

## ***Tucson Electric Power Company***

3950 East Irvington Road (85714)  
Post Office Box 711, Tucson, Arizona 85702



Area Code 520  
Telephone 571-4000

### ***Certified Mail***

7008-1300 0000 1606 3131, ADEQ  
7008-1300 0000 1606 3148, EPA

June 19, 2009

Ms. Ursula Kramer, Director  
Pima County Department of Environmental Quality  
150 W. Congress Street  
Tucson, AZ 85701

RE: Application for Significant Revision to Air Quality Permit No. 1052  
Irvington Generating Station (IGS)

Dear Ms. Kramer:

Tucson Electric Power (TEP) entered into a Consent Order, effective February 17, 2009, with the Arizona Department of Environmental Quality (ADEQ). Pursuant to the Order, TEP is submitting under Pima County Code 17.12.260, an application for a significant permit revision to Air Quality Permit No. 1052 currently issued for operation of the IGS facility. Enclosed please find the application package.

TEP appreciates the Department's assistance in processing this permit revision. If you have any questions in this matter, please feel free to contact me at (520) 918-8316 or Mr. Zig Fang at (520) 918-8380.

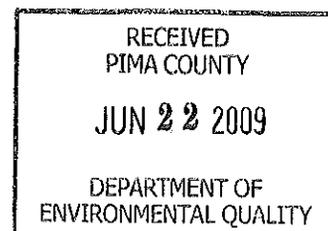
Sincerely,

A handwritten signature in black ink, appearing to read "Charles W. Komadina".

Charles W. Komadina, Director  
Corporate Environmental Compliance & Permits

Enclosure

cc: EPA Region IX  
T. Sobolewski, PCDEQ  
T. Baggiore, ADEQ  
A. Hoekstra  
M. Mansfield  
E. Bakken  
R. Kane  
Z. Fang



**Irvington Generating Station  
Significant Permit Revision Application**

**Submitted to:  
Pima County Department of Environmental Quality  
150 West Congress Street  
Tucson, Arizona 85701-1317**

**Submitted by:  
Tucson Electric Power Company  
P.O. Box 711  
Mail Stop DS503  
Tucson, Arizona 85702**

**June 2009**

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## Executive Summary

Tucson Electric Power (TEP) currently operates under Air Quality Permit No. 1052, the Irvington Generating Station (IGS) located in Tucson at 3950 East Irvington Road, Tucson, Arizona 85714. The station is permitted for three gas-fired steam turbine units designated as Units I1, I2 and I3, one coal and/or gas-fired steam turbine unit designated as Unit I4, and three gas simple cycle combustion turbine units designated as Unit IGT1, IGT2 and IGT3. Each of Units I1 and I2 has a net capacity of 81 megawatts (MW), Unit I3 has 104 MW, Unit I4 has 156 MW, and each of Units IGT1-IGT2 has 24 MW. IGS supplies electric power for sale to customers primarily in the Tucson area. The generating station produces electricity by combusting fuels and converting heat to electricity through turbines. The IGS facility can operate 24 hours per day, 7 days per week, and 52 weeks per year.

