APS

*A subsidiary of Pinnacle West Capital Corporation*

Palo Verde Nuclear
Generating Station

**Robert S. Bement**
Vice President
Nuclear Operations

Tel (623) 393-6116
Fax (623) 393-6077

Mail Station 7602
PO Box 52034
Phoenix, Arizona 85072-2034

291-03737-RSB/ST
June 12, 2007



**HAND DELIVERED**

MCAQD One Stop Shop
Emissions Inventory Intake
501 N. 44th Street, Suite 200
Phoenix, AZ 85008-6538

Dear Sir or Madam:

Subject: Palo Verde Nuclear Generating Station 2006 Annual Air Emissions Inventory

Palo Verde Nuclear Generating Station (PVNGS) is submitting the 2006 Air Emissions Inventory in accordance with instructions received from your office. In addition, in accordance with the PVNGS Non-Title V Air Permit (#030132) Condition 21 we are also providing a Hazardous Air Pollutant (HAPs) report (Attachment 2). Permit Condition 21 requires PVNGS to calculate emissions of HAPs emitted in quantities above 500 pounds per calendar year, and specifically requires the calculation and reporting of emissions of chloroform, xylenes and ethyl benzene.

PVNGS used electronic versions of the forms for this Emissions Inventory Report. Deletions in the text are noted in red with a strikethrough. Additions to the text are shown in blue Italics.

If you have any questions regarding this submittal, please contact Mr. Sreenath Thota at (623) 393-6537.

Based on information and belief formed after reasonable inquiry, the statements and information in this submittal are true, accurate, and complete.

Sincerely,

R Bement

RSB/ST/hsc

Attachments

# PALO VERDE NUCLEAR GENERATING STATION

## 2006 AIR EMISSIONS INVENTORY

Prepared for

MARICOPA COUNTY
ENVIRONMENTAL SERVICES DEPARTMENT

Prepared by

ARIZONA PUBLIC SERVICE COMPANY
PALO VERDE NUCLEAR GENERATING STATION
ENVIRONMENTAL SECTION

# GENERAL INFORMATION AND BUSINESS FORM

The following information is provided in this section:

1. Business Form
2. Process Identification Number Cross Reference Table

**MARICOPA COUNTY**
**AIR QUALITY**
**DEPARTMENT**

**Emissions Inventory Unit**
**(602) 506-6790**
**(602) 506-6985 (FAX)**
**(602) 506-6704 (TDD)**

# 2006 Annual Emissions Inventory

Due Date: 06/13/2007
Permit Number: 030132

## *Business Form*

1. Owner Name: **ARIZONA PUBLIC SERVICE CO**
2. Business Name: **PALO VERDE NUCLEAR GENERATING STATION**
3. Business Street Address (Physical Location): **5801 S. WINTERSBURG RD**
4. City: **TONOPAH** 5. Zip Code: **85354-7529**
6. Number Of Employees **2200** 7. Property Size: **4080.00 acres**
8. SIC Code: Primary: **4911** Secondary:
9. NAICS Code Primary: **221113** Secondary: **221121**
10. Preparer of the Inventory (primary contact for technical questions concerning this report):
    - Name: **MARTIN P. EROH**
    - Title: **ENVIRONMENTAL SECTION LEADER**
    - Employer: **ARIZONA PUBLIC SERVICE**
    - Telephone: **(623) 393-6688** Fax: **(623) 393-5442**
    - E-mail address of preparer: ***meroh@aps.com***
11. Who should receive the Annual Emissions Inventory Form next year?:
    - Name: **MARTIN P. EROH**
    - Title: **ENVIRONMENTAL SECTION LEADER**
    - Employer: **ARIZONA PUBLIC SERVICE**
    - Address: **PO BOX 52034 MS 7626**
    - City: **PHOENIX** State: **AZ** Zip Code: **85072-2034**
    - Telephone: **(623) 393-6688** Fax: **(623) 393-5442**

Return the original copy of all completed forms to:
**MCAQD One Stop Shop**
**Emissions Inventory Intake**
**501 N. 44th Street, Suite 200**
**Phoenix, AZ 85008 -6538**

For more information, contact the Maricopa County Emissions Inventory Unit at (602) 506-6790.
Detailed instructions, sample forms and reference materials are available at:
**www.maricopa.gov/aq/divisions/planning_analysis/emissions_inventory/default.aspx**

## EMISSIONS SUMMARY

This section contains the Data Certification Form. Summary sheets for the General and Evaporative Processes have been provided for reference.

# *Data Certification Form* 2006

Permit Number(s) 030132

For EACH pollution listed, total up all emissions recorded on your General Process and Evaporative Process Forms. Enter these numbers in column 1, "Totals from Process Forms". Report emissions from accidental releases in column 2.
Add the figures in each row across, and enter the result in column 3, "Total Emissions."

| Summary of 2006Annual Emissions: | (1) Totals from Process Forms | (2) + Accidental Releases | (3) = TOTAL EMISSIONS |
|---|---|---|---|
| CO | *53727 lbs* | *0 lbs* | *53727 lbs* |
| NHx | *3159 lbs* | *0 lbs* | *3159 lbs* |
| Lead | *0 lbs* | *0 lbs* | *0 lbs* |
| HAP&NON | --- | --- | --- |
| VOC | *42641 lbs* | *0 lbs* | *42641 lbs* |
| $NO_x$ | *182190 lbs* | *0 lbs* | *182190 lbs* |
| $SO_x$ | *2802 lbs* | *0 lbs* | *2802 lbs* |
| $PM_{10}$ | *55971 lbs* | *0 lbs* | *55971 lbs* |

**TO COMPLETE YOUR EMISSIONS INVENTORY REPORT:**

- Complete the Confidentiality Statement below.
- Sign and date this form below where indicated.
- Send the **original** copy of your completed forms to: Maricopa County Air Quality Dept., Emissions Inventory Unit, One Stop Shop, Emissions Inventory Intake, 501 N. 44th Street, Suite 200, Phoenix, AZ 85008-6538.
- Keep a copy of all forms for your records.

**CONFIDENTIALITY STATEMENT:**

This annual emissions report contains requests to keep some data confidential. ☐ YES ☒ NO
If you check "YES", you must submit documentation and meet certain requirements before your data can be deemed confidential. See enclosed instructions for further details.

**CERTIFICATION STATEMENT:**

I declare under penalty of perjury that the data (e.g. materials, quantities, emissions factors, controls, and annual emissions) presented herein represents the best available information and is true, accurate and complete to the best of my knowledge.

R Bement — 6/12/2007 — (623) 393-6116

Signature of owner/business officer — Date of Signature — Telephone Number

ROBERT S. BEMENT — VP Nuclear Operations

Type or print full name of owner/business officer — Type or print full title

**PALO VERDE NUCLEAR GENERATING STATION**
**Air Quality Permit Number: 030132**
**Annual Emissions Calculation for 2006**

| PROCESS ID/ DESCRIPTION PROCESS EMISSIONS | CO | NOX | PM10 | SOX | VOC | COMMENTS |
|---|---|---|---|---|---|---|
| 1. LIME UNLOAD | --- | --- | 0 | --- | --- | |
| 2. LIME STORAGE | --- | --- | 503 | --- | --- | |
| 3. LIME SUPPLY | --- | --- | 509 | --- | --- | |
| 4. SODA ASH UNLOAD | --- | --- | 0 | --- | --- | |
| 5. SODA ASH STORAGE | --- | --- | 151 | --- | --- | |
| 6. SODA ASH SUPPLY | --- | --- | 145 | --- | --- | |
| 7. MISC DIESEL ENGINES | 223 | 1,038 | 73 | 12 | 85 | |
| 7. MISC DIESEL ENGINES (PERMIT EXEMPT) | 8,824 | 41,000 | 482 | 482 | 3,346 | |
| 8. MISC GAS ENGINES (PERMITTED) | 0 | 0 | 0 | 0 | 0 | |
| 8. MISC GAS ENGINES (PERMIT EXEMPT) | 7,687 | 199 | 12 | 11 | 372 | |
| 9. UNIT EMERG DIESELS | 36,232 | 136,395 | 2,427 | 2,208 | 3,489 | |
| 10. TSC DIESEL | 324 | 1,233 | 22 | 20 | 32 | |
| 11. SEC DIESEL | 47 | 217 | 15 | 3 | 18 | |
| 12. FIRE PUMP DIESELS | 77 | 356 | 25 | 4 | 29 | |
| 13. ADMIN A DIESEL | 130 | 489 | 9 | 8 | 13 | |
| 14. ADMIN B DIESEL | 48 | 223 | 16 | 3 | 18 | |
| 16. AUX BOILER | 0 | 0 | 0 | 0 | 0 | |
| 17. UNIT COOLING TOWERS | --- | --- | 47,084 | --- | 5,047 | |
| 18. RECAL FURNACE | --- | --- | --- | --- | --- | Release point no longer used. Historical information only. |
| 19. RECAL FURNACE (SOx) | --- | --- | --- | --- | --- | Release point no longer used. Historical information only. |
| 20. GTG | 74 | 766 | 161 | 47 | 0 | |
| 21. CHEM DIESEL | 35 | 164 | 12 | 2 | 13 | |
| 22. PORT COOLING TOWER | --- | --- | 290 | --- | 3 | |
| 23. SALT SILOS | --- | --- | 694 | --- | --- | |
| 24. ILRT LEAK RATE | --- | --- | --- | --- | --- | Only performed who ILRT testing is required |
| 25. WRF COMPRESSOR | --- | --- | --- | --- | --- | Release point no longer used. Historical information only. |
| 26. ABRASIVES HOPPER | --- | --- | 0 | --- | --- | |
| 27. S/G CLEAN - ADV (UNITS 1, 2, 3) | --- | --- | --- | --- | --- | Only applicable when S/G Cleaning in progress. |
| 28. S/G CLEAN - EVAP | --- | --- | --- | --- | --- | Release point no longer used. Historical information only. |
| 29. S/G CLEAN - EVAP COND | --- | --- | --- | --- | --- | Only applicable when S/G Cleaning in progress. |
| 30. S/G CLEAN - COOL TWR | --- | --- | --- | --- | --- | Only applicable when S/G Cleaning in progress. |
| 31. SEC SUBSTATION L EDG | 14 | 54 | 2 | 1 | 1 | |
| 32. SEC HUBS 2,3,4 EDGS | 8 | 54 | 1 | 1 | 3 | |
| 33. MISC COMB EQ - DIESEL | 0 | 1 | 0 | 0 | 0 | |
| 34. MISC COMB EQ - LPG | 0 | 0 | 0 | 0 | 0 | |
| 35. PORTABLE BOILER (CONTRACTOR) | 0 | 0 | 0 | 0 | 0 | |
| 36. ABRASIVE BLASTING OPERATIONS | --- | --- | 3,338 | --- | --- | |
| **EVAPORATIVE EMISSIONS** | | | | | | |
| 51. GAS TANK AS1 WORKING LOSS | --- | --- | --- | --- | 0 | |
| 52. GAS TANK AS2 STANDING LOSS | --- | --- | --- | --- | 2,822 | |
| 53. GAS TANK AS1 FUELING | --- | --- | --- | --- | 1,105 | |
| 54. GAS TANK AS2 WORKING LOSS | --- | --- | --- | --- | 926 | |
| 55. GAS TANK AS2 STANDING LOSS | --- | --- | --- | --- | 3,935 | |
| 56. GAS TANK AS2 LOADING | --- | --- | --- | --- | 0 | |
| 57. GAS TANK AS2 FUELING | --- | --- | --- | --- | 0 | |
| 60. ADHESIVES | --- | --- | --- | --- | 659 | |
| 61. CLEANERS | --- | --- | --- | --- | 4,298 | |
| 62. LUBRICANTS | --- | --- | --- | --- | 1,085 | |
| 63. MISC CHEM USE | --- | --- | --- | --- | 4,772 | |
| 64. MAINT COATINGS | --- | --- | --- | --- | 7,386 | |
| 65. MAINT SOLVENTS | --- | --- | --- | --- | 2,937 | |
| 66. MAINT COAT SURFACE PREP | --- | --- | --- | --- | 21 | |
| 67. ASPHALT PAVING OPERATIONS | --- | --- | --- | --- | 427 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| PERMITTED SOURCES ONLY | 37,216 | 140,990 | 55,477 | 2,309 | 38,924 | |
| Emissions in Tons: | 18.61 | 70.50 | 27.74 | 1.15 | 19.46 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| PERMITTED AND PERMIT EXEMPT SOURCES | 53,727 | 182,190 | 55,971 | 2,802 | 42,641 | |
| Emissions in Tons: | 26.86 | 91.09 | 27.99 | 1.40 | 21.32 | |

# ATTACHMENT 1

## 2006 Annual Air Emission Inventory

## IDENTIFICATION NUMBER CROSS-REFERENCE TABLE

| PROCESS ID NO. | PROCESS (P) Or EVAP (E) | DESCRIPTION | STACK NO. | CONTROL DEVICE NO. (If applicable) |
|---|---|---|---|---|
| **PROCESS SOURCES** | | | | |
| 1 | P | Lime Unloading Filter Separator | 1 | 1 |
| 2 | P | Lime Storage Silos | 2 Lime, 102 Recalcined lime | 2 Lime, 102 recalcined lime |
| 3 | P | Lime Supply Silos | 3 | 3 |
| 4 | P | Soda Ash Unloading Filter Separator | 4 | 4 |
| 5 | P | Soda Ash Storage Silos | 5 | 5 |
| 6 | P | Soda Ash Supply Silo | 6 | 6 |
| 7 | P | Miscellaneous Portable Diesel Engines | 7 | |
| 8 | P | Miscellaneous Portable Gasoline Engines | 8 | |
| 9 | P | EDGS (Unit 1, 2, and 3) Emergency Diesel Generators | 9 | |
| 10 | P | Technical Support Center Diesel | 10 | |
| 11 | P | Security Diesel | 11 | |
| 12 | P | Fire Protection Pump Diesels | 12 | |
| 13 | P | Administration Building A Diesel | 13 | |
| 14 | P | Administration Building B Diesel | 14 | |
| 16 | P | Auxiliary Boiler | 16 | |
| 17 | P | Units 1, 2, and 3 Cooling Towers | 17 | |
| 18, 19 | P | Recalcination Furnace (RELEASE POINT REMOVED FROM PERMIT IN 2003) | 18 | 18 quencher, venturi scrubber, 19 impingement tray separator, 118 cyclone separator, 119 high lime content |
| 20 | P | Gas Turbines | 20 | |
| 21 | P | Chemical Storage Building Diesel | 21 | |
| 22 | P | Portable Cooling Tower | 22 | |
| 23 | P | Salt Silos | 23 | 23 baghouse |
| 24 | P | Rental Compressors-ILRT | | |
| 25 | P | WRF Rental Air Compressor (RELEASE POINT REMOVED FROM PERMIT IN 2002) | | |
| 26 | P | Abrasive Media Hopper | 26 | 26 |
| 27 | P | S/G Chemical Cleaning – ADV Stacks (2 per unit) Units 1, 2, or 3 | 27 | |
| 28 | P | S/G Cleaning - Evaporator Discharge (RELEASE POINT REMOVED FROM PERMIT IN 2003) | 28 | |
| 29 | P | S/G Cleaning – Evaporator Condenser | 29 | |
| 30 | P | S/G Cleaning – Evaporator Condenser Cooling Tower | 30 | |
| 31 | P | Security Substation L Emergency Generator (179 Hp) | | |

## IDENTIFICATION NUMBER CROSS-REFERENCE TABLE

| PROCESS ID NO. | PROCESS (P) Or EVAP (E) | DESCRIPTION | STACK NO. | CONTROL DEVICE NO. (If applicable) |
|---|---|---|---|---|
| 32 | P | Security Hubs 2, 3, 4 Emergency Diesel Generators (Total Of 3 Engines At 35 Hp Each) | | |
| 33 | P | Misc. Diesel Fuel Burning Combustion Equipment (< 10 MMBtu / Hr) | | |
| 34 | P | Misc. LPG Burning Combustion Equipment | | |
| *35* | *P* | *Contractor Portable Boiler* | | |
| *36* | *P* | *Abrasive Blasting Operations (confined & unconfined)* | | |
| **EVAPORATIVE SOURCES** | | | | |
| Horizontal Fixed Roof Storage Tanks (Gasoline) AND Gasoline Fueling Operations | | | | |
| 51 | E | AS1 Working Losses | | |
| 52 | E | AS1 Standing Losses | | |
| 53 | E | AS1 Fueling | | |
| 54 | E | AS2 Working Losses | | |
| 55 | E | AS2 Standing Losses | | |
| 56 | E | AS2 Loading | 56 | 56 |
| 57 | E | AS2 Fueling | | |
| Other Evaporative Process | | | | |
| 60 | E | Adhesives | | |
| 61 | E | Cleaners, Degreasers | | |
| 62 | E | Lubricants | | |
| 63 | E | Miscellaneous Chemical Use | | |
| | E | Maintenance Coatings | | |
| 64 | | Coatings | | |
| 65 | | Solvent, Thinner , Diluent | | |
| 66 | | Surface Preparation Products | | |
| 67 | E | Asphalt Paving Operations | | |
| | | | | |
| 90 | E | Ammonia Releases from Circulating Water Systems | | |

# STACK INFORMATION

The stack form contains stack information for each stationary stack that is connected to a control device or any stack that discharged more than 5 tons of combined pollutant emissions during the reporting year. Although no steam generator cleaning was conducted during the year, the stack information was left on the form for historical information.

The latitude and longitude coordinates of the stacks were included this year. There are several process release points that are identical and were historically assigned a common stack identification number. The separate coordinates of each stack were included unless they were physically located close together where separate coordinates would not provide additional location information. These differences are described below for each release point with multiple stacks:

Lime Storage Silos – Identical stacks associated with each of nine storage silo baghouses (six for pebble lime and three for recalcined lime) were assigned a common stack identification number. The coordinates represent the common location of the group of stacks.

Lime Supply Silos - Identical stacks associated with each of three supply silo baghouses were assigned a common stack identification number. The coordinates represent the common location of the group of stacks.

Soda Ash Storage Silos – Identical stacks associated with each of six storage silo baghouses were assigned a common stack identification number. The coordinates represent the common location of the group of stacks.

