TU ELECTRIC

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William J. Cahill, Jr.
Group Vice President

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Institute of Nuclear Power Operations
Plant Analysis Department
1100 Circle 75 Parkway, Suite 1500
Atlanta, GA 30339-3064

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES) UNIT 1
TRANSMITTAL OF QUARTERLY PLANT PERFORMANCE AND
OTHER INDICATOR DATA (FOURTH QUARTER 1991)

Gentlemen:

Enclosed is one copy of the "Quarterly Plant Performance and Other Indicator Data," form, Revision 7, for the fourth quarter of 1991. Also enclosed is a copy of the "Gross Heat Rate Data Form" which includes Unit 1 data for 1991. Please contact Mr. Larry J. Hinze at (817) 897-6067, if you require additional information.

Sincerely,

William J. Cahill, Jr.

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Enclosures

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ENCLOSURE 1

QUARTERLY PLANT PERFORMANCE INDICATOR

DATA FORM

Quarterly Plant Performance and Other Indicator Data

Revision 7 (12/90)

This package provides forms for **Performance Indicator Data** and for **Other Indicator Data.** The performance indicator data is used for determining unit capability factor, unplanned capability loss factor, safety system performance, collective radiation exposure, volume of radioactive waste, industrial safety accident rate, thermal performance, fuel reliability, and chemistry index. The other indicator data is used for determining equivalent availability factor and unplanned safety system actuations and also provides information on outage management, chemistry and radiation protection.

Page 2 provides general guidelines for completing these data forms.

These forms should be filled out with complete quarterly data for each nuclear unit and **received at INPO within 30-45 days of the quarter's end.**

Please return these forms to the **Institute of Nuclear Power Operations, Plant Analysis Department, 1100 Circle 75 Parkway, Suite 1500, Atlanta, Georgia 30339-3064.** If you have any questions concerning these forms, contact the Plant Analysis Department at (404) 953-5439.

For additional information about the data elements and reporting instructions, see **"Detailed Descriptions of International Nuclear Power Plant Performance Indicators and Other Indicators,"** issued by INPO in December 1990.

Data for: Year: 19 91 Quarter: 1 2 3 (4)

Date: January 13, 1992

Utility: TU Electric

Nuclear Station: Comanche Peak Steam Electric Station (CPSES)

Person to be contacted at utility if questions arise concerning this report:

Name (please print or type) Larry J. Hinze

Title Sr. Specialist / Plant Analysis

Telephone (include area code) (817) 897-6067

Guidelines for Completing Data Forms

The following guidelines should be followed when completing these data forms to improve data uniformity and clarity. This will facilitate data review and entry in the computerized data base.

1. Fill in only the number of columns appropriate for the number of units at the station. Fill in all blanks in these columns. If data is not available for an item, enter "NA."

2. If data elements are not provided, include explanatory footnotes (e.g., "plant shutdown"). Also use footnotes to provide any other special information about a data element.

3. Enter data to the correct number of decimal places, when specified on the form.

4. Data revisions for previous quarters should be provided on separate data sheets. If a small number of revisions are involved, the preferred method is to provide a copy of the original data form annotated to show both the old and the new data values. If many revisions are involved, they may be provided in tabular form, showing the old and new values. The reason for the data change should be included.

Performance and Other Indicator Data

Revision 7 (12/90)

Nuclear Station: Comanche Peak Steam Electric Station Year: 19 91 Quarter: 1 2 3 (4)

	Unit 1	Unit 2	Unit 3
Docket No.	50-445		
GENERATION DATA			
Gross Maximum Capacity (MWe)	1161		
Gross Dependable Capacity (MWe)	1161		
Reference Energy Generation (MWh)	2564649		
Critical Hours (to nearest tenth of an hour)	647.4		
Available Hours (to nearest tenth of an hour)			
Service	545.3		
Reserve Shutdown	0		
Unavailable Hours (to nearest tenth of an hour)			
Forced Outage	31.5		
Maintenance Outage	0		
Planned Outage (Basic)	1343.6		
Planned Outage (Extended)	288.6		
Equivalent Derated Hours (to nearest tenth of an hour)			
Forced	11.5		
Maintenance	0		
Planned	22.6		
Energy Loss			
Planned Energy Loss (MWh)	1921222.8		
Unplanned Energy Loss (MWh)	49923		

Reporting Instructions

GENERATION DATA

Note: Guidance for these data elements is provided in the INPO document "Detailed Descriptions of International Nuclear Power Plant Performance Indicators and Other Indicators," December 1990.

Gross Maximum Capacity (GMC)

Enter the maximum capacity (to the nearest whole MWe) that a unit can sustain over an extended period of time (e.g., one day). This capacity is established by formal demonstration and should be corrected to reflect conditions under which minimum ambient restrictions are imposed. When a demonstration test has not been conducted, an estimated maximum capacity of the unit shall be used.

