



General Electric Company  
175 Curtner Avenue, San Jose, CA 95125

October 3, 1989  
GBSLTR.050  
MFN-073-89

U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D. C. 20555

**Subject:** Germane to Safety - Crosby Main Steam Safety/Relief Valve "Dogs"

**Attention:** Carl H. Berlinger, Chief  
Generic Communications Branch

Please find the attached memo of my telephone call to you of October 3, 1989. The call provided information about Crosby Main Steam Safety/Relief Valve "Dogs".

Very truly yours,

G. B. Stramback  
Safety Evaluation Programs Manager

Attachment

cc: L. S. Gifford (GE-Rockville)  
R. C. Mitchell  
PRC File

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PDR PT21 EMVGENE  
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## MEMO OF TELEPHONE CALL

DATE: October 3, 1989  
TIME: 1:30 PM  
PERSON CALLING: G. B. Stramback  
PERSON CALLED: Carl Berlinger (NRC-NRR, 301-492-1168)  
SUBJECT: Germane To Safety Crosby Main Steam Safety/Relief Valve "Dogs"

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Carl Berlinger was called in order to inform the NRC of a condition determined to be not reportable but considered to be Germane-to-Safety. This conclusion is based upon GE completing its evaluation as to reportability under 10 CFR Part 21.

### BACKGROUND

Two different Owners of BWR's in which Crosby main steam safety relief valves (SRV's) are installed have reported that a component of the valve lifting mechanism on one of their SRV's (one from each plant) fractured during in-service surveillance and start-up testing (cold testing). The failures occurred when there was no pressure on the system. System pressure assists in the valve opening and reduces the stress on the component with the reported failures. The component, called a "dog", is a Safety Related part of the electro-pneumatic actuator lifting mechanism used to open the SRV (see attached Figure 1). Failure of the dog prevents the SRV from operating in the pressure relief mode of operation in response to an external manual or automatic opening signal (e.g., Automatic Depressurization System or Alternate Shutdown functions). However the safety valve spring controlled overpressure relieving function of the SRV is not affected by failure of the dog (the pressure relief function still works even with a failed dog). No dogs have failed during plant operation.

The Crosby SRV's in question are Style HB-65-BP, size 6xRx10 and Style HB-65-DF, size 8xRx10. The dog is identified as Piece Number 38 on Assembly Drawings identified in Crosby Instruction Manuals I-11069 and I-11070 (GE Vendor Print File Numbers 6115-18-2 and 6114-18-4). Crosby SRV's are installed at nine BWR plant sites. Some of these valves have been in service since 1978.

### BASIS

Based on engineering analysis it has been concluded that a substantial safety hazard does not exist. To date only two dogs supplied to customers have failed, and those occurred during testing wherein stresses to open the valve are appreciably higher than during reactor power operation when the reactor pressure would help open the valve (reduced stress on the dog). The most challenging safety demand for this valve is during a hypothetical small break LOCA while at power and assuming the single worst additional failure of the High Pressure Emergency Core Cooling System. In this scenario a realistic analysis shows that the equivalent of three SRV's are required to depressurize the reactor and allow the Low Pressure Systems to refill the vessel before fuel limits are challenged. Since there have been no dog failures during power operation, the dog is expected to function as anticipated to accomplish the depressurization function.

Metallurgical examination of the two failed parts revealed the material to be brittle and out of specification for chemistry (high sulphur in the steel and sulfides at the grain boundaries). Examination of all of the dogs at one plant showed 9 out of 25 dogs to be out of specification, thereby vulnerable to failure during cold testing.

## MEMO OF TELEPHONE CALL (Cont.)

### CORRECTIVE ACTIONS AND PREVENTIVE MEASURES

GE has sent out RICSIL #044 (June, 1989) to alert all BWR utilities of the issue and requesting failure information from the nine utilities with Crosby SRVs; no additional failures have been identified since this action. This letter includes a GE recommended sampling technique and acceptable metallurgical properties for the dog. GE is in the process of notifying the utility owners of these GE recommendations.

To assure safe operation of the plant at least three good SRVs should be in ADS locations in each plant. Chemistry samples should be taken of all spares such that out-of-chemistry parts are replaced and ready for installation at the next refueling outage. In-service parts should be removed at the next refueling outage, samples taken, and out-of-chemistry dogs replaced before the valves are returned to service.

