

**RACT Evaluation Report – Central Valley Water Reclamation Facility**

**UTAH PM<sub>2.5</sub> SIP RACT**

**Salt Lake City Nonattainment Area**

**Utah Division of Air Quality**

**Major New Source Review Section**

**October 1, 2014**



State of Utah

GARY R. HERBERT  
*Governor*

GREGORY S. BELL  
*Lieutenant Governor*

Department of  
Environmental Quality

Amanda Smith  
*Acting Executive Director*

DIVISION OF AIR QUALITY  
Cheryl Heying  
*Director*

DAQE-AN0104140011-09

August 18, 2009

Ronald L. Roberts  
Central Valley Water Reclamation Fac.  
800 West Central Valley Road  
Salt Lake City, UT 841193379

Dear Mr. Roberts:

Re: Approval Order: Modification to Approval Order (DAQE-AN0414008-05) to Add an  
Emergency Generator  
Salt Lake County; CDS A; NSPS (Part 60), Nonattainment and Maintenance Area, PM<sub>10</sub> SIP /  
Maint Plan, Title V (Part 70)  
Project Number: N0104140011

The attached document is the Approval Order for the above-referenced project. Future correspondence on this Approval Order should include the engineer's name as well as the DAQE number as shown on the upper right-hand corner of this letter. The project engineer for this action is Camron Harry, who may be reached at (801) 536-4232.

Sincerely,

M. Cheryl Heying, Executive Secretary  
Utah Air Quality Board

MCH:CAH:dn

cc: Mike Owens  
Salt Lake Valley Health Department

**STATE OF UTAH**

**Department of Environmental Quality**

**Division of Air Quality**

**APPROVAL ORDER: Modification to Approval Order (DAQE-AN0414008-05) to Add an Emergency Generator**

**Prepared By: Camron Harry, Engineer  
Phone: (801) 536-4232  
Email: caharry@utah.gov**

**APPROVAL ORDER NUMBER**

**DAQE-AN0104140011-09**

**Date: August 18, 2009**

**Central Valley Water Reclamation Facility  
Wastewater Treatment Plant**

**Source Contact:  
Mr. Ronald L. Roberts,  
Phone: (801) 973-9100**

**M. Cheryl Heying  
Executive Secretary  
Utah Air Quality Board**

## Abstract

Central Valley Water Reclamation Facility is requesting a modification to their current Approval Order DAQE-AN0414008-05 to add a diesel-fueled generator rated at 896 hp. The facility is located in South Salt Lake City, in Salt Lake County, a non-attainment area for the National Ambient Air Quality Standards (NAAQS) for PM<sub>10</sub> and SO<sub>2</sub>, and is a maintenance area for ozone. National Emission Standards for Hazardous Air Pollutants (NESHAP) and Maximum Achievable Control Technology (MACT) do not apply to this source. New Source Performance Standards (NSPS) Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines apply to this source. Title V of the 1990 Clean Air Act does apply to this source.

The emissions, in tons per year, will change as follows: PM<sub>10</sub> +1.03, NO<sub>x</sub> + 12.40, SO<sub>2</sub> + 0.46, CO + 3.65, VOC +0.60, HAPs + 0.03.

The changes in emissions, in tons per year, will result in the following potential to emit totals: PM<sub>10</sub>=2.23, NO<sub>x</sub>=150.0, SO<sub>2</sub>=5.09, CO=215.06, VOC=59.42, HAPs=0.58.

This proposed modification has been reviewed and air dispersion modeling was not required; the thresholds for a PSD review and an increment analysis were not triggered. A SIP change is not required for this proposed modification.

