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U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
ANNUAL OPERATING REPORT FOR 2005

Gentlemen:

Attached is the CPSES Annual Operating Report for 2005 prepared and submitted pursuant to guidance provided in C.1.b of U.S. NRC Regulatory Guide 1.16, Revision 4.

This communication contains no new licensing basis commitments regarding CPSES Units 1 and 2. Should you have any questions, please contact Douglas Snow at (254) 897-8448.

A001

Sincerely,

TXU Generation Company LP

By: TXU Generation Management Company LLC
Its General Partner

Mike Blevins

By: [signature]
Fred W. Madden
Director, Regulatory Affairs

DWS
Attachment

c - B. S. Mallett, Region IV
M. C. Thadani, NRR
Resident Inspectors, CPSES

Attachment to TXX-06040

COMANCHE PEAK STEAM ELECTRIC STATION

ANNUAL OPERATING REPORT

2005

TXU Generation Company LP

TABLE OF CONTENTS

1.0 SUMMARY OF OPERATING EXPERIENCE

The Comanche Peak Steam Electric Station (CPSES) is a dual unit pressurized water reactor power plant, supplied by Westinghouse Electric Corporation. It is located in Somervell County in North Central Texas approximately 65 miles southwest of the Dallas-Fort Worth Metropolitan area. Each generating unit core was originally designed for a warranted power output of 3411 Megawatt thermal (MWt). This output, combined with the reactor coolant pump heat output of 14 MWt, gives a warranted NSSS output of 3425 MWt, which is the license application rating. Both units rated thermal power was subsequently increased to 3458 MWt, which represents a 1.4 percent increase in core output (from 3411 to 3458 MWt). The reactor coolant pump heat output considered in the safety analysis was increased to approximately 16 MWt for both units. All safety systems, including the engineered safety features, are designed for operations at a maximum NSSS output of 3579 MWt and an associated maximum core output of 3565 MWt.

1.1 CPSES UNIT 1

CPSES Unit 1 achieved initial criticality on April 3, 1990. Initial power generation occurred on April 24, 1990, and the plant was declared commercial on August 13, 1990. Since being declared commercial, CPSES Unit 1 has generated 127,221,083 net Megawatt-hours (MWH) of electricity as of December 31, 2005, with a net unit capacity factor of 82.02% (using MDC). The cumulative unit and reactor availability factors were 87.64% and 90.46% respectively, as of December 31, 2005.

On October 8, 2005, the unit began a power ramp down for its eleventh refueling outage. The unit entered the refueling outage on the same day. During the refueling outage, 88 fresh fuel assemblies were loaded for Cycle 12. The refueling outage lasted 30 days 15 hours and ended on November 8, 2005. Unit 1 reached 100% power on November 15, 2005.

During the refueling outage, the major work scope completed included:

- Identification and inspections of leaking fuel rods
- Reconstitution of one assembly with a leaking fuel rod
- Alloy 600 inspections (Rx Head, BMI, Other RCS locations)
- Replacement of Mechanical Seals on Reactor Coolant Pumps 1-02 and 1-04
- 100% eddy current testing of the "U" tubes in all four steam generators
- Eddy current inspection of the last stage blades for both LP turbines
- Replacement of all four LP Turbine steam inlet compensators
- Performance of 5-year inspection on Diesel Generator
- Digital upgrade to the Train Bravo Diesel Generator Exciter and Voltage Regulators
- Digital upgrade to the Turbine-Generator Protection System controls.

Figure 1.1 provides the generation profile of the average daily net electrical output of Unit 1 for 2005. Table 1.1 is a compilation of the yearly and total summaries of the operating data.

During this reporting period there were no failures or challenges to the Safety Valves.

