

# **THE ADJUNCT DATA FILE TECHNICAL SUPPORT DOCUMENT**

**Prepared for:**

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## **NOTICE**

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## ABBREVIATIONS AND SYMBOLS

|                 |  |
|-----------------|--|
| ADF             | -- Adjunct Data File                           |
| bbl             | -- Barrel                                      |
| Btu             | -- British thermal unit                        |
| CAA             | -- Clean Air Act                               |
| CFR             | -- Code of Federal Regulations                 |
| DOE             | -- Department of Energy                        |
| EIA             | -- Energy Information Administration           |
| EPA             | -- U.S. Environmental Protection Agency        |
| GWh             | -- Gigawatt hour                               |
| kW              | -- Kilowatt                                    |
| kWh             | -- Kilowatt hour                               |
| lbs             | -- Pounds                                      |
| MMBtu           | -- Million Btu                                 |
| MW              | -- Megawatt                                    |
| NADB            | -- National Allowance Data Base                |
| NERC            | -- North American Electric Reliability Council |
| NSPS            | -- New Source Performance Standards            |
| PC              | -- Personal (micro)computer                    |
| Pechan          | -- E.H. Pechan & Associates, Inc.              |
| ppm             | -- Parts per million                           |
| QF              | -- Qualifying facilities                       |
| RNSPS           | -- Revised New Source Performance Standards    |
| SAS             | -- Statistical Analysis System                 |
| SDF             | -- Supplemental Data File                      |
| SIP             | -- State Implementation Plan                   |
| SO <sub>2</sub> | -- Sulfur dioxide                              |



## **SECTION 1 INTRODUCTION**

Section 402 of the Clean Air Act (CAA) defines a utility unit as a "fossil-fuel combustion device." Although most of the utility units are associated with traditional electric utilities (and are therefore included in the National Allowance Data Base (NADB) Version 2.1), there are several that are associated with nontraditional utilities.

The Department of Energy's (DOE) Energy Information Administration (EIA) has identified several possible utility units that are not included in the NADB. These units were identified from Form EIA-867 (EIA, 1990), which includes units not operated by traditional electric utilities.

Utility units from nontraditional utilities that filed Form EIA-867 are included in this data base. These are generating turbines (generators) that are owned by a nontraditional utility that potentially sell electricity to an electric utility and are greater than 25 MW. Specifically, the following unit categories are included in the Adjunct Data File (ADF):

- Existing units (on-line prior to November 15, 1990), new units (on-line after November 15, 1990), and planned fossil-fuel steam units (not on-line as of December 31, 1991).
- New and planned simple combustion units (including gas turbines and internal combustion units).
- New and planned cogenerators that are greater than 25 MW and can potentially sell generation to a utility.

Represented in this data base are 793 generating unit records from 475 plants. Not all ADF utility units are necessarily affected, but they are potentially affected. There are 38 fields (variables, or data elements). The data are sorted by State name, plant name, boiler ID, and generator ID, and are assigned a unique sequence number beginning with 3,837, the first number after the last NADB Version 2.1 sequence number.

The ADF is available in dBASE III Plus PC format, as well as on the IBM mainframe in Statistical Analysis System (SAS) format.

The data from Form EIA-867 are confidential. EPA is publishing the ADF for public comment and review. It will be announced in a Spring 1992 *Federal Register* notice. Once the rules are finalized, EPA will allocate allowances using the available data in the

**ADF based on the determinations of applicability. If sufficient data are unavailable for a unit, no allowances will be allocated.**

## SECTION 2

### DESCRIPTION OF DATA ELEMENTS

The ADF contains 38 data elements, 9 of which have values that were extracted from the 1990 Form EIA-867 (EIA, 1990). They have been grouped into five categories. The first category – identification or fixed variables – includes variables numbered 1 through 11. The second category contains elements numbered 12 and 13, which relate to the calculation of the 1985 actual SO<sub>2</sub> emission rate, and the third category includes data elements numbered 14 through 18, which are associated with the determination of the 1985 allowable SO<sub>2</sub> emission rate. Elements numbered 19 through 34 fall into the fourth category as EIA-supplied data. The fifth and last category includes the variables numbered 35 through 38, which are each calculated from other elements in the data base. Table 1 lists and summarizes these variables. The file structure of the PC version is found in Appendix A.

