Month rolling average monthly emission limit (kilograms/month)	Cleaning capacity (cubic meters)	3-Month rolling average monthly emission limit (kilograms/month)
0.00	0	1.00	330	2.00	500
0.05	55	1.05	340	2.05	508
0.10	83	1.10	349	2.10	515
0.15	106	1.15	359	2.15	522
0.20	126	1.20	368	2.20	530
0.25	144	1.25	377	2.25	537
0.30	160	1.30	386	2.30	544
0.35	176	1.35	395	2.35	551
0.40	190	1.40	404	2.40	558
0.45	204	1.45	412	2.45	565
0.50	218	1.50	421	2.50	572
0.55	231	1.55	429	2.55	579
0.60	243	1.60	438	2.60	585
0.65	255	1.65	446	2.65	592
0.70	266	1.70	454	2.70	599
0.75	278	1.75	462	2.75	605
0.80	289	1.80	470	2.80	612
0.85	299	1.85	477	2.85	619
0.90	310	1.90	485	2.90	625
0.95	320	1.95	493	2.95	632

<sup>1</sup> Divide cubic feet by 35.31 to obtain the cleaning capacity in cubic meters.

<sup>2</sup> Multiply kilograms/month by 2.2046 to obtain the 3-month rolling average in pounds/month.

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: r. (1) (c), cr. (4) Register December 2008 No. 636, eff. 1-1-09; correction in (1) (intro.) made under 13.92 (4) (b) 7., Stats., Register December 2008 No. 636.

**NR 469.085 Facility-wide standards. (1)** Each owner or operator of an affected facility shall comply with the requirements specified in this section. For purposes of this section, “affected facility” means all solvent cleaning machines, except solvent cleaning machines used in the manufacture and maintenance of aerospace products, solvent cleaning machines used in the manufacture of narrow tubing, and continuous web cleaning machines, located at a major source that are subject to the facility-wide limits in sub. (2) (b), and for area sources, “affected facility” means all solvent cleaning machines, except cold batch cleaning machines, located at an area source that are subject to the facility-wide limits in sub. (2) (b).

**(2) (a)** Each owner or operator of an affected facility shall maintain a log of solvent additions and deletions for each solvent cleaning machine.

**(b)** Each owner or operator of an affected facility shall ensure that the total emissions of perchloroethylene (PCE), trichloroethylene (TCE) and methylene chloride (MC) used at the affected facility are equal to or less than the applicable facility-wide 12-month rolling total emission limit presented in Table 8 as

determined using the procedures in sub. (3). Equation 9, where the facility emissions of PCE and TCE are weighted according to their carcinogenic potency relative to that of MC, shall be used for multiple solvents.

$$WE = (PCE \times A) + (TCE \times B) + MC \quad (\text{Equation 9})$$

where:

WE is the weighted 12-month rolling total emissions in kg (lbs)

PCE is the 12-month rolling total PCE emissions from all solvent cleaning machines at the facility in kg (lbs)

TCE is the 12-month rolling total TCE emissions from all solvent cleaning machines at the facility in kg (lbs)

MC is the 12-month rolling total MC emissions from all solvent cleaning machines at the facility in kg (lbs)

A is the carcinogenic potency of PCE relative to the carcinogenic potency of MC, and is equal to 12.5

B is the carcinogenic potency of TCE relative to the carcinogenic potency of MC, and is equal to 4.25



**Table 8. Facility-wide Emission Limits for Facilities With Solvent Cleaning Machines**

Solvents emitted	Facility-wide annual emission limits in kg—for general population degreasing machines	Facility-wide annual emission limit in kg for military depot maintenance facilities
PCE only <sup>a</sup>	4,800	8,000
TCE only	14,100	23,500
MC only	60,000	100,000
Multiple solvents—Calculate the MC-weighted emissions using equation 9	60,000	100,000

<sup>a</sup> PCE emission limit calculated using the unit risk estimate (URE) for PCE calculated by the California EPA Office of Environmental Health Hazard Assessment and listed in their Toxicity Criteria Database, which is accessible at <http://www.oehha.ca.gov/tcdb/index.asp>.

(3) Each owner or operator of an affected facility shall, on the first operating day of every month, demonstrate compliance with the applicable facility-wide emission limit on a 12-month rolling total basis using the procedures in pars. (a) to (e). For purposes of this subsection, “each solvent cleaning machine” means each solvent cleaning machine that is part of an affected facility regulated by this section.

(a) Each owner or operator of an affected facility shall, on the first operating day of every month, ensure that each solvent cleaning machine system contains only clean liquid solvent. This includes fresh unused solvent, recycled solvent and used solvent that has been cleaned of soiled materials. A fill line shall be indicated during the first month the measurements are made. The solvent level within the machine shall be returned to the same fill-line each month, immediately prior to calculating monthly emissions as specified in pars. (b) and (c). The solvent cleaning machine does not have to be emptied and filled with fresh unused solvent prior to the calculations.

