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**FEDERAL ENERGY REGULATORY COMMISSION
ATLANTA REGIONAL OFFICE
Parkridge 85 North Building
3125 Presidential Parkway - Suite 300
Atlanta, Georgia 30340
(770) 452-3800**

AUG 23 2000

Mr. Dan Gillen
NRC Dam Safety Officer
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Gillen:

Enclosed is the final report of the inspection of the Comanche Peak Steam Electric Station. The staff of the Federal Energy Regulatory Commission (FERC) conducted the inspection on September 5, 1999, and prepared the report. Staff inspected the Safe Shutdown Impoundment Dam (SSID), portions of the reservoir rim, equalization canal, and general observation of the cooling water intake and discharge structures. All available instrumentation data were also reviewed.

The inspection revealed no conditions that represent an immediate threat to the safety of the dam. Several suggestions for improved dam maintenance and checking of instrumentation were made by FERC staff engineer Mr. William R. Ross at the meeting held subsequent to the inspection. These are listed below for your information.

1. As the surface rock on the outer shells of the SSID deteriorates, new rock will be required to repair deficient areas. Any new rock should be evaluated for durability and sized for fetch and wave run-up determined from the latest design criteria.
2. Piezometers should be tested and evaluated as to their operational status and the cause of the erratic readings above reservoir levels.
3. Survey base monuments should be checked to ensure the accuracy of the data.
4. The licensee should conduct periodic inspections and/or survey the underwater slopes of the SSID to ensure the quality of the outer shells.

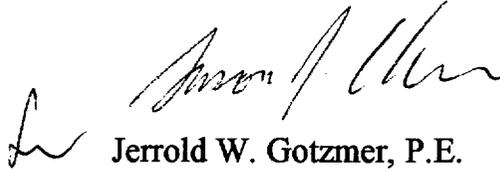
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Mr. Dan Gillen

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Thank you for your assistance during this undertaking. If there are questions about the report or its content, please contact Mr. Ross of this office at (770) 452-3780.

Sincerely,

A handwritten signature in cursive script, appearing to read "Jerrold W. Gotzmer".

Jerrold W. Gotzmer, P.E.
Director

Enclosure

**Operation Inspection Report
for
Nuclear Regulatory Commission
Inspected by
F E R C
Atlanta Regional Office**

Date of Inspection September 5, 1999

Dam (name) Safe Shutdown Impoundment Dam

Location Comanche Peak Steam Electric Station Grandbury, Texas
(River or reservoir) **(State)**

NRC Licensed Project Comanche Peak Steam Electric Station

Features of Dam and Impoundment Inspected Impoundment Dam and
Equalization Canal

Inspected by William R. Ross

Accompanied by Messrs. Carl Corbin, William Crowe, and Bruce Turner,
employees of the licensee, and Messrs. Daniel Rom and Scott Schwind,
representatives of the Nuclear Regulatory Commission.

Weather Clear, temperatures in the high 80's

Summary

This inspection covers the Safe Shutdown Impoundment Dam (SSID) within the Squaw Creek reservoir at the Comanche Peak Steam Electric Plant. The inspection included the SSID earth dam and equalization canal. No conditions were observed at the time of the inspection that should be considered an immediate threat to the safety of the dam or the nuclear facility.

A meeting was held subsequent to the inspection to discuss the inspection findings with representatives of the Comanche Peak Station and the Nuclear Regulatory Commission. Discussions included the testing of dam monitoring instrumentation and the possible future action regarding the degradation of the surface rock on both slopes of the dam.

Submitted _____



William R. Ross, P.E.

Project Description

The Safe Shutdown Impoundment Dam (SSID) was constructed to provide a 30-day source of emergency reactor cooling water. The site is located within the boundary of the Texas Utilities Electric (TU) nuclear power plant Comanche Peak Steam Electric Station between Grandbury and Glen Rose, Texas (Photograph 1). The SSID is a zoned earth and rockfill dam with an impervious core and upstream and downstream chimney filters (Figures 1 and 2). The dam forms a 39.8-acre subimpoundment within the Squaw Creek reservoir at a normal pool elevation of 775.0 feet National Geodetic Vertical Datum (NGVD). Crest elevation is 796.0 NGVD and the length is 1,500 feet. The maximum height is approximately 70.0 feet. The top elevation of the impervious core and adjacent filters is 784.0 feet NGVD. Both upstream and downstream slopes are 2.5 feet horizontal to 1 foot vertical (2.5:1). The minimum reservoir available for the Safe Shutdown cooling water is 382 acre-feet at pool elevation 770.0 feet N.G.V.D.