This air quality AO authorizes the project with the following conditions and failure to comply with any of the conditions may constitute a violation of this order. This AO is issued to, and applies to the following:

**Name of Permittee:**

**Permitted Location:**

Central Valley Water Reclamation Fac.  
800 West Central Valley Road  
Salt Lake City, UT 841193379

Central Valley Water Reclamation Fac.:  
Wastewater Treatment Plant  
800 W Central Valley Road  
Salt Lake City, UT 84119-3379

**UTM coordinates:** 422,600 m Easting, 4,506,500 m Northing  
**SIC code:** 4952 (Sewerage Systems)

### **Section I: GENERAL PROVISIONS**

- I.1 All definitions, terms, abbreviations, and references used in this AO conform to those used in the UAC R307 and 40 CFR. Unless noted otherwise, references cited in these AO conditions refer to those rules. [R307-101]
- I.2 The limits set forth in this AO shall not be exceeded without prior approval. [R307-401]
- I.3 Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be reviewed and approved. [R307-401-1]
- I.4 All records referenced in this AO or in other applicable rules, which are required to be kept by the owner/operator, shall be made available to the Executive Secretary or Executive Secretary's representative upon request, and the records shall include the two-year period prior to the date of the request. Unless otherwise specified in this AO or in other applicable state and federal rules, records shall be kept for a minimum of two (2) years. [R307-401]

- I.5 At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this AO, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Executive Secretary which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded. [R307-401-4]
- I.6 The owner/operator shall comply with R307-150 Series. Inventories, Testing and Monitoring. [R307-150]
- I.7 The owner/operator shall comply with UAC R307-107. General Requirements: Unavoidable Breakdowns. [R307-107]

**Section II: SPECIAL PROVISIONS**

**II.A The approved installations shall consist of the following equipment:**

- II.A.1 **Water Reclamation Plant**  
Source Wide
- II.A.2 **Waukesha Engine**  
One (1) Waukesha Model GL 9500 engine generator - 1150 kW
- II.A.3 **Waukesha Engine**  
One (1) Waukesha Model 9390 engine generator - 1150 kW
- II.A.4 **Waukesha Engine**  
Three (3) Waukesha Model 8L-AT27GL engine generators - 1340 kW each
- II.A.5 **Back-up Generator**  
One (1) diesel back-up generator site rated at 1186 bhp
- II.A.6 **Back-up Generator**  
One (1) diesel back-up generator site rated at 896 hp
- II.A.7 **Back-up Generator**  
One (1) diesel back-up generator site rated at 349 hp
- II.A.8 **Back-up Generator**  
One (1) diesel back-up generator site rated at 896 hp
- II.A.9 **Flare**  
Two (2) digester gas flares

II.A.10           **Spray Applicator**

II.A.11           **Paint Booth**  
One water-wash paint spray booth

**II.B           Requirements and Limitations**

II.B.1            **Water Reclamation Plant**

II.B.1.a          The following limits originate from the Utah State Implementation Plan, Section IX, Part H for Central Valley Water Reclamation Facility:

NO<sub>x</sub> emissions from the operation of all engines at the plant shall not exceed 0.648 tons per day.

Compliance with the daily mass emission limits shall be demonstrated by multiplying emission factors (in units of mass per kw-hr) determined for each engine by the most recent stack test results, by the respective kilowatt hours generated each day. Power production shall be determined by examination of electrical meters which shall record the electricity production. Continuous recording is required. The records shall be kept on a daily basis.

NO<sub>x</sub> emission from the operation of all engines at the plant shall not exceed 205.6 tons per year.

Stack testing to determine the emission factors necessary to show compliance with the emission limitations stated in this condition shall be performed at least once every five (5) years. [R307-110]

II.B.1.b          Central Valley Water Reclamation Facility shall notify the Executive Secretary in writing when the installation of the new equipment listed in II.A has been completed and is operational. To insure proper credit when notifying the Executive Secretary, send your correspondence to the Executive Secretary, attn: Compliance Section.

If construction and/or installation has not been completed within 18 months from the date of this AO, the Executive Secretary shall be notified in writing on the status of the construction and/or installation. At that time, the Executive Secretary shall require documentation of the continuous construction and/or installation of the operation and may revoke the AO in accordance with [R307-401-18].