Among the boiler units operated at IGS, Unit I4 is the only unit capable of burning coal that was, therefore, subject to the Clean Air Mercury Rule ("CAMR"). This rule was vacated on February 8, 2008, by the United States Court of Appeals for the District of Columbia ("the Court"). The unit was also subject to a State enforceable only Mercury reduction rule that incorporated the CAMR requirements in addition to State enforceable only requirements. To clear uncertainty caused by the Court's vacatur, TEP entered into a Consent Order, effective February 17, 2009, with Arizona Department of Environmental Quality (ADEQ) to agree to an alternative plan for voluntary implementation of an early mercury control strategy that will achieve total mercury emissions reductions substantially similar to the reductions that would be achieved under the Arizona Administrative Code, Title 18, Chapter 2, Article 7, Section 734 (the "State Mercury Standard"). The State Mercury Standard imposed a mercury emission limit of 10% of inlet mercury, which is equivalent to 90% control efficiency or equivalent to 0.0087 lb/GWh. Similarly 50% control efficiency is equivalent to 0.0435 lbs/GWh. The application being submitted today is prepared consistent with and compliant to the terms of the Consent Order. It includes among other things, a mercury control strategy to be implemented beginning on January 1, 2011, that is expected to achieve a 50 percent reduction of total mercury emissions (based on inlet mercury in the coal) from Unit I4 or an outlet mercury emissions rate of 0.0435 lb/GWh, and a demonstration that the expected 50 percent mercury reduction or 0.0435 lb/GWh emissions rate, carried out by the control strategy, will be achieved. An enforceable operation and maintenance (O&M) plan is proposed to ensure effective implementation of the mercury control strategy. A monitoring system and recordkeeping and reporting methodology is also proposed for Unit I4 as an indication of the level of mercury reduction or outlet mercury emission rate.

## **Section 1.0 Permit Application Forms**

This section includes:

- Standard Permit Application Form
- Compliance Certification & Certification of Truth, Accuracy, and Completeness

RECEIVED  
PIMA COUNTY

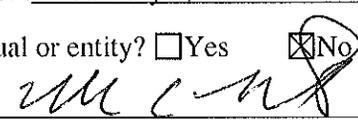
JUN 22 2009

ENVIRONMENTAL QUALITY  
AIR PROGRAM

**PIMA COUNTY DEPARTMENT OF ENVIRONMENTAL QUALITY**  
150 West Congress Street ♦ Tucson, AZ 85701 ♦ Phone: (520) 740-3340

**STANDARD PERMIT APPLICATION FORM FOR CLASS I SOURCES**

(As required by A.R.S. § 49-480, and Title 17 of the Pima County Code)

1. Permit to be issued to (Business License Name of Organization): Tucson Electric Power Company
2. Mailing Address: P.O. Box 711, Mail Stop DS503  
City: Tucson State: Arizona ZIP: 85702
3. Plant Name (if different than item #1): Irvington Generating Station
4. Name (or names) of Owner or Operator: UniSource Energy  
FAX #: \_\_\_\_\_ Phone: \_\_\_\_\_  
Email: \_\_\_\_\_
5. Name of Owner's Agent: Charles W. Komadina  
FAX #: (520) 918-8250 Phone: (520) 918-8316
6. Plant/Site Manager/Contact Person: Mark Mansfield, Manager  
FAX #: (520) 256-6695 Phone: (520) 745-3232  
Email: MMansfield@tep.com
7. Proposed Equipment/Plant Location Address: 3950 East Irvington Road  
City: Tucson State: Arizona ZIP: 85714  
Indian Reservation (if applicable): \_\_\_\_\_ T/R/S, Lat/Long, Elev: Township - 15S, Range - 14E  
Latitude - 32° 9' 50", Longitude - 110° 54' 16", Elev. - 2610' above MSL
8. General Nature of Business: Electric Power Generation  
Standard Industrial Classification Code: 4911 State Permit Class: Class I
9. Type of Organization:  Corporation  Individual Owner  Partnership  Government Entity  Other
10. Permit Application Basis (Check all that apply):  New Source  General Permit  Portable Source  
 Administrative  Minor  Significant  Renewal Existing Permit # 1052  
Date of Commencement of Construction or Modification: January 1, 2011  
Is any of the equipment to be leased to another individual or entity?  Yes  No
11. Signature of Responsible Official of Organization:   
Official Title of Signer: Manager, Irvington Generating Station
12. Typed or Printed Name of Signer: Mark Mansfield  
Date: 6/19/09 Telephone Number: (520) 745-3232

***Certification of Compliance with all Applicable Requirements***

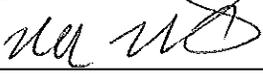
Permit Number (If existing source) 1052

This certification must be signed by a Responsible Official. Applications without a signed certification will be deemed incomplete.

