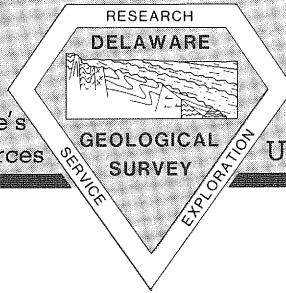


# First State Geology

Current information about Delaware's geology, hydrology and mineral resources



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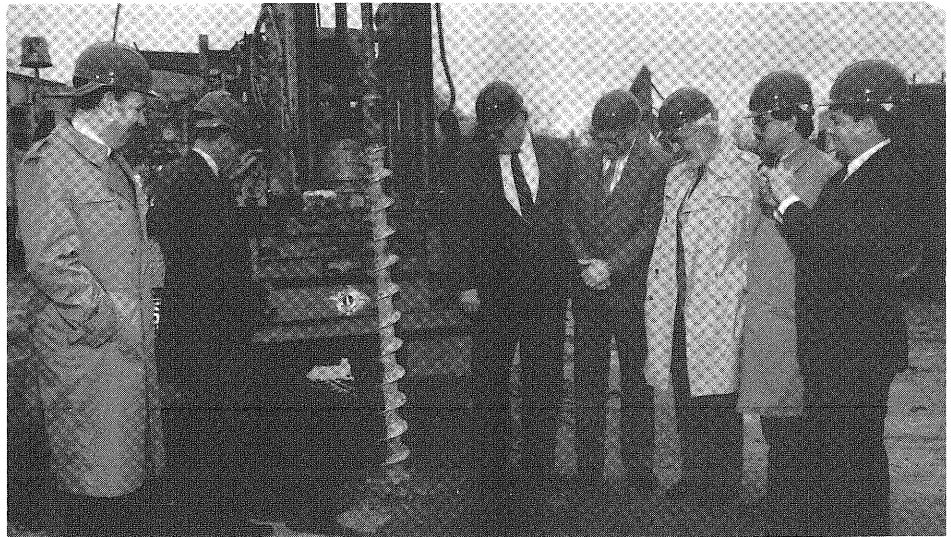
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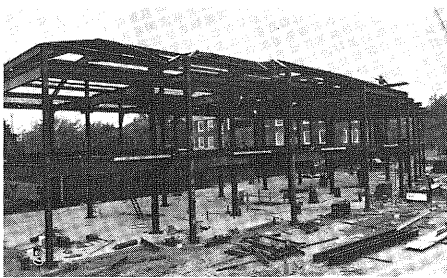
## New Building Ground-Breaking

The "Celebration of Construction" of the new DGS building was held on April 8. Ground was ceremonially "broken" by action of the DGS drilling rig (see photo). Actual construction began in January. Robert R. Jordan, State Geologist and Director, presided. Speakers included Russel C. Jones, President of the University of Delaware; J. Bruce Bredin, Chairman, Board of Trustees, University of Delaware; Hon. George E. Hale, Secretary, Department of Administrative Services; State Representative Steven H. Amick; Kenneth N. Weaver, Director, Maryland Geological Survey; and John J. Dragonetti representing the U. S. Geological Survey.

At the luncheon following ground-breaking, Thomas E. Pickett, Associate Director of the DGS, presented a quartz crystal to Don Homsey, the architect, who was inspired by crystal forms to design the prism bay windows for the new building. Robert Jordan invited everyone to a symposium to be held in 1989 to commemorate the dedication of the building.



