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~~Jul~~ 23 1982

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MEMORANDUM FOR: John T. Greeves, Section Leader
Design Section
High-Level Waste Technical
Development Branch
Division of Waste Management

FROM: Mysore S. Nataraja
Design Section
High-Level Waste Technical
Development Branch
Division of Waste Management

SUBJECT: TRIP REPORT, SHORT COURSE ON APPLIED ROCK MECHANICS,
UNIVERSITY OF CALIFORNIA, DAVIS

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Introduction:

An intensive short course on Applied Rock Mechanics was held at the University of California, Davis, between July 11 and July 18, under the auspices of the University Extension. At my request, I was allowed to attend the above course. The program consisted of six and half hours of lectures/demonstrations a day for six days.

Course Contents:

The following topics were covered during the course:

- 1) Geologic Exploration of Rock Sites:
 - o Sampling
 - o Borehole Inspection
 - o Seismic Method
 - o Resistivity Method
- 2) Stereographic Analysis of Geologic Data:
 - o Basic Constructions using the Conformal Stereonet

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- 3) Deformability and Strength of Rock Materials:
 - o Observation of Deformations under Load
 - o Constitutive Laws
 - o Failure Criteria
 - o Environmental Effects
- 4) Deformability and Strength of Joints and Faults:
 - o Joint Stiffness and Joint Strength
 - o Dilatancy
- 5) Hydraulic Properties of Rock Mass:
 - o Theory
 - o Instrumentation
 - o Data Analysis
- 6) Rock Slope Stability Analysis:
 - o Addition of Forces
 - o Cone of Friction
 - o Analysis of 2 and 3 Plane Wedges
- 7) In-Situ Measurements of Rock Mass Deformability and Strengths:
 - o Theory
 - o Instrumentation
 - o Data Analysis
- 8) In-Situ Measurements of Stresses in Rock Masses:
 - o Theory
 - o Instrumentation
 - o Data Analysis
- 9) Rock Mass Reinforcement with Shotcrete and Bolts:
- 10) Finite Element Methods in Rock Mechanics:
 - o Theory
 - o Computations
 - o Examples

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As can be seen above, the coverage was extensive, and according to the Instructor, is a condensation of three graduate level courses in Rock Mechanics.

The Instructor:

Francois E. Heuze who is the Leader of the Rock Mechanics Program at the Lawrence Livermore National Laboratory of the University of California was the course instructor. Because of his deep involvement in large scale in-situ testing at NTS and other projects, and his past experience in teaching while he was a full-time faculty at the University of Colorado, Dr. Heuze was effective and organized in his presentation of material.

Significance to WMHT Program:

WMHT staff is deeply involved in reviewing the test data from BWIP, NTS, and Salt sites that are being collected by DOE for submission to NRC. The WMHT staff should be familiar with the recent advances in the field of Rock Mechanics in order to be able to play an effective role in the review process of SCR and other documents that will be submitted by DOE. From the above point of view, the course was a useful exercise in collecting a number of good references and participating in group discussions involving theory, testing, modeling, and analyses of rock masses.

A copy of the Certificate Awarded for Successful Completion of the course is attached for records.

ORIGINAL SIGNED BY

Mysore S. Nataraja
Design Section
High-Level Waste Technical
Development Branch
Division of Waste Management

Enclosure:
As Stated

OFC	:	WMHT	:	WMHT	:	:	:	:	:
NAME	:	NATARAJA, cfm	:	GREEVES	:	:	:	:	:
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UNIVERSITY OF CALIFORNIA, DAVIS
UNIVERSITY EXTENSION

In recognition that

MYSORE S. NATARAJA

has successfully completed the requirements for

APPLIED ROCK MECHANICS

July 11-17, 1982

July 17, 1982
Date

Shuqi'
University of California, Davis Extension