The Engineering Geologist

THE GEOLOGICAL SOCIETY OF AMERICA

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

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CHAIRMAN'S MESSAGE

Among other items, the 1981 Annual Meeting in Cincinnati concentrated on developing a program that would attract division members to the regional and annual meetings. The Division had endeavored during the past two years to expand the quarterly newsletter, and published some solicited short professional papers by members. The hope of this effort was to create interest and add to the general knowledge of engineering geologists. However, we got caught up in the rising inflation, and when the budget arrived we found ourselves without funds. Therefore, because of the budget constraint, the Newsletters in the future will contain only pertinent information on the state of the Division, information on upcoming events and a few short abstract-type articles that are interesting and informative.

Our entire professional career is a learning process. We learn and grow by challenging assignments at our place of employment, and in continuing education courses, but primarily, through transfer of information from knowledgeable colleagues, who publish or present papers at societal meetings. The board feels that in order to reach the members who do not attend the annual meetings, more emphasis should be placed on specifically planned engineering geology/environmental geology, sessions/ symposiums/field trips at sectional meetings. To do this means a lead time of at least 9 months prior to the meeting, where active, interested engineering geologists in various sections volunteer their services to the program chairman and carry out the program. To alert the members we will publish in the Newsletters the times and places of the future sectional meetings as soon as they are available. Certainly most of us attend the professional meetings for the content of the programs and look forward to and enjoy good, stimulating papers that apply to our particular interest. Therefore, we should all take the challenge and participate in the sectional meetings. Certainly corporate, government and individual files have abundant non-proprietary data and case histories that have been overlooked, but which contain much valued information that could advance our state of applied geologic knowledge.

In the Newsletter, November 1981, George Kiersch, our GSA representative on the USNC/Roch-Mechanics pointed out that the National Research Council Panel on Rock-Mechanics Research Requirements, looked at rock-mechanics research under seven separate subpanel areas, and concluded by stating, "there were no well understood procedures by which laboratory data can be used to predict reliably the behavior of rock masses in situ." He suggests, a need to increase the participation of mature, field experienced geologists in the evaluation of a rock mass being investigated. This illustrates the need for continuing development of all geologists working in the engineering applicstion of geologic theories snd techniques. So with a continuing need of good papers on applied geology, we are encouraging engineering geologist members of the various sections to volunteer their services to local committees organizing engineering geology sessions. This can be done by offering individual papers or convening symposia on a selected subject. This symposia could even by a cooperative program with AEG/ASCE members on a particular theme. So in the future, when you obtain your sectional programs of upcoming meetings and note the lack of a definitive program on engineering or applied geology, this simply means the members of the Division in your section did not consider giving of their own time and efforts to initiate the program.

For the 1982 Annual Meeting in New Orleans, the Engineering Geology Division is continuing to develop themes for the symposium on the History of Engineering Geology, which will be a joint effort by Mathewson and Kiersch.

Harry F. Ferguson
N. Huntingdon, PA

GSA SECTION MEETING SCHEDULE
1983 (Plan to Participate)

CORDILLERAN/ROCKY MOUNTAIN
May 2-4, Salt Lake City, Utah, William Nash, Co-Chairman

NORTH-CENTRAL
April 28-29, Madison, Wisconsin, Campbell Craddock, General Chairman

SOUTH-CENTRAL
Dates not decided, College Station, Texas, Melvin C. Schroeder, General Chairman

NORTHEAST
Dates not decided, Monticello, New York, General Chairman not yet named

SOUTHEAST
Dates not decided, Tallahassee, Florida, Ramil C. Wright, General Chairman

GSA ANNUAL MEETING
October 31-November 3, Indianapolis, Indiana, Arthur Mirsky, Genersl Chairman

GSA - ENGINEERING GEOLOGY DIVISION SELECTION GUIDELINES

Distinguished Practice Award

The Engineering Geology Division of GSA feels it is appropriate to recognize outstanding individuals for their continuing contributions to the technical and/or professional stature of engineering geology by presentation of the Distinguished Practice Award.