II.B.1.c          Visible emissions from the following emission points shall not exceed the following values:

- A. All gas engines - 10% opacity
- B. All diesel generators - 20% opacity
- C. All fugitive emissions - 15% opacity
- D. Digester gas flares - 10% opacity
- E. Spray booth exhaust - 10% opacity

Opacity observations of emissions from all engines, fugitive emissions, and the spray booth exhaust shall be conducted according to 40 CFR 60, Appendix A, Method 9; opacity observations of emissions from the digester gas flares shall be conducted according to 40 CFR

60, Appendix A, Method 22. [R307-201-3]

**II.B.2 Back-Up Generators**

II.B.2.a Each of the emergency diesel generators shall only be operated for maintenance and during power outages of the plant and shall not exceed 500 hours per rolling 12-month total. Records documenting generator maintenance and emergency usage shall be kept in a log and shall show the date the generator was operated, the duration in hours of the generator usage, the power generated and the reason for each generator usage.

To determine compliance with a rolling 12-month total, by the first day of each month a new 12-month total shall be calculated using data from the previous 12 months. Monthly calculations shall be made no later than 20 days after the end of each calendar month. [R307-401]

II.B.2.b The owner/operator shall only use fuel oil #1, #2, or any combination of #1 & #2 as a fuel for the emergency generators. Sulfur content of the fuel shall not exceed 0.05 % by weight.

The sulfur content shall be determined by ASTM Method D-4294-89 or approved equivalent. Certification of fuel oil shall be either by Central Valley Water Reclamation Facility's own testing or test reports from the fuel oil marketer. [R307-401]

**II.B.3 Waukesha Engine Generators**

II.B.3.a Emissions to the atmosphere from each of the 1150 kw engine generators shall not exceed the following rates and concentrations:

Pollutant	lb/hr	gm/(hp-hr)
NO <sub>x</sub>	5.95	1.75
CO	12.24	3.6

[R307-102]

II.B.3.b Emissions to the atmosphere from each of the 1340 kw engine generators shall not exceed the following rates and concentrations:

Pollutant	lb/hr	gm/(hp-hr)
NO <sub>x</sub>	7.13	1.8
CO	9.90	2.5

[R307-102]

II.B.3.c A compliance test shall be done at least once every five years or perform an annual portable analyzer test, subsequent to the initial compliance test. The Executive Secretary may require testing at any time. If an existing source is modified, a compliance test is required on the modified emission point that has an emission rate limit.

Notification: The Executive Secretary shall be notified at least 30 days prior to conducting any required emission testing. A source test protocol shall be submitted to DAQ when the testing notification is submitted to the Executive Secretary.

The source test protocol shall be approved by the Executive Secretary prior to performing the test(s). The source test protocol shall outline the proposed test methodologies, stack to be tested, and procedures to be used. A pretest conference shall be held, if directed by the Executive Secretary.

**Sample Location:** The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or other methods as approved by the Executive Secretary. An Occupational Safety and Health Administration (OSHA) or Mine Safety and Health Administration (MSHA) approved access shall be provided to the test location.

**Calculations:** To determine mass emission rates (lb/hr, etc.) the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric flow rate and any necessary conversion factors determined by the Executive Secretary, to give the results in the specified units of the emission limitation.

For an existing source/emission point, the production rate during all compliance testing shall be no less than 90% of the maximum production achieved in the previous three (3) years.

For a new source/emission point, the production rate during all compliance testing shall be no less than 90% of the production rate listed in this AO. If the maximum AO allowable production rate has not been achieved at the time of the test, the following procedure shall be followed:

- 1) Testing shall be at no less than 90% of the production rate achieved to date.
- 2) If the test is passed, the new maximum allowable production rate shall be 110% of the tested achieved rate, but not more than the maximum allowable production rate. This new allowable maximum production rate shall remain in effect until successfully tested at a higher rate.
- 3) The owner/operator shall request a higher production rate when necessary. Testing at no less than 90% of the higher rate shall be conducted. A new maximum production rate (110% of the new rate) will then be allowed if the test is successful. This process may be repeated until the maximum AO production rate is achieved.

