



DEPARTMENT OF
ECOLOGY
State of Washington

**PROPOSED TECHNICAL SUPPORT
DOCUMENT FOR CITY OF SPOKANE
WASTE-TO-ENERGY FACILITY
PSD PERMIT NO. 88-1B, AMENDMENT 1**

Prepared by

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1. EXECUTIVE SUMMARY

The Prevention of Significant Deterioration (PSD) permit program is required under state and federal law. The objective of the PSD program is to prevent significant adverse environmental impact from emissions into the atmosphere by a proposed new or modified source. The Spokane Waste-to-Energy (WTE) Facility was previously issued PSD permit No. 88-1B. Spokane has requested an amendment to this permit.

Spokane requests amending PSD permit 88-1B by:

1. Removing the requirement to install and operate a hydrogen chloride emission monitoring system from Approval Condition 4.
2. Amending the 8-hour average referenced in Approval Conditions 5 and 6 to specify an eight (8) hour block average consistent with the Spokane Regional Clean Air Agency's (SRCAA) Air Operating Permit (AOP) emission limits, which are based on block averages of 3-hour, 4-hour, and 24-hour.
3. Amending the 24-hour average referenced in Approval Condition 6 specifying a twenty-four (24) hour block average consistent with the SRCAA AOP emission limits, which are based on block averages of 3-hour, 4-hour, and 24-hour.
4. Amending the 6-minute per hour reference in Approval Condition 8 specifying a six (6) minute block consistent with the SRCAA AOP emission limits, which are based on 6-minute block average.
5. Removing the requirement to have a spare set of baghouse bags (1/4 of the total number) on-site from Approval Condition 17. The WTE facility has found that a large number of spare bags has been held in inventory for years, and never used. Instead the plant has a proactive program to ensure proper bag condition, and to replace bags on a planned schedule with brand new bags purchased as part of the maintenance program.
6. Removing the 10 percent natural gas limit. The requirement was originally made to clarify that the plant was not subject to 40 CFR Part 60, Subpart Db. Since that time, EPA has revised Subpart Db to clearly exempt municipal waste combustor (MWC). See 40 CFR 60.40b(k) for the Spokane plant. Condition 26(b) is now unnecessary and yet creates a paperwork obligation to track each unit's annual capacity factor.

Ecology is proposing to make the above changes to the PSD permit.

2. INTRODUCTION

2.1. The Permitting Process

The state of Washington has a State Implementation Plan (SIP) approved PSD program. PSD permitting requirements in the state of Washington are established in Washington Administrative Code (WAC) 173-400-700 through 750; and Ecology's approved PSD program SIP.

The objective of the PSD program is to prevent significant adverse environmental impact from emissions into the atmosphere by a proposed new major source, or a major modification to an existing major source. The program limits degradation of air quality to that which is not considered "significant." PSD rules require the utilization of Best Available Control Technology (BACT) for certain new or modified emission units, which is the most effective air pollution control equipment and procedures that are determined to be available after considering environmental, economic, and energy factors.

The PSD rules must be addressed when a company is adding a new emission unit or modifying an existing emission unit in an attainment or unclassifiable area. PSD rules apply to pollutants for which the area is classified as attainment or unclassifiable with the National Ambient Air Quality Standards (NAAQS). PSD rules are designed to keep an area with "good" air in compliance with the NAAQS. The distinctive requirements of PSD are BACT, air quality analysis (allowable increments and comparison with the NAAQS), and analysis of impacts of the project on visibility, vegetation, and soils.

2.2. Site and Project Description

2.2.1. Site Description

The City of Spokane (SRSWS) owns a Waste-to-Energy facility that is used to burn the majority of municipal solid waste generated in Spokane County. The facility is in Spokane County and located at 2900 South Geiger Boulevard, Spokane, Washington. The WTE facility is located in a Class II area that is designated as "attainment or unclassifiable" for the purpose of PSD permitting for all pollutants.