A nominee need not be a member of the Engineering Geology Division but must have made a major contribution to engineering geology in North America. The selection of the winner is the responsibility of the Management Board. No more than one Distinguished Practice Award will be given each year. The award will be in the form of a plaque.

The Division Chairman will invite the Award winner to the Engineering Geology Division Annual Luncheon. The Division Secretary will prepare a 100-150 word citation for the presentation ceremony, prepare the plaque, and arrange for appropriate publicity.

Meritorious Service Awards

The continued success of the Engineering Geology Division depends on the efforts of many dedicated individuals. Each year, the Chairman thanks these people for their help. However, it seems appropriate to recognize outstanding efforts on behalf of the Engineering Geology Division through a Meritorious Service Award.

The Awards should be presented only to Division members for outstanding service to the Division. To maintain the uniqueness of the award, generally only one, and no more than two, should be presented each year.

In May of each year, the Division Chairman should solicit nominations for Award winners from the Division's Management Board and the Chairmen of all Division Committees. Each nomination should be accompanied by a brief statement indicating the outstanding service provided by the nominee. In July, the Division Chairman should compile the nominations and circulate them to the Management Board for ranking.

The highest ranking nominee or, in unusual circumstances, the two highest ranking candidates will be selected by the Division Chairman to receive the award(s). The Division Chairman will invite the award winner(s) to the Annual Engineering Geology Division Luncheon and arrange for preparation of the certificate of Meritorious Service and appropriate publicity.

HAZARDOUS WASTE MANAGEMENT - SOME TRENDS AND PREDICTIONS FOR 1982

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Now in its third year of intensive public interest, Hazardous Waste Management has yet to come to a unified front, both in the siting and design of Hazardous Waste Management Facilities (HWMF) and in the remedial treatment (cleanup) of the Nation's worst uncontrolled hazardous waste sites. During the conduct of the first full-scale siting and cleanup activities, in 1981, it became apparent that engineering geology will play a strong role in future activities although 1981 did not bring us to the point of routine choices in siting and cleanup, some very important factors and relationships were generally established. These considerations will be important for engineering geologists and their firms or employers, in planning for continued participation in Hazardous Waste Management.

The role of engineering geology in both siting and cleanup is a clear one. Although most of the geologic efforts are labeled as "hydrogeologic" due to the great and reasonable concern for protection of groundwater, the bulk of the data collection, analysis and decision making favor the expertise held by many engineering geologists. Unlike traditional groundwater studies, HW site exploration deals mainly with the depth and areal extent, engineering properties and physiochemical nature of surficial materials. The techniques and expertise for determining these factors represent the base of technical expertise of most engineering geologists. Furthermore, there is real concern for the effect of near-surface bedrock in determining the presence and nature of movement of groundwater. Again, in many instances, the hydrologic properties of bedrock depend not on primary permeability, but on the elements of secondary permeability; joints and a variety of other fractures induced by weathering and a variety of late-Quaternary physical stresaes.

Since the release of the first Resource Conservation and Recovery Act (RCRA) draft regulations in 1978, there has been a pronounced degree of learning and increased understanding among all parties to HWMF siting; Government, Industry, and the consulting practice. The drift in USEPA from total dependence on standardized siting and design procedures has been welcomed by most workers in the field. The present reliance on Best Engineering Technique (BET) and Best Engineering Judgement (BEJ) now gives a full opportunity for the owner and designer to match geologic conditions and geologic properties with waste type and method of treatment, storage, or disposal. During the past three years, since issuance of the first RCRA draft regulations, State and Federal Regulatory personnel have struggled with optimizing the siting regulations and in fitting the intent of the regulations to the specific geologic conditions in their regions of jurisdiction, and to accomodate prevailing public sentiment.