*J. Bruce Bredin, Chairman of the Board of Trustees of The University of Delaware, breaks ground with the DGS drilling rig. Behind him is University President Russel C. Jones. The other participants in the program, from left to right, are State Representative Steven H. Amick, John J. Dragonetti of the U. S. Geological Survey, Kenneth N. Weaver of the Maryland Geological Survey, Hon. George E. Hale representing Governor Castle, and Robert R. Jordan, State Geologist and Director.*

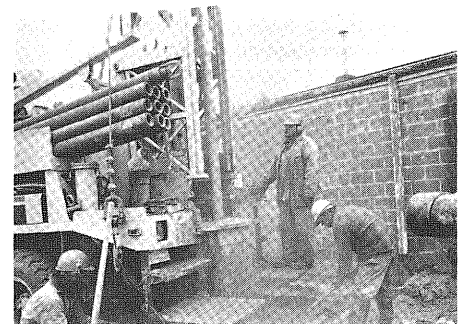


*Structural steel skeleton of the new DGS building is in place. View of the front, which faces north.*

## Construction Update

Substantial progress has been made during the last few months on the DGS Building. Underground placement of utilities is complete, the concrete slab has been poured, and structural steel was erected in May. Completion is scheduled for March 1989.

In April, a 265-foot test well was drilled by the Walton Corporation of Newark. At a depth of about 55 feet the drill hole encountered a tough crystalline rock, a biotite-quartz-plagioclase gneiss that probably extends into adjacent Cecil County, Maryland, where it has been recently mapped. This



*Test well being drilled by the Walton Corporation is located within the garage site of the new DGS building. Building in background will be demolished during second phase of construction.*

confirms that the building has a solid geological "foundation." The well will be used to develop and calibrate our geophysical logging equipment and for educational purposes. It is located inside the site of the garage of the new DGS building. The DGS appreciates the generosity of the Walton Corporation who donated their services.

## Drill Hole Near Lewes Reveals New Data

A deep hole drilled in October 1987 near Lewes penetrated a glauconitic sand unit of early Miocene age overlying a glauconitic silt unit of Oligocene-early Miocene age. The units extend from a depth of 1,020 feet to total depth of the well at 1,337 feet. The top of the upper glauconitic sand unit is 52 feet below the base of a 70-foot thick, coarse-grained, shelly sand section correlative with the sands of the Cheswold aquifer of the lower Calvert Formation. The top of the lower glauconitic silt unit occurs between 1,151 and 1,172 feet. The information is based on studies by A. S. Andres, R. N. Benson, and J. H. Talley of geophysical logs and samples from the test hole.

Microfossil studies by R. N. Benson indicate an unconformity within the glauconitic silt unit at a depth of 1,218 feet. The sample immediately above that depth contains fossils that identify the lowest biozone of the Miocene, the *Globorotalia kugleri* planktic foraminiferal zone. The glauconitic silts and sands above 1,218 feet were deposited in outer neritic (300-600 feet) water depths. Microfossils from all samples below 1,218 feet identify the *Globorotalia opima opima* biozone, which spans the time interval between late early and early late Oligocene. The uppermost Oligocene biozone, the *Globorotalia ciproensis* zone, is missing. Additional evidence for a hiatus at 1,218 feet is a jump from an outer neritic paleoenvironment above that well depth to a deep upper bathyal (1,000-1,500 feet) one below.

Observation wells for determining water quality, water-yielding capabilities, and water levels and associated gradients were constructed in the Choptank Formation (screened from 390-410 feet) in the deep test hole, Oh25-02, and in the Manokin aquifer (screened from 210-220 feet and 232-240 feet) in a second hole drilled at the site, Oh25-03. J. H. Talley determined that the water from the Choptank Formation is relatively hard, is non-potable (600 mg/l of chloride), and low-yielding probably because the sands are cemented by dolomite. Water from the Manokin is fresh and its yield is rated good to excellent.

The project was supported by the Continental Margins Program of the U. S. Department of Interior's Minerals Manage-

ment Service. The Program is a cooperative agreement with the University of Texas at Austin on behalf of the Association of American State Geologists. John H. Talley and Richard N. Benson were co-principal investigators for the DGS project.

