

CENTRAL AVRA VALLEY STORAGE AND RECOVERY PROJECT (CAVSARP)

TECHNICAL SUPPORT DOCUMENT (TSD)

I. GENERAL COMMENTS:

A. Company Information

Facility Name: Central Avra Valley Storage and Recovery Project (CAVSARP)

Physical address:

13800 W. Mile Wide Road
Tucson, Arizona 85735

Mailing Address:

P.O. Box 27210
Tucson, Arizona 85726

B. Background

Date (Most Recent First)	Action
November 7, 2012	Received 5-yr permit renewal application.
September 23, 2005	Received 5-yr permit renewal application.
December 11, 2001	Minor permit revision complete. Revised permit issued.
August 7, 2001	Application for a minor revision to address change in periodic frequency testing, methods and conditions.
March 14, 2001	1 st five-year Synthetic Minor permit issued to the facility. (Expired March 13 th , 2006).
December 7, 2000	Application for air quality permit received.

This renewal application is the third, five-year permit for CAVSARP.

C. Attainment Classification

The facility is located in an area that is in attainment for all pollutants.

II. FACILITY DESCRIPTION

A. Process Description

The CAVSARP facility operates twenty-five large-capacity well pumps and fourteen boosters that are used to recover naturally treated Central Arizona Project water from the regional aquifer. Seven of the boosters and thirteen of the well pumps are fired by pipeline quality natural gas; the remainder of the engines, twelve well pumps and seven boosters are electric powered. The electric powered well pumps and boosters are not considered stationary sources under this air quality operating permit. A complete list of applicable equipment is listed in Attachment B of this permit and an equipment location plan in Attachment C of this permit.

All engines are equipped with a catalytic oxidation unit and a factory installed air/fuel ratio control that are designed to reduce carbon monoxide (CO) emissions and nitrogen oxide (NO_x) emissions respectively.

These emissions controls are designed to ensure the CO and NO_x emissions do not exceed the manufacturers' specified emission data and are preset to operate lean burn.

Combining the air/fuel ratio controller and the catalytic oxidation unit reduces the emissions of criteria pollutants to below the major source threshold. Based on the above information, the CAVSARP facility may be permitted as a synthetic minor source. Air pollutants emitted from the facility include NO_x, SO_x, CO, PM₁₀, VOC and HAPs.

B. Air Pollution Control Equipment

All natural gas fired engines are installed with catalytic oxidation units and air/fuel ratio controls that limit the carbon monoxide and nitrogen oxide emissions respectively. No other air pollution control equipment is used at the facility.

III. REGULATORY HISTORY

A. Testing & Inspections

The facility has been permitted since March 14, 2001 and has been inspected twice to date. Since permit issuance, the source has periodically tested the Driving Well Pumps and Driving Booster Pumps to demonstrate compliance with the synthetic minor CO and NO_x limiting standards. Attachment 1 of this TSD contains a tabular representation the test results.

Driving Well Pumps AF-034B and AF-037B (report test date: 2/5-7/2003 & 2/14/03) demonstrated non compliance with the NO_x emission limitation. The facility arranged for the well pumps to be adjusted by the manufacturer to reduce the nitrogen oxides (NO_x) emissions to below 1 gm/bhp-hr. The source subsequently re-tested these engines on 04/9-10/03 and 04/04-06/05, the results of which demonstrated compliance with the NO_x standard.

Driving Well Pump AF-038B (report test date 01/02-16/02) demonstrated non compliance with the NO_x emission limitation. The facility arranged for the well pumps to be adjusted by the manufacturer to reduce the nitrogen oxides (NO_x) emissions to below 1 gm/bhp-hr. The source subsequently re-tested this engine on 03/22/02, 06/12-13/02, and 04/04-06/05 and the results of the test demonstrated compliance with the NO_x standard.

All Driving Well Pumps and Driving Booster Pumps have been tested at least twice (with the exception of CA-009A and CA-014A), the results of which have demonstrated compliance with the CO, NO_x and previous synthetic minor Formaldehyde limiting standard.

The applicability of the synthetic minor formaldehyde emission limitation standard has been removed from the permit as past test data demonstrates compliance with this standard by a factor of ten; In addition, there is no standard for formaldehyde emissions nor does the facility meet any thresholds for HAPs.

