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February 16, 1994

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Group Vice President

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
FAILED BOLTING ON PACIFIC AIR PRODUCTS
COMPANY GRAVITY DAMPERS
10CFR21 REPORTABLE DEFICIENCY

Gentlemen:

On January 19, 1994, TU Electric notified the NRC of an issue regarding failed bolting on Pacific Air Products Company (PAPCO) gravity dampers via facsimile. Attached is the report which satisfies the reporting requirements of 10CFR21.

The report has been formatted in a manner that corresponds to the specific information requested by subparts (i) through (viii) of paragraph 21.21(c)(4) of the regulation. This is exclusive of that portion of subpart (vi) regarding names and locations of other facilities which may be affected, as this information is not known to TU Electric and subpart (viii) in its entirety regarding the advice that has been or will be given to other facilities. Such advice would be dependent on the facility specific use of the subject components.

A copy of this report will be sent to Reed National Air Products, which is now the parent company of PAPCO.

Sincerely,

William J. Cahill, Jr.

GLM:bm
ATTACHMENT

cc: Mr. L. J. Callan, Region IV
Mr. L. A. Yandell, Region IV
Resident Inspectors, CPSES

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10CFR21 REPORTABLE DEFICIENCY INVOLVING
FAILED BOLTING ON PAPCO GRAVITY DAMPERS

(i) Information supplied by:

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(ii) The facility is the Comanche Peak Steam Electric Station (CPSES) Units 1 and 2. The basic components involved are the $\frac{1}{2}$ -20 X $\frac{3}{4}$ " bolts connecting the damper blades to the shafts on diesel generator room vent fan discharge gravity dampers.

(iii) The gravity dampers containing the bolting were supplied to CPSES by the manufacturer, PAPCO.

(iv) Description

The bolting material in question involves $\frac{1}{2}$ " bolts, $\frac{3}{4}$ " long, 20 UNC, used to attach the 16 gauge sheet metal damper blades to the $\frac{3}{4}$ " diameter shafts on PAPCO gravity dampers. The gravity dampers are model number SL 100 BPHD-N. The bolting material is identified on PAPCO drawings as commercial grade with certifications to ASTM standards.

Site Specific Summary

During a system walkdown on October 1, 1993, it was noted that some of the Unit 2 diesel generator room vent fan discharge gravity dampers were partially open with the associated fans off. The gravity dampers open when the diesel ventilation fans start to provide sufficient air flow to cool the diesel generator room and close to prevent back flow through an idle fan. Further inspection found that five of the eight large capacity (50,000 CFM) dampers had at least one blade broken loose from the shaft due to failure of the bolts connecting the blades to the shafts.

A documentation review noted two previous similar bolt failures involving a Unit One diesel generator room vent fan discharge gravity damper and a primary plant supply fan discharge gravity damper. All of the bolt failures were on dampers which are downstream of a high horsepower vane axial fan (40HP diesel generator room ventilation fans and a 60HP primary plant supply fan).

Analysis of the failed bolts was performed by CPSES engineering in order to determine the cause of the failures. The analysis determined that the bolts failed in a bending mode under dynamic loading conditions. Some of the holes in the damper blade material were oversized allowing one side of the bolt and lock washer to be unsupported, imparting excessive bending stresses into the bolt. Also, some of the bolts lacked lock washers and/or adequate preloading, allowing the bolts to loosen. The prying action of the damper blade during opening and closing imparted excessive bending stresses to the bolt.

Based on the above, TU Electric concluded that inadequate design/manufacturing of these bolts could have resulted in decreased air flow from the diesel generator rooms which could have rendered the diesel generators inoperable due to excessive room temperature. Therefore, this condition is considered a defect as defined in 10CFR21.

Site Specific Safety Implications

The failed bolting actually discovered on the diesel generator room vent fan discharge gravity dampers did not make the dampers incapable of performing their safety function. Using the conservative assumption that all loose blades identified would become stuck in the closed position, thereby decreasing the airflow through the dampers a proportionate amount, an evaluation was performed which concluded that sufficient airflow would be available to maintain the diesel generator room temperatures within design limits; however, if enough blades were to have become loose due to this condition, the dampers could have been incapable of performing their safety related function.

- (v) On December 14, 1993, following the completion of a failure analysis to determine the root cause of the failed bolting, TU Electric identified that this condition was potentially reportable under the provisions of 10CFR21.
- (vi) TU Electric has identified 92 safety related dampers, in addition to those discussed in (iv) above, which may be susceptible to failure of the bolting connecting the damper blades to the shafts.

