NATIONAL DRINKING WATER ADVISORY COUNCIL

MEETING NOTES

NOVEMBER 11 – 13, 2009

PHILADELPHIA MARRIOTT DOWNTOWN

1201 MARKET STREET

PHILADELPHIA, PA 19107

PREPARED FOR:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF GROUND WATER AND DRINKING WATER

1201 CONSTITUTION AVENUE, NW

WASHINGTON, DC 20004

Members of the National Drinking Water Advisory Council (NDWAC) in Attendance

Gregg Grunenfelder, Chair, Assistant Secretary, Division of Environmental Health, Washington State Department of Health, Olympia, WA

Nancy A. Beardsley, Director, State of Maine Division of Environmental Health, Maine CDC, Department of Health and Human Services, Augusta, ME

Jeff Cooley, Utilities Division Operations Manager, City of Vacaville, Vacaville, CA

Dennis Diemer, General Manager, East Bay Municipal Utility District, Oakland, CA

Timothy Kite, Water Superintendent, Long Creek Township Water Department, Decatur, IL

Olga Morales-Sanchez, Rural Development Specialist, Rural Community Assistance Corporation, Dona Ana, NM

Jennifer B. Nuzzo, Associate, Center for Biosecurity, University of Pittsburgh Medical Center, Baltimore, MD

Douglas M. Owen, Vice President and Chief Technology Officer, Malcolm Pirnie, Inc., White Plains, NY

David Saddler, Manager, Water/Wastewater and Propane Department, Tohono O'odham Utility Authority, Sells, AZ

Duane Smith, Executive Director, Oklahoma Water Resources Board, Oklahoma City, OK

Lisa Sparrow, Chief Operating Officer, Utilities, Inc., Northbrook, IL

Carl Stephani, Executive Director, Central Connecticut Regional Planning Agency, Unionville, CT

Hope Taylor, Executive Director, Clean Water for North Carolina, Durham, NC

Bob Vincent, Assistant Bureau Chief Environmental Health Division, Florida Dept of Health, Tallahassee, FL

Brian L. Wheeler, Executive Director, Toho Water Authority, Kissimmee, FL

U.S. Environmental Protection Agency (EPA) Attendees

Pam Barr, Director, Standards and Risk Management Division (SRMD), Office of Ground Water and Drinking Water (OGWDW), U.S. EPA

Tom Carpenter, OGWDW

Nanci Gelb, Deputy Director, OGWDW

Steve Heare, Drinking Water Protection Division (DWPD), OGWDW

Jyotsna Jagai, Office of Research and Development (ORD), U.S. EPA

Audrey Levine, National Program Director for Drinking Water, ORD

David Travers, Director, Water Security Division, OGWDW

Jacquelyn Springer, OGWDW

Designated Federal Officer (DFO)

Veronica Blette, Chief, WaterSense Branch, U.S. EPA

Centers for Disease Control and Prevention (CDC) Liaison

Dr. Max A. Zarate-Bermudez, Division of Emergency and Environmental Health Services, National Center for Environmental Health, Centers for Disease Control and Prevention (CDC), Atlanta, GA

Science Advisory Board (SAB) Liaison

Dr. Jeffrey Griffiths, Director of Global Health, Tufts University School of Medicine, Boston, MA

Speakers and Members of the Public

Kelly Anderson, Philadelphia Water Department

Jeanne Bailey, Fairfax Water

Vicky Binetti, EPA Region 3

Jonathan Colvin, Cincinnati Drug and Poison Information Center

Frederika Deaue, Water for Life Project

Hayley Farr, The Cadmus Group, Inc.

Vanessa Leiby, The Cadmus Group, Inc.

Adam Lovell, The Cadmus Group, Inc.

Mike Keegan, National Rural Water Association (NRWA)

Howard Neukrug, Philadelphia Water Department

Alexa Obolensky, Philadelphia Water Department

Lisa Ragain, Aqua Vitae

Alan Roberson, American Water Works Association (AWWA)

Jim Taft, Association of State Drinking Water Administrators (ASDWA)

Ed Thomas, NRWA

Jennie Ward-Robinson, Institute for Public Health and Water Research (IPWR)

National Drinking Water Advisory Council

November 2009 Meeting Summary

DAY 1 (November 11, 2009)

OPENING REMARKS

Veronica Blette, Designated Federal Officer (DFO), welcomed the meeting attendees and thanked them for attending the meeting on Veterans Day. She noted that the theme of the meeting was research, and that the agenda featured presentations from the Office of Research and Development (ORD) and presenters from the American Public Health Association (APHA) on research efforts at the utility, state, and federal government on emerging contaminants, geologic sequestration (GS), and other issues. Ms. Blette added that the meeting agenda did not include any consultation issues – a change from previous meetings.

FOLLOW UP SINCE LAST MEETING

Veronica Blette – DFO, EPA and Nanci Gelb – Deputy Director of the Office of Ground Water and Drinking Water, EPA

Nanci Gelb, Deputy Director of Office of Ground Water and Drinking Water (OGWDW), presented updates on the base and American Reinvestment and Recovery Act (ARRA) programs of Drinking Water State Revolving Fund (DWSRF). As part of ARRA, the DWSRF and Clean Water State Revolving Fund (CWSRF) received $2 billion and $4 billion, respectively. The requirements for the ARRA funds differed from the base program in that all funds must be under contract or construction by February 17, 2010, twenty percent of the funds must be used for green projects (e.g., energy and water efficiency), and projects must comply with the Buy American provision and the Davis-Bacon Act. The goals of the ARRA funds were to create jobs, to provide for disadvantaged communities, and to implement green projects.

To meet these deadlines and requirements, OGWDW developed guidance and a database reporting system to capture project level data (e.g., federal grant awards, assistance agreements awarded, projects under contract, projects under construction, and payments). OGWDW estimates that there will be 1,425 ARRA DWSRF projects under contract by February 17, 2010. Many states expect that contracts will begin to be executed in December 2009, though outlays will lag as they will follow the progress of construction.

Ms. Gelb noted that the DWSRF program has now provided approximately $16 billion in assistance, and has approximately $18 billion available. Looking into the future, Congress has appropriated $1.37 billion to the DWSRF in 2010. This appropriation includes the twenty percent green project and Davis-Bacon requirements, as well as a thirty percent floor for subsidies.

David Saddler clarified that the Davis-Bacon requirement set the minimum prevailing wage rate, but does not specify the highest paid wage. He suggested that for some states' prevailing wage rate is thirteen percent higher than the Davis-Bacon requirement.

Ms. Gelb responded that many states are familiar with Davis-Bacon and that record keeping is the major challenge.

Duane Smith inquired about whether Davis-Bacon applied to all funds in the DWSRF program, or just the ARRA funds and 2010 appropriation.

Ms. Gelb stated that the Environmental Protection Agency (EPA) is still trying to interpret Congress' actions.

Mr. Smith asked for clarification on the thirty percent floor for subsidies.

Ms. Gelb responded this provision provides grants to disadvantaged communities. Each state individually defines a disadvantaged community.

Ms. Blette noted that the subsidies from the ARRA are not limited to disadvantaged communities, but are more likely to go to communities that would otherwise not be able to afford a loan.

Mr. Smith applauded the twenty percent green requirement and encouraged EPA to continue working with states to clarify how the requirement will not take away from other public health projects.

Gregg Grunenfelder asked Ms. Blette to comment on states' concern that the green requirement would take away from projects for public health issues. He suggested that if the green requirement is defined correctly, it could in fact support public health issues.

Nanci Beardsley hoped that the green project requirement is defined broadly enough so that the program does not lose its public health focus.

Ms. Blette stated that many states feel that all SRF projects are green, because the projects protect water quality and public health. She suggested that there are many *shades* of green, and that states and utilities are now looking at the water business from a new perspective. For example, how can states prioritize a project to install meters versus a project for arsenic treatment. While treatment has traditionally been prioritized, metering is now important because it supports the sustainability of the system – in other words, reducing use reduces infrastructure and treatment costs. Ms. Blette added that states need to "green" existing projects, by improving energy efficiency. She argued that the there are diverse opportunities for green projects for the CWSRF, since in the past not many systems requested funding for non point source projects. However, it is more difficult for the DWSRF to define what is "green."

Mr. Grunenfelder responded that sustainability and long-term viability of systems is important, but projects solely for energy efficiency improvements stray from the program's public health mission.

Ms. Blette added that states and systems are becoming more aware of climate change, and issues of water quantity and quality.

Jeff Cooley stated that he was concerned with the pressure put on states to prioritize shovel-ready projects to create jobs. In particular, when he analyzed the list of shovel-ready projects in California, many did not meet the real need within the water sector (e.g., they were projects put "on the shelf" by water utilities). Mr. Cooley appreciates that the shovel-ready projects created jobs, however he is concerned that the projects do not meet the real infrastructure needs of the next five to ten years.

Ms.Gelb replied that the shovel-ready contingency did not apply to the base 2009 funds or the new 2010 appropriation. She hopes that the 2009 and 2010 base funds will meet long-term infrastructure needs, and she acknowledged that many states were under pressure to allocate the ARRA funds to shovel-ready projects, and that attention may have been diverted from other pressing needs. Ms. Gelb stated that the up-coming SRF re-authorization ($3.5 billion over five years) adds priority criteria for asset management and sustainability. Other SRF priorities include consideration for small systems, capacity development, and sustainability with respect to disadvantaged communities.

Mr. Saddler stressed his concern about the February 17, 2010 deadline, in particular that shovel-ready projects may have outdated budgets that may be too low to cover the projects' costs. He wondered whether shovel-ready projects may have to go through another bid process, and whether this has been factored into the deadline.

Ms. Gelb responded that EPA encouraged states to open project bids well in advance of the February 17, 2010 deadline. Rather than projects coming in over budget, EPA has heard that projects have come in under estimate, so the additional dollars will need to be re-allocated to other projects. If states do not allocate all ARRA funds by February 17, 2010 EPA will have to re-allocate the ARRA funds to states that met the deadline.

Mr. Grunenfelder explained that one of the changes Washington experienced was that some systems, after signing contracts, no longer wanted ARRA funds because of the "red tape" associated with the funds.