Continual operation of the emission units with air/fuel ratio controls and catalytic oxidation units will ensure that the NO_x and CO emissions are not exceeded. As a result, PDEQ has eliminated further cyclic testing requirements on all engines. The Permittee shall continually maintain and operate the engines according to manufacturer's instructions and/or in-house maintenance plan.

The facility has received one Notice of Violation (NOV) dated April 27, 2007. The NOV detailed numerous occasions when the facility failed to provide PDEQ timely notification of performance testing. This violation was adequately resolved and closed on May 24, 2007. The facility is currently in substantial compliance with Pima County Code Title 17.

B. Excess Emissions

The facility has submitted no reports of excess emissions.

IV. EMISSIONS ESTIMATES

The emission calculations submitted by the facility (dated July 24, 2015) have been verified. The emissions summary with and without controls are presented in the following Table:

Emission Source	Engine Status	Emissions					
		NO _x	CO	VOC	PM ₁₀	SO ₂ ²	HAPs
NG ¹ Fired Engines (Pumps and Boosters)	Uncontrolled	211.0	131.0	28.0	0.01	0.14	17.2
	Controlled	71.7	12.2	28.0	0.01	0.14	8.4

¹ NG: Natural Gas

² Based on 100% conversion of fuel sulfur content to SO₂. (Assumes sulfur content in natural gas of 2,000 gr/10⁶scf.)

Based on these emissions, the facility's permit class is a **Class II, Area Source** for all regulated air pollutants.

V. APPLICABLE REQUIREMENTS

New Source Performance Standards (NSPS):

No NSPS rules apply to the facility.

National Emission Standards for Hazardous Air Pollutants (NESHAP):

40 CFR 63, Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

This rule applies to many types of internal combustion engines at major sources of hazardous air pollutants (HAPs) and area sources of HAPs. The CAVSARP facility is an area source of HAPs because controlled HAPs emissions are less than 10 tons per year (tpy) of any single HAP and less than 25 tpy of combined HAPs.

Specifically for CAVSARP, this rule applies to the non-emergency spark-ignition 4-stroke lean burn engines at the facility that were ordered before June 12, 2006. The date for these engines to meet the requirements of the rule is October 19, 2013. The specific requirements of the rule that apply to the CAVSARP engines are:

- 40 CFR 63.6603 and Table 2d- Emission limitations/management practices
- 40 CFR 63.6625(e), (h), and (j)- Monitoring, installation, collection, operation and maintenance requirements
- 40 CFR 63.6605 and 40 CFR 63.6640 -Continuous compliance
- 40 CFR 63.6655 [except 63.6655(c) and (f)]- Recordkeeping requirements
- 40 CFR Part 63, Subpart A, General Provisions, as applicable; except per 40 CFR 63.6645(a)(5), the following do not apply: 63.7(b) and (c); 63.8(e), (f)(4), and (f)(6); and 63.9(b), (c), (d), (e), (g), and (h).

Another Federal rule that has changed since the last air permit renewal in 2008 is 40 CFR 60, Subpart JJJJ: Standards of Performance for Stationary Spark-Ignition Internal Combustion Engines. Amongst others, this rule applies to spark-ignition internal combustion engines ordered after June 12, 2006 and manufactured on or after July 1, 2008 for engines with a maximum engine horsepower less than 500 hp. All of the CAVSARP engines have a maximum engine horsepower less than 500 hp but all were manufactured before July 1, 2008. Therefore, this rule does not apply to the CAVSARP engines.

Pima County Code (PCC) - The following PCC rules apply:

Permit contents	PCC 17.12.185
Permit Fees	PCC 17.12.510
Permit revision, reopening, revocation and reissuance, or termination for cause	PCC 17.12.270
Standards and applicability (includes NESHAP)	PCC 17.16.040
Visibility limiting standard	PCC 17.16.050
Duty to Provide Information	PCC 17.12.165
Visible Emissions Testing	PCC 17.16.040
Standards of performance for stationary rotating machinery	PCC 17.16.340
Source Sampling, Monitoring, and Testing	PCC 17.20.010

Testing Requirements:

Mass emission testing to determine compliance with the particulate matter standard in PCC 17.16.340.C is not normally necessary as standard emission factors for natural gas fired engines yield emission estimates of particulate matter that are far less than the standard allowed by the referenced equation.

