TECHNICAL EVALUATION
AND
PRELIMINARY DETERMINATION

APPLICANT

Hillsborough County

50 North Falkenburg Road
Tampa, Florida

Hillsborough County Resource Recovery Facility
Facility ID No. 0570261

PROJECT

Draft Permit No. 0570261-013-AC/PSD-FL-369C
Application for Minor Source Air Construction Permit
Revisions to Mercury (Hg) Continuous Emission Monitoring System (CEMS) Provisions for Unit 4

COUNTY

Hillsborough County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Office of Permitting and Compliance
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

August 1, 2011

1. GENERAL PROJECT INFORMATION

Air Pollution Regulations

Projects at stationary sources with the potential to emit air pollution are subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The statutes authorize the Department of Environmental Protection (Department) to establish regulations regarding air quality as part of the Florida Administrative Code (F.A.C.), which includes the following applicable chapters: 62-4 (Permits); 62-204 (Air Pollution Control - General Provisions); 62-210 (Stationary Sources - General Requirements); 62-212 (Stationary Sources - Preconstruction Review); 62-213 (Operation Permits for Major Sources of Air Pollution); 62-296 (Stationary Sources - Emission Standards); and 62-297 (Stationary Sources - Emissions Monitoring). Specifically, air construction permits are required pursuant to Rules 62-4, 62-210 and 62-212, F.A.C.

In addition, the U. S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 specifies New Source Performance Standards (NSPS) for numerous industrial categories. Part 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP) based on specific pollutants. Part 63 specifies NESHAP based on the Maximum Achievable Control Technology (MACT) for numerous industrial categories. The Department adopts these federal regulations on a quarterly basis in Rule 62-204.800, F.A.C.

Facility Description and Location

This existing plant is a mass-burn municipal waste combustor (MWC) plant categorized under Standard Industrial Classification No. 4953. This existing plant is located in Hillsborough County at 350 North Falkenburg Road in Tampa, Florida. The UTM Coordinates are: Zone 17, 368.2 km East and 3092.7 km North; Latitude: 27° 57' 14" North and Longitude: 82° 40' 22" West.

This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to state and federal Ambient Air Quality Standards (AAQS).

Facility Regulatory Categories

- The facility is a major source of hazardous air pollutants (HAP).
- This facility does not operate units subject to the acid rain provisions of the Clean Air Act.
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

Project Description

As part of the project for the Title V air operation permit revision (Project No. 0570261-012-AV), the applicant requested a concurrent air construction permit revision to change several underlying construction permit conditions related to mercury (Hg) continuous emission monitoring system (CEMS) provisions for Unit 4.

Application Processing Schedule

Application for a Title V Air Operation Permit Revision received via Electronic Permit Submittal and Processing System (EPSAP) on June 9, 2010.
Application for Concurrent Air Construction/PSD Permit Revision from CDM (consultant) dated May 9, 2011 and received on May 11, 2011.

Relevant Documents

- Permit No. 0570261-007-AC/PSD-FL-369
- Permit No. 0570261-010-AC/PSD-FL-369B

2. PSD APPLICABILITY

General PSD Applicability

For areas currently in attainment with the state and federal AAQS or areas otherwise designated as unclassifiable, the Department regulates major stationary sources of air pollution in accordance with Florida's PSD preconstruction review program as defined in Rule 62-212.400, F.A.C. Under preconstruction review, the Department first must determine if a project is subject to the PSD requirements ("PSD applicability review") and, if so, must conduct a PSD preconstruction review. A PSD applicability review is required for projects at new and existing major stationary sources. In addition, proposed projects at existing minor sources are subject to a PSD applicability review to determine whether potential emissions *from the proposed project itself* will exceed the PSD major stationary source thresholds. A facility is considered a major stationary source with respect to PSD if it emits or has the potential to emit:

- 5 tons per year or more of lead;
- 250 tons per year or more of any regulated air pollutant; or
- 100 tons per year or more of any regulated air pollutant and the facility belongs to one of the following 28 PSD-major facility categories: fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, coal cleaning plants (with thermal dryers), Kraft pulp mills, portland cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants, primary copper smelters, municipal incinerators capable of charging more than 250 tons of refuse per day, hydrofluoric, sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process), primary lead smelters, fuel conversion plants, sintering plants, secondary metal production plants, chemical process plants, fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input, petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels, taconite ore processing plants, glass fiber processing plants and charcoal production plants.