Soda Ash Supply Silos - Identical stacks associated with each of two supply silo baghouses were assigned a common stack identification number. The coordinates represent the common location of the group of stacks.

Unit Emergency Diesel Generators – Identical stacks associated with each of six identical generators were assigned a common stack identification number. Each operating Unit at PVNGS (Units 1, 2, and 3) contains a pair of generators. The coordinates represent the common location of each group of two individual stacks located in Units 1, 2, and 3.

Unit Cooling Towers – There are three identical individual cooling towers per unit for a total of nine cooling towers. The cooling towers were assigned a common stack identification number. The coordinates represent the common location of each group of three towers located in Units 1, 2, and 3.

Steam Generator Cleaning Evaporator Condenser Discharge – The equipment is only brought onsite during chemical cleaning. No cleaning was done during 2004 so no coordinates are available.

Steam Generator Cleaning Evaporator Cooling Tower - The equipment is only brought onsite during chemical cleaning. No cleaning was done during 2004 so no coordinates are available.

## *Stack Form 2006*

Permit Number: **030132**

| 1 | 2 | 3 | 4 | 5a OR 5b | | 6a OR 6b and 6c | | | 7 |
|---|---|---|---|---|---|---|---|---|---|
| Stack ID | Stack Type Code* | Stack Height** | Exit Gas Temperature | Velocity feet/sec | Flow Rate acfm | Diameter inside inch[1] | Length / Width inside inch | | Stack Name/Description (Optional) |
| 1 | D | 12 ft | 120°F | 98.8 | 2070.0 | 8 | | | LIME UNLOADING FILTER SEPARATOR<br>*Lat: N 33.395 Long: W 112.857* |
| 2 | D | 60 ft | 120°F | 27.6 | 2030.0 | 15 | 9 | 20 | EACH OF 6 LIME STORAGE SILO BAGHOUSES<br>*Lat: N 33.395 Long: W 112.857* |
| 3 | D | 42 ft | 120°F | 19.8 | 1460.0 | 15 | 9 | 20 | EACH OF 6 LIME SUPPLY SILO BAGHOUSES<br>*Lat: N 33.395 Long: W 112.857* |
| 4 | D | 12 ft | 120°F | 98.8 | 2070.0 | 8 | | | SODA ASH UNLOADING FILTER SEPARATOR<br>*Lat: N 33.395 Long: W 112.857* |
| **5** | **D** | **60 ft** | **120°F** | **27.0** | **1990.0** | **15** | **9** | **20** | **EACH OF 6 SODA ASH STORAGE SILO BAGHOUSES**<br>***Lat: N 33.395 Long: W 112.857*** |
| **6** | **D** | **43 ft** | **120°F** | **12.2** | **900.0** | **15** | **9** | **20** | **EACH OF 2 SODA ASH SUPPLY SILO BAGHOUSES**<br>***Lat: N 33.395 Long: W 112.857*** |
| **9** | **V** | **90 ft** | **1000°F** | **179.0** | **60000.0** | **32** | | | **EMERGENCY GENERATORS (EACH OF 6)**<br>***Unit 1 – Lat: N 33.388 Long: W 112.861***<br>***Unit 2 – Lat: N 33.385 Long: W 112.864***<br>***Unit 3 – Lat: N 33.383 Long: W 112.864*** |
| **17** | **V** | **64 ft** | **110°F** | **31.6** | **1342000.0** | **360** | | | **EACH OF 144 FANS (3 UNIT COOLING TOWERS)**<br>***Unit 1 – Lat: N 33.391 Long: W 112.863***<br>***Unit 2 – Lat: N 33.388 Long: W 112.867***<br>***Unit 3 – Lat: N 33.383 Long: W 112.869*** |
| **23[2]** | **D** | **36 ft** | **120°F** | **8.3** | **1992.0** | **27** | **6** | **94** | **EACH OF 2 SALT SILOS**<br>***Lat: N 33.396 Long: W 112.858*** |
| **26** | **H** | **22 ft** | **120°F** | **9.3** | **1100.0** | **19** | **12** | **24** | **ABRASIVE BLAST MEDIA STORAGE HOPPER**<br>***Lat: N 33.391 Long: W 112.860*** |
| 27 | V | 89 ft | 290°F | 104.8 | 100000.0 | 54 | | | EACH OF 6 ATMOS. DUMP VALVE DISCHARGE STACKS FOR UNITS 1-3<br>*Unit 1 – Lat: N 33.388 Long: W 112.861*<br>*Unit 2 – Lat: N 33.385 Long: W 112.864*<br>*Unit 3 – Lat: N 33.383 Long: W 112.864* |
| 29 | H | 20 ft | 110 °F | 21.1 | 2000.0 | 17 [4] | | | STM. GENERATOR CLEANING EVAP. CONDENSER DISCHARGE<br>*No coordinates – equipment not onsite* |
| 30 | V | 9 ft | 110 °F | 48.7 | 23000.0 | 38 | 24 | 48 | STM. GENERATOR CLEANING EVAP. CONDENSER *COOLING TOWER*<br>*No Coordinates – equipment not onsite* |
| 56 | H | 4ft | 120°F | | | 4 | | | GASOLINE VAPOR BALANCE SYSTEM<br>*Lat: N 33.388 Long: W 112.857* |
| 102[3] | D | 60 ft | 120°F | 8.1 | 600 | 15 | 9 | 20 | EACH OF 3 RECALCINED LIME STORAGE SILO BAGHOUSES (TRANSFER MODE)<br>*Lat: N 33.395 Long: W 112.857* |

## *Stack Form 2006*

Permit Number: **030132**

| 1 | 2 | 3 | 4 | 5a OR 5b | | 6a OR 6b and 6c | | 7 |
|---|---|---|---|---|---|---|---|---|
| Stack ID | Stack Type Code* | Stack Height** | Exit Gas Temperature | Velocity feet/sec | Flow Rate acfm | Diameter inside inch[(1)] | Length / Width inside inch | Stack Name/Description (Optional) |
| [1] *Effective diameters are reported for rectangular stack dimensions. Exit Velocities were calculated using the effective diameters.* | | | | | | | | |
| [2] *The discharge is a circumferential slot around the bag housing. This slot is 6" high. See next page for sketch of filter and discharge.* | | | | | | | | |
| [3] *There are 9 lime storage silos, Process ID 2. Six of those silos typically receive direct lime deliveries. The velocities and flow rates for those silos is shown under Stack 2. The other three lime storage silos are typically used for recalcined lime storage. Stack 102 flow rates and velocities represent the system operation using the recalcined lime transfer blower. Since the recalcined lime storage silos are permitted to receive direct lime deliveries, refer to the velocities and flow rates listed under Process ID 2 for direct transfer deliveries of lime to the recalcined lime storage silos.* | | | | | | | | |
| [4] *The stack is a twelve inch diameter stack that ends at a "T" consisting of 12 inch horizontal pipe with two discharge points. The diameter reported is the effective diameter of both 12 inch diameter discharge points.* | | | | | | | | |

* Stack Type Codes: V = Vertical unobstructed H = Horizontal unobstructed D= Downward unobstructed G = Goosneck
W = Obstructed vertical (e.g. weather cap)

** Stack height is calculated relative to the surrounding terrain. For example: the stack height of a 10 foot stack sitting on a 20 foot building is 30 feet.

## CONTROL DEVICE INFORMATION

Process ID 2 represents 9 lime storage silos at PVNGS. The design and control equipment for all 9 silos is the same. There are two separate Stack and Control Device codes for the Lime Storage Silos.

- Stack 2/Control Device 2 represents the 6 silos that receive new lime deliveries.
- Stack 102/Control Device 102 represents the other three silos that receive recalcined lime.

The description for Control ID Number 26 was modified to include the type of control device.

The control equipment used for the recalcination furnace (Control ID Numbers 18, 19, 118 and 119) has been abandoned in place and is no longer used. However, information has been kept on the control device table for historical reference only.

## *Control Device Form* 2006

Permit Number: **030132**

| 1 | 2 | 3 | | 4 | 5 | | 6 |
|---|---|---|---|---|---|---|---|
| **Control ID** | **Installation/ Reconstruction * Date** | **Size or Rate Capacity**** | | **Control Type Code** | **Control Device Name/Description** | | **Stack ID** |
| 1 | 1/1/84 | 2070. | cfm | 018 | LIME UNLOADING FILTER SEPARATOR 518 SQ FT CLOTH AREA | | 1 |
| 2 | 1/1/84 | 2030. | cfm | 018 | 6 LIME STORAGE SILOS BAGHOUSES 189 SQ FT CLOTH AREA | | 2 |
| 3 | 1/1/84 | 1460. | cfm | 018 | 6 LIME SUPPLY SILOS BAGHOUSES 189 SQ FT CLOTH AREA | | 3 |
| 4 | 1/1/84 | 2070. | cfm | 018 | SODA ASH UNLOADING FILTER SEPARATORE 518 SQ FT CLOTH AREA | | 4 |
| 5 | 1/1/84 | 1990. | cfm | 018 | 6 SODA ASH STORAGE SILOS BAGHOUSES 189 SQ FT CLOTH AREA | | 5 |
| 6 | 1/1/84 | 900. | cfm | 018 | 2 SODA ASH STORAGE SILOS BAGHOUSES 189 SQ FT CLOTH AREA | | 6 |
| 18 | 1/1/84 | 343. | cfm | 053 | RECAL FURNACE QUENCHER & VENTURI SCRUBER ***(NO LONGER IN USE – HISTORICAL REFERENCE ONLY))*** | | |
| 19 | 1/1/84 | 343. | cfm | 055 | RECAL FURNACE IMPINGEMENT TRAY SEPARATOR *(NO LONGER IN USE – HISTORICAL REFERENCE ONLY)* | | |
| 23 | 1/1/84 | 1092. | cfm | 018 | 2 SALT SILO BAGHOUSES, 31 SQ FT CLOTH AREA | | 23 |
| 26 | 02/15/2000 | 1100. | cfm | 101 | ABRASIVE BLAST MEDIA STORAGE HOPPER ***HEPA FILTER*** | | 26 |
| 56 | | | cfm | 096 | VAPOR BALANCE FOR LOADING REUELING TRUCK | | |
| 102[1] | 1/1/84 | 600. | cfm | 018 | 3 RECAL LIME STORAGE SILOS BAGHOUSES 189 SQ FT CLOTH AREA | | 102 |
| 118 | 1/1/84 | 343. | cfm | 075 | RECAL FURNACE CYCLONE SEPARATOR *(NO LONGER IN USE – HISTORICAL REFERENCE ONLY)* | | |
| 119 | 1/1/84 | 343. | cfm | 999 | RECALCINATOR FURNACE, HIGH LIME CONTENT *(NO LONGER IN USE – HISTORICAL REFERENCE ONLY)* | | |

*[1] Control device 102 flow rate (600 cfm) represents the flow rate from the recalcined lime transfer blower for the 3 lime storage silos that are typically used for recalcined lime storage. The design of these silos and emissions control systems is identical to the six lime storage silos represented by Control Device 2. All 9 silos were designed and permitted for storage of either direct lime deliveries or recalcined lime. When used for direct lime delivery, the silos represented by Control Device 102 have the same flow rates, velocities, and air to cloth ratios as Control Device 2.*

* Reconstruction means any component of the control device was replaced and the cost (fixed capital) of the new component(s) was more than half of what it would have cost to purchase or construct a new control device.

** Air or water flow rate in the cubic feet per minute.

## GENERAL PROCESS FORMS

The General Process Forms came preprinted with process information. PVNGS re-entered the originals on electronic forms. The following summarizes the significant changes.

1. Two new processes were added to the emissions report. The first is for a portable diesel fired boiler used to heat water in order to perform *in situ* pipe repairs. The equipment is owned and operated by a contractor and is not stored at the facility when not in use. The second is for abrasive blasting operations (confined and unconfined) conducted at the facility. The specific release points associated with these process are:
    - Process ID 35, Contractor Portable Boiler
    - Process ID 34, Abrasive Blasting Operations (confined and unconfined).

2. There were no rail deliveries of bulk chemicals during the reporting year.

3. Process ID 24, Compressor Rental – ILRT Leak Test, was added in 2000. However, Integrated Leak Rate Testing (ILRT) is only performed periodically in accordance with Nuclear Regulatory Commission requirements. There were no emissions from this process during the reporting year.

4. The steam generating cleaning process was modified in 2003. The steam generator cleaning evaporator discharge (Process ID 28) was replaced with the steam generator evaporator condenser discharge (Process ID 29) and Steam generator evaporator condenser cooling tower (Process ID 30). The processes associated with chemical cleaning of the steam generators (S/G) typically occur once every five to seven years per Unit. Therefore, the release forms were written to cover releases from any Unit during a given year. The specific release points associated with this process are:
    - Process ID 27, Atmospheric Dump Valve Releases from S/G Chemical Cleaning (Units 1, 2, or 3)
    - Process ID 29, S/G Chemical Cleaning Evaporator Condenser Discharge
    - Process ID 30, S/G Chemical Cleaning Evaporator Condenser Cooling Tower

    There was no steam generator cleaning conducted during the reporting year.

5. Emissions reported for miscellaneous diesel and gasoline engines include emissions from both small stationary engines (North Annex Back-up Generator & the Construction Pond Pumps) as well as from the remaining non-road engines.

## GENERAL PROCESS FORMS (continued)

6. The County forms were pre-printed with emissions factors for the existing processes. A one-page emissions calculation page was included as supplemental information as necessary for each process. For some processes, additional information was necessary to calculate emissions. In these instances, additional information is supplied in the section titled, "Emissions Factor Calculation Sheets". Processes with additional information are noted below.

    - Combustion Sources using diesel fuel: Since actual fuel sulfur content typically varies at a value less than 0.05% by weight, the permit limit of 0.05% was used to calculate emissions in lieu of specific fuel sulfur analysis data. Actual emissions would be lower than those calculated.

    - The PM10 emissions for the Unit Cooling Towers were calculated in accordance with the methodology in Permit Condition 55b. Since the emissions are a function of the TDS concentration and resulting critical droplet size diameter, the emissions factor was back calculated from the total emissions and actual operating hours.

    - The VOC emission factor for the Unit Cooling Towers, Process ID 17, was adjusted to reflect site specific use of chemicals added to the towers.

    - The PM10 emission factor for the Portable Cooling Towers, Process ID 22, is a function of the average measured TDS concentration. Since this concentration will vary, the emissions factor was back calculated from the total emissions and actual operating hours.

    - VOC emission factors for the Various Evaporative Processes, Process ID's 60 through 67, change slightly each year depending on actual chemical use. These factors were developed based on material balance for the current year's chemical usage.

    - The emission factors for the Auxiliary Boiler, Process ID 16, were different than the ones listed on the pre-printed form. The emission factors used were obtained from the Maricopa County Air Quality Department Website for SIC Code 10100501.

    - The emissions factors for the Contractor Portable Boiler, Process ID 35, were obtained from the Maricopa County Air Quality Department Website for SIC Code 10200502 (Industrial Boiler Distillate Oil < 10 MMBtu/hr).

    - The emission factor for the Abrasive Blasting Operations, Process ID 36, was obtained from AP-42, Table 13.2.6-1.

    - The ammonia emission factor for Process ID 90 was updated based on release data from the year 2006.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 1

☐ 2. Process Type/Description: **LIME UNLOADING FILTER SEPARATOR (USED FOR RR DELIVERIES OF LIME ONLY)**

3. Stack ID(s) (only if required on Stack Form) 1

4. Process TIER Code: 071099 **MISCELLANEOUS INDUSTRIAL PROCESSES**

SCC Code: 30510405 (*8 digit number*) **BULK MATL UNLOADING: LIMESTONE**

5. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%

6. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 0 Weeks/Year

7. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59

☐ 8. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **LIME DELIVERED BY RAIL**

9. ☒ Used (*input*) or ☐ Produced (*output*)

☐ 10. Annual Amount: (*a number*) 0

12. – Fuel Sulfur Content (in percent) ____ %

13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **TONS**

14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| PM-10 | 100 | TON | N | 2 | 100.000 | 1 | | 99.960 | 3 | 0 lbs |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| Lime Unloading Filter-Separator | MC Process ID No.: 1 |
| PVNGS Source No.: LSN-S01 | MC Stack No.: 1 |
| SCC: 30510405 | MC Control ID No.: 1 |

**Material Delivered by Rail** **0 Tons**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 4.00E-02 | lb/T loaded | by material balance | 0.0 lb |

*Date: 6/8/2007 / Time: 3:30 PM*

*(1) LIME UNLOAD*

# *General Process Form* 2006

Permit Number(s): **030132**

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: **2**
2. Process Type/Description: **LOADING/UNLOADING LIME INTO STORAGE SILOS**
3. Stack ID(s) (only if required on Stack Form) **2** **102** ____ ____ ____
4. Process TIER Code: **071099** **MISCELLANEOUS INDUSTRIAL PROCESSES**
5. SCC Code: **30510405** (*8 digit number*) **BULK MATL UNLOADING: LIMESTONE**
6. Seasonal Throughput Percent: Dec-Feb **25**% Mar-May **25**% Jun-Aug **25**% Sep-Nov **25%**
7. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year **8760** Weeks/Year ____
8. Typical Hours of Operation: (*military time*) Start **00:00** End **23:59**
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **LIME**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) **16761**
12. – Fuel Sulfur Content (in percent) ____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **TONS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) ____

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **PM-10**[1] | **100** | **TON** | **N** | **2** | **100.000** | **2** | | **99.970** | **3** | ***503* lbs** |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

[1] *There are 9 lime storage silos. The emissions control system on each silo is the same. Since all lime used was direct loaded, the emission factors associated with the primary control device is 2 rather than 102. The primary control devices 2 and 102 are not in series.*

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| Lime Storage Silo | MC Process ID No.: 2 |
| PVNGS Source ID No.: AWLSNTO1A-F, AWLSNTO2A-C | MC Stack No.: 2 |
| SCC: 30510405 | MC Control ID No.: 2, 102 |

**Material Processed:**

| | | |
|---|---|---|
| Recalcined Lime | N/A | Tons |
| Lime by Truck | 16,761 | Tons |
| Lime by Rail | 0 | Tons |
| Sum | 16,761 | Tons |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 3.00E-02 | lb/T loaded | by material balance | 502.8 lb |

**Notes:**

1) Vendor data given for PM. Assume $PM_{10}$ = 1/2 * PM.