Gross Dependable Capacity (GDC)

Enter the maximum gross electrical output (to the nearest whole MWe) that can be achieved under ambient limitations for the current quarter. Calculate the average for the time the unit is available. This value may vary from quarter to quarter depending on actual ambient conditions, but it cannot exceed GMC.

GENERATION DATA (continued)

Reference Energy Generation

Enter the energy (to the nearest whole megawatt-hour [electric]) that could be produced if the unit were operated continuously at full power under reference ambient conditions. Reference ambient conditions are environmental conditions representative of the annual mean (or typical) ambient conditions for the unit. The reference energy generation is determined by multiplying the reference unit power by the period hours. The reference unit power is the maximum power capability of the unit under reference ambient conditions. If a maximum power capability has been determined by formal test, the reference unit power is determined by correcting test results to reference ambient conditions. If a formal test has not been performed, the reference power should be based on design values, adjusted for reference ambient conditions.

Critical Hours

Enter the number of hours the reactor was critical during the period.

Service Hours

Enter the number of hours that the unit was synchronized to the system.

Reserve Shutdown Hours

Enter the number of hours that the unit was available to the system but not synchronized for reasons of economy.

Forced Outage Hours

Enter the sum of the hours attributable to unit start-up failures and outages required before the end of the next weekend.

Maintenance Outage Hours

Enter the number of hours required for outages that could be deferred beyond the end of the next weekend but not until the next planned outage.

Planned Outage Hours (Basic)

Enter the number of hours that the unit is unavailable due to inspection, testing, refueling, or overhaul. Such outages are planned with activities scheduled well in advance and are of a predetermined duration.

Planned Outage Hours (Extended)

Enter the number of hours that the planned outage was extended to accommodate planned and scheduled work that required more time than originally expected. Extensions due to conditions discovered during the outage would represent a change in scope and, therefore, must be counted as forced outage hours.

Equivalent Forced Derated Hours

Note: *Equivalent full capacity hours are the number of hours the plant would have to operate at full power to replace the energy production lost during the derate.*

Enter the number of equivalent full capacity hours that result from unplanned reductions of capacity that cannot be postponed beyond the end of the next weekend.

Equivalent Maintenance Derated Hours

Enter the number of equivalent full capacity hours that result from unplanned reductions of capacity that can be deferred beyond the end of the next weekend but not until the next planned outage.

Equivalent Planned Derated Hours

Enter the number of equivalent full capacity hours that result from unit deratings, that are scheduled well in advance, and are of a predetermined duration.

Planned Energy Loss

Enter the energy (to the nearest whole megawatt-hour [electric]) that was not produced during the period because of planned shutdowns or load reductions due to causes under plant management control. Energy losses are considered to be planned if they are scheduled at least four weeks in advance. Planned energy loss will be used to calculate unit capability factor.

Unplanned Energy Loss

Enter the energy (to the nearest whole megawatt-hour [electric]) that was not produced during the period because of unplanned shutdowns, outage extensions, or load reductions due to causes under plant management control. Energy losses are considered to be unplanned if they are not scheduled at least four weeks in advance. Unplanned energy loss will be used to calculate the unplanned capability loss factor indicator.

Performance and Other Indicator Data

Nuclear Station: Comanche Peak Steam Electric Station   Year: 1991   Quarter: 1 2 3 (4)

	Unit 1	Unit 2	Unit 3
Docket No.	50-445		

SAFETY SYSTEM PERFORMANCE

PWR Safety System Performance

	Unit 1 known planned	Unit 1 known unplanned	Unit 1 estimated	Unit 2 known planned	Unit 2 known unplanned	Unit 2 estimated	Unit 3 known planned	Unit 3 known unplanned	Unit 3 estimated
High-pressure safety injection system: Component unavailable hours *	11.47		0						
Number of trains	4								
Auxiliary feedwater system: Component unavailable hours *	5.76	0	0						
Number of trains	3								

BWR Safety System Performance

	Unit 1 known planned	Unit 1 known unplanned	Unit 1 estimated	Unit 2 known planned	Unit 2 known unplanned	Unit 2 estimated	Unit 3 known planned	Unit 3 known unplanned	Unit 3 estimated
High-pressure injection/heat removal system: High-pressure coolant injection system: Component unavailable hours *									
High-pressure core spray system: Component unavailable hours *									
Reactor core isolation cooling system: Component unavailable hours *									
Feedwater coolant injection system: Component unavailable hours *									
Number of trains									
Isolation condenser system: Component unavailable hours *									
Number of trains									
Residual heat removal system: Component unavailable hours *									
Number of trains									

Emergency AC Power System Performance

(Include additional sheets if more than three emergency generators.)

