Enclosure

FORT ST. VRAIN

BUILDING 10

SAFETY EVALUATION

Building 10 at Fort St. Vrain is a 4 story nuclear Class 1 safety related reinforced concrete structure which houses a battery room, electrical equipment, two computer rooms, an office and a training room. The building is located about 10 feet east of the Turbine Building and about 10 feet south of the Technical Support Building. The space between Building 10 and the Turbine Building is bridged by a Walkover Structure along a portion of the Building 10 west wall. Building 10 is 30 by 41 feet in plan and is 63 feet tall. The outer walls are 12 inch thick reinforced concrete. The structure is founded on 6 reinforced concrete caissons 4 feet in diameter and approximately 58 feet long. The caissons are keyed into the underlying rock a minimum of 6 feet. The floors are 6 inch thick reinforced concrete slab supported by steel beams, except for the top floor slab, which is 1 foot 3 inches thick. The roof slab is 1 foot thick reinforced concrete also supported by steel beams. The first floor is a reinforced concrete slab on grade.

The Walkover Structure provides access from the Turbine Building into Building 10 at two floor levels. The Walkover Structure is approximately 10 by 20 feet in plan dimension and is approximately 52 feet tall. The building is constructed of braced structural steel with metal siding on the north and south walls. The east and west walls are provided by Building 10 and the Turbine Building respectively. The structure has two

intermediate reinforced concrete floor slabs and a reinforced concrete roof supported on steel beams. The steel columns that support the structure are founded on reinforced concrete footings that are in turn supported by the soil. The first floor is a reinforced concrete slab on grade.

The licensee stated in a letter (Lee to Hunter dated August 28, 1985) that the two structures were designed and constructed in accordance with the following building codes.

1. AISC Manual of Steel Construction; 8th edition 1980
2. Uniform Building Code (UBC) 1979
3. ACI 318 1977
4. ACI 349 1976
5. AWS D1.1

The results of the seismic analysis of Building 10 and the Walkover Structure were reported by the licensee in the August 28, 1985 letter. The response spectrum technique was used where the north-south and vertical direction or the east-west and vertical direction motions are combined using the absolute sum method. The stresses that result from earthquakes are combined with loads from other sources according to the combination equations described in the FSAR. The stresses computed using the load combination equations were compared with the allowable stresses and were reported to be below these allowables.

The deflections of the Turbine-Reactor Building and the Walkover Structure and Building 10 were provided by the Licensee in the August 28, 1985 letter. The largest computed absolute differential displacement in the direction of concern (east-west) was 0.81 inches for the Design Basis Earthquake (DBE). It is not clear from the information provided whether the licensee means that this is the sum of the deflections for the Turbine Building - Walkover Structure or the Walkover Structure - Building 10 movements or the relative movements of the building pairs. This item should be clarified in responding to our question below.

The detailed sections on the drawings provided show a 1 inch clearance at the foundation and a 2 inch clearance at the roof of the Walkover Structure. The information provided on drawing B-453 Section L shows the clearance of the checkered plate on the intermediate floors in the Walkover Structure to be 1/4 inch. This is less than the calculated required clearance of 0.81 inches. Therefore, it is possible to have collision between the Walkover Structure and Building 10 at elevations 4811 and 4829 feet and collision between the Walkover Structure and the Turbine Building at the same elevations.

The licensee stated in the August 28 letter that both structures were designed to withstand the tornado specified in the FSAR. The tornado missile used for the design was a 4 x 12 inch by 12 feet fir plank weighing 105 pounds. The licensee also reported that an impact analysis of the Building 10 walls was performed which indicated that they could

resist the postulated missiles without penetration or spalling of the concrete. The metal siding on the Walkover Structure was qualified by a topical report by H. H. Robertson, the manufacturer of the siding. (The final acceptance of this topical report is still pending.) Building 10 was designed to withstand an external pressure drop of 3 psig in 3 seconds. The Walkover Structure was qualified by the licensee by showing that the building would depressurize in 0.2 seconds by venting the internal air through openings in the corners of the structure, and the siding could withstand the reduced pressures.

EVALUATION

The staff has examined the information provided in the FSAR Section 1.2.2.2 and in a Public Service Company of Colorado letter from Lee to Hunter, NRC, Region IV, dated August 23, 1985 with attached drawings. The staff finds that Building 10 and the Walkover Structure were designed in accordance with the requirements specified in the FSAR for Category I buildings. However, the staff is concerned about the apparent lack of clearance between the Walkover Structure and Building 10. It appears that these two structures could impact each other during the postulated earthquake. This apparent impact potential should be addressed by the utility.

Reviewer: H. Polk