The Engineering Geologist

THE GEOLOGICAL SOCIETY OF AMERICA

NEWSLETTER OF THE ENGINEERING GEOLOGY DIVISION OF THE GEOLOGICAL SOCIETY OF AMERICA

Vol. 18, Number 1 June 1983

COMMENTS FROM THE CHAIRMAN

The tight financial situation of our Division caused the reduction of the Engineering Geologist to a single issue a year. Until we have freed ourselves from the financial straight jacket. Therefore, I have to keep my own comments brief to leave space for important communications and announcements. However, I would like to touch upon a few points which have concerned me for some time.

In an atmosphere of optimism Dick Proctor reported two years ago that courses in geology are being introduced into civil engineering curricula at many schools. Unfortunately, I cannot share such good news with Dick. About 15 years ago, a nationwide change in the curricula in engineering, let courses of geology or engineering geology to be dropped in favor of now more fashionable courses in computer applications. This included my own courses for engineers and architects. Though they are finding out that we do not build castles in the air, a much needed re-introduction of such courses in geology has not always materialized in a recent evaluation and re- organization of engineering curricula. Though earth materials, minerals and rocks are just receiving a light touch in courses of soil mechanics taught by non-geologists, geological natural processes such as earthquakes, landslides, erosion, etc. Are completely ignored. I wish I could present to you figures obtained from recent questionnaires to schools. Questionnaires in the past have received very little attention as the return used to be well below the 50% mark offering only a slanted view on the opinions.

The technical symposia of our Division have attracted much attention in the past despite disappointing attendance. This year's symposium on the disposal of nuclear waste organized by Lokesh Chaturvedi of Santa Fe, NM will be a very timely contribution. I cannot see how we can maintain our present high standard of living in a relatively clean environment without nuclear energy. I hope that this symposium will continue to pursue our efforts for future symposia.

Our meetings have shown our ability to communicate quite well with one another. We seem to have failed, however, to establish a proper contact with specialists in adjacent and often overlapping fields. The ASTM committee C-18, Natural Building Stone, is much involved in rock mechanics, stone decay-with no link to our Division: quarry owners, architects, and research scientists hammer out standards for the industry. It is unfortunate that the EGD-GSA is so remote to this group. My own association with the C-18 committee has shown me how little we still know about some basics in rock mechanics, such as; how to measure quickly and simply the flexural strength of stone with a minimum of material, or the meaning of dry-to-wet strength ratios, or what does micro-wave oven drying do to test specimens, and many other problems. No doubt there are other groups which need our cooperation. The AEG's successful publication, the Bulletin of the Association Engineering Geology offers a perfect outlet for the publication of interdisciplinary topics. I have especially enjoyed the series, "Geology of Cities". The new editor Chris Mathewson has forged ahead with the Bulletin. I would say to the number one publication in the field of engineering geology. I strongly urge our members to use this journal as the major outlet for new information in the field.

In hoping to see as many of you as possible at our annual Division luncheon and at the Rad-Waste symposium in Indianapolis, I remain with best wishes for a successful summer in the field - whereever this may be,

Erhard M. Winkler, Chairman, EGD-GSA

GSA-EGD Symposium "Geologic Disposal of Radioactive Wastes"

Convenor: Lokesh Chaturvedi, Environmental Evaluation Group, 320 E. Marcy Street, P.O. Box 968, Santa Fe, NM 87503

The Engineering Geology Division of GSA is sponsoring a half day symposium on "Geologic Disposal of Radioactive Wastes" at the 1983 annual GSA meeting (October 31 - November 3) at Indianapolis. The purpose of the symposium is to focus on the past experience and the anticipated problems to be resolved in the

future, with respect to the long-term isolation requirements of the high level, trasuranic and low level nuclear wastes. The program will include presentations on some general topics such as the question of "geologic predictability for the immediate (geologic) future," some generic topics such as "the suitability of salt deposits for nuclear waste disposal," and several status reports on current projects. The following is a tentative list of speakers, their affiliations and the title of their talks, for this symposium.

Arthur L. Bloom, Professor, Department of Geological Sciences, Cornell University-- "Geologic Predictability for the immediate (geologic) future."

Charles Hadlock, Arthur D. Little, Inc.-- "Development of Criteria for radioactive waste repositories."

Steven J. Lambert, Sandia National Laboratories -- "Search for dynamic processes in the evaluation of geologic repositories for Radioactive Wastes."

Harry Smeade, Consultant, Office of Nuclear Waste Isolation -- "Status of site investigations in salt and crystalline rocks."

Roger Y. Anderson, Professor, Department of Geology, University of New Mexico -- "Suitability of salt deposits for radioactive waste disposal."