	Unit 1	Unit 2	Unit 3
Emergency Generator I.D.	1-01	1-02	
Unavailable hours (known planned, known unplanned, estimated) *	3 | 0 | 0	3 | 0 | 0	
Number of Start Demands	10	5	
Number of Start Failures	0	0	
Number of Load-run Demands	5	4	
Number of Load-run Failures	0	0	
Failure Dates (mo./day/yr.)			

* For each event involving more than 50 hours of total unavailability, provide the supplementary information requested on page seven of this form.

SAFETY SYSTEM PERFORMANCE (continued)

Reporting Instructions

Note: Guidance for these data elements is provided in the INPO document "Detailed Descriptions of International Nuclear Power Plant Performance Indicators and Other Indicators," December 1990.

For PWRs, enter data for the high-pressure safety injection and auxiliary feedwater systems. For BWRs, enter data for the two appropriate high-pressure injection/heat removal systems installed in the unit, and for the residual heat removal (RHR) system. Early BWRs that use systems other than RHR for heat removal under low-pressure conditions should enter data for these systems in the space provided for the residual heat removal system.

For each applicable PWR and BWR system, enter the number of component unavailable hours (known planned, known unplanned, and estimated) and the number of trains. The number of hours should be to the nearest tenth of an hour.

For the emergency AC power system, enter the hours (known planned, known unplanned, and estimated) that each emergency generator was inoperable. The emergency AC power system is treated at the train level rather than the component level. That is, unavailable hours are recorded only when the emergency generator train is unavailable to produce emergency AC power.

The number of component unavailable hours is the sum of the hours that each component in the system was unavailable to perform its safety function. These unavailable hours consist of the following:

- *known planned component unavailable hours:* the hours that components are unavailable due to planned causes (e.g., preventive maintenance, surveillance testing, and modifications)
- *known unplanned component unavailable hours:* the hours that components are unavailable due to unplanned causes (e.g., corrective maintenance following failure and human errors causing component unavailability)
- *estimated component unavailable hours:* the average time a component was in a failed state prior to discovery of the failure—This time is estimated as one-half the time since the last successful operation or test of the component, unless the failure was caused by an external event (e.g., lightning) that occurred at a known time, the failure occurred in a component that is normally in continuous operation, or the failure was annunciated in the control room while the component was in a standby condition.

Component unavailable hours due to failures can be obtained in most cases from the NPRDS data base. Estimated component unavailable hours can be obtained from the difference between the NPRDS "discovery date" and the failure "start date/time." The known component unavailable hours can be obtained from the difference between the NPRDS "end date/time" and the failure "discovery date."

Component unavailable hours due to causes other than failures can be obtained using control room logs, licensee event reports, maintenance work orders, LCO logs, preventive maintenance records, and surveillance test records.

A component is not considered to be unavailable if it is capable of performing its safety function. Failure reports must be reviewed to determine if the component's safety function was made unavailable by the failure. For example, if a normally open valve is found failed in the open position, and this is the position required for the system to perform its function, unavailable hours would not be counted for the time the valve was in a failed state (estimated hours). However, unavailable hours (known unplanned hours) would be counted for the repair of the valve if the repair required the valve to be closed or required the line containing the valve to be isolated, and this degraded the full capacity or redundancy of the system.

When a component failure is detected, the time since the last successful test or operational demand may include some time when the system was not required for service. In this case, the estimated component unavailable hours are estimated as one-half the time the system was required to be available since the last successful test or operation.

When two or more components in a system are unavailable concurrently due to failures, the unavailable hours for each component are counted separately when determining the sum of component unavailable hours for the system.

Performance and Other Indicator Data

SAFETY SYSTEM PERFORMANCE (continued)

Supplementary Information Regarding Component Unavailability

For each event involving more than 50 hours of total unavailability, provide the following information on a separate attachment to this form.

Unit: [Name and number]

System: [Applicable safety system]

Component Name: [Include function: e.g., AFW pump discharge valve]

Event Date: [Discovery date] Plant Operating Mode: [Mode during event]

Unavailable Hours: known planned ______; known unplanned ______; estimated ______

Description: [Clearly describe the cause of unavailability, such as maintenance, failure, etc.]

Reporting Instructions (continued)

The emergency AC power system and the BWR residual removal (RHR) system are normally required to be in service during all modes of operation. Component unavailable hours are not counted when certain components (e.g., emergency generator, RHR pump) are electively removed from service for planned activities (e.g., preventive maintenance, overhauls) or are out-of-service for unplanned activities (e.g., corrective maintenance and human errors) and the reactor is in a mode that allows components to be removed from service for an unlimited time without incurring a limiting condition for operation (LCO). However, estimated unavailable hours caused by failures or human errors are always counted, even when the reactor is in a mode that allows unlimited removal of the component from service.