Descriptions of each of the data elements appear below, although due to Form EIA-867 confidentiality restrictions, only eight data elements (SEQNUM, STATNAM, PNAME, GENID, UTILNAME, UCODE, EPARGN, and ORISPL) have values. Further information may be found in the *National Allowance Data Base Version 2.1 Technical Support Document*.

#### IDENTIFICATION OR FIXED VARIABLES

1. **Sequence Number (SEQNUM) --**  
This field contains the record number, beginning with 3837 (the first integer after the last SEQNUM for the NADB Version 2.1), which is assigned after the data file has been sorted by State name, plant name, boiler ID, and generator ID.
2. **State Name (STATNAM) --**  
This field contains the name of the State where the plant is located.
3. **Plant Name (PNAME) --**  
The name associated with each plant (facility), as reported on Form EIA-867, is contained in this field.
4. **Boiler Identification Code (BLRID) --**  
This code identifies the boiler. Since none of the units have a known assigned boiler ID code, a default value of two asterisks followed by the GENID is used.

**5. Generator Identification Code (GENID) --**

This code identifies the generator or turbine. The source of the generator ID code is Form EIA-867.

**6. Nontraditional Utility Name (UTILNAME) --**

There is a utility name for every utility. The nontraditional utility name is determined from Form EIA-867.

**7. Nontraditional Utility Code (UCODE) --**

Each nontraditional utility has a unique utility code, originating from Form EIA-867, that is associated with UTILNAME.

**8. EPA Region (EPARGN) --**

This field contains the number of the EPA region in which the facility is located.

**9. County Name (CNTYNAME) --**

The field contains the county name.

**10. Plant Code (ORISPL) --**

This plant code is a unique plant identification code, assigned by Form EIA-867. Note that ORISPL in the ADF has 5 digits, while ORISPL in the NADB has 4 digits.

**11. Phase 1 Allowances (PHASE1AL) --**

This field contains the Phase 1 allowances, in tons, that appear in Table A of the CAA. Note that these values are not necessarily the final Phase 1 allocations.

**1985 ACTUAL SO<sub>2</sub> EMISSION RATE-RELATED VARIABLES**

**12. 1985 Boiler Total Heat Input (TOTHT) --**

Total heat input, in 10<sup>12</sup> Btu, is the sum for 1985 of the products of the amount of each fuel consumed and the associated heat content.

**13. 1985 Boiler SO<sub>2</sub> Emissions (SO2) --**

This field contains the 1985 SO<sub>2</sub> emissions, in tons.

## **1985 ALLOWABLE SO<sub>2</sub> EMISSION RATE (LIMIT)-RELATED VARIABLES**

### **14. Boiler SO<sub>2</sub> Regulatory Category (SO2CATEG) --**

The regulatory category determines the type of emission regulation the unit must meet. The plant may be regulated under one of the following:

- The State Implementation Plan (SIP), meaning that State or local regulations are binding (=1);
- The New Source Performance Standards (NSPS), 40 Code of Federal Regulations (CFR) Part 60, subpart D (=2);
- The revised NSPS (RNSPS), 40 CFR Part 60, subpart Da (=3);
- The NSPS, 40 CFR Part 60, subpart GG (=4);
- The SIP for the existing gas turbine, combined cycle, with auxiliary firing (=6); or
- The NSPS, 40 CFR Part 60, subpart GG for the existing gas turbine, combined cycle, with auxiliary firing (=9).

### **15. Boiler SO<sub>2</sub> Scrubber Flag (SCRUBBER) --**

This field indicates whether the boiler was scrubbed (=1) or unscrubbed (=0) in 1985. Units that showed a zero percent SO<sub>2</sub> removal efficiency were assumed to be unscrubbed.

### **16. 1985 Boiler SO<sub>2</sub> Emission Limit (FELIM85) --**

This field is the federally enforceable SO<sub>2</sub> emission limit (rounded to four decimal places) that applied to each boiler in 1985; it has been converted to pounds of SO<sub>2</sub> per million Btu of heat input (lbs/MMBtu). For units with more than one limit, the most stringent federally enforceable limit is used. For newer units subject to NSPS, and those that came on-line after 1985, the federally permitted limit is used. For units with no federally enforceable limit, a code of 99.9 is used.