Sue M. Price Rockwell Hanford Operations -- "Evaluation of basal flows for a potential geologic repository for radioactive wastes."

William W. Dudley, U.S. Geologic Survey -- "Evaluation of ash flow tuff for a potential radioactive Waste Repository."

Dev K. Shukla, D'Appolonia Consulting Engineers, Inc. -- "Geomechanical investigations for a radioactive waste repository."

For any questions or suggestions for this symposium, you may write or call Lokesh Chaturvedi, Environmental Evaluation Group, P.O. Box 968, Santa Fe, NM 87503. Telephone (505) 827-8280.

REPORT ON THE WASHINGTON CONFERENCE ON UNCONTROLLED HAZARDOUS WASTES SITES

29 NOVEMBER - 1 DECEMBER 1982

Engineering geologists involved in cleanup of the Nation's uncontrolled hazardous wastes sites are finding that keeping abreast of SUPERFUND developments is a constant challenge. Particularly perplexing is the planning required for training, equipping, and marketing necessary for consulting geological and geotechnical firms wishing to participate in this work. The technical challenges and volume of potential professional service work associated with SUPERFUND are so large (about $200,000,000 in the October 1982 SUPERFUND Zone and Technical Assistance Team TAT contracts alone) that few among the hard-pressed consulting firms can ignore this source of potential business.

There appears to be one annual national clearinghouse of face-to-face information exchange - the MANAGEMENT OF UNCONTROLLED HAZARDOUS WASTE SITES (MUHWS) Conference held in Washington, DC. This conference, just completing its third year, is the creation of a non-profit Maryland firm, Hazardous Materials Control Research Institute (HMCRI). Perhaps the most interesting facet of the conference is the total involvement and affiliated sponsorship of the U.S. Environmental Protection Agency (EPA). The MUHWS Conference appears to be fully and enthusiastically utilized by EPA as an annual coming-out party to inform all who are interested, of the year's developments and the projections for future activities. To this end, EPA is most successful. HMCRI claims that some 1100 persons were registered for the three-day conference this year.

As in the past two years, the conference proceedings were made available in hard-backed paper (477 pages this year) at the time of registration. While HMCRI makes no claims as to the lasting value of the proceedings as a finished editorial product, the purpose of the proceedings is well apparent; to get the latest findings by Government and industry out to those who are interested. Those who do not have the three volumes of proceedings would do well to contact HMCRI for purchase of remaining copies!

One could criticize the organizers for producing a conference that is more free-wheeling in content than a strictly technical gathering. However, it is obvious that EPA feels well satisfied in having 1100 practicioners and administrators mingle for three days in an atmosphere that is free of other distractions and pressures. One hundred and five papers were scheduled for delivery at the Conference; most of these papers were delivered in three simultaneous sessions. This reviewer was well pleased with the value received in attending the conference.

The conference was an obvious market-place for the agencies and firms in getting to know each other and in discussing possible ventures. The U.S. Army Corps of Engineers (through its Missouri River Division) took the time and effort to staff an exhibition booth with key personnel involved in its SUPERFUND cleanup contract management. The Corps took pains to explain its SUPERFUND function and how the private sector will complete most of the design and contract specification work for the remedial site cleanup actions. EPA's booth was large and well-staffed by knowledgeable people; copies of the new "Handbook for Remedial Action at Waste Disposal Sites" were available for the asking and mail requests were accepted as the supply on hand was exhausted. A wide variety of contractors were represented, both those offering geotechnically-oriented services (such as slurry walls, groundwater control, and manmade liner installation) as well as contractors specializing in the actual remedial actions associated with SUPERFUND or state or industrial-originated remedial action.

Most of the professional service firms offering exhibits were traditional environmental engineering companies, a few of whom have become firmly established at the center of site cleanup activities. Non-profit

research institutes were in a strong presence, especially in the exhibit area.

The Conference has only one real shortcoming - that is, if a person was to believe that attendance at the MUHWS Conference would result in instant clarity of thinking about the subject, there would be a sure discontent to follow. The Conference organizers apparently believe that the structure (or lack thereof) best services those who have experience or the interest to independently learn about HW management, rather than to expect instant understanding. For those who spend time to develop their expertise in HW management, the Conference is an absolute "Must" - for those who would market their services in this area of business, the Conference is even more important!

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Carbonate Petrology of the Fort Hays Member, Niobrara Formation, Boulder County, Boulder, Colorado

SALEH M. BILLO, Riyadh Univ., Ryadh, Saudi Arabia.