Emergency AC Power System Performance

The following provides reporting instructions for the emergency AC power system. These instructions make assumptions concerning the methods and criteria to be used in testing emergency diesel generators that are consistent with those currently proposed by INPO and EPRI, but differ somewhat from those in Regulatory Guide 1.108. It is anticipated that these methods and criteria will be adopted by the NRC.

The emergency AC power system includes all emergency generators at the station that are installed to power safe shutdown loads in the event of a loss of off-site power, including diesel generators, gas turbines, hydro-electric turbines, and the diesel generator dedicated to the BWR HPCS system.

Number of Start Demands

Enter all valid and inadvertent start demands, including all start-only demands and all start demands that are followed by load-run demands, whether by automatic or manual initiation. A start-only demand is a demand in which the emergency generator is started, but no attempt is made to load the generator. See "Exceptions" below.

Number of Start Failures

Enter all valid start failures. Any failure within the emergency generator system that prevents the generator from achieving specified frequency (or speed) and voltage is classified as a valid start failure. (For the monthly surveillance test, the generator can be brought to rated speed and voltage in a time that is recommended by the manufacturer to minimize stress and wear. Similarly, if the generator fails to reach rated speed and voltage in the precise time required by technical specifications, the start attempt is not considered a failure if the test demonstrated that the generator would start in an emergency.) See "Exceptions" below. Any condition identified in the course of maintenance inspections (with the emergency generator in the standby mode) that would have resulted in a start failure if a demand had occurred should be counted as a valid start demand and failure.

Number of Load-run Demands

Enter all valid load-run demands. To be valid, the load-run attempt must follow a successful start and meet one of the following criteria: (See "Exceptions" below.)

- a load-run of any duration that results from a real (e.g., not a test) automatic or manual signal
- a load-run test to satisfy the plant's load and duration test specifications
- other operations (e.g., special tests) in which the emergency generator is planned to run for at least one hour with at least 50 percent of design load

Number of Load-run Failures

Enter all valid load-run failures. A load-run failure should be counted when the emergency generator starts but does not pick up load and run successfully. Any failure during a valid load-run demand should be counted. See "Exceptions" below. (For monthly surveillance tests, the generator can be loaded at a rate that is recommended by the manufacturer to minimize stress and wear. Similarly, if the generator fails to load in the precise time required by technical specifications, the load-run attempt is not considered a failure if the test demonstrated that the generator would load and run in an emergency.)

Emergency AC Power System Performance

Any condition identified in the course of maintenance inspections (with the emergency generator in the standby mode) that would have resulted in a load-run failure if a demand had occurred should be counted as a valid load-run demand and failure.

Known Planned and Known Unplanned Unavailable Hours

The emergency AC power system is treated at the train level rather than the component level. Unavailable hours are recorded only when the emergency generator train is unavailable to produce emergency AC power.

Estimated Unavailable Hours

Estimated unavailable hours are estimated as one-half the time between a start failure and the last successful start, or one-half of the time between a load-run failure and the last successful load-run operation.

Exceptions

Unsuccessful attempts to start or to load-run should not be counted as valid demands or failures when they can be definitely attributed to any of the following:

- spurious operation of a trip that would be bypassed in the emergency operation mode (e.g., high cooling water temperature trip)
- malfunction of equipment that is not required to operate during the emergency operating mode (e.g., circuitry used to synchronize the emergency generator with off-site power sources, but not required when off-site power is lost)
- intentional termination of the test because of alarmed or observed abnormal conditions (e.g., small water or oil leaks) that would not have ultimately resulted in significant emergency generator damage or failure
- component malfunctions or operating errors that did not prevent the emergency generator from being restarted and brought to load within a few minutes (i.e., without corrective maintenance or significant problem diagnosis)
- a failure to start because a portion of the starting system was intentionally disabled for test purposes, if followed by a successful start with the starting system in its normal alignment

Each emergency generator failure that results in the generator being declared inoperable following a failure should be counted as one demand and one failure. Exploratory tests during corrective maintenance should not be counted as demands or failures when the emergency generator has not been declared operable again. The successful test that is run following repair to verify operability should be counted as a valid successful test.

Failure Dates

For each valid start or load-run failure, enter the failure discovery date (should be consistent with NPRDS failure discovery date).

Performance and Other Indicator Data

(See instructions on back.)