*The responsible official is defined as a person who is in charge of principal business functions or who performs policy or decision making functions for the business. This may also include an authorized representative for such persons. For a complete definition, see Pima County Air Quality Control, Title 17, Section 17.04.340(A)(186).*

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Pima County Department of Environmental Quality (PDEQ) as public record. I also attest that I am in compliance with the applicable requirements and will continue to comply with such requirements and any future requirements that become effective during the life of my permit. I will present a certification of compliance to PDEQ no less than annually and more frequently if specified by PDEQ. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the requirements of Title 17 of the Pima County Code and any permit issued thereof.

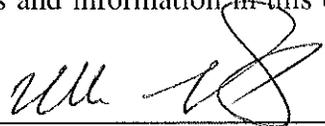
Name (Print/Type): Mark Mansfield Title: Manager, Irvington Generating Station

(Signature):  Date: June 19, 2009

***Certification of Truth, Accuracy, and Completeness***

17.12.160(H) - Certification of Truth, Accuracy, and Completeness. Any application form, report, or compliance certification submitted pursuant to this Chapter shall contain certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the documents are true, accurate, and complete.

By my signature I, (Name) Mark Mansfield, hereby certify that based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible Official of Organization: 

Title: Manager, Irvington Generating Station Date: June 19, 2009

## Section 2.0 Permit Revision Description

TEP is submitting an application for a significant permit revision to the Air Quality Permit No. 1052. This permit was issued by Pima County Department of Environmental Quality (PCDEQ) on July 21, 2006, for operation of TEP's Irvington Generating Station (IGS). The permit revision application is prepared pursuant to a Consent Order TEP entered into with Arizona Department of Environmental Quality (ADEQ), effective on February 17, 2009. The Order crafts an alternative plan for TEP for voluntary implementation of an early mercury control strategy at Unit I4 with a goal of achieving either total mercury emissions reduction of 50 percent or 70 percent, based on the mercury present in the coal burned at Unit I4, or an outlet mercury emission rate equal to or less than, respectively, 0.0435 or 0.0261 pounds per gigawatt-hour (lbs/GWh). With this permit action, TEP is opting for the 50 percent early reduction, or, in lieu of the 50% reduction, TEP may opt for an outlet mercury emissions rate equal to or less than 0.0435 lb/GWh. The early reduction plan will begin on January 1, 2011 and end on December 31, 2015, with the first compliance year ending December 31, 2011. Included in this section are discussions of five elements (subsections 2.1 – 2.5) required by the Order to be contained in the application.

### ***2.1 A proposal to implement a mercury control strategy for a 50 percent early mercury reduction or an outlet mercury emissions rate of 0.0435 lb/GWh***

TEP proposes to utilize the fabric filter (FF) baghouse at IGS Unit I4 to capture and remove mercury from flue gas as its early mercury control strategy. Mercury present in the boiler flue gas is generally in three forms: as oxidized mercury species ( $\text{Hg}^{2+}$ ) in vapor phase (e.g.,  $\text{HgCl}_2$  etc.), as particulate-bound mercury ( $\text{Hg}_p$ ) (i.e., the mercury that is adsorbed onto solid surfaces of fly ash or unburned carbon), and as elemental mercury vapor ( $\text{Hg}^0$ ). FF Baghouse is known for its capability of capturing particulate-bound mercury. A FF baghouse is currently being maintained and operated at IGS Unit I4 to control and remove particulate matter. The mercury control strategy recognizes the co-benefit mercury capture ( $\text{Hg}_p$ ) of the existing FF baghouse. The control strategy is expected to achieve a reduction of total mercury emissions by 50 percent or more, or a rate of mercury emissions equal to or less than 0.0435 lb/GWh. To implement the control strategy, TEP will maintain and operate the FF baghouse beginning on January 1, 2011, and through December 31, 2015, in a manner consistent with good air pollution control practice for minimizing, in addition to particulate matter, the emissions of mercury. As a key component of the good air pollution control practice, TEP seeks to implement an operating and maintenance (O&M) plan to ensure effectiveness of the mercury control strategy as required by the Consent Order. Subsection 2.3 will discuss the plan in more details.