At the present time, many of the geologic issues of siting have been reasonably resolved. However, the important differences in regional geology and physiography, combined with important trends in public sentiment have led to regionally-dependent HWMF siting attitudes. While this could have been predicted, the emotional aspect of HW Management seems to have become the controlling factor in individual site selection at the present time. For the time being, low-level radioactive waste (LLW) disposal siting efforts can be considered as an anologous issue. For instance, the management of HW in the Northeast has developed into a quadrilateral standoff between the generators, the environmental consulting field, the regulators, and the concerned elements of the public. It is now generally regarded that HW management in the Northeast will eventually come to the siting of regional HWMF's in which all forms of HW are received, logged in, and treated for the maximum extent of energy and resource recovery and the maximum extent of volume reduction. Volume reduction also remains the prime issue in disposal of LLW, which is often contained in scintillation vials and a HW suspension solution. With volume reduction a prime consideration, the costs of designing and constructing secure land burial for the limited residuum (say no more than 10 percent of the original volume) are in a reasonable range.

While processing and incineration seem to be the

most viable solutions for the Northeast, the general public and environmental activists do not yet effectively understand the very important need to sct cooperatively on the issue of where to site the HWMFs. The public participation tradition of the Northeast is fully embodied in waste management regulations that call for a very open process of site selection. It has been demonstrated in the Northeast that the siting process must take into consideration virtually all lands that are within an economically reasonable and environmentally-safe transport distance from centers of generation. The selection process must fully insure that virtually no plots of land of sufficient size (an HWMF generally requires considerably more than 200 acres) are overlooked in the site selection. The screening process is subject to close scrutiny by the media and interim judgements by the press are often viewed by HWM workers as bordering on sensationalism. As the site selection process narrows sufficiently to produce a list of worthwhile candidates, opposition is already organized in the near-urban and suburban sites.

Interestingly, state government is usually involved in the siting of HWMFs. While most states are involved in the regulatory review of siting and design, the truly great magnitude of the HW management problem has resulted in the assumption of key siting roles by state government also. In fact, the costs, legal and social complexities, and permitting time required currently for most HWMF siting efforts are so great that waste generators and the waste management industry simple do not have the political clout and financial resources to attempt to "run the gauntlet" of siting without assistance from the States. The entire siting issue in the Northeast, for example, has become so complex, costly and politically inflamatory, that the industrial partners are generally sitting on the sidelines waiting for an indication of what realistic siting and management alternatives may be available to them.

In the meantime, the few remaining disposal sites depend mainly on secure landfilling, without benefit of recovery technology. As the existing permits for landfilling expire, interim measures are resolved on a case-by-case basis in each state, so that major industrial facility closures are avoided.

Industry, however, is often acting in a very responsible way. Unknown to the general public, many waste generating industries are quietly investigating the environmental status of their individual plant sites. This work is conducted on a confidential basis between industry and qualified environmental engineering consulting firms, affording the participants with an opportunity to assess their plant-specific environmental profiles and to initiate remedial measures where appropriate.

The few ongoing HWMF siting efforts, today, are being conducted largely in the less-populated states and there largely in the most sparsely-populated rural areas. Most of these HWMF sites relie mainly on land burial of unprocessed HW delivered in a dry to semi-dry state and packaged in EPA-standardized barrels. Nearly all of the siting efforts that have a reasonable chance of permitting are being conducted with close cooperation of State officials. Most of the state regulatory agancies are under the stringent budgetary restrictiona of the times and are extremely short-handed in terms of qualified engineering geologists and hydrogeologists. Many of the agencies rely heavily on the resources of their State geological surveys, some of which have developed staffs of as many as ten or more qualified professionals.