Nuclear Station: Comanche Peak Steam Electric Station Year: 1991 Quarter: 1 2 3 (4)

	Unit 1	Unit 2	Unit 3
Docket No.	50-445		
Unplanned Safety System Actuations			
ECCS	0		
Emergency AC Power	0		

Collective Radiation Exposure

Station radiation exposure:

Current quarter (Dosimeter or TLD)	119.24	man-rem
Previous quarter (TLD or Film Badge)	1.35	man-rem

Low-level Solid Radioactive Waste Volume

(to nearest tenth of a cubic meter)

	Dry Active Waste	Sludge, Resins, and Bottoms
Processed waste shipped for burial (cubic meters)	15.5	5.8
Processed waste in storage awaiting shipment for burial (cubic meters)	4.0	13.6

Industrial Safety Accident Rate

Number of lost-time accidents involving days away from work (excluding fatalities)	1
Number of work-related fatalities	0
Number of accidents involving days of restricted work	2
Total man-hours worked (to nearest whole hour)	597686

Reporting Instructions

Note: Guidance for these data elements is provided in the INPO document "Detailed Descriptions of International Nuclear Power Plant Performance Indicators and Other Indicators," December 1990.

Unplanned Safety System Actuations

For the following emergency core cooling systems (ECCS), enter the total number of safety system actuations that occur due to unplanned events:

PWRs— high-pressure injection, low-pressure injection, safety injection tank (accumulator or core flood)

BWRs— high-pressure coolant injection, low-pressure coolant injection, high-pressure core spray, low-pressure core spray

Although a single event may cause the actuation of more than one safety system, the event is counted *only once.*

Enter the total number of emergency AC power system actuations (emergency generator starting and loading demands) that result from loss of power to a safeguards bus. Do not include spurious or inadvertent starts of emergency generators.

Collective Radiation Exposure

Enter the total radiation exposure for personnel (including contractors) for the present quarter in man-rem. Use the best available data.

Enter the total radiation exposure for the previous quarter using measurements from the legal exposure dosimeter device (TLD or film badges).

Low-level Solid Radioactive Waste Volume

Processed low-level radioactive waste is waste for which volume reduction has been completed, and that is packaged ready for shipment and burial at a licensed burial site.

Enter the volume of processed low-level radioactive waste shipped for burial during the quarter. This includes material shipped both from the site and from an off-site vendor, if an off-site vendor was used in the processing of the material.

Enter the volume of processed low-level radioactive waste that is ready for shipment for burial and that is stored either on-site or off-site at the end of the quarter.

The volume of dry active waste and of resins, sludges, and bottoms should be provided separately as done for reports to the NRC. Do not include material that will be processed and is not prepared for shipment such as resin in temporary storage tanks, compactible waste in waste containers in the plant, and material sent off-site for additional processing.

Industrial Safety Accident Rate

Enter the total number of accidents involving utility personnel permanently assigned to the site that resulted in one or more days away from work (excluding the day of the accident). On the federal Occupation Safety and Health Act (OSHA) form 200, this is the total of column 3.

Enter the number of work-related fatalities (immediate or delayed) resulting from on-site activities for personnel permanently assigned to the site. On OSHA form 200, this is the total of column 1.

Enter the total number of accidents involving utility personnel permanently assigned to the site that resulted in one or more days of restricted activity (excluding the day of the accident). On OSHA form 200, this is the difference between columns 2 and 3.

Enter the total number of man-hours worked by utility personnel permanently assigned to the site.

Performance and Other Indicator Data

(See instructions on back.)

Nuclear Station: Comanche Peak Steam Electric Station Year: 1991 Quarter: 1 2 3 (4)

		Unit 1	Unit 2	Unit 3
Docket No.		50-445		

Thermal Performance

		Unit 1	Unit 2	Unit 3
Design Gross Heat Rate (corrected) (BTU/kWh)		10048		
Total Correction to Design Gross Heat Rate (BTU/kWh)		0		
Adjusted Actual Gross Heat Rate (BTU/kWh)				
	Month 1 Average	DN		
	Month 2 Average	DN		
	Month 3 Average	10040		
Circulating Water Inlet Temperature at Which Actual Gross Heat Rate was Determined (degrees F):				
	Month 1 Average	DN		
	Month 2 Average	DN		
	Month 3 Average	57		
Total Adjustment to Actual Gross Heat Rate (BTU/kWh)				
	Month 1 Average	DN		
	Month 2 Average	DN		
	Month 3 Average	-120		
Power Level at Which Actual Gross Heat Rate was Determined (percent)				
	Month 1 Average	DN		
	Month 2 Average	DN		
	Month 3 Average	99.6		

Reporting Instructions

Note: *Guidance for these data elements is provided in the INPO document "Detailed Descriptions of International Nuclear Power Plant Performance Indicators and Other Indicators," December 1990.*

Thermal Performance

The thermal performance indicator is the ratio of the design gross heat rate (corrected) to the adjusted actual gross heat rate. This allows comparison of thermal performance among plants with different design efficiencies. If the unit consistently operates at a gross heat rate *lower* than what is currently considered to be the design gross heat rate, then the design gross heat rate value should be reevaluated. The design gross heat rate must be corrected to reflect plant modifications and operating deviations from original thermal design (e.g., changing system line-ups to improve efficiency).