2) The silo acts as an expansions vessel, allowing most of the particulate to fall out due to gravity.
A conservative estimate of 10% going to the filter was used, 90% dropout inherent in transfer process.

3) Filter efficiency is 99.97%.

4) All of these factors are included in the emissions factor shown above.

5) Annual emissions reflects the sum of emissions from both recalcined lime and pebble lime.

## *General Process Form* 2006

Permit Number(s): **030132**

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: **3**
2. Process Type/Description: **LOADING/UNLOADING LIME INTO SUPPLY SILOS (6)**
3. Stack ID(s) (only if required on Stack Form) **3**
4. Process TIER Code: **071099** **MISCELLANEOUS INDUSTRIAL PROCESSES**
5. SCC Code: **30510405** (*8 digit number*) **BULK MATL UNLOADING: LIMESTONE**
6. Seasonal Throughput Percent: Dec-Feb **25%** Mar-May **25%** Jun-Aug **25%** Sep-Nov **25%**
7. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year **8760** Weeks/Year
8. Typical Hours of Operation: (*military time*) Start **00:00** End **23:59**
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **LIME PEBBLE**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) **16978**
12. – Fuel Sulfur Content (in percent) ____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **TONS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **PM-10** | **100** | **TON** | **N** | **2** | **100.000** | **3** | | **99.970** | **3** | ***509*** **lbs** |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | | |
|---|---|---|
| **Lime Supply Silos** | **MC Process ID No.:** | **3** |
| **PVNGS Source ID No.: AWLSNTO3A-F** | **MC Stack No.:** | **3** |
| **SCC: 30510405** | **MC Control ID No.:** | **3** |

**Material Processed**

**Lime Used** 16,978 T

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 3.00E-02 | lb/T loaded | by material balance | 509.3 lb |

**Notes:**

1) Vendor data given for PM. Assume $PM_{10}$ = 1/2 * PM.
2) The silo acts as an expansions vessel, allowing most of the particulate to fall out due to gravity.
   A conservative estimate of 10% going to the filter was used, 90% dropout inherent in transfer process.
3) Filter efficiency is 99.97%.
4) All of these factors are included in the emissions factor shown above.
5) Annual emissions reflects the sum of emissions from both recalcined lime and pebble lime.
6) The sum of recalcined lime produced and pebble lime delivered is used for the amount of material.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 4
2. Process Type/Description: **SODA ASH UNLOADING FILTER SEPARATOR (USED FOR RAILROAD DELIVERIES OF SODA ASH ONLY)**
3. Stack ID(s) (only if required on Stack Form) 4
4. Process TIER Code: 071099 **MISCELLANEOUS INDUSTRIAL PROCESSES**
5. SCC Code: 30510498 (*8 digit number*) **BULK MATL UNLOADING: MINERAL**
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 0 Weeks/Year
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **SODA ASH**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 0
12. – Fuel Sulfur Content (in percent) %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **TONS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **PM-10** | **100** | **TON** | **N** | **2** | **100.000** | **4** | | **99.960** | **3** | ***0*** **lbs** |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| Soda Ash Unloading Filter-Separator | MC Process ID No.: 4 |
| PVNGS Source ID No.: AWSXNS01 | MC Stack No.: 4 |
| SCC: 30510498 | MC Control ID No.: 4 |

**Material Delivered by Rail** 0 Tons

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 4.00E-02 | lb/T loaded | by material balance | 0.0 lb |

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 5
2. Process Type/Description: LOADING/UNLOADING SODA ASH INTO STORAGE SILOS (6)
3. Stack ID(s) (only if required on Stack Form) 5
4. Process TIER Code: 071099 MISCELLANEOUS INDUSTRIAL PROCESSES
5. SCC Code: 30510498 (*8 digit number*) BULK MATL UNLOADING: MINERAL
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 8760 Weeks/Year
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") SODA ASH
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 5042
12. – Fuel Sulfur Content (in percent) ____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) TONS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| PM-10 | 100 | TON | N | 2 | 100.000 | 5 | | 99.970 | 3 | *151* lbs |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 = Manufacturer Specifications
8 = Site-Specific Emission Factor
9 = Vendor Emission Factor
10 = Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 = Tested efficiency / EPA reference method
2 = Tested efficiency / other source test method
3 = Design value from manufacturer
4 = Best Guess / engineering estimate
5 = Calculated, based on material balance
6 = Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Soda Ash Storage Silos** | **MC Process ID No.: 5** |
| **PVNGS Source ID No.: AWSXNTO1A-F** | **MC Stack No.: 5** |
| **SCC: 30510498** | **MC Control ID No.: 5** |

**Material Processed**

| | |
|---|---|
| **Soda Ash by Truck** | **5,042 Tons** |
| **Soda Ash by Rail** | **0 Tons** |
| **Sum** | **5,042 Tons** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 3.00E-02 | lb/T loaded | by material balance | 151.3 lb |

**Notes:**

1) Vendor data given for PM. Assume $PM_{10}$ = 1/2 * PM.

2) The silo acts as an expansions vessel, allowing most of the particulate to fall out due to gravity. A conservative estimate of 10% going to the filter was used, 90% dropout inherent in transfer process.

3) Filter efficiency is 99.97%.

4) All of these factors are included in the emissions factor shown above.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 6
2. Process Type/Description: LOADING/UNLOADING SODA ASH INTO SUPPLY SILOS (2)
3. Stack ID(s) (only if required on Stack Form) 6
4. Process TIER Code: 071099 — MISCELLANEOUS INDUSTRIAL PROCESSES
5. SCC Code: 30510498 (*8 digit number*) — BULK MATL UNLOADING: MINERAL
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 8760 Weeks/Year
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") SODA ASH
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 4830
12. – Fuel Sulfur Content (in percent) ____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) TONS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| PM-10 | 100 | TON | N | 2 | 100.000 | 6 | | 99.970 | 3 | *145* lbs |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | | |
|---|---|---|
| **Soda Ash Supply Silo** | **MC Process ID No.:** | **6** |
| **PVNGS Source ID No.: AWSXNTO2A,B** | **MC Stack No.:** | **6** |
| **SCC: 30510498** | **MC Control ID No.:** | **6** |

**Material Processed** **4,830 Tons**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 3.00E-02 | lb/T loaded | by material balance | 144.9 lb |

**Notes:**

1) Vendor data given for PM. Assume $PM_{10}$ = 1/2 * PM.
2) The silo acts as an expansions vessel, allowing most of the particulate to fall out due to gravity.
   A conservative estimate of 10% going to the filter was used, 90% dropout inherent in transfer process.
3) Filter efficiency is 99.97%.
4) All of these factors are included in the emissions factor shown above.
5) The amount of soda ash delivered is used as the amount of material.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 7

☐ 2. Process Type/Description: MISC. PORTABLE DIESEL ENGINES < 600 HP (NON-ROAD AND MOVABLE STATIONARY ENGINES)

3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____

4. Process TIER Code: 020599 FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION

5. SCC Code: 20200102 (*8 digit number*) IND: DISTIL. OIL (DIESEL) - RECIP

6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%

7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 8760 Weeks/Year _____

8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59

☐ 9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") DIESEL

10. ☒ Used (*input*) or ☐ Produced (*output*)

☐ 11. Annual Amount: (*a number*) *67880*

12. – Fuel Sulfur Content (in percent) *0.05* %

13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS

14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 130 | M GALS | N | 5 | | | | | | 8824 lbs |
| NOX | 604 | M GALS | N | 5 | | | | | | *4100* lbs |
| PM-10 | 42.5 | M GALS | N | 5 | | | | | | *482* lbs |
| SOX | *7.1* | M GALS | N | 3 | | | | | | *482* lbs |
| VOC | 49.3 | M GALS | N | 5 | | | | | | *3346* lbs |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

**Miscellaneous Portable Diesel Engines (Permitted)** — **MC Process ID No.: 7**
**PVNGS Source ID No.: None**
**SCC: 20200102**

**Fuel Use** 1,718 gal

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.30E+02 | lb/M gal | AP-42, Sect. 3.3 | 223 lb |
| $NO_2$ | 6.04E+02 | lb/M gal | AP-42, Sect. 3.3 | 1,038 lb |
| PM10 | 4.25E+01 | lb/M gal | AP-42, Sect. 3.3 | 73 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 12 lb |
| Ozone (VOC) | 4.93E+01 | lb/M gal | AP-42, Sect. 3.3 | 85 lb |

**Notes:**
1) Emissions calculations are for non-road engines and movable stationary sources.
2) All of this equipment was less than 600 hp. Emissions are based on fuel consumption.
3) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 8
2. ☐ Process Type/Description: MISC PORTABLE GASOLINE ENGINES (NON-ROAD AND MOVABLE STATIONARY ENGINES)
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: 020599 — FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION
5. SCC Code: 20200301 (*8 digit number*) — IND: GASOLINE - RECIPROCATING
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 8760 Weeks/Year _____
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. ☐ Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") GASOLINE
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. ☐ Annual Amount: (*a number*) 973 — 12. – Fuel Sulfur Content (in percent) _____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 7900 | M GALS | N | 5 | | | | | | *7,687* lbs |
| NOX | 205 | M GALS | N | 5 | | | | | | *199* lbs |
| PM-10 | 12.6 | M GALS | N | 5 | | | | | | *12* lbs |
| SOX | 11.1 | M GALS | N | 3 | | | | | | *11* lbs |
| VOC | 382 | M GALS | N | 5 | | | | | | *372* lbs |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Miscellaneous Portable Gasoline Engines (Permitted)** | **MC Process ID No.: 8** |
| **PVNGS Source ID No.: None** | |
| **SCC: 20200301** | |

**Fuel Use** **0 gal**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | SOURCE | EMISSIONS |
|---|---|---|---|
| CO | 7.90E+03 lb/Mgal | AP-42, Sect. 3.3 | 0 lb |
| $NO_2$ | 2.05E+02 lb/Mgal | AP-42, Sect. 3.3 | 0 lb |
| PM10 | 1.26E+01 lb/Mgal | AP-42, Sect. 3.3 | 0 lb |
| $SO_2$ | 1.11E+01 lb/Mgal | AP-42, Sect. 3.3 | 0 lb |
| Ozone (VOC) | 3.82E+02 lb/Mgal | AP-42, Sect. 3.3 | 0 lb |

**Notes:**

1) Emissions rates are based fuel consumption.
2) Emissions factors are based on AP-42 Section 3.3 Gasoline and Diesel Industrial Engines dated 10/96.
3) Gasoline Heating Value is 20,300 BTU/lb.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 9
2. Process Type/Description: **6 EMERGENCY GENERATORS @ 7670 HP, NRC-SAFETY POWER "EDG"**
3. Stack ID(s) (only if required on Stack Form) 9
4. Process TIER Code: *020599* — ***FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION***
5. SCC Code: **20200401** (*8 digit number*) — **INDUSTRIAL: LG. BORE ENGINE: DIESEL**
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 705 Weeks/Year 52
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **DIESEL**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 311056 — 12. – Fuel Sulfur Content (in percent) *0.05* %
12. Units of Measure: (*for example: tons, gallons, million cu ft, acres, units produced etc.*) GALS
13. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **CO** | **116** | **M GALS** | **N** | **5** | | | | | | ***36232*** **lbs** |
| **NOX** | **438** | **M GALS** | **N** | **5** | | | | | | ***136395*** **lbs** |
| **PM-10** | **7.85** | **M GALS** | **N** | **5** | | | | | | ***2427*** **lbs** |
| **SOX** | ***7.1*** | **M GALS** | **N** | **3** | | | | | | ***2208*** **lbs** |
| **VOC** | **11.2** | **M GALS** | **N** | **5** | | | | | | ***3489*** **lbs** |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Emergency Diesel Generators, Units 1-3,** | **MC Process ID No.: 9** |
| **PVNGS Source ID No.: 1,2,3 M-DGA, DGB-HO1** | **MC Stack No.: 9** |
| **SCC: 20200401** | |

| | |
|---|---|
| **Operating Hours** | **822.9 hrs (aggregate)** |
| **Fuel Use Rate** | **378 gallons per hour** |
| **Total Fuel Use** | **311,056 gallons (estimated)** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.165E+02 | lb/M gal | AP-42, Sect. 3.4 | 36,232 lb |
| $NO_2$ | 4.385E+02 | lb/M gal | AP-42, Sect. 3.4 | 136,395 lb |
| PM10 | 7.804E+00 | lb/M gal | AP-42, Sect. 3.4 | 2,427 lb |
| $SO_2$ | 7.100E+00 | lb/M gal | by material balance | 2,208 lb |
| Ozone (VOC) | 1.122E+01 | lb/M gal | AP-42, Sect. 3.4 | 3,489 lb |

**Notes:**

1) Emissions rates are based on nameplate full load (maximum) fuel consumption.

2) The fuel sulfur content was 0.04 % S by weight at a density of 7.1 lbs fuel / gal.

3) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 10
2. Process Type/Description: TSC GENERATOR, 1000 HP
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: 020599 FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION
5. SCC Code: 20200401 (*8 digit number*) INDUSTRIAL: LG. BORE ENGINE: DIESEL
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 125 Weeks/Year 52
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") DIESEL
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 2813
12. – Fuel Sulfur Content (in percent) 0.05 %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 116 | M GALS | N | 5 | | | | | | *328* lbs |
| NOX | 438 | M GALS | N | 5 | | | | | | *1233* lbs |
| PM-10 | 7.85 | M GALS | N | 5 | | | | | | 22 lbs |
| SOX | *7.1* | M GALS | N | 3 | | | | | | *20* lbs |
| VOC | 11.2 | M GALS | N | 5 | | | | | | *32* lbs |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Technical Support Center Emergency Diesel** | **MC Process ID No.: 10** |
| **PVNGS Source ID No.: AMDGNOTO1** | **MC Stack No.: 10** |
| **SCC: 20200401** | |

| | | |
|---|---|---|
| **Operating Hours** | **37.5** | **hrs** |
| **Fuel Use Rate** | **75** | **gal/hr** |
| **Total Fuel Use** | **2,813** | **gal (estimated)** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.165E+02 | lb/M gal | AP-42, Sect. 3.4 | 328 lb |
| $NO_2$ | 4.385E+02 | lb/M gal | AP-42, Sect. 3.4 | 1233 lb |
| PM10 | 7.804E+00 | lb/M gal | AP-42, Sect. 3.4 | 22 lb |
| $SO_2$ | 7.100E+00 | lb/M gal | by material balance | 20 lb |
| Ozone (VOC) | 1.122E+01 | lb/M gal | AP-42, Sect. 3.4 | 32 lb |

**Notes:**

1) Operating hours were rounded to the nearest whole number

2) Emissions rates are based on nameplate full load (maximum) fuel consumption.

3) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 11
2. Process Type/Description: **SECURITY GENERATOR, 227 HP**
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____ _____
4. Process TIER Code: **020599** **FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION**
5. SCC Code: **20200102** *(8 digit number)* **INDUSTRIAL: DISTILLATE OIL; RECIP**
6. Seasonal Throughput Percent: Dec-Feb **25%** Mar-May **25%** Jun-Aug **25%** Sep-Nov **25%**
7. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year **37.5** Weeks/Year **52**
8. Typical Hours of Operation: *(military time)* Start **00:00** End **23:59**
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **DIESEL**
10. ☒ Used *(input)* or ☐ Produced *(output)*
11. Annual Amount: *(a number)* **360** 12. – Fuel Sulfur Content (in percent) ***0.05*** %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **GALS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) **0.001**

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **CO** | **130** | **M GALS** | **N** | **5** | | | | | | ***47*** **lbs** |
| **NOX** | **604** | **M GALS** | **N** | **5** | | | | | | ***217*** **lbs** |
| **PM-10** | **42.5** | **M GALS** | **N** | **5** | | | | | | ***15*** **lbs** |
| **SOX** | ***7.1*** | **M GALS** | **N** | **3** | | | | | | ***3*** **lbs** |
| **VOC** | **49.3** | **M GALS** | **N** | **5** | | | | | | ***18*** **lbs** |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Security Headquarters Emergency Generator** | **MC Process ID No.: 11** |
| **PVNGS Source ID No.: AASKNEO1** | **MC Stack No.: 11** |
| **SCC: 20200102** | |

| | | |
|---|---|---|
| **Operating Hours** | **40** | **hr** |
| **Fuel Use Rate** | **9** | **gal/hr** |
| **Total Fuel Use** | **360** | **gal (estimated)** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | MONTHLY EMISSIONS |
|---|---|---|---|---|
| CO | 1.30E+02 | lb/M gal | AP-42, Sect. 3.3 | 47 lb |
| $NO_2$ | 6.04E+02 | lb/M gal | AP-42, Sect. 3.3 | 217 lb |
| PM10 | 4.25E+01 | lb/M gal | AP-42, Sect. 3.3 | 15 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 3 lb |
| Ozone (VOC) | 4.93E+01 | lb/M gal | AP-42, Sect. 3.3 | 18 lb |

**Notes:**

1) Emission rates are based on the nameplate full load (maximum) fuel consumption.

2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 12
2. Process Type/Description: **FIRE PROTECTION PUMPS, 2 @ 190 HP**
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: 020599 **FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION**
5. SCC Code: 20200102 (*8 digit number*) **INDUSTRIAL: DISTILLATE OIL; RECIP**
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 60.2 Weeks/Year _____
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **DIESEL**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 590 12. – Fuel Sulfur Content (in percent) *0.05* %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 130 | M GALS | N | 5 | | | | | | *77* lbs |
| NOX | 604 | M GALS | N | 5 | | | | | | *356* lbs |
| PM-10 | 42.5 | M GALS | N | 5 | | | | | | *25* lbs |
| SOX | *7.1* | M GALS | N | 3 | | | | | | *4* lbs |
| VOC | 49.3 | M GALS | N | 5 | | | | | | *29* lbs |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Fire Protection Pump** | **MC Process ID No.: 12** |
| **PVNGS Source ID No.: AMFPNPO1A/B** | **MC Stack No.: 12** |
| **SCC: 20200102** | |

| | | |
|---|---|---|
| **Operating Hours** | **60** | **hours** |
| **Fuel Use Rate** | **9.8** | **gal/hr per pump** |
| **Total Fuel Use** | **590** | **gal (estimated)** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.30E+02 | lb/M gal | AP-42, Sect. 3.3 | 77 lb |
| $NO_2$ | 6.04E+02 | lb/M gal | AP-42, Sect. 3.3 | 356 lb |
| PM10 | 4.25E+01 | lb/M gal | AP-42, Sect. 3.3 | 25 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 4 lb |
| Ozone (VOC) | 4.93E+01 | lb/M gal | AP-42, Sect. 3.3 | 29 lb |

**Notes:**

1) Emission rates are based on the nameplate full load (maximum) fuel consumption.

