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REGION V

PACIFIC AIR PRODUCTS CO.
3133 West Harvard Street · Santa Ana, California 92704 · P.O. Box 5277 · Telephone 714/557-1710 · Telex No. 67-8319

November 23, 1982

Log No. 5445-H-76

Nuclear Regulatory Commission Region V
1450 Mavia Lane
Walnut Creek, California 94596

Attention: Mr. Jesse L. Crews, Director
Office of Inspection & Enforcement

Regarding: Report of Possible Defect
Title 10, Chapter 1, Part 21 C.F.R.-Energy

Subject: Possibility of Bettis Pneumatic Acutators Expelling Mobil 28 Lubricant in the Exhaust Air Through An ASCO Solenoid With Ethylene Propylene Seals, Causing Seals to Swell and Solenoid to Stick.

Gentlemen:

We are preparing to supply dampers to Seabrook N.P.S. Units 1 & 2. The dampers were planned to have Bettis Actuators (NCB315, NCB525, etc.) and ASCO Solenoids (NP8320A184E, NP831654E) with Ethylene Propylene seals. The housing of the Bettis scotch-yoke mechanism contains a generous amount of Mobil 28 lubricant. In our concern about the swelling of the "O" rings in the actuator, we inquired about the possibility of the actuator exhaust cycle ejecting some of the Mobil 28 lubricant through (into) the ASCO solenoid valve.

NRC IE Information Notice No. 80-11 cautions about the effect of petroleum based lubricants on ASCO NP valves with ethylene propylene seals and recommends viton elastomers.

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On their shipping tag, ASCO cautions about oil causing the seals to swell (ethylene propylene seals).

However, ASCO's qualification Document ASQ 2168/TR Rev. A limits the application of valves with viton to radiation levels of 20 megarads if a shifting of position will be required. Ethylene propylene must be used for radiation exposures from 20 to 50 megarads.

In the Seabrook N.P.S. application we are using solenoids with viton elastomers for low radiation levels. However, for radiation levels of 44 megarads, we are using Bettis actuators with ASCO solenoids having elthylene propylene seals. Our concern about the possibility of the expulsion of the Mobil 28 lubricant caused us to request certification from Bettis that no lubricant would be expelled. In Para. 3 of Bettis' reply of 11/11/82 (copy attached) it is stated that they cannot certify that no lubricant will be expelled.

Pacific air Products has not finished a review of this matter. The Bettis actuators we planned to furnish for Seabrook use only fifty pounds air versus a possible 120 pounds air on other applications. The fifty pound air would have a much lower exhaust velocity. Pacific Air Products has not shipped any of these Bettis/ASCO ethylene propylene combinations; therefore, no nuclear facility is presently endangered by our product. We have done some testing of the Bettis actuators for lubricant expulsion and found no lubricant being expelled. We are continuing our evaluation and would be interested in any information that is available.

Sincerely,

PACIFIC AIR PRODUCTS CO.

Frank Neal

Frank Neal
Vice President

Enclosure: Bettis Letter 11/11/82 (Bob Kane)

FN:dg

G H BETTIS
A Galveston-Houston Company

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November 11, 1982

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PACIFIC AIR PRODUCTS

Pacific Air Products Co.
3133 West Harvard
P. O. Box 5277
Santa Ana, California 92704

Attn: Frank Neal

Re: PAPCO P.O.'S 13559, 11793, 13985.
Your questions on construction and performance of G. H. Bettis NCB actuators.

Dear Frank:

The opportunity to talk with you about the use of Bettis NCB actuators in your product has cleared up many of the questions that I had. These actuators were designed to be fast in their stroking speed. Because the actuators minimum internal pressured volume is significant when compared to its maximum pressured volume there is an initial increment of pressure activated travel that can not be controlled by a restriction to the flow rate of actuator air. However, total travel time can be controlled in this fashion. Please refer to your copy of Bettis Nuclear Qualification test report as defined by IEEE 323-1974, Vol. I, page 13, for a graphic illustration of the NCB 520-SR80 high initial stroking speed.

The qualification of Bettis actuators to IEEE 323-1974 included the use of EP seals and Mobile 28 lubricant. This combination does not have as low a stick-slip friction characteristic as a G. H. Bettis commercial actuator of same type and size. Therefore, there is a pressure build up required in the actuator to overcome the spring preload and static friction of the seals. This characteristic increases the speed that the actuator strokes for the first increment of travel. Long periods of inactivity increase the static friction of the seals as they form and intimate contact with mating surfaces.

With regard to certification that Mobile 28 will not be expelled from the actuator through the actuators pressure air port, we will be unable to provide this certification. The actuators internal moving parts are lubricated by surface application of lubricant with no means provided to isolate lubricant from the pressure port or pressurized high velocity air.

The relubrication of actuators at your sight by a G. H. Bettis serviceman was done in accordance with the IEEE qualification using the correct lubricants.

Frank, because the correct lubricants and seals were used originally and during rework of these actuators, there will be no formal reply to item (3) in your letter of October 22, 1982.

G. H. Bettis will do what we can within the bounds of our qualification to minimize the rapid stroking speed of these actuators.

I presented your letter of October 22, 1982 and the substance of our telephone conversation of November 9, 1982 to the G. H. Bettis staff. Their conclusion was as I have stated. There was a discussion as to whether this was a reportable problem as defined by 10CFR-21. Since the rapid movement of the actuator is a characteristic of its operation it was determined not to be reportable.

Sincerely,
G. H. BETTIS COMPANY

Bob Kane
Director, Engineering & Research

BK:jw
cc: Bill Bitterman
Norm Quam
Kelly Mama