Enter the design gross heat rate (corrected), which is the minimum theoretical heat rate that can be attained at design operating conditions for 100 percent power. This value is determined by correcting the initial plant design gross heat rate to include the demonstrated effect of modifications such as the addition of cooling towers or the replacement of moisture separator reheaters. The cumulative impact of all such modifications to date should be used to make the design correction. This value should be updated following plant modifications. In addition, the design gross heat rate also should be corrected for operating deviations from the original thermal design, but should not reflect degraded equipment performance.

Enter the cumulative total correction to the design gross heat rate due to modifications and operating deviations from original thermal design. This value should be reported initially, and whenever plant modifications or operating deviations have been made that affect the design gross heat rate. Enter the basis for any corrections in the remarks.

Enter the adjusted actual gross heat rate attained in the normal equipment lineup during one 24-hour period each month at a power level greater than 80 percent. The actual gross heat rate should be established by averaging at least three sets of data taken within the 24-hour period. When operating at less than 100 percent power, the actual gross heat rate should be adjusted for the actual operating power level. The actual gross heat rate also should be adjusted to account for circulating water inlet temperature deviation from the design value and for the thermal power loss resulting from the use of steam-driven feedwater pumps. No correction should be made for the use of steam-driven pumps if these pumps were used to determine the design gross heat rate. (This correction is to prevent a penalty for using the most efficient mode of operation when both steam and electric-driven feed pumps are installed.) Do not enter data if the unit has not operated above 80 percent power for a 24-hour period.

Enter the average circulating water inlet temperature during each 24-hour period used to determine the adjusted actual gross heat rate.

Enter the total adjustment to the actual gross heat rate used each month to account for circulating water inlet temperature deviations from design values and the use of steam-driven feedwater pumps. If circulating water temperature curves are not available, the adjustment may be based on condenser backpressure.

Enter the power level at which the unit was operating each month when the actual gross heat was determined.

Performance and Other Indicator Data

Revision 7 (12/90)

(See instructions on back.)

Nuclear Station: ______________________ Year: 19__ Quarter: 1 2 3 4

			Unit 1	Unit 2	Unit 3
Docket No.			______	______	______

BWR Fuel Reliability

Six primary noble gas fission product activity rates (microcuries/sec): (decimal format)

			Unit 1	Unit 2	Unit 3
Kr-85m	Month 1	Average	______	______	______
	Month 2	Average	______	______	______
	Month 3	Average	______	______	______
Kr-87	Month 1	Average	______	______	______
	Month 2	Average	______	______	______
	Month 3	Average	______	______	______
Kr-88	Month 1	Average	______	______	______
	Month 2	Average	______	______	______
	Month 3	Average	______	______	______
Xe-133	Month 1	Average	______	______	______
	Month 2	Average	______	______	______
	Month 3	Average	______	______	______
Xe-135	Month 1	Average	______	______	______
	Month 2	Average	______	______	______
	Month 3	Average	______	______	______
Xe-138	Month 1	Average	______	______	______
	Month 2	Average	______	______	______
	Month 3	Average	______	______	______

Power level at which activity level was measured:
(percent of full power)

		Unit 1	Unit 2	Unit 3
Month 1	Average	______	______	______
Month 2	Average	______	______	______
Month 3	Average	______	______	______

Linear heat generation rate (kW/ft):

	Unit 1	Unit 2	Unit 3
Month 1	______	______	______
Month 2	______	______	______
Month 3	______	______	______

Reporting Instructions

Note: Guidance for these data elements is provided in the INPO document "Detailed Descriptions of International Nuclear Power Plant Performance Indicators and Other Indicators," December 1990.

BWR Fuel Reliability

Enter the monthly average steady-state activity rate for the indicated fission gases as measured at the steam jet air ejector. Steady-state is defined as continuous operation for at least three days at a power level that does not vary more than ±5 percent. Plants should collect data for this indicator at a power level above 85 percent when possible. Plants that did not operate at steady-state power above 85 percent should collect data for this indicator at the highest steady-state power level attained during the month.

Enter the average power level (percent of full power) at which the fission gas activity was determined each month.

Enter the linear heat generation rate in kilowatts per foot for each month. Although this value should change only at a refueling, it should be entered for each to ensure the correct current value is being used.

Performance and Other Indicator Data

Revision 7 (12/90)

(See instructions on back.)