**Volumetric Flow Rate:** 40 CFR 60, Appendix A, Method 2 or other testing methods approved by the Executive Secretary.

**Carbon Monoxide (CO):** 40 CFR 60, Appendix A, Method 10, or other testing method approved by the Executive Secretary.

**Nitrogen Oxide (NO<sub>x</sub>):** 40 CFR 60, Appendix A, Method 7, 7A, 7B, 7C, 7D, 7E, or other testing method approved by the Executive Secretary. [R307-150]

#### II.B.3.d

The following emission limits shall not be exceeded:

- 1) Maximum combined emissions from the five Waukesha Engines shall not exceed 132.79 tons of NO<sub>x</sub> per rolling 12-month period.
- 2) Maximum combined emissions from the five Waukesha Engines shall not exceed 210.56 tons of CO per rolling 12-month period.

To determine compliance with a rolling 12-month total, by the first day of each month a new 12-month total shall be calculated using data from the previous 12 months. Monthly calculations shall be made no later than 20 days after the end of each calendar month. Emission factors shall be used to calculate the rolling 12-month emission rate limitations. The emission factors shall be obtained using the appropriate EPA reference method on the latest test results. The emission factor shall have units of mass per hp-hr. The rolling 12-month emission rate shall be obtained by multiplying the emission factor and the production (in hp-hr/month), using the appropriate unit conversion factors. In the absence of test data, the emission rates listed in conditions II.B.3.a & b may be used to calculate the emission factor.

Records of production shall be kept for all periods when the plant is in operation. Production shall be determined by examination of electrical meters, which shall record the electricity production. Continuous recording is required. The records shall be kept on a daily basis.

For all five engines, an emission report showing compliance for NO<sub>x</sub> and CO as stated in the above conditions shall be supplied to the Executive Secretary any time a new baseline (air to fuel ratio) is set due to annual maintenance and repairs. [R307-150]

II.B.3.e The owner/operator shall only use digester gas, natural gas, or a mixture of the two as a fuel in the generator engines. [R307-401]

II.B.4 **Painting Equipment**

II.B.4.a The VOC content of the paint as used in the booth shall not exceed the density limits established in R307-340. High solids (low VOC content) paints shall not be thinned or otherwise reduced beyond manufacturer's recommendations. These parameters shall be tested by using the appropriate ASTM method or another method approved by the Executive Secretary. [R307-340]

**Section III: APPLICABLE FEDERAL REQUIREMENTS**

In addition to the requirements of this AO, all applicable provisions of the following federal programs have been found to apply to this installation. This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including UAC R307.

NSPS (Part 60), IIII: Stationary Comp/Ignit R.I.C.E

**PERMIT HISTORY**

This AO is based on the following documents:

Is Derived From	Additional Information - PTE Calculations dated March 9, 2009
Is Derived From	NOI dated February 3, 2009
Replaces	DAQE-AN0414008-05 dated September 6, 2005

**ACRONYMS**

The following lists commonly used acronyms and their associated translations as they apply to this document:

40 CFR	Title 40 of the Code of Federal Regulations
AO	Approval Order
ATT	Attainment Area
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CDS	Classification Data System (used by EPA to classify sources by size/type)
CEM	Continuous emissions monitor
CEMS	Continuous emissions monitoring system
CFR	Code of Federal Regulations
CO	Carbon monoxide
COM	Continuous opacity monitor
DAQ	Division of Air Quality (typically interchangeable with UDAQ)
DAQE	This is a document tracking code for internal UDAQ use
EPA	Environmental Protection Agency
HAP or HAPs	Hazardous air pollutant(s)
ITA	Intent to Approve
MACT	Maximum Achievable Control Technology
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NO <sub>x</sub>	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
PM <sub>10</sub>	Particulate matter less than 10 microns in size
PM <sub>2.5</sub>	Particulate matter less than 2.5 microns in size
PSD	Prevention of Significant Deterioration
R307	Rules Series 307
R307-401	Rules Series 307 - Section 401
SO <sub>2</sub>	Sulfur dioxide
Title IV	Title IV of the Clean Air Act
Title V	Title V of the Clean Air Act
UAC	Utah Administrative Code
UDAQ	Utah Division of Air Quality (typically interchangeable with DAQ)
VOC	Volatile organic compounds