(b) Each owner or operator of an affected facility shall, on the first operating day of the month, using the records of all solvent additions and deletions for the previous month, determine solvent emissions ( $E_{unit}$ ) from each solvent cleaning machine using equation 10:

$$E_{unit} = SA_i - LSR_i - SSR_i \quad \text{(Equation 10)}$$

where:

$E_{unit}$  is the total halogenated HAP solvent emissions from the solvent cleaning machine during the most recent month  $i$ , (kilograms of solvent per month)

$SA_i$  is the total amount of halogenated HAP liquid solvent added to the solvent cleaning machine during the most recent month  $i$ , (kilograms of solvent per month)

$LSR_i$  is the total amount of halogenated HAP liquid solvent removed from the solvent cleaning machine during the most recent month  $i$ , (kilograms of solvent per month)

$SSR_i$  is the total amount of halogenated HAP solvent removed from the solvent cleaning machine in solid waste, obtained as described in par. (c), during the most recent month  $i$ , (kilograms of solvent per month)

(c) Each owner or operator of an affected facility shall, on the first operating day of the month, determine  $SSR_i$  using the method specified in subs. 1. and 2.

1. From tests conducted using EPA reference method 25d, incorporated by reference in s. NR 484.04 (25).

2. By engineering calculations included in the compliance report.

(d) Each owner or operator of an affected facility shall, on the first operating day of the month, after 12 months of emissions data are available, determine the 12-month rolling total emissions,  $ET_{unit}$ , for the 12-month period ending with the most recent month using equation 11:

$$ET_{unit} = \sum_{j=1}^{12} E_{unit} \quad \text{(Equation 11)}$$

where:

$ET_{unit}$  is the total halogenated HAP solvent emissions over the preceding 12 months, (kilograms of solvent emissions per 12-month period)

$E_{unit}$  is the halogenated HAP solvent emissions for each month ( $j$ ) for the most recent 12 months (kilograms of solvent per month)

(e) Each owner or operator of an affected facility shall, on the first operating day of the month, after 12 months of emissions data are available, determine the 12-month rolling total emissions,  $ET_{facility}$ , for the 12-month period ending with the most recent month using equation 12:

$$ET_{facility} = \sum_{j=1}^i ET_{unit} \quad \text{(Equation 12)}$$

where:

$ET_{facility}$  is the total halogenated HAP solvent emissions over the preceding 12 months for all cleaning machines at the facility (kilograms of solvent emissions per 12-month period)

$ET_{unit}$  is the total halogenated HAP solvent emissions over the preceding 12 months for each unit,  $j$  (kilograms of solvent emissions per 12-month period)

$i$  is the total number of units at the facility

(4) If the applicable facility-wide emission limit presented in Table 8 is not met, an exceedance has occurred. All exceedances shall be reported as required in s. NR 469.12 (8).

(5) Each owner or operator of an affected facility shall maintain records specified in pars. (a) to (c) either in electronic or written form for a period of 5 years. For purposes of this subsection, “each solvent cleaning machine” means each solvent cleaning machine that is part of an affected facility regulated by this section.

(a) The dates and amounts of solvent that are added to each solvent cleaning machine.

(b) The solvent composition of wastes removed from each solvent cleaning machine as determined using the procedure described in sub. (3) (c).

(c) Calculation sheets showing how monthly emissions and the 12-month rolling total emissions from each solvent cleaning machine were determined, and the results of all calculations.

(6) Each owner or operator of an affected facility shall submit an initial notification report to the department no later than May 3, 2010. This report shall include the information specified in pars. (a) to (e).

(a) The name and address of the owner or operator of the affected facility.

(b) The physical location of the solvent cleaning machines that are part of an affected facility regulated by this section.

(c) A brief description of each solvent cleaning machine at the affected facility including machine type (batch vapor, batch cold, vapor in-line or cold in-line), solvent to air interface area and existing controls.

(d) The date of installation for each solvent cleaning machine.

(e) An estimate of annual halogenated HAP solvent consumption for each solvent cleaning machine.

(7) Each owner or operator of an affected facility shall submit to the department an initial statement of compliance on or before May 3, 2010. The statement shall include the information specified in pars. (a) to (c).

(a) The name and address of the owner or operator of the affected facility.

(b) The physical location of each solvent cleaning machine that is part of an affected facility regulated by this section.

(c) The results of the first 12-month rolling total emissions calculation.