2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

## *General Process Form* 2006

Permit Number(s): **030132**

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: **13**
2. Process Type/Description: **ADMIN-A GENERATOR, 600 HP**
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: **020599** **FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION-**
5. SCC Code: **20200401** (*8 digit number*) **IND: LG. BORE ENGINE-DIESEL**
6. Seasonal Throughput Percent: Dec-Feb **25%** Mar-May **25%** Jun-Aug **25%** Sep-Nov **25%**
7. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year **37.2** Weeks/Year _____
8. Typical Hours of Operation: (*military time*) Start **00:00** End **23:59**
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **DIESEL**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) **1116**
12. – Fuel Sulfur Content (in percent) **0.05** %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **GALS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) **0.001**

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **CO** | **116** | **M GALS** | **N** | **5** | | | | | | ***130*** **lbs** |
| **NOX** | **438** | **M GALS** | **N** | **5** | | | | | | ***489*** **lbs** |
| **PM-10** | **7.85** | **M GALS** | **N** | **5** | | | | | | ***9*** **lbs** |
| **SOX** | ***7.1*** | **M GALS** | **N** | **3** | | | | | | ***8*** **lbs** |
| **VOC** | **11.2** | **M GALS** | **N** | **5** | | | | | | ***13*** **lbs** |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Administration Building A Diesel** | **MC Process ID No.: 13** |
| **PVNGS Source ID No.: A Generator** | **MC Stack No.: 13** |
| **SCC: 20200401** | |

| | | |
|---|---|---|
| **Operating Hours** | **37** | **hr** |
| **Fuel Use Rate** | **30** | **gal/hr** |
| **Total Fuel Use** | **1116** | **gal (estimated)** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.165E+02 | lb/M gal | AP-42, Sect. 3.3 | 130 lb |
| $NO_2$ | 4.385E+02 | lb/M gal | AP-42, Sect. 3.3 | 489 lb |
| PM10 | 7.804E+00 | lb/M gal | AP-42, Sect. 3.3 | 9 lb |
| $SO_2$ | 7.100E+00 | lb/M gal | by material balance | 8 lb |
| Ozone (VOC) | 1.122E+01 | lb/M gal | AP-42, Sect. 3.3 | 13 lb |

**Notes:**

1) Emission rates are based on the nameplate full load (maximum) fuel consumption.

2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 14

☐ 2. Process Type/Description: ADMIN-B GENERATOR, 289 HP

3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____

4. Process TIER Code: 020599 FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION

5. SCC Code: 20200102 (*8 digit number*) IND: DISTIL. OIL (DIESEL) -RECIP

6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%

7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year *30.8* Weeks/Year _____

8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59

☐ 9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") DIESEL

10. ☒ Used (*input*) or ☐ Produced (*output*)

☐ 11. Annual Amount: (*a number*) *369.6*

12. – Fuel Sulfur Content (in percent) *0.05* %

13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS

14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 130 | M GALS | N | 5 | | | | | | *48* lbs |
| NOX | 604 | M GALS | N | 5 | | | | | | *223* lbs |
| PM-10 | 42.5 | M GALS | N | 5 | | | | | | *16* lbs |
| SOX | 7.1 | M GALS | N | 3 | | | | | | *3* lbs |
| VOC | 49.3 | M GALS | N | 5 | | | | | | *18* lbs |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Administration Building B Diesel** | **MC Process ID No.: 14** |
| **PVNGS Source ID No.: B Generator** | **MC Stack No.: 14** |
| **SCC: 20200102** | |

| | | |
|---|---|---|
| **Operating Hours** | **31** | **hr** |
| **Fuel Use Rate** | **12** | **gal/hr** |
| **Total Fuel Use** | **370** | **gal (estimated)** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.30E+02 | lb/M gal | AP-42, Sect. 3.3 | 48 lb |
| $NO_2$ | 6.04E+02 | lb/M gal | AP-42, Sect. 3.3 | 223 lb |
| PM10 | 4.25E+01 | lb/M gal | AP-42, Sect. 3.3 | 16 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 3 lb |
| Ozone (VOC) | 4.93E+01 | lb/M gal | AP-42, Sect. 3.3 | 18 lb |

**Notes:**

1) Emission rates are based on the nameplate full load (maximum) fuel consumption.

2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 16
2. Process Type/Description: AUXILIARY BOILER
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: 020202 FUEL COMB. INDUSTRIAL: OIL-DISTILLATE
5. SCC Code: 10100501 (*8 digit number*) UTIL: GRDES 1&2 OIL-NORMFIRE
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 0 Weeks/Year _____
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") DIESEL
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 0 12. – Fuel Sulfur Content (in percent) 0.05 %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 5 | M GALS | N | 5 | | | | | | 0 lbs |
| NOX | 24 | M GALS | N | 5 | | | | | | 0 lbs |
| PM-10[1] | 2 | M GALS | N | 5 | | | | | | 0 lbs |
| SOX | 7.1 | M GALS | N | 3 | | | | | | 0 lbs |
| VOC[1] | 0.2 | M GALS | N | 6 | | | | | | 0 lbs |
| | | | | | | | | | | lbs |

[1] Updated emissions factors from County website for SCC Code. See Calculation Sheet No. 5

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Auxiliary Boiler** | **MC Process ID No.: 16** |
| **PVNGS Source ID No.: ASN-B02** | **MC Stack No.: 16** |
| **SCC: 10100501** | |

**Hours of Operation** **Less than 1 hr**
**Fuel Consumption** **0 gal**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 5.00E+00 | lb/M gal | Maricopa County | 0 lb |
| $NO_2$ | 2.40E+01 | lb/M gal | Maricopa County | 0 lb |
| PM10 | 2.00E+00 | lb/M gal | Maricopa County | 0.0 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 0 lb |
| Ozone (VOC) | 2.00E-01 | lb/M gal | Maricopa County | 0.00 lb |

**Notes:**

1) Emissions are based on the metered fuel consumption.

2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 17
2. Process Type/Description: **3 UNIT COOLING TOWERS, W/ 3 TOWERS PER UNIT (TOTAL HOURS OF OPERATION)**
3. Stack ID(s) (only if required on Stack Form) 17
4. Process TIER Code: 140699 **MISCELLANEOUS: COOLING TOWERS**
5. SCC Code: 38500101 (*8 digit number*)
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 8760 Weeks/Year
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **HRS OF OPERATION, AGGREGATE**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 0
12. – Fuel Sulfur Content (in percent) ____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **HRS OF OPERATION**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| PM-10[1] | 1.97 ~~2.1623~~ | HR OF OPERATI | N | ~~2~~ 8 | | | | | | 47,084 lbs |
| VOC[1] | 0.205 | HR OF OPERATI | N | ~~2~~ 3 | | | | | | 4,874 lbs |
| | | | | | | | | | | |

[1] *Emission factors updated based on engineering calculation and material balance. See Calculation Sheet No. 2.*

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Units 1, 2, and 3 Cooling Tower** | **MC Process ID No.: 17 (includes all 3 units, all 9 towers)** |
| **PVNGS ID No.: CWN-W01,2,3** | **MC Stack No.: 17** |
| **SCC Code: 38500101** | |

**Cumulative Operating Days (all units): 992.0 days**
**Cumulative Operating Hours (all Units 23,808 hrs**

| POLLUTANTS | EMISSIONS FACTOR | | SOURCE | ANNUAL EMISSIONS |
|---|---|---|---|---|
| PM10 | 1.9776E+00 | lb/hr | Non-Title V Permit Application | 47,084 lb |
| VOC (Total) | 2.120E-01 | lb/hr | Materials balance & CARB | 5,047 lb |

**Non Chloroform VOC Emission Factor:**

Total Non Chloroform VOC = (9,000 gallons of AF1091)(0.067 lbs VOC / gallon) = 0,600 lbs
Non Chloroform VOC Emission Factor = (600 lbs) / (23808 hr) = 0.025 lb / hr

**Chloroform VOC Emission Factor:**

The chloroform emissions factor of 20 kg-s/cubic m-yr, was obtained from Table 8.6-2, Emission Factor for Volatile Organic Compounds from "Emissions Characteristics of Cooling Towers. Using Reclaimed Wastewater in California", Science Applications, Inc., prepared for California State Air Resources Board, August 11, 1981.

Chloroform VOC Emissions Factor = (20 kg-s/cubic m-yr)(1 yr/365 d)(1 d / 24 hr)(2.2 lb / kg) (1 min / 60 s) (1 cubic m / 264.1 gal) (Circulating Water Flow in gal / min)
Chloroform VOC Emissions Factor = (20 kg-s/cubic m-yr)(1 yr/365 d)(1 d / 24 hr)(2.2 lb / kg) (1 min / 60 s) (1 cubic m / 264.1 gal) (590,000 gal/min)
Chloroform VOC Emissions Factor = 0.187 lbs / hr

**Total VOC Emission Factor:**

VOC Emissions Factor = Non Chloroform Emissions Factor + Chloroform Emissions Factor
VOC Emissions Factor = 0.025 lb / hr + 0.187 lb / hr
VOC Emissions Factor = 0.212 lb / hr

## *General Process Form 2006*

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 20

☐ 2. Process Type/Description: 2 DIESEL FIRED "GAS" TURBINES, NRC LEVEL EMERGY POWER. CO, NOX, PM10 ESF FROM VENDOR

3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____

4. Process TIER Code: 020599 — FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION-

5. SCC Code: 20200101 (*8 digit number*) — INDUSTRIAL: DISTILLATE OIL: TURBINE

6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%

7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 53.8 Weeks/Year _____

8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59

☐ 9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") DIESEL

10. ☒ Used (*input*) or ☐ Produced (*output*)

☐ 11. Annual Amount: (*a number*) 6551

12. – Fuel Sulfur Content (in percent) 0.05 %

13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS

14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 11.3 | M GALS | N | 9 | | | | | | 74 lbs |
| NOX | 117 | M GALS | N | 9 | | | | | | 766 lbs |
| PM-10 | 24.6 | M GALS | N | 9 | | | | | | 161 lbs |
| SOX[1] | 7.1 | M GALS | N | 3 | | | | | | 47 lbs |
| VOC | 0.057 | M GALS | N | 5 | | | | | | 0 lbs |
| | | | | | | | | | | lbs |

[1] *SOX Emission Factor updated with fuel sulfur content. See Calculation Sheet No. 1*

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 = Manufacturer Specifications
8 = Site-Specific Emission Factor
9 = Vendor Emission Factor
10 = Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 = Tested efficiency / EPA reference method
2 = Tested efficiency / other source test method
3 = Design value from manufacturer
4 = Best Guess / engineering estimate
5 = Calculated, based on material balance
6 = Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Station Blackstart Turbine** | **MC Process ID No.: 20** |
| **PVNGS Source ID No.: AMGTNKO1A/B** | **MC Stack No.: 20** |
| **SCC: 20200101** | |

| | | |
|---|---|---|
| **Operating Hours** | **54** | **hours** |
| **Fuel Consumption** | **6,551** | **gallons (aggregate)** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.13E+01 | lb/M gal | Vendor data | 74 lb |
| $NO_2$ | 1.17E+02 | lb/M gal | Vendor data | 766 lb |
| PM10 | 2.46E+01 | lb/M gal | Vendor data | 161 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 47 lb |
| Ozone (VOC) | 5.62E-02 | lb/M gal | AP-42, Sect. 3.1 | 0.4 lb |

**Notes:**

1) Fuel Consumption was based on fuel totalizer readings.

2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

3) Vendor data given for PM. PM10 assumed equivalent to PM.

4) The VOC emissions factor is based on AP-42 Section 3.1 Stationary Gas Turbines dated 04/00.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 21
2. Process Type/Description: CHEMICAL STORAGE BLDG GENERATOR, 150 HP
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: 020599 FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION
5. SCC Code: 20200102 (*8 digit number*) INDUSTRIAL: DISTILLATE OIL: RECIP
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 40 Weeks/Year _____
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") DIESEL
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 272
12. – Fuel Sulfur Content (in percent) 0.05%
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 130.0 | M GALS | N | 5 | | | | | | *35* lbs |
| NOX | 604.0 | M GALS | N | 5 | | | | | | *164* lbs |
| PM-10 | 42.5 | M GALS | N | 5 | | | | | | *12* lbs |
| SOX | *7.1* | M GALS | N | 3 | | | | | | *2* lbs |
| VOC | 49.3 | M GALS | N | 5 | | | | | | *13* lbs |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Chemical Storage Building Diesel** | **MC Process ID No.: 21** |
| **PVNGS Source ID No.: C Generator** | **MC Stack No.: 21** |
| **SCC: 20200102** | |

| | | |
|---|---|---|
| **Operating Hours** | **40** | **hrs** |
| **Fuel Use Rate** | **6.8** | **gal/hr** |
| **Total Fuel Use** | **272** | **gal (estimated)** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.30E+02 | lb/M gal | AP-42, Sect. 3.3 | 35 lb |
| $NO_2$ | 6.04E+02 | lb/M gal | AP-42, Sect. 3.3 | 164 lb |
| PM10 | 4.25E+01 | lb/M gal | AP-42, Sect. 3.3 | 12 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 2 lb |
| Ozone (VOC) | 4.93E+01 | lb/M gal | AP-42, Sect. 3.3 | 13 lb |

**Notes:**

1) Emission rates are based on the nameplate full load (maximum) fuel consumption.

2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 22
2. ☐ Process Type/Description: PORTABLE COOLING TOWER (UNITS ARE BASED ON TDS-HRS, EF BACK CALCULATED)
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: 140699 MISCELLANEOUS: COOLING TOWERS
5. SCC Code: 38500101 (*8 digit number*) COOLING TOWERS: PROC COOLING: MECH DRAFT
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 1392 Weeks/Year _____
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. ☐ Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") HRS OF OPERATION
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. ☐ Annual Amount: (*a number*) 3440 **12.** – Fuel Sulfur Content (in percent) _____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) HRS OF OPERATION
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) _____

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| PM-10[1] | *0.113* | HR OF OPERATI | N | 5 | | | | | | *290* lbs |
| VOC[1] | 0.0019 | HR OF OPERATI | N | 2 | | | | | | *3* lbs |
| | | | | | | | | | | |

[1] *Emissions factor back-calculated using AP-42 methodology and published VOC emissions factors. See Calculation Sheet No. 3*

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **PORTABLE COOLING TOWER** | **MC Process ID No.: 22** |
| **SCC Code: 38500101** | **MC Stack No.: 22** |

| | |
|---|---|
| **Average TDS** | **3,440 ppm** |
| **Operating Days** | **58 days** |
| **Operating Hours** | **1392 hours** |

| POLLUTANTS | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 2.08E-01 | lb/hr | manufacturer's data | 290 lb |
| VOC (Chloroform) | 1.90E-03 | lb/hr | CARB Reference | 3 lb |

**Particulate Matter:**

Emissions factors for $PM_{10}$ and chloroform are derived from formulas below.

Where: CFR = circulating flow rate (gpm) (2 cells) = 6,000
F1 = Liquid Drift Rate (fraction of flow rate) = 0.002% = 0.00002

PM-10 (lb/hr) = CFR x F1 x 8.4 lb/gal x 60 min/hr x (1/1,000,000 ppm) x Average TDS
PM-10 (lb/hr) = {6000 x 0.00002 x 8.4 x 60 x (1/1,000,000) x 3,440}= 0.208 lbs/hr

**Chloroform:**

The chloroform emissions factor of 20 kg-s/cubic m-yr, was obtained from Table 8.6-2, Emission Factor for Volatile Organic Compounds from "Emissions Characteristics of Cooling Towers Using Reclaimed Wastewater in California", Science Applications, Inc., prepared for California State Air Resources Board, August 11, 1981.

Chloroform VOC Emissions Factor = (20 kg-s/cubic m-yr)(1 yr/365 d)(1 d / 24 hr)(2.2 lb / kg) (1 min / 60 s) (1 cubic m / 264.1 gal) (Circulating Water Flow in gal / mi
Chloroform VOC Emissions Factor = (20 kg-s/m-yr)(1 yr/365 d)(1 d / 24 hr)(2.2 lb / kg) (1 min / 60 s) (1 cubic m / 264.1 gal) (6,000 gal/min)
Chloroform VOC Emissions Factor = 0.00190 lb / hr

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 23
2. Process Type/Description: LOADING/UNLOADING SALT SILOS (2)
3. Stack ID(s) (only if required on Stack Form) 23
4. Process TIER Code: 071099 MISCELLANEOUS INDUSTRIAL PROCESSES
5. SCC Code: 30510498 (*8 digit number*) BULK MATL UNLOADING: MINERAL
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 8760 Weeks/Year
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") SALT
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) *6936*
12. – Fuel Sulfur Content (in percent) _____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) TONS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| PM-10 | 10.0 | TON | N | 2 | 100.000 | 23 | | 99.000 | *3* | *694* lbs |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Salt Silos** | **MC Process ID No.: 23** |
| **PVNGS Source ID No.: AMSSMS02A,B** | **MC Stack No.: 23** |
| **SCC: 30510498** | **MC Control ID No.: 23** |

**Material Processed** **6,936 Tons**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 1.00E-01 | lb/T loaded | by material balance | 694.0 lb |

**Notes:**

1) Vendor data given for PM. Assume $PM_{10}$ = 1/2 x PM.

2) The silo acts as an expansions vessel, allowing most of the particulate to fall out due to gravity.
The salt delivered is a large particle size.
A conservative estimate of 1.0% going to the filter was used, 99% dropout inherent in transfer process.

3) Filter efficiency is 99%.

4) All of these factors are included in the emissions factor shown above.