SAFE SHUTDOWN IMPOUNDMENT PERTINENT DATA

Reservoir:

| | |
|--------------------------------|-----------------------------|
| Normal water surface elevation | 775 feet NGVD |
| Surface area @ 775.0 ft NGVD | 39.8 acres |
| Volume @ 775.0 ft NGVD | 558 acre-feet |
| Surface area @ 770.0 feet NGVD | 30.8 acre-feet |
| Volume @ 770.0 feet NGVD | 382 acre-feet |
| Hazard Potential | High (per previous reports) |

Dam:

| | |
|-----------------|----------------|
| Type | Earth Rockfill |
| Length | 1,500 feet |
| Maximum height | 70 feet |
| Crest elevation | 796 feet NGVD |

A. Safety of the Project. During this inspection there were no deficiencies noted that should be considered as an immediate threat to the safety and stability of the Safe Shutdown Impoundment Dam (SSID). All of the project features were accessed by walking. The features inspected included the SSID, portions of the reservoir rim, equalization canal, and general observation of the cooling water intake and discharge structures. Figure 3 shows the location of photographs taken during this inspection.

1. Safe Shutdown Impoundment Dam. The dam crest did not display any settlement, instability, or significant erosion. The crest gravel road did not exhibit any significant ruts or problem areas from vehicular traffic (Photograph 2). The left (north) end of the crest had an area that indicated the ponding of rainfall runoff from the abutment (Photograph 3). At the time of this inspection, the ponding did not appear to pose an immediate danger to the integrity of the dam. However, the licensee representatives were informed that some regrading or modifying of the left abutment might be necessary to redirect rainfall runoff from accessing and ponding on the dam. The alignment of the SSID appeared normal with no deformations observed.

The slopes on the upstream (west\impoundment) side and downstream (east\Squaw Creek Reservoir) side appeared to be stable with no indications of movement, settlement, or instability observed (Photographs 4 and 5). Slope conditions underwater were not observed or surveyed; therefore, no determination of conditions below the reservoir or impoundment elevations were made during this inspection.

As noted during the FERC 1997 inspection, this inspection found the surface rock in the outside shells of the embankment to be subject to degradation. While no beaching or localized settlement appears to have occurred due to this condition, continued degradation of the rock could result in maintenance and possible stability problems. As in 1997, it was again recommended that when additional rockfill is required for slope repairs, the material should not be from the same source, and the licensee should conduct an evaluation of the rock for durability. Also discussed was the need for the licensee to inspect the rock slopes regularly for beaching, rock degradation, and slope instability. During the reporting period, the licensee conducted a survey of the rock shell slopes to ensure no detrimental conditions existed underwater.

Some minor vegetation was observed near the pond's waterline. The licensee representative stated that all vegetation would be removed when the dam is treated with a herbicide as part of the regular dam maintenance program.

The abutments at each end of the dam were free of erosion with no major areas of concern observed. All the abutment groins appeared to be in good condition. Some minor erosion was noted on the right upstream groin. The licensee representatives stated they were aware of

the condition and have been taking measures to correct and repair the area.

The intake structure for the emergency cooling water is located upstream of the dam's left abutment. On the Squaw Creek reservoir side of the SSID, a rock jetty separates and directs the main cooling water discharge away from the SSID and into the main reservoir. Flow into the Safe Shutdown intake structure and discharge from the main cooling water discharge does not appear to have a physical impact on the SSID.

a. Impoundment Rim. The impoundment rim is mostly lined with scrub trees and bushes. Some erosion along the rim was observed, but appeared to be limited to beaching of natural soils at the impoundment water elevation. The slope stability of the rim appeared adequate from the dam to the equalization canal. The impoundment intake structure is located upstream of the left abutment. Cooling water withdrawn at the intake structure from the SSID is circulated back into the impoundment farther upstream on the left rim.

b. Equalization Canal. The equalization canal separates the impoundment from the main Squaw Creek reservoir (Photograph 6). A concrete weir with a top elevation of 769.5 feet NGVD, retains the required volume of cooling water should the main reservoir be lost. A floating boom at the impoundment end of the canal keeps algae out of the impoundment. The impoundment intake also has a strainer on it to remove algae. Along the equalization canal, no deficiencies in slope stability or erosion were noted. Underwater conditions of the canal could not be determined; however, licensee representatives stated that sedimentation in the canal and reservoir was deemed acceptable in a 1997 inspection. The licensee has scheduled a sediment survey of the canal to be conducted every 10 years. The 10-year timeframe appears to be acceptable since the SSI and canal are isolated and have a small rainfall runoff area. Based upon the survey results, the licensee will take the necessary actions to remove excess sediment and any undesirable underwater debris.