#### GE Recommendations:

- 1- Perform metallurgical evaluations of spares and identify SRVs with dogs confirmed to meet the 0.06% maximum sulfur content specified in ASTM-A-148. The chemical sample must be taken at least 0.05 inches below the heat-treated surface of the dog to avoid surface effects (staying within the limits of Figure 2, attached). A hardness test should also be taken at the same depth as the chemical analysis. Reject all dogs which exceed the specified sulfur content. The evaluations should be done on a schedule commensurate with installing valves with confirmed acceptable sulfur content at the next refueling outage.
- 2- At the next refueling outage, perform metallurgical evaluations of the remainder of the SRVs (in-service SRVs) as discussed in 1-, above, to identify those with dogs confirmed to meet the sulfur content of ASTM-A-148 (0.06% max.).
- 3- Assure that at least three of the ADS/SRVs have dogs with confirmed acceptable sulfur content before start-up from the next refueling outage. Install as many SRVs with good dogs as possible considering an expedited replacement part schedule.
- 4- By the second refueling outage after notification, eliminate all dogs which fail to meet the sulfur content specified in ASTM-A-148 in a manner that will preclude them from being reinstalled.

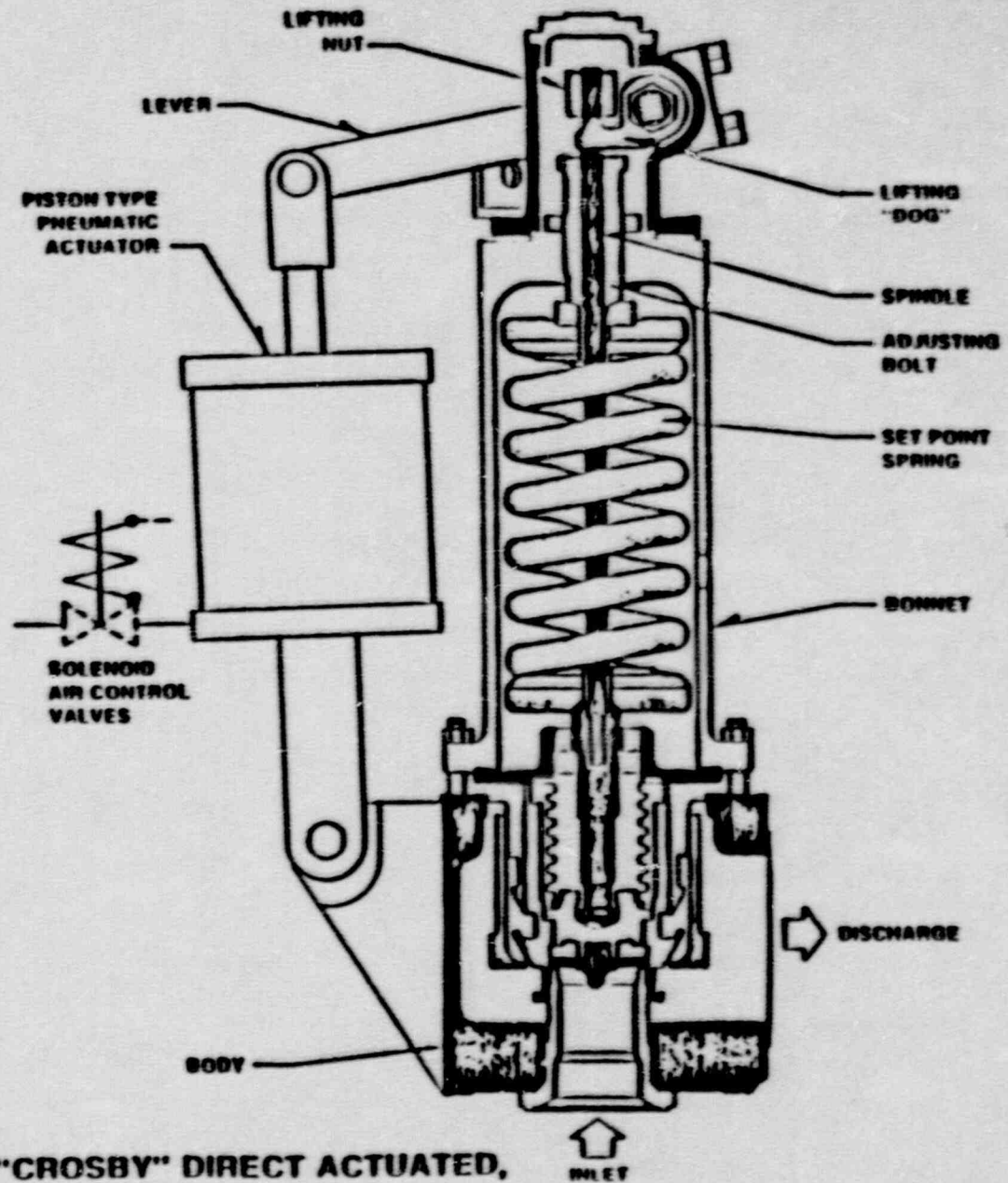
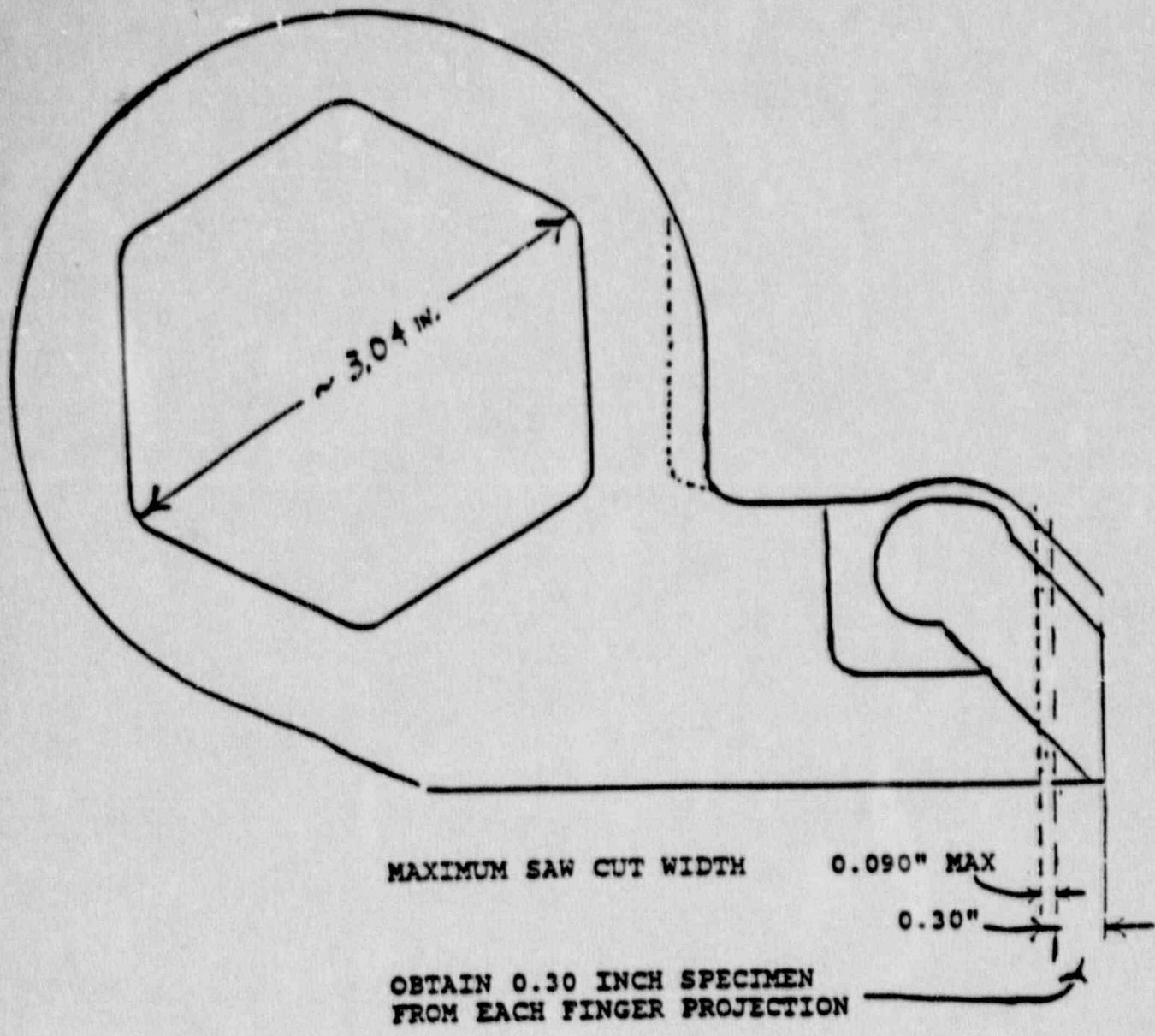


FIGURE 1. "CROSBY" DIRECT ACTUATED, SAFETY/RELIEF VALVE



NOTE: DO NOT OVERHEAT SAMPLE WHEN CUTTING  
 USE COOLANT IF NECESSARY.  
 MAINTAIN SAMPLE IDENTITY.

FIGURE 2. DETAIL SKETCH FOR CUTTING SAMPLE FROM DOG



**GE Nuclear Energy**

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Office of Nuclear Reactor Regulation  
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