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MEMORANDUM FOR: George Lear, Chief
Hydrologic and Geotechnical Engineering Branch
Division of Engineering

FROM: Lyman W. Heller, Leader, Geotechnical Engineering Section
Hydrologic and Geotechnical Engineering Branch
Division of Engineering

SUBJECT: TOPIC DISCUSSION FOR 1981 ANNUAL REPORT

In accordance with your commitment to R. Vollmer dated September 2, 1981, we have prepared the attached topic discussions for inclusion in the 1981 Annual Report, as follows:

- Item (c): Technical Assistance Program for Licensing
- Item (e): GE Test Reactor (GETR) Review
- Item (g): Midland NPP Remedial Repairs

These topic discussions were prepared by Dr. Owen Thompson, Geotechnical Engineering Section.

Original Signed by L. W. Heller

Lyman W. Heller, Leader
Geotechnical Engineering Section
Hydrologic and Geotechnical
Engineering Branch, DE

Attachments:
As stated

cc: GES Staff
M. Flieger

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DATE	9/7/81	9/7/81				

Annual Report 1981 Topic Discussion

(c) Technical Assistance Program for Licensing

Both the Midland and Bailly plants have required an unusually large review effort. At the Midland plant, improperly placed soil fill beneath safety-related structures resulted in excessive settlement and cracking of some structures; remedial measures proposed by the applicant are being reviewed.

The Bailly plant pile foundation was changed from a long-pile installation to a shorter-pile installation. The shorter pile proposal required intensive staff review because of the possibility of ASLB hearings on the shorter piling issue.

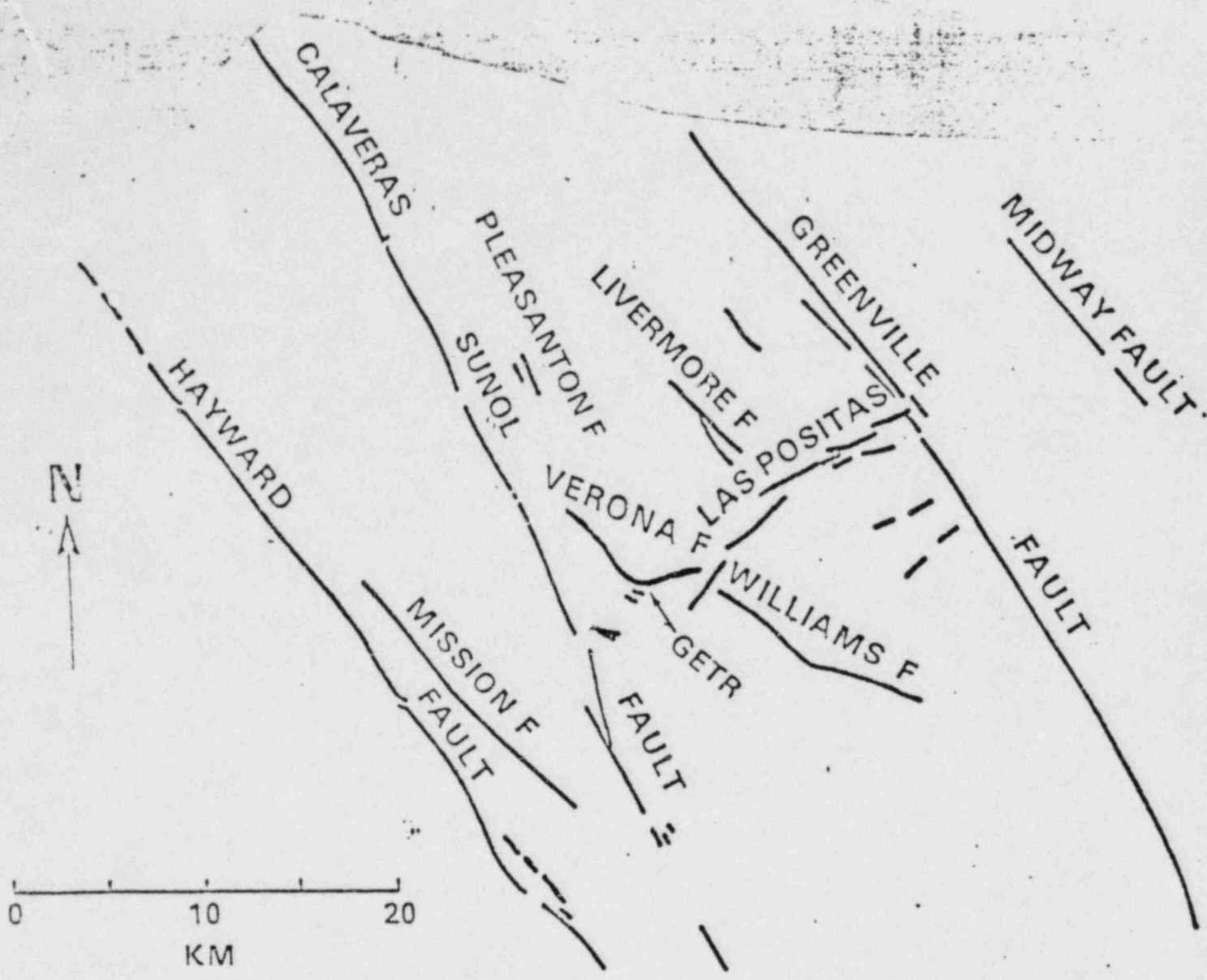
The U.S. Army Corps of Engineers, including the Detroit District (COE-Detroit) has been providing technical assistance to the HGEB staff including the reviews of the Midland and Bailly plants which began in 1979. The COE-Detroit resources have been supplemented by COE Waterways Experiment Station (COE-WES) staff for these two plants. An expert on pile foundations has also provided assistance with the review of the specialized pile foundation of the Bailly plant.