2. Instrumentation. Initially, instrumentation at the SSID included four piezometers and eight settlement monuments (Photographs 7 and 8). Currently, the settlement monuments and three piezometers are monitored.

Piezometric levels P-I-1, P-II-1, and P-II-2 show piezometric levels consistently above the main reservoir and impoundment levels. Historically, the trends of Piezometers P-II-1 and P-II-2 match each other fairly close. P-I-1 shows higher piezometric levels and trends that generally do not match either the other piezometers or the reservoir levels. The accuracy of the three piezometers is suspect, particularly P-I-1. However, the readings do not appear to indicate a threat to the structural integrity of the dam. All the piezometers should be cleaned, tested and evaluated as to their operational status.

Influences from rain infiltration and piezometer design and installation should also be evaluated. The licensee stated that independent consulting firm Freese and Nichols will conduct a study in the year 2000.

A survey of the SSID settlement monuments was last conducted on June 26, 1998. The survey was compared to the 1996 and 1997 surveys and the 1983 baseline survey. The 1998 data had no change in the vertical or horizontal readings greater than +0.02 foot or -0.01 foot. Settlement since 1990 has been negligible with a total settlement since construction of about 0.12 foot. Horizontal deflection of the survey monument has been negligible since 1986 with a total deflection of about 0.12 to 0.14 foot. The changes are acceptable and within the expected range for a 70-foot-high rock filled dam. The licensee should also check the base monuments during the next survey to ensure the accuracy and reliability of the monitoring program.

3. Hazard Potential Classification. Based upon the existing hydrology of the SSID, it would be classified as a "Low" hazard potential structure since any breach would be contained in the larger Squaw Creek Reservoir. In the event of a breach, there would be no adverse impact on the surrounding lands or persons.

4. Consultant's Safety Inspection Reports. The licensee has employed consultants to conduct inspections in 1992, 1993, 1994, and 1995. The inspections by the licensee and its consultants appear adequate to find and correct dam safety deficiencies. Past inspections have noted the levels and behavior of the piezometers and deterioration of the rock on the outer slopes. Only the FERC 1997 investigation has recommended an investigation be conducted to determine the status of the piezometers and the cause of the erratic readings.

5. Licensee's Inspection Program. The licensee conducts dam safety inspections with licensee staff and consultants. Licensee personnel conduct informal inspections as part of the operation and maintenance program. A formal checklist has been established for the annual licensee dam inspection, and procedures for the inspection of the SSID are listed in the licensee's Document PPT-SX-7517, titled "Safe Shutdown Impoundment Inspection." The inspection program reveals the conditions also described in this report. The program appears sufficient to note any possible dam safety deficiencies.

B. Operation and Maintenance. The SSID appears to have been properly maintained and operated. The licensee's operation and maintenance program appears to be adequate for the SSID.

1. Dams, and Embankments. During this inspection, the dam, abutments, and groins did not display any major adverse maintenance problems. The crest is well protected with a gravel road surface. Erosion observed at the groin was not sufficient for any immediate

action by the licensee. Also the level of deterioration in the surface rock was not sufficient to require replacement. During the reporting period, the licensee reworked several areas to reduce erosion, standing water, and promote proper drainage.

The licensee representatives agreed to continue to regularly inspect the structures and repair or remove any adverse conditions as part of their regular maintenance program for the dam and embankments.

2. Spillway Gates and Standby Power. The project has no spillway gates; therefore, standby power for emergency gate operations is not required.

3. Power Plants. There is no hydro generating plant at this project.

4. Reservoir. The SSID is small (40 acres maximum). Some slight erosion is evident in the natural soil formations at the reservoir edge. The shoreline erosion is not sufficient to endanger the operational requirements of the impoundment. The impoundment, which has a design life of 40 years for sedimentation, and equalization canal are inspected annually by the licensee.

5. Records. Instrumentation data, construction, and design documents are maintained at the site per NRC requirements. Dam and embankment investigation and design data can be found in the licensee's technical specifications, licensing documents, design documents, and drawings. Instrumentation data and records, monitoring guidance, and inspection documentation can be found in past NRC inspection reports. Documentation appears adequate.