<u>Damper Tag No.</u>	<u>Damper Function</u>
CP1-VADPGU-03	Electrical Area Fan Cooler Fan 1-17/1-18 Discharge Gravity Damper
CP1-VADPGU-04	Electrical Area Fan Cooler Fan 1-17/1-18 Suction Gravity Damper
CP1-VADPGU-08	Electrical Area Fan Cooler Fan 1-15/1-16 Discharge Gravity Damper

<u>Damper Tag No.</u>	<u>Damper Function</u>
CP1-VADPGU-10	Electrical Area Fan Cooler Fan 1-15/1-16 Suction Gravity Damper
CP1-VADPGC-23	High Pressure Chemical Feed Room Exhaust Gravity Damper
CP1-VADPGC-24	High Pressure Chemical Feed Room Supply Gravity Damper
CP1-VADPGC-25	High Pressure Chemical Feed Room Exhaust Gravity Damper
CP1-VADPGU-38	Battery Room Exhaust Fan Discharge Gravity Damper
CP1-VADPGU-39	Battery Room Exhaust Fan Discharge Gravity Damper
CP1-VADPGU-40	Battery Room Exhaust Fan Discharge Gravity Damper
CP1-VADPGU-41	Battery Room Exhaust Fan Discharge Gravity Damper
CP1-VADPGU-42	Battery Room Exhaust Fan Discharge Gravity Damper
CP1-VADPGU-43	Battery Room Exhaust Fan Discharge Gravity Damper
CP1-VADPGU-46	Diesel Generator Fuel Oil Day Tank Area Vent Fan Gravity Damper
CP1-VADPGU-47	Diesel Generator Fuel Oil Day Tank Area Vent Fan Gravity Damper
CP1-VADPGU-48	Diesel Generator Room Vent Fan Discharge Gravity Damper
CP1-VADPGU-49	Diesel Generator Room Vent Fan Discharge Gravity Damper
CP1-VADPGU-50	Diesel Generator Room Vent Fan Discharge Gravity Damper
CP1-VADPGU-51	Diesel Generator Room Vent Fan Discharge Gravity Damper
CP1-VADPGU-52	Diesel Generator Room Vent Fan Discharge Gravity Damper
CP1-VADPGU-53	Diesel Generator Room Vent Fan Discharge Gravity Damper
CP1-VADPGU-54	Diesel Generator Room Vent Fan Discharge Gravity Damper
CP1-VADPGU-55	Diesel Generator Room Vent Fan Discharge Gravity Damper
CP1-VADPGU-60	Electrical Area Fan Cooler Fan 1-17 Discharge Gravity Damper
CP1-VADPGU-61	Electrical Area Fan Cooler Fan 1-18 Discharge Gravity Damper
CP1-VADPGU-62	Electrical Area Fan Cooler Fan 1-15 Discharge Gravity Damper
CP1-VADPGU-63	Electrical Area Fan Cooler Fan 1-16 Discharge Gravity Damper

<u>Damper Tag No.</u>	<u>Damper Function</u>
CP2-VADPGU-03	Switchgear Room Fan Cooler Fan 2-17/2-18 Discharge Gravity Damper
CP2-VADPGU-04	Switchgear Room Fan Cooler Fan 2-17/2-18 Suction Gravity Damper
CP2-VADPGU-08	Switchgear Room Fan Cooler Fan 2-15/2-16 Discharge Gravity Damper
CP2-VADPGU-10	Switchgear Room Fan Cooler Fan 2-15/2/16 Suction Gravity Damper
CP2-VADPGC-22	High Pressure Chemical Feed Room Ventilation Supply Gravity Damper
CP2-VADPGC-23	High Pressure Chemical Feed Room Ventilation Exhaust Gravity Damper
CP2-VADPGC-24	High Pressure Chemical Feed Room Ventilation Supply Gravity Damper
CP2-VADPGC-25	High Pressure Chemical Feed Room Ventilation Exhaust Gravity Damper
CP2-VADPGU-38	Battery Room Exhaust Fan Discharge Gravity Damper
CP2-VADPGU-39	Battery Room Exhaust Fan Discharge Gravity Damper
CP2-VADPGU-40	Battery Room Exhaust Fan Discharge Gravity Damper
CP2-VADPGU-41	Battery Room Exhaust Fan Discharge Gravity Damper
CP2-VADPGU-42	Battery Room Exhaust Fan Discharge Gravity Damper
CP2-VADPGU-43	Battery Room Exhaust Fan Discharge Gravity Damper
CP2-VADPGU-46	Diesel Generator Fuel Oil Day Tank Area Vent Fan Gravity Damper
CP2-VADPGU-47	Diesel Generator Fuel Oil Day Tank Area Vent Fan Gravity Damper
CP2-VADPGU-60	Switchgear Room Fan Cooler Fan 2-17 Discharge Gravity Damper
CP2-VADPGU-61	Switchgear Room Fan Cooler Fan 2-18 Discharge Gravity Damper
CP2-VADPGU-62	Switchgear Room Fan Cooler Fan 2-15 Discharge Gravity Damper
CP2-VADPGU-63	Switchgear Room Fan Cooler Fan 2-16 Discharge Gravity Damper
CPX-VADPGC-01	Containment Hydrogen Purge Exhaust Fan Discharge Gravity Damper
CPX-VADPGU-01	Control Room Emergency Pressurization Unit Gravity Damper
CPX-VADPGC-02	Containment Hydrogen Purge Exhaust Fan Discharge Gravity Damper
CPX-VADPGU-02	Control Room Emergency Pressurization Unit Gravity Damper