While mercury can be captured by baghouse as a co-benefit, the degree of mercury capture varies, depending upon not just the specific control technology configuration but also the type and mercury content of the coal being burned. IGS Unit I4 is permitted and capable of burning coal, natural gas, fuel oil, landfill gas, or their combination. The coals primarily consumed by Unit I4 are either McKinley coal from New Mexico or Colowyo coal from Colorado. Historically, both coals showed relatively low average mercury content of 0.03  $\mu\text{g/g}$ . With the particular combination of control configuration and types of coal burnt, Section 2.2 demonstrates

that the IGS Unit I4 will be able to achieve the target goal of 50 percent mercury reduction or an outlet mercury emission rate equal to or less than 0.0435 lb/GWh.

***2.2 A demonstration that the mercury control strategy is designed to achieve the 50 percent early mercury reduction or an outlet mercury emissions rate of 0.0435 lb/GWh***

TEP proposes as the core mercury control strategy, to resort to the native mercury capture capability (i.e., the level of plain mercury reduction without add-on mercury-specific control technology) of the existing air pollution control equipment. To quantitatively evaluate the native control level achievable at the IGS, TEP has since 2007 conducted limited stack performance tests at Unit I4. The following table summarizes results of the evaluation, demonstrating that the native mercury capture capability at IGS Unit I4 is commensurable to the target goal of either an outlet mercury emissions rate of 0.0435 lb/GWh, or a 50 percent mercury reduction. For comparison purposes, the table also excerpts FF mercury removal data from a 1999 EPA Information Collection Request (ICR) study. A total of six different boiler units with FF-only control were tested during the study and the average mercury removal rate was shown to be 72% for firing sub-bituminous coal and 90% for firing bituminous coal. Note that the ICR study correlates well with the tested Unit I4 removal rate.

Dates	Methodology	Inlet Hg, lbs/GWh	Outlet Hg, lbs/GWh	Removal Efficiency
June 5, 2007	Ontario Hydro	0.0248	0.0050	79.9%
November 11, 2008	Reference Method 101A	0.0248	0.0071	71.6%
1999 ICR Data	Ontario Hydro			72-90%

***2.3 A proposed enforceable operating and maintenance (O&M) plan that will ensure implementation of the mercury control strategy designed for the early mercury reduction***

TEP proposes to adopt into its mercury control O&M plan, the current compliance assurance monitoring (CAM) plan for Unit I4 FF baghouse. See attached in Appendix A to this application for the draft mercury control O&M plan proposed by TEP.

***2.4 A proposed monitoring system and recordkeeping and reporting methods for determining mercury emissions from each EUSGU at SGS and for assuring that the mercury control is functioning in accordance with the O&M plan***

TEP proposes the monitoring system and recordkeeping and reporting methods to include annual stack emissions testing, to be performed at Unit I4 during each calendar year when coal is fired, to determine Unit I4 outlet mercury rate for that particular year. If the results of the test demonstrate that the emission rate is at or below 0.0435 lbs/GWh, no further testing and/or monitoring will be performed until the following calendar year stack emissions test. If, however, the test results demonstrate that the emission rate is higher than 0.0435 lbs/GWh, TEP will also conduct a mercury coal analysis at least once each month for each type of coal burned at Unit I4 to determine monthly inlet mercury. The inlet and outlet mercury data will be used to derive an annual percent reduction of mercury emissions from Unit I4. TEP will then record, and report to

the Department for information only, the annual emission rate or the annual mercury percent reduction. Appendix A to this application proposes draft language for the monitoring, recordkeeping and reporting.

