APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-602/90-02 Construction Permit: CPRR-123

Docket: 50-602

Licensee: University of Texas
College of Engineering
Department of Mechanical Engineering
Nuclear Engineering Program
Austin, Texas 78712

Facility Name: Nuclear Engineering Teaching Laboratory (NETL) (Triga Mark II)

Inspection At: NETL, Balcones Research Center

Inspection Conducted: April 17, 1990 (Onsite); April 23-27, 1990 (Inoffice)

Inspectors: M. E. Murphy, Reactor Inspector, Test Programs Section, Division of Reactor Safety — 5/9/90 Date

for G. R. Konwinski, Project Manager, Uranium Recovery Field Office, RIV — 5/9/90 Date

Approved: W. C. Seidle, Chief, Test Programs Section Division of Reactor Safety — 5/9/90 Date

Inspection Summary

Inspection Conducted April 17-27, 1990 (Report 50-602/90-02)

Areas Inspected: Routine, announced inspection to followup on a public allegation.

Results: One public allegation remained open following the issuance of NRC Inspection Report 50-602/90-01. This allegation concerned the possibility that a water spring existed under the Nuclear Engineering Teaching Laboratory (NETL) building and the allegation remained open pending further hydrogeological review. A hydrogeologist from the Region IV Uranium Recovery Field Office conducted a site visit and reviewed several sources of information to determine if the alleged spring existed and, if it did, what could the ground water safety impact be on the facility. There was no safety concern identified.

DETAILS

1. PERSONS CONTACTED

* T. L. Bauer, Reactor Supervisor
*+B. W. Wehring, Director, Nuclear

+Denotes attendance at the exit interview conducted April 17, 1990.
*Denotes participation in the telephone exit interview conducted on May 2, 1990.

2. FOLLOWUP TO PUBLIC ALLEGATIONS

The NRC Region IV office became aware of allegations made by a former construction contractor for the University of Texas Triga Mark II Facility in newspaper articles appearing in the December 1989 issues of the "Austin American Statesman" and "The Daily Texan." Subsequent telephone contacts with the contractor and his successor to clarify the technical issues resulted in the identification of six specific concerns. Five of these allegations were found to have no safety concern as documented in NRC Inspection Report 50-602/90-01. The remaining allegation was addressed by this inspection.

- Concern: The ' -tor site has an underground spring that was capped during construction. The spring is alleged to be located on the ramp side of the reactor building approximately 12 feet inside of the reactor building bay door. Water in-leakage has occurred in the fuel storage tubes, sump areas, and the heat exchanger room.

During this inspection, several sources of information were reviewed to determine if the alleged spring existed and, if it did, what the ground-water safety impact could be on the facility. Of the reviewed documents, several pieces of information were utilized to determine water levels and construction practices. These documents are as follows:

- Subsurface Exploration Logs B-1P, B-2, B-3, and B-4, Section 02010, specifications for: Nuclear Engineering Teaching Laboratory, Balcones Research Center, The University of Texas at Austin, Project No. 102-568, September 15, 1986.

- A drawing illustrating the over excavation under the reactor submitted by cover letter dated July 23, 1987, from Construction Incorporated of Texas, Stafford, Texas.

- Drawings A 2.1 and A 2.3, from the as-built construction drawing package.

- Item 6, "Reference Material," submitted by the University of Texas in response to the allegation consisting of daily construction quality control reports and foundation inspection reports.

A review of these documents indicated that there is a presence of ground water at the site. However, the reference to a spring is most likely an interpretation of an individual working on the site on a given day. The term "spring" is defined as a place where water flows upon the land. This would indicate that some pressure exists which would cause the water to flow. There were no data to support the allegation that a spring or a form of flowing water existed at the site.

Notwithstanding the above, the presence or absence of a spring is probably not the relevant issue at the site. More importantly, the presence of ground water at the site should be explored to determine if it will have any impact on the operation of the facility. A great majority of the construction logs, boring reports, and daily reports indicate the presence of ground water adjacent to and underlying the reactor building. The construction reports that do not indicate the presence of ground water most likely represent an oversight on behalf of individuals rather than the true absence of ground water. As shown below, ground water is noted to be found in numerous borings and foundation pier voids.