1.2 CPSES UNIT 2

CPSES Unit 2 achieved initial criticality on March 24, 1993. Initial power generation occurred on April 9, 1993, and the plant was declared commercial on August 3, 1993. Since being declared commercial, CPSES Unit 2 has generated 106,319,519 net Megawatt-hours (MWH) of electricity as of December 31, 2005, with a net unit capacity factor of 84.97% (using MDC). The cumulative unit and reactor availability factors were 89.19% and 91.89% respectively, as of December 31, 2005

On March 26, 2005, the unit began a power ramp down for its eighth refueling outage. The unit entered the refueling outage on the same day. During the refueling outage, 93 fresh fuel assemblies were loaded for Cycle 9. The refueling outage lasted 32 days 12 hours and ended on April 28, 2005. Unit 2 reached 100% power on May 4, 2005

During the refueling outage, the major work scope completed included:

- Fuel rod oxide (corrosion) measurements in support of the U2 elevated pH program.
- Alloy 600 Inspections of the Reactor Vessel BMI's, the Pressurizer and all hot and cold leg nozzles
- Reactor Head Penetration Volumetric Inspections
- Steam Generator (S/G) Primary Side Inspections on all four S/Gs
- Implementation of an LP turbine upgrade modification
- Replacement of RCP Motor 2-03.

Figure 1.2 provides the generation profile of the average daily net electrical output of Unit 2 for 2005. Table 1.2 is a compilation of the yearly and the total summaries of the operating data.

During this reporting period there were no failures or challenges to the Safety Valves.

2.0 OUTAGES AND REDUCTIONS IN POWER

2.1 CPSES UNIT 1

Table 2.1 describes unit operating experience including unit shutdowns and provides explanations of significant dips in average power levels for CPSES Unit 1.

2.2 CPSES UNIT 2

Table 2.2 describes unit-operating experience including unit shutdowns and provides explanations of significant dips in average power levels for CPSES Unit 2.

3.0 EXPOSURE AND MONITORING REPORT

Deleted (Reference 69 FR 35067 & TSTF-369).

4.0 IRRADIATED FUEL INSPECTION RESULTS

4.1 CPSES UNIT 1

Core Offload Visual Examination Results

Visual examinations of Unit 1, Cycle 11 fuel assemblies were performed by inspection personnel by viewing the assemblies from the edge of Spent Fuel Pool #1 as assemblies were off-loaded from the core. Concurrent with the poolside visual exams, all assemblies identified as failed by in-mast sipping were also examined using CPSES underwater camera equipment. All fuel assemblies appeared to be in good condition with no anomalies observed, including the assemblies identified as failed by in-mast sipping. Light residual crud levels on the assemblies were observed and were generally consistent with crud patterns observed during previous refueling outage inspection campaigns.

In-Mast Sipping (IMS) Results

During refueling outage 1RF11 core offload, IMS inspections were performed on all assemblies. The results provided clear indications of 5 failed fuel assemblies: M66, N17, N46, N12, and N24. All fuel assemblies except M66 were scheduled to be reloaded into the Cycle 12 core. The IMS indication for assembly N46 was much lower than the other failed assemblies but was still significantly greater than the background indications from non-failed assemblies.

IMS can identify a failed assembly but does not provide information on the number or location of failed fuel rods within a failed assembly. To determine the number and location of individual failed rods, Ultrasonic Testing (UT) was performed on each fuel rod of each assembly identified as failed by IMS.

UT Results

Prior to UT, each face of each IMS identified failed assembly received additional detailed visual inspections using a Westinghouse high magnification underwater camera. The results of these high magnification visual inspections and UT results are provided below.

Assembly M66 - Failed rod indicated in assembly location P5
No visual anomalies were observed.
Assembly N24 - Failed rod indicated in assembly location O1
Debris observed between fuel rods O1 and P1
Assembly N46 - Failed rod indicated in assembly location F7 although the UT trace for that rod was not as definitive for failure indication as the other failed rods.

	No visual anomalies were observed.
Assembly N12 -	Failed rod indicated in assembly location D16. Small "bumps" on rod P16 were observed during pre-reconstitution visual inspections.
Assembly N17 -	Failed rod indicated in assembly location J16. No visual anomalies were observed.