### **17. 1985 SO<sub>2</sub> Emission Limit Annualization Factor (ANNFACT) --**

This field is the annualization factor that, when multiplied by the SO<sub>2</sub> emissions limit (FELIM85), produces the annualized SO<sub>2</sub> emission limit (ANNLIM85).

### **18. 1985 SO<sub>2</sub> Emission Limit Averaging Period (AVGPD) --**

This field contains 1 of 18 codes indicating the averaging period or time over which the emission limit is applied.

## **EIA-SUPPLIED VARIABLES**

### **19. 1989 Generator Nameplate Capacity (NAMEPCAP) --**

This field contains the 1989 nameplate capacity of the generator, in MW and rounded to two decimal places.

- 20. 1989 Generator Summer Net Dependable Capability (SUMNDCAP) --**  
This field contains the 1989 summer net dependable capability of the generator, in MW and rounded to two decimal places. If a value is not available, the default value is NAMEPCAP.
- 21. Generator Month On-line (GENMNONL) --**  
This data value is the month portion of the generator startup date. For existing units, this is the first electricity date. For units that have been repowered, it is the repowered generator startup date. For planned units, it is the projected first electricity date.
- 22. Generator Year On-line (GENYRONL) --**  
This data value is the year portion of the generator on-line date. See GENMNONL for further details.
- 23. Boiler Month On-line (BLRMNONL) --**  
The boiler on-line month is the month portion of the boiler on-line date.
- For units from plants of at least 100 MW and with a generator first electricity on-line date between 1984 and 1989, the boiler on-line date is the generator first positive generation date.
- For units with a generator first electricity on-line date prior to 1984 or from plants with less than 100 MW, the boiler on-line date is the generator first electricity date.
- For units with future on-line dates of 1990 and beyond, the boiler on-line date is the projected generator first electricity date.
- There are, however, a few exceptions.
- 24. Boiler Year On-line (BLRYRONL) --**  
The boiler on-line year is the year portion of the boiler on-line date. See BLRMNONL for further details.
- 25. 1985-1987 Boiler-generator Average Total Heat Input, "Baseline" (BASE8587) --**  
The average total heat input (also called "baseline"), in  $10^{12}$  Btu, is the arithmetic mean of the calculated heat inputs for all 1985 through 1987 reported fuels.
- If there was no fuel consumption for any of the three years, the baseline value is 0. Note that outage hours do not affect the numerical value contained in this field.

**26. Consecutive Planned and Forced Outage Hours (OUTAGEHR) --**

This field represents the number of continuous hours (with a 2,920-hour minimum) a unit was out of service between 1985 and 1987 due to a planned or forced outage.

The North American Electric Reliability Council (NERC) defines a planned outage as "the removal of a unit from service to perform work on specific components that is scheduled well in advance and has a predetermined duration (e.g., annual overhaul, inspections, testing)." It defines a forced outage as "an unplanned component failure (immediate, delayed, postponed, startup failure) or other condition that requires the unit be removed from service immediately or before the next weekend" (NERC,1990).

If there were individual outages each totaling less than four months (2,920 hours) during 1985-1987, the value is 0.

**27. Primary Fuel Indicator (PRIMFUEL) --**

This field, for those units with fuel use, has a value of 1 if the coal heat input is greater than 50 percent of the total heat input for the years 1985 through 1987, and a value of 2 otherwise (for oil/gas units).

**28. 1980-1989 Gas Share (GAS8089) --**

This value, calculated from 1980 through 1989 data for oil/gas units on-line during the period from 1985 to 1987, is the percentage of gas consumed by each boiler during this time period. The equation used is:

$$GAS8089=100*(1980-1989 \text{ gas heat input})/(1980-1989 \text{ total heat input}).$$

The value is 0 for coal units (those with a greater than 50 percent share) on-line during the period from 1985 to 1987.

**29. 1989 Generator Heat Rate (HEATRATE) --**

The generator heat rate value, in Btu/kWh, is the net full load heat rate reported for each generator.

**30. 1985 Generator Generation (GENER) --**

This field contains the generator generation for 1985, in GWh.