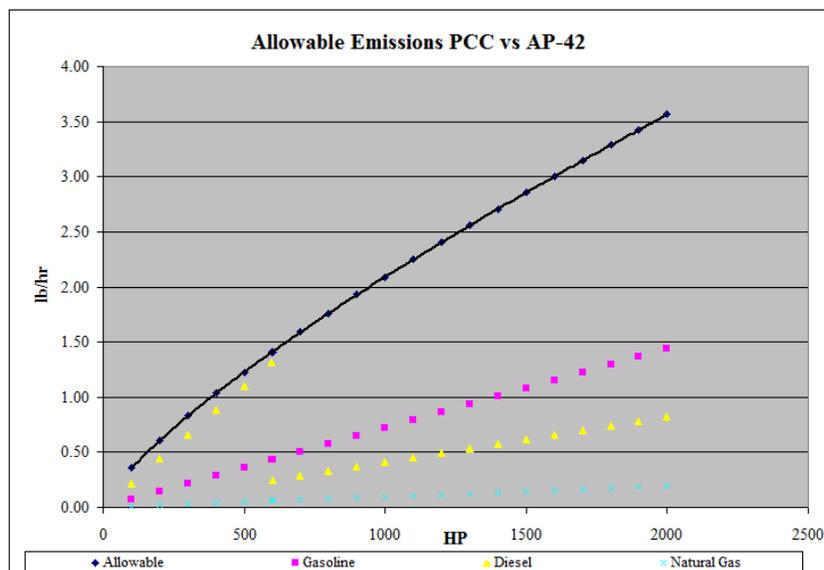
Alternate Operating Scenarios:

The applicant has not requested any alternate operating scenarios.

Miscellaneous Comments:

1. Particulate Matter

PCC 17.16.165.C.1 limits the emissions of particulate matter from fossil fuel fired industrial and commercial equipment. This rule has not been included in the permit as allowable emissions are well above potential emissions. The following Chart illustrates the fact:



AP-42 estimated emissions are demonstrably less than allowable emissions. Therefore, it is not necessary to include the standard in the permit explicitly but, by reference in Attachment 1.

2. Sulfur Dioxide:

Compliance with the fuel limitation requirement (II.D of Section 1) shall ensure compliance with the Sulfur Dioxide Standard of PCC 17.16.165.E which limits the emission of SO₂ to 1.0 pound per million BTU heat input, when burning low sulfur fuel. The definition of low sulfur fuel (PCC 17.04.340.A. “Low Sulfur Fuel”) is fuel oil containing less than 0.9 percent sulfur by weight. The source has reported to consume only natural gas in the incinerator process however, assuming worst case scenario, AP-42 Appendix A, page A-5 states the heating value of diesel fuel is 137,000 BTU per gallon. Thus, 1 million BTU of heat input is equivalent to 7.3 gallons of diesel. At 7.05 lbs per gallon, 51.47 lbs of diesel will produce 1 million BTU. At 0.9% 51.47 lbs of diesel contains 0.46 lbs of sulfur. Combined with Oxygen to form SO₂ and assuming 100% of the sulfur in the fuel forms SO₂ this would yield 0.92 lb SO₂ per 1MMBtu. Thus, low sulfur fuel oil will produce 0.92 lbs of SO₂ per million BTU of heat input. This is roughly 8% less than the prescribed 1.0 pound SO₂ per million BTU (PCC 17.16.165.E). Likewise, distillate, residual, and other such fuel oils range from 0.84 to 0.94 lbs of SO₂ per million BTU. Thus, it is not necessary to include the standard in the permit.

VII. IMPACTS TO AMBIENT AIR QUALITY

Not a major source thus no studies are required.

VIII. CONTROL TECHNOLOGY DETERMINATION

No control technologies needed to be determined. This is a water recovery project operating as a Class II, synthetic minor stationary source.

IX. PREVIOUS PERMIT CONDITIONS

Not applicable, as no previous permit conditions were developed as part of an installation or preconstruction review permit.