Assembly N12 – This once-burned fuel assembly operated on the core periphery during Cycle 11 and had a relatively low burnup with a large burnup gradient across the assembly. It was decided to reconstitute assembly N12 first in order to use the assembly in Cycle 12. Reconstitution also allowed visual inspections of the failed rod to help determine the cause of the failed fuel in the Cycle 11 core. The failed rod in assembly location D16 was successfully extracted. High magnification underwater camera inspection of the failed rod showed distinct evidence of debris fretting near the lower endplug area. Assembly location D16 was subsequently loaded with a stainless steel rod. The fuel rod in assembly location C15 (diagonally adjacent in the assembly to the failed rod in D16) was also pulled with no indications of debris fretting observed. The intact fuel rod in location P16 was also pulled due to visual indications which were initially characterized as "bumps" on the clad surface. When the rod was pulled and examined, no bumps or other anomalies were observed. It is possible that the bumps were loose crud deposits. Assembly locations C15 and P16 were both successfully loaded with stainless steel rods. Westinghouse issued a Field Anomaly Report which evaluated the results of the reconstitution and concluded that assembly N12 was acceptable for use without restriction. The Cycle 12 core includes reconstituted fuel assembly N12.

Assembly N17 Reconstitution Attempt

Following the successful reconstitution of N12, reconstitution of assembly N17 was attempted. During the extraction of the failed rod (assembly location J16) from N17, only the upper endplug of the rod came up with the extraction tool leaving the failed rod still in the assembly. The fuel rod plenum spring was observed to be intact and secure within the rod. Further reconstitution of N17 was discontinued.

A review of the Westinghouse manufacturing records for the Cycle 11 reload assemblies showed that all the end plug girth welds of the failed rods had acceptable UT weld examination results and there were no deviations reported with the welds. Endplug weld anomalies associated with Westinghouse fabricated fuel have been observed on once-burned fuel rods in the past, but only rarely. There have been only a few weld anomaly related defects in Westinghouse fuel in the last 25 years with none observed in the last 15 years.

However, Westinghouse historical fuel performance records show there have been numerous cases of leaking rods with the cracked and broken top end plugs and almost all of these cases have clearly shown that the primary leaking mechanism was a non-weld related anomaly. Comanche Peak Unit 1 also previously experienced separated endplugs during Cycle 1 and Cycle 2. Past data, including the previous CPSES separated endplug events; indicate that cracked and broken top endplugs were typically

caused by the embrittlement of the cladding in the vicinity of the top girth weld. This embrittlement is the result of rod internal secondary hydriding of the top end plug and/or the attached cladding.

Internal hydriding results from the available hydrogen from the coolant leakage associated with a separate primary failure location on the rod. It is likely that the broken top endplug in assembly location J16 of fuel assembly N17 is also due to secondary hydriding. However, the internal hydriding had not yet manifested itself into severe degradation of the rod. These conclusions are based on prior CPSES and Westinghouse experiences, the timing and nature of the failures developed in the Cycle 11 core, review of Westinghouse manufacturing records, and the visual appearance of the separated end plug. Internal secondary hydriding of rod J16 likely caused a circumferential crack in the heat affected zone of the weld which significantly weakened the cladding. It is believed that the endplug did not separate during the cycle but separated when the rod was gripped and pulled with the fuel rod handling tool. It is likely that the endplug would have eventually separated from the rod on its own with further irradiation in the core.

Assemblies N24, N46, and M66 Reconstitution

Following 1RF11 core reload, reconstitution of assemblies N24 and N46 was attempted for failure determination and to possibly recover the assemblies for future use. During the detailed visual exam of N24, it was noted that the failed rod in assembly location O1 was elongated approximately one-half inch. It was also noted that the top endplug area of the rod appeared to be bulged slightly and appeared to be slightly cocked to one side. These observations were indications of possible internal secondary hydriding of the upper endplug area of the rod, similar to that which occurred in the failed rod in assembly N17 (discussed above). It was decided to discontinue reconstitution of the assembly due to the possibility of endplug separation during rod extraction and handling.

