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**W. J. Cahill**
*Executive Vice President*

March 1, 1989

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
ADVANCE FSAR CHANGE

Gentlemen:

Attached is an advance copy of a future FSAR change consisting of marked up FSAR pages. These changes provide an update to the FSAR description of toxic chemicals at CPSES. The service water and circulating water chlorination system and other significant amounts of chlorine stored onsite will be removed. CPSES will use an alternate biocide such as Sodium Hypochlorite/Sodium Bromide in the service water and circulating water systems. Future FSAR amendments to appropriate portions of the FSAR will describe this change in biocide. TU Electric will perform an evaluation in accordance with Regulatory Guide 1.78 of other toxic chemicals at CPSES. The removal of the surveillance requirements of the control room air intake chlorine monitors is currently being reviewed by the NRC staff as part of the CPSES Technical Specifications.

These changes will be provided in a future FSAR amendment.

Sincerely,

William J. Cahill, Jr.

RSB/smp
Attachment

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (3)
Ms. Melinda Malloy, OSP





A029
1/1

Discussion

| Q421.19

This regulatory guide is not applicable to CPSES design and construction activities. The quality assurance methods for operations phase activities will comply with applicable guidance contained in Revision 1 (4/76) of this regulatory guide. The application of the requirements of ANSI N45.2.5 -1974, as endorsed by this regulatory guide, will be in accordance with the guidance provided in ANSI N18.7 - 1976.

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Also refer to Section 17.2

| 8

Regulatory Guide 1.95

Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release

Discussion

| Q312.27

The CPSES design complies with the intent of Revision 1 (1/77) of this regulatory guide as described in Sections 2.2, ~~6.4 and 9.4~~. ~~A plant specific analysis has been performed in lieu of the isolated air exchange rate specified in Table 1 of this regulatory guide. (See Section 6.4.2.3)~~

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Regulatory Guide 1.96

Design of Main Steam Isolation Valve Leakage Control Systems for Boiling Water Reactor Nuclear Power Plants

Discussion

This regulatory guide is not applicable to the CPSES.

effects on the plant.

The gas wells in the site vicinity, described in Section 2.5.1, could also be a source of flammable vapor clouds and were evaluated for their potential effects on the plant. Since exploration in the area is still active, a hypothetical gas well was postulated using data available from the Texas Railroad Commission. A discussion of this hypothetical well is provided in Section 2.5.1.

2.2.3.1.3 Toxic Chemicals

Insert A →

~~The only toxic chemical in the vicinity of CPSES is the chlorine gas stored onsite for plant use. Rupture of a gas cylinder was evaluated for its potential effects on the plant.~~

2.2.3.1.4 Fires

The only non-plant-related source of fire in the vicinity of CPSES is the crude oil pipeline. The rupture of this pipeline was evaluated for its potential effect on the plant.

2.2.3.1.5 Collision with Intake Structure

The Service Water Intake Structure is located on the Safe Shutdown Impoundment (see Figure 1.2-1), which is not open to public transportation. Therefore, a significant collision with this structure is not considered a credible event.

2.2.3.1.6 Liquid Spills

The only source of liquid spills in the vicinity of CPSES is the crude oil pipeline which was evaluated for its potential effect on the plant.

INSERT A:

2.2.3.1.3 Toxic Chemicals

Toxic chemicals which are stored and used onsite at CPSES are evaluated in accordance with the criteria and guidance of Regulatory Guide 1.78 and NUREG 0570.

2.2.3.2 Effects of Design Basis Events

The design basis events identified above are:

1. Gas Pipeline and Gas Well Accidents

2. Accidental Release of ~~Chlorine~~ Toxic Chemicals

3. Crude Oil Pipeline Rupture

Each of these is evaluated below.

2.2.3.2.1 Gas Pipeline and Gas Well Accidents

Potential accidents involving the release of natural gas from existing pipelines and postulated wells described in Section 2.2.2 do not pose a hazard to the plant. As shown below, in the event of an accident the concentration of gas at all plant air intakes is well below the lower flammability limit. Also detonation of an unconfined natural gas-air mixture is not considered to be a credible event [1,2,3,4].

Each of the existing pipelines and a potential gas well were analyzed to determine the most limiting potential accident condition; the results of this analysis indicated that the most limiting release of natural gas would involve a break in the 36-inch Lo-Vaca natural gas pipeline. The analysis of this accident was performed using the following conservative assumptions:

1. A large break in the pipeline occurs at the point of nearest approach to the plant (12,250 feet to air intake structure).