## Southeast Area Sand Inventory Project (SEASIP)

The DGS has begun a project with the Beach Preservation Section, Division of Soil and Water Conservation, Department of Natural Resources and Environmental Control, to assess the occurrence and availability of onshore sand resources for beach nourishment along Delaware's Atlantic Coast. Existing borrow operations will be evaluated as sand sources for the short-term nourishment program. Through geologic mapping, areas will be identified that contain acceptable material of sufficient volume to provide sources of borrow for several years for the long-term program.

Although Delaware has an abundance of sand, only a small portion of the total amount is useful for beach nourishment. The texture (size and sorting of sand particles) of beach sands is determined by the activity and energy of the waves on the beach. That is why beach sand has a characteristic feel and appearance. Sand that is too fine will either blow or wash away. For example, the beach at Cape Charles, Virginia, was recently nourished with very fine sand which was soon piled by the wind into dunes in yards, streets, and other unwanted places. Adding sand that is too coarse makes walking and recreational activities in barefeet unpleasant and tends to make the beach steep and narrow. Exploration for beach nourishment material, then, concentrates on finding sand that has a texture similar to that of the existing beach and that can be economically removed and transported to areas where it is required.

Information derived from the research will also be used by the DGS in support of its investigations of the water, mineral, and other earth resources in southeastern Sussex County. Principal investigators of the project are John H. Talley and Thomas E. Pickett.

## Hydrology News

### Eastern Sussex County Ground-Water Study Continues

A multi-year project in eastern Sussex County focuses on ground-water flow and ground-water quality in the Columbia

aquifer, which is the near surface aquifer that supplies water to most wells and provides fresh water to sustain the flow of local streams. The results of the project will be used for the planning and management of water resources in the Inland Bays region.

Drilling, construction, and sampling of monitoring wells have been major activities since the project was announced in the Winter 1988 issue of *First State Geology*. To date, 21 monitoring wells have been installed and at least 7 more are planned.

Because well installation is an expensive and time-consuming activity, a number of existing privately owned wells are being sampled during the project. To date, nearly 50 wells have been identified as having proper construction characteristics for sampling. Requests for sampling access were mailed and about one-third of the well owners responded positively. More sampling requests will be mailed and property owners who receive them are encouraged to participate in the project. For additional information contact Scott Andres at the Survey offices (302-451-2847).

### New Castle County Project

The Water Resources Agency for New Castle County has published a three-volume map set titled "Water Resource Protection Areas for the City of Newark, City of Wilmington, and New Castle County, Delaware." The maps, which were prepared in part from published geologic and hydrologic maps and reports of the Delaware Geological Survey and in consultation with Survey staff, contain information on the Cocksylville Formation, wellhead, surface water, and recharge resource protection areas.

The program was developed as an initial step in an effort to increase the protection of public as well as domestic water supply sources in New Castle County through modification of local zoning codes and to identify areas requiring additional investigation.

## State Mapping Advisory Committee (SMAC)

By W. S. Schenck  
Co-Chairman, SMAC

The meeting of the Delaware State Mapping Advisory Committee (SMAC) at the DGS, April 27, focused on digital mapping and Geographic Information Systems (GIS). Both cartographic systems are of great interest to many Delaware agencies. Discussions at the meeting also resulted in these recommendations for U. S. Geological Survey (USGS) mapping in Delaware:

1. A program dedicated toward total

revision of the 7.5-minute topographic quadrangles in Delaware.

2. Immediate production of the hydrography data layers for the 1:100,000-scale digital line graphs that will give Delaware complete coverage of digital base maps.
3. Continued production of the 1:24,000-scale digital line graphs for GIS users in the State.
4. Conversion of the metric contours on the 1984 coastal and inland bays quads to feet.
5. Continued production of orthophoto-quads of the State.
6. Support for alternating the new National Aerial Photography Program (NAPP) leaf-on leaf-off.

SMACs were originally proposed by the USGS as a way for each state to have some direction and input into the USGS mapping program within its boundaries. Representatives from state, county, and local agencies gather together for a yearly evaluation of the USGS mapping activities.