Jennifer Nuzzo asked whether EPA has analyzed the progress made or the accomplishments achieved with ARRA funds.

Ms. Gelb answered that www.recovery.gov is currently the public face for recovery efforts. States are required to report progress (e.g., jobs created, public health outcomes) on a quarterly basis. She acknowledged that once ARRA funds have been utilized, it will be important to accumulate the information and analyze it.

Ms. Nuzzo stated that it is helpful for stakeholders to track work being completed on the recovery.gov site, but that EPA should still synthesize and publicize the information over time. EPA should get credit for having worked so hard to ensure that funds were being spent appropriately and in a timely manner.

Mr. Grunenfelder applauded EPA's efforts, particularly in terms of providing guidance to states. EPA was well ahead of other programs in terms of spending stimulus money.

Ms.Gelb noted that EPA quickly established a Senior Stimulus Committee, with leads from different programs. The Office of Water (OW) also created a Stimulus Steering Committee that included regional members.

APHA PERSPECTIVE: CONNECTING THE PUBLIC TOTHEIR WATER

Jennie Ward-Robinson – Executive Director, Institute for Public Health and Water Research

Ms. Blette introduced the first guest speaker, Jennie Ward-Robinson from the Institute for Public Health and Water Research (IPWR) which conducts international and domestic projects related to drinking water.

Jennie Ward-Robinson noted that her interest in drinking water stems from her family roots in Barbados. Growing up, she understood the relationship between water coming from the sky, and the water that comes out of the tap. However, she stated that this relationship is not well understood in the United States; the experiences and interactions of people who produce and procure water are very different from people who use water. She added that in the developing world, clean water makes the difference between life and death. In the United States, the population must reconsider how water is delivered and used in order to avoid future issues.

Ms. Ward-Robinson stated that IPWR's outreach and education work is grounded on scientific evidence. It is committed to sustainable access to adequate quality drinking water world-wide; this fundamental value crosses the organization's vision, mission, and operating principles. The organization is also committed to community involvement, as communities that own and understand the water source and supply are more likely to communicate and engage with the water utility. Currently the organization funds projects and works with partners across the world, however their most recent project is in Trinidad and Tobago. Ms. Ward-Robinson noted that the country openly recognizes how poverty plays a role in resource allocation and water provisions, and that IPWR is working to understand the challenges of balancing cultural expectations with political demands and communication in the country. She added that prior to launching projects in developing countries it is important to first determine what the public knows about its water sources, what has been promised to them, and whether the government has the capacity to develop infrastructure and set safe standards.

Ms. Ward-Robinson stated that the challenges to sustainability in the Caribbean include cultural and social behavioral changes, intense rainfall, the use of non-covered tanks, and low literacy rates. The organization has learned how to make on-the-ground connections (e.g., through sports stars, politicians, and community champions), and to work with universities and environmental agencies to build capacity. These efforts have helped bring resources and behavioral changes to the communities. This challenge is highlighted by a study completed by University of California, Berkeley, which showed that two to three years after interventions people will revert back to past habits unless behavioral changes occur.

Ms. Ward-Robinson noted that the key take-away message from the APHA conference with respect to water and health is the education gap. Education is important because it gives rise to ownership and conservation, as well as a shared responsibility for the water supply. As part of education, it will also be important to integrate the concept of environmental sustainability for drinking water.

Brian Wheeler asked if IPWR partners with Water for People, adding that he encourages organizations with parallel missions to collaborate.

Ms. Ward-Robinson noted that IPWR works with Water for People and Rotary International, as well as with other organizations. IPWR is a small organization, so most of the work is completed through partners; it tries to extract scientific evidence and best practices, then it convenes groups to spearhead agendas.

Dr. Griffiths asked if IPWR has worked with Rural Water Association and utilized its circuit rider model.

Ms. Ward-Robinson stated that IPWR is aware of the circuit rider model, and she expected that the water champions will fill that role in the communities.

Mr. Cooley agreed that education and impacting actual change is important in communities. He told a similar story about his work with systems in Alabama where sewer water runs on the ground, potentially contaminating ground water, because the communities cannot afford septic tanks. With support, the communities have since built wells, but Mr. Cooley wondered what would happen in the future without a champion in the community. He stated that it is difficult to educate the public on the importance of safe drinking water and the measures taken in the industry to ensure safe drinking water, and added that programs like those established by IPWR are essential to bridge the educational gap in the communities.

Olga Morales-Sanchez noted that the United States can learn from developing countries, but also send a message to developing countries that infrastructure requires long-term sustainability.

Ms. Ward-Robinson stated a summit may be held in the Caribbean region, since many islands are investigating their water infrastructure, which is over one hundred years old. In Barbados, there is a sixty percent failure rate. Many islands are beginning to think about desalination.

Max Zarate-Bermudez inquired about how IPWR organizes a collaboration group, at both the local and international levels.

Ms. Ward-Robinson answered that there are twenty individual groups in Trinidad, and through connections at universities, the government and government offices, IPWR was able to build interest. In the United States, Ms. Ward-Robinson spoke with Ms. Blette and the American Water Works Association about specific water issues and how to think about the issues in the context of health, national security, and other vulnerabilities. Ms. Ward-Robinson offered that people are willing to engage if they understand the benefits of the project and their role in the outcome.

Hope Taylor thanked Ms. Ward-Robinson for her work, stating that her organization just completed a water justice canvas across hundreds of households to understand perceptions of water.

They found that the myths about bottled water are dissipating and upward trends in local participation in the provision of public water.

UPDATE ON CLIMATE READY WATER UTILITIES WORK GROUP

David Travers - EPA Water Security Division

Ms. Blette introduced David Travers, the Director of OGWDW's Water Security Division (WSD), stating that Mr. Travers would present on the status of the Climate Ready Water Utilities (CRWU) Work Group and on active and effective security programs.

David Travers noted that the CRWU Work Group was created after the May 2009 NDWAC meeting in Seattle, Washington. Over the last few months, candidates were identified and nominated, and the working group was formed.

The WSD is developing a climate change assessment tool that focuses on the adaptation and assessment of climate change impacts for water utilities. The tool will downscale temperature and precipitation data based on the water utility's specific location. The tool is based on a draft framework, designed by a broad work group of technical experts, software developers, and agency leaders. Mr. Travers stated that the tool is still limited, but the group may begin pilot tests using the tool.

Mr. Travers added that an energy management guidebook was produced by the Office of Wastewater Management. The guidebook provides utilities with examples of efficiencies and mitigation methods to reduce their carbon footprints. Also, Steve Heare's division is working with the Association of State Drinking Water Administrators (ASDWA) on water availability and sustainability.

The CRWU Work Group includes 21 representatives from utilities, states, and organizations, as well as NDWAC members Olga Morales-Sanchez, Lisa Sparrow, and Duane Smith. The group's kick-off conference call will be held on November 23, 2009, and it will meet in person from December 3 to 4, 2009. The meetings are scheduled to finish by September 2010, and a final report will be produced by the end of 2010.

Ms. Blette stated that once the report is finalized by the Work Group, it will be submitted to NDWAC for review and comment, and then transmitted to the Agency.

Doug Owen asked how research and work completed by the Water Research Foundation, the WateReuse Foundation, the Association of Metropolitan Water Agencies (AMWA), and other organizations would be accessed and used by the CRWU Work Group.

Mr. Travers responded that the process will be directed by the Work Group members; however, the group is not planning to "reinvent the wheel" and he expects that the Work Group will reach out to the research community. The Work Group meetings will be public meetings, and the associations and foundations will have the opportunity to provide feedback.

Mr. Owen said that he merely hoped that the Work Group would build on conclusions reached by the associations and foundations, rather than identify the same conclusions.

Mr. Travers did not expect that this would be a problem, because many of his colleagues at the WSD have read the majority of the research materials and he expected that the subject matter experts will have read them as well.

Dr. Griffiths commented that carbon sequestration is being undertaken, and that it may impact utilities using ground water. He wondered if the Work Group would consider how climate change activities, like carbon sequestration or hydro fracturing, may impact water utilities.

Mr. Travers expected that carbon sequestration may be beyond the scope of the Work Group's charge, since it will only look at impact assessment and energy policies adopted by states. However, he thought that carbon sequestration maybe built into the risk assessment tool, rather than the criteria for a climate ready utility.

Dr. Zarate-Bermudez noted that carbon mitigation is more of an issue for the power industry, but that it might impact the assessment side. He noted that CDC is working with AMWA on this issue, and that he would provide updates to the Work Group. Dr. Zarate-Bermudez also inquired about the impacts of climate regulation on the water industry.

Mr. Travers responded that climate legislation may be a larger issue for power utilities than for water utilities, since there are not yet provisions of the Clean Air Act to incentivize carbon sequestration. However, water utilities are still major users of electricity.

Ms. Nuzzo asked if they had considered response plans for extreme weather events and other emergency response events tied to climate change, as part of the climate ready criteria.

Mr. Travers stated that the framework for the risk assessment tool considers an array of impacts from climate change (e.g., sea level rise, increased intensity from hurricanes, temperature change) to help utilities understand the hydrologic changes. He expects that part of the climate ready criteria will be to evaluate risks that the utility faces. However, the models' projections still have a degree of uncertainty; the criteria need to represent actionable items for a water utility.

Ms. Nuzzo offered that this may be a good opportunity or reminder for water systems to evaluate or complete response plans.

Mr. Wheeler asked how global climate change predictions have been downscaled to the utility-level.

Mr. Travers explained that using one output, they were able to downscale the impacts to 1/8 of a mile. They are unable to gauge the accuracy of the tool, but it utilizes at least sixteen of the models used by the Intergovernmental Panel on Climate Change (IPCC). Mr. Travers noted that there is still no certainty on climate science, but that utilities need to begin to take action now with the use of this best available tool.

Mr. Smith noted that there are many federal agencies working on climate change issues including, the Army Corps of Engineers, EPA, the Bureau of Land Management (BLM), and the Natural

Resource Conservation Service (NRCS); each will produce policies that impact water utilities. Mr. Smith urged that all of the federal information be easily understood by the utilities.