Once it is determined that a project is subject to PSD preconstruction review, the project emissions are compared to the "significant emission rates" defined in Rule 62-210.200, F.A.C. for the following pollutants: carbon monoxide (CO); nitrogen oxides (NO_X); sulfur dioxide (SO_2); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM_{10}); volatile organic compounds (VOC); lead (Pb); fluorides (F); sulfuric acid mist (SAM); hydrogen sulfide (H_2S); total reduced sulfur (TRS), including H_2S; reduced sulfur compounds, including H_2S; municipal waste combustor organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans; municipal waste combustor metals measured as PM; municipal waste combustor acid gases measured as SO_2 and hydrogen chloride (HCl); municipal solid waste landfills emissions measured as non-methane organic compounds (NMOC); and Hg. In addition, significant emissions rate also means any emissions rate or any net emissions increase associated with a major stationary source or major modification which would construct within 10 kilometers of a Class I area and have an impact on such area equal to or greater than 1 $\mu g/m^3$, 24-hour average.

If the potential emission exceeds the defined significant emissions rate of a PSD pollutant, the project is considered "significant" for the pollutant and the applicant must employ the Best Available Control Technology (BACT) to minimize the emissions and evaluate the air quality impacts. Although a facility or project may be *major* with respect to PSD for only one regulated pollutant, it may be required to install BACT controls for several "significant" regulated pollutants.

PSD Applicability for Project

The project will revise permit conditions related to Hg CEMS provisions for Unit 4. There will be no emissions increases and the project is not subject to PSD preconstruction review. Because the revisions are being made to a PSD air construction permit a 30-day comment period will be specified concurrent with the 30-day comment period for the draft Title V air operation permit.

3. DEPARTMENT REVIEW

Background

Municipal waste combustors (MWCs) currently are required to perform stack tests to monitor mercury emissions under the federal regulations, 40 CFR 60, Subparts Cb/Eb. Hg CEMS are currently optional under 40 CFR 60, Subparts Cb/Eb. The Department recognizes that Unit 4 at the HCRRF may be the first MWC unit in the U.S. with the requirement in a permit to install a Hg CEMS. The application of Hg CEMS technology to MWCs is new in the U.S.

The initial PSD permit, Permit No. 0570261-007-AC/PSD-FL-369, had required the installation of a Hg CEMS within two years of Unit 4's commencement of operation. The basis for the two year timeframe after Unit 4's commencement of operation was predicated on Hg CEMS being installed and operated on utilities under the federal Clean Air Mercury Rule (CAMR) regulations (discussed in detail on Page 4 of the Technical Evaluation and Preliminary Determination document for Permit No. 0570261-007-AC/PSD-FL-369). The Department had concluded that 3rd generation Hg CEMS would become available and reasonably accurate by the time the HCRRF Unit 4 was to start operation. About 2 ½ years after coal-fired utility boilers were to have installed Hg CEMS, the HCRRF was to install a Hg CEMS. Subsequent to issuance (October 2, 2006) of the initial PSD permit for the HCRRF Unit 4, the federal CAMR regulations were vacated on February 8, 2008. Many of the Hg CEMS purchased by utilities were effectively mothballed.[1] The proposed federal Utility MACT (maximum achievable control technology) also known as the "NESHAP" (National Emissions Standards for Hazardous Air Pollutants) was recently promulgated on March 16, 2011.[2] The proposed Utility MACT contains mercury emission standards and monitoring requirements, e.g., Hg CEMS or Hg sorbent traps. The proposed dates for compliance with the Utility MACT are up to 2014/2015. With the federal regulatory drivers like the Utility MACT, Hg monitoring technology advancements and the market for Hg monitoring technology should increase in the near future.

Response to Requested Revisions

As part of the project for the Title V air operation permit revision (Project No. 0570261-012-AV), the applicant requested several changes to Title V air operation permit conditions. Some of these changes required revisions to the underlying construction permit conditions, which are explained below in this Technical Evaluation and Preliminary Determination.