(8) Each owner or operator of an affected facility shall submit a solvent emission report every year. The solvent emission report can be combined with the annual report required in s. NR 469.12 (6) into a single report for each facility. The solvent emission report shall contain the information specified in pars. (a) and (b).

(a) The average monthly solvent consumption for the affected facility in kilograms per month.

(b) The 12-month rolling total solvent emission estimates calculated each month using the method as described in sub. (3).

**History:** CR 07-105; cr. Register December 2008 No. 636, eff. 1-1-09.

**NR 469.09 Test methods.** (1) Except as provided in subs. (6) and (7) for continuous web cleaning machines, each owner or operator of a batch vapor or in-line solvent cleaning machine complying with an idling emission limit standard in s. NR 469.04 (2) (a) 2. or (b) 2. or (3) (a) 2. or (b) 2. shall determine the idling emission rate of the solvent cleaning machine using Method 307 in Appendix A of 40 CFR part 63, incorporated by reference in s. NR 484.04.

(2) Except as provided in sub. (7) for continuous web cleaning machines, each owner or operator of a batch vapor or in-line solvent cleaning machine complying with s. NR 469.08 shall on the first operating day of every month ensure that the solvent cleaning machine system contains only clean liquid solvent as defined in s. NR 469.02 (5). A fill line shall be indicated during the first month the measurements are made. The solvent level within the machine shall be returned to the same fill line each month, immediately prior to calculating monthly emissions as specified in sub. (3). The solvent cleaning machine does not have to be emptied and filled with fresh unused solvent prior to the calculations.

(3) Except as provided in subs. (6) and (7) for continuous web cleaning machines, each owner or operator of a batch vapor or in-line solvent cleaning machine complying with s. NR 469.08 (1) (a) or (b) shall on the first operating day of the month comply with the requirements specified in pars. (a) to (c).

(a) Using the records of all solvent additions and deletions for the previous monthly reporting period required under s. NR 469.08 (1) (a) 1. or (b) 1., determine solvent emissions ( $E_i$  or  $E_n$ ) using equation 2 for cleaning machines with a solvent/air interface and equation 3 for cleaning machines without a solvent/air interface.

$$E_i = \frac{SA_i - LSR_i - SSR_i}{AREA_i} \quad \text{(Equation 2)}$$

$$E_n = SA_i - LSR_i - SSR_i \quad \text{(Equation 3)}$$

where:

$E_i$  is the total halogenated HAP solvent emissions from the solvent cleaning machine during the most recent monthly reporting period  $i$ , kilograms of solvent per square meter of solvent/air interface area per month (pounds of solvent per square foot of solvent/air interface area per month)

$E_n$  is the total halogenated HAP solvent emissions from the solvent cleaning machine during the most recent monthly reporting period  $i$ , kilograms of solvent per month (pounds of solvent per month)

$SA_i$  is the total amount of halogenated HAP liquid solvent added to the solvent cleaning machine during the most recent monthly reporting period  $i$ , kilograms of solvent per month (pounds of solvent per month)

$LSR_i$  is the total amount of halogenated HAP liquid solvent removed from the solvent cleaning machine during the most recent monthly reporting period  $i$ , kilograms of solvent per month (pounds of solvent per month)

$SSR_i$  is the total amount of halogenated HAP solvent removed from the solvent cleaning machine in solid waste, obtained as described in par. (b), during the most recent monthly reporting period  $i$ , kilograms of solvent per month (pounds of solvent per month)

$AREA_i$  is the solvent/air interface area of the solvent cleaning machine, square meters, (square feet)

(b) Determine  $SSR_i$  using the method specified in subd. 1. or 2.

1. From tests conducted using Method 25D in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 484.04.

2. By engineering calculations included in the compliance report, which is described in s. NR 469.12 (6).

(c) Determine the monthly rolling average, EA, for the 3-month period ending with the most recent reporting period using equation 4 for cleaning machines with a solvent/air interface or equation 5 for cleaning machines without a solvent/air interface.

$$EA_i = \frac{\sum_{j=1}^3 E_{ij}}{3} \quad \text{(Equation 4)}$$

$$EA_n = \frac{\sum_{j=1}^3 E_{nj}}{3} \quad \text{(Equation 5)}$$

where:

$EA_i$  is the average halogenated HAP solvent emissions over the preceding 3 monthly reporting periods, kilograms of solvent per square meter of solvent/air interface area per month (pounds of solvent per square foot of solvent/air interface area per month)

$EA_n$  is the average halogenated HAP solvent emissions over the preceding 3 monthly reporting periods, kilograms of solvent per month (pounds of solvent per month)

$E_{ij}$  is the halogenated HAP solvent emissions for each month (j) for the most recent 3 monthly reporting periods, kilograms of solvent per square meter of solvent/air interface area per month (pounds of solvent per square foot of solvent/air interface area per month)

$E_{nj}$  is the halogenated HAP solvent emissions for each month (j) for the most recent 3 monthly reporting periods, kilograms of solvent per month (pounds of solvent per month)

$j=1$  is the most recent monthly reporting period

$j=2$  is the monthly reporting period immediately prior to  $j=1$

$j=3$  is the monthly reporting period immediately prior to  $j=2$

(4) Each owner or operator of a batch vapor or in-line solvent cleaning machine using dwell to comply with ss. NR 469.04 to

469.07 shall determine the appropriate dwell time for each part or parts basket using the procedure specified in pars. (a) and (b).