Nuclear Station: Comanche Peak Steam Electric Station Year: 19 91 Quarter: 1 2 3 (4)

		Unit 1	Unit 2	Unit 3
Docket No.		50-445		

PWR Fuel Reliability

		Unit 1	Unit 2	Unit 3
Iodine-131 (microcuries/g): (decimal format)				
Month 1	Average	DN		
Month 2	Average	DN		
Month 3	Average	0.00652		
Iodine-134 (microcuries/g): (decimal format)				
Month 1	Average	DN		
Month 2	Average	DN		
Month 3	Average	0.0117		
Purification rate constant ($seconds^{-1}$): (decimal format)				
Month 1	Average	DN		
Month 2	Average	DN		
Month 3	Average	0.000021*		
Power level at which activity level was measured: (percent of full power)				
Month 1	Average	DN		
Month 2	Average	DN		
Month 3	Average	100		
Linear heat generation rate (kW/ft):				
Month 1		DN		
Month 2		DN		
Month 3		5.58		

PWR and BWR Fuel Rod Defects **

	Unit 1	Unit 2	Unit 3
Estimated number of defective fuel rods	2		
Most recent confirmed number of defective fuel rods	2		
Date of last power operation with the defective fuel (mo/yr)	10/91		
Technique that identified defect (code)	2,3,5		
Cause of defect (code) and number and cycle of rods with each defect cause (see back of form for format)	10(2-1)***		

Remarks: *Density Correction Applied **Defects at End-of-Cycle #1
***Failed rods may be examined during fuel reconstitution at a later date

Reporting Instructions

Note: Guidance for these data elements is provided in the INPO document "Detailed Descriptions of International Nuclear Power Plant Performance Indicators and Other Indicators," December 1990.

PWR Fuel Reliability

Enter the monthly average steady-state reactor coolant activities for iodine-131 and iodine-134. Steady-state is defined as continuous operation for at least three days at a power level that does not vary more than ± 5 percent. Plants should collect data for this indicator at a power level above 85 percent when possible. Plants that did not operate at steady-state power above 85 percent should collect data for this indicator at the highest steady-state power level attained during the month.

Enter the monthly average purification rate constant. The purification rate constant is the letdown flow rate in units per second divided by the reactor coolant system volume at normal operating temperature (excluding the pressurizer) expressed in the same unit of measure.

Enter the average power level (percent of full power) at which the coolant activity was determined each month.

Enter the linear heat generation rate in kilowatts per foot for each month. Although this value should change only at a refueling, it should be entered for each to ensure the correct current value is being used.

PWR and BWR Fuel Rod Defects

If the unit was operating during any part of the quarter, enter the estimated number of defective fuel rods corresponding to the highest monthly average iodine or fission gas activity level reported above. If no activity level was reported during the quarter because the steady-state power requirements were not met, enter "NR" (not required).

Enter the requested information (described below) regarding any defective fuel rods that were confirmed by the most recent fuel inspection. This information should be provided as soon as it is available, usually in the same quarter as the inspection or in the following quarter. If the results of the most recent inspection have already been provided, enter "NR" (not required) for each quarter until the next inspection.

Enter as many code numbers as are applicable (e.g., if more than one analysis technique was used, enter the applicable code numbers, such as "1,3").

Enter the number of defective fuel rods confirmed by the most recent fuel inspection.

Enter the date the reactor last operated at power with the defective fuel (month/year).

Enter the code number(s) of the technique(s) used to identify the defect:

1. Sipping
2. Ultrasound (UT)
3. Visual inspection
4. Eddy current testing
5. Coolant activity
6. Other (explain in remarks)

For each cause of defect, enter the code number from the followng list.

1. Debris-induced
2. Crud-induced localized corrosion (CILC)
3. Pellet-cladding interaction (PCI)
4. Manufacturing (e.g., hydriding)
5. Mishandling
6. Baffle jetting
7. Spacer/rod fretting
8. Stress corrosion cracking
9. Power shock
10. Unknown (note in remarks additional follow-up activities, if any)
11. Other (explain in remarks)

Also enter how many rods were defective due to each cause and the fuel cycle of the defective rods (not the fuel cycle of the plant). For example, if three rods (two in their second cycle and one in its third cycle) had debris-induced defects, and two rods (in their first cycle) had damage from baffle jetting, enter the data in the following format:

Cause of Defect (code) and Number	1 (2-2, 1-3)	______	______
and Cycle of Rods with Each Defect Cause	6 (2-1)	______	______

Performance and Other Indicator Data

Nuclear Station: Comanche Peak St... Electric Station Year: 19 91 Quarter: 1 2 3 (4)

	Unit 1	Unit 2	Unit 3
Docket No.	50-445		
OUTAGE MANAGEMENT			
Last refueling outage completion date (mo/day/yr)	12/11/91		
Last refueling outage duration (days)	68		
Next refueling outage start date (mo/day/yr)	09/15/9?		
Next refueling outage expected duration (days)	70		
CHEMISTRY INDEX			
Conductivity (micro S/cm) (to nearest thousandth of a micro S/cm)	0.472		
Is morpholine used for pH control? (Yes or No)	YES		
Chloride concentration (ppb) (to nearest tenth of a ppb)	N/A		
Sodium concentration (ppb) (to nearest tenth of a ppb)	1.2		
Sulfate concentration (ppb) (to nearest tenth of a ppb)	N/A		
Dissolved oxygen (ppb) (to nearest tenth of a ppb)	6.5		

Reporting Instructions

OUTAGE MANAGEMENT

Enter the date the unit was initially synchronized to the power grid after completing the last refueling outage.