2. Gas is released by a constant enthalpy process yielding a gas temperature for dispersion calculations of 40°F (for a 60°F initial gas temperature) due to the Joule-Thompson effect.

3. The flowrates out of the break is the maximum steady flow for single-ended break (572 $m^3$/sec) and a double-ended break (1144 $m^3$/sec).

cloud (4.95 percent volume concentration) is 746 feet for the double-ended break (1144 $m^3$/sec) and 652 feet for the single-ended break (572 $m^3$/sec) with a 1 m/sec wind speed. Parametric studies with various flowrates showed that even under worst case conditions occurring when the gas flow was 600 $m^3$/sec, the vertical distance was 650 feet. Similar studies with various wind speeds, showed that the minimum clearance between the air intake and the lower flammability limit of the natural cloud was greater than the 650 feet obtained with the 1 m/sec wind speed.

Similar analysis of the Lone Star 6-inch pipeline located 4,235 feet from the plant intake structure showed that the distance from the air intake to the lower flammability of the natural gas cloud is 3,855 feet. An analysis of a postulated gas well located 2,250 feet from the nearest plant structure showed that the distance from the structure to the lower flammability limit of the natural gas cloud is 1,050 feet.

2.2.3.2.2 Accidental Release of ~~Chlorine~~ Toxic Chemicals

Insert B →

~~Chlorine~~ gas cylinders are stored in chlorination buildings which are located near the Circulating Water and Service Water intake structures. There are 24 chlorine gas cylinders (one-ton-capacity each) in the Circulating Water Chlorination Building and six in the Service Water Chlorination Building. Under normal conditions, the leakage from the storage cylinders will be inconsequential. However, as a safety measure, leak detectors and masks are provided in the chlorine storage and injection areas.

Analyses were performed utilizing the approach outlined in NRC Regulatory Guide 1.95, "Protection of Nuclear Power Plant Control Room Operators against an Accidental Chlorine Release."

52 | Three atmospheric stability classes are analyzed: very unstable
| (Category A) as might possibly occur in clear calm air immediately

INSERT B:

A study has been performed to evaluate the potential for chlorine releases from offsite chlorine storage and transportation affecting control room habitability. This study revealed no chlorine storage locations or frequent chlorine transportation within a 5 mile radius of CPSES in quantities that are large enough to require evaluation under the criteria of Regulatory Guide 1.78. Therefore, potential accidents involving the release of chlorine from offsite storage locations and transportation routes do not pose a significant hazard to control room habitability.

The circulating cooling water and service water systems will be chemically treated for control of biololgical growth with solutions of sodium hypochlorite and sodium bromide. The diluted sodium hypochlorite and sodium bromide solutions will not present a threat to control room habitability. No liquified chlorine will be stored within the site boundary in containters exceeding 150 lbs capacity. The only liquified chlorine that will be stored within the protected area will be in small quantities of 20 lbs or less to be used for laboratory purposes.

Other toxic chemicals which are stored and used onsite at CPSES are evaluated for potential impact of their release upon control room habitability in accordance with the criteria and guidance of Regulatory Guide 1.78 and NUREG 0570. Toxic chemicals which are determined to be hazardous to control room habitability are controlled and detection instrumentation is provided, as apropriate.

following a tornado; neutral (Category D) as might occur during rainy or cloudy weather immediately following a tornado; very stable (Category F) as specified for consideration in R.G. 1.78. Worse-case wind speeds of one (1) meter per second are used for Categories A and F and two (2) meters per second for Category D. | 52

Chlorine releases from both chlorination buildings were analyzed. Although the Service Water Chlorination Building is located closer, the Control Room air intake additional dispersion due to structural obstacles causes releases from this building to be the less severe case. The results contained herein are those computed for an accidental release of chlorine from the Circulating Water Chlorination Building.

Two types of chlorine releases were analyzed. The first is a low leakage-rate release due to defective valves or fittings. The second is a catastrophic rupture of one of the one-ton-capacity liquid chlorine storage cylinders.

The majority of chlorine releases are of the first type involving long-term release rates not exceeding one pound of chlorine per second.

1. Chlorine Releases Due to Leak From Valve or Fittings

   A long-term release with a leakage rate of one pound per second resulting from a valve/fitting defect was analyzed. Using the diffusion model for continuous release, the maximum concentration at the Control Room air intake was calculated to be 29.3 ppm. | 52

2. Chlorine Container Rupture

   In the postulated accident, it is assumed that the entire storage cylinder of chlorine was ruptured. The dispersion of chlorine in the atmosphere and the possible effects on the functioning or Control Room personnel were evaluated.