<u>Damper Tag No.</u>	<u>Damper Function</u>
CPX-VADPGU-03	Control Room Emergency Filtration Unit Gravity Damper
CPX-VADPGU-05	Control Room Air Conditioning Unit Gravity Damper
CPX-VADPGU-06	Control Room Air Conditioning Unit Gravity Damper
CPX-VADPGC-07	Primary Plant Vent Supply Fan Discharge Gravity Damper
CPX-VADPGC-08	Primary Plant Vent Supply Fan Discharge Gravity Damper
CPX-VADPGC-09	Primary Plant Vent Supply Fan Discharge Gravity Damper
CPX-VADPGC-10	Primary Plant Vent Supply Fan Discharge Gravity Damper
CPX-VADPGC-11	Primary Plant Vent Supply Fan Discharge Gravity Damper
CPX-VADPGC-12	Primary Plant Vent Supply Fan Discharge Gravity Damper
CPX-VADPGC-13	Primary Plant Vent Supply Fan Discharge Gravity Damper
CPX-VADPGC-14	Primary Plant Vent Supply Fan Discharge Gravity Damper
CPX-VADPGC-15	Auxiliary Bldg. Vent Equipment Room Supply Fan Gravity Damper
CPX-VADPGC-16	Auxiliary Bldg. Vent Equipment Room Supply Fan Gravity Damper
CPX-VADPGC-17	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGU-17	Control Room Air Conditioning Unit Discharge Gravity Damper
CPX-VADPGC-18	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGU-18	Control Room Air Conditioning Unit Discharge Gravity Damper
CPX-VADPGC-19	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-20	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-21	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-22	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-23	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-24	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-25	Primary Plant Vent Exhaust Fan Discharge Gravity Damper

<u>Damper Tag No.</u>	<u>Damper Function</u>
CPX-VADPGC-26	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-27	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-28	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGU-28	Control Room Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-29	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGU-29	Control Room Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-30	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGU-30	Control Room Kitchen and Toilet Exhaust Fan Gravity Damper
CPX-VADPGC-31	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGU-31	Control Room Kitchen and Toilet Exhaust Fan Gravity Damper
CPX-VADPGC-32	Primary Plant Vent Exhaust Fan Discharge Gravity Damper
CPX-VADPGC-33	Auxiliary Bldg. Vent Equipment Room Exhaust Fan Gravity Damper
CPX-VADPGC-34	Auxiliary Bldg. Vent Equipment Room Exhaust Fan Gravity Damper
CPX-VADPGU-34	UPS Air Conditioning Unit Discharge Gravity Damper
CPX-VADPGU-35	UPS Air Conditioning System Booster Fan Inlet Gravity Damper
CPX-VADPGU-36	UPS Air Conditioning Unit Discharge Gravity Damper
CPX-VADPGU-37	UPS Air Conditioning System Booster Fan Inlet Gravity Damper

(vii) TU Electric has replaced the failed bolts with higher strength bolts. The Unit One diesel generator room vent fan discharge gravity dampers have been inspected and no broken bolts were identified. All of the other safety-related gravity dampers subject to this condition are being inspected to assure that other broken bolts do not exist. If broken bolts are identified during the inspections, the bolts will be replaced with higher strength bolts.

(viii) Not applicable.