Reconstitution of N46 was attempted next. As noted in the UT results presented above, the rod in assembly location F7 was identified as potentially failed but the UT indication was very weak. It is also noted that IMS results for N46 were much weaker than for the other failed assemblies, but distinctively stronger than the background indications from the intact assemblies. Rod F7 was successfully extracted from the assembly. Visual examination of the rod showed no failure indications and an eddy current measurement also indicated that the rod was intact. Rod F7 was then placed in a single rod sipping system which also confirmed the rod to be intact. Since there were no other UT suspect rods in assembly N46, further reconstitution was discontinued and the assembly will not be re-used since the failed rod could not be identified and removed. It is suspected that assembly N46 contains a very tight defect which may allow fission gases to escape (which would be detected by sipping) but may not be large enough to allow a significant amount of water to enter the rod, thus eluding detection by UT.

Based on the confirmation of debris related failures in assemblies N12 and N24 and the amount of debris discovered in the lower core plate area, it was concluded that reconstitution of discharged assembly M66 would not provide any significant new failure information. It was therefore decided not to reconstitute assembly M66 since the

risk involved with failed rod removal and handling more than offset the potential information to be gained from examination of the failed rod.

4.2 CPSES UNIT 2

Visual examinations of Unit 2, Cycle 8 fuel assemblies were performed by inspection personnel by viewing the assemblies from the edge of Spent Fuel Pool #2 as assemblies were off-loaded from the core. Some randomly selected fuel assemblies were examined using underwater camera equipment which was performed concurrently with the poolside visual exams. All fuel assemblies appeared to be in good condition with no anomalies observed. In general, only light residual crud levels on the assemblies were observed and were consistent with crud patterns observed during previous refueling outage inspection campaigns.

During refueling outage 2RF08, eleven fuel assemblies were inspected for crud deposition and cladding corrosion in support of the CPSES/EPRI Unit 2 demonstration elevated pH program. Eight of the measured fuel assemblies were of the Westinghouse design with ZIRLO fuel rod cladding and three fuel assemblies were of the Framatome-ANP (F-ANP) design with Zr-4 low tin type cladding.

The purpose of this exam was to investigate the effect of higher RCS pH level and higher RCS lithium concentration on crud levels and waterside corrosion thickness in support of the elevated pH program. A benchmark inspection was performed during 2RF06 to establish crud and corrosion levels after operation at normal lithium concentration (~3.5 ppm) and pH levels (7.1 to 7.2). During Cycle 7, the plant was operated at a constant pH level of 7.3 and maximum lithium concentration of 5 ppm. During Cycle 8, the plant operated at a constant pH level of 7.4 and a maximum lithium concentration of 6 ppm.

One third-burn F-ANP assembly had measured fuel rods with burnup ranging from 33,700 to 39,100 MWD/MTU. Peak oxide thickness for these rods ranged from 24 to 35 microns. No crud was observed on this assembly.

Two second-burn F-ANP assemblies had measured fuel rods with burnup ranging from 35,200 to 49,200 MWD/MTU. Peak oxide thickness ranged from 27 to 79 microns. Areas of brown crud and localized dark crud were observed on these assemblies. Peak corrosion values for assembly JJ83 were probably affected by crud. There was some evidence of oxide blistering on Face 2 of assembly JJ23. This is where the highest oxide thickness measurements were observed. Oxide blistering has been observed in the industry in Zr-4 clad with peak oxide thickness in the range of 60 - 80 microns.

Four second-burn Westinghouse assemblies had measured fuel rods with burnup ranging from 29,400 to 48,400 MWD/MTU. Peak oxide thickness ranged from 13 to 68 microns. Broad areas of brown crud and localized dark crud were also observed on these assemblies. Peak corrosion values for assemblies JW05 and JW07 may have also been affected by crud.