Attachment 1

Emissions Testing History

Description	Identification Number	Manufacturer	Model	Serial Number	Test Report Date	NOx Emissions (g/bhp-hr)	CO Emissions (g/bhp-hr)	Formaldehyde (CH ₂ O) Emissions (lb-bhp)
Driving Booster Pumps	8	Caterpillar	3412LE	6ZM00219	3/3-5/2003	0.87	0.10	7.89 E-6
					04/06-07/04		0.10	
					05/22-26/06	0.45	0.08	
	9	Caterpillar	3412LE	6ZM00220	01/02-16/02	0.78	0.04	20.6 E-6
					06/11/03	0.83	0.05	2.61 E-5
					04/06-07/04		0.05	
	10	Caterpillar	3412LE	6ZM00221	05/22-26/06	0.22	0.04	
					01/02-16/02	0.68	0.09	36.6 E-6
					04/06-07/04		0.14	
	11	Caterpillar	3412LE	6ZM00222	05/22-26/06	0.21	0.08	
					3/3-5/2003	0.80	0.06	1.37 E-5
					03/04/05	0.75	0.09	
	12	Caterpillar	3412LE	6ZM00223	2/1-2 & 5-8/07	0.38	0.07	
					3/3-5/2003	0.48	0.12	4.70 E-5
03/03/05					0.76	0.11		
13	Caterpillar	3412LE	6ZM00224	2/1-2 & 5-8/07	0.50	0.11		
				3/3-5/2003	0.79	0.11	2.80 E-5	
				03/03/05	0.66	0.11		
14	Caterpillar	3412LE	6ZM00225	2/1-2 & 5-8/07	0.59	0.08		
				01/02-16/02	0.83	0.08	30.1 E-6	
				04/06-07/04		0.13		
Driving Well Pumps	AF-31	Waukesha	F18GLD	C-14032/2	2/5-7/2003 & 2/14/03	0.67	0.09	3.72 E-5
					02/03/05	0.80	0.06	
					2/1-2 & 5-8/07	0.90	0.10	
	AF-32	Waukesha	F18GLD	C-14229/6	04/10/03	0.77	0.04	1.39 E-5
					04/04-06/05	0.69	0.04	
					2/1-2 & 5-8/07	0.99	0.08	
	AF-34	Waukesha	F18GLD	C-14032/1	2/5-7/2003 & 2/14/03	1.91	0.10	6.04 E-8
					4/9-10/03	0.80	0.09	
					04/04-06/05	0.62	0.04	
	AF-37	Waukesha	F18GLD	C-14032/3	2/1-2 & 5-8/07	0.72	0.05	
					2/5-7/2003 & 2/14/03	1.20	0.07	10.77 E-8
					4/9-10/03	0.80	0.05	
	AF-38	Waukesha	F18GLD	C-13596/1	04/04-06/05	0.83	0.03	
					2/1-2 & 5-8/07	0.93	0.05	
01/02-16/02					1.39	0.07	4.1 E-6	
AF-39	Waukesha	F18GLD	C-14007/2	03/22/02	0.40			
				06/12-13/03	0.70	0.06		
				04/04-06/05	0.74	0.06		
AF-40	Waukesha	F18GLD	C-13596/2	2/1-2 & 5-8/07	0.24	0.10		
				2/5-7/2003 & 2/14/03	0.78	0.07	1.72 E-5	
				02/03/05	0.82	0.08		
CA-9	Waukesha	F18GLD	C-14033/1	2/1-2 & 5-8/07	0.79	0.04		
				01/02-16/02	0.71	0.06	10.0 E-6	
				06/12-13/03	0.71	0.10		
CA-12	Waukesha	F18GLD	C-14580/1	04/04-06/05	0.69	0.11		
				2/1-2 & 5-8/07	0.28	0.10		
				05/06/05	0.95	0.03		
CA-14	Waukesha	F18GLD	C-14229/2	06/11/03	0.83	0.05	2.61 E-5	
				2/1-2 & 5-8/07	0.91	0.12		
				07/20-22/04	0.90	0.03	1.35 E-5	
CA-15	Waukesha	F18GLD	C-14229/5	05/22-26/06	0.71	0.04		
				05/22-26/06	0.87	0.02		
				07/20-22/04	0.64	0.03	1.33 E-5	
CA-16	Waukesha	F18GLD	C-14276/1	05/22-26/06	0.93	0.09		
				07/20-22/04	0.45	0.04	1.33 E-5	
				05/22-26/06	0.58	0.03		
CA-17	Waukesha	F18GLD	C-14557/2	07/20-22/04	0.58	0.04	1.1 E-5	
				05/22-26/06	0.92	0.11		
Blank cells indicate no data								
Emission Limitations:					Exceedences of Emission Limitation			
		NOx	≤1.0 g/bhp-hr					
		CO	≤0.3 g/bhp-hr					
		CH ₂ O	≤1.32E-4 lb/bhp-hr					