2.2.E Central Valley Water Reclamation Facility

1. The installations shall consist of only the following equipment:

Four 625 Kw Engine-Generator Sets

2. Central Valley Water Reclamation shall retrofit one of the engine-generator sets with a catalytic convertor or clean burn configuration to achieve a reduction in NO<sub>x</sub> emissions.
3. Emissions to the atmosphere from the indicated emission point shall not exceed the following rates and concentrations:

A. Retrofitted Engine

1.	NO <sub>x</sub>	3.69 lbs/hr	16.2 tons/yr
2.	CO	3.69 lbs/hr	16.2 tons/yr

B. Uncontrolled Engines (each of three)

1.	NO <sub>x</sub>	17.6 lbs/hr	62.5 tons/yr
2.	CO	17.6 lbs/hr	62.5 tons/yr

4. Compliance with the above emission limitations shall be determined by continuous emission monitors. The monitors shall be operated in accordance with Section 4.6 Utah Air Conservation Regulations.
5. Visible emissions from any point or fugitive emission source associated with the installation or control facilities shall not exceed 0% opacity. Opacity observations of emissions from stationary sources shall be conducted in accordance with 40 CFR 60, Appendix A, Method 9.
6. The following production limits shall not be exceeded without prior approval in accordance with Section 3.1, UACR:
  - A. 13.35 X 10<sup>3</sup> MW\*hr/yr total for the three uncontrolled engines;
  - B. 5,475 MW\*hr/yr for the engine burning natural gas with the catalytic convertor.

Energy production shall be determined by reading Watt-Hour meters which shall be installed on each engine. The records shall be kept on a daily basis.

7. The owner/operator shall use only natural gas or digester gas as fuel in the engines. If any other fuel is to be used, an approval order shall be required in accordance with Section 3.1, UACR.
8. "Allowable emissions" as defined in Section 1.12, UACR, for this source (the entire plant) are hereby established at 1.67 tons/yr for PM<sub>10</sub>, 0.61 tons/yr for SO<sub>2</sub>, 46.7 tons/yr for NO<sub>x</sub>.

# **RACT EVALUATION REPORT CENTRAL VALLEY WATER RECLAMATION FACILITY**

## **1.0 INTRODUCTION AND FACILITY DESCRIPTION**

Central Valley Water Reclamation Facility (CVWRF) is a municipal wastewater treatment facility located in Salt Lake City. The primary SIC Code for the facility is 4952-Sewage Systems.

The facility operates under Utah DAQ AO DAQE-AN0104140011-09, dated August 18, 2009. The facility is subject to 40 CFR 60 Subparts A-General Provisions and Subpart IIII regulations – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Additionally, Title V of the 1990 Clean Air Act applies to this facility. CVWRF is a major source for NO<sub>x</sub> and CO.

### **1.1 Central Valley Water Reclamation Facility Identification**

*Name:* Central Valley Water Reclamation Facility  
*Address:* 800 W Central Valley Road  
Salt Lake City, Utah 84119  
*Owner/Operator:* Central Valley Water Reclamation Facility  
*UTM coordinates:* 422,600 m Easting, 4,506,500 m Northing

### **1.2 Facility Process Summary**

CVWRF occupies approximately 81 acres. The facility treats between 50 and 60 million gallons of wastewater every day.

### **1.3 Facility Criteria Air Pollutant Emissions Sources**

Five (5) Waukesha Engine Generators (3-1340 kW and 2-1150 kW)  
One (1) Water-wash Paint Spray Booth  
Four (4) Emergency generators (1186 hp, 2-896 hp, 349 hp)  
Digesters  
Biological Process  
Two (2) Digester Flares  
Composting

### **1.4 RACT Cut-off Threshold**

The following emission points with baseline actual emissions less than 5 tpy were determined to be de minimus and not evaluated for RACT as any additional controls would not significantly reduce emissions.