Four first-burn Westinghouse assemblies had measured fuel rods with burnup ranging from 25,000 to 28,200 MWD/MTU. Peak oxide thickness ranged from 9 to 24 microns. Again, broad areas of brown crud and localized dark crud were also observed on these assemblies. Peak corrosion values for assemblies KK30 and KK35 may have also been affected by crud.

Corrosion performance did not seem to change for F-ANP assemblies from Cycle 6 to Cycle 8. Corrosion for first-burn Westinghouse assemblies increased slightly from Cycle 7 to Cycle 8, however most first-burn measurements agreed well with best estimate predictions and all were well within upper bound predictions. Most of the corrosion measurements for the second-burn Westinghouse assemblies are within the ZIRLO experience range for the same levels of burnup, but some measurements were at the very high end of the range. The additional oxide measurement campaign following Cycle 9 is being considered.

5.0 OUTAGE RELATED SINGLE RADIOACTIVITY RELEASE OR RADIATION EXPOSURE TO AN INDIVIDUAL THAT ACCOUNTS FOR MORE THAN 10 PERCENT OF ALLOWABLE ANNUAL VALUES

Deleted (Reference 69 FR 35067 & TSTF-369)

FIGURE 1.1
COMANCHE PEAK STEAM ELECTRIC STATION - UNIT 1
GENERATION PROFILE
AVERAGE DAILY UNIT POWER LEVEL for 2005

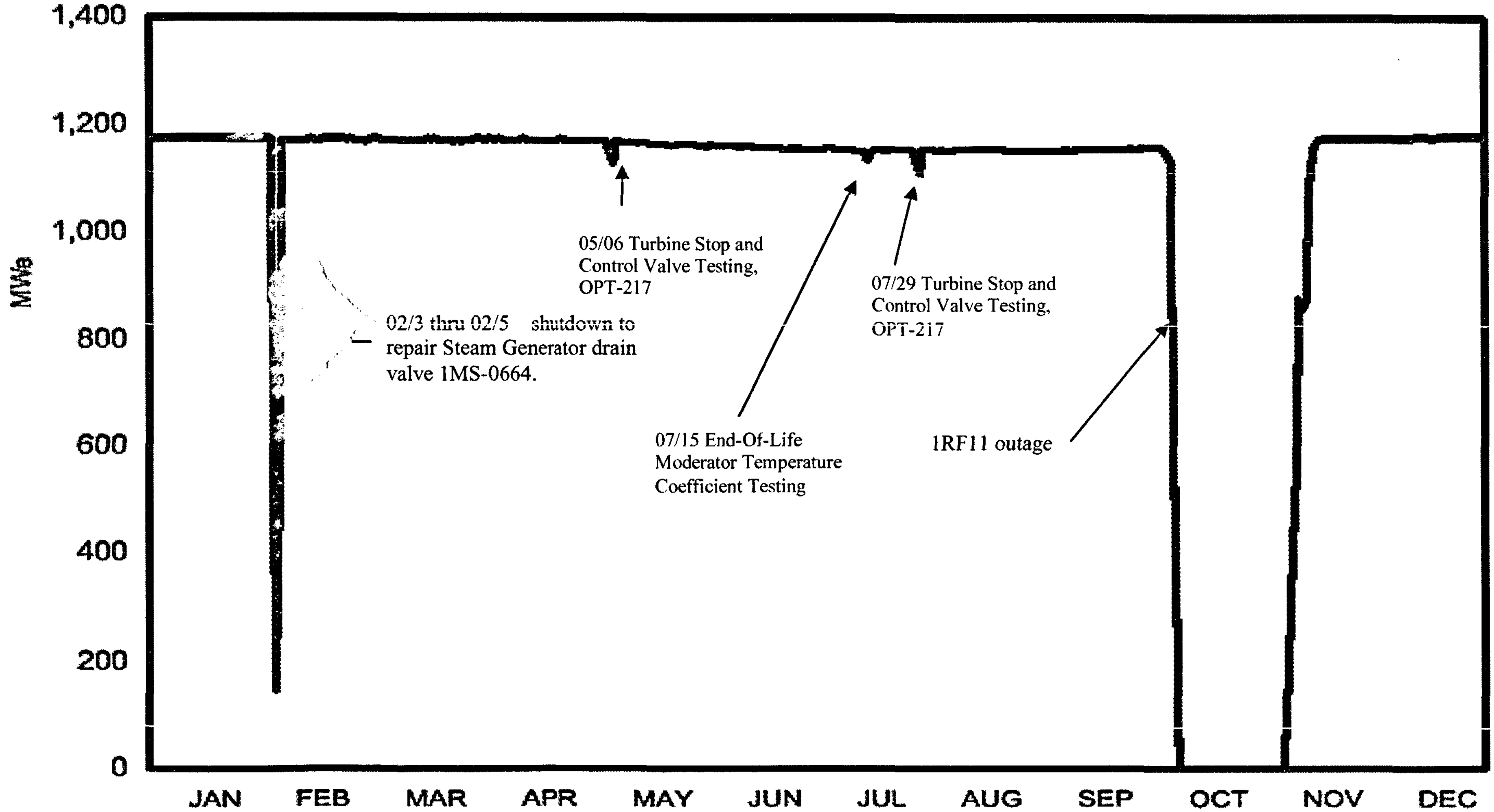

TABLE 1.1

COMANCHE PEAK STEAM ELECTRIC STATION - UNIT 1

ANNUAL ELECTRIC POWER GENERATION DATA (2005)

	YEAR	CUMULATIVE