(a) Determine the amount of time for the part or parts basket to cease dripping once placed in the vapor zone. The part or parts basket used for this determination shall be at room temperature before being placed in the vapor zone.

(b) The proper dwell time for parts to remain in the freeboard area above the vapor zone is no less than 35% of the time determined in par. (a).

(5) An owner or operator of a source shall determine the source's potential to emit from all solvent cleaning machines, using the procedures described in pars. (a) to (c).

(a) Determine the potential to emit for each individual solvent cleaning machine using equation 6.

$$PTE_i = H_i \times W_i \times SAI_i \quad (\text{Equation 6})$$

where:

$PTE_i$  is the potential to emit for solvent cleaning machine  $i$ , kilograms of solvent per year (pounds of solvent per year)

$H_i$  is hours of operation for solvent cleaning machine  $i$  (hours per year)

= 8760 hours per year, unless otherwise restricted by a federally enforceable requirement

$W_i$  is the working mode uncontrolled emission rate for solvent cleaning machine  $i$ , kilograms per square meter per hour (pounds per square foot per hour)

= 1.95 kilograms per square meter per hour (0.40 pounds per square foot per hour) for batch vapor and cold cleaning machines  
 = 1.12 kilograms per square meter per hour (0.23 pounds per square foot per hour) for in-line cleaning machines

$SAI_i$  is the solvent/air interface area of solvent cleaning machine  $i$ , square meters, (square feet). Section NR 469.02 (38) defines the solvent/air interface area for those machines that have a solvent/air interface. Solvent cleaning machines that do not have a solvent/air interface shall calculate a solvent/air interface area using the procedure in par. (b).

(b) Solvent cleaning machines that do not have a solvent/air interface shall calculate a solvent/air interface area using equation 7.

$$SAI = 2.20 \times (\text{Vol})^{0.6} \quad (\text{Equation 7})$$

where:

$SAI$  is the solvent/air interface area (square meters)

$\text{Vol}$  is the cleaning capacity of the solvent cleaning machine (cubic meters)

**Note:** Equation 7 requires the use of metric units. Multiply cubic feet by 0.02832 to obtain cubic meters. Multiply square meters by 10.764 to obtain square feet.

(c) Sum the  $PTE_i$  for all solvent cleaning machines to obtain the total potential to emit for solvent cleaning machines at the facility.

(6) Each owner or operator of a continuous web cleaning machine using a squeegee system to comply with s. NR 469.073 (3) shall determine the maximum product throughput using the method in this subsection. The maximum product throughput for each squeegee type used at a facility shall be determined prior to December 2, 1999, the compliance date for these units.

(a) Conduct daily visual inspections of the continuous web part. This monitoring shall be conducted at the point where the continuous web part exits the squeegee system. It is not necessary for the squeegees to be new at the time monitoring is begun if the following 2 conditions are met:

1. The continuous web part leaving the squeegee system has no visible solvent film.

2. The amount of continuous web that has been processed through the squeegees since the last replacement is known.

(b) Continue daily monitoring until a visible solvent film is noted on the continuous web part.

(c) Determine the length of continuous web product that has been cleaned using the squeegee since it was installed.

(d) The maximum product throughput for the purposes of this chapter is equal to the time it takes to clean 95% of the length of product determined in par. (c). This time period, in days, may vary depending on the amount of continuous web product cleaned each day.

(7) Each owner or operator of a continuous web cleaning machine demonstrating compliance with the alternative standard of s. NR 469.08 (4) shall, on the first day of every month, ensure that the solvent cleaning machine contains only clean liquid solvent. A fill-line shall be indicated during the first month the measurements are made. The solvent level with the machine shall be returned to the same fill-line each month, immediately prior to calculating overall cleaning system control efficiency emissions as specified in sub. (8). The solvent cleaning machine does not need to be emptied and filled with fresh unused solvent prior to the calculation.