Mr. Travers stated that the Work Group's focus will be to translate federal and state expertise into practical tools for water utilities, rather than on developing a new climate change science program.

Ms. Blette added that she heard that federal agencies will assist the Work Group.

Mr. Travers responded that the United States Geological Survey (USGS) and other federal agencies expressed interest in the Work Group. These agencies were involved in the development of the risk assessment tool, as well. He expects that the Work Group will identify unknowns with the established policy and that costs may be prohibitive for renewable energy and carbon emission control, and that these costs will be passed on to the consumer. The water industry will also have increased costs.

EPA ACTIVITIES ON ACTIVE AND EFFECTIVE SECURITY

David Travers - EPA Water Security Division

Mr. Travers noted that EPA is working to help communities, and in particular critical users of water, understand the consequences of a disruption in water service. EPA has encountered many scenarios where water utility personnel lack the credentials to access their own facilities during an emergency response event.

Mr. Travers stated that the NDWAC Water Security Work Group identified fourteen features of an active and effective water security program. Then, the Water Security Coordinating Council (WSCC) and Government Coordinating Council (GCC), through the Department of Homeland Security narrowed the fourteen features to ten. Twenty-three practices were identified (e.g., developing partnerships with law enforcement and fire departments in the community) as part of the ten features. The first pilot of this program, in Seattle, Washington required a heavy degree of federal support. The second pilot, in Chicago, Illinois included 125 major corporations in the health care, energy, and pharmaceutical sectors. This pilot exposed the inadequacy of the corporations' contingency plans, as each corporation contracted with the same water delivery company to provide backup water. Furthermore, most of the corporations did not have an emergency connection point for the water delivery. This pilot study showed that a community-wide emergency response plan must be developed; this plan can be developed at a low cost.

The Chicago pilot study underscored another important need for water in a large network of hospitals and other medical facilities (e.g., Baxter facility which produces IVs and blood bags for the entire country). Ninety percent of disinfection needs in hospitals are achieved through steam cleaning. Subsequently, a medical summit was held that forged connections between the water utilities and the medical communities.

The pilot was continued on a smaller scale in Evanston, Illinois. Utilities, fire and police departments, Northwestern University, and health care organizations came together and identified new issues: interconnections between cities haven't been utilized in decades and the water systems

operate on different levels of water pressure. The utility facilitated an exchange of information among all of the different groups, and it was identified that emergency response plans must expand from a focus on terrorism to include all types of hazards.

Mr. Grunenfelder asked how they could share the findings with the entire water utility industry.

Mr. Travers responded that they must work on community-based efforts, by bringing together a diverse group of stakeholders outside of the typical emergency response community. The WSD is developing a guidebook for community-based water resiliency. This is a step-by-step guide to assist utility owners and operators in identifying community-specific goals and objectives, and implementing projects with critical water users. The guidebook will also include a sample invitation letter aimed at the community, a compilation of case studies for elected officials, and materials for community workshops and webcasts. The guidebook and materials are not yet available, but Mr. Travers expects that the first version will be distributed within the next year.

Ms. Taylor noted that she sits on her local emergency planning committee; the committee does not have a representative from either the public works department or a water utility. However, she indicated that the local committee is an ideal place for smaller communities to begin discussing water security.

Mr. Travers responded that it is common that water representatives are not integrated into the local commissions.

Mr. Kite added that Chicago has two of the largest water plants in the region, and that the system has sixty to seventy water main breaks each winter. This puts a lot of stress on the different zones, and leads to shutting down thezones for hours. This can impact hospitals and other major water users.

Ms. Nuzzo was struck by the difficulty in bringing health care facilities into the discussion on water security. She added that in her experience, security staff and infection control staff are responsible for hospital preparedness and disaster control programs. She thought that it would be helpful to consult with the Office of the Assistant Secretary for Preparedness and Response of the Department of Health and Human Services to engage the health care community in thinking about water issues. Health care partnerships have been formed across the country to support community-wide planning for healthcare surge capacity and response. Ms. Nuzzo stated that health care facilities are not likely to consider water issues in the context of their planning efforts without specific direction and technical resources.

Dr. Griffiths stated that he used to teach a water and health course ten years ago for public health officials and utilities. He noted that financial resources are needed to develop partnerships, as many public health officials do not have the financial resources to attend conferences or forums. Dr. Griffiths added that there are also cultural differences that must be addressed, and wondered how the concept of resiliency might be included in the conversations.

Mr. Travers noted that the National Infrastructure Advisory Council (NIAC), which includes the chair of the WSCC, developed a resiliency report that applies to all 18 critical infrastructure sectors

and attempts to define resiliency. He stated that the WSD, WSCC, and GCC have developed an all-hazards consequence management plan that provides a checklist of all of the activities that a utility should evaluate when preparing for an emergency. The plan includes eighteen hazards, ranging from the pandemic flu to a cyber attack, weapons of mass destruction, terrorism, power loss, earthquakes, and floods. This plan would serve as a supplement to traditional emergency response plans. They also developed general guidelines for seven different hazard scenarios, including step-by-step lists of basic actions that a utility should take. Mr. Travers added that Critical Infrastructure Protection Advisory Council (CIPAC) approved the all-hazards consequence management plan on November 3rd; they hope to publish the plan by the end of the year.

Mr. Cooley said that California conducts one of the largest earthquake emergency exercises each year. Mr. Cooley sits on the Water and Wastewater Committee, and noted that there is still a lot of ground to cover until the industries are fully included in the response process. Mr. Cooley stated that the House and Senate are working on a Water Security Act and the Chemical Facility Anti-terrorism Standards (CFATS).

Mr. Travers expanded on the discussion by stating that EPA has responsibility for drinking water and waste water systems, and that the bills in Congress would transform the water security program from a voluntary program into a mandatory, regulatory program. The regulation would cover medium and large-sized drinking water systems (those serving more than 3,300 people) and wastewater systems treating more than 2.5 million gallons per day (MGD). The systems would be required to prepare a vulnerability assessment and address the vulnerabilities and implement different performance standards. Mr. Travers expects that this bill could have profound implications for the water industry and the water security program.

Mr. Cooley asked whether the WSD is working with Homeland Security.

Ms. Blette responded that Homeland Security is on their speed dial!

Mr. Cooley suggested that the WSD offer an education program for Homeland Security on water systems. At different meetings and seminars, Mr. Cooley has met Homeland Security staff members who are experts on security issues, but have little knowledge about water systems.

REGIONAL PERSPECTIVE: COLLABORATING WITH STATES AND OTHER DECISION MAKERS

Vicky Binetti – Associate Director, Drinking Water and Source Water Protection, EPA Region 3

Vicky Binetti, the Associate Director of the Drinking Water and Source Water Protection program at EPA Region 3, presented on EPA's work with partners in the Mid-Atlantic states. Ms. Binetti noted that the Source Water Collaborative (SWC) is a national effort, consisting of twenty-three members including national organizations, federal agencies, professional and trade organizations, and non-government organizations. The SWC's core mission is to protect water resources by focusing on the connection between land use and water quality. SWC was formed in 2006 and its

work began at the local level, to minimize and mitigate contamination risks, to control existing risks, to implement smart growth techniques, and to practice water resource planning.

Ms. Binetti stated that the SWC's Web site (www.protectdrinkingwater.org) features products developed by the collaborative, informational resources, and contact information for key individuals in states. Products include a planner's guide for incorporating drinking water protection into community planning. Specifically, it identifies five opportunities to introduce water resource planning into land use planning, planning review, and planning for public investment. Other products include a financial tool developed by the Environmental Finance Center and campaign materials for "A Call to Action" for local officials. In the future, the Web site will include a customizable source water protection pamphlet that will be able to feature a municipality's own photos, logos, and messages. The SWC is also working on a database/Wiki of best management practices for land use, and will hold a regional forum (in Maine and Delaware) to develop priority actions for the specific watersheds.

A local collaborative, the Schuylkill Action Network (SAN) has been established in the Schuylkill River, which winds through 232 municipalities and is the largest tributary of the Delaware River. Water quality issues (e.g., pathogens, algae, metals, pesticides, chloride and sodium, and Methyl tertiary-butyl ether [MBTE]) in Schuylkill River are dominated by agriculture and abandoned mines in the upper stretch, and urban runoff in the lower stretch. The SAN, which now has more than one hundred partner organizations, has received grants to manage acid mine drainage, and for riparian buffers, cattle crossings, farm conservation plans, and campus stormwater projects. They also have a RiverCast Network which forecasts water quality on the river.

Another important watershed in Region 3 is the Potomac River Watershed, which spans four states and the District of Columbia. The Potomac Watershed Partnership includes 19 members including water utilities, EPA, and USGS. The Partnership runs a monitoring and early warning system, and also has an Emergency Response Work Group. Ms. Binetti noted that emerging contaminants are a major concern on the river as a result of publicity on intersex fish, urban runoff, and pathogens. The organization has conducted a year-long study with eight utilities on perchlorate.

Ms. Binetti stated that the states covered by Region 3 have a deep reservoir of natural gas in the Marcellus Shale, at 5,000 feet or below. This reservoir has not been exploited because it is hard to reach and because currently, natural gas is relatively plentiful. However, advances in drilling practices, which allow lateral drilling from a single vertical well and hydrofracturing to increase flow are making the formations more viable for development. Hydrofracking is a technique that uses waterborne particles to split the shale and increase the area into which the gas can flow and be recovered is being used to recover natural gas. However, this technique requires a significant amount of surface or ground water use (four to five million gallons per well). The recovered water may be contaminated with metals and radionuclides and total dissolved solids (TDS) may reach a couple hundred thousand parts per million. This recovered water cannot be treated easily, and must be disposed of in a publically owned treatment works (POTWs) or in an underground injection well. Unfortunately, only eight commercial wells in Pennsylvania will currently accept the brine. Ms. Binetti is concerned that drillers may be tempted to dispose of the water illegally. She added that

Pennsylvania has published new discharge standards for TDS to control the discharge from POTWs.