**31. Total Capacity of the Fossil-steam Units of the Operating Utility (UCAPFSST) --**

This field is the sum, in MW, of the capacity of all the fossil-fuel steam units operated by the operating utility of the particular unit in 1989. In a few cases, this value is 0 because all of the utility's units retired before 1989 or had not come on-line by 1989. In addition, if the capacity was less than 500 kW, this field value was set to 0.

**32. Maximum of the Average Heat Inputs for Any Combination of Three Consecutive Years from 1980-1989 (MXBS8089) --**

This heat input data element (also called "maximum heat baseline"), in  $10^{12}$  Btu, is the maximum of the average heat inputs for every combination of three consecutive years reported between 1980 and 1989. It is calculated similarly to BASE8587, but only for units subject to §405(i) of the CAA; the value is 0 otherwise.

**33. Representative Year SO<sub>2</sub> Emission Rate (RY\_ER) --**

The representative year SO<sub>2</sub> emission rate, in lbs/MMBtu and rounded to four decimal places, is nonzero only for those cases in which there is a positive baseline (either BASE8587 or MXBS8089) value, but no 1985 emission rate.

This field is assigned the 1985 (or 1986 or 1987) SO<sub>2</sub> emission rate.

If a unit has a positive baseline value, a SO<sub>2</sub>RTE value of 0, EIA emission rates that are calculated to be 0, and is more than 90 percent gas for either the 1980 to 1989 (GAS8089>90) or 1985 time period, then this field is assigned a default value of .0006, based on the AP-42 factor for natural gas. A utility may have requested, during the comment period, use of an alternate year's rate.

**34. Municipally Operated Flag (FLAGMUND) --**

If an operating utility is municipally owned, this field has a value of 1, and 0 otherwise.

**CALCULATED VARIABLES**

**35. 1985 Boiler SO<sub>2</sub> Emission Rate (SO<sub>2</sub>RTE) --**

The actual SO<sub>2</sub> emission rate, in lbs/MMBtu and rounded to four decimal places, is calculated from the boiler SO<sub>2</sub> emissions (tons) in 1985 and the boiler total heat input of fuels burned ( $10^{12}$  Btu) in 1985. The equation used is:

$$SO_2RTE = (2 * SO_2) / (1000 * TOTHT).$$

**36. 1985 Annualized Boiler SO<sub>2</sub> Emission Limit (ANNLIM85) --**

The "allowable 1985 SO<sub>2</sub> emission rate," in lbs/MMBtu and rounded to four decimal places, is defined in the CAA as an annual equivalent SO<sub>2</sub> emission limit. ANNLIM85 is calculated using the equation:

$$ANNLIM85 = ANNFACT * FELIM85.$$

**37. Generator Heat Input at 60 Percent Capacity (HT60) –**

This field, in  $10^{12}$  Btu, is calculated using the formula as shown, where 5,256 is a conversion factor (60 percent of 8,760 hrs/yr):

$$HT60 = (HEATRATE * SUMNDCAP * 5256) / 10^9.$$

The net summer capability is used because the nameplate capacity for many units is not a good measure of the maximum MW a generator can produce. Most planners use a measure of dependable capacity such as net dependable summer capability.

**38. Boiler-generator Share of Generator Heat Input at 60 Percent Capacity (HT60SHR) –**

This field, in  $10^{12}$  Btu, is calculated from HT60 for multi-header units. For each generator with multiple boilers, based on BASE8587, HT60 is apportioned among the boilers. If the BASE8587 value is 0, HT60 is then shared equally among the boilers. If there is a single boiler associated with a generator, HT60SHR is equal to HT60.