Paint Equipment: 2008 actual baseline VOC emissions for the paint spray booth were

0.16 tpy. Surface coating painting operations in the PM<sub>2.5</sub> nonattainment area are regulated under R307-347, R307-350, and R307-353.

Emergency Generators: 2008 actual baseline emissions for all emergency generators were as follows, in tons per year: PM<sub>2.5</sub> = 0.06, NO<sub>x</sub> = 1.78, SO<sub>x</sub> = 0.20, and VOC = 0.80. In addition to low actual emissions, emergency generators operate less than 100 hours per year for maintenance and testing purposes.

Biological Processes/Clarifiers: Clarifiers (10), trickling filters (6), and aeration basins (6) combined emit approximately 12.5 tons per day or 2.28 tpy of VOCs.

Flare: 2008 actual baseline NO<sub>x</sub> emissions for the flare were 0.001 tpy.

## **2.0 RACT Evaluation**

### **2.1 Emission Source and Existing Controls: Generators**

CVWRF currently has three 1340 kw Waukesha lean burn generators and two 1150 kw Waukesha lean burn generators. These engines are currently limited to 0.648 tpy NO<sub>x</sub> and 132.79 tpy NO<sub>x</sub> with the following individual NO<sub>x</sub> limitations:

1150 kW engines = 5.95 lb/hr (1.75 gm/hp-hr)

1340 kW engines = 7.13 lb/hr (1.80 gm/hp-hr)

The PM<sub>10</sub> SIP limits NO<sub>x</sub> emissions from all engines at the plant not to exceed 0.648 tpd and 205.6 tpy.

The total 2008 reported actual emissions for the five Waukesha generators were as follows, in tons per year: PM<sub>2.5</sub> = 0.04, NO<sub>x</sub> = 4.93, SO<sub>x</sub> = 0.12, and VOC = 5.03.

## **NO<sub>x</sub>**

### **Available Control Technology**

The identified RACT for NO<sub>x</sub> emissions from these three generators includes curtailing natural gas usage during poor weather conditions and buying power from the grid (USE) as well as selective catalytic reduction (SCR). The RBLC lists low emission combustion SCR, lean burn, good combustion practices (GCP), and non-selective catalytic reduction (NSCR) as potential NO<sub>x</sub> emission control technologies.

#### **Curtail the Use of Engines during Bad Weather (USE)**

A proposed control strategy to reduce emissions is to curtail the use of the engines during bad weather conditions. Currently, the natural gas component of mixed gas represents the majority of the energy feed to the engines. By eliminating natural gas use during these periods, emission reductions of approximately 55% are possible. Power loss to plant operations will be compensated by importing more power from the utility company.

### SCR

SCR has been applied to large (>250 MMBtu/hr) utility and industrial boilers, process heaters, and combined cycle gas turbines. SCR can be applied as a stand-alone NO<sub>x</sub> control or with other technologies such as combustion controls. In practice, SCR systems operate at to achieve NO<sub>x</sub> control efficiencies in the range of 70% to 90%.

The SCR process is based on the chemical reduction of the NO<sub>x</sub> molecule. The SCR employs a metal-based catalyst with activated sites to increase the rate of the reduction reaction. A nitrogen based reducing agent (reagent), such as ammonia or urea, is injected into the post combustion flue gas. The reagent reacts selectively with the flue gas NO<sub>x</sub> within a specific temperature range and in the presence of the catalyst and oxygen to reduce the NO<sub>x</sub> into molecular nitrogen (N<sub>2</sub>) and water vapor (H<sub>2</sub>O).

### GCP

GCP refers to the operation of the engine at high combustion efficiencies which reduce the emissions of incomplete combustion.