The Fort Hays Member of the Cretaceous Niobrara Formation, about 15 feet of massive, fine grained light-gray limestone which contains some shale partings, resists erosion sufficiently to form a minor ridge along most of the margin of the foothills. It contains conspicuous Inoceramus deformus. Two outcrops, at Lee Hill road and Sixmile fole (Fig. 1), have been studied in detail. Oriented sections were taken from the base to the top in each outcrop. Two thin sections, one normal and one parallel to bedding were made of each slide, and percentage- thickness graphs were drawn.

Each of the stratigraphic sections can be divided into six spectral units which correlate fairly well.

The abundance of Foraminifera and Inoceramus rhombs and fragments indicates rapid attainment of conditions favorable for marine life. Conditions probably approached a neritic open marine outer shelf environment.

Textural characteristics, the presence of scattered quartz grains in the groundmass, and the variation in fossil concentrations in the various beds may indicate occasional storms, long-shore currents and eddies.

Reduction in percentage of fossils upward in the section, and the absence of clayey material compared with the lower units, suggests that the lower beds were deposited closer to the shore than the upper beds. This may indicate (1) transgression of the sea which caused progressively deeper water over the sample localties, (2) lowering of land relief and consequent reduction of velocities so that river currents could not carry fine detritus as far seaward, or (3) both.

The larger grains, mostly Foraminifera, are mud-supported--are not bound together during deposition Wackestone (Dunham) (2) , or Folk's (3) Foraminiferal biomicrite. This petrographic evidence suggests that the Foraminifera were pelagic, their tests settled to the bottom in a cloud of precipitated calcium carbonate and, at the base, clay.

The interpretation of the sedimentation suggests biostromal deposition like that described by Cummings (1), rather than biohermal or reef deposition as described by Swinchatt (5).

References

(1) Cummings, E.R., 1932, GSA Bull., v. 43, p. 334.

(2) Dunham, R.J., 1962, Classification of carbonate rocks According to Depositional Texture.

(3) Folk, R.L., 1962, Spectral Subdivision of Limestones Types -- A.A.P.G., Memoirs, Tulsa, Oklahoma, U.S.A. 1962.

(4) Hunter, M. Zena, 1947 - Ph.D. Thesis, Department of Geology, University of Colarado.

(5) Swinchatt, P. Jonathan, 1965 - Significance of constituent composition, texture and skeletal breakdown in some recent 965

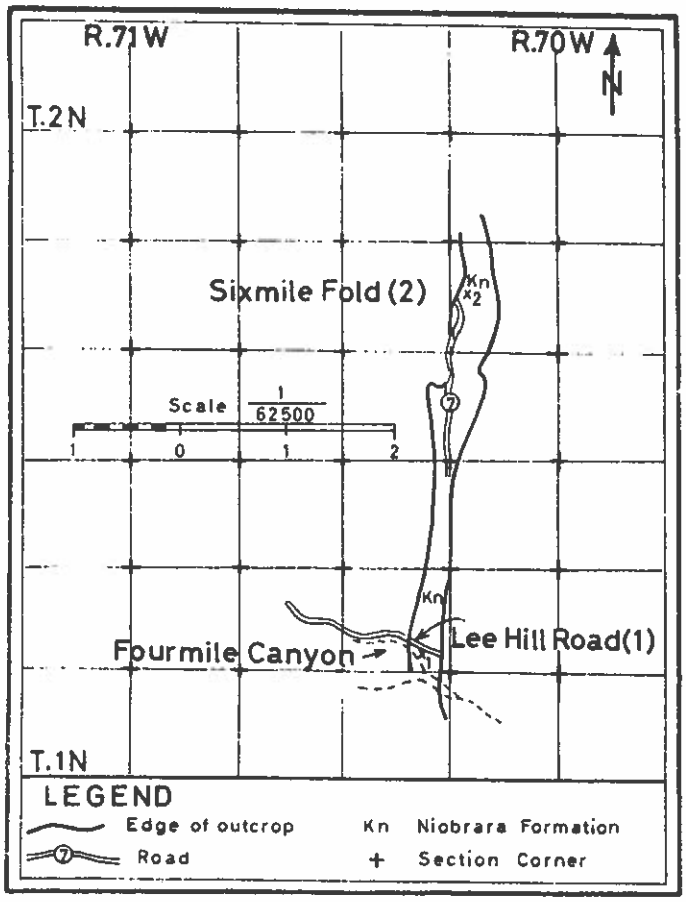

FIGURE 1. Map showing outcrop of Cretaceous Niobrara Formation in Boulder County, Boulder, Colorado, and reference localities.