**Table 1**  
**ADF Variable List**

| Field Number | Variable Name | Description  |
|--------------|---------------|--|
| 1            | SEQNUM        | Sequence number  |
| 2            | STATNAM       | State name   |
| 3            | PNAME         | Plant name   |
| 4            | BLRID         | Boiler identification code   |
| 5            | GENID         | Generator identification code  |
| 6            | UTILNAME      | Nontraditional utility name  |
| 7            | UCODE         | Nontraditional utility code  |
| 8            | EPARGN        | EPA region   |
| 9            | CNTYNAME      | County name  |
| 10           | ORISPL        | DOE ORIS plant code  |
| 11           | PHASE1AL      | Phase 1 allowances (tons) from Table A of the CAA  |
| 12           | TOTHT         | 1985 boiler total heat input ( $10^{12}$ Btu)  |
| 13           | SO2           | 1985 boiler SO <sub>2</sub> emissions (tons)   |
| 14           | SO2CATEG      | Boiler SO <sub>2</sub> regulatory category (1=SIP, 2=NSPS D, 3=NSPS Da, 4=NSPS GG, 6=SIP for existing gas turbine, combined cycle, with auxiliary firing, 9=NSPS GG for existing gas turbine, combined cycle, with auxiliary firing) |
| 15           | SCRUBBER      | Boiler SO <sub>2</sub> scrubber flag (1=yes, 0=no)   |
| 16           | FELIM85       | 1985 boiler SO <sub>2</sub> emission limit (lbs/MMBtu)   |
| 17           | ANNFACT       | 1985 SO <sub>2</sub> emission limit annualization factor   |
| 18           | AVGPD         | 1985 SO <sub>2</sub> emission limit averaging period   |
| 19           | NAMEPCAP      | 1989 generator nameplate capacity (MW)   |
| 20           | SUMNDCAP      | 1989 generator summer net dependable capability (MW)   |
| 21           | GENMNONL      | Generator month on-line (first electricity)  |
| 22           | GENYRONL      | Generator year on-line (first electricity)   |
| 23           | BLRMNONL      | Boiler month on-line   |
| 24           | BLRYRONL      | Boiler year on-line  |
| 25           | BASE8587      | 1985-1987 boiler-generator average total heat input, "baseline" ( $10^{12}$ Btu)   |
| 26           | OUTAGEHR      | Consecutive planned and forced outage time during 1985-1987<br>>= 2,920 hours (hours) from GADS  |
| 27           | PRIMFUEL      | Primary fuel indicator based on greatest fuel heat share during 1985-1987 (1=coal>50%, 2=oil/gas)  |
| 28           | GAS8089       | 1980-1989 gas share (%)  |
| 29           | HEATRATE      | 1989 generator full load heat rate (Btu/kWh)   |
| 30           | GENER         | 1985 generator generation (GWh)  |
| 31           | UCAPFSST      | Total capacity of the fossil-steam units of the operating utility (MW)   |
| 32           | MXBS8089      | Maximum of the average heat inputs for any combination of three consecutive years from 1980-1989 for selected units ( $10^{12}$ Btu)   |
| 33           | RY_ER         | Representative year SO <sub>2</sub> emission rate (lbs/MMBtu)  |
| 34           | FLAGMUNI      | Municipally operated flag (1=yes, 0=no)  |
| 35           | SO2RTE        | 1985 boiler SO <sub>2</sub> emission rate (lbs/MMBtu)  |
| 36           | ANNLIM85      | 1985 annualized boiler SO <sub>2</sub> emission limit (lbs/MMBtu)  |
| 37           | HT60          | Generator heat input at 60 percent capacity ( $10^{12}$ Btu)   |
| 38           | HT60SHR       | Boiler-generator share of generator heat input at 60 percent capacity ( $10^{12}$ Btu)   |

## **REFERENCES**

**EIA, 1990: Energy Information Administration, "Annual Nonutility Power Producers Report," Form EIA-867, 1990.**

**NERC, 1990: North American Electric Reliability Council, Generating Availability Data System, "Generating Availability Report: 1985-1989," August 1990.**

**Pechan, 1992: E.H. Pechan & Associates, Inc., "The National Allowance Data Base Version 2.1: Technical Support Document," Contract No. 68-D9-0168, prepared for EPA's Office of Atmospheric and Indoor Air Programs, May 1992.**