The assumptions made in the analysis and the results obtained were as follows:

52 | a. A catastrophic rupture of the largest sized (one-ton-or 2,000 lb capacity) liquid chlorine container was assumed.

52 | b. One quarter of the liquid in the container (500 lb) was assumed to flash off instantaneously and move toward the Control Room air intake (puff release).

52 | The remaining chlorine was conservatively assumed to evaporate into the atmosphere at a rate of 10 lbs per second (plume release).

66 | c. The horizontal distance between the circulating water chlorine cylinder storage location and the control air intake was estimated to be 804 ft (245 m); the difference in elevation was estimated to be 72 ft (21.95 m) .

65 | Using the above assumptions, the concentrations of chlorine near the Control Room air intake was computed. The maximum concentration was calculated to be 649 ppm due to the puff release and 293 ppm due to the plume release.

d. Vapor Dispersion Models

The vapor from instantaneous flashing (puff) and from continuous vaporization or evaporation (plume) moves in the direction of the wind and disperses by diffusion into the atmosphere. The wind is assumed to be in the direction from the source of spill to the Control Room air intake.

1) Instantaneous Puff Release Model

$$\chi = \frac{Q}{(2\pi)^{3/2}\sigma_{XI}\sigma_{YI}\sigma_{ZI}} \exp\left\{-\frac{1}{2}\left(\frac{X^2}{\sigma_{XI}^2} + \frac{Y^2}{\sigma_{YI}^2}\right)\right\}$$

$$\left\{\exp\left\{-\frac{1}{2}\left(\frac{(Z-H)^2}{\sigma_{ZI}^2}\right)\right\} + \exp\left\{-\frac{1}{2}\left(\frac{(Z+H)^2}{\sigma_{ZI}^2}\right)\right\}\right\}$$

where

$\chi$ = Concentration (g/m)

Q = Source Strength (g)

$\sigma_{XI}$, $\sigma_{YI}$, $\sigma_{ZI}$ = Adjusted standard deviation of the puff concentration in the horizontal along-wind (X), horizontal crosswind (Y) and vertical cross-wind direction (Z)

X, Y, Z = Distance from the puff center in the X, Y, Z directions.

H = Height of source above the ground (m).

2) Continuous Plume Release Model

$$\chi = \frac{Q'}{2\pi \bar{u} \sigma_Y \sigma_Z} \exp\left\{-\frac{1}{2} \frac{Y^2}{\sigma_Y^2}\right\}$$

$$\left\{\exp\left(-\frac{1}{2}\frac{(Z-H)^2}{\sigma_Z^2}\right) + \exp\left(-\frac{1}{2}\frac{(Z+H)^2}{\sigma_Z^2}\right)\right\}$$

where

$\chi$ = Concentration (m)

$Q'$ = Continuous source strength (g/sec)

$\sigma Y$, $\sigma Z$ = Standard deviation of the plume concentration in the Y and Z direction respectively. (m)

Y, Z = Distance from the plume center in the Y, Z direction. (m)

u- = Wind Speed (m/s)

52 | Adjustments to account for dilution factors due to structural obstacles have been made in accordance with Reference [20] for the puff release and with Reference [19] for the plume release.

In the event of an abnormal chlorine leakage to the environment, the leak detectors located in the storage areas will initiate an alarm in the Control Room. This alarm will alert the operator to switch the Control Room ventilation system to the emergency operation mode or the emergency recirculation mode. In addition, the chlorine detectors at each Control Room air intake automatically switch the Control Room ventilation system to the isolation mode. Termination of outside air is accomplished by not permitting the emergency pressurization fans to operate during a high chlorine release signal. The details of the Control Room ventilation system are discussed in Section 9.4.1. | 46

3. Chlorine concentration in the Control Room | 52

Concentration of chlorine in the Control Room were calculated under three different assumptions: | 52

a. Control Room Isolation (as described in Section 9.4.1), | 52

b. Control Room not isolated, and | 52

c. Control Room not isolated with tornado vent paths open (post-tornado conditions). | 52

The peak chlorine concentration did not exceed 15 ppm for a and b, above. The peak concentration for c. was 26.3 ppm; however, the concentration did not exceed 15 ppm for a time greater than two minutes after the tornado vents open. Therefore, there is sufficient time for the operators to put a self-contained breathing apparatus into operation in accordance with Reference [13]. | 52

2.2.3.2.3 Oil Pipeline Accidents

As indicated in Table 2.2-2 and as shown in Figures 2.1-2b and 2.5.1-17, the West Texas Gulf crude oil pipeline runs, at its closest approach, approximately 4000 feet from the CPSES. Considering the | 10