Successful siting of HWMF requires this close cooperation between industry and the State permitting agency. While State agency personnel are short-handed to the degree that little actual field explorations are performed by them, the most effective siting efforts are being conducted with full disclosure to the State. State geologists are usually given the opportunity of reviewing field exploration programs and resulting data, as they are developed and their comments are incorporated into the developing siting activity. Siting efforts that are conducted in a designer-owner vacuum are almost always destined to schedule delays, cost overruns and possible loss of permitting. The one really apparent governing rule for the industry-designer-regulator relationship is close, continuous, and open dialog. It has been demonstrated on far too many occasions that the regulatory expertise and climate at the regulatory agency will change or vary rapidly; hence a siting effort that lags the developing frame of the regulatory mind will find itself in a position of not having accomplished enough of the right site-qualification effort.

Most of us in HW management would also have predicted that the beginning of 1982 would have seen some clearly defined roles and actions in remedial treatment of uncontrolled HW sites. This, unfortunately, has not come to pass. Indeed, Superfund cleanup, as funded through USEPA, has been underway for more than six months, but at a far lesser degree of involvement than originally imagined by industry and the engineering and geologic profession. The major decision that appears to remain undetermined is that of "who" will be the prime managers of the cleanup effort. The so-called Interim Superfund effort (underway since mid-1981) has been managed by three of the larger environmental engineering firms in the nation. The management includes the following actions:

- Overall evaluation of previous site-specific data packages developed through EPA emergency action and as exist in the general geologic literature of the site area;
- Choice of a single or limited remedial treatment plan;
- Conduct of limited additional explorations and analyses, as indicated;
- Interaction with the appropriate state counterpart agency;
- Development of site remedial treatment contractor qualifications and specifications for cleanup;
- Assistance in evaluating and choosing contractors;
- Approval of a contractor health and safety plan;
- Development of a contractor financial control program;
- Field monitoring of contractor activities and of the nature, acceptability and completeness of the cleanup activity, and;
- Assistance to the state and USEPA in evaluating the state of cleanup and determining the time of termination of activities.

Most of the high-priority uncontrolled sites are examples of deplorable waste disposal practices and worst-case geologic conditions. The most difficult issues to emerge from these remedial treatment actions are:

- "Who" shares the liability of environmental damage and public health impact?
- When is "enough" in the depth and areal extent of cleanup?
- What are the impacts of other waste disposal activities or pollution incidences in geologically-influential proximity to the site?
- Where is the residue of soil contamination to be relocated?

USEPA has had under study two other options of Superfund management; one has been to turn the management over to the Army Corps of Engineers and the other to give substantial management responsibilities to the States. While this and other decisions remain to be made, the bulk of engineering geologic and hydrogeologic practitioners who have an interest in working in the HWMF and Superfund activities are marking time. There has been a scramble among the larger environmental engineering firms to add experienced engineering geolo-

gists and hydrogeologists to their staffs. In the meantime, the engineering geological and geotechnical consulting firms have had little direction and a less-than desireable level of involvement. Many of the firms possess ideal site qualification, exploration and geotechnical design capabilities, but lack the specific HW management expertise and health and safety plans to effectively market their services. Depending on the level of preparation of capabilities desired, implementation of a Health & Safety Plan can cost a firm from $25,000 to more than $150,000 of capital investment over a six-month period. Many of the environmental engineering firms are alert to the liabilities associated with field operations and are extremely hesitant to take on site-specific engineering geologic and hydrogeologic explorations. Subcontracting of geological and geotechnical field investigations, together with drilling and sampling, have been traditional in the environmental engineering field.

In summary, efficient and accurate field explorations, sampling, groundwater modeling, HWMF and remedial design, and construction or cleanup monitoring, belong in the hands of qualified engineering geologists, hydrogeologists and geotechnical engineers. There are literally so many potentials for environmental impairment and financial liability that siting and cleanup management organizations should pay great attention to the need for the best possible technical participation by engineering geologists and hydrogeologists. The final prediction: 1982 should finally prove "who" will become experienced in the degree that significant participation in HWMF siting and cleanup is assured in future years.

Rolla, Misaouri
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