weathering schist with locally abundant quartz-plagioclase-biotite granulite in 4- to 10-cm thick beds. Also included are thin units of rusty, graphitic schist, slabby calc-silicate granulite, gray weathering schist, and bedded wollastonite marble. These features suggest correlation with the Sangerville Formation of central Maine, rather than the more proximal, conglomeratic Rangeley Formation of western Maine.

Units interpreted as the local pre-Silurian basement of the Merrimack belt are present with the cover in a series of west-directed, pre-peak metamorphic, Acadian thrust nappes, overturned to the east. The basement is characterized by plagioclase gneiss with interlayered amphibolite, like Monson Gneiss to the west, but also contains smaller amounts of other rocks, suggesting closer correlation with units east of the Merrimack belt. In particular, the belt at Leadmine Pond contains mappable units 20-150 feet thick of sulfidic sillimanite-graphite-coarse feldspar schist, well layered amphibolite with hornblende clots, thickly bedded garnet quartzite with minor rusty sillimanite schist, light green, diopside calc-silicate with minor marble, and two-pyroxene granulite. Locally present are garnet amphibolite, brown-weathering feldspathic gneiss, magnetite-bearing alaskitic gneiss, and gray, garnetiferous gneiss. This lithologic assemblage suggests possible correlation with the Waterford Group (Conn.), or western part of the Neshoba Formation (Mass.), or Mt. Ararat, Richmond Corner, and Nehumkeag Pond units (Maine). If any of these correlations is correct, rocks east of the Clinton-Newbury fault may extend westward under this part of the Merrimack belt, where they are involved in early Acadian structures.

№ 1485

TIMING OF PALEOZOIC PLUTONISM IN THE MIRAMICHI TERRANE, NEW BRUNSWICK

BEVIER, Mary Lou, Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario, Canada K1A 0E8

Intrusive activity occurred throughout middle Paleozoic time in Miramichi terrane;however, two major plutonic episodes have been distinguished. Although U-Pb systematics for zircons from the granitic rocks reflect both significant inheritance and Pb loss, the new data obtained in this study provide additional constraints on the timing of plutonism in this area.

Intrusive rocks from the earlier episode are pervasively deformed and include biotite-muscovite ± garnet-bearing (S-type) units which are probably consanguinous with silicic volcanic rocks of the Tetagouche Group. New U-Pb ages are reported for the following deformed plutons: Fox Ridge (452 +15/-1 Ma), South Renous (448 +17/-16 Ma), Mullin Stream Lake (458 +16/-1 Ma), Serpentine River (454 +12/-9 Ma), and Meridian Brook (464 +43/-10 Ma).

Granites from the second intrusive episode are mostly undeformed and include S-, I-, and A-types (in decreasing abundance). Previously published Rb-Sr, K-Ar, and Ar-Ar ages for these granites are Early to Middle Devonian. A new U-Pb age of 414 +11/-1 Ma for alkali granite from the undeformed Mount Elizabeth intrusive complex confirms the existence of Silurian plutons in the later episode and extends its range.

Zircons from Miramichi terrane granites show evidence for an inherited component of probable middle Proterozoic age, suggesting that older basement was present in the granite source area. Initial Pb isotopic ratios for these granites also indicate a distinct Precambrian component.

№ 21034

GROUNDWATER AND A GLACIAL LAKE - WILLIAMSTOWN, MASSACHUSETTS

BIERMAN, Paul R., Department of Geology, Univ. of Washington, Seattle, WA 98105 and MARLER, Linda, Ground Water Associates, 15 Ryder St., Arlington, MA 02174

To characterize the hydrogeology of the Hoosic River Valley in northwestern Massachusetts, we installed 27 monitoring wells, performed extensive water quality and sediment grain size analyses, and conducted a 74 hour aquifer test. Our study was performed to determine the potential impact of several solid waste disposal sites on existing and proposed municipal wells.

This investigation delineated three unconsolidated, hydrogeologic units overlying dolomitic bedrock: 1. A shallow water table aquifer in channel and overbank deposits of the present and ancestral Hoosic River (up to 12m of sand, gravel, and silt). 2. A glaciolacustrine aquitard — rhythmic deposits of glacial Lake Bascom (20 to 40m of silt, clay, and fine sand). 3. A deep confined aquifer in glaciofluvial and subaqueous ice contact deposits (5 to 10m of sand and rounded gravel).

Deep aquifer characteristics were determined from pumping test and laboratory data. In most of the study area, static water levels in the deep aquifer are more than 10m above ground surface. Vertical gradients under nonstressed conditions range from 0.345 to -0.275. We determined a conservative transmissivity of 26,000gpd/ft and a coefficient of storage of 10^{-4}. Triaxial permeabilities of fine grain samples of the aquitard range between 10^{-7} to 10^{-8}cm/sec. Grain size analyses indicate that the aquitard coarsens where a major drainage entered Lake Bascom. Where the confining unit loses its integrity, ground water exists in a single water table system.