Hours RX was Critical	8,036.32	119,138.75
RX Reserve Shutdown Hours	0	2870.89
Hours Generator On-line	8,005.27	118,199.37
Gross Thermal Energy Generated (MWH)	27,398,320.80	393,790,588.20
Gross Electric Energy Generated (MWH)	9,583,864	132,877,752
Net Electric Energy Generated (MWH)	9,217,834	127,221,083
RX Service Factor (%)	91.74	88.33
RX Availability Factor (%)	91.74	90.46
Unit Service Factor (%)	91.38	87.64
Unit Availability Factor (%)	91.38	87.64
Unit Capacity Factor (%, using MDC net)	91.50	82.02
Unit Capacity Factor (%, using DER net)	91.50	82.02
Unit Forced Outage Rate (%)	0.00	2.61

TABLE 2.1
COMANCHE PEAK STEAM ELECTRIC STATION - UNIT 1
UNIT OPERATING EXPERIENCE INCLUDING SHUTDOWNS AND POWER REDUCTIONS DURING 2005

NO	DATE	TYPE F: FORCED S: SCHEDULED	DURATION* (HOURS)	REASON	METHOD OF SHUTTING DOWN THE REACTOR OR REDUCING POWER	CORRECTIVE ACTION/COMMENTS
1	02032005	S	19.53	B	2	On 2/3/05 at 0302 commenced reactor shutdown to enter the containment building and repair 1MS-0664, Steam Generator secondary side tube sheet drain valve. Reactor manually tripped per procedure at 0359. Completed repairs and restarted the reactor, critical at 1731. Synched to grid at 2331. Unit returned to full power on 2/5/05 at 0023.
2	10082005	S	735.2	C	2	On October 8, 2005 at 0902 the unit began downpower to enter 1RF11. Unit was tripped per procedure at 1139 entering MODE 3. Generator breakers were closed on 11/8/05 at 0151ending refueling outage.