(8) Each owner or operator of a continuous web cleaning machine complying with s. NR 469.08 (4) shall, on the first operating day of the month, determine the overall cleaning system control efficiency ( $E_o$ ) for the previous month using equation 8 and the records of all solvent additions, solvent deletions and solvent recovered from the carbon adsorption system for the previous monthly reporting period required under s. NR 469.11 (5).

$$E_o = R_i / (R_i + S_{a_i} - SSR_i) \quad (\text{Equation 8})$$

where:

$E_o$  is the overall cleaning system control efficiency

$R_i$  is the total amount of halogenated HAP liquid solvent recovered from the carbon adsorption system and recycled to the solvent cleaning system during the most recent monthly reporting period,  $i$ , kilograms of solvent per month

$S_{a_i}$  is the total amount of halogenated HAP liquid solvent added to the solvent cleaning system during the most recent monthly reporting period,  $i$ , kilograms of solvent per month

$SSR_i$  is the total amount of halogenated HAP solvent removed from the solvent cleaning system in solid waste, obtained as described in sub. (3) (b), during the most recent monthly reporting period,  $i$ , kilograms of solvent per month

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: am. (1), (2) and (3) (intro.), cr. (6), (7) and (8) Register December 2008 No. 636, eff. 1-1-09.

**NR 469.10 Monitoring procedures.** (1) Except as provided in sub. (7), each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the equipment standards in s. NR 469.04 (2) (a) 1. or (b) 1. or (3) (a) 1. or (b) 1. shall conduct monitoring and record the results on a weekly basis for the control devices, as appropriate, specified in pars. (a) to (e).

(a) If a freeboard refrigeration device is used to comply with these standards, the owner or operator shall use a thermometer or thermocouple to measure the temperature at the center of the air blanket during the idling mode.

(b) If a superheated vapor system is used to comply with these standards, the owner or operator shall use a thermometer or thermocouple to measure the temperature at the center of the superheated solvent vapor zone while the solvent cleaning machine is in the idling mode.

(c) If a squeegee system, air knife system or combination squeegee and air knife system is used to comply with the requirements of s. NR 469.073 or 469.077, the owner or operator shall visually inspect the continuous web part exiting the solvent cleaning machine to ensure that no solvent film is visible on the part.

(d) Except as provided in par. (e), if a superheated part system is used to comply with the requirements of s. NR 469.073 or

469.077, the owner or operator shall use a thermometer, thermocouple or other temperature measurement device to measure the temperature of the continuous web part while it is in the solvent cleaning machine. The measurement may also be taken at the exit of the solvent cleaning machine.

(e) As an alternative to complying with par. (d), the owner or operator may provide data, sufficient to satisfy the department, that demonstrate that the part temperature remains above the boiling point of the solvent at all times that the part is within the continuous web solvent cleaning machine. These data could include design and operating conditions such as information supporting any exothermic reaction inherent in the processing.

(2) Except as provided in sub. (7), each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the equipment standards of s. NR 469.04 (2) (a) 1. or (b) 1. or (3) (a) 1. or (b) 1. shall conduct monitoring and record the results on a monthly basis for the control devices, as appropriate, specified in pars. (a) and (b).

(a) If a working-mode, downtime-mode or idling-mode cover is used to comply with these standards, the owner or operator shall conduct a visual inspection to determine if the cover is opening and closing properly, completely covers the cleaning machine openings when closed, and is free of cracks, holes and other defects.

(b) If dwell is used, the owner or operator shall determine the actual dwell time by measuring the period of time that parts are held within the freeboard area of the solvent cleaning machine after cleaning.

(3) Except as provided in sub. (7), each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the equipment or idling emission standards in ss. NR 469.04 to 469.07 shall monitor the hoist speed as described in pars. (a) to (d).

(a) The owner or operator shall determine the hoist speed by measuring the time it takes for the hoist to travel a measured distance. The speed is equal to the distance in meters (feet) divided by the time in minutes (meters per minute or feet per minute).

(b) The monitoring shall be conducted monthly. If after the first year, no exceedances of the hoist speed are measured, the owner or operator may begin monitoring the hoist speed quarterly.

(c) If an exceedance of the hoist speed occurs during quarterly monitoring, the monitoring frequency shall return to monthly until another year of compliance without an exceedance is demonstrated.

(d) If an owner or operator can demonstrate to the department's satisfaction in the initial compliance report that the hoist cannot exceed a speed of 3.4 meters per minute (11 feet per minute), the required monitoring frequency shall be quarterly, including during the first year of compliance.

(4) Except as provided in sub. (7), each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the equipment standards in s. NR 469.04 (2) (a) 1. or (b) 1. or (3) (a) 1. or (b) 1. using a reduced room draft shall conduct monitoring and record the results as specified in par. (a) or (b).

(a) If the reduced room draft is maintained by controlling room parameters by redirecting fans, closing doors and windows, etc., the owner or operator shall conduct an initial monitoring test of the wind speed and of room parameters, quarterly monitoring of wind speed and weekly monitoring of room parameters as specified in subs. 1. and 2.