**APPENDIX A**  
**DBASE III PLUS ADF FILE STRUCTURE**  
**(File: ADF.DBF)**

| Field | Name     | Type | Width | Description  |
|-------|----------|------|-------|--|
| 1     | SEQNUM   | Num  | 4     | Sequence number  |
| 2     | STATNAM  | Char | 20    | State name   |
| 3     | PNAME    | Char | 20    | Plant name   |
| 4     | BLRID    | Char | 6     | Boiler ID  |
| 5     | GENID    | Char | 4     | Generator ID   |
| 6     | UTILNAME | Char | 30    | Nontraditional utility name  |
| 7     | UCODE    | Num  | 5     | Nontraditional utility code  |
| 8     | EPARGN   | Num  | 2     | EPA region   |
| 9     | CNTYNAME | Char | 20    | County name  |
| 10    | ORISPL   | Num  | 5     | Plant code   |
| 11    | PHASE1AL | Num  | 9     | Phase 1 allowances (tons) from Table A of the CAA  |
| 12    | TOTHT    | Num  | 11,6  | 1985 boiler total heat input ( $10^{12}$ Btu) from NURF  |
| 13    | SO2      | Num  | 10,2  | 1985 boiler SO <sub>2</sub> emissions (tons) from NURF   |
| 14    | SO2CATEG | Num  | 2     | Boiler SO <sub>2</sub> regulatory category (0=no information, 1=SIP, 2=NSPS D, 3=NSPS Da, 4=NSPS GG, 6=SIP for existing gas turbine, combined cycle, with auxiliary firing, 9=NSPS GG for existing gas turbine, combined cycle, with auxiliary firing) |
| 15    | SCRUBBER | Num  | 1     | Boiler SO <sub>2</sub> scrubber flag (1=yes, 2=no, 9=no information)   |
| 16    | FELIM85  | Num  | 8,4   | 1985 boiler SO <sub>2</sub> emission limit (lbs/MMBtu)   |
| 17    | ANNFACT  | Num  | 4,2   | 1985 SO <sub>2</sub> emission limit annualization factor   |
| 18    | AVGPD    | Num  | 2     | 1985 SO <sub>2</sub> emission limit averaging period (see Technical Support Document)  |
| 19    | NAMEPCAP | Num  | 7,2   | 1989 generator nameplate capacity (MW)   |
| 20    | SUMNDCAP | Num  | 7,2   | 1989 generator summer net dependable capability (MW)   |
| 21    | GENMNONL | Num  | 2     | Generator month on-line (first electricity)  |
| 22    | GENYRONL | Num  | 4     | Generator year on-line (first electricity)   |
| 23    | BLRMNONL | Num  | 2     | Boiler month on-line   |
| 24    | BLRYRONL | Num  | 4     | Boiler year on-line  |
| 25    | BASE8587 | Num  | 11,6  | 1985-1987 boiler-generator average total heat input, "baseline" ( $10^{12}$ Btu) from Form 767   |
| 26    | OUTAGEHR | Num  | 6     | Consecutive planned and forced outage time during 1985-1987 >=2,920 hours (hours) from GADS  |
| 27    | PRIMFUEL | Num  | 1     | Primary fuel indicator based on greatest fuel heat share during 1985-1987 (1=coal>50%, 2=oil/gas)  |
| 28    | GAS8089  | Num  | 7,3   | 1980-1989 gas share (%)  |
| 29    | HEATRATE | Num  | 8,2   | 1989 generator full load heat rate (Btu/kWh)   |
| 30    | GENER    | Num  | 8,2   | 1985 generator generation (GWh)  |
| 31    | UCAPFSST | Num  | 8,2   | Total capacity of the fossil-steam units operated by the operating utility (MW)  |
| 32    | MXBS8089 | Num  | 11,6  | Maximum of the average heat inputs for any combination of three consecutive years from 1980-1989 for selected units ( $10^{12}$ Btu)   |
| 33    | RY_ER    | Num  | 8,4   | Representative year SO <sub>2</sub> emission rate (lbs/MMBtu)  |
| 34    | FLAGMUNI | Num  | 1     | Municipally operated flag (1=yes, 0=no)  |
| 35    | SO2RTE   | Num  | 8,4   | 1985 boiler SO <sub>2</sub> emission rate (lbs/MMBtu)  |
| 36    | ANNLIM85 | Num  | 8,4   | 1985 annualized boiler SO <sub>2</sub> emission limit (lbs/MMBtu)  |
| 37    | HT60     | Num  | 11,6  | Generator heat input at 60 percent capacity ( $10^{12}$ Btu)   |
| 38    | HT60SHR  | Num  | 11,6  | Boiler-generator share of generator heat input at 60 percent capacity ( $10^{12}$ Btu)   |