1) REASON

A: EQUIPMENT FAILURE (EXPLAIN)
B: MAINT OR TEST
C: REFUELING
D: REGULATORY RESTRICTION
E: OPERATOR TRAINING AND LICENSE EXAMINATION
F: ADMINISTRATIVE
G: OPERATIONAL ERROR (EXPLAIN)
H: OTHER (EXPLAIN)

2) METHOD

1: MANUAL
2: MANUAL SCRAM
3: AUTOMATIC SCRAM
4: OTHER (EXPLAIN)

- INDICATES SHUTDOWN HOURS/OTHERWISE "NA" FOR NOT APPLICABLE

FIGURE 1.2
COMANCHE PEAK STEAM ELECTRIC STATION - UNIT 2
GENERATION PROFILE
AVERAGE DAILY UNIT POWER LEVEL for 2005

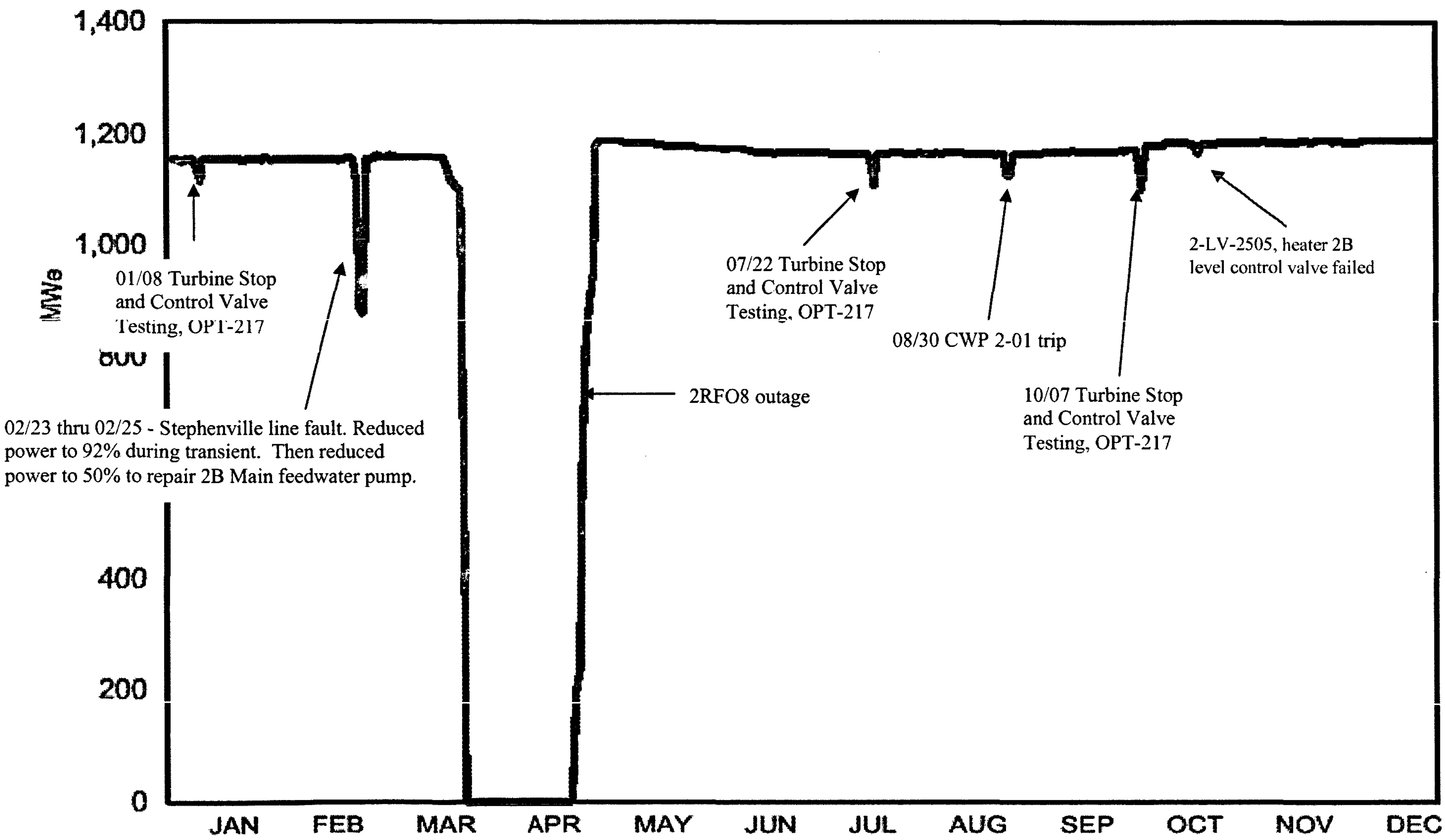

TABLE 1.2

COMANCHE PEAK STEAM ELECTRIC STATION - UNIT 2

ANNUAL ELECTRIC POWER GENERATION DATA (2005)

	YEAR	CUMULATIVE
Hours RX was Critical	7,999.82	97,619.87
RX Reserve Shutdown Hours	0	2,366.46
Hours Generator On-line	7,979.79	97,050.07
Gross Thermal Energy Generated (MWH)	27,246,705.60	324,555,501.60
Gross Electric Energy Generated (MWH)	9,593,738	110,814,160
Net Electric Energy Generated (MWH)	9,225,366	106,319,519
RX Service Factor (%)	91.32	89.72
RX Availability Factor (%)	91.32	91.89
Unit Service Factor (%)	91.09	89.19
Unit Availability Factor (%)	91.09	89.19
Unit Capacity Factor (%, using MDC net)	91.58	84.97
Unit Capacity Factor (%, using DER net)	91.58	84.97
Unit Forced Outage Rate (%)	0.00	2.58

TABLE 2.2
COMANCHE PEAK STEAM ELECTRIC STATION - UNIT 2
UNIT OPERATING EXPERIENCE INCLUDING SHUTDOWNS AND POWER REDUCTIONS DURING 2005

NO	DATE	TYPE F: FORCED S: SCHEDULED	DURATION* (HOURS)	REASON	METHOD OF SHUTTING DOWN THE REACTOR OR REDUCING POWER	CORRECTIVE ACTION/COMMENTS