6. Emergency Action Plan (EAP). The NRC does not require nuclear facilities to have an EAP for "Low" hazard dam structures. The safe shutdown water impoundment at Comanche Peak Steam Electric Station is classified as a "Low" hazard structure. However, during this inspection the need for an EAP was discussed with the licensee and NRC representatives and it was mutually agreed that an EAP was not necessary. The SSID at Comanche Peak Nuclear Station is connected to the reservoir by an equalization canal. Therefore, the water elevation in the SSID is at the same elevation as the reservoir. Failure of any SSID structure will not have any adverse affect on the surrounding lands or persons. There are no toxic materials associated with the SSID that should pose an environmental hazard to the project or the public.

C. Environmental, Public Use, and Safety. The Safe Shutdown impoundment is closed to the public. No additional actions to protect life and property appear to be required.

1. Public Safety Plan. N/A.

2. Need for Action. None.

3. Environmental and Public Use Inspection. No environmental or public use or public safety problems were noted. Since the dam and the Safe Shutdown impoundment are closed to the public, no additional actions are needed to protect life and property.

D. Matters of Commission Interest.

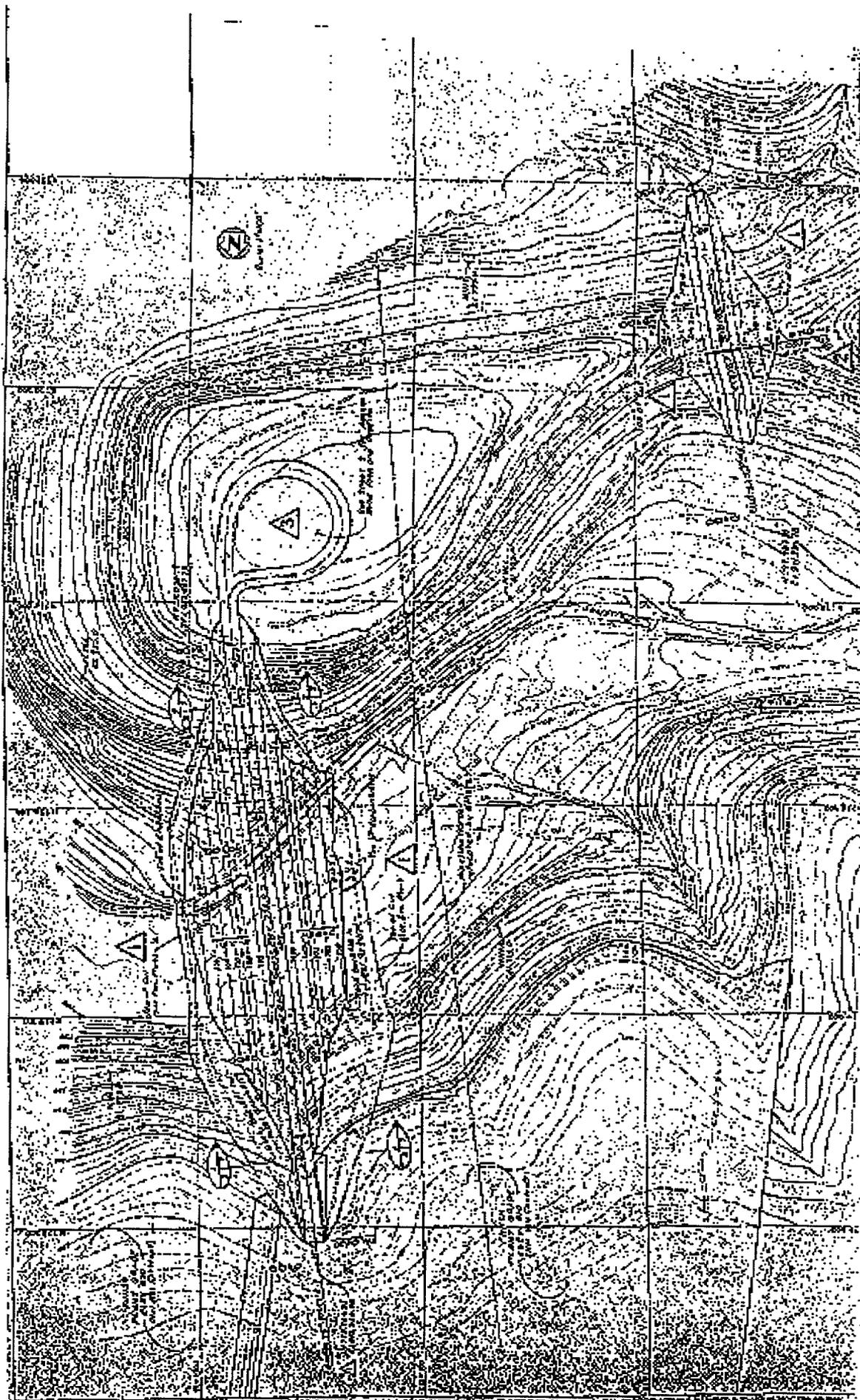
1. Additions, Betterments, Leases, Retirements, or Needed Extensions. None.