2.2.2. Facility Description

The WTE facility began operation in 1991. The property area covers 52 acres. The WTE facility burns up to about 950 tons per day (tpd) of municipal solid waste. The original Notice of Construction and PSD applications identified the facility as having a nominal capacity to burn 800 tpd of municipal solid waste, based on a heat value of 5,500 Btu/lb of waste, which is equivalent to 8.8e9 Btu/day. The average heat value of the waste burned at the WTE facility is 4,500-4,800 Btu/lb. With the lower heat value, WTE facility is able to burn more than 800 tons of municipal solid waste per day and remain within the nominal capacity of the facility in terms

of Btu equivalency (i.e., stay below 8.8e9 Btu/day). Natural gas is used as supplemental fuel during start-up, shut downs, and other periods when additional heat input is needed to maintain proper combustion.

The WTE facility's process includes:

- The receipt of municipal solid waste.
- Some sorting of waste. There are special areas on the tipping floor for yard and garden waste, sheetrock, and large appliances. There is a separate area where recyclables and household hazardous wastes are collected.
- Municipal solid waste is burned in the two incinerators. The yard and garden waste is generally transported to an off-site facility for composting. The sheetrock is landfilled. Appliances and other recyclables are recycled. Household hazardous waste is disposed of appropriately.
- Heat from the burning of waste is used to generate electricity which is sold.
- Ash is disposed of in an ash landfill.

The WTE facility operates two Von Roll 400 tpd municipal refuse-fired, water wall boiler trains manufactured by Babcock and Wilcox. Each boiler has been equipped with an Air Pollution Control Inc. spray dryer absorber (SDA) and fabric filter (FF) baghouse for air pollution control. The bag houses contain 3,420 bags (1,710 bags per boiler line).

Combustion gases exit the boiler economizer and pass through the SDA. For control of nitrogen oxides, each boiler is equipped with a Selective Non-Catalytic Reduction (SNCR) System that uses anhydrous ammonia. Each boiler is also equipped with a powdered activated carbon injection system (PACIS) with the injection location just prior to the SDA. The PACIS operates at a nominal rate of two pounds per hour (lb/hr), or more. Gases exit the SDA and enter the FF where they exit to an induced draft fan prior to entering separate flues in a common stack.

The Continuous Emission Monitoring System (CEMS) monitors O₂, SO₂, NO_x, opacity, and CO.

The WTE Facility's emission units are listed in Table 1 below.

Emission Unit	Air Pollution Control
Babcock and Wilcox boiler with Von Roll grates, rated at 183.33 MMBtu/hr	Combustion control, ammonia injection, spray dry absorber, baghouse, carbon injection system
Babcock and Wilcox boiler with Von Roll grates, rated at 183.33 MMBtu/hr	Combustion control, ammonia injection, spray dry absorber, baghouse, carbon injection system
Lime silo	Baghouse
Ash handling system	Scrubber
Fire pump engine, diesel fired (compression ignition), 235 hp	None

2.3. Permit Amendment

1. The City of Spokane WTE Facility requested modification of the September 1, 1989, issued PSD permit 88-1B, Approval Condition 4, which reads as follows:

“Hydrogen Chloride emissions from each incinerator stack shall not exceed fifty ppm on a dry basis corrected to seven percent oxygen as measured by a method approved by the department, unless the owner or operator demonstrates that the uncontrolled emissions of hydrogen chloride are reduced by at least eighty percent and a procedure acceptable to the department for monitoring is developed. Within six months after EPA adopts a performance specification for hydrogen chloride emission monitors, Spokane shall install and operate a hydrogen chloride emission monitoring system.”

Spokane requested the requirement to install and operate a hydrogen chloride emission monitoring system be removed. To support this request, Spokane provided the following information to Ecology:

- The WTE facility uses SDAs followed by fabric filtration on each of the two MWCs to minimize emissions. These systems are highly effective in controlling acid gases, including hydrogen chloride (HCl) and sulfur dioxide (SO₂).
- MWC facilities were included in 1995 in EPA’s first Emission Guideline for MWCs, 40 CFR Part 60, Subpart Cb, which brought requirements for the pre-1994 MWCs up to new source standards at that time through use of the MACT emission limit setting process. In 2006, the requirements were reviewed and updated again. In 2015, EPA began the process of another update. EPA’s process is considered being protective of air quality both in terms of the emission limits that are set, and the monitoring that is suitable.
- The Spokane WTE facility has been operating for nearly 25 years with annual HCl emissions testing only. Annual test results have consistently shown HCl emission to be less than six ppm and averaging at three ppm as summarized in Table 2.