Since its inception ten years ago, Delaware's SMAC has evolved into a state mapping coordinating body whose members bring to its annual meetings information concerning new mapping projects and cartographic products that can benefit agencies that use maps. At the 1987 meeting, SMAC took the first step toward coordinating the digital and GIS efforts among Delaware agencies by establishing the Digital Subcommittee. Since then the subcommittee has further evolved, under the Delaware Office of Information Systems, to a group working toward future cartographic compatibility among Delaware's many agencies.

## Cartographic Corner

By W. S. Schenck  
Coordinator, DGSCIC

- The Wilmington North and Wilmington South 7.5-minute quadrangles were photo-revised by the U. S. Geological Survey (USGS) in 1987. These and all other Delaware quads are available through the DGS Cartographic Information Center for \$2.50 per quad.
- 1:100,000-scale (100k) and 1:24,000-scale (24k) quadrangles of Delaware are available as digital products from the USGS. Transportation and boundary digital layers of the Wilmington, Dover, Seaford, and Salisbury 100k quadrangles are available to users. The USGS plans to digitize the hydrography layers in the near future. Transportation, boundary, and hydrography data layers are now available for the 7.5-minute (24k) Elkton, Cecilton, Middletown, Hickman, Greenwood, and Seaford East quadrangles in

Delaware. Boundary and hydrography data layers are available for Wilmington North, Wilmington South, Marcus Hook, and Saint Georges. Data layers for both the 100k and the 24k quadrangles are available on 9-track tapes in Digital Line Graph (DLG) format.

- A reminder that 1:250,000-scale (250k) land use/land cover map data for Delaware are also available as digital products. Included are land use/land cover polygons, political units, hydrologic units, census units, census tract subdivisions, and federal land ownership data layers. The Wilmington and Salisbury 250k quadrangle land use/land cover digital information is also available on 9-track tapes.
- The USGS contracted, in 1987, for Side-Looking Airborne Radar (SLAR) data that will be collected this summer. Photographic mosaics as well as digital subsets should be available to users by mid-1989.
- The National Geodetic Survey (NGS) has personal computer programs available to help Delaware's geodetic control users change to the North American Datum of 1983 (NAD83). The two programs of interest are LEFTI and SPCS83. LEFTI transforms geographic positions from one datum to another, i.e., NAD27 to NAD83. SPCS83 converts NAD83 state plane coordinates to NAD83 geographic positions and vice versa. DGSCIC will purchase these programs and provide transformations of positions as a service.
- The North American Cartographic Information Society (NACIS) will hold its annual meeting October 12-15, 1988, in Denver, Colorado, and has issued a Call For Papers. The theme of this year's meeting is "Expanding Frontiers." For more information or to submit an abstract, please contact Juan Jose Valdes, NACIS Program Chair, Cartographic Division, National Geographic Society, 1600 M Street, N.W., Washington, D.C. 20036, 202-775-7873.

For further information please contact the Delaware Geological Survey Cartographic Information Center (DGSCIC) at 302-451-8262.

## Publications

### Recent DGS Publications

#### Hydrologic Map Series

No. 7 Geohydrology of the Southern Coastal Area, Delaware, Sheet 2, Geohydrology of the Columbia Aquifer: J. H. Talley, 1988.

#### Miscellaneous Map Series

No. 1 Availability of Earth Science Maps of Delaware, 1988 update.

#### Information Series

No. 5 Earthquakes in Delaware: K. D. Woodruff, 1988

### Other Publications by DGS Staff

T. E. Pickett, 1988, James C. Booth - The papers of a nineteenth-century chemist-geologist: Collections, University of Delaware Library Associates, v. 3, p. 20-35.

### Forthcoming Publications

Hydrologic Map Series No. 6

Geology of the Chesapeake and Delaware Canal Area, Delaware, Sheet 2, Thickness of the confining unit beneath the water-table aquifer: K. D. Woodruff, 1988, scale 1:24,000.