Ms. Binetti noted that public concern over natural gas drilling is mixed. Though the projects have high financial and environmental costs, the target drilling areas are located in impoverished communities that will benefit from the revenue generated. She also described a situation in Dunkard Creek, WV, a watershed that receives significant mining waste and high TDS. The creek has experienced several large fish kills attributable to golden algae blooms that typically only occur in saline waters.

Ms. Binetti stressed that secondary Maximum Contaminant Levels (MCLs) for drinking water protection (typically used for controlling taste, odor, and aesthetic issues) can help control TDS. She encouraged a stronger connection between the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA).

Mr. Grunenfelder was glad that Ms. Binetti reminded the group about the exemplary work of the SWC. In Washington he has seen a push for local and state governments to create jobs and a business-friendly atmosphere, but these efforts lack a clear link to the protection of drinking water or land uses. He noted that he will think about how to use the SWC tools in the future.

DAY 2 (November 12th)

TOXICOSURVEILLANCE OF PUBLIC DRINKING WATER: A POISON CONTROL PERSPECTIVE

Jonathan Colvin – Assistant Director, Cincinnati Drug and Poison Information Center

Jonathan Colvin presented on the activities of regional poison control centers. Sixty poison centers serve the U.S. population, staffed by medical specialists such as pharmacists, toxicologists, paramedics, physicians, and nurses. The Cincinnati Drug and Poison Information Center (DPIC) receives about 600 calls per day. Each phone call to a poison control center is answered by a staff member who has experience in medicine as well as toxicology. It is estimated that poison centers deliver about $900 million per year in health care cost reduction by preventing unnecessary use of ambulances and hospitalization. It is estimated that every $1 investment in poison control centers yields $7-15 in medical cost savings. Poison centers can also provide information on health effects for broad classes of contaminants in drinking water, and can monitor distribution and patterns of reported symptoms and contaminants. In the Water Security Initiative pilot project in Cincinnati, the Cincinnati DPIC monitored calls from June 2007 to November 2009, and analyzed calls that could be related to water contamination. The Center did not confirm any community-wide water contamination events during the pilot study, but did confirm 32 individual cases of water contamination, including an arsenic-contaminated well. Oftentimes the Center identified water main breaks before the water utility was aware of the problem, and the Center identified a case in which a classroom walking club was affected by an irritant powder found in new water bottles. Mr. Colvin

noted that regional poison centers are operated independently, but the model for contamination surveillance could be adopted nationally and applied to all poison control centers. Efficient and inexpensive nation-wide water surveillance could be achieved through cooperative monitoring by all poison control centers, and the Cincinnati DPIC would like to create a toolkit to encourage communication between poison centers and water utilities.

Mr. Grunenfelder asked Mr. Colvin to share his perspective on the nation-wide reduction in funding for poison centers. He commented that increased funding for health care would not be as effective without increased funding for poison centers.

Mr. Colvin explained that there is no specific way that a poison center must be funded. State funding in Ohio was eliminated, so the Cincinnati DPIC is supported through other funding sources. He added that it makes economic sense to keep a poison center open; as an example, the closure of a Los Angeles, California regional poison center led to an increase in poison-related Medicare expenditures. Many centers have reached their case capacity, and when additional centers close the remaining centers will not be able to absorb the excess case load. Mr. Colvin stated that reduced funding is a problem for the entire public health sector, and poison centers are a part of that sector.

Dr. Zarate-Bermudez asked if the Cincinnati DPIC cooperated with the CDC regarding the methods and results.

Mr. Colvin explained that the Cincinnati center had not collaborated with CDC, but the results may warrant cooperation with the agency in the future.

Dr. Giffiths commented on the data collected from human surveillance of health issues related to water. He asked if the trigger for an investigation related to water was based on high-volumes of calls, or substances of concern.

Mr. Colvin explained that trigger for an investigation occurs when a Poison Specialist determines that there is a high probability that an event could be linked to water contamination. About one in twenty triggers per month was related to water.

Dr. Griffiths commented that a regression of the total call numbers could illuminate a correlation between human surveillance and the call volume trigger.

Mr. Colvin stated that the Center had not yet carried out regressions on the data, but would be interested in pursuing such an approach.

Dr. Griffiths asked if the Center receives locational data related to each call that could be plotted on a GIS map.

Mr. Colvin explained that the Center protocol is to collect a ZIP code, which may not be very precise. However, if a staff member suspects a water issue he will ask for an address or the nearest intersection.

Dr. Griffiths asked if poison centers are bound by the Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule. HIPAA may not allow poison centers to collect

locational data from its callers. HIPAA also prohibits covered entities from identifying locational data units smaller than 20,000 persons, so the use of ZIP codes is a common method of compliance with HIPAA. Epidemiologists cannot use specific locational data.

Mr. Colvin clarified that the Cincinnati DPIC is covered by HIPAA, but that staff ask for verbal permission to share locational data. All of the phone calls are recorded.

Ms. Nuzzo asked if poison centers have the capacity to conduct follow-up investigations of water contamination results. The data gathered from poison centers may be more reliable if the centers are able to conduct follow-up investigations in the event of a trigger.

Mr. Colvin confirmed that the Cincinnati DPIC can extract data and reduce false positives that make the data less useful. The data is transferred to a national network where it is examined for confirmation of trends. Poison centers have access to national raw data, but usually they are reluctant to use scarce public health resources for follow-up investigations. The benefits of data collection are clear, but medical directors or managing directors, not epidemiologists, administer the poison centers.

APHA PERSPECTIVES: TRACKING SOURCES OF WATERBORNE DISEASE IN THE WATERSHED

Jyotsna Jagai, EPA Office of Research and Development (ORD)

Jyotsna Jagai presented on diarrheal disease data generated during her PhD research at Tufts University. Most diarrheal diseases are related to unsafe water supplies and are present in the U.S. and other developed countries. There is often a seasonal pattern in cases of diarrheal disease that indicates dominant environmental factors in transmission. Dr. Jagai noted that two protozoa of interest are *giardia* and *cryptosporidium* - both are seasonally variable and can be measured in surface water. Her research focused on the Ohio and Mississippi Rivers and in particular, cities with populations above 50,000 people, within ten miles of the rivers. This is because the cities were most likely to use surface water for drinking water supplies. The cities selected included Louisville, Cincinnati, Evansville, and Pittsburgh. She then examined diagnoses codes for giardiasis, cryptosporidiosis, and non-specific gastrointestinal (GI) symptoms in Medicare and Medicaid data between 1991 and 2004. The study also examined river discharge data, which was consistent across the time and location of the study. The hypothesis was that peak flow would be closely correlated with peak hospitalization rate; however, there was no discernable trend in the peak hospitalization rate. There were strong seasonal trends for ill-defined GI infections and GI symptoms. Dr. Jagai stated that she was unable to control for drinking water supply and source, and assumed that users consumed surface water from higher elevations in the watershed. The interaction between GI illness and river discharge was not as predicted, but a relationship was identified. Land use factors may have had significant effects on this data, and Dr. Jagai indicated that there is a need for large-scale data collection and interdisciplinary analysis.

Ms. Blette commented that the seasonal variation suggests higher contamination rates in the spring, but she expected higher rates in the summer.

Dr. Griffiths explained that in temperate zones there are often two peaks in contamination rates - the spring and fall. In the U.S., much of the waterborne illness reporting is related to fall recreation, but many states report data from both spring and fall. GI diagnoses that were precisely identified in the past are now diagnosed as unidentified GI illnesses because they are not considered a serious threat to human life in the U.S.

Ms. Blette asked if there was a different pattern of contamination for elderly patients, given that they are often exposed to water for drinking rather than for recreation activities.

Dr. Jagai confirmed that the study focused on the elderly population.

Dr. **Griffiths** commented that there is no national dataset for these illnesses in children.

Dr. Zarate-Bermudez added that data collected during rain events indicate more cases of diarrheal disease. He asked whether these cases relate to *giardia* and *cryptosporidium*.

Dr. Jagai explained that both *giardia* and *cryptosporidium* contamination have been associated with precipitation events. She expected a time lapse between heightened river discharge – and thus poor water quality – and higher rates of hospitalization. However, the data did not identify a time lapse; the increase in hospitalizations was almost immediate.

Dr. Zarate-Bermudez expressed interest in closer collaboration in order to analyze the data in greater detail.

Mr. Wheeler noted that, after a dry period, the next wet period produces a spike in coliforms due to a flushing effect. Prolonged wet periods often reduce infection rates.

Dr. Jagai commented that many water systems conduct similar monitoring, but it is difficult to aggregate the data from individual systems.

Mr. Grunenfelder noted that there is a similar effect in Washington, in areas with livestock. Washington will often close shellfish harvesting areas after precipitation events.

Mr. Owen asked if higher incidence of GI infections were correlated with Combined Sewer Overflows (CSOs).

Dr. Jagai explained that the research did not analyze CSOs, and it would be a topic for further research.

Mr. Vincent asked if there was a lifespan for the presence of these contaminants in a water source.

Dr. Griffiths explained that *cryptosporidium* can last at least six months under cool conditions. *Cryptosporidium* will die off relatively quickly in hot or dry conditions. *Giardia* is not as robust, but can survive for a number of months in a viable state.

Mr. Vincent asked if discharges from West Virginia could be making people in Kentucky ill, following a travel time delay.

Dr. Jagai noted that she was hoping to discover such a trend, but was unable to identify a significant relationship.

EPA DRINKING WATER RESEARCH PROGRAM OVERVIEW

Audrey Levine - Director, EPA ORD National Program for Drinking Water Research

Audrey Levine, the National Director of EPA's Office of Research and Development (ORD) presented on ORD research. She stated that ORD has 1,911 employees and a budget of approximately $587 million. The office is responsible to all EPA program offices and regional offices, and there is collaboration between the offices on many programs. ORD research is conducted in lab units, and much of the drinking water research is conducted at the National Risk Management Research Laboratory. Each EPA region has an ORD science liaison and a regional research program. Within EPA, regions assume leadership for certain research activities on a rotating basis. ORD organizes its work according to research needs and priorities. ORD receives data from regions, EPA division offices, and other stakeholders, and is evaluated by a board of scientific counselors and the Science Advisory Board, which is ORD's voice to Congress.