2. Requiring Commission Action. None.

3. Project Compliance. N/A.

E. Findings and Followup Actions. An exit meeting was held subsequent to the inspection to discuss the inspection findings with the licensee and NRC representatives. The results of the meeting and inspection were that no items were found that should adversely affect the safety or integrity of the SSID structures. The following comments were made at the exit meeting.

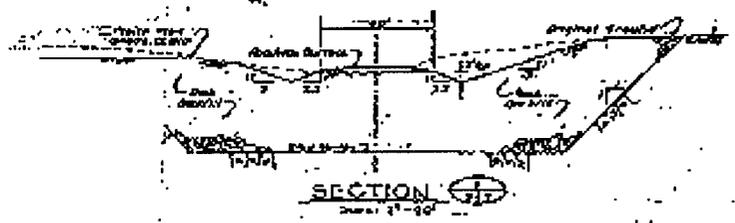
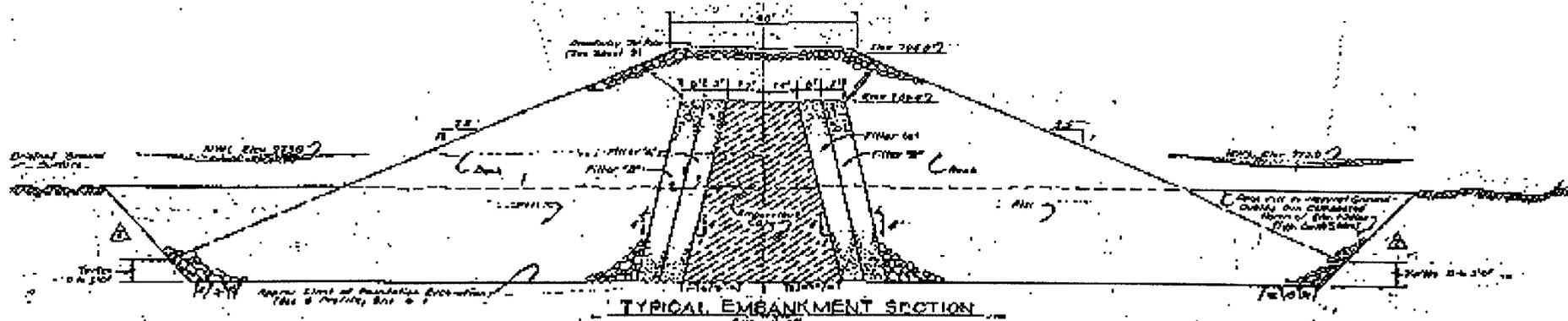
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3. Survey base monuments should be checked to ensure the accuracy of the data.
4. The licensee should conduct periodic inspections and/or survey the slopes underwater to ensure the quality of the outer shells of the SSID.



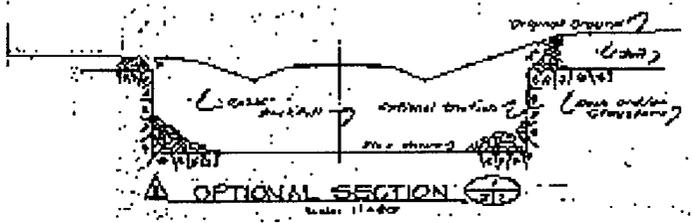
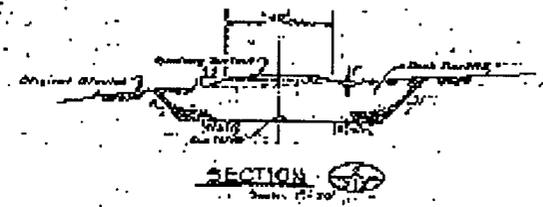
COMANCHE PEAK
STEAM ELECTRIC STATION

SAFE SHUTDOWN IMPOUNDMENT DAM GENERAL PLAN

FIGURE 1



△ Note: The distance in alignment of the end of Filter Zone A and Zone B, with study the proposed dam and the dam will shall be 2.5' each respectively.