Bombay Hook Quadrangle (BBH) Atlas, N. Spoljaric, editor.

Little Creek Quadrangle (LTC) Atlas, N. Spoljaric, editor.

Clay and clay-size mineral composition of the Cretaceous-Tertiary section, test well Je32-04: N. Spoljaric.

Ground-water levels, 1977-1987, J. H. Talley.

## Jordan Receives AAPG Distinguished Service Award

Robert R. Jordan, State Geologist and Director of the Delaware Geological Survey, received the Distinguished Service Award of the American Association of Petroleum Geologists (AAPG) at the annual AAPG meeting in Houston on March 21. Jordan was recognized for his contributions as a public geologist, in particular his extensive work with Delaware State government in drafting natural resource legislation and regulations, and his articulation of the role of geology in public policy.

His AAPG service includes membership on the North American Commission on Stratigraphic Nomenclature, the Select Committee on the Outer Continental Shelf (OCS), and chairmanship of the ad hoc Committee on Opportunities in Water Resources and Waste Management.



Lawrence W. Funkhouser (on left), AAPG President, presents Distinguished Service Award to Robert R. Jordan.

## DGS Staff Photograph

Because all staff members of the Delaware Geological Survey were at the April 8 ground-breaking for the new DGS building, it was an appropriate time to take their picture. It is not often that everyone is at the same place at the same time and not dressed for field work. From left to right, Tom Smith, Scott Andres, Nenad Spoljaric, Ken Woodruff, Tom Pickett, Bob Jordan, Dick Benson, Marlene Carucci, Roland Bounds, Johan Groot, Kelvin Ramsey, Dorothy Windish, Sandy Schenck, and John Talley.



## Staff Notes

Congratulations to **Bob Jordan**, Director, **Marlene Carucci**, Executive Secretary, and **John Talley**, Senior Scientist. Jordan and Carucci each completed 30 and Talley 15 years of service with the DGS in May 1988.

**Kelvin W. Ramsey** has been appointed to the position of Research Associate II. He will serve as Project Geologist for the Southeast Area Sand Inventory Project (SEASIP).

**Richard N. Benson**, Senior Scientist, represented the State of Delaware at the February 5 meeting in Chantilly, Virginia, of the Mid-Atlantic Regional Technical Working Group of the Outer Continental Shelf (OCS) Advisory Board to the Secretary of the U. S. Department of Interior. He also received additional contract funds for "Geologic Framework and Hydrocarbon

Potential Offshore Delaware Bay" under the Continental Margins Program Cooperative Agreement between the U.S. Department of Interior's Minerals Management Service and the Association of American State Geologists.

**Robert R. Jordan**, State Geologist and Director, represented Delaware at the meeting of the OCS Policy Committee of the OCS Advisory Board in New York City, April 6. He chaired a panel discussion on Atlantic offshore activities.

**Thomas E. Pickett**, Associate Director, served as one of the judges of high school student oral presentations for the Delaware Junior Science Symposium held at the University on March 28. He led a field trip to selected geologic sites in New Castle County for the Delaware Nature Education Society on April 6.

**John H. Talley**, Senior Scientist, has

been reappointed by DNREC Secretary John E. Wilson III as chairperson of the On-Site Systems Advisory Board. Talley participated in a symposium in January sponsored by the American Society for Testing Materials titled "Standards Development for Ground Water and Vadose Zone Monitoring Investigations."

**Kenneth D. Woodruff**, Associate Director, taught a two-day course on geophysical well logging for personnel of the U. S. Geological Survey at Towson, Maryland, January 19-20. Woodruff and Pickett represented DGS at the Cluster Meeting of eastern state geological surveys and the U. S. Geological Survey in Birmingham, Alabama, February 22-24. Cluster meetings are useful for the exchange of information and coordination of efforts between the state and federal surveys.

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