1	02/23/05	F	22.83	A	1	At 2210 on February 23, 2005 commenced a controlled power reduction to 50% reactor power to repair the 2B Main Feedwater Pump turbine controls. Return to full power at 2100 on February 24, 2005.
2	03262005	S	780.22	C	2	On March 26, 2005 at 2245 the unit began downpower to enter 2RF08. Unit was tripped per procedure at 1146 entering MODE 3. Unit entered MODE 6 March 30, 2005 at 1413. Unit exited MODE 6 after core reload April 20, 2005 and entered MODE 5 at 0753. On April 27, 2005 Unit entered MODE 2 and reactor was critical at 0457. Unit entered MODE 1 on April 27, 2004 at 1733. Unit was synchronized to grid on April 28, 2005 at 0059 ending 2RF08. Duration of 32 days and 13 hours. The unit returned to full power on May 4, 2005 at 0331.
3	08302005	F	41.75	A	1	On August 30, 2005 circulating pump, CWP 2-01, tripped on motor fault. Unit was downpowered to 96% and motor was replaced. Returned to full power August 31 at 2359.
4	10242005	F	15.08	A	4	On October 24, 2005 manually reduced power to 97% at 0115 when 2-LV-2505, heater 2B level control valve failed. Valve was repaired and unit returned to full power at 1620 on same day.

1) REASON

A: EQUIPMENT FAILURE (EXPLAIN)
B: MAINT OR TEST
C: REFUELING
D: REGULATORY RESTRICTION

E: OPERATOR TRAINING AND LICENSE EXAMINATION
F: ADMINISTRATIVE
G: OPERATIONAL ERROR (EXPLAIN)
H: OTHER (EXPLAIN)

2) METHOD

1: MANUAL
2: MANUAL SCRAM
3: AUTOMATIC SCRAM
4: OTHER (EXPLAIN)

* INDICATES SHUTDOWN HOURS/OTHERWISE ⌊NA⌋ FOR NOT APPLICABLE