Soil Penetrations With Water Present

Borings	Water Elevation (Mean Sea Level)
B-1P	782.0' msl
B-2	781.0' msl
B-3	780.5' msl

Foundations Pier Void	Moisture Notes
D-8	3" water
G-7 and D-9	encountered water severely in both holes
G-9	seepage of water in pier
E-10	5" of water in pier
ER-1 and ER-9	slight seepage, water pumped out
G.5A	2" of water in pier
F-2	4" of water in pier
F-4	3" of water in pier
E-8	5" of water in pier
D-7	water seepage in pier

Soil Penetrations Without Water Present

ER-5, ER-6, ER-7, ER-10, ER-11, ER-12, ER-2, G-6, F-3, E.1-3, D-2, D-2, E-7, E-9, and D-6.

The construction data indicates that ground water is present over the entire site. Based upon the data associated with the B-1 to B-4 borings, the static water level is located at approximately 781 feet above mean sea level (msl) as of a May to June time-frame. In this type of near surface aquifer, significant seasonal variations can be expected. The water levels associated with the foundation pier voids do not represent static water levels and are not, therefore, reliable in defining the water surfaces, but can be used to note subsurface areas where water was encountered.

There are several other elevations and water conveyance structures that are important in determining where ground waters at the site will move. Two perimeter drainage systems have been installed at the reactor building. A foundation drain at elevation 785 feet above msl surrounds the perimeter of the building. This system gravity drains to a catch basin where it is pumped to a storm sewer. Additionally, a drain embedded in a gravel pack underlying the reactor vessel at an elevation of 781 feet above msl (the estimated static water level) gravity drains to a sump where any water encountered is pumped to a drain system. The finished floor level of the reactor is at 787 feet above msl. These water levels are graphically shown in Figure 1.

These two systems can be considered as ground-water sinks that have the ability to control water encountered in the underlying strata as well as its weathered surface. Considering the drainage systems that exist at the site, ground water should be consistently drained at a depth of 785 feet above msl at the building's perimeter and 781 feet above msl at the base of the reactor vessel. These depths are 2 feet and 6 feet, respectively, below the floor of the building. Therefore, if the drainage systems perform as designed, then the water surface in the vicinity of the reactor vessel should always be lower than the floor of the structure.

Should the drain system fail, seasonal variations in ground water at this site could cause water to enter the building. This leads to the conclusion that some quality assurance associated with the drain operation should be implemented. Fortunately, such a mechanism exists at the site. Soil boring B-1P was cased and developed as a piezometer located in the reactor room. If additional assurance, as to the functioning of the drains is thought to be necessary, then the piezometer's water level should be monitored. If the drains are functioning as designed, the water level should never rise beyond 781 feet above msl.

The data that was received indicates that a spring probably does not exist at the site. However, there is ground water under and adjacent to the reactor building. The water levels will be controlled by the two drainage systems that exist at the site, if they function as designed. Additional quality assurance of these systems can be developed if the water level in piezometer B-1P is monitored. If the drain systems are operating, the water level in B-1P will be at or below the reactor foundation level.

