LAWRENCE LIVERMORE LABORATORY

Selected Operating Reactor Issues Program II

Reactor Coolant System Vents (NUREG-00737, Item II.B.1.)
NRC FIN A0250 - Project 9

FINAL TECHNICAL EVALUATION REPORT FOR JAMES A. FITZPATRICK

Docket Number 50-333
NRC TAC Number 44373

Prepared by J. T. Held of Energy Incorporated - Seattle (Subcontract 4324401) for Lawrence Livermore National Laboratory under contract to the NRC Office of Nuclear Reactor Regulation, Division of Licensing.

NRC Lead Engineer - Gus Alberthal

TF-357/0812a

March 2, 1983

University of California, P.O. Box 808, Livermore, California 94550 ☐ Telephone (415) 422-1100 ☐ Telex 910-386-8336 UCLL LVMR

Docket Number 50-333
NRC TAC Number 44373

TECHNICAL EVALUATION REPORT ON REACTOR COOLANT SYSTEM VENTS FOR JAMES A. FITZPATRICK

INTRODUCTION

The requirements for reactor coolant system high point vents are stated in paragraph (c)(3)(iii) of 10 CFR 50.44, "Standards for Combustible Gas Control System in Light Water Cooled Power Reactors," and are further described in Standard Review Plan (SRP) Section 5.4.12, "Reactor Coolant System High Point Vents," and Item II.B.1 of NUREG-0737, "Clarification of TMI Action Plan Requirements." In response to these and previous requirements, the Power Authority of the State of New York has submitted information in References 1 and 2 in support of the vent system at the James A. Fitzpatrick Nuclear Power Plant.

EVALUATION

The function of the reactor coolant system (RCS) vent system is to vent noncondensible gases from the high points of the RCS to assure that core cooling during natural circulation will not be inhibited. The Boiling Water Reactor (BWR) Owners' Group has submitted documentation (References 3 through 6) on how the RCS venting requirements are met in General Electric (GE) BWRs. The BWR Owners' Group position has been endorsed by the licensee.

In accordance with the BWR Owners' Group position, the primary means of venting noncondensible gases from the reactor pressure vessel at James A. Fitzpatrick are six power-operated, safety-grade automatic depressurization system (ADS) safety/relief valves which alone provide adequate venting.

We have reviewed design information on the valves associated with the above system that will serve as RCS vents and confirmed that they are operable from the main control room. We have also determined that the valves are provided with emergency power and that a degree of redundancy in the RCS vent system is provided by powering different

vent paths from different emergency buses. NRC has previously verified that the safety/relief valves are provided with positive position indication in the main control room (Reference 7). Additional RCS venting occurs at the high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) system turbine exhausts.

The licensee has further identified the need to vent the residual heat removal (RHR) heat exchangers using existing RHR vent valves. The RHR vent valves are used to vent noncondensible gases from the RHR heat exchangers to the suppression pool whenever the plant is taken to cold shutdown. The two safety-related motor-operated valves on each heat exchanger are arranged in series, are provided with emergency power, are operable from the control room, and are provided with positive position indication via stem-mounted switches. We therefore find the existing RHR system venting provisions acceptable.

The licensee has verified that no other protection systems that are necessary to maintain adequate core cooling require remote venting since none are susceptible to the buildup of a large amount of noncondensible gas that could cause a loss of function of these systems.

CONCLUSION

We conclude, based on the applicability of the BWR Owners' Group position to James A. Fitzpatrick and our specific review of the James A. Fitzpatrick design, that the existing systems at James A. Fitzpatrick are sufficient to effectively vent noncondensible gases from the RCS and the RHR system and meet the requirements of NUREG-0737 Item II.B.1 and paragraph (c)(3)(iii) of 10 CFR 50.44. We therefore recommend that the James A. Fitzpatrick RCS and RHR system venting capability be found acceptable by NRC. It should be noted, however, that the following items were excluded from the scope of our review: seismic and environmental qualification, operating guidelines and procedures, and required modifications to the plant technical specifications and in-service inspection program for use of existing systems as RCS and RHR system vents.

REFERENCES

1. Letter, P.J. Early (Power Authority of the State of New York) to D.G Eisenhut (NRC), "James A. Fitzpatrick Nuclear Power Plant, Docket No. 50-333, Response to NRC Requirements Based on Studies of TMI," dated October 22, 1979.

2. Letter, J.P. Bayne (Power Authority of the State of New York) to D.B. Vassallo (NRC), "James A Fitzpatrick Nuclear Power Plant, Docket No. 50-333, Reactor Coolant System Vents, NUREG-0737 Item II.B.1," dated March 19, 1982.

3. Letter, T.D. Keenan (BWR Owners' Group) to D.G. Eisenhut (NRC), "BWR Owners' Group Positions on NUREG-0578," dated October 17, 1979.

4. Letter, D.B. Waters (BWR Owners' Group) to NRC (Attn: D.G. Eisenhut), "Preliminary Clarification of TMI Action Plan Requirements — BWR Owners' Group Comments," dated October 8, 1980.

5. General Electric Report NEDO-24708A, Revision 1, "Additional Information Required for NRC Staff Generic Report on Boiling Water Reactors," dated December 1980.

6. Letter, D.B. Waters (BWR Owners' Group) to NRC (Attn: D.G. Eisenhut), "NUREG-0660/0737 Requirement II.B.1: Reactor Coolant System Vents," dated April 24, 1981.

7. NUREG-0737, "Clarification of TMI Action Plan Requirements," Item II.D.3, "Direct Indication of Relief- and Safety-Valve Position," dated November 1980.