ATTACHMENT 1

Comanche Peak Steam Electric Station
Units 1 and 2 Proposed Secondary Water
Chemistry Monitoring Program

Revision 1

NRC Docket Nos. 50-445 and 5-446

July 15, 1981

Comanche Peak Proposed
Secondary Water Chemistry
Monitoring Program

The CPSES secondary sampling schedule will be, in large part, Westinghouse's suggested general schedule for sampling. This schedule will be included into procedure CHM-106.

The critical sampling control points for secondary system chemical parameters are steam generator (water), main steam and condensate feedwater. Table 1 provides chemical parameters and their values for normal operation for each critical control point. Figure 1 shows these critical sampling points (and others) on a secondary system schematic.

The procedures used to measure the value of critical parameters are:

a. pH-CHM-332 - This method involves the immersion of a glass electrode into the sample and recording the reading on the meter.

b. Conductivity - CHM-309 - This method involves the measurement of the electrical conductance of the sample using a dip cell or a flow cell connected to a bridge type instrument.

c. Chloride - CHM-203 - Several methods will be applicable for this analysis. Those that may be used are:

   (1) a titrametric method using dilute mercuric nitrate solution in the presence of mixed diphenylcarbazone - brosophenal blue indicator.

   (2) a spectrophotometric method that uses the formation of terric thiocynate complex from the reaction of chloride ion with mercuric thiocyanate.

d. Suspended Solids - CHM-330 - This method involves the filtration of the sample through a 0.55 micron filter paper and weighing the increase in weight of the filter paper.

e. Silica - CHM-325 - This method is a spectrophotometric method. A colored complex is produced by the reaction of soluble silica with molybdate.

f. Flourides - Specific ion electrode technique.

Process sampling points and potential grab sample points are provided in Table 2.

Procedure CHM-101, "Chemistry Document Control" will describe the methods, techniques, and responsibilities for the recording of all chemistry data, the review of the analytical results or trends, and the records storage requirements for this information. The responsible senior technician, Radiochemist and the Chemistry and Health Physics Engineer shall have a review responsibility of these chemical records. The Chemistry and Health Physics Engineer has overall review responsibility of these records.

If abnormal chemistry cannot be corrected within a reasonable period of time by chemical addition, use of full flow condensate polishers, and/or steam generator blow-down, the plant may decrease power so that the system causing the problem can be isolated and repaired.

Corrective actions due to abnormal chemistry conditions are provided in Table 3.

The Chemistry and Health Physics Engineer has overall responsibility for the timely recommendation of corrective actions to correct abnormal secondary side chemical conditions. The Manager of Plant Operations is responsible for deciding to modify plant operations because of abnormal

chemical conditions.

Procedure CHM-104 indentifies the Chemistry and Health Physics Engineer as the authority responsible for the interpretation of data.

Once the Chemistry and Health Physics Engineer is aware of the off control point condition, and it cannot be corrected within a reasonable amount of time, he will notify the Manager of Plant Operations through the Engineering Superintendent, who upon ascertaining the situation and considering consequences, will decide upon a schedule for appropriate correction of the problem.

TABLE 1

Secondary Water Chemistry
(Normal Operation)

Steam Generator (water)

ph at 25°C	8.5 to 9.2
cation conductivity (max.), micromho/cm	2.0
free hydroxide (max.), as ppm Ca CO_3	0.15
Chloride, as ppm Cl	0.15
Suspended Solids (max.), ppm	1.0
silica (max.), as ppm SiO_2	5.0

Condensate Feedwater

ph at 25°C	8.8 to 9.2
disolved solids (max.), as ppm Ca CO_3	1.0
free hydroxide (max.), as ppm Cl	0.15
iron and copper, ppm (each)	0.01
dissolved oxygen, as ppm O_2	0.005
hydrazine (residual), as ppm N_2H_4	0.01

Main Steam

ph at 25°C	8.8 to 9.2
cation conductivity (max.), micromho/cm	2.0
silica (max.), as ppm SiO_2	0.5

TABLE 2

SECONDARY PLANT SAMPLING SYSTEM SOURCES

Sample Source	Parameter Measured	Receiver and Function	Range
Hot wells (2 samples)	cation conductivity	recorder with high alarm	0.1 to 10 mmho/cm
Hot well salinity troughs (16 local points)	specific conductivity	indicator with high alarms	0 to 100 mmho/cm
Condensate pump discharge	dissolved oxygen	recorder with high and low alarms	0 to 20 ppb; 0 to 200 ppb
	pH	recorder with high and low alarms	2 to 12
	sodium ion	recorder with high alarm	1 to 100 ppb
Heater drain pump discharge	cation conductivity	recorder with high alarm	0.1 to 10 mmho/cm
	pH	recorder with high and low alarms	2 to 12
Polisher outlet	cation conductivity	recorder with high alarm	0.1 to 10 mmho/cm

TABLE 2 (Continued)

SECONDARY PLANT SAMPLING SYSTEM SOURCES

Sample Source	Parameter Measured	Receiver and Function	Range
	pH	recorder with high and low alarms	2 to 12
Steam generator feedwater (4 samples)	Hydrazine	recorder with high and low alarms	0 to 50 ppb
	cation conductivity	recorder with high alarm	0.1 to 10 mmho/cm
	pH	recorder with high and low alarms	2 to 12
Main Steam (4 samples)	cation conductivity	recorder with high alarm	0.1 to 10 mmho/cm
	pH	recorder with high and low alarms	2 to 12
	silica	recorder with high alarm	0 to 100 ppb
Vacuum deaerator outlet	dissolved oxygen	recorder with high alarm	0 to 20 and 0 to 200 ppb

TABLE 2 (Continued)

SECONDARY PLANT SAMPLING SYSTEM SOURCES

Sample Source	Parameter Measured	Receiver and Function	Range
Auxiliary condenser outlets (2 local points)	specific conductivity	indicator with high alarm	0 to 100 mmho/cm
Steam Generator Blowdown	ph	meter with recorder and high and low alarms	2 to 12
	cation conductivity	meter with recorder and high alarm	0 to 10 mmho's
	sodium analyzer	Recorder with alarm	0.1 to 1000 ppb

TABLE 3

Corrective Action Due to Abnormal Chemistry Conditions
During Normal Operations

Typical Event: Condenser Tube Leakage

Surveillance: An increase in the normal limits of such critical parameters as cation conductivity and sodium concentrations will prompt Action Levels to be initiated.

Critical Parameter Measurement *	Normal Concentration	Abnormal Concentration	Action Level
Cation Conductivity	≥2 mmhos	>2 but ≤ 5 mmhos	I
		>5 but ≤ 7 umhos	II
		umhos	III
Sodium Concentration	≤150 PPB	>150 but ≤ 220 PPB	I
		>220 but ≤ 500 PPB	II
		>500 PPB	III

Action Level I - Identify and correct the problem causing the abnormal chemistry. Abnormal condition should return to normal within 7 days, if not proceed to Action Level II.

Action Level II - Within four hours reduce power to less than 50%. Correct abnormal condition within 100 hours, if not proceed to Action Level III.

Action Level III - Proceed immediately to Hot Shutdown.

TABLE 3 (Continued)

Corrective Action Due to Abnormal Chemistry Conditions
During Normal Operations

* As measured at the Steam Generator Blowdown.

** Note: Normal and abnormal concentrations and action level times were selected for illustrative purposes only. Real values will be developed later and will be selected using the latest guidance from the industry, Westinghouse, and research groups such as the Electric Power Research Institute.

FIGURE 1

CPSES SECONDARY SYSTEM SCHEMATIC