The annual budget for the ORD Drinking Water Program is $47 million, and the program funds about 180 staff in various offices. The budget does not include congressional appropriations, which in previous years have included appropriations for GS and water infrastructure research. Staff members have many areas of expertise, including statistics, engineering, epidemiology, toxicology, biology, physical science, and chemistry. The water program focuses on ecological and human issues, and there is also a program on pesticides and toxics. The focal point for the program is to encourage public health outcomes. Source water research is centered on personal care products and pharmaceuticals, as well as GS and aquifer recovery. Water treatment research includes the candidate contaminant list (CCL) database, as well as small system research. Many other ORD research programs have elements that relate to the drinking water program.

Mr. Grunenfelder stated that EPA Administrator Lisa Jackson has identified children's health as a priority, and asked if that priority has affected ORD's research agenda.

Dr. Levine replied that ORD includes children's health centers, and there is a focus on children's health in much of the health effects research.

Mr. Wheeler commented that a $47 million budget is not very substantial when compared to the large ORD research agenda. He mentioned that, as recently as three years ago, there was not sufficient data to link before-and-after effects of certain chemicals.

Dr. Levine agreed that there is a desire to test before-and-after effects of many short-term diseases. She mentioned that some long-term diseases such as cancer are harder to test.

Mr. Wheeler indicated that his concern is that the regulatory development did not reflect positive helath effects data. When existing regulations were developed there were only exposure data used as a basis because there was not health effects data available.

Dr. Levine explained that studies on children are providing new cause and effect data. Researchers are trying to follow populations longitudinally (from conception to death) and geographically (since exposure to environmental stressors is community-based). There are community-based children's centers that share environmental conditions, so researchers can divide populations according to drinking water source.

Ms. Barr agreed that EPA needs either strong surveillance or epidemiological studies.

Dr. Levine noted that EPA is collaborating with CDC on an epidemiological study. Grant-funded research continues to focus on health effects. It is difficult to maintain internal priorities, and many epidemiology experts have begun studying health effects in water recreation.

Ms Barr reiterated that EPA continues to conduct health effects research, but the organizational environment is challenging.

Dr. Levine noted that the ORD program is driven by deadlines.

Ms. Nuzzo asked for clarification on how ORD sets strategic priority areas and specific research questions. She asked if individual investigators define priorities and projects or if there are program-wide discussions about the best way to approach research topics.

Dr. Levine replied that each lab has different methods for developing research. Many projects depend on context, and may be shared between groups; but ORD maintains strong dialogue. She provided an example of a study on combinations of chemicals that is a collaborative effort between the OW and representatives from different ORD labs. Programs are subject to frequent review. For distribution system research, ORD is developing a conceptual model of the issue in order to determine what decisions must be made and the data and research needs. Dr. Levine added that there is also pressure to conduct multidisciplinary research. The structure of the division may have to change in order to promote collaboration – many researchers receive promotions based on publishing, but perhaps should be promoted based on collaboration.

Ms. Barr explained that OGWDW is identifying research needs, specifically through the CCL, and conducted two workshops to foster dialogue about research. The OW is developing a research strategy.

Ms. Nuzzo inquired about ability the of ORD to research an emerging issue, and wondered if ORD had the flexibility to conduct research in-house or could direct extramural funds for investigating emerging issues.

Dr. Levine explained that there is greater flexibility if an emerging issue is address by a Congressional appropriation. If an emerging issue is identified through a directive, the resources will be diverted from other research areas. For example, the research on recreational waters was Court-ordered, so funding for the research was extracted from other programs. Research direction also depends on in-house capacity; research on geologic sequestration included internal staff as well as extramural grants.

Mr. Owen reiterated that the $47 million budget seemed too low to support the ORD drinking water research agenda, and noted that the overall cost of some individual studies is quite large. He

asked how much of the budget is devoted to research on health effects, and where the rest of the $587 million ORD budget is being spent. He also asked about the future direction of ORD research relative to the research priorities that the current administration may have.

Dr. Levine explained that much of the research supports EPA Goal 4: Safe Communities and Healthy Ecosystems. The water quality research program does not conduct many health effects studies. The drinking water program conducts health effects research in the National Exposure Research Laboratory (NERL), but the program has downsized in recent years. The epidemiology studies are often conducted extramurally.

Ms. Taylor asked what research has been directed at biofuels.

Dr. Levine commented that biofuels receive a lot of attention in Washington, D.C., and explained that there is an ORD research strategy and budget assigned to the topic. Biofuels research is inherently interdisciplinary, so representatives from many programs met and identified short- and long-term research needs. There was interest from researchers from the air and waste programs, as well as interest on biofuel lifecycle impacts on water. Dr. Levine noted that there is potential for conflict because an ethanol production plant can draw water from the same source as a drinking water supply.

Ms. Taylor asked if there is greater detail on how biofuels research priorities are determined. She is advocating for research on hydrofracking and asked how to encourage ORD to research certain topics.

Dr. Levine explained that EPA Region 3 is active in researching hydrofracking. ORD is working with Region 1 on chloramines. Much of EPA's knowledge of chloramines is based on ingestion and inhalation, but it is thought that chloramines are more effective than chlorine at treating *Legionella*. Other research focused on nitrification due to ammonia in water supplies. The Water Research Foundation (formerly American Water Works Association Research Foundation [AwwaRF]) works with ORD on many research projects, and ORD does not expect to devote an entire research program to chloramination.

Ms. Barr mentioned that EPA provides Q&As and summary documents to help explain the health effects of chloramination. There are also gaps in knowledge at this time, including the relative effects of monochloramines, dichloramines, and trichloramines. Usage of these chemicals is pervasive around the country and ORD is monitoring the situation.

Ms. Taylor mentioned that some sub-populations are especially vulnerable to these chemicals.

Dr. Zarate-Bermudez asked a question on behalf of Dr. Griffiths, who had stepped out of the room. Dr. Zarate-Bermudez asked why non-point source discharges related to agriculture are researched by USDA rather than EPA, and asked if the agencies coordinate and communicate on these matters.

Dr. Levine replied that ORD collaborates with USGS and USDA on agricultural and other non-point source water pollution issues. There is also a directive from the new administration to focus

on some areas such as the Chesapeake Bay; these areas often require a large consortium of government agencies.

Mr. Smith commented that ORD's research program is impressive, but that there is a disconnect between ORD's research and the implementation and communication of the research at the local level. He asked how state agencies and utilities can promote ORD's research program and findings to local parties. He noted that ORD does not market its research to local communities.

Dr. Levine agreed that many ORD papers are too complicated for public consumption, and explained that it is a priority to translate the research and communicate effectively to the public. She commented that ORD seeks to encourage communication as well as behavioral change, but that these issues are not addressed in the historical structure of ORD.

Mr. Smith offered to speak with Dr. Levine at a later time, to share ideas.

Public Participation

There were no public comments.

EPA ACTIVITIES ON NUTRIENTS: NUTRIENTS INNOVATION TASK GROUP

Steve Heare – EPA Drinking Water Protection Division, OGWDW

Mr. Heare informed the Council that the Nutrients Innovation Task Group was a result of an Association of State and Interstate Water Pollution Control Administrators (ASIWPCA) meeting and a joint meeting between senior management at EPA, ASDWA, and ASIWPCA. The states contributed a review of data and of existing tools, and focused on applying current methods to address nutrient problems. The effort lasted six months, and a report was released on September 24, 2009. The report includes five case studies, innovative approaches to address nutrient loading, analysis of cost effectiveness, and an accountability fact sheet with thirty examples. The report also includes a memo to the EPA Administrator presenting the findings.

Mr. Heare noted that the effects of nutrients on water quality are widespread in 49 states and that one-third of streams and many miles of coastline are impaired. There have also been economic impacts, including $15 million for drinking water supply controls in Fremont, Ohio. Urban storm water is a major source of nutrient loading. By 2030, fifty percent of urban areas will be redeveloped; this produces both challenges and an opportunity for redevelopment, to minimize impact. Municipal wastewater systems are heavily regulated, but only about four percent of systems have limits for nitrogen and ten percent for phosphorus. Livestock production, atmospheric deposition, confined animal feeding operations (CAFOs), and row crops also create nutrient loading problems.

Solutions can include full implementation of point source water quality tools, such as the development of water quality standards, TMDLs, written limits in operating permits, and joint

accountability between point and non-point sources. There is also an emphasis on incentives and innovations such as trading. Mr. Heare stated that the current approach is insufficient, and non-point sources will demand a significant effort to address. The Source Water Collaborative may be used as a vehicle to bring local stakeholders together.

Jim Taft (ASDWA) explained that nutrient loading is a win-win opportunity to link CWA and SDWA objectives and goals. The problem seems intractable, but there is a significant drinking water component that could bring new energy to solve the problem.

Ms. Blette commented that when the issue was first addressed there was no mention of drinking water, and now drinking water has become a focal point of the discussion. There was recognition that drinking water could be an important driver for this effort.

Mr. Taft agreed that it was recognized that public involvement might be spurred by drinking water rather than clean water concerns.

Mr. Grunenfelder noted that in the state of Washington, most nutrient impacts are on ground water, in private wells. The state does not have sufficient information or regulatory authority over private wells, and will cooperate with CDC and USGS in order to consolidate information about private wells. There are also significant impacts from CAFOs and agriculture, but it is a difficult political task to enforce CAFO nutrient loading.

Mr. Heare explained that some stakeholders have suggested an increase in the regulation of water treatment plants, but others suggest strict regulation of other major point sources.

Mr. Taft suggested that traditional water regulations, TMDLs, and classical approaches are not sufficient at this point, but that a technology-based solution may help.

Mr. Wheeler promoted a comprehensive approach because the regulation of point sources may not create a significant benefit, even with a large investment of resources.

Mr. Taft explained that the report indicated that in some locations, point sources are a significant problem, but that there are many important non-source contributors to water contamination.