The applicant requested changes to the AC/PSD permit by submitting a permit modification request by letter on May 11, 2011. The "Specific Condition No." cited below refers to the specific condition in Permit No. 0570261-010-AC/PSD-FL-369B. Specific Condition Nos. 3.B.19., 26., 30., 32., 33. and 35., contain Hg CEMS provisions for Unit 4. The applicant requested changes to these provisions.

1. Specific Condition Nos. 3.B.19., 26., 30., 32. and 35., mention the timeframe in which a Hg CEMS is required to be installed or reference the period prior to its installation.

   Applicant's Requested Changes:

   1-year Extension on Installing a Hg CEMS. CDM (consultant) on behalf of Hillsborough County RRF (the applicant) requested an additional year (12 months) to install a Hg CEMS on Unit 4.

   Department's Responses:

   An additional 1 year (12 months) extension in which to install a Hg CEMS is reasonable considering the new Hg monitoring technology and learning curve challenges associated with being first in the MWC industry to install a Hg CEMS.

   Specific Condition 3.B.35. is where the core requirement to install a Hg CEMS within two years of Unit 4's commencement of operation is located in PSD permit, Permit No. 0570261-010-AC/PSD-FL-369B. Specific Condition Nos. 3.B.19., 26., 30. and 32. in the PSD permit mention or cross reference the two year timeframe in which to install a Hg CEMS. The Department agrees with the requested change, changing these affected specific conditions.

2. Specific Condition 3.B.33.b., contains CEMS data availability requirements.

Applicant's Requested Changes:

Relief on the % Hg CEMS Data Availability. The applicant requested relief on the percent (%) data availability as it applies to a Hg CEMS. CDM on behalf of the applicant indicated that from their investigations, research and experiences show that Hg CEMS on MWC applications have not achieved 95% monitor availability. Specifically, the applicant requested relief from the 95% monitor availability stated in Specific Condition 3.B.33.b.

Department's Responses:

The percent (%) data availability requirements in Specific Condition 3.B.33.b. require 95% data availability for each CEMS with an exception to the Hg CEMS. As stated at the end of this specific condition the 95% monitor availability requirement were not to apply during the first two years of operation of the Hg CEMS (mentioned in 40 CFR 60, Subpart Eb for optional Hg CEMS). The limit in the PSD permit, 28 ug/dscm, was established to avoid a BACT determination. The Hg CEMS was required for reasonable assurance purposes not under 40 CFR 60, Subpart Eb. Unless a Hg CEMS is used to demonstrate compliance with the Eb limit (50 ug/dscm), the owner or operator is not required to comply with the Eb requirements like the prescribed % data availability, site-specific plans, etc.

Being that this is the first Hg CEMS being applied to an MWC unit in the U.S., it is recognized that it will be a challenge to work through any issues encountered during the initial installation and operation of the Hg CEMS. Relief on the % data availability may be provided in the form of a step approach as experience is gained by HCRRF. A step approach may be desirable to ultimately achieve a % data availability goal. A two step approach is proposed by the Department; specifically, for the 3rd year of operation of the CEMS an 80% data availability annually and for the 4th year of operation of the CEMS a 90% data availability annually with an ultimate goal of achieving 95% data availability annually. This two step approach is added to the specific condition.

3. Specific Condition 3.B.35. is where the core requirement to install a Hg CEMS within two years of Unit 4's commencement of operation is located in PSD permit, Permit No. 0570261-010-AC/PSD-FL-369B.

Applicant's Requested Changes:

Hg CEMS Field Test and Success Criteria. CDM on behalf of the applicant requested that a Hg CEMS be field tested on Unit 4 and success criteria for the field test to be added to the permit.

Department's Responses:

In the Fall of 2010, the applicant had reported to the Department problems with a Tekran Instruments Corp. manufactured Hg CEMS which had voluntarily been installed on an MWC unit in the U.S.[3] At the April 6, 2011 meeting Department agreed to allow the field testing of a Hg CEMS on Unit 4. CDM followed up with a letter dated May 9, 2011, reaffirming that a new generation Hg CEMS made by Sick-Maihak, Inc. would be field tested on HCRRF Unit 4. Field testing of a Hg CEMS is warranted as this is the first such Hg CEMS application on an MWC unit in the U.S.