(e) GE Test Reactor (GETR) Review

The GE Test Reactor (GETR) is located near Livermore, California and is close to the Verona Fault (see location sketch). A postulated extension of the Verona Fault beneath the GETR plant and its effects on the plant was considered by the NRC.

The GETR foundation mat is located about 20 feet below grade and is underlain by very dense sandy and gravelly clay and a hard, cemented conglomerate known as the Livermore Gravel.

The effect of a surface rupture that could be caused by the Verona Fault has been analyzed by the licensee. The licensee has concluded that if a fault plane formed in the bedrock at a location having the potential of intersecting the reactor foundation, the fault plane would shift while propagating through the subgrade soil and in fact, miss the reactor foundation slab. Based on their independent calculations and analyses, the NRC staff concurred in the licensee's conclusion.



(g) Midland NPP Remedial Repairs

During construction of the Midland NPP, the engineered earth fill that was placed beneath safety-related structures and pipelines was not properly controlled, and the required degree of compaction was not attained. As a result, buildings and foundations supported on soil fill have settled and cracked. The applicant has proposed a number of remedial engineering solutions to correct or repair affected facilities.

The remedial measure adopted for the Diesel Generator Building was soil surcharging. The area inside and around the Diesel Generator building was loaded with a 20 ft layer of sand over a period of seven months. This procedure is expected to compress the poorly compacted fill material beneath this structure and reduce its future settlement. Since surcharging in 1979, the Diesel Generator Building has settled only a small additional amount.

The Service Water Structure was to be supported by adding piles along one side of this structure. The applicant has abandoned this plan and has proposed to underpin the structure by extending the exterior foundation walls through the unsuitable fill down to the competent glacial soil beneath the fill. Installation of the underpinning will require sequential excavation of segments of the fill and replacement by concrete so that only small portions of the existing foundation walls will be unsupported at a given time during the period of remedial work.

Support for the Auxiliary Building is to be provided by removal of the unsuitable fill and replacing it with lean concrete. For this operation, shafts beside the building and tunnels under the building will be excavated so that temporary piers can be used to provide support until the lean concrete can be put in place.