1. Measure the wind speed within 15.2 centimeters (6 inches) above the top of the freeboard area of the solvent cleaning machine using the following procedure:

a. Determine the direction of the wind current by slowly rotating a velometer or similar device until the maximum speed is located.

b. Orient a velometer in the direction of the wind current at each of the 4 corners of the machine.

c. Record the reading for each corner.

d. Average the values obtained at each corner and record the average wind speed.

2. Monitor on a weekly basis the room parameters established during the initial compliance test that are used to achieve the reduced room draft.

(b) If a full or partial enclosure is used to achieve a reduced room draft, the owner or operator shall conduct an initial monitoring test and, thereafter, monthly monitoring tests of the wind speed within the enclosure using the procedure specified in subs. 1. and 2. and a monthly visual inspection of the enclosure to determine if it is free of cracks, holes and other defects.

1. Determine the direction of the wind current in the enclosure by slowly rotating a velometer inside the entrance to the enclosure until the maximum speed is located.

2. Record the maximum wind speed.

(5) Except as provided in sub. (7), each owner or operator using a carbon adsorber to comply with this chapter shall measure and record the concentration of each halogenated HAP compound in the exhaust of the carbon adsorber weekly with a colorimetric detector tube. This test shall be conducted while the solvent cleaning machine is in the working mode and is venting to the carbon adsorber. The exhaust concentration shall be determined using the procedure specified in pars. (a) to (c).

(a) Use a colorimetric detector tube designed to measure a concentration of 100 parts per million by volume of the particular halogenated HAP compound in air to an accuracy of  $\pm 25$  parts per million by volume. If the cleaning machine uses solvent that contains two or more halogenated HAP compounds, use one compound-specific colorimetric detector tube per halogenated HAP compound.

(b) Use the colorimetric detector tubes according to the manufacturer's instructions.

(c) Provide a sampling port for monitoring within the exhaust outlet of the carbon adsorber that is easily accessible and located at least 8 stack or duct diameters downstream from any flow disturbance such as a bend, expansion, contraction or outlet; downstream from no other inlet; and at least 2 stack or duct diameters upstream from any flow disturbance such as a bend, expansion, contraction, inlet or outlet.

(6) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the idling emission limit standards of s. NR 469.04 (2) (a) 2. or (b) 2. or (3) (a) 2. or (b) 2. shall comply with the requirements specified in pars. (a) and (b).

(a) If using controls listed in subs. (1) to (5), the owner or operator shall comply with the monitoring frequency requirements in subs. (1) to (5).

(b) If using controls not listed in subs. (1) to (5), the owner or operator shall establish the monitoring frequency for each control and submit it to the department for approval in the test report specified in s. NR 469.12 (3) (f).

(7) Each owner or operator using a control device listed in subs. (1) to (5) may use alternative monitoring methods and procedures as specified in s. NR 460.07 (6).

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: am. (1), (intro.), cr. (1) (c) to (e) Register December 2008 No. 636, eff. 1-1-09.

**NR 469.11 Recordkeeping requirements.** (1) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of ss. NR 469.04 to 469.077 shall maintain all of the records, in written or electronic form, specified in pars. (a) to (g), for the lifetime of the machine.

(a) Owner's manuals, or if not available, written maintenance and operating procedures, for the solvent cleaning machine and control equipment.

(b) The date of installation for the solvent cleaning machine and all of its control devices. If the exact date for installation is not known, a letter certifying that the cleaning machine and its



control devices were installed on or before November 29, 1993, or after November 29, 1993, may be substituted.

(c) If dwell is used to comply with these standards, records of the tests required in s. NR 469.09 (4) to determine an appropriate dwell time for each part or parts basket.

(d) For a solvent cleaning machine complying with the idling emission limit standards of s. NR 469.04 (2) (a) 2. or (b) 2. or (3) (a) 2. or (b) 2., records of the initial performance test, including the idling emission rate and values of the monitoring parameters measured during the test.

(e) Records of the halogenated HAP solvent content for each solvent used in a solvent cleaning machine subject to the provisions of this chapter.

(f) If a squeegee system is used to comply with these standards, records of the test required by s. NR 469.10 (6) to determine the maximum product throughput for the squeegees and records of both the weekly monitoring required by s. NR 469.10 (1) (c) for visual inspection and the length of continuous web product cleaned during the previous week.

(g) If an air knife system or a combination squeegee and air knife system is used to comply with these standards, records of the determination of the proper operating parameter and parameter value for the air knife system.

**(2)** Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with ss. NR 469.04 to 469.07 shall maintain the records specified in pars. (a) to (d), either in electronic or written form, for a period of 5 years.

