

AmerGen

An Exelon/British Energy Company

Clinton Power Station

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October 31, 2001

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Report of Potential Operation in Excess of Licensed Thermal Power Level

On October 5, 2001, the plant was in Mode 1 (POWER OPERATION) at about 100 percent reactor [RCT] power. At about 1450 hours, Clinton Power Station (CPS) concluded that the unit may have operated at a power level in excess of the Facility Operating License Condition 2.C (1), Maximum Power Level (i.e., 2894 megawatts thermal). At about 1605 hours, CPS notified the NRC Operations Center about the condition in accordance with Operating License Condition 2.G. This issue was discovered during Exelon and General Electric (GE) reviews of BWR industry operating experience data for main steam carryover.

The basis for the notification to the NRC was a GE document dated September 2001 and titled "Impact of Steam Carryover Fraction on Process Computer Heat Balance Calculations." The document reports on a non-conservative assumption for the moisture carryover fraction used in the process computer [CPU] for calculation of core thermal power and the resulting impact from this error. The moisture carryover fraction is the fraction of flow leaving the reactor pressure vessel [RPV] still in the liquid state. The moisture carryover fraction used in the CPS process computer assumes that the steam at the inlet to the main steam [SB] lines has a 0.1% moisture content. Using the 0.1% value, the process computer's heat balance calculation reduces the calculated energy to reflect that the assumed moisture would have less energy per pound than evaporated steam. As a result the calculated thermal power would be less than the actual thermal power if the moisture carryover is in fact less than the 0.1% assumed.

The GE report identifies that industry data indicates that the assumed carryover fraction of 0.1% should be closer to zero and is therefore non-conservative for the GE Boiling Water Reactor (BWR) 4, 5, and 6 designs. A review of CPS test data for moisture carryover testing performed on May 21, 2001, found a moisture carryover value of 0.0046% and for testing performed on October 4, 2001, found a moisture carryover value of 0.0020 %. These values are consistent with a number of other newer BWRs.

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CPS Engineering determined that the test data induced an estimated bias of approximately 2.4 megawatts thermal. Based on this non-conservatism, an Operating Order was issued to compensate for the error in the calculated core thermal power. The order directed that operators not exceed an indicated average core thermal power of 2890 megawatts thermal, a derate of 4 megawatts thermal below the licensed power level of 2894 megawatts thermal. At 1510 hours, CPS completed power reduction to 2890 megawatts thermal.

Condition Report (CR) 77802 was initiated to track corrective action for this issue.

No automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. No inoperable equipment or components directly affected this condition.

The cause of this issue is GE design control. The GE supplied calculation for the heat balance used a value for moisture carryover of 0.1% that was taken from earlier BWR designs. Considering the design improvements and efficiencies of the steam dryers used in the newer BWR designs, such as the CPS BWR-6 design, this value for moisture carryover was non-conservative and should have been reevaluated.

CPS completed installation of Modification EC 333294 at 0805 hours on October 11, 2001. This modification changed the moisture carryover fraction in the Process Computer software from 0.1% to 0.0% to correct the heat balance calculation. The administrative limit on power level was removed following completion of the modification.

As part of the corrective action for this issue, CPS will review other terms in the heat balance calculation for accuracy. (ATI 79848-01)

This issue is reportable under the provisions of Facility Operating License Condition 2.C (1) which limits the Maximum Power Level of the unit to 2894 megawatts thermal. The magnitude of this error is less than the uncertainty margin in the transient accident analysis basis. Therefore, this error would have negligible impact on any analyzed transient or accident.

No equipment failed as a result of this error.

Clinton Power Station has not experienced similar errors resulting in reportable violations of the Facility Operating License.

For further information regarding this event, contact J. A. Miller, Engineering Supervisor, at (217) 937-3929.

Respectfully,


J. M. Heffler
Vice President
Clinton Power Station

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Enclosure

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cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety - Illinois Department of Nuclear Safety