***2.5 A proposal to include in the permit revision a requirement to submit the application for a significant permit revision by no later than January 1, 2014***

TEP proposes in this permit revision to include a permit condition required by the Consent Order to submit a significant permit revision application by no later than January 1, 2014 to incorporate among other things, the post-2015 applicable mercury standards, including the State Mercury Standard (R18-2-734) and the federal NESHAP standards, if any by then. See attached in Appendix A to this application for the draft permit language proposed by TEP.

## **Section 3.0 Regulatory Applicability Analysis**

### ***3.1 Applicable Air Quality Requirements***

TEP entered into a Consent Order with ADEQ effective on February 17, 2009, which requires TEP to submit by June 30, 2009, an application for a significant permit revision to incorporate into the current IGS Air Quality Permit No. 1052 among other things, an early mercury control strategy aimed to achieve a total mercury emission reduction of 50 percent, or an outlet mercury rate of equal to or less than 0.0435 pounds per giga-watt beginning on January 1, 2011. Implementation of the control strategy requires that TEP propose (1) a state enforceable operation and maintenance (O&M) plan that will ensure that the mercury control strategy be carried out, and (2) monitoring system and recordkeeping and reporting methods for determining mercury emissions and as an indication that mercury controls are working in accordance with the O&M plan. This application as prepared satisfies and is consistent with the Consent Order.

### ***3.2 Exemptions and Insignificant Activities***

TEP is not proposing any additional exemptions or insignificant activities with this permit application.

### ***3.3 Compliance Status***

TEP is currently in compliance with its air quality permit and will meet any additional applicable requirements that become effective during the permit term in a timely manner.

**APPENDIX A**  
**DRAFT REDLINE PERMIT**

*Air Quality Permit No. 1052 is hereby amended by adding a new Attachment "I" to read as follows:*

**ATTACHMENT "I": MERCURY PROVISIONS**  
**Air Quality Permit No. 1052**  
**For**  
***TUCSON ELECTRIC POWER COMPANY – Irvington Generating Station***

**I. GENERAL**

A. The State mercury Standard set forth in A.A.C. R18-2-734 shall not apply to the Permittee until December 31, 2016.

B. All conditions under this attachment are state enforceable only. Except as required in Section II for implementing an Operation and Maintenance (O&M) Plan, this attachment shall not be construed as inclusion of an enforceable mercury emissions limitation or any mercury emissions reductions.

C. For the purposes of this attachment, the early mercury reduction shall not begin until the later of January 1, 2011, or 185 calendar days after the date the Department issues this permit revision, and shall end on December 31, 2015.

**II. AIR POLLUTION CONTROL REQUIREMENTS**

A. "Associated air pollution control equipment" shall refer to the existing fabric filters (FF) for Unit I4, and good air pollution control practices shall mean the practices that conform to those prescribed in the Operation and Maintenance (O&M) Plan attached in Addendum A.

B. For the time period defined in Condition I.C, the Permittee shall operate and maintain Unit I4, including associated air pollution control equipment and monitoring system, in a manner consistent with safety and good air pollution control practices for reducing of mercury emissions.

**III. MONITORING, RECORDKEEPING, AND REPORTING**

Until such time as the Department amends the mercury monitoring, recordkeeping and reporting requirements of R18-2-734.D, or USEPA finalizes a federal mercury monitoring, recordkeeping, and reporting rule, whichever occurs first, the Permittee shall apply the following monitoring, recordkeeping and reporting methods for determining mercury emissions from Unit I4:

A. The Permittee shall perform stack testing for Unit I4 during a calendar year in each of the early mercury reduction years as defined in Condition I.C. The stack testing shall be conducted downstream of Unit I4 fabric filters while coal is being burned as the main fuel, using EPA Reference Method 29 or other equivalent testing methods. Results of the tests shall be reduced as outlet mercury rate in lbs/mmBtu. If the unit is not operating with coal as its main fuel, the stack test will not be performed until such time as the unit is back operating with coal as its main

fuel. Coal burning shall not be required for the sole purpose as to conduct stack mercury emission testing.