Enter the number of days required to complete the last refueling outage from the time the output breaker was opened until the unit was returned to the power grid.

Enter the expected start date of the next refueling outage. This date should be updated on each quarterly report. If a unit is in a refueling outage at the end of the quarter, enter the start of the outage.

Enter the expected length (in days) of the next refueling outage. This duration should be updated on each quarterly report. If a unit is in a refueling outage at the end of the quarter, enter the expected duration.

Reporting Instructions

CHEMISTRY INDEX

Note: *Guidance for these data elements is provided in the INPO document "Detailed Descriptions of International Nuclear Power Plant Performance Indicators and Other Indicators," December 1990.*

Enter the values for the parameters listed below, as applicable for the plant design. The values should be the average of the daily values taken during power operation for the quarter. For each parameter, the daily value to be used is the average of the time-weighted average values in each steam generator (or feedwater train). Enter "NR" if the parameter is not required based on plant design, as specified below. Cation conductivity should be corrected for boric acid, if used, but not for morpholine. If morpholine is used for pH control, that should be noted in the space provided on the data form. Reactor water conductivity should not be cor... for zinc.

Parameter	PWRs with Recirculating Steam Generators	PWRs with Once-through Steam Generators	BWRs
Conductivity:	blowdown (cation)	feedwater (cation)	reactor water (specific)
Chloride:	blowdown	feedwater	reactor water
Sodium:	blowdown	feedwater	not required (NR)
Sulfate:	blowdown	not required (NR)	reactor water
Dissolved oxygen:	condensate pump discharge	condensate pump discharge	feedwater

The following additional guidance applies to the above parameters:

- Use whole days in the calculation.
- Include only samples taken at power operation; i.e., above 10 percent power for BWRs or above 30 percent power for PWRs.
- If a sample is missed for a day, the data values should be carried over from the previous day, unless power is at or below 10 percent for BWRs or 30 percent for PWRs.
- Values that are less than the lowest measurable level should be reported as equal to the lowest measurable level.

Performance and Other Indicator Data

Nuclear Station: Comanche Peak Steam Electric Station Year: 19 91 Quarter: 1 2 3 (4)

	Station Total
RADIATION PROTECTION	
Number of exposures greater than 5 rem/yr:	
Utility personnel	0
Contract personnel	0
Number of positive whole-body counts greater than reporting level	0

Reporting Instructions

RADIATION PROTECTION

Enter the number of utility and contract workers who exceed 5 rem annual exposures during the quarter. This includes exposure received at all work sites.

Enter the number of whole-body counts at the station that exceeded the reporting level for any radionuclide in Table 1 (see next page). Do not include whole-body counts determined to be the result of external contamination, uptake at other facilities, or medical treatment. Also, do not include whole-body counts taken as a follow-up to an initial positive whole-body count.

Reporting Instructions

RADIATION PROTECTION (continued)

Table 1
Radionuclides and Reporting Level

Radionuclides	Reporting Level (nCi)
Cr-51	10,000
Mn-54	400
Co-58	400
Fe-59	100
Co-60	10
Zn-65	100
Zr-95	70
Nb-95	600
Ru-103	300
Rh-106	50
Ag-110m	40
Sb-124	100
Sb-125	300
I-131	30
I-133	100
Cs-134	60
Cs-137	80
Ba-140	700
Ce-141	300
Ce-144	100

GROSS HEAT RATE DATA FORM

The following data elements are requested to support calculation of an industry gross heat rate value for 1991. These values should be the unit totals for January 1, 1991 through December 31, 1991. Definitions are provided below.

Nuclear Station: Comanche Peak Steam Elcctric Station

Unit No.	1		
Thermal Generation (MWh) (total for the year)	17175066		
Gross Electrical Generation (MWh) (total for the year)	5581360		

Definitions:

Thermal Generation: The total number of thermal megawatt-hours (to the nearest whole MWh) generated by the unit during the year.

Gross Electrical Generation: The total number of gross electrical megawatt-hours (to the nearest whole MWh) generated by the unit during the year.

Note: This data form should be returned with the performance indicator data form for the fourth quarter of 1991. Both the quarterly data form and this form should be mailed to arrive at INPO by January 31, 1992.