**COMANCHE PEAK
STEAM ELECTRIC STATION**

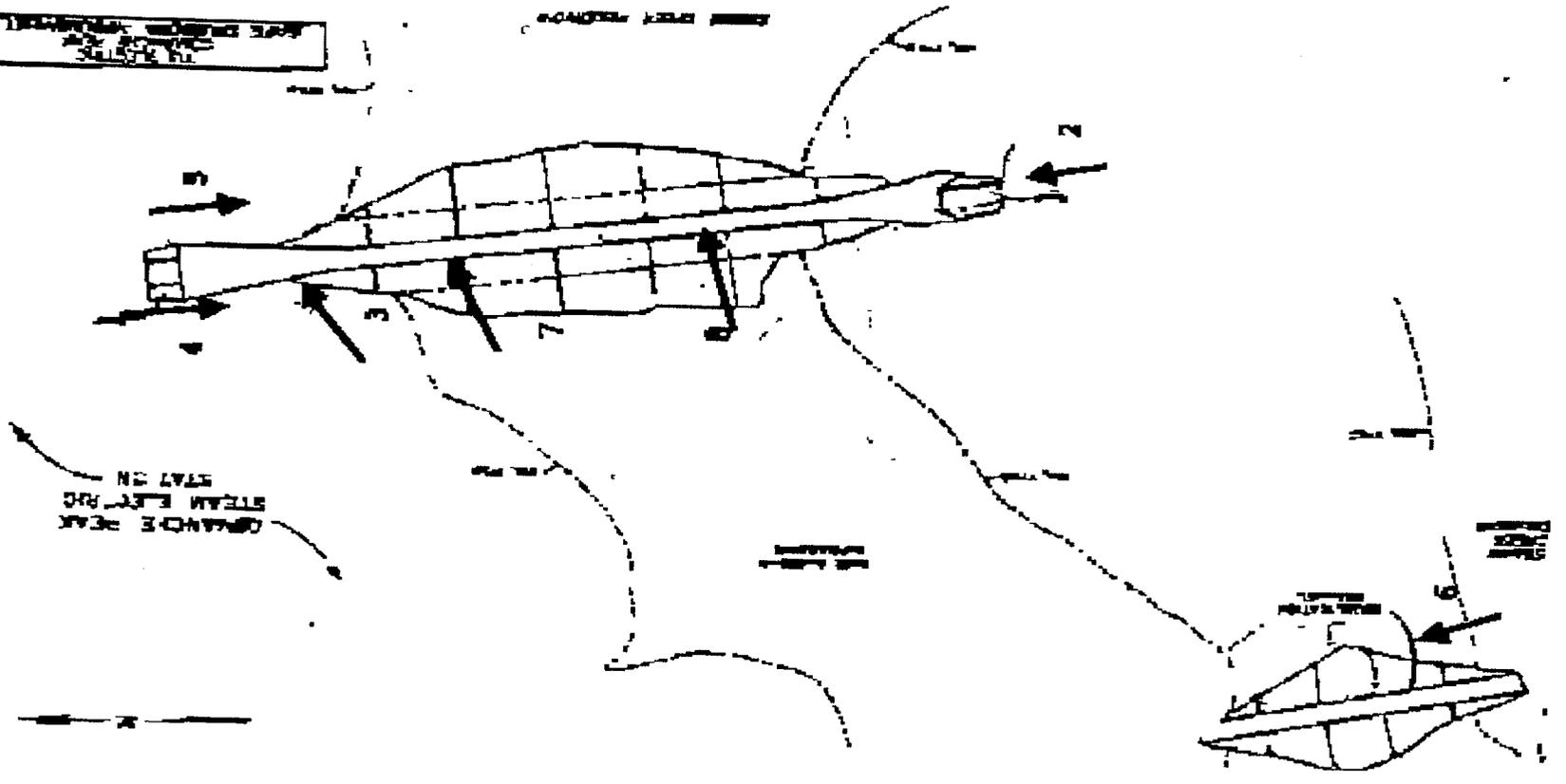
SAFE SHUTDOWN IMPOUNDMENT DAM SECTIONS

FIGURE 2

FIGURE 3

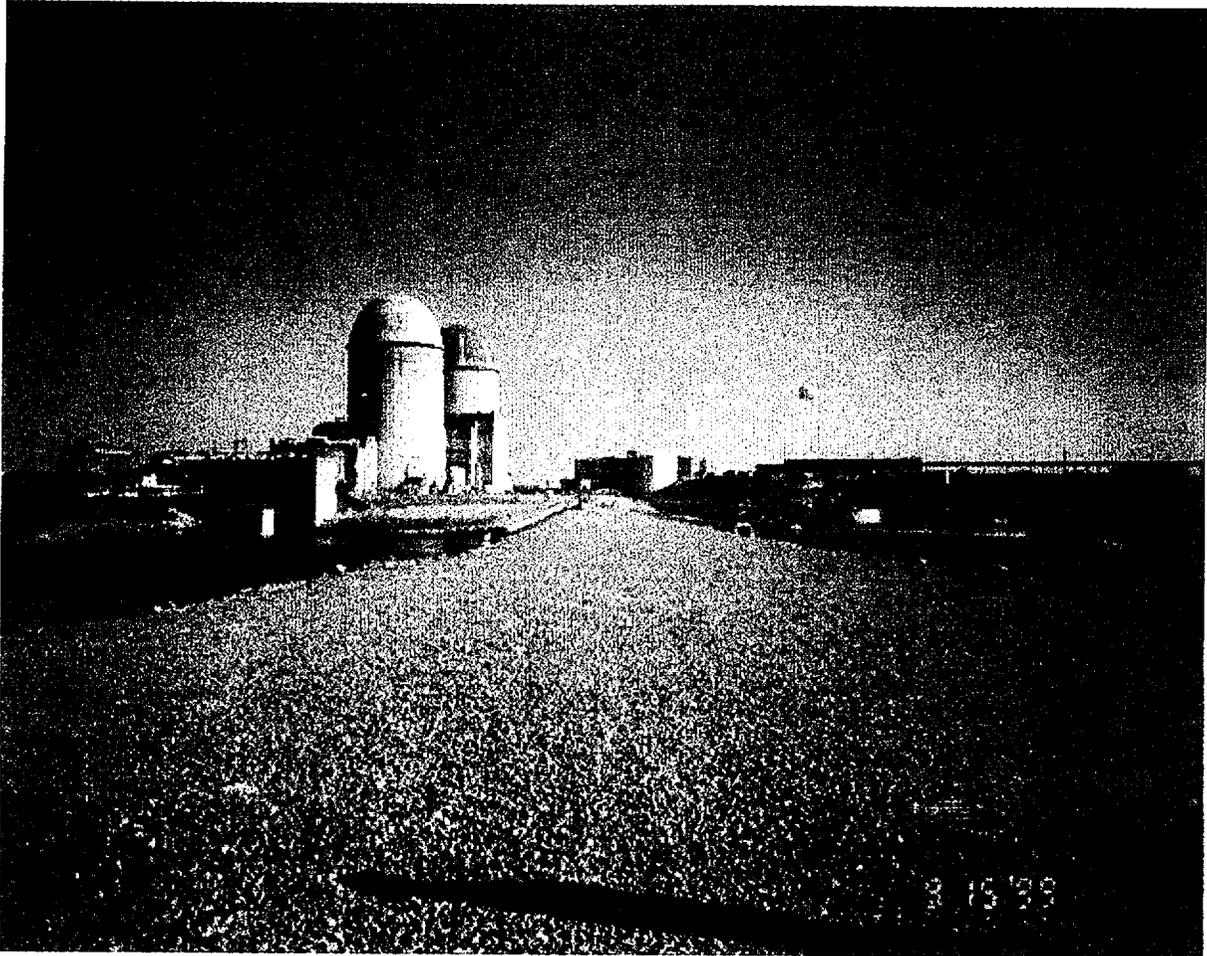
PHOTOGRAPH LOCATIONS

THE PHOTOGRAPH LOCATIONS
ARE INDICATED BY THE
ARROWS





Photograph 1 Project sign located on the main entrance road.



Photograph 2 Gravel road on the SSID crest. The upstream slope (west\impoundment) side is on the left. The downstream slope (east\Squaw Creek Reservoir) is on the right. The Comanche Peak nuclear station is in the background.