### NSCR

NSCR is a common reference to Three-Way Catalysts. NSCR catalysts address CO and hydrocarbon (HC) exhaust emissions via oxidation, while also converting NO<sub>x</sub> via reduction. NSCR derives its name from being a contrast to SCR, by which NO<sub>x</sub>, in the presence of excesses of oxygen, are “selectively” reduced by the reaction with other nitrogen-based compounds, such as ammonia or urea.

## **Technically infeasible RACT controls**

### SCR

Installation of SCR systems on the engines would compromise the equipment life due to the concentrations of siloxane and sulfur in the digester gas. Additionally, implementation of SCR would increase particulates from ammonia injection into the air. No SCR systems are known to be operating in digester gas applications within the United States. Therefore, the SCR option is considered technically infeasible.

### NSCR

NSCR catalysts are effective to reduce NO<sub>x</sub> emissions when applied to rich-burn engines fired on natural gas, propane and gasoline. The engines are lean-burn engines, therefore, the NSCR option is considered technically infeasible.

## **Evaluation and Ranking of Technically feasible RACT Controls**

The remaining feasible RACT option controls are GCP and USE.

Costs for USE were based on the difference between purchasing utility power versus purchasing natural gas during inversion conditions for an estimated 60 days per year. Based on this, it is estimated that an annualized cost would be \$50,650 per year, or approximately \$32,062 per ton of NO<sub>x</sub> removal (1.58 tpy removal of NO<sub>x</sub>).

Implementation of USE for the generators is cost prohibitive.

### **Selection of RACT controls**

DAQ recommends GCP, the existing NO<sub>x</sub> limitations and no add on controls be installed on the five IC engines as RACT for the control of NO<sub>x</sub> emissions.

### **VOC's**

#### **Available Control Technology**

Only one add-on control technology has been identified by DAQ to reduce emissions of VOC from IC engines – the use of oxidation catalysts. An oxidation catalyst is similar in design and operation to a catalytic control system on a passenger vehicle, in that an inline, self-regenerating, catalyst system is placed within the exhaust stream prior to the final stack, so that emissions of CO and VOC can be further oxidized to CO<sub>2</sub> and water. Oxidation of VOC can approach efficiencies of 70%, depending on initial concentrations and stack characteristics.

#### **Technically infeasible RACT controls**

An oxidation catalyst is a feasible control technology.

#### **Evaluation and Ranking of Technically feasible RACT Controls**

Installation of an oxidation catalyst on all five IC engines would reduce emissions of VOC by at best a total of 3.5 tpy. Actual emission reductions will likely be slightly less than 3.5 tpy, depending on the actual amount of startup operations.

It is not economically feasible to install add on controls to five IC engines for a total actual reduction of 3.5 tpy.

#### **Selection of RACT controls**

DAQ recommends as RACT that no add on controls be installed on the five IC engines for the control of VOC emissions.

## **2.2 Emission Source and Existing Controls: Digesters**

CVWRF now utilizes a two-staged anaerobic digestion process which reduced the amount of digester gas by about 85%. The majority of the digester gas is produced in air-tight, egg-shaped digesters which results in the reduction of fugitive VOC emissions. VOC emissions from the digesters are sent to the flare.

The total 2008 actual VOC emissions for the digesters were 23.48 tons per year based on approximately 0.0002 lbs per cubic feet.

### **Available Control Technology**

Based on the review of U.S. EPA RBLC database and similar operations, the following control technologies have been identified that would be applicable for controlling VOC emissions from the digesters: Operate using good management practices and flaring.

In January 2011 CVWRF implemented a change of operation for the digesters; it now operates in a two-stage mode. Sludge is conveyed to the primary stage digesters for detention for approximately 20 days. The two primary digesters are egg-shaped and are completely air-tight, therefore no gas vents to the atmosphere. Ninety percent of the gas production occurs in this primary stage. The second digesters, with 20 day detention times, are of a floating roof design where some leakage may occur. Ten percent of the gas production occurs in the secondary digesters. This new design is significant because previously, fifty percent of the gas was produced in both phases. The new VOC emission rate for the entire system is 0.22 lbs/1000 gallon (0.000029 lbs / cubic foot), an approximate reduction of 85%.