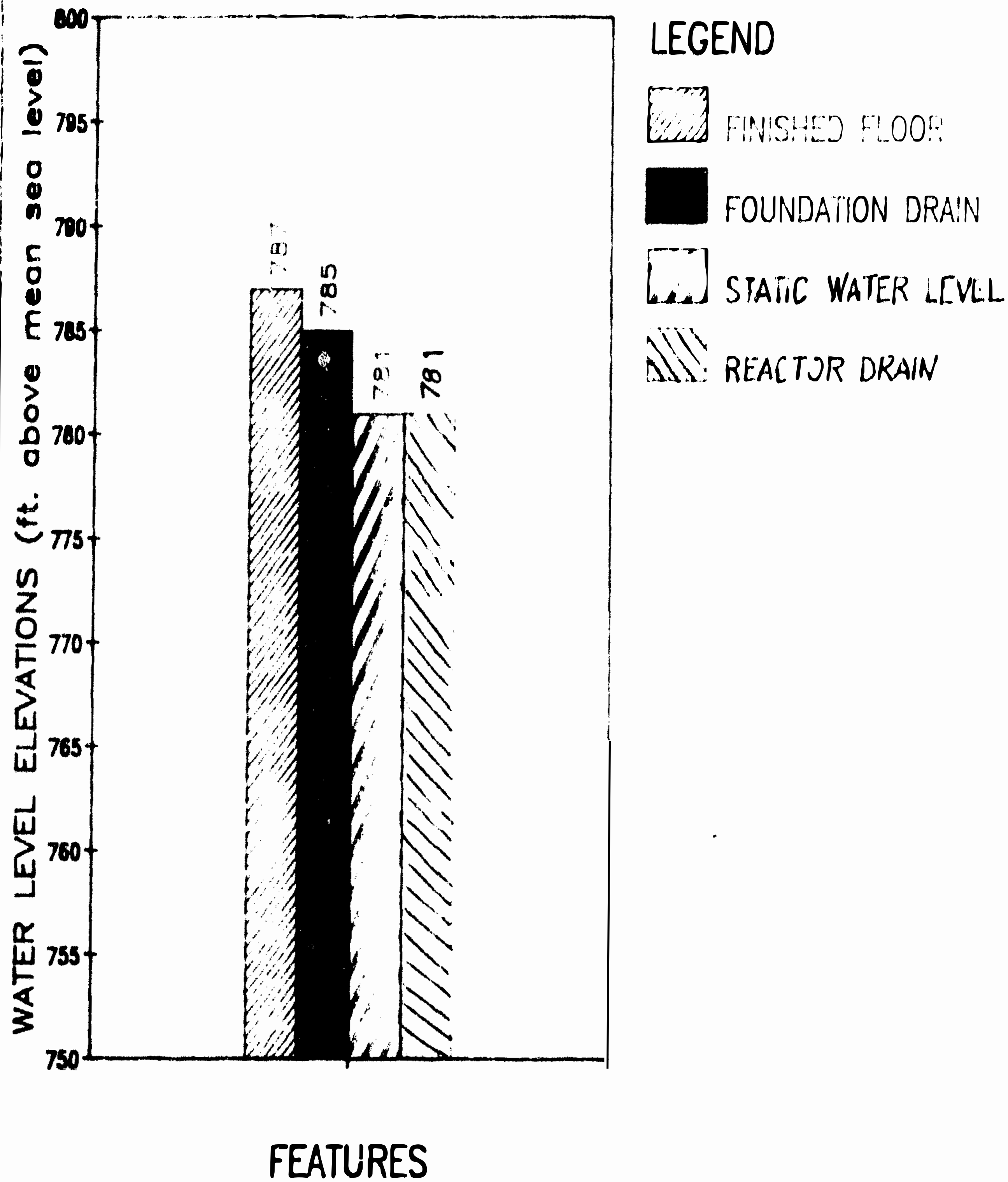
After discussions, the licensee agreed to implement periodic monitoring of the water level in piezometer B-1P. Since the cleaning and closure, there has been no water found in the fuel storage tubes. Actions taken during construction to seal the construction joint between the floor and wall of the liquid waste room sump appear to have resolved water intrusion in this area. The heat exchanger room leaks were in the area of the wall tilt panel joint and appear to be surface-water runoff related because of the relative heights of grade level and leakage point. The tilt panel joint has been repaired and there is no apparent leakage at this time.

Based on the review of documents and a walkdown of the site areas of concern, the allegation was partially substantiated; however, water intrusion appeared to be construction related and effective repairs have been made. No safety concerns were identified.

3. EXIT INTERVIEW

The inspection scope and findings were discussed with personnel designated in paragraph 1 at the conclusion of the site visit on April 17, 1990, and by telephone at the conclusion of the inspection on May 1, 1990. The licensee did not identify as proprietary any of the material provided to, or reviewed by, the inspectors.

FIGURE ONE
VARIOUS ELEVATIONS AT THE BALCONES RESEARCH CENTER



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