Mr. Vincent mentioned that ground water can be shallow and affected quickly by surface contamination. His state experiences nitrate violations in the rainy season, but they also experience pesticide contamination at other times. It is worth the effort to expand agricultural Best Management Practices (BMPs) and CAFO clean-up operations.

Dr. Griffiths shared a story from Waco, Texas. There is a large reservoir used for drinking water and recreation. The headwaters had a high concentration of CAFOs, and storms produced major overflows. The aquatic life in the top third of the river was killed by contamination, and there was a rumor that half of the flow consisted of feces and urine. Furthermore, the utility experienced algal blooms in December and January, an almost unheard-of occurrence. The agricultural lobby had significant influence over the state environmental agency, and lobbied to keep the CAFOs open. Dr. Griffiths added that the ecological and economic cost of the CAFOs was shocking, and the influence of these operations can be felt in many regions. The impacts on water quality can be significant.

Mr. Grunenfelder agreed that clean water regulators face a significant challenge in addressing contamination from agriculture across the country.

Mr. Smith argued that green funds from ARRA should be allocated to individuals in watersheds rather than utilities. The funds could provide many benefits through the activities of private landowners.

PHILADELPHIA WATER UTILITY UPDATE – GREEN CITY, CLEAN WATER

Howard Neukrug – Director: City of Philadelphia Office of Watersheds

Howard Neukrug delivered a presentation on Philadelphia's drinking water and wastewater utilities. Wastewater in Philadelphia is significantly impacted by combined sewer overflows (CSOs). On September 1, 2009 Philadelphia submitted its long term control plan update, which proposes to keep water out of the sewer system rather than increasing system capacity. The long-term control plan is a $1.6 billion, 20-year plan that will restore and protect all urban streams by greening one-third of the city. The additional green cover will reduce runoff to about half of its current volume. There are several challenges: the costs are based upon a doubling of water and sewer rates which exceed affordability for customers, Philadelphia has no control over upstream activities that affect its water quality, and the impact on the drinking water system will be negligible. Philadelphia's population has dropped by half a million people in fifty years, and its citizens are paying for water infrastructure designed for 2.5 million customers, not 1.5 million. The city is shrinking and the infrastructure is aging, but there are opportunities for city renewal and sustainability. There are 40,000 vacant lots in Philadelphia and the water department would like to convert many of those vacant lots to green space. Mr. Neukrug added that there are many triple-bottom-line benefits to reducing storm water runoff and investing in green infrastructure, but that the utility is looking for an evolution, not a revolution. New regulations have reduced runoff by one billion gallons per year and every redevelopment project manages storm water. The utility is changing its wastewater rates according to the amount of impervious surface area on a customer's land rather than the size of a wastewater meter. The top five hundred largest parcels make up 12.3 percent of the impervious land cover in the city, and through this change the utility is encouraging strong urban growth and a dense urban fabric, rather than sprawl and impervious land use.

Mr. Grunenfelder commented that this comprehensive, innovative approach could be a perfect target for ARRA funding.

Mr. Neukrug replied that the ARRA funds have been allocated to the redevelopment authority, and it is difficult to coordinate with the authority to build new communities using green infrastructure.

Mr. Grunenfelder suggested that the utilities encourage the U.S. Department of Health and Human Services to consider green infrastructure in its community wellness and prevention efforts.

Mr. Neukrug explained that the utility's greatest challenge is coordination with the city government and other stakeholders.

Ms. Sparrow asked about the impacts of drought on plant life in a green city. She asked how the city plans to choose species for its green spaces, and if the city plans to replace plant life as it dies.

Mr. Neukrug stated that the utility would rely on the parks commissioner, horticultural society, and green roof engineers for advice on green design and selecting suitable plant life. He noted that the most important aspect of plant selection is the associated maintenance cost, including watering during dry periods.

Mr. Vincent asked if there would be restrictions on fertilizers and pesticides for the city plants, and asked if the city has negotiated with downstream neighbors to help pay for the water quality improvements.

Mr. Neukrug answered that there are no restrictions on pesticide and fertilizer use for city plant life. He confirmed that it has been challenging to transform Philadelphia's green effort into a regional initiative. Oftentimes there are streams and rivers that are influenced by runoff from multiple communities, but only Philadelphia is improving its storm water impacts while surrounding communities do not undergo a similar effort. He reiterated that coordination with partners and stakeholders is very challenging.

Mr. Diemer asked if the doubling of utility rates in twenty years was inclusive or exclusive of inflation, and inquired about the response from customers.

Mr. Neukrug noted that the utility seeks to clarify that the trends in utility costs will not change dramatically. The capital budget for the utility is $280 million per year. There are many funded activities including the green infrastructure program and facilities replacement, but for the utility to survive the rates will have to double in twenty years, in inflation-adjusted dollars.

CITY OF PHILADELPHIA SOURCE WATER PROTECTION PROGRAM

Kelly Anderson – Philadelphia Water Department Source Water Protection Program

Kelly Anderson delivered a presentation on source water protection efforts in the City of Philadelphia. The city derives all of its drinking water from two sources: the Delaware and Schuylkill Rivers. The city operates three drinking water treatment plants that treat 560 MGD. Philadelphia is located at the bottom of the Delaware River watershed, which includes ten percent of the U.S. population, and there are thousands of point sources of water pollution. The Schuylkill River was very industrial in the 1800s, and typhoid deaths were common before chlorine was used to disinfect water. After conventional drinking water treatment was introduced, source water protection received less attention. Currently, Philadelphia relies on multiple barrier treatment of its drinking water, including particulate removal, disinfection, and distribution system regulation. The Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESTWR) which regulates *cryptosporidium* has been a significant driver for source water protection in the region. The Schuylkill River is unsafe for recreation thirty percent of the time; storm water runoff is the leading cause of pollution in the watershed, but forest clearing also has significant impacts. Agricultural runoff increases nutrient and

pathogen loading, abandoned mine drainage releases heavy metals, and treated wastewater can compose almost sixty percent of the river's flow during periods of low precipitation.

The City of Philadelphia supports four components of source water protection: Green Philadelphia, pollution prevention, recreation, and river ecology. The Coalition for Pennsylvania's Riverfronts works to promote high quality, accessible riverways. Ms. Anderson stated that the utility organized a pharmaceutical take-back program in collaboration with EPA Region 3, and RiverCast which provides the public with real-time water quality information. Climate change will be a major issue for Philadelphia, and the utility is interested in research and adaptation regarding sea level rise and salt water intrusion. Regional coordination is important to the utility, including an early warning system in the Delaware River Valley. The SAN has been an important asset to utility coordination. The network was formed as a result of a watershed assessment; it is divided into Work Groups that focus on individual priorities, such as abandoned mines or agriculture. EPA provided a grant and the Philadelphia Water Department received $1.4 million to address SAN's priorities. The Department funded projects such as BMPs, construction, plantings, and riparian buffer repair.

Ms. Anderson noted that Philadelphia has little control over its source water, but works with its partners and neighbors to protect its drinking water supply. Targeted grants have been imperative in allowing the utility to track changes and improvements in its drinking water program.

Mr. Neukrug added that source water protection is still not funded to the extent necessary. Funding is allocated for clean water programs more than drinking water programs. The CWA and SDWA do not provide any regulatory authority for the City, which must rely on partnerships such as SAN to preserve water quality.

Ms. Taylor asked if the figure for stream impairment was based on stream miles.

Ms. Anderson confirmed that the measurements for stream impairment are in stream miles.

Mr. Kite inquired about the average annual rainfall for the city.

Ms. Anderson replied that Philadelphia receives about 45 inches of rainfall annually.

Mr. Kite commented that his utility in Illinois has adopted a similar source water protection approach: educating farmers, planting grass, installing grates, and creating water supply protection zones. Drilling or other significant activities require approval by the water utility.

Mr. Neukrug explained that Philadelphia has no control over the land that supplies it source water. The city does not own the land and cannot control where residents chose to live in the watershed.

Ms. Anderson reiterated that the City is working hard to use partnerships to protect its watershed. The Delaware River Basin partnership was the first time U.S. EPA, Pennsylvania Department of Environmental Protection, and the utility actually joined together to increase water quality.

Ms. Blette mentioned that the Governor recently released a state infrastructure plan and asked if there was a focus on source water protection.

Mr. Neukrug replied that the source water protection areas are not accounted for.

Ms. Blette asked if the utility has been able to explain the cost benefits of source water protection.

Mr. Neukrug replied that the drinking water industry is proud of its ability to treat raw water, so source water protection is not a priority. In Philadelphia, money is spent on drinking water treatment. On the other hand, in New York City, which has a protected watershed, new drinking water treatment plants may decrease the emphasis on source water protection.

Ms. Anderson commented that the only regulatory tool for source water protection is the LT2 Rule.

Mr. Vincent asked if the City has ever shut down its Delaware River drinking water intake.

Ms. Anderson replied that the City shut down the Schuylkill treatment plant once because of a cyanide leak that resulted in a significant fish kill. The City has not shut down the Delaware River intake.

Mr. Neukrug explained that the City would not be able to provide drinking water indefinitely without the Delaware River intake.

Mr. Vincent asked if the City has pursued well field development.

Ms. Anderson replied that the utility would like to conduct a ground water feasibility study to determine the potential for ground water use.

Mr. Vincent explained that drinking water utilities in his state prefer ground water because it is less variable than surface water.

Mr. Neukrug commented that the Philadelphia utility cannot afford to develop a ground water source.

EMERGING CONTAMINANTS IN PHILADELPHIA

Alexa Obolensky – Philadelphia Water Department Bureau of Laboratories

Alexa Obolensky delivered a presentation describing contaminant research in Philadelphia. Starting in 2003, the Philadelphia Water Department began unregulated contaminant monitoring, as a participant in several AwwaRF research projects. This research has continued, and many of the results have supported new research methods and chemical analyses. The Department is engaged in a database project to synthesize data and generate reports for public consumption.