B. If necessary, the Permittee shall conduct coal mercury and heating value analysis at least once each month for each coal type to determine monthly inlet mercury in lbs/mmBtu. For purposes of this permit revision, "inlet mercury" means the average concentration of mercury in the coal burned at Unit I4, as determined by ASTM methods, EPA-approved methods or an alternative method approved by the Department. Analysis of coal samples provided by the coal supplier may be utilized for this purpose.

C. If necessary, the Permittee shall determine for each calendar year, an annual percent reduction of mercury emissions, using the inlet and outlet mercury data obtained from Conditions III.A and B above. The calendar year average inlet and outlet mercury rate shall be derived based on Unit I4 total calendar year heat input in lbs/mmbtu.

D. The Permittee shall maintain records of, and report to the Director, the calendar year average outlet mercury rate as determined pursuant to Condition III.A above, or the calendar year based annual percent reduction of mercury emissions as determined pursuant to Condition III.C above, whichever is appropriate. The report shall be submitted once a year following each emitting year and shall contain the calendar year based mercury data of the preceding year. The first such reporting is due in 2012 for the emitting year of 2011. All reports shall be for information only and shall not be used for demonstration of compliance with any mercury standards and/or work procedures.

E. Notwithstanding the requirements of Conditions III.A-D above, testing and acquisition of inlet/outlet mercury data shall not be required in any such calendar year when the annual heat input contributed from Unit I4 burning coal is less than 50 percent of the Unit I4 annual total heat input.

#### **IV. APPLICATION TO INCORPORATE POST-2015 APPLICABLE STANDARDS**

The Permittee shall submit to the Director an application for a significant permit revision required by A.A.C. R18-2-734(F) by no later than January 1, 2014, except that if a federal mercury MACT has been promulgated before January 1, 2014, and the Department has not yet amended A.A.C. R18-2-734 to incorporate the federal MACT standards, the application may be delayed, after consultation with the Director, in order to consolidate the federal requirements into the application to conform with the amended A.A.C. R18-2-734. The application shall include the following elements:

A. The State Mercury Standard as specified in A.A.C. R18-2-734 and any amendments thereto adopted by the Department prior to January 1, 2014;

B. A control strategy for meeting the State Mercury Standard and any amendments thereto adopted by the Department prior to January 1, 2014;

C. A demonstration that the control strategy is designed to meet the State Mercury Standard and any amendments thereto adopted by the Department prior to January 1, 2014;

D. A proposal to comply with the State Mercury Standard by December 31, 2016, except as provided in A.A.C. R18-2-734(H), under the following conditions:

1. For the purposes of applying the exception established in A.A.C. R18-2-734(H), each date specified in that provision shall be increased by three calendar years;

2. The exception in A.A.C. R18-2-734(G) shall not apply.

## **ADDENDUM A - OPERATION AND MAINTENANCE PLAN**

This Operation and Maintenance (O&M) Plan is aimed at achieving an early mercury reduction at Unit I4 by optimizing control performance of Unit I4 fabric filters (FF). Recent tests have shown that proper FF operation can inherently reduce the mercury emissions at a level greater than 50% (based on inlet mercury in the coal) or less than 0.0435 lb/GWh. This O&M Plan adopts the compliance assurance monitoring (CAM) plans for Unit I4 fabric filters as prescribed in Section IV, Part "B" of the permit, to assure optimal FF performance for mercury reduction.

The particulate matter emissions CAM plan outlined in IV.A.2, Part "B" of the permit, will be followed to assure proper operation and maintenance of Unit I4 fabric filters for reduction of mercury emissions from Unit I4.