MID-CONTINENT MAPS AVAILABLE

The Kansas Geological Survey now has available a suite of nine large-scale regional maps showing different geological features of the Nemaha Uplift and adjacent structural areas, according to Frank Wilson, senior geologist at the Kansas Geological Survey. The maps cover about the southwest quarter of Iowa, southeast quarter of Nebraska, eastern third of Kansas and the northeast third of Oklahoma.

The maps, available in a blue-line format, were produced as part of a cooperative project between the state geological surveys at Kansas, Oklahoma, Nebraska, and Iowa. Much of the funding for the project was Provided by the Nuclear Regulatory Commission.

The suite consists of maps of LANDSAT lineaments; earthquake epicenters; surface bedrock geology; base of the Kansas City group, shaded topographic relief; top of the Precambrian; Bouger gravity magnetics; and Precambrian rock types.

The maps measure about two feet by three feet and are drawn at a scale of one to a million, so that one inch on the map equals about 16 miles.

The maps cost $5.00 each (plus $2.00 handling per order) and may be obtained from the Kansas Geological Survey, Publications Dept., West Campus, The University of Kansas, Lawrence, KS 66044. For additional information contact: F.W. Wilson (913) 864-4991.

THE BURWELL AWARD

by

E. L. Krinitzsky
Chairman, Burwell Award Committee

Following are the criteria on which the award is based, approved by the Council on May 4, 1968:

The E. B. Burwell, Jr., Memorial Award will be made to the author or authors of a published paper of distinction which advances knowledge concerning principles or practice of engineering geology, or of related fields of applied soil or rock mechanics where the role of geology is emphasized. There is no restriction as to the publisher or publishing agency of such a paper. The author or authors of the selected paper need not be a member or members of the Engineering Geology Division or of The Geological Society of America, and need not be residents or citizens of the United States.

The Committee has used various rating systems and recently has approved a new approach. The candidates papers for the 1984 Burwell Award will be judged in equal measured on:

1. Clarity of presentation
2. Originality of subject or approach
3. Insight into previously unrecognized essentials
4. Importance in Engineering Geology

The objective is to recognize a paper that "advances knowledge" and is a "paper of distinction". Recommendations of candidates that meet these requirements are welcome.

SHORT COURSE

ROCK ENGINEERING

Presented by
DR. EVERT HOEK
Golder Associates Ltd.

September 26-30, 1983
in St. Louis, Missouri

This course is designed for geologists and engineers who are concerned with the design and construction of rock slopes, tunnels, caverns and foundations. The content is based upon the two textbooks written by Dr. Hoek. However, rather than repeat the material in the texts, which will be provided to each participant, the course will emphasize practical applications and case histories and there will be ample time for participants to discuss their own problems and interests. For further information and advance registration contact: Dr. John Rockaway, Department of Geological Engineering, University of Missouri-Rolla, Rolla, MO 65401, PHONE: 314:341-4799.

Essential aid for Engineering Geologists and Soil Engineers

EXCAVATION AND GRADING CODE ADMINISTRATION, INSPECTION, AND ENFORCEMENT

C. Michael Scullin (1982) Prentice Hall, 448 pages Price $45.95

This book illustrates the State-of- the-Art and Standards of Performance of hillside and flatland urban development from the 1950's through to the present. It is written in simple terms to be understood by those who have limited knowledge in the subject matter. It is a training manual that includes over 300 illustration of sequential "how to" mitigate geologic hazards and losses due to landslide, subsidence, expansive soil, drainage, and earthquake causes. The numerous illustrations are a direct, illustrative methodology of "how to" perfrorm the many aspects of grading control, soil testing, drainage construction, slope finishing, landscaping, and slope maintenance. It illustrates how to minimize cause and effect of human error resulting from lack of maintenance or lack or knowledge of hillside homeowners.

The book is written as a training manual useful in public administration, management, supervision, engineering geology, soil engineering, soil testing, grading construction, grading inspection, urban planning, civil engineering, real estate disclosure, law, and financial lending. Where grading codes have been enforced through effective grading inspection, the loss factor

due to geologic causes has been reduced 90% to 95%.

The concepts and technical applications described in the text may be applied anywhere the need is recognized, where geologic hazard loss-reduction is considered and where a cost-benefit program is to be effectively realized. The book is written for those who know nothing about the technology, but must determine "acceptable risk" parameters of development for their communities and their industries. The book is not intended to replace sound civil engineering judgement or the high standards of design and performance of other technically skilled professionals--geotechnicians, structural engineers, architects, and the like. This book illustrates the minimum standards of performance that should be required for safe development where grading control technology is needed in our urban development.

January 1, 1983

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(continued next page)

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