On March 10, 2008 the Associated Press released a report that was based on a survey of all major water utilities, including Philadelphia. The report cited Philadelphia in the lead paragraph, and stated that Philadelphia officials had detected 56 pharmaceutical products in drinking water, including medicines for many well-known illnesses. Philadelphia staff had undergone training in risk communication and media relations, and had covered pharmaceuticals in drinking water. The department presented testimony to the Philadelphia City Council and the U.S. Senate. Most of the attention was from the news and water professional community; the Department received only fifteen calls from its 1.5 million customers. The AP story claimed that water utilities were not

disclosing data, were conducting inconsistent monitoring, and were not treating for contaminants. Although the Department included a paragraph on the issue of pharmaceuticals in the annual Consumer Confidence Report (CCR), the Department realized that was important to better manage data and communicate results in the future. The Department learned that message development and communication practice are essential to maintaining public trust. The utilities and the media have different goals, timeframes, standards, and language. Scientific illiteracy is expected and accepted, but oversimplified scientific information can become misinformation that generates mistrust.

While preparing risk communication regarding a potential haloacetic acid violation, the Department spoke with health experts and environmental advocates, shared the data, and prepared a white paper in order to generate feedback. Following the earlier approach, the Department prepared a white paper on endocrine disruptors (EDCs), and pharmaceuticals and personal care products (PPCPs). The department also piloted a take-back program for pharmaceuticals. Ms. Obolensky noted that communicating information on emerging contaminants must be part of a water utility's strategy, and sharing data in the middle of a research plan is not appropriate. Even given these significant challenges, the City plans to continue its unregulated contaminant research and monitoring.

Dr. Griffiths commented that he works with risk communicators, and was interested to learn that there can be multiple audiences for information. A utility can prepare a simple response, as well as additional information for highly educated audiences. It is possible that drinking water compliance may move away from single-contaminant monitoring to include combinations of chemicals and continued exposure to low levels of chemicals. Priorities include disinfection byproducts, metals, pharmaceuticals, and endocrine disruptors. In the future there may be significant changes in the scientific approach to monitoring as well as to risk communication.

Ms. Obolensky noted that there must be a wider consideration of chemicals that do not provide a societal benefit. The companies that release products designed to be disposed of in the water supply ought to provide funds to detect those chemicals in drinking water and to remove them.

CONTAMINATION WARNING SYSTEM DEMONSTRATION PILOT

Alexa Obolensky – Philadelphia Water Department Bureau of Laboratories

Philadelphia was one of four U.S. cities awarded funding to participate in a contamination warning system study. There are five components to the contamination monitoring plan: online monitoring, sampling and analysis, enhanced security monitoring, consumer complaint surveillance, and public health surveillance. There is also a consequence management plan followed by review and evaluation, and system engineering. EPA has released contaminant detection strategies for different classes of contaminants, which will be identified through water quality monitoring, customer calls, and 911 calls. The project focuses on creating a sustainable early-warning system that provides daily information. Philadelphia has sensing equipment for many indicators and contaminants, such as turbidity, chlorine and conductivity, and all samples are controlled with a Supervisory Control and Data Acquisition (SCADA) system. System integration will incorporate a geographic information system (GIS) platform. There are enhanced security plans for facilities and designs, and integrated

alarms. The Philadelphia Water Department would like to develop experience with new monitoring technologies, gather distribution data, integrate the control center, and continue training. The Department would like to maintain its connections with the Departments of Health and Water.

Mr. Owen commented on the importance of the relative complexity of this project. Many organizations are involved, and many of the departments may not communicate with the Water Department very often. He asked whether it was easier or more difficult than expected to coordinate the program.

Ms. Obolensky noted that there are many obstacles for government entities in purchasing and coordination, but explained that it has been beneficial to work with different departments and different areas within the Water Department. There were compatibility issues with the different data sources, but many stakeholders are excited about the program's interest in their work and the EPA funds for project development.

Ms. Nuzzo asked about event characterization after contamination detection. In other environmental monitoring programs, such as the EPA/DHS BioWatch program, it has been found that groups responsible for interpreting and responding to monitoring results/signals often require additional and significant outside information in order to justify the consequences of initiating a response to an environmental detection positive result. Ms. Nuzzo asked what circumstances would trigger an actionable event under the water contaminant monitoring program, and commented that the final decision to initiate a response would be a judgment call by experienced prfessionals and not solely in response to environmental positives.

Ms. Obolensky replied that the program is a pilot study, and that the Department is setting up a system for learning purposes. Priorities include establishing communication protocols, sharing information, and increasing human intelligence. There will be no automatic triggers that determine that an event has occurred. Stakeholders will assist with data gathering and analysis.

Ms. Nuzzo mentioned that in the BioWatch environmental monitoring program, many detections have been classified as BioWatch positive events/triggers. However, these events have were not determined to have a significant public health risk. For example, the presence of the genetic material of pathogens did not require a response and unless there was affirmative intelligence, the national security community would not initiate a response. Data gathering and analysis is only one aspect of an environmental monitoring program. A plan for how to respond to triggers and under what conditions is another.

Mr. Saddler commented that Philadelphia has two watersheds over which it has no control. The emergency response process is developing such that protection must come from the local water utility, but this may not be possible in areas like the western U.S., which includes extensive water supply systems. The Colorado River serves millions of people, as does the Missouri River and the Great Lakes. In these larger water supply systems, detection and monitoring must not be the responsibility of local water utilities. There are many federal agencies that have the capacity to carry out monitoring and detection.

Ms. Blette noted that the contaminant warning system is focused on distribution systems, not source water.

Mr. Saddler noted that there is potential for contamination in source water and encouraged action by the federal government.

Mr. Zarate-Bermudez explained that CDC is currently working on the topic of warning systems and expressed interest in speaking with the Water Department in greater detail. He encouraged coordination with the Department of Health.

Ms. Obolensky noted that one of the epidemiologists in the Water Department is a CDC fellow.

Mr. Vincent asked if the pilot study would include directions for public communication and response coordination.

Ms. Obolensky replied that the study would cover those topics, but has not yet generated specific results. There are many similarities between the contaminant warning system and the Public Notification rule. The designation of boundaries for communication and risk can apply to both subjects.

DAY 3 (November 13th)

REGULATORY TOOLS AND RULE DEVELOPMENT UPDATE

Pam Barr – Director, EPA Standards and Risk Management Division (SRMD)

Pam Barr delivered a presentation on regulatory development. Current regulatory development will be based on the third Candidate Contaminant List (CCL3). EPA published a pre-determination that they would not regulate perchlorate, but received 33,000 comments and the Obama administration requested that EPA review the science, including health effects data related to infants, children, and pregnant women. EPA generated a supplementary request for comment and information, and the new determination allows the EPA Administrator the flexibility to regulate the contaminant. Data is being gathered for the second UCMR (UCMR2), for such contaminants as brominated flame retardants and explosives. The most significant detect was for *N*-Nitrosodimethylamine (NDMA). Six of eleven insecticides were detected, as well as an explosive.

Every six years EPA must review its regulations and revise them, as appropriate. EPA is reviewing 71 primary drinking water regulations and plans to publish its results in December 2009 or January 2010. Some contaminant regulations are already being revised (e.g., lead) and are not included under the six-year review. EPA is revising the Total Coliform Rule (TCR) and expects to publish a proposal in summer 2010. EPA holds a stakeholder meeting each year, and it is anticipated that this year's meeting will focus on analytical methods. Ms. Barr added that EPA published short term revisions to the Lead and Copper Rule (LCR) in 2007 and held a public meeting in October 2008. Short-term problems with the LCR were resolved through the 2007 revisions, but many long-term

issues must be addressed: lead service line replacement, sampling protocols, copper monitoring, and tiering criteria for lead and copper sampling sites.

Under the expedited methods approval process, EPA can approve new methods without public comment through the *Federal Register*, and can create a notice relatively quickly after carrying out an evaluation. EPA completed the third notice last week, approving a new type of continuous chlorine analyzers that will help with Ground Water Rule (GWR) implementation. Ms. Barr stated that EPA cooperates with ASDWA on implementation concerns, and asks them for priority implementation changes and feedback. For example, TCR modifications were a result of state and water utility feedback.

Priorities for research included biofilms, nitrification, intrusion, storage, contamination accumulation, water main repair, and cross connections. EPA partnered with the Water Research Foundation and created a steering committee that included members from EPA, utilities, public health, environmental groups, and state governments. The committee expects to produce a final agenda for distribution system research by April 2010. The drinking water multi-year plan is under development; it is subject to resource availability, but EPA hopes to produce a final draft in the near future. The plan will be delivered to the Board of Scientific Counselors (an external ORD review board) in spring 2010.

Mr. Grunenfelder asked if EPA's research on perchlorate had been concluded.

Ms. Barr replied that EPA is analyzing the public comments and will brief the Administrator. The Administrator will make the final decision, but there is no known schedule.

Ms. Blette asked if NDWAC could review the multi-year research plan and place a member on the Board of Scientific Counselors (BOSC).

Ms. Barr explained that BOSC is composed of PhD scientists with experts in certain subject areas, but thought that NDWAC might be able to offer a liaison.

Ms. Blette asked if there is a role for the Science Advisory Board (SAB) in setting research priorities or commenting on rule development.

Dr. Griffiths explained that SAB may comment on plan priorities and the relevant rigor of the science, but SAB is not involved in priority setting. SAB communicated with the Administrator about perchlorate in an effort to delay rule development until further information was available.

Ms. Barr noted that the multi-year plan is an ORD document, but that NDWAC might be able to provide input.

Mr. Wheeler was concerned that research is always under-resourced in the regulatory development process. He suggested that NDWAC continue to press the Administrator to support drinking water research, perhaps through a follow-up letter to the new administration.

Dr. Zarate-Bermudez asked if microbial contaminants were removed from CCL3.

Ms. Barr confirmed that two microbial contaminants were removed based on occurrence and health effects data.

Dr. Griffiths agreed that NDWAC ought to support drinking water research. EPA research is grossly underfunded, and an estimate claimed that ORD receives approximately seven percent of the national environmental research budget. The remainder of the environmental research budget is allocated to other organizations in the government. He encouraged cooperation between agencies and suggested that EPA take advantage of the research and information being generated by other agencies, on topics that affect drinking water quality, such as nutrient loading. He noted that SAB does not consider it possible to evaluate the research on the 71 drinking water contaminants under review without outside assistance.

