A continuous core hole (CO Dc 152) was drilled between May 19 and 26, 2010 by USGS Geologic Division. The core hole was drilled through the Pensauken, Choptank, and Calvert Formations, some possible Oligocene sediments, and the top of the Piney Point Formation, to a depth of 400 feet (ft), with a core recovery rate of 76 percent. Cores were described in detail on site, and subsamples were collected for biostratigraphic analysis of dinoflagellate cysts and calcareous nannofossils. Samples of shell material were analyzed in the laboratory for strontium isotopes. Geophysical logs (gamma radiation, 16- and 64-inch resistivity, single-point resistivity, self-potential, and 6-ft lateral) were run in the open hole by the Delaware Geological Survey.

Test wells CO Dc 153, 154, 155, and 156 were drilled between August 2 and August 11, 2010 to depths of 310, 249, 215, and 156 ft, respectively. Drill cuttings were collected at 10-ft intervals, and three split-spoon core samples were collected at intervals where continuous core was not
recovered. The wells were screened with 4.5-inch diameter SDR-17 PVC; with 0.02-inch slot and were cased to the surface with 4.5-inch SDR-17 PVC pipe and completed with steel protective casings and locking caps.

The test wells penetrated (from top to bottom) the Surficial aquifer, the Choptank aquifer/confining unit, and the Calvert aquifer system. CO Dc 156 was screened in the Choptank aquifer, which at the test site consists of fine to medium, silty sand with varying amounts of shell material, interbedded with clay/silt intervals. Wells CO Dc 153, 154, and 155 were screened in several sands of the Calvert aquifer system, which consisted of greenish-gray fine to medium-grained gray silty sand with shell fragments, and interbedded clay intervals.

The completed wells were developed using compressed air to remove drilling fluid and fine-grained sediment from the well bores and screens. Twenty-four hour aquifer tests were conducted on CO Dc 153, 154, and 155 at pumping rates of 86 gallons per minute (gpm), 18 gpm, and 80 gpm, respectively. During each test, there was a significant tidal fluctuation in the observation wells, caused by tides in the Choptank River, located about 200 ft from the test wells. The tidal fluctuation in the observation wells tended to mask any drawdown caused by the pumping well, complicating the analysis of aquifer connectivity. Data analysis is continuing.

Water samples were collected from CO Dc 153, 154, and 155 during the aquifer tests. Samples were analyzed for field parameters (pH, alkalinity, specific conductance, dissolved oxygen), major ions, nutrients, metals, and radionuclides. None of the U.S. Environmental Protection Agency’s Primary Drinking Water Standards were exceeded.

<table>
<thead>
<tr>
<th>Well number</th>
<th>Permit number</th>
<th>Screened interval (feet below land surface)</th>
<th>Aquifer</th>
<th>Pumping rate (gallons per minute)</th>
<th>Transmissivity (feet squared per day)</th>
<th>pH</th>
<th>Total dissolved solids (residue on evaporation at 180° C.) (milligrams per liter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO Dc 153</td>
<td>CO-95-0860</td>
<td>286 - 302</td>
<td>Calvert</td>
<td>86</td>
<td>Not applicable</td>
<td>8.6</td>
<td>364</td>
</tr>
<tr>
<td>CO Dc 154</td>
<td>CO-95-0861</td>
<td>232 - 244</td>
<td>Calvert</td>
<td>18</td>
<td>Not applicable</td>
<td>8.4</td>
<td>321</td>
</tr>
<tr>
<td>CO Dc 155</td>
<td>CO-95-0862</td>
<td>184 - 209</td>
<td>Calvert</td>
<td>80</td>
<td>Not applicable</td>
<td>8.2</td>
<td>339</td>
</tr>
<tr>
<td>CO Dc 156</td>
<td>CO-95-0942</td>
<td>66 - 76</td>
<td>Choptank</td>
<td>(No pumping test performed)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After testing was completed, pressure transducers were installed in all four test wells to continuously record water levels at 6-minute intervals, between October 18 and December 16, 2010. A tide gage was also installed on an unused pier on the Choptank River from October 13 to November 30, 2010 to correlate water-level fluctuations in the test wells with tides in the river.

Reference

For more information, contact David D. Drummond, Maryland Geological Survey, ddrummond@dnr.state.md.us
DNR Publication Number: 12-9192011-527, December, 2011

Other Contact Information: DNR: Toll free in Maryland: 1-877-620-8DNR; Maryland Geological Survey: 410-554-5500; TTY users call via the MD Relay
Internet Address: www.dnr.Maryland.gov
Maryland Geological Survey: www.mgs.md.gov

- The facilities and services of the Maryland Department of Natural Resources are available to all without regard to race, color, religion, sex, sexual orientation, age, national origin or physical or mental disability.
- This document is available in alternative format upon request from a qualified individual with disability.

Printed on recycled paper.