	HC1 Inlet (ppm @ 7% O₂)	HC1 Outlet (ppm @ 7% O₂)	% Removal
Maximum	812	5.5	99.8
Minimum	544	1.3	99.1
Average	643	2.6	99.6

Table 3 presents the WTE facility's HCl source test results.

Table 3. Source Test Results				
Date	Unit	HCl Inlet (ppm @ 7% O₂)	HCl Outlet (ppm @ 7% O₂)	% Removal
6/22/15	Unit 1	599.3	2.8	99.5
	Unit 2	635.3	1.9	99.7
6/23/14	Unit 1	762.5	3.5	99.5
	Unit 2	729.1	2.2	99.7
6/24/13	Unit 1	595.0	2.7	99.5
	Unit 2	596.0	2.0	99.7
6/18/12	Unit 1	630.4	2.2	99.7
	Unit 2	636.8	1.7	99.7
6/06/11	Unit 1	544.3	2.0	99.6
	Unit 2	623.4	2.1	99.7
6/10/10	Unit 1	738.3	1.6	99.8
	Unit 2	698.4	2.1	99.7
6/15/09	Unit 1	593.5	1.5	99.7
	Unit 2	812.3	2.5	99.7
5/20/08	Unit 1	598.5	2.1	99.6
	Unit 2	649.6	3.1	99.5
5/21/07	Unit 1	652.4	3.5	99.5
	Unit 2	565.5	1.3	99.8
5/24/04	Unit 1	598.2	5.5	99.1
	Unit 2	635.7	2.7	99.6
5/01/01	Unit 1	688.0	5.5	99.2
	Unit 2	566.0	3.4	99.4

- The WTE facility uses lime to control acid gases. The WTE facility demonstrates compliance with their SO₂ emission limit using continuous emission monitors. For their HCl limit, the WTE facility performs an annual source test to demonstrate compliance. It is the permittee's contention that because HCl generally reacts more readily than SO₂ in their air emissions treatment system, continuous monitoring of SO₂ already provides assurance that the HCl limit is being met, and therefore continuous monitoring for HCl is a "non-value" added component. The WTE facility requests that SO₂ continuous monitoring be officially considered the surrogate for HCl continuous monitoring with the stipulation that the annual HCl source tests are continued to be required to also demonstrate compliance with their HCl limit.

In a letter dated March 23, 2016, Spokane noted that using a CEM for HCl monitoring is not required in WAC 173-434-170 for MWCs, and EPA MWC regulations do not require HCl CEM.

Ecology has discussed the installation of a HCl CEM with SRCAA. SRCAA noted that if the WTE facility is required to have a HCl CEM system, it is important to clarify how the HCl CEMS will be used as a compliance demonstration method for the PSD HCl limit. For the past approximately 25 years, WTE has been approved to use an annual stack test, using Method 26 or 26A, as the compliance method for the 50 ppm HCl limit with the compliance method agreed to be the average of three 1-hour tests. This requirement was placed in the AOP for the facility so that the facility and SRCAA both knew what the compliance method was for the PSD HCl emission limit. The original PSD permit says that HCl is to be measured by a method approved by the department.

In regards to the HCl limits applicable to the WTE facility, one is given in the state incinerator regulation (Chapter 173-434 WAC), and another one given in the federal MWC emission limits (40 CFR 60, Subpart Cb). The state incinerator regulation requires annual testing, even if they have a CEMs (see WAC 173-434-170(3)). The federal MWC emission limit states that the owner or operator can elect to operate a CEMs to be used in place of the annual stack test for monitoring.

The source test data clearly shows the control equipment is doing a good job controlling the acid gases.