Ms. Beardsley commented that funding for drinking water programs is trending downward.

Ms. Barr noted that drinking water research needs are particularly underfunded.

Dr. Griffiths estimated that the drinking water budget was cut in half over the past six years.

Ms. Barr referred to ORD's new focus on an interdisciplinary research approach. The OW has non-interdisciplinary research needs with enormous public health consequences, such as corrosion control. EPA would like to ensure that the new multi-disciplinary approach will address necessary research needs. Ms. Barr will attend a meeting in December 2009 to learn about the new approach within ORD.

Dr. Zarate-Bermudez inquired about why EPA would tier sampling sites for copper contamination.

Ms. Barr explained that copper has an effect on GI illness. The tiering of monitoring sites for the lead and copper rule is based on potential occurrence of lead distribution pipes and soldering in plumbing. EPA is considering whether lead monitoring sites should continue to be based on 1980s data, and whether it would be appropriate to also include tiering critieria for copper.

Dr. Griffiths noted that some health researchers are concerned that copper may interfere with the absorption of iron.

Mr. Vincent suggested that NDWAC review its letter to the administration, sent in November 2008 about drinking water research. The letter may not have addressed internal budget balancing or Congressional appropriations.

Mr. Kite noted that there is a December 1, 2009 deadline for the GWR, but there have been no mandates for action on continuous chlorine monitoring in Illinois and few monitoring techniques have been approved.

Ms. Barr clarified that the rule does not require systems to use continuous chlorine monitoring equipment. There was one type of equipment already approved and the new addendum allows a much broader range of equipment. A water equipment manufacturers association and AWWA asked EPA to allow a broader range of analyzers. Other methods have also been approved and a system may use any approved method to achieve compliance.

Mr. Kite explained that his utility switched to testing for fecal coliform as well as total coliform. The template for public notice of coliform violations should be updated because the notice uses strong language about severe health effects, but is delivered to customers three months after a violation.

Ms. Barr replied that the TCR FACA group recommended that a nonacute total coliform violation trigger a system assessment and a correction without public notification. If a system identifies a problem, the system must correct it regardless of its relationship to the coliform result. Public notification would be required if the system does not conduct an assessment or corrective action.

Mr. Kite noted that coliform sampling techniques have not been updated, and explained that there may be sampling errors based on sample collection errors/contamination and sample location. Many systems are so large that it is difficult to reach primary and alternate sampling sites in one day.

Mr. Cooley commented that defining continuous monitoring could be difficult, but it is much better defined in the drinking water program than in the clean water program. He recalled that a neighboring system was required to generate a public notice, and a letter to the editor of the local paper asked why the public wasn't notified earlier about the violation. He noted that a utility can conduct its own investigations and corrective actions without waiting for regulatory requirements.

GEOLOGIC SEQUESTRATION OF CARBON DIOXIDE

Steve Heare – EPA Drinking Water Protection Division

Steve Heare delivered a presentation on EPA's activities regarding the geologic sequestration of carbon dioxide. He introduced **Steve Platt**, a national expert on EPA's Underground Injection Control (UIC) program and a Region 3 staff member. There are several goals for EPA's GS activities. One is to promulgate regulations to support the commercial-scale development of underground sequestration, and the second is to tailor the UIC program to address unique GS considerations such as huge volumes, buoyancy, viscosity, and potential corrosivity. EPA would like to create an adaptive regulatory approach that responds to new technologies and new information. EPA would also like to capitalize on the UIC program's thirty years of experience. Mr. Heare noted that EPA received comments on a proposed GS rule on many topics, including the area of review, monitoring, post-injection care, and long-term financial responsibility. EPA is considering comprehensive rule development in concert with Clean Air Act (CAA) monitoring of greenhouse gases. EPA proposed that all injection must be conducted below the lowest underground source of drinking water (USDW); but some commenters reminded EPA that there are deep aquifers in some

areas of the country, and that the requirement would eliminate many areas of the country from using GS. EPA is considering a waiver process for permit writers to allow injection above or between the lowest USDW that may be equally protective of USDWs. EPA will respond to comments, work with the Office of Air and Radiation, conduct Office of Management and Budget (OMB) review, and finalize the rule by December 2010.

Mr. Grunenfelder asked if there were provisions for public hearings or public notification in the consideration of injection above the lowest USDW.

Mr. Heare confirmed that public notification and hearings are incorporated into the existing permitting process. The new proposal incorporated the internet into the public participation process.

Mr. Owen recalled that NDWAC prepared a letter to the Administrator in December 2008 outlining issues associated with permitting geologic sequestration sites. NDWAC cautioned that there may be many necessary, complex skills needed to evaluate whether to grant a permit. The rule should determine what information will be necessary for a permit application and who must be involved in its preparation and review.

Mr. Heare explained that one of the big issues in the program is that it is operating on a $10 million budget. The process of permitting one of the wells is phenomenally complex. EPA is concerned that the states and the agency lack expertise and resources for adequate oversight. The waiver process is just one example in which additional resources will be required for analysis, oversight, and management.

Mr. Platt explained that there are complications in these reviews. There should not be any problems injecting below or near USDWs, but there must be expert review of the process. An underground plume can move significantly in fifty years, so area of review (AOR) determinations will require significant oversight. The plumes may migrate beyond state or national borders.

Mr. Owen asked if the expertise is transferrable from related review processes.

Mr. Platt replied that the required level of expertise will depend on the magnitude of the project and the permitting process. EPA does have some expertise, but many staff members will be retiring soon and funding has been inadequate to bring in new staff. EPA Region 3 can review Class II well permits in four to six months, but additional permits may slow the review process. Region 3 is also involved in long-term financial responsibility, including discussions on who will be responsible and what financial mechanisms will be required.

Mr. Cooley asked if the relevant lowermost USDWs for GS are potential USDWs or those sources that are already in-use.

Mr. Heare confirmed that any potential USDW, using the Agency's established definition, must be considered.

Ms. Morales-Sanchez asked permission from the council to advise the Administrator on this matter. It is important for EPA to define review criteria in the present in order to prevent environmental disasters in the future.

Mr. Kite mentioned that a project in the Illinois region received $75 million from the Department of Energy to conduct a $90 million project. He thought that some of the money ought to be made available for evaluations, oversight, and research.

Dr. Griffiths replied that different agencies have different priorities. EPA's health-based and environmental priorities are not necessarily aligned with DOE's priorities. He suggested that NDWAC may want to consider speaking with representatives from DOE.

Mr. Saddler commented that it is troublesome that these questions remain unanswered, while the final rule will be published in December 2010. He stated that there is potential for catastrophe, and thought that publishing a rule and creating law before answering these questions is very irresponsible.

Mr. Heare replied that EPA debated how quickly to proceed. Industry, Congress, and environmental groups such as Sierra Club and the Natural Resources Defense Council (NRDC) urged the Agency to move quickly, especially because a number of states are already regulating the process. EPA anticipates making revisions to the rule after it is published.

Mr. Saddler commented that the electric industry is urging progress, and having electrical engineers commenting on geologic questions is concerning. States are entitled to regulate however they would like, but it is more difficult to control the federal government.

Mr. Heare reminded the Council that states already can permit GS wells as Class I industrial wells.

UPDATE ON HYDRAULIC FRACTURING

Steve Heare – EPA Drinking Water Protection Division

Steve Heare delivered a presentation on hydraulic fracturing and natural gas resources. The Marcellus Shale, located under much of the eastern U.S. could provide the entire natural gas supply to the U.S. for fifteen to twenty years. Coalbed methane generated much interest in the early 2000s and is much shallower than shale deposits. Coal bed deposits are hundreds of feet deep, while shale deposits are thousands of feet deep. The Marcellus Shale is between 5,000 and 7,000 feet deep. Hydraulic fracturing (hydrofracking) is a process that improves the flow of fluids by connecting preexisting fractures. Fluid is pumped under pressure into the rock, exceeding the strength of the rock and opening fractures. Direct impacts can include underground sources of drinking water (USDW) contamination through injection or migration of the fluids. Coalbed methane hydrofracking uses about 50,000 to 350,000 gallons per site. Marcellus Shale sites would each require five million gallons of water, not including the volume of additives. Mr. Heare noted that about fifty

percent of the injected water returns to the surface as wastewater, and the wastewater is occasionally radioactive or has high TDS.

EPA studied hydrofracking of coalbed methane wells in 2000, but did not identify a link between hydrofracking and USDW contamination. The Energy Policy Act of 2005 exempted hydrofracking from SDWA regulation unless diesel fuel was used as the injection fluid. Hydrofracking fluids include biocides and other additives, and the companies that make the chemicals consider them to be proprietary. Companion bills in the U.S. House of Representatives and Senate were introduced to undo the 2005 Energy Policy Act SDWA exemption, and if the legislation passes, the UIC program would once again regulate hydrofracking as Class II injection. The 2010 appropriation bill includes language urging EPA to study fracturing, but no funding source is provided for the study.

Mr. Platt explained that hydrofracking is a complex topic, as well as an important issue for Region 3. It is a water management issue more than a water contamination issue. Contamination tends to result from surface spillage, leakage, and well construction, rather than hydrofracking. Water management is an important issue because EPA predicts that thirty percent of the water used will return to the surface. If thirty million gallons return to the surface it is likely that some will be recycled and reused. Fluids that return to the surface during gas production may require deep well disposal, and locating disposal sites could be a challenge. Many hydrofracking operators have disposed of used process water at wastewater treatment facilities or may have disposed of the material illegally.

Ms. Morales-Sanchez asked if any neighbors or community members were notified of these problems, given that the activity is exempt from SDWA requirements.

Mr. Platt replied that the state is responsible for regulating the activity. There have been enforcement actions taken against the operators, but EPA is not involved.

Ms. Morales-Sanchez asked if operators will have responsibilities under the Resource Conservation and Recovery Act (RCRA) if new legislation places regulatory responsibility on EPA.

Mr. Heare was unsure if the wastewater would be considered hazardous under RCRA. If operators are using the materials for their intended use then they are exempt from RCRA. The materials are