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SUBJECT: BLANKET PRESSURIZER LEVEL CHANGE WHEN DRAINING
CONDENSATE FROM THE BLANKET HEAT EXCHANGER

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FROM: R. R. Wiethaup and R. Van Winkle

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During the oxygenated water runs, heat was supplied to the system by high-pressure steam from a package boiler. Condensate was to have been removed from the heat exchanger shell by a steam trap. Unfortunately, the blanket side steam trap leaked and it was necessary for the operator to control the condensate level in the blanket heat exchanger by periodically opening drain valve HV-540 for about 15 sec. It was noticed that whenever this was done, the steam pressure dropped from 940 to 920 psig (PR-551) and the blanket pressurizer level dropped about 8% on LR-245.

The simultaneity of these events indicates a causal connection between them. Therefore, two proposed mechanisms have been examined to see if they explain the phenomena.

In either case, it is proposed that the steam stays saturated and, therefore, the drop in pressure is accompanied by a drop in temperature. In Case 1, it was assumed that the temperature of the tube-side water in the heat exchanger was reduced the same amount as the steam. The contraction in volume would cause a drop in level of 5% on LR-245, vs an observed drop of 8%. In Case 2, it was assumed that the blanket water that passed through the heat exchanger during the 15-sec period was cooled. The contraction in volume would cause a drop in level of 13% on LR-245.

It is concluded that the drop in pressurizer level is caused by the drop in steam pressure while bleeding condensate from the heat exchanger.

R. Van Winkle