(a) The results of control device monitoring required under s. NR 469.10.

(b) Information on the actions taken to comply with ss. NR 469.06 and 469.07. This information shall include records of written or verbal orders for replacement parts, a description of the repairs made and additional monitoring conducted to demonstrate that monitored parameters have returned to accepted levels.

(c) Estimates of annual solvent consumption for each solvent cleaning machine.

(d) If a carbon adsorber is used to comply with these standards, records of the date and results of the weekly measurement of the halogenated HAP solvent concentration in the carbon adsorber exhaust required in s. NR 469.10 (5).

**(3)** Except as provided in sub. (5) for continuous web cleaning machines, each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of s. NR 469.08 shall maintain the records specified in pars. (a) to (c), either in electronic or written form, for a period of 5 years.

(a) The dates and amounts of solvent that are added to the solvent cleaning machine.

(b) The solvent composition of wastes removed from cleaning machines as determined using the procedure described in s. NR 469.09 (3) (b).

(c) Calculation sheets showing how monthly emissions and the rolling 3-month average emissions from the solvent cleaning machine were determined, and the results of all calculations.

**(4)** Each owner or operator of a solvent cleaning machine without a solvent/air interface complying with the provisions of s. NR 469.08 shall maintain records on the method used to determine the cleaning capacity of the cleaning machine.

**(5)** Each owner or operator of a continuous web cleaning machine complying with the provisions of s. NR 469.08 (4) shall maintain the following records in either electronic or written form for a period of 5 years.

(a) The dates and amounts of solvent that are added to the solvent cleaning machine.

(b) The dates and amounts of solvent that are recovered from the desorption of the carbon adsorber system.

(c) The solvent composition of wastes removed from each cleaning machine as determined using the procedures in s. NR 469.09 (3) (b).

(d) Calculation sheets showing the calculation and results of determining the overall cleaning system control efficiency as required by s. NR 469.09.

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97; CR 07-105: am. (1) (intro.) and (3) (intro.), cr. (1) (f), (g) and (5) Register December 2008 No. 636, eff. 1-1-09.

**NR 469.12 Reporting requirements. (1)** Each owner or operator of a new solvent cleaning machine subject to the provisions of this chapter for which the construction or reconstruction commenced after April 1, 1997, shall submit an initial notification report to the department as soon as practicable before the construction or reconstruction is planned to commence. The report shall be submitted as part of and incorporated into the application required under s. NR 406.03 or 407.04 (1) (b) 3. with the following revisions and additions:

(a) The report shall include a brief description of each solvent cleaning machine including machine type (batch vapor, batch cold, vapor in-line or cold in-line), solvent/air interface area and existing controls.

(b) The report shall include the anticipated compliance approach for each solvent cleaning machine.

(c) The report shall include an estimate of annual halogenated HAP solvent consumption for each solvent cleaning machine.

**(2)** Each owner or operator of a batch cold solvent cleaning machine subject to the provisions of this chapter shall submit an initial statement of compliance to the department. For existing sources, this report shall be submitted to the department no later than 150 days after the compliance date specified in s. NR 469.01 (1) (d). For new sources, this report shall be submitted to the department no later than 150 days after April 1, 1997 or 150 days after startup, whichever is later. This report shall include the requirements specified in pars. (a) to (d).

(a) The name and address of the owner or operator.

(b) The address where the solvent cleaning machines are located.

(c) A statement, signed by the owner or operator of the solvent cleaning machine, stating that the solvent cleaning machine for which the report is being submitted is in compliance with the provisions of this chapter.

(d) The compliance approach for each solvent cleaning machine.

**(3)** Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of ss. NR 469.04 to 469.07 shall submit to the department an initial statement of compliance for each solvent cleaning machine. For existing sources, this report shall be submitted to the department no later than 150 days after the compliance date specified in s. NR 469.01 (1) (d). For new sources, this report shall be submitted to the department no later than 150 days after April 1, 1997 or 150 days after startup, whichever is later. This statement shall include the requirements specified in pars. (a) to (g).

(a) The name and address of the owner or operator.

(b) The address where the solvent cleaning machines are located.

(c) A list of the control equipment used to achieve compliance for each solvent cleaning machine.

(d) For each piece of control equipment required to be monitored, a list of the parameters that are monitored and the values of these parameters measured on or during the first month after the compliance date.

(e) Conditions to maintain the wind speed requirements of s. NR 469.06 (2) (b) 2. if applicable.

(f) For solvent cleaning machines complying with the idling emission limit standards of s. NR 469.04 (2) (a) 2. or (b) 2. or (3) (a) 2. or (b) 2., a test report for tests of idling emissions meeting the specifications in Method 307 of Appendix A of 40 CFR part 63, incorporated by reference in s. NR 484.04. This report shall comply with the requirements specified in subds. 1. to 4.