The applicant proposed three specific criteria to judge the success of field testing a Hg CEMS on Unit 4. The three criteria were: 1) Performance Specification 12A (PS-12A), "Specifications and Test Procedures for Total Vapor Phase Mercury Continuous Monitoring Systems in Stationary Sources;" 2) a minimum % data availability; and, 3) a cost comparison between the operation & maintenance (O&M) costs of a Hg CEMS vs. the O&M costs of CEMS currently operational at HCRRF like the SO_2, NOx and CO CEMS.

The Department concurs with a quality assurance quality control (QA/QC) criteria. The addition of a method for the QA/QC of a Hg CEMS is appropriate.

The Department concurs with the idea behind this criteria. The Department was unable to understand clearly the specific requested language. As previously proposed by the Department, the proposed monitor availability for the 3rd year of operation of the Hg CEMS is 80%. The Department proposes to establish a minimum level of 70% for monitoring availability during the field testing.

The Department concurs with the idea behind a cost criterion. However, the Department proposes to not make this part of the field test "success criteria." Instead the applicant is being required to separately prepare and report updated cost information for a Hg CEMS with a field test report and to provide its conclusions and recommendations.

The applicant previously provided cost estimations on March 7, 2011 in a follow up to its report entitled "Findings and Recommendations: Continuous Monitoring of Mercury Emissions at a Municipal Waste Combustor - January 2011." [4, 5] In that cost analysis, the lowest Hg CEMS cumulative (total) cost was estimated to be $4.9 million compared to an Hg sorbent trap monitoring system of $1.65 million; a difference of about $3.25 million. In the same cost analysis, a Hg CEMS's cost range from 2.96 - 4.4 times more than an Hg sorbent trap monitoring system. It is important to note that the higher cost estimates were based on a Tekran Hg CEMS instrument having to replace the gold trap more frequently. Using capital costs from a next generation Hg CEMS like the Sick-Maihak instrument and O&M costs derived from actual Hg CEMS field testing on an MWC unit is more appropriate for use. Also, more up-to-date purchase costs for Hg monitoring technology is appropriate under the current market conditions. The applicant should be able to easily update the previously submitted cost estimation information for a Hg CEMS. For convenience, the cited cost estimation information which can be updated is attached to this technical evaluation.

Revisions

The approved revisions are shown in ~~strikethrough~~ (for deletions) and double-underlines (for additions) format within the permit revision itself. All changes are emphasized with yellow highlight.

4. PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. No air quality modeling analysis is required because the project does not result in a significant increase in emissions.

Mr. Scott M. Sheplak, P.E. was the project engineer responsible for reviewing the application and drafting Permit No. 0570261-007-AC/PSD-FL-369. He is the project engineer responsible for reviewing this application and drafting this permit revision. Additional details of this analysis may be obtained by contacting him by telephone at 850/717-9074 or by e-mail at scott.sheplak@dep.state.fl.us in the Department's Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

References

[1] World wide web site. Mid-Atlantic Regional Air Management Association, Inc. (MARAMA)/Institute of Clean Air Companies (ICAC) Hg CEMS Webinar. Webinar attended on July 26, 2011. Presentations posted on the following world wide web site http://www.marama.org/mercury-cems-webinar.

[2] World wide web site. U.S. Environmental Protection Agency (EPA). Utility MACT Information. http://www.epa.gov/airquality/powerplanttoxics/actions.html. Accessed on March 16, 2011.

[3] Reported to the Department on October 22, 2010 at the meeting between HCRRF representatives and the Department.

[4] World wide web site. State of Florida, Department of Environmental Protection. "Attachment A" of response to request for additional information dated and received on March 7, 2011.
Posted and available at http://arm-permit2k.dep.state.fl.us/psd/0570261/000059BF.pdf.

[5] World wide web site. "Findings and Recommendations: Continuous Monitoring of Mercury Emissions at a Municipal Waste Combustor - January 2011" received by the Department on January 28, 2011.
Posted and available at http://arm-permit2k.dep.state.fl.us/psd/0570261/0000582F.pdf.