Ecology concludes that the existing compliance method of using a CEM for SO₂ compliance and an annual source test for HCl is still appropriate for HCl. Ecology proposes to remove the requirement from the PSD permit for the WTE to use a CEM for compliance testing for HCl. Ecology will amend the PSD permit to remove this requirement.

2. Spokane requested the permit be amended in multiple places to define the averages in the permit to be a “block average.”

In their submittals to Ecology, Spokane noted that their SRCAA AOP emission limits are based on block averages: 3-hour, 4-hour, and 24-hour. Spokane is seeking consistency in their permits’ language. Ecology concurs with Spokane that their permits’ language should be consistent.

Ecology found the block average acceptable. For example, the 4-hour block average means “the average of all hourly emission concentrations when the affected facility is operating and combusting municipal solid waste measured over 4-hour periods of time from 12:00 midnight to 4 a.m., 4 a.m. to 8 a.m., 8 a.m. to 12:00 noon, 12:00 noon to 4 p.m., 4 p.m. to 8 p.m., and 8 p.m. to 12:00 midnight.” (40 CFR 60.51b; Title 40 - Protection of Environment; Chapter I - Environmental Protection Agency; Subchapter C - Air Programs; Part 60 - Standards of Performance for New Stationary Sources)

Ecology concurs and approves the request. Ecology's new proposed language for Approval Condition 5 is:

“Nitrogen oxides emissions from each incinerator stack shall not exceed 165 ppm on a dry basis corrected to seven percent oxygen for an eight-hour block average as measured by EPA Methods 1, 2, 3, 4, 7, and applicable methods or a continuous monitoring system that meets the requirements of Approval Condition 12.”

Ecology proposes the following new language for Approval Condition 6:

“Carbon monoxide emissions from each incinerator stack shall not exceed 100 ppm on a dry basis corrected to seven percent oxygen for an eight-hour block average for more than five percent of the operating time in a month, or 100 ppm for a twenty-four hour block average or 86 tons per year. Carbon monoxide shall be measured by a continuous monitoring system which meets the requirements of Approval Condition 12.”

Ecology proposes the following new language for Approval Condition 8:

“Opacity from each incinerator stack shall not exceed 10 percent for more than a six-minute block per hour as measured by a continuous monitoring system which meets the requirements of Approval Condition 12.”

3. Spokane requested Approval Condition 17 be revised to reflect their 25-year experience in bag usage for their baghouse. Approval Condition 17 currently requires an actual number of bags be kept onsite.

The WTE facility has found that a large number of spare bags have been held in inventory for years, and never used. The bags do have expiration dates.

Ecology agrees with Spokane's assessment of bag usage, and proposes the following new language for Approval Condition 17:

“The baghouse(s) shall have a maximum effective air to cloth ratio of 4:1 and maintain a spare bag inventory on the premises sufficient to properly operate and maintain the baghouse(s). “

4. Spokane requested Approval Condition 26 be amended to remove the 10 percent natural gas limit. The original requirement for a 10 percent natural gas limit was made to clarify that the plant was not subject to 40 CFR Part 60, Subpart Db. Since that time, EPA has revised Subpart Db to clearly exempt MWCs. See 40 CFR 60.40b(k) below for the clarification that addresses the WTE facility. Condition 26(b) is now unnecessary and creates a paperwork obligation to track each unit's annual capacity factor.

From 40 CFR 60.40b(k):

“(k) Any affected facility that meets the applicability requirements and is subject to an EPA approved State or Federal section 111(d)/129 plan implementing subpart Cb or subpart BBBB of this part is not covered by this subpart.”

Ecology proposes the following new language for Approval Condition 26:

“26. (a) Operation of the equipment must be conducted in compliance with all data specifications submitted as part of PSD application, unless otherwise approved by the department.

(b) Only natural gas shall be used in the auxiliary burners.”

3. PUBLIC INVOLVEMENT

There will be a 30-day public comment period from September 1, 2016, through September 30, 2016. If there is sufficient interest, a public hearing will be scheduled.

4. AGENCY CONTACT

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