1. This test shall be on the same solvent cleaning machine model that is used at the source. The test may be done by the owner or operator of the affected machine or may be supplied by the vendor of that solvent cleaning machine or a third party.

2. This report shall clearly state the monitoring parameters, monitoring frequency and the delineation of exceedances for each parameter.

3. If a solvent cleaning machine vendor or third party test report is used to demonstrate compliance, it shall include the following for the solvent cleaning machine tested: name of persons or company that performed the test, model name, the date the solvent cleaning machine was tested, serial number, and a diagram of the solvent cleaning machine tested.

4. If a solvent cleaning machine vendor or third party test report is used, the owner or operator of the solvent cleaning machine shall comply with the following requirements: submit a statement by the solvent cleaning machine vendor or third party tester that the solvent cleaning machine tested is the same model as the unit for which the report is being submitted; or demonstrate to the department's satisfaction that the solvent emissions from the solvent cleaning machine for which the test report is being submitted are equal to or less than the solvent emissions from the solvent cleaning machine in the vendor or third party test report.

(g) If a carbon adsorber is used to comply with these standards, the date and results of the weekly measurement of the halogenated HAP solvent concentration in the carbon adsorber exhaust required in s. NR 469.10 (5).

(4) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of s. NR 469.08 shall submit to the department an initial statement of compliance for each solvent cleaning machine. For existing sources, this report shall be submitted to the department no later than May 1, 1998. For new sources, this report shall be submitted to the department no later than 150 days after April 1, 1997 or 150 days after startup, whichever is later. The statement shall include the information specified in pars. (a) to (d).

(a) The name and address of the solvent cleaning machine owner or operator.

(b) The address where the solvent cleaning machines are located.

(c) The solvent/air interface area for each solvent cleaning machine or, for cleaning machines without a solvent/air interface, a description of the method used to determine the cleaning capacity and the results.

(d) The results of the first 3-month average emissions calculation.

(5) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of ss. NR 469.04 to 469.07 shall submit an annual report by February 1 of the year following the one for which the report is being made. This report, which may be combined with the report required under sub. (6)

into a single report for each facility, shall include the requirements specified in pars. (a) and (b).

(a) A signed statement from the facility owner or designee stating that, "All operators of solvent cleaning machines have received training on the proper operation of solvent cleaning machines and their control devices sufficient to pass the test required in s. NR 469.05 (10), Wis. Adm. Code."

(b) An estimate of solvent consumption for each solvent cleaning machine during the reporting period.

(6) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with the provisions of s. NR 469.08 shall submit a solvent emission report every year. This solvent emission report, which may be combined with the report required under sub. (5) into a single report for each facility, shall contain the requirements specified in pars. (a) to (c).

(a) The size (solvent/air interface area or cleaning capacity) and type of each unit subject to this chapter.

(b) The average monthly solvent consumption for the solvent cleaning machine in kilograms per month.

(c) The 3-month monthly rolling average solvent emission estimates calculated each month using the method as described in s. NR 469.09 (3).

(7) Each owner or operator of a batch vapor or in-line solvent cleaning machine shall submit an exceedance report to the department semiannually except when the department determines on a case-by-case basis that more frequent reporting is necessary to accurately assess the compliance status of the source or an exceedance occurs. Once an exceedance has occurred, the owner or operator shall follow a quarterly reporting format until a request to reduce reporting frequency under sub. (8) is approved. Exceedance reports shall be delivered or postmarked by the 30th day following the end of each calendar half or quarter, as appropriate. The exceedance report shall include the applicable information in pars. (a) to (c).

(a) Information on the actions taken to comply with ss. NR 469.06 and 469.07. This information shall include records of written or verbal orders for replacement parts, a description of the repairs made, and additional monitoring conducted to demonstrate that monitored parameters have returned to accepted levels.

(b) If an exceedance has occurred, the reason for the exceedance and a description of the actions taken.

(c) If no exceedances of a parameter have occurred, or a piece of equipment has not been inoperative, out of control, repaired or adjusted, a statement of this information.

(8) An owner or operator who is required to submit an exceedance report on a quarterly or more frequent basis may reduce the frequency of reporting to semiannual if the conditions in pars. (a) to (c) are met.

(a) The source has demonstrated a full year of compliance without an exceedance.

(b) The owner or operator continues to comply with all relevant recordkeeping and monitoring requirements specified in ch. NR 460 and in this chapter.

(c) The department does not object to a reduced frequency of reporting for the affected source as provided in s. NR 460.09 (5) (c) 3.

**History:** Cr. Register, March, 1997, No. 495, eff. 4-1-97.