# *General Process Form 2006*

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 24
2. Process Type/Description: **ILRT LEAK TEST RENTAL COMPRESSOR - REQUIRED EVERY 10 YEARS**
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: 020599 **FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION**
5. SCC Code: 20200102 (*8 digit number*) **INDUSTRIAL: DISTILLATE OIL: RECIP**
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 0 Weeks/Year _____
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **DIESEL,**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 0
12. – Fuel Sulfur Content (in percent) _____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **GALS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 0.74 | M GALS | N | 7 | | | | | | 0 lbs |
| NOX | 6.1 | M GALS | N | 7 | | | | | | 0 lbs |
| PM-10 | 0.1 | M GALS | N | 7 | | | | | | 0 lbs |
| SOX | 0.0852 | M GALS | N | 7 | | | | | | 0 lbs |
| VOC | 0.02 | M GALS | N | 7 | | | | | | 0 lbs |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

### Release Point 24: ILRT Compressors

NOT INCLUDED - ONLY NEED TO ADD ONCE PER 10 YEARS.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 26
2. Process Type/Description: **ABRASIVE BLAST MEDIA STORAGE HOPPER**
3. Stack ID(s) (only if required on Stack Form) 26
4. Process TIER Code: 071099 **MISCELLANEOUS INDUSTRIAL PROCESSES**
5. SCC Code: 30900201 (*8 digit number*) **ABRASIVE BLASTING: METAL: GENERAL**
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 8760 Weeks/Year
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **ABRASIVE BLAST MEDIA**
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 0
12. – Fuel Sulfur Content (in percent) ____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **TONS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| PM-10 | 20 | | TONS | N | 2 | 100.000 | 26 | | 99.00 | 3 | 0 lbs |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Abrasive Media Hopper** | **MC Process ID No.: 26** |
| **PVNGS Source No. - None Assigned** | **MC Stack No.: 26** |
| **SCC 30900201** | **MC Control ID No.: 26** |

**Material Loaded** **0 Tons**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 2.00E-01 | lb/T loaded | by material balance | 0.0 lb |

**Notes:**

1) Assumes 99% dropout rate of material due to large particle size. Only 1% goes to filter.

2) Filter efficiency based on typical value for HEPA filters of 99.00 %

3) Assumes all emissions are PM10.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 27
2. Process Type/Description: STEAM GENERATOR CHEMICAL CLEANING – ATMOS. DUMP VALVE STACKS UNITS 1, 2 , 3
3. Stack ID(s) (only if required on Stack Form) 27
4. Process TIER Code: 071099 MISCELLANEOUS INDUSTRIAL PROCESSES
5. SCC Code: 39999999 (*8 digit number*) MISC. INDUSTRIAL PORCESS: OTHER NOT CLASSIFIED
6. Seasonal Throughput Percent: Dec-Feb 0% Mar-May 0% Jun-Aug 0% Sep-Nov 100%
7. Normal Operating Schedule: Hours/Day 12 Days/Week 1 Hours/Year 12 Weeks/Year
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") HRS OF OPERATION (VENT TIME)
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) 0
12. – Fuel Sulfur Content (in percent) _____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) HRS OF OPERATION
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 9.9 | HR OF OPERATI | N | 2 | | | | | | *0* lbs |
| VOC | 102 | HR OF OPERATI | N | 2 | | | | | | *0* lbs |
| NHX | 9.9 | HR OF OPERATI | N | 2 | | | | | | *0* lbs |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
# Air Quality Permit Number: 030132
# Annual Emissions Calculation for 2006

## Release Point 27: SG Cleaning (ADV)

NOTE: THIS RELEASE POINT IS ONLY ACTIVE WHEN S/G CLEANING OCCURRED.

# *General Process Form 2006*

Permit Number(s): **030132**

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: **29**
2. Process Type/Description: **STEAM GENERATOR CHEMICAL CLEANING – EVAPORATOR CONDENSER DISCHARGE**
3. Stack ID(s) (only if required on Stack Form) **29**
4. Process TIER Code: **071099** **MISCELLANEOUS INDUSTRIAL PROCESSES**
5. SCC Code: **39999999** (8 digit number) **MISC. INDUSTRIAL PROCESS: OTHER NOT CLASSIFIED**
6. Seasonal Throughput Percent: Dec-Feb **0%** Mar-May **0%** Jun-Aug **0%** Sep-Nov **100%**
7. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year **1080** Weeks/Year
8. Typical Hours of Operation: (military time) Start **00:00** End **23:59**
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **GALLONS PROCESSED**
10. ☒ Used (input) or ☐ Produced (output)
11. Annual Amount: (a number) ***0***
12. – Fuel Sulfur Content (in percent) _____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **GALS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units)

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **NHX** | **0.032247** | | **GALLONS** | **N** | **2** | | | | | | ***0*** **lbs** |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

### Release Point 29: SG Cleaning (Evaporator Condenser)

NOTE: THIS RELEASE POINT IS ONLY ACTIVE WHEN S/G CLEANING OCCURRED.

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 30
2. Process Type/Description: STEAM GENERATOR CHEMICAL CLEANING – EVAPORATOR COOLING TOWER
3. Stack ID(s) (only if required on Stack Form) 30
4. Process TIER Code: 071099 MISCELLANEOUS INDUSTRIAL PROCESSES
5. SCC Code: 39999999 (8 digit number) MISC. INDUSTRIAL PROCESS: OTHER NOT CLASSIFIED
6. Seasonal Throughput Percent: Dec-Feb 0% Mar-May 0% Jun-Aug 0% Sep-Nov 100%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 1080
8. Typical Hours of Operation: (military time) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") HOURS OF OPERATION
10. ☒ Used (input) or ☐ Produced (output)
11. Annual Amount: (a number) *0*
12. – Fuel Sulfur Content (in percent) _____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) HRS OF OPERATION
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) _____

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| PM10 | 0.015 | HR OF OPERATI | N | 2 | | | | | | *0* lbs* |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

* Not in use for 2006

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
# Air Quality Permit Number: 030132
# Annual Emissions Calculation for 2006

## Release Point 30: SG Cleaning (Cooling Tower)

NOTE: THIS RELEASE POINT IS ONLY ACTIVE WHEN S/G CLEANING OCCURRED.

## *General Process Form* 2006

Permit Number(s): **030132**

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: **31**
2. Process Type/Description: **SECURITY SUBSTATION L EMERGENCY GENERATOR (179 HP)**
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: **020599** **FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION**
5. SCC Code: **20200102** (8 digit number) **INDUSTRIAL: DISTALLATE OIL: RECIP**
6. Seasonal Throughput Percent: Dec-Feb **25%** Mar-May **25%** Jun-Aug **25%** Sep-Nov **25%**
7. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year ***16*** Weeks/Year 52 _____
8. Typical Hours of Operation: (*military time*) Start ***00:00*** End **23:59**
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") ***DIESEL***
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) ***133***
12. – Fuel Sulfur Content (in percent) ***0.05*** %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) ***GALS***
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) ***0.001***

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **CO** | **106** | **M GALS** | **N** | **7** | | | | | | ***14*** **lbs** |
| **NOX** | **407** | **M GALS** | **N** | **7** | | | | | | ***54*** **lbs** |
| **PM-10** | **14.6** | **M GALS** | **N** | **7** | | | | | | ***2*** **lbs** |
| **SOX** | ***7.1*** | **M GALS** | **N** | **3** | | | | | | ***1*** **lbs** |
| **VOC** | **6.34** | **M GALS** | **N** | **7** | | | | | | ***1*** **lbs** |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

**Security Substation L Emergency Diesel Generator** — **MC Process ID No.: 31**
**PVNGS Source ID No.: AMQFNH01*A*Engine**
**SCC: 20200102**

| | | |
|---|---|---|
| **Operating Hours** | **16.2** | **hr** |
| **Fuel Use Rate** | **8.2** | **gal/hr** |
| **Fuel Use** | **133** | **gal** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 1.06E+02 | lb/Mgal | Vendor Data | 14 lb |
| $NO_2$ | 4.07E+02 | lb/Mgal | Vendor Data | 54 lb |
| PM10 | 1.46E+01 | lb/Mgal | Vendor Data | 2 lb |
| $SO_2$ | 7.10E+00 | lb/Mgal | by material balance | 1 lb |
| Ozone (VOC) | 6.34E+00 | lb/Mgal | Vendor Data | 1 lb |

**Notes:**

1) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

2) Calculated from the following vendor emission data, engine power of 170 bhp, and fuel use rate of 8.2 gal / hr:
   CO (lb/Mgal) = [(2.33 g / hp - hr) (170 hp) (1 lb / 454 g)] / [(8.2 gal fuel / hr) (1 Mgal / 1000 gal)] = 106 lb / Mgal
   NOx (lb/hr) = [(8.92 g / hp - hr) (170 hp) (1 lb / 454 g)] / [(8.2 gal fuel / hr) (1 Mgal / 1000 gal)] = 407 lb NOx / Mgal

PM10 (lb/hr) = [(0.33 g / hp - hr) (170 hp) (1 lb / 454 g)] / [(8.2 gal fuel / hr) (1 Mgal / 1000 gal)] = 15.1 lb PM10 / Mgal
VOC (lb/hr) = [0.14 g / hp - hr) (170 hp) (1 lb / 454 g)] / [(8.2 gal fuel / hr) (1 Mgal / 1000 gal)] = 6.34 lb VOC / Mgal

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 32
2. Process Type/Description: SECURITY HUBS 2, 3, 4 EMERGENCY DIESEL GENERATORS (TOTAL OF 3 ENGINES AT 35 HP EACH)
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: 020599 FUEL COMB. INDUSTRIAL: INTERNAL COMBUSTION
5. SCC Code: 20200102 (8 digit number) INDUSTRIAL: DISTILLATE OIL - RECIP
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 66 Weeks/Year 52
8. Typical Hours of Operation: (*military time*) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") DIESEL (AGGREGATE)
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) *139* 12. – Fuel Sulfur Content (in percent) *0.05* %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 54.8 | M GALS | N | 7 | | | | | | *8* lbs |
| NOX | 385 | M GALS | N | 7 | | | | | | 54 lbs |
| PM-10 | 7.14 | M GALS | N | 7 | | | | | | *1* lbs |
| SOX | 7.1 | M GALS | N | 3 | | | | | | *1* lbs |
| VOC | 21.9 | M GALS | N | 7 | | | | | | *3* lbs |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Security Hubs 2-4 Emergency Diesel Generators** | **MC Process ID No.: 32** |
| **PVNGS Source ID No.: AMQFNH01*B, C, & D*Engine** | |
| **SCC: 20200102** | |

| | | |
|---|---|---|
| **Operating Hours (aggregate)** | **66.2** | **hr** |
| **Fuel Use Rate** | **2.1** | **gal/hr** |
| **Fuel Use** | **139** | **gal** |

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 5.47E+01 | lb/Mgal | Vendor Data | 8 lb |
| $NO_2$ | 3.85E+02 | lb/Mgal | Vendor Data | 54 lb |
| PM10 | 7.14E+00 | lb/Mgal | Vendor Data | 1 lb |
| $SO_2$ | 7.10E+00 | lb/Mgal | by material balance | 1 lb |
| Ozone (VOC) | 2.20E+01 | lb/Mgal | Vendor Data | 3 lb |

**Notes:**

1) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

2) Calculated from the following vendor emission data, engine power of 170 bhp, and fuel use rate of 2.1 gal / hr:

CO (lb/Mgal) = [(1.49 g / hp - hr) (35 hp) (1 lb / 454 g)] / [(2.1 gal fuel / hr) (1 Mgal / 1000 gal)] = 54.7 lb / Mgal

NOx (lb/hr) = [(10.5 g / hp - hr) (35 hp) (1 lb / 454 g)] / [(2.1 gal fuel / hr) (1 Mgal / 1000 gal)] = 385 lb NOx / Mgal

PM10 (lb/hr) = [(0.20 g / hp - hr) (35 hp) (1 lb / 454 g)] / [(2.1 gal fuel / hr) (1 Mgal / 1000 gal)] = 7.34 lb PM10 / Mgal
VOC (lb/hr) = [0.60 g / hp - hr) (35 hp) (1 lb / 454 g)] / [(2.1 gal fuel / hr) (1 Mgal / 1000 gal)] = 22.0 lb VOC / Mgal

## *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: 33
2. Process Type/Description: MISC. DIESEL FUEL BURNING COMBUSTION EQUIPMENT (< 10 MMBTU / HR)
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____ _____
4. Process TIER Code: 010202 FUEL COMB. ELEC. UTIL.: OIL-DISTALLATE
5. SCC Code: 10200503 (8 digit number) INDUSTRIAL; DISTALLATE OIL < 10 MMBTU
6. Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
7. Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year *17.8* Weeks/Year 52
8. Typical Hours of Operation: (military time) Start 00:00 End 23:59
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") DIESEL
10. ☒ Used (*input*) or ☐ Produced (*output*)
11. Annual Amount: (*a number*) *50*
12. – Fuel Sulfur Content (in percent) *0.05* %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) GALS
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) 0.001

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| CO | 5 | M GALS | N | 6 | | | | | | *0* lbs |
| NOX | 20 | M GALS | N | 6 | | | | | | *1* lbs |
| PM-10 | 2 | M GALS | N | 6 | | | | | | *0* lbs |
| SOX | *7.1* | M GALS | N | 3 | | | | | | *0* lbs |
| VOC | 0.2 | M GALS | N | 6 | | | | | | *0* lbs |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Misc Diesel Fuel Burning Combustion Equipment** | **MC Process ID No.: 33** |
| **PVNGS Source ID No.: None** | **MC Stack No.: None** |
| **SCC: 10200503** | |

**Fuel Consumption** **50 gal**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 5.00E+00 | lb/M gal | AP-42, Sect. 1.3 | 0 lb |
| $NO_2$ | 2.00E+01 | lb/M gal | AP-42, Sect. 1.3 | 1 lb |
| PM10 | 2.00E+00 | lb/M gal | AP-42, Sect. 1.3 | 0.1 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 0 lb |
| Ozone (VOC) | 2.00E-01 | lb/M gal | AP-42, Sect. 1.3 | 0.01 lb |

**Notes:**

1) Emissions are based on the metered fuel consumption.
2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

## *General Process Form* 2006

Permit Number(s): **030132**

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process ID: **34**
2. Process Type/Description: **MISC. LPG BURNING COMBUSTION EQUIPMENT**
3. Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____
4. Process TIER Code: **010301** **FUEL COMB. ELEC. UTIL.: GAS**
5. SCC Code: **10201002** (8 digit number) **INDUSTRIAL; LPG: PROPANE**
6. Seasonal Throughput Percent: Dec-Feb **25%** Mar-May **25%** Jun-Aug **25%** Sep-Nov **25%**
7. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year ***2.1*** Weeks/Year **52**
8. Typical Hours of Operation: (military time) Start **00:00** End **23:59**
9. Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") **LPG (PROPANE)**
10. ☒ Used (input) or ☐ Produced (output)
11. Annual Amount: (a number) ***19***
12. – Fuel Sulfur Content (in percent) _____ %
13. Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) **GALS**
14. Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) **0.001**

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 23 | 25 |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **CO** | **3.2** | **M GALS** | **N** | **6** | | | | | | ***0*** **lbs** |
| **NOX** | **19** | **M GALS** | **N** | **6** | | | | | | ***0*** **lbs** |
| **PM-10** | **0.6** | **M GALS** | **N** | **6** | | | | | | ***0*** **lbs** |
| **SOX** | **0.02** | **M GALS** | **N** | **6** | | | | | | ***0*** **lbs** |
| **VOC** | **0.6** | **M GALS** | **N** | **6** | | | | | | ***0*** **lbs** |
| | | | | | | | | | | **lbs** |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Misc LPG Burning Combustion Equipment** | **MC Process ID No.: 34** |
| **PVNGS Source ID No.: None** | **MC Stack No.: None** |
| **SCC: 10201002** | |

**Fuel Consumption** **19 gal**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | ANNUAL EMISSIONS |
|---|---|---|---|---|
| CO | 3.20E+00 | lb/M gal | Maricopa County | 0.06 lb |
| $NO_2$ | 1.90E+01 | lb/M gal | Maricopa County | 0.36 lb |
| PM10 | 6.00E-01 | lb/M gal | Maricopa County | 0.01 lb |
| $SO_2$ | 2.00E-02 | lb/M gal | Maricopa County | 0.00 lb |
| Ozone (VOC) | 6.00E-01 | lb/M gal | Maricopa County | 0.01 lb |

**Notes:**

1) A Sulfur content for LPG was assumed to be the same as butane, 0.18 gr per cubic meter, per footnote in Table 1.5-2 of AP-42.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

**15.** Process ID: *35*

**16.** Process Type/Description: ***Contractor Portable Boiler*** **- Not in use in 2006**

**17.** Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____

**18.** Process TIER Code: *010202* ***FUEL COMB. ELEC. UTIL.: OIL-*** **DISTILLATE**

**19.** SCC Code: *10200503* (8 digit number) ***INDUSTRIAL, DISTILLATE OIL: < 10MMBTU/HR***

**20.** Seasonal Throughput Percent: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%

**21.** Normal Operating Schedule: Hours/Day 24 Days/Week 7 Hours/Year 99 Weeks/Year _____

**22.** Typical Hours of Operation: (military time) Start 00:00 End 23:59

**23.** Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") ***DIESEL***

**24.** ☒ Used (input) or ☐ Produced (output)

**25.** Annual Amount: (a number) *0* **12.** – Fuel Sulfur Content (in percent) *0.05%*

**26.** Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) ***GALS***

**27.** Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) *0.001*

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **23** | **25** |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| *CO* | *5.0* | *M GALS* | *N* | *5* | | | | | | *0* lbs |
| *NOX* | *20.0* | *M GALS* | *N* | *5* | | | | | | *0* lbs |
| *PM-10* | *2.0* | *M GALS* | *N* | *5* | | | | | | *0* lbs |
| *SOX* | *7.2* | *M GALS* | *N* | *5* | | | | | | *0* lbs |
| *VOC* | *0.2* | *M GALS* | *N* | *5* | | | | | | *0* lbs |
| | | | | | | | | | | lbs |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Contractor Portable Boiler** | **MC Process ID No.: 35** |
| **PVNGS Source ID No.: N/A** | **MC Stack No.: 35** |
| **SCC: 10200503** | |

**Hours of Operation** N/A hr
**Fuel Consumption** 0 gal

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| CO | 5.00E+00 | lb/M gal | Maricopa County | 0 lb |
| $NO_2$ | 2.00E+01 | lb/M gal | Maricopa County | 0 lb |
| PM10 | 2.00E+00 | lb/M gal | Maricopa County | 0 lb |
| $SO_2$ | 7.10E+00 | lb/M gal | by material balance | 0 lb |
| Ozone (VOC) | 2.00E-01 | lb/M gal | Maricopa County | 0 lb |

**Notes:**

1) Emissions are based on fuel consumption.