Photograph 3 Area located on the left end of the SSID crest that ponds rainfall runoff from the left abutment. Note the vegetation.



Photograph 4 Riprapped upstream slope of the SSID.



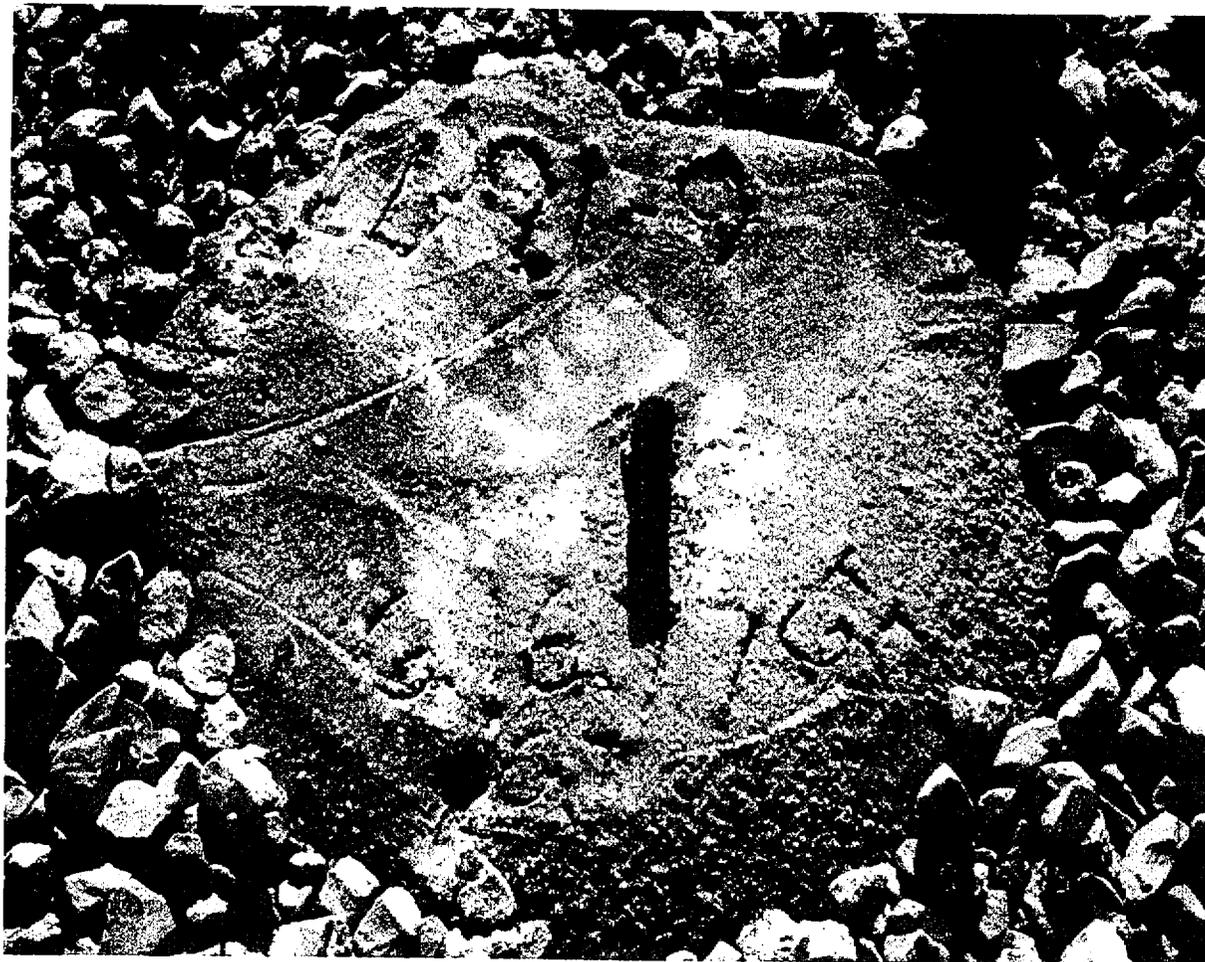
Photograph 5 Riprapped downstream slope of the SSID.



Photograph 6 The equalization canal looking towards the impoundment. The floating boom at the end of the canal keeps algae out of the impoundment.



Photograph 7 Typical piezometer located on the SSID crest to monitor the phreatic line.



Photograph 8 Typical survey monument located on the SSID crest to monitor movement.