№ 1600

GLACIAL-MARINE SEDIMENTS OF THE INNER CONTINENTAL SHELF AND SEACOAST REGION OF NEW HAMPSHIRE

BIRCH, Francis S., Department of Earth Sciences, University of New Hampshire, Durham, NH 03824

The glacial-marine sediments of the inner shelf differ from those of the seacoast region below the marine limit (about 30m near the Massachusetts border and 70m near Maine). Differences are only in part due to methods of study (seismic reflection and cores on the shelf; well samples and outcrops on land).

On the shelf, seismic profiles show the glacial-marine sediments ("Unit 2") as a draped, acoustically-layered unit of relatively constant thickness. There is less layering in the central part than at the top or bottom. In places a strongly layered sub-unit is found at the base of Unit 2. Vibracores from the central part in shallow water consist of sandy mud and mud with thin layers of fine sand, rare dropstones and abundant microfossils and macrofossils. Unit 2 is interpreted as distal glacial-marine outwash. The role of ice and the age with respect to sea-level are controversial.

Glacial-marine sediments on land are more complex. Ice-contact deltas of sand and gravel dominate the landscape. They occur in closely spaced rows marking successive edges of the ice. In contrast there are no such deposits on the shelf indicating that calving was faster, on a larger scale or unaccompanied by abundant melt water.

Away from the deltas near the marine limit, the glacial-marine deposits have a four-part stratigraphy. The basal facies is thick-bedded sand with gravel and mud layers (proximal outwash). The second facies is mud (distal outwash). The third is interbeded mud and thin sand layers (storm deposits as the sediments built to wave-base in the high post-glacial sea). The final facies is a sand sheet found only within a few kilometers of the marine limit (variously interpreted as "outwash," "shore," "shallow marine" and "eolian"). Draping of the glacial-marine deposits is slight to absent and decreases upward. Fossils are very rare and inadequately described.

№ 2910

SAND AND GRAVEL DEPOSITS ON THE INNER CONTINENTAL SHELF OF NEW HAMPSHIRE

BIRCH, Francis S., Department of Earth Sciences, University of New Hampshire, Durham, NH 03824

Mapping and evaluation of sand and gravel deposits were the purposes of this study. Locations, volumes and textures were determined from seismic reflection surveys, side-scan sonar surveys, grab samples and vibracores.

The deposits lie in water depths of less than thirty meters where they overlie bedrock or an unconformity cut into sandy glacial-marine mud (Presumpscot Formation analog). They occur in three distinct forms. Shoreface wedges extending seaward from modern beaches are one type. Another type includes free-standing sheets and mounds. A third category, composed largely of broken shells, lies landward of the rocky Isles of Shoals. Maximum sand thicknesses range from ten to fifteen meters.

The sands are mainly very fine to fine sand (trapped on 4ϕ to 3ϕ seives). The surface sands fine southward and generally are coarser than the interior sediments. Gravel is rare and also decreases southward, the dominant direction of bottom currents. This transport direction, textural relationships to other sedimentary units and the prominent unconformity beneath them all suggest that the sand was derived in part from the sandy glacial-marine mud and in part from coastal erosion. A Holocene age is implied by location with respect to the Late Wisconsinan glacial-marine sediments and by radiocarbon dates from analogous sands elsewhere on the shelf.

Total volume of the deposits exceeds 106 million cubic meters with half found in just two large deposits. The total quantity, quantity per unit area, and size of individual deposits are significant compared to deposits on land in southeastern New Hampshire.

№ 2976

GEOHYDROLOGIC CHARACTERIZATION FOR ENVIRONMENTAL ASSESSMENT OF LOW-LEVEL WASTE DISPOSAL AT THE WEST VALLEY DEMONSTRATION PROJECT

BLICKWEDEHL, Robert R., Dames & Moore, P.O. Box 191, West Valley, New York 14171

The site of the U.S. Department of Energy's West Valley Demonstration Project contains a closed nuclear fuel reprocessing plant, high-level radioactive waste management facilities, and low-level waste storage and disposal areas. The site is located on a fairly level plateau which is underlain by a sequence of glacial, interglacial and post glacial deposits that fill a valley carved out of Devonian shale bedrock.

The glacial deposits are dominated by silty clay tills which have very low hydraulic conductivities. The interglacial deposits are somewhat coarser grained but still have low hydraulic conductivities.

The site has been studied extensively for more than 10 years. Recent studies have focused on the weathered till, which comprises the upper 300 cm of the soil column and is more permeable than the unweathered till below it as a result of extensive desiccation fracturing.