2) Low sulfur fuel (<0.05% S by wt) is burned in this equipment. However, for calculation purposes, a maximum fuel sulfur content of 0.05 % by weight at a fuel density of 7.1 lbs / gal was assumed.

# *General Process Form* 2006

Permit Number(s): 030132

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

**28.** Process ID: *36*

**29.** Process Type/Description: *ABRASIVE BLASTING OPERATIONS (CONFINED & UNCONFINED)*

**30.** Stack ID(s) (only if required on Stack Form) _____ _____ _____ _____ _____

**31.** Process TIER Code: *071099* *MISC INDUSTRIAL PROC*

**32.** SCC Code: *30900201* (8 digit number) *ABRASIVE BLASTING: METAL: GENERAL*

**33.** Seasonal Throughput Percent: Dec-Feb *25*% Mar-May *25*% Jun-Aug *25*% Sep-Nov *25%*

**34.** Normal Operating Schedule: Hours/Day *24* Days/Week *7* Hours/Year *1080* Weeks/Year *52*

**35.** Typical Hours of Operation: (military time) Start *00:00* End *23:59*

**36.** Emissions based on: (name of material or other parameter, e.g. "rock", "diesel", "vehicle miles traveled") *ABRASIVE BLAST MEDIA*

**37.** ☒ Used (input) or ☐ Produced (output)

**38.** Annual Amount: (a number) *128.4* **12.** – Fuel Sulfur Content (in percent) _____ %

**39.** Units of Measure: (for example: tons, gallons, million cu ft, acres, units produced etc.) *TONS*

**40.** Unit Conversion Factor: (if needed to convert Unit of Measure to correlate with emission factor units) _____

| | Emission Factor (EF) Information | | | | Control Device Information | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **23** | **25** |
| Pollutant | Emission Factor (EF) (number) | Emission Factor Unit (lbs per) | Controlled EF? Yes or No | Calculation Method Code* | Capture % Efficiency | Primary Control Device ID | Secondary Control Device ID | Control Device(s) % Efficiency | Efficiency Reference Code** | Estimated Actual Emissions |
| **PM-10** | *26* | **TONS** | **N** | **5** | | | | | | *3338* **lbs** |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

***Calculation Method Codes**

1 = Continuous Emissions Monitoring Measurements
2 = Best Guess/ Engineering Judgment
3 = Material balance
4 = Source Test Measurements (Stack Test)
5 = AP-42/Fire Method or Emission Factor
6 = State or Local Agency Emission Factor
7 =Manufacturer Specifications
8 =Site-Specific Emission Factor
9 =Vendor Emission Factor
10 =Trade Group Emission Factor

**** Control Efficiency Reference Codes**

1 =Tested efficiency / EPA reference method
2 =Tested efficiency / other source test method
3 =Design value from manufacturer
4 =Best Guess / engineering estimate
5 =Calculated, based on material balance
6 =Estimated, based on a published value

# PALO VERDE NUCLEAR GENERATING STATION
## Air Quality Permit Number: 030132
## Annual Emissions Calculation for 2006

| | |
|---|---|
| **Abrasive Blasting Operations (confined & unconfined)** | **MC Process ID No.: 36** |
| **PVNGS Source No. - None Assigned** | **MC Stack No.: N/A** |
| **SCC 30900202** | **MC Control ID No.: N/A** |

**Material Loaded** **256,784 lbs**
**128.392 Tons**

| CRITERIA POLLUTANT | EMISSIONS FACTOR | | SOURCE | EMISSIONS |
|---|---|---|---|---|
| PM10 | 2.60E+01 | lb/T abrasive | AP-42, Table 13.2.6-1 | 3338.2 lb |

**Notes:**

1) Then PM10 Emissions factor obtained from Table 13.2.6-1 from AP-42 for sand blasting of mild steel panels without controls. The emissions factor was adjusted for units of tons of abrasive.

PM10 Emission Factor = (13 lb PM10 / 1,000 lb abrasive) (2000 lb abrasive / ton abrasive) = 26 lb / ton

# EVAPORATIVE PROCESS FORMS

The Evaporative Process Forms were preprinted with much of the process information.

Van refueling operations from a bulk delivery vessel are no longer conducted. The gasoline emissions for working and Standing losses, Process ID's 51, 52, 54, and 55, were determined using EPA Tanks 4.0.9d computer program. Emissions for loading operations, Process ID's 53, 56, and 57, were determined using County emissions factors. Supplemental emissions information is provided under the section titled, "Gasoline Tank Emissions."

Evaporative Process ID's 60 through 67 were determined from site wide product use information by merging database information from material purchase and distribution, material chemical information, and daily user logs. The amount of materials and VOC emissions were determined by this compilation. The emissions factor was back-calculated from these results. This submittal includes the summary information for each evaporative process. Detailed information is maintained and available upon request.

A detailed ammonia emissions analysis for water treatment activities was conducted for the 1998 emissions summary. During 2006 this analysis was updated based on current emissions calculations and use data. These results are now used as a basis to estimate ammonia emissions. The summary data is provided for Process ID 90, Ammonia Releases.

## *Evaporative Process Form* 2006

Permit Number(s): **030132**

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process Type/Description: **HORIZONTAL FIXED ROOF STORAGE TANKS, CALC USING EPA TANKS 4.0.9*D***

2. Process TIER Code: **090212** **STORAGE & TRANSPORT: PETROLEUM PROD – NON-RESALE**

3. Seasonal Throughput Percent: Dec-Feb **25**% Mar-May **25**% Jun-Aug **25**% Sep-Nov **25**%

4. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year **8760** Weeks/Year

5. Typical Hours of Operation: (*military time*) Start **00:00** End **23:59**

| 6 | 7 | 8 | 9 | | 10 | 11 | | 12 | 13 | 14 | | | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process ID | Stack ID(s) | Material Type | Annual Usage Input | lb or gal | VOC. HAP&NON or NHx | Emission Factor | EF Units (lbs per) | Pounds of pollutant* sent off site | Capture % Efficiency | Control ID | Control % Efficiency | Control Efficiency Code** | Estimated Emissions (lbs/yr) |
| 51 | | GASOLINE (AS1), WORKING | *0* | GL | VOC | *0.0117* | GAL | | % | | % | | *0* |
| 52 | | GASOLINE (AS1), STANDING | *2622* | LB | VOC | 1.0 | LB | | % | | % | | *2,622* |
| 54 | | GASOLINE (AS2), WORKING | *94430* | GL | VOC | *0.00981* | GAL | | % | | % | | *926.14* |
| 55 | | GASOLINE (AS2), STANDING | *3395* | LB | VOC | 1.0 | LB | | % | | % | | *3,935* |

***The emissions for Process ID's 51 through 55 were determined using the EPA Tanks 4.09d computer program. See the section "Gasoline Tank Emissions" for more information on these processes.***

NOTE: Do NOT change pre-printed Process ID numbers. See the instructions for information on how to delete materials that are no longer used, or to assign Process ID numbers for new materials.

* If you have off-site recycling/disposal of any of the materials listed above, you must complete an Off-Site Recycling/Disposal Form to receive credit for reduced emissions.

****Control Efficiency Reference Codes**

1 = Tested efficiency / EPA reference method
2 = Tested efficiency / other source test method
3 = Design value from manufacturer
4 = Best Guess / engineering estimate
5 = Calculated, based on material balance
6 = Estimated, based on a published value

## *Evaporative Process Form* 2006

Permit Number(s): **030132**

Place an X in any gray cell to mark data requested to be held confidential. See Instructions for requirements for information to be deemed confidential.

1. Process Type/Description: **GAS. LOADING LOSSES: #53 CONSUMER; #56 TO REFUEL TRUCK; #57 VANS FROM TRUCKS**
2. Process TIER Code: **090212** **STORAGE & TRANSPORT: PETROLEUM PROD – NON-RESALE**
3. Seasonal Throughput Percent: Dec-Feb **25**% Mar-May **25**% Jun-Aug **25**% Sep-Nov **25**%
4. Normal Operating Schedule: Hours/Day **24** Days/Week **7** Hours/Year **8760** Weeks/Year
5. Typical Hours of Operation: (*military time*) Start **00:00** End **23:59**

| 6 | 7 | 8 | 9 | | 10 | 11 | | 12 | 13 | 14 | | | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process ID | Stack ID(s) | Material Type | Annual Usage Input | lb or gal | VOC. HAP&NON or NHx | Emission Factor | EF Units (lbs per) | Pounds of pollutant* sent off site | Capture % Efficiency | Control ID | Control % Efficiency | Control Efficiency Code** | Estimated Emissions (lbs/yr) |
| 53 | | GASOLINE (AS1), LOADING | *94430* | GL | VOC | 0.0117 | GAL | | % | | % | | *1105* |
| 56 | 56 | GASOLINE (AS2), LOADING | *0* | GL | VOC | 0.01045 | GAL | | 100.00 % | 56 | 90.00% | 6 | *0* |
| 57 | | GASOLINE (AS2), FUELING | *0* | GL | VOC | 0.0117 | GAL | | % | | % | | *0* |

***See the section "Gasoline Tank Emissions" for more information on these processes.***

NOTE: Do NOT change pre-printed Process ID numbers. See the instructions for information on how to delete materials that are no longer used, or to assign Process ID numbers for new materials.

* If you have off-site recycling/disposal of any of the materials listed above, you must complete an Off-Site Recycling/Disposal Form to receive credit for reduced emissions.

****Control Efficiency Reference Codes**

1 = Tested efficiency / EPA reference method
2 = Tested efficiency / other source test method
3 = Design value from manufacturer
4 = Best Guess / engineering estimate
5 = Calculated, based on material balance
6 = Estimated, based on a published value

# TANKS 4.0.9d
## Emissions Report - Summary Format
## Tank Indentification and Physical Characteristics

**Identification**

| | |
|---|---|
| User Identification: | AS-1 (2006 Emissions) |
| City: | Tonopah |
| State: | Arizona |
| Company: | Palo Verde Nuclear Generating Station - APS |
| Type of Tank: | Horizontal Tank |
| Description: | Small gasoline tank at autoshop |

**Tank Dimensions**

| | |
|---|---|
| Shell Length (ft): | 32.00 |
| Diameter (ft): | 7.90 |
| Volume (gallons): | 12,000.00 |
| Turnovers: | 7.23 |
| Net Throughput(gal/yr): | 94,430.00 |
| Is Tank Heated (y/n): | N |
| Is Tank Underground (y/n): | N |

**Paint Characteristics**

| | |
|---|---|
| Shell Color/Shade: | White/White |
| Shell Condition | Good |

**Breather Vent Settings**

| | |
|---|---|
| Vacuum Settings (psig): | -0.06 |
| Pressure Settings (psig) | 0.12 |

Meterological Data used in Emissions Calculations: Phoenix, Arizona (Avg Atmospheric Pressure = 14.12 psia)

# TANKS 4.0.9d
# Emissions Report - Summary Format
# Liquid Contents of Storage Tank

## AS-1 (2006 Emissions) - Horizontal Tank
## Tonopah, Arizona

| Mixture/Component | Month | Daily Liquid Surf. Temperature (deg F) Avg. | Min. | Max. | Liquid Bulk Temp (deg F) | Vapor Pressure (psia) Avg. | Min. | Max. | Vapor Mol. Weight. | Liquid Mass Fract. | Vapor Mass Fract. | Mol. Weight | Basis for Vapor Pressure Calculations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gasoline (RVP 9) | All | 75.04 | 68.08 | 81.99 | 72.61 | 6.1481 | 5.3933 | 6.9851 | 67.0000 | | | 92.00 | Option 4: RVP=9, ASTM Slope=3 |
| 1,2,4-Trimethylbenzene | | | | | | 0.0365 | 0.0281 | 0.0471 | 120.1900 | 0.0250 | 0.0002 | 120.19 | Option 2: A=7.04383, B=1573.267, C=208.56 |
| Benzene | | | | | | 1.7472 | 1.4553 | 2.0858 | 78.1100 | 0.0180 | 0.0070 | 78.11 | Option 2: A=6.905, B=1211.033, C=220.79 |
| Cyclohexane | | | | | | 1.7957 | 1.5019 | 2.1351 | 84.1600 | 0.0024 | 0.0010 | 84.16 | Option 2: A=6.841, B=1201.53, C=222.65 |
| Ethylbenzene | | | | | | 0.1799 | 0.1430 | 0.2245 | 106.1700 | 0.0140 | 0.0006 | 106.17 | Option 2: A=6.975, B=1424.255, C=213.21 |
| Hexane (-n) | | | | | | 2.7927 | 2.3522 | 3.2983 | 86.1700 | 0.0100 | 0.0062 | 86.17 | Option 2: A=6.876, B=1171.17, C=224.41 |
| Isooctane | | | | | | 0.9536 | 0.7676 | 1.1526 | 114.2200 | 0.0400 | 0.0085 | 114.22 | Option 1: VP70 = .812 VP80 = 1.093 |
| Isopropyl benzene | | | | | | 0.0880 | 0.0688 | 0.1117 | 120.2000 | 0.0050 | 0.0001 | 120.20 | Option 2: A=6.963, B=1460.793, C=207.78 |
| Toluene | | | | | | 0.5189 | 0.4227 | 0.6331 | 92.1300 | 0.0700 | 0.0081 | 92.13 | Option 2: A=6.954, B=1344.8, C=219.48 |
| Unidentified Components | | | | | | 7.8127 | 7.7672 | 7.7723 | 66.3456 | 0.7456 | 0.9659 | 89.36 | |
| Xylene (-m) | | | | | | 0.1505 | 0.1194 | 0.1884 | 106.1700 | 0.0700 | 0.0024 | 106.17 | Option 2: A=7.009, B=1462.266, C=215.11 |

# TANKS 4.0.9d
# Emissions Report - Summary Format
# Individual Tank Emission Totals

## Emissions Report for: Annual

**AS-1 (2006 Emissions) - Horizontal Tank**
**Tonopah, Arizona**

| | Losses(lbs) | | |
|---|---|---|---|
| Components | Working Loss | Breathing Loss | Total Emissions |
| Gasoline (RVP 9) | 926.14 | 2,621.95 | 3,548.09 |
| Hexane (-n) | 5.78 | 16.35 | 22.13 |
| Benzene | 6.51 | 18.42 | 24.92 |
| Isooctane | 7.89 | 22.34 | 30.23 |
| Toluene | 7.51 | 21.27 | 28.79 |
| Ethylbenzene | 0.52 | 1.47 | 2.00 |
| Xylene (-m) | 2.18 | 6.17 | 8.35 |
| Isopropyl benzene | 0.09 | 0.26 | 0.35 |
| 1,2,4-Trimethylbenzene | 0.19 | 0.53 | 0.72 |
| Cyclohexane | 0.89 | 2.52 | 3.42 |
| Unidentified Components | 894.59 | 2,532.61 | 3,427.19 |

# TANKS 4.0.9d
## Emissions Report - Summary Format
## Tank Indentification and Physical Characteristics

**Identification**

| | |
|---|---|
| User Identification: | AS-2 (2006 Emissions) |
| City: | Tonopah |
| State: | Arizona |
| Company: | Palo Verde Nuclear Generating Station - APS |
| Type of Tank: | Horizontal Tank |
| Description: | Large gasoline tank at autoshop |

**Tank Dimensions**

| | |
|---|---|
| Shell Length (ft): | 37.00 |
| Diameter (ft): | 9.50 |
| Volume (gallons): | 20,000.00 |
| Turnovers: | 4.72 |
| Net Throughput(gal/yr): | 94,430.00 |
| Is Tank Heated (y/n): | N |
| Is Tank Underground (y/n): | N |

**Paint Characteristics**

| | |
|---|---|
| Shell Color/Shade: | White/White |
| Shell Condition | Good |

**Breather Vent Settings**

| | |
|---|---|
| Vacuum Settings (psig): | -0.06 |
| Pressure Settings (psig) | 0.12 |

Meterological Data used in Emissions Calculations: Phoenix, Arizona (Avg Atmospheric Pressure = 14.12 psia)

# TANKS 4.0.9d
# Emissions Report - Summary Format
# Liquid Contents of Storage Tank

## AS-2 (2006 Emissions) - Horizontal Tank
## Tonopah, Arizona

| Mixture/Component | Month | Daily Liquid Surf. Temperature (deg F) Avg. | Min. | Max. | Liquid Bulk Temp (deg F) | Vapor Pressure (psia) Avg. | Min. | Max. | Vapor Mol. Weight. | Liquid Mass Fract. | Vapor Mass Fract. | Mol. Weight | Basis for Vapor Pressure Calculations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gasoline (RVP 9) | All | 75.04 | 68.08 | 81.99 | 72.61 | 6.1481 | 5.3933 | 6.9851 | 67.0000 | | | 92.00 | Option 4: RVP=9, ASTM Slope=3 |
| 1,2,4-Trimethylbenzene | | | | | | 0.0365 | 0.0281 | 0.0471 | 120.1900 | 0.0250 | 0.0002 | 120.19 | Option 2: A=7.04383, B=1573.267, C=208.56 |
| Benzene | | | | | | 1.7472 | 1.4553 | 2.0858 | 78.1100 | 0.0180 | 0.0070 | 78.11 | Option 2: A=6.905, B=1211.033, C=220.79 |
| Cyclohexane | | | | | | 1.7957 | 1.5019 | 2.1351 | 84.1600 | 0.0024 | 0.0010 | 84.16 | Option 2: A=6.841, B=1201.53, C=222.65 |
| Ethylbenzene | | | | | | 0.1799 | 0.1430 | 0.2245 | 106.1700 | 0.0140 | 0.0006 | 106.17 | Option 2: A=6.975, B=1424.255, C=213.21 |
| Hexane (-n) | | | | | | 2.7927 | 2.3522 | 3.2983 | 86.1700 | 0.0100 | 0.0062 | 86.17 | Option 2: A=6.876, B=1171.17, C=224.41 |
| Isooctane | | | | | | 0.9536 | 0.7676 | 1.1526 | 114.2200 | 0.0400 | 0.0085 | 114.22 | Option 1: VP70 = .812 VP80 = 1.093 |
| Isopropyl benzene | | | | | | 0.0880 | 0.0688 | 0.1117 | 120.2000 | 0.0050 | 0.0001 | 120.20 | Option 2: A=6.963, B=1460.793, C=207.78 |
| Toluene | | | | | | 0.5189 | 0.4227 | 0.6331 | 92.1300 | 0.0700 | 0.0081 | 92.13 | Option 2: A=6.954, B=1344.8, C=219.48 |
| Unidentified Components | | | | | | 7.8127 | 7.7672 | 7.7723 | 66.3456 | 0.7456 | 0.9659 | 89.36 | |
| Xylene (-m) | | | | | | 0.1505 | 0.1194 | 0.1884 | 106.1700 | 0.0700 | 0.0024 | 106.17 | Option 2: A=7.009, B=1462.266, C=215.11 |

