MEMORANDUM

To: Groundwater Advisory Council
From: H. Bokuniewicz
Re: Minutes of the meeting of 21 November, 2005
Date: December 2, 2005

PRESENT	**REGRETS**
M. Benotti	M. Alarcon
H. Bokuniewicz	N. Bartilucci
S. Colabufo	L. Koppelman
S. Jones	R. Liebe
J. Milazzo	G. Proios
M. Nofi	K. Willis
B. Nemickas	P. Witkowski
D. Paquette	
S. Robbins	
K. Roberts	
W. Spitz	
S. Terracciano	

1. The minutes of the last meeting were not available.

2. The USGS Albany Office is planning a USGD/DEC "Summit" in Troy. Although the exact date has not been set, representatives from the LI offices of the DEC and the USGD might want to attend since funding priorities are expected to be discussed. Most of the previous priorities upstate have been funding for upstate gaging stations etc. but upstate programs are not as extensive as those on Long Island. The existing LI program for tidal data telemetry may be eliminated however, and perhaps a program of investigations in the Lloyd should be proposed.

3. Mark Benotti is a Ph.D. candidate at Stony Brook who has been working with Bruce Brownawell as an EPA STAR fellow on the occurrence and fate of emerging contaminants. He has also been working with Steve Terracciano at the USGS Office preparing a fact sheet on pharmaceutically active compounds (PhACs) and personal care products (PCPs). He has developed LC-T0F-MS methodology for the analysis of such compounds to investigate their occurrence in both surface water and groundwater and to explore the processes controlling their mobility. The concentrations in natural waters are very low, in the nanogram per liter range which is equivalent to one dose of Advil in an Olympic-sized swimming pool. These compounds can enter groundwater though on-site sewage treatment systems which are used by 60% of Suffolk County households, as well as through sewage water reuse.

   In cooperation with the USGS about seventy-two wells were sampled mostly in the glacial aquifer. Fifty-two were sampled by the USGS with an average depth of 250 feet. Samples from the deep wells showed detects below the median concentrations

found in surface waters in the USGS National Reconnaissance Survey, except for Prozac which was detected at levels above the median concentrations found in surface waters. The most frequently detected compounds were epileptic drugs, caffeine, and antibiotics. Three sewage treatment plants were sampled and antidepressants were found most frequently.

Twenty shallower wells were sampled by Mark. The shallower wells were purposely set close to point sources and had an average depth of sixty-two feet. Mark also sampled five sewage treatment plants. The shallow well concentrations were about twice as high as concentrations in the deep wells but, typically concentrations in groundwater were about one-tenth the median concentrations in surface water. Some detects, however, were at concentrations higher than the USGS median concentrations in national surface waters but these were from susceptible locations. The most frequently detected contaminants included caffeine and nicotine degradates.

Detection limits are in the sub ppt (part-per-trillion) range and the highest concentrations were less than about 60 ppt. Prozac concentrations were detected at levels higher than the median value in US surface waters and, in general, concentrations in groundwater were higher than those reported from Europe (Germany). There is no literature on toxic or health effects. Any effects have usually been reported only at mg/l concentrations and detects in natural waters have been at the nanogram per liter level. Hormones are effective at very low levels but the evidence is that they are not very mobile. The general population probably does not understand these results. As detection methods improve, more detects occur. This doesn't necessarily mean there are more compounds in the water than before, but with aging populations and more, new drugs there may be increased loadings to the environment.

At a nursing home site, monitoring wells were set around the septic system. The flow was about one foot per day. Water temperatures in the samples were elevated, suggesting that the monitoring wells were intercepting the plume. Caffeine was removed below detection limits within 250 meters by a combination of bacterial degradation and dilution. Some samples were frozen perhaps for future study of inorganic chemicals, DOC, anions and cations in order to independently calculate the dilution effects. The substances that were rapidly removed, as expected, included both those with a low solubility or high rate of microbial degradation. Compounds with high solubility and/or low degradation migrated most readily as expected.

Work on Cape Cod was done in cooperation with "Silent Spring" about 20-feet down gradient of a buried leach-pit. Compounds migrated well horizontally and the plume was bounded by a redox boundary about a foot-wide. The plumes were anoxic and ammonia levels were high. EPTA, used in food additives and shampoos, was detected and showed evidence of removal. Compounds tended to behave conservatively in the plume itself but there tended to be rapid removal of things like DAS and caffeine in the redox zone. Estrone, however, persisted in the redox zone.

The compounds with the highest loading were caffeine and paraxanthline, but carbumazepine and sulfamethoxozole were determined to be the best traces based on a variety of factors. Most PHAC's appear because of human, pass-through but some states have instituted buy-back programs to prevent unused medications from

entering the aqueous waste stream. STPs do not chlorinate and pharmaceuticals tend to survive STPs. PHACs are sensitive to bacterial degradation and oxygen levels so, perhaps, treatment processes could be modified to remove pharmaceuticals by increasing the residence time or binding with Fe.

Mark hopes to defend his thesis in March. We will look into distributing his results by Power-Point although the USGS data cannot be distributed before their internal review is complete.

4. The SCWA application for a well into the Lloyd in Northport is three years old. The moratorium was put in place when wells were proposed for air-conditioning units at Roosevelt Field until such time that sufficient studies allowed the DEC to make rules and regulations. SCWA already has three Lloyd wells in Huntington and there are a good number along the north shore in Nassau County. The current SCWA application was characterized by models and pumping test but there are serious political/administrative obstacles. There seems to be some concern to preserve the Lloyd as a potential source of fresh water in a dire emergency. The DEC Commissioner can lift the moratorium if there is sufficient evidence on such parameters as capacity, recharge rate, safe yields discharge, and water levels. It would also be useful to examine the extent of influence between different parts of the Lloyd i.e. how fast does the hydraulic head decrease.

The value of the Institute convening a symposium on the technical studies of the Lloyd was discussed. George Proios could not attend this meeting but recommends that the Institute confine any symposium to the technical and scientific issues and not attempt to settle controversial policy or management issues. The Institute should not be in any way, seen as “lobbying” for or against the standing moratorium. However, the technical issues have not been comprehensively re-examined in decades. The purpose would be to raise the level of scientific discourse and to compile the fragmented studies done in the last few decades. In any event, such a review of the recent studies would be useful in establishing whether or not there is a sound working knowledge of the dynamics of the Lloyd and in focusing further discussion on the outstanding issues. Such a review of the recent research would not necessarily change the DEC’s position on the moratorium but at least it would remove some of the uncertainly in the discussion and unnecessary restriction on intelligent management. To lift the moratorium, even partially, DEC would need to have a workable program in place. To be valuable, care would have to be taken to keep the discussion focused on science and not digress into controversial management or policy issues. Speakers would be invited. We might consider a meeting as early as January, perhaps at Bethpage, but BNL or SUNY are other options. We’d anticipate participation from the USGS (Paul Misut has been modeling the system in Queens) and CDM (Mary Ann) and, perhaps, Paul Grosser (P.W. Grosser Consulting), CDM and/or Malcolm Pirnie and Don Cohen or Dan St. Germaine, on the Brooklyn/Queens Section involved in the ARS proposal. Steve Colabufo has modeled the section in Northport for the Water Authority. Of course, the information gaps and need for future research defined. We should look at the SWAP results for the Lloyd and revisit the need for offshore wells to define the offshore boundary. The proposal for the offshore wind farm may provide a mechanism for getting data on the deep offshore aquifers.

5. The next meeting will be held on Monday, 19 December 2005, 9:30 to 11 AM, at the Offices of Dvirka and Bartilucci in Woodbury.

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