### **Technically infeasible RACT controls**

Good management practices and flaring are feasible RACT controls.

### **Evaluation and Ranking of Technically feasible RACT Controls**

The existing controls of two-stage mode operations, good management practices and flaring to control VOC emissions from the digesters are the only technically feasible RACT control options for VOC emissions from the digesters.

### **Selection of RACT controls**

The continued use of two-stage mode operations, good management practices and flaring to control VOC emissions is recommended by DAQ as RACT for the digesters.

## **2.3 Emission Source and Existing Controls: Composting**

Updates in 2011 to modify the composting program from an open-air window operation to an in-vessel aerated static pile (IASP) were designed to meet the strictest air board regulations on the capture of VOCs. A 95% removal rate was approximated using San Joaquin Valley Compost factors.

In 2008, CVWRF was not operating a composting operation so there are no baseline actual emissions to report. However, CVWRF estimates that VOC emissions to atmosphere off site were approximately 211 pounds per day (38.5 tpy).

## **Available Control Technology**

Based on the review of U.S. EPA RBLC database and similar operations, no control technologies have been identified that would be applicable for controlling VOC emissions from composting.

In 2008 composting was done off-site from CVWRF and was uncovered (open-air windrow operation), all VOC emissions entered the atmosphere. In 2011, CVWRF brought composting on-site and installed an in-vessel aerated static pile system along which includes a micropore cover technology. This new system consists of fixed air plenums and blowers to maintain a controlled air flow to each composting pile. The process also uses micro pore breathable membrane covers which provide a barrier that most long chain molecules, fatty acids, sulfur compounds and other VOC cannot penetrate. San Joaquin Valley Compost factors indicate a removal rate of approximately 95%. With the new system, only approximately 11.4 pounds per day (2.08 tpy) will be emitted to the atmosphere.

## **Technically infeasible RACT controls**

The existing IASP operation is currently operating and technically feasible.

## **Evaluation and Ranking of Technically feasible RACT Controls**

The existing IASP windrow operation is currently operating and the only technically feasible control option.

## **Selection of RACT controls**

The continued use of the IASP operation for composting is recommended by DAQ as RACT for VOC emissions.

### **3.0 Startup Shutdown**

CVWRF operates the engines on a continuous basis with scheduled shutdowns for maintenance approximately every six weeks. Startups last two minutes and shutdowns are on an automatic four minute timer (manufacturer's recommendation).

### **4.0 Conclusion- Emissions Reduction through RACT implementation**

Emission reductions were not established in the RACT analysis because many technologies were eliminated due to insignificant or no current emissions or cost concerns.

## **5.0 Implementation Schedule**

Operations at CVWRF have been determined to meet the requirements of RACT, there is no further implementation schedule proposed.

## **6.0 Notes**

In TechLaw's June 28, 2013 Evaluation report there was an erroneous reference to CVWRF being owned/operated by a subsidiary of McWane Case Iron Pipe Company.

## **7.0 References**

1. Central Valley Water Reclamation Facility. 11386 Emission Inventory. 2008
2. Modification to Approval Order (DAQE-AN0414008-05) to Add an Emergency Generator Approval Order DAQE-AN0104140011-09. State of Utah, Department of Environmental Quality, Division of Air Quality. Camron Harry, Engineer. August 18, 2009.
3. Letter from Ronald L. Roberts, CVWRF, to Martin D. Gray, Utah Division of Air Quality. March 1, 2013.
4. Techlaw. UDSHW Contract 126015, Work Assignment No. 07, Utah PM<sub>2.5</sub> SIP RACT Support, Revised RACT Evaluation Report Central Valley Water Reclamation Facility; Salt Lake City. June 28, 2013.
5. Central Valley Water Reclamation Facility. Update to Central Valley Best Available Control Technology (BACT) Assessment. April 14, 2014.