# TANKS 4.0.9d
# Emissions Report - Summary Format
# Individual Tank Emission Totals

## Emissions Report for: Annual

**AS-2 (2006 Emissions) - Horizontal Tank**
**Tonopah, Arizona**

| | Losses(lbs) | | |
|---|---|---|---|
| Components | Working Loss | Breathing Loss | Total Emissions |
| Gasoline (RVP 9) | 926.14 | 3,935.43 | 4,861.57 |
| Hexane (-n) | 5.78 | 24.55 | 30.32 |
| Benzene | 6.51 | 27.64 | 34.15 |
| Isooctane | 7.89 | 33.53 | 41.42 |
| Toluene | 7.51 | 31.93 | 39.44 |
| Ethylbenzene | 0.52 | 2.21 | 2.73 |
| Xylene (-m) | 2.18 | 9.26 | 11.44 |
| Isopropyl benzene | 0.09 | 0.39 | 0.48 |
| 1,2,4-Trimethylbenzene | 0.19 | 0.80 | 0.99 |
| Cyclohexane | 0.89 | 3.79 | 4.68 |
| Unidentified Components | 894.59 | 3,801.33 | 4,695.92 |

# EMISSIONS FACTOR CALCULATION SHEETS

Additional emissions calculation information has been provided for the following processes:

Calculation Sheet No. 1 – Diesel Fuel Combustion Sources
(Process ID 7, 9, 10, 11, 12, 13, 14, 16, 20, 21, 24, 31, 32, 33, 35)

Calculation Sheet No. 2 – Unit Cooling Towers
(Process ID 17)

Calculation Sheet No. 3 – Portable Cooling Tower
(Process ID 22)

Calculation Sheet No. 4 – Various Evaporative Processes
(Process ID 60, 61, 62, 63, 64, 65, 66, 67)

Calculation Sheet No. 5 – Abrasive Blasting Operations (confined & unconfined)
(Process ID 36)

# EMISSIONS FACTOR CALCULATION SHEET NO 1

Permit Number: **030132**

Process ID No. **7, 9, 10, 11, 12, 13, 14, 16, 20, 21, 24, 31, 32, 33, 35**

Process Description: **Diesel Combustion Sources**

Description of Correction: **Calculation of Fuel Sulfur Content and SOX Emission Factors**

$SO_2$ emissions are derived from the fuel sulfur content. All sulfur in the fuel is assumed to be converted to $SO_2$ during combustion. In lieu of actual fuel sulfur analyses, a maximum fuel sulfur content at the permit limit of 0.05% was used in all of the calculations. Actual fuel sulfur content was less than this value so actual emissions will be lower. The following method was used to calculate the $SO_2$ emissions factor.

***$SO_2$ Emissions Factor (lb $SO_2$ / M GAL) Calculation Method:***

$SO_2$ Emissions Factor = Fuel Sulfur Content (%S) x (1 lb S/100 lb fuel) x (2 lb $SO_2$/lb S) x (7.1 lb fuel/gal) x (1000 gal/M GAL)

= Fuel Sulfur Content (%S) x (142)

= (0.05) x (142) = 0.71 lb $SO_2$ / M GAL

# EMISSIONS FACTOR CALCULATION SHEET NO 2

Permit Number: **030132**

Process ID No. **17**

Process Description: **Unit Cooling Towers**

Description of Correction: **Updated to PM-10 and VOC Emission Factors**

The methodology for calculating PM-10 and VOC Emissions from the Unit Cooling Towers was re-evaluated as part of the Non-Title V permit application update. The methodology is a refinement of the AP-42 method that calculated a critical droplet diameter that contains enough dissolved solids that will create a 10-micron diameter solid particle upon evaporation of the water. Based on a measured particle size distribution, the mass fraction of droplets less than the critical droplet diameter can then be used to estimate the PM-10 fraction emitted from the towers. This method was incorporated into permit Condition 55b.

VOC emissions from the cooling towers were re-assessed. Chloroform emissions were calculated using an emissions factor obtained from Table 8.6-2 in "Emissions Characteristics of Cooling Towers Using Reclaimed Wastewater in California", Science Applications, Inc., prepared for the California State Air Resources Board and dated August 11, 1981.

The water treatment chemicals used in the cooling tower were evaluated for VOC content. It was conservatively assumed that all of the VOC added to the towers evaporated.

The following sections describe the methods used to derive the emissions factors used.

***PM-10 Emission Factor Calculation Method:***

PM-10 emissions were calculated using the formula presented in Permit Condition 55b. This formula uses monthly average TDS concentrations and operating hours to calculate a critical droplet diameter. The mass fraction of droplets with diameters equal or less than the critical droplet diameters can be extrapolated from the table included as part of Permit Condition 55b. These calculations need to be performed monthly. The emissions factor used was based on the total monthly emissions calculated using the formula in permit condition 55b divided by the total operating hours in the year. Copies of the permit pages and monthly calculation results attached.

The emissions factor reported on the form was calculated as follows:

PM-10 Emissions Factor for year = (47,084 lb PM-10) / (23,808 hr)
= 1.97 lbs PM10 / hr

The PM-10 Emissions Factor for December 2006 = (308 lb PM-10) / (2232 hr)
= 0.14 lbs PM10/hr

New Emission approved by Maricopa County after source test.

# EMISSIONS FACTOR CALCULATION SHEET NO 2

Permit Number: **030132**

Process ID No. **17**

Process Description: **Unit Cooling Towers**

Description of Correction: **Updated to PM-10 and VOC Emission Factors**

***VOC Emission Factor Calculation Method:***

The cooling towers were examined for VOC emissions. Testing indicates that chloroform is formed as a by-product when the cooling tower circulating water is chlorinated. The amount of chloroform produced can vary widely. Chloroform emissions were calculated from an emissions factor (20 kg-s/$m^3$-yr) obtained from Table 8.6-2 in "Emissions Characteristics of Cooling Towers Using Reclaimed Wastewater in California", Science Applications, Inc., prepared for the California State Air Resources Board and dated August 11, 1981 (see attached copy of table). The design circulating flow rate of 590,000 gallons per minute was used in the calculation.

VOC Emissions Factor 1 = (20 kg-s/ $m^3$-yr)(1 yr/365 d)(2.2 lb / kg) (1 min / 60 s)
X (1 $m^3$ / 264.1 gal) (590,000 gal / min) (1 d / 24 hr)
= 0.187 lb VOC / hr

Water treatment chemicals are also added to the cooling tower water to reduce potential foaming of the water. The concentration in the circulating water is maintained in the parts per million level. Conservatively assuming that all of the VOC contained in the water treatment chemicals evaporates through the towers, a non-chloroform VOC emissions factor can be determined.

One chemical used during 2006 that contained VOC at a tested concentration of 0.07 lbs / gallon was Foamtrol AF1091. The amounts used during 2006 were based on use records and total operating hours. During 2006, thirty totes containing 300 gallons each of AF1091 (9,000 gallons total) were purchased. The non-chloroform emissions were calculated from the following:

VOC Emissions Factor 2 = (9,000 gal AF1091) (0.07 lb / gal) / 23,808 hr
= 0.026 lbs / hr

The VOC Emissions Factor is the sum of the chloroform and non-chloroform VOC emissions factors.

VOC Emission Factor = 0.187 + 0.026 = 0.213 lbs/hr

e. Description of recommended actions.

The Permittee shall complete and submit the Compliance Plan within 120 days of exceeding the hydrogen sulfide emission limitation.
[Rule 220, §303]

## COOLING TOWERS OPERATIONS

**54. Operating Limitations:**

The Permittee shall limit the total dissolved solids (TDS) concentration of the circulating water of each cooling tower unit to 30,000 ppm. The Permittee may calculate this value as a rolling average for the month based on the weekly TDS sampling described below.

[Rule 220, §302.2]

**55. Monitoring & Record Keeping:**

The Permittee shall conduct the following monitoring and shall retain records on-site for a period of no less than 5 years from the date of such record.

a. Total Dissolved Solids Concentration (TDS):

1. On a weekly basis, when the towers are in operation, the Permittee shall measure and record the TDS concentration in the circulating water of each unit cooling tower system (only one sample is required for each unit cooling tower system. A cooling tower system consists of three towers and a common circulating water system.). If the towers are not in operation on the scheduled day for sampling, the Permittee shall obtain a sample on the next day the cooling tower is operating.
2. On a monthly basis, the Permittee shall calculate and record an arithmetic average of the weekly samples collected in the calendar month.
3. On a monthly basis, when the portable cooling tower is in operation, the Permittee shall measure and record the TDS concentration in the circulating water of each portable cooling tower system. If the towers are not in operation for the entire month, no sample is required.

[Rule 220 §302.5] [Locally enforceable only]

b. Emissions Calculations:

1. On a monthly basis within 20 days following the end of each calendar month, the Permittee shall calculate and record PM10 emissions from each cooling tower unit using the applicable equation specified below. Emissions from the portable cooling tower are not required to be calculated during months it has not been operated:

(a) For each unit cooling tower system (one for each of Units 1, 2, and 3), monthly emissions shall be calculated using the following equation:

$PM10 = (8.4x10^{-6})(24)(60)(F_1)(F_D)(CFR)(TDS)(D)$

$PM10 = 0.0121 (F_1) (F_D) (CFR) (TDS) (D)$

where,

PM10 = PM10 emissions (tons/number of operating days);

CFR = circulating water flowrate in gallons per minute;

TDS = the monthly average total dissolved solids concentration (ppm);

D = the cumulative days of cooling tower operation during the month (days).

$F_1$ = 0.00001 (0.00075% from salt drift study);

$F_D$ = the cumulative mass fraction of drift droplets emitted that will result in $PM_{10}$ emissions determined by linear interpolation from Table 1 using the droplet diameter calculated from the following equation:

$$D_C = \frac{1301}{TDS^{1/3}}$$

where:

$D_C$ = the drift droplet diameter that will evaporate and produce a solid particle with a diameter of 10 microns.

Table 1

PVNGS Unit Cooling Tower Particle Size Distribution

| $D_C$ Droplet Diameter (micron, µm) | $F_D$ Cumulative Mass Fraction (< Diameter) | $D_C$ Droplet Diameter (micron, µm) | $F_D$ Cumulative Mass Fraction (< Diameter) |
|---|---|---|---|
| 0 | 0.00000 | 475 | 0.36724 |
| 15 | 0.00009 | 550 | 0.39493 |
| 25 | 0.00036 | 650 | 0.40655 |
| 35 | 0.00500 | 750 | 0.41994 |
| 45 | 0.02828 | 850 | 0.43192 |
| 55 | 0.06739 | 950 | 0.44923 |
| 65 | 0.09640 | 1100 | 0.47234 |
| 85 | 0.12894 | 1300 | 0.51496 |
| 100 | 0.14447 | 1500 | 0.56629 |
| 120 | 0.15897 | 1700 | 0.59469 |
| 140 | 0.17381 | 1900 | 0.65639 |
| 165 | 0.19692 | 2100 | 0.71808 |
| 195 | 0.21905 | 2300 | 0.84833 |
| 225 | 0.23927 | 2500 | 0.84833 |
| 255 | 0.25994 | 2700 | 0.84833 |
| 285 | 0.27691 | 2900 | 0.90231 |
| 325 | 0.30455 | 3100 | 0.90231 |
| 375 | 0.32817 | 3300 | 0.90231 |
| 425 | 0.34979 | 3500 | 1.00000 |

After the completion of the source test in Permit Condition 56, and after the Permittee has received a written approval of the source test report by the Department, the Permittee

# PALO VERDE NUCLEAR GENERATING STATION

## Air Quality Permit Number: 030132

## Annual Emissions Calculation for 2006

UNIT 1

| Month | Average TDS (ppm) | Operating Days (days) | Critical Droplet Diameter (µm) | Mass Fraction | PM10 Emissions (lbs) | Lower Table Values | | Upper Table Values | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Diameter | Mass Fraction | Diameter | Mass Fraction |
| January | 17,472 | 31.0 | 50.14 | 0.04838 | 1,870.2 | 45 | 0.02828 | 55 | 0.06739 |
| February | 17,965 | 28.0 | 49.67 | 0.04654 | 1,670.8 | 45 | 0.02828 | 55 | 0.06739 |
| March | 17,135 | 31.0 | 50.46 | 0.04963 | 1,881.5 | 45 | 0.02828 | 55 | 0.06739 |
| April | 11,700 | 8.0 | 57.31 | 0.07409 | 494.9 | 55 | 0.06739 | 65 | 0.09640 |
| May | 0 | 31.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| June | 0 | 30.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| July | 14,765 | 31.0 | 53.03 | 0.05969 | 1,949.9 | 45 | 0.02828 | 55 | 0.06739 |
| August | 27,872 | 31.0 | 42.91 | 0.02341 | 1,443.6 | 35 | 0.00500 | 45 | 0.02828 |
| September | 23,120 | 30.0 | 45.67 | 0.0309 | 1,529.6 | 45 | 0.02828 | 55 | 0.06739 |
| October | 19,225 | 31.0 | 48.56 | 0.0422 | 1,795.0 | 45 | 0.02828 | 55 | 0.06739 |
| November | 23,780 | 30.0 | 45.24 | 0.02922 | 1,487.7 | 45 | 0.02828 | 55 | 0.06739 |
| December | 25,265 | 31.0 | 44.34 | 0.02674 | 1,494.7 | 35 | 0.00500 | 45 | 0.02828 |
| ***Totals for Year*** | ***N/A*** | ***343.0*** | ***N/A*** | ***N/A*** | ***15,618*** | ***N/A*** | ***N/A*** | ***N/A*** | ***N/A*** |

UNIT 2

| Month | Average TDS (ppm) | Operating Days (days) | Critical Droplet Diameter (µm) | Cumulative Mass Fraction | PM10 Emissions for (lbs) | Lower Table Values | | Upper Table Values | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Diameter | Mass Fraction | Diameter | Mass Fraction |
| January | 28,336 | 31.0 | 42.67 | 0.02286 | 1,433.2 | 35 | 0.00500 | 45 | 0.02828 |
| February | 27,075 | 28.0 | 43.33 | 0.02439 | 1,319.6 | 35 | 0.00500 | 45 | 0.02828 |
| March | 25,755 | 31.0 | 44.05 | 0.02607 | 1,485.5 | 35 | 0.00500 | 45 | 0.02828 |
| April | 27,220 | 30.0 | 43.25 | 0.02421 | 1,411.0 | 35 | 0.00500 | 45 | 0.02828 |
| May | 29,255 | 31.0 | 42.22 | 0.02181 | 1,411.7 | 35 | 0.00500 | 45 | 0.02828 |
| June | 28,140 | 30.0 | 42.77 | 0.02309 | 1,391.2 | 35 | 0.00500 | 45 | 0.02828 |
| July | 26,490 | 31.0 | 43.64 | 0.02511 | 1,471.7 | 35 | 0.00500 | 45 | 0.02828 |
| August | 25,704 | 31.0 | 44.08 | 0.02614 | 1,486.6 | 35 | 0.00500 | 45 | 0.02828 |
| September | 25,715 | 30.0 | 44.08 | 0.02614 | 1,439.2 | 35 | 0.00500 | 45 | 0.02828 |
| October | 12,650 | 3.0 | 55.84 | 0.06983 | 189.1 | 55 | 0.06739 | 65 | 0.09640 |
| November | 13,252 | 15.0 | 54.98 | 0.06731 | 954.9 | 45 | 0.02828 | 55 | 0.06739 |
| December | 23,570 | 31.0 | 45.38 | 0.02977 | 1,552.4 | 45 | 0.02828 | 55 | 0.06739 |
| ***Totals for Year*** | ***N/A*** | ***322.0*** | ***N/A*** | ***N/A*** | ***15,545*** | ***N/A*** | ***N/A*** | ***N/A*** | ***N/A*** |

UNIT 3

| Month | Average TDS (ppm) | Operating Days (days) | Critical Droplet Diameter (µm) | Cumulative Mass Fraction | PM10 Emissions for (lbs) | Lower Table Values | | Upper Table Values | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Diameter | Mass Fraction | Diameter | Mass Fraction |
| January | 27,192 | 31.0 | 43.26 | 0.02423 | 1,457.7 | 35 | 0.00500 | 45 | 0.02828 |
| February | 27,555 | 28.0 | 43.07 | 0.02379 | 1,310.0 | 35 | 0.00500 | 45 | 0.02828 |
| March | 24,345 | 31.0 | 44.89 | 0.02802 | 1,509.2 | 35 | 0.00500 | 45 | 0.02828 |
| April | 1,256 | 3.0 | 120.58 | 0.1594 | 42.9 | 120 | 0.15897 | 140 | 0.17381 |
| May | 10,686 | 22.0 | 59.07 | 0.0792 | 1,328.9 | 55 | 0.06739 | 65 | 0.09640 |
| June | 27,856 | 30.0 | 42.92 | 0.02344 | 1,398.0 | 35 | 0.00500 | 45 | 0.02828 |
| July | 26,295 | 31.0 | 43.75 | 0.02537 | 1,475.9 | 35 | 0.00500 | 45 | 0.02828 |
| August | 27,080 | 31.0 | 43.32 | 0.02437 | 1,460.1 | 35 | 0.00500 | 45 | 0.02828 |
| September | 25,735 | 30.0 | 44.07 | 0.02611 | 1,438.7 | 35 | 0.00500 | 45 | 0.02828 |
| October | 24,675 | 29.0 | 44.69 | 0.02756 | 1,407.5 | 35 | 0.00500 | 45 | 0.02828 |
| November | 22,235 | 30.0 | 46.27 | 0.03325 | 1,582.9 | 45 | 0.02828 | 55 | 0.06739 |
| December | 24,445 | 31.0 | 44.83 | 0.02788 | 1,507.9 | 35 | 0.00500 | 45 | 0.02828 |
| ***Totals for Year*** | ***N/A*** | ***327.0*** | ***N/A*** | ***N/A*** | ***15,920*** | ***N/A*** | ***N/A*** | ***N/A*** | ***N/A*** |

# EMISSIONS FACTOR CALCULATION SHEET NO 3

Permit Number: **030132**

Process ID No. **22**

Process Description: **Portable Cooling Tower**

Description of Correction: **Updated PM-10 and VOC Emission Factors**

The emissions inventory forms allow the use of only one conversion factor unit per process (i.e. hours or TDS). "Hours of Operation" has been selected as the common unit. Emissions and emissions factors that were back calculated are provided below.

### *PM-10 Emission Factor Calculation:*

PM-10 emissions can be calculated from the following formula:

PM (lb/hr) = CFR x F1 x 8.4 lb/gal x 60 min/hr x ($1/10^6$ ppm) x TDS

Where:

CFR = circulating flow rate (gpm) (2 cells) = 6,000
F1 = Liquid Drift Rate (fraction of flow rate) = 0.002% = 0.00002
Average TDS = 3,440 ppm

Substituting in the parameters gives:

PM (lbhr) = [6000 x 0.00002 x 8.4 x 60 x ($1/10^6$) x 3,440] lbs/hr = 0.208 lb / hr

### *VOC Emissions Factor Calculation Method*

Chloroform VOC emissions were calculated from an emissions factor (20 kg-s/$m^3$-yr) obtained from Table 8.6-2 in "Emissions Characteristics of Cooling Towers Using Reclaimed Wastewater in California", Science Applications, Inc., prepared for the California State Air Resources Board and dated August 11, 1981 (see Calculation Sheet No. 2 for copy of table). The design circulating flow rate of 6,000 gallons per minute was used in the calculation.

VOC Emissions Factor 1 = (20 kg-s/ $m^3$-yr)(1 yr/365 d)(2.2 lb / kg) (1 min / 60 s)
X (1 $m^3$ / 264.1 gal) (6,000 gal / min) (1 d / 24 hr)
= 0.0019 lb VOC / hr

# EMISSIONS FACTOR CALCULATION SHEET NO 4

Permit Number: **030132**

Process ID No. **60, 61, 62, 63, 64, 65, 66, 67**

Process Description: **Various Evaporative Processes**

Description of Correction: **Updated VOC Emissions Factors**

Evaporative Process ID's 60 through 67 were determined from site wide product use information by merging database information from material purchase and distribution, material chemical information, and daily user logs. The amount of materials and VOC emissions were determined by this compilation. The emissions factor was back-calculated from these results. This submittal includes the summary information for each evaporative process. Detailed information is maintained and available upon request.

The emissions factors used were determined from the following equation:

VOC Emission Factor = (Total lbs VOC Emitted) / (Total gallons material used)

A summary of the evaporative data and emission factor calculations is provided below:

| Process ID | Process Description | Total VOC Emitted (lbs) | Total Gallons Used (gal) | VOC Emissions Factor (lb / gal) |
|---|---|---|---|---|
| 60 | Adhesives | 659 | 443 | 1.4875 |
| 61 | Cleaners | 4298 | 1083 | 3.9686 |
| 62 | Lubricants | 1085 | 477 | 2.2746 |
| 63 | Misc | 4777 | 5024 | 0.9508 |
| 64 | Coatings - Paints | 7386 | 8471 | 0.8719 |
| 65 | Coatings - Solvents | 2937 | 933 | 3.1479 |
| 66 | Coatings - Surface Prep | 21 | 80 | 0.2625 |
| 67 | Asphalt Products | 427 | 5169 | 0.0826 |

# EMISSIONS FACTOR CALCULATION SHEET NO 5

Permit Number: **030132**

Process ID No. **36**

Process Description: **Abrasive Blasting (confined & unconfined)**

Description of Correction: **PM-10 Emission Factors**

The PM-10 emission factor was obtained from Table 13.2.6-1 from AP-42. The value listed in the table for sand blasting mild steel panels without controls was 13 lb / 1000 lb of abrasive media. The emission factor was adjusted to units of tons:

PM-10 Emissions (lb / ton) = (13 lb PM-10 / 1000 lb media) (2000 lb / ton)
= 26 lb PM-10 / ton

## 13.2.6 Abrasive Blasting

### 13.2.6.1 General[1-2]

Abrasive blasting is the use of abrasive material to clean or texturize a material such as metal or masonry. Sand is the most widely used blasting abrasive. Other abrasive materials include coal slag, smelter slags, mineral abrasives, metallic abrasives, and synthetic abrasives. Industries that use abrasive blasting include the shipbuilding industry, automotive industry, and other industries that involve surface preparation and painting. The majority of shipyards no longer use sand for abrasive blasting because of concerns about silicosis, a condition caused by respiratory exposure to crystalline silica. In 1991, about 4.5 million tons of abrasives, including 2.5 million tons of sand, 1 million tons of coal slag, 500 thousand tons of smelter slag, and 500 thousand tons of other abrasives were used for domestic abrasive blasting operations.

### 13.2.6.2 Process Description[1-9]

Abrasive blasting systems typically include three essential components: an abrasive container (i. e., blasting pot); a propelling device; and a blasting nozzle or nozzles. The exact equipment used depends to a large extent on the specific application and type(s) of abrasive.

Three basic methods can be used to project the abrasive towards the surface being cleaned: air pressure; centrifugal wheels; or water pressure. Air blast (or dry) systems use compressed air to propel the abrasive using either a suction-type or pressure-type process. Centrifugal wheel systems use a rotating impeller to mechanically propel the abrasive by a combination of centrifugal and inertial forces. Finally, the water (or wet) blast method uses either air pressure or water pressure to propel an abrasive slurry towards the cleaned surface.

Abrasive materials used in blasting can generally be classified as sand, slag, metallic shot or grit, synthetic, or other. The cost and properties associated with the abrasive material dictate its application. The following discusses the general classes of commonly used abrasives.

Silica sand is commonly used for abrasive blasting where reclaiming is not feasible, such as in unconfined abrasive blasting operations. Sand has a rather high breakdown rate, which can result in substantial dust generation. Worker exposure to free crystalline silica is of concern when silica sand is used for abrasive blasting.

Coal and smelter slags are commonly used for abrasive blasting at shipyards. Black Beauty™, which consists of crushed slag from coal-fired utility boilers, is a commonly used slag. Slags have the advantage of low silica content, but have been documented to release other contaminants, including hazardous air pollutants (HAP), into the air.

Metallic abrasives include cast iron shot, cast iron grit, and steel shot. Cast iron shot is hard and brittle and is produced by spraying molten cast iron into a water bath. Cast iron grit is produced by crushing oversized and irregular particles formed during the manufacture of cast iron shot. Steel shot is produced by blowing molten steel. Steel shot is not as hard as cast iron shot, but is much more durable. These materials typically are reclaimed and reused.

Synthetic abrasives, such as silicon carbide and aluminum oxide, are becoming popular substitutes for sand. These abrasives are more durable and create less dust than sand. These materials typically are reclaimed and reused.

Other abrasives include mineral abrasives (such as garnet, olivine, and staurolite), cut plastic, glass beads, crushed glass, and nutshells. As with metallic and synthetic abrasives, these other abrasives are generally used in operations where the material is reclaimed. Mineral abrasives are reported to create significantly less dust than sand and slag abrasives.

The type of abrasive used in a particular application is usually specific to the blasting method. Dry blasting is usually done with sand, metallic grit or shot, aluminum oxide (alumina), or silicon carbide. Wet blasters are operated with either sand, glass beads, or other materials that remain suspended in water.

### 13.2.6.3 Emissions And Controls[1,3,5-11]

Emissions —

Particulate matter (PM) and particulate HAP are the major concerns relative to abrasive blasting. Table 13.2.6-1 presents total PM emission factors for abrasive blasting as a function of wind speed. Higher wind speeds increase emissions by enhanced ventilation of the process and by retardation of coarse particle deposition.

Table 13.2.6-1 also presents fine particulate emission factors for abrasive blasting. Emission factors are presented for PM-10 and PM-2.5, which denote particles equal to or smaller than 10 and 2.5 microns in aerodynamic diameter, respectively. Emissions of PM of these size fractions are not significantly wind-speed dependent. Table 13.2.6-1 also presents an emission factor for controlled emissions from an enclosed abrasive blasting operation controlled by a fabric filter; the blasting media was 30/40 mesh garnet.

Limited data from Reference 3 give a comparison of total PM emissions from abrasive blasting using various media. The study indicates that, on the basis of tons of abrasive used, total PM emissions from abrasive blasting using grit are about 24 percent of total PM emissions from abrasive blasting with sand. The study also indicates that total PM emissions from abrasive blasting using shot are about 10 percent of total PM emissions from abrasive blasting with sand.

Hazardous air pollutants, typically particulate metals, are emitted from some abrasive blasting operations. These emissions are dependent on both the abrasive material and the targeted surface.

Controls —

A number of different methods have been used to control the emissions from abrasive blasting. Theses methods include: blast enclosures; vacuum blasters; drapes; water curtains; wet blasting; and reclaim systems. Wet blasting controls include not only traditional wet blasting processes but also high pressure water blasting, high pressure water and abrasive blasting, and air and water abrasive blasting. For wet blasting, control efficiencies between 50 and 93 percent have been reported. Fabric filters are used to control emissions from enclosed abrasive blasting operations.

Table 13.2.6-1. PARTICULATE EMISSION FACTORS FOR ABRASIVE BLASTING[a]

EMISSION FACTOR RATING: E

| Source | Particle size | Emission factor, lb/1,000 lb abrasive |
|---|---|---|
| Sand blasting of mild steel panels[b] (SCC 3-09-002-02) | Total PM | |
| | 5 mph wind speed | 27 |
| | 10 mph wind speed | 55 |
| | 15 mph wind speed | 91 |
| | PM-10[c] | 13 |
| | PM-2.5[c] | 1.3 |
| Abrasive blasting of unspecified metal parts, controlled with a fabric filter[d] (SCC 3-09-002-04) | Total PM | 0.69 |

a One lb/1,000 lb is equal to 1 kg/Mg. Factors represent uncontrolled emissions, unless noted. SCC = Source Classification Code.

b Reference 10.

c Emissions of PM-10 and PM-2.5 are not significantly wind-speed dependent.

d Reference 11. Abrasive blasting with garnet blast media.

References For Section 13.2.6


1. C. Cowherd and J. Kinsey, *Development Of Particulate And Hazardous Emission Factors For Outdoor Abrasive Blasting*, EPA Contract No. 68-D2-0159, Midwest Research Institute, Kansas City, MO, June 1995.

2. Written communication from J. D. Hansink, Barton Mines Corporation, Golden, CO, to Attendees of the American Waterways Shipyard Conference, Pedido Beach, AL, October 28, 1991.

3. South Coast Air Quality Management District, *Section 2: Unconfined Abrasive Blasting*, Draft Document, El Monte, CA, September 8, 1988.

4. A. W. Mallory, "Guidelines For Centrifugal Blast Cleaning", *J. Protective Coatings And Linings, 1(1)*, June 1984.

5. B. Baldwin, "Methods Of Dust-Free Abrasive Blast Clearing", *Plant Engineering, 32(4)*, February 16, 1978.

6. B. R Appleman and J. A. Bruno, Jr., "Evaluation Of Wet Blast Cleaning Units", *J. Protective Coatings And Linings, 2(8)*, August 1985.

7. M. K. Snyder and D. Bendersky, *Removal Of Lead-Based Bridge Paints*, NCHRP Report 265, Transportation Research Board, Washington, DC, December 1983.

8. J. A. Bruno, "Evaluation Of Wet Abrasive Blasting Equipment", *Proceedings Of The 2nd Annual International Bridge Conference*, Pittsburgh, PA, June 17-19, 1985.

9. J. S. Kinsey, *Assessment Of Outdoor Abrasive Blasting*, Interim Report, EPA Contract No. 68-02 4395, Work Assignment No. 29, U. S. Environmental Protection Agency, Research Triangle Park, NC, September 11, 1989.

10. J. S. Kinsey, S. Schliesser, P. Murowchick, and C. Cowherd, *Development Of Particulate Emission Factors For Uncontrolled Abrasive Blasting Operations*, EPA Contract No. 68-D2-0159, Midwest Research Institute, Kansas City, MO, February 1995.

11. *Summary Of Source Test Results, Poly Engineering, Richmond, CA*, Bay Area Air Quality Management District, San Francisco, CA, November 19, 1990.

12. *Emission Factor Documentation For AP-42 Section 13.2.6, Abrasive Blasting, Final Report*, Midwest Research Institute, Cary, NC, September 1997.

## Off-Site Recycling / Disposal Forms 2006

There were two waste streams identified that sent material offsite for disposal.

**Waste Stream Number: 01 – Waste cold cleaning solvents / degreasers**
These materials were spent solvents that were used for parts cleaning operations. These materials were sent offsite for disposal.

**Waste Stream Number: 02 – Waste paint thinners / cleaning solvents**
These materials were the paint thinners and cleaning solvents that could not be recycled onsite. All materials were sent offsite for disposal.

WASTE PAINT THINNER

## *Off-Site Recycling/Disposal Form 2006*

Permit number(s) 030132

Provide one off-site recycling/disposal form for each waste stream at your business location. A waste stream is the waste from one or more processes mixed together to make one waste product before it is taken off site for recycling, disposal or combustion.

1) Assign a unique two-digit ID number to identify the waste stream that will be described below. 02
(Start with ID# 01 for first waste stream. Make a copy of this blank form and use 02 for second, etc.)

2) What was the quantity of this waste stream in 2006 ? 285 *Check one:* ☑ pounds ☐ gallons
Indicate whether this quantity is reported in pounds or gallons. Keep waste disposal company manifests as proof that this amount of waste was taken off site.

3) What was the **average** pollutant content of the waste stream? NOTE: Report in the same units (pounds or gallons) as used in Line 2.

VOC 0.95 lbs/unit HAP&NON 0 lbs/unit NHx 0 lbs/unit

4) Calculate the **total** annual pollutant content of the waste in this waste stream.
(volume of waste, from Line 2) x (pollutant content, from Line 3) = Total pollutants in waste stream, in lbs/yr.

VOC 271 lbs/yr HAP&NON N/A lbs/yr NHx N/A lbs/yr

5) List the process ID numbers of the processes contributing to this waste stream. Also estimate the pounds of pollutant that each process contributed to this waste stream.

**NOTE:** Column totals in the table below must equal the total for each pollutant type reported on line 4. The quantities you report below for each pollutant and process must also be reported in column 12 on the Evaporative Process Form.
**See the Instructions for an example of a completed Off-Site Recycling/Disposal Form.**

| Process ID | Annual VOC (lbs) | Annual HAP&NON (lbs) | Annual NHx (lbs) |
|---|---|---|---|
| 61 Contributed about | 271 lbs | N/A lbs | N/A lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |

WASTE DEGREASERS

## *Off-Site Recycling/Disposal Form 2006*

Permit number(s) 030132

Provide one off-site recycling/disposal form for each waste stream at your business location. A waste stream is the waste from one or more processes mixed together to make one waste product before it is taken off site for recycling, disposal or combustion.

1) Assign a unique two-digit ID number to identify the waste stream that will be described below. 01
(Start with ID# 01 for first waste stream. Make a copy of this blank form and use 02 for second, etc.)

2) What was the quantity of this waste stream in 2006 ? 174 *Check one:* ☑ pounds ☐ gallons
Indicate whether this quantity is reported in pounds or gallons. Keep waste disposal company manifests as proof that this amount of waste was taken off site.

3) What was the **average** pollutant content of the waste stream? NOTE: Report in the same units (pounds or gallons) as used in Line 2.

VOC 0.95 lbs/unit HAP&NON 0 lbs/unit NHx 0 lbs/unit

4) Calculate the **total** annual pollutant content of the waste in this waste stream.
(volume of waste, from Line 2) x (pollutant content, from Line 3) = Total pollutants in waste stream, in lbs/yr.

VOC 165 lbs/yr HAP&NON N/A lbs/yr NHx N/A lbs/yr

5) List the process ID numbers of the processes contributing to this waste stream. Also estimate the pounds of pollutant that each process contributed to this waste stream.

**NOTE:** Column totals in the table below must equal the total for each pollutant type reported on line 4. The quantities you report below for each pollutant and process must also be reported in column 12 on the Evaporative Process Form.
**See the Instructions for an example of a completed Off-Site Recycling/Disposal Form.**

| Process ID | Annual VOC (lbs) | Annual HAP&NON (lbs) | Annual NHx (lbs) |
|---|---|---|---|
| 61 Contributed about | 165 lbs | N/A lbs | N/A lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |
| Contributed about | lbs | lbs | lbs |

# ATTACHMENT 2

## 2006 Annual HAPS Report

# Palo Verde Nuclear Generating Station
# Air Quality Permit 030132
# 2006 Annual HAPS Report

| Summary of 2006 Annual Emissions | Total Process Emissions* (tons) | Accidental Releases (tons) | Total Emissions (tons) |
|---|---|---|---|
| Xylene | 1.34 | 0 | 1.34 |
| Ethyl Benzene | 0.19 | 0 | 0.19 |
| Chloroform | 2.23 | 0 | 2.23 |
| *Total* | *3.76* | *0* | *3.76* |

** - In accordance with Permit Condition 21, only those HAPS with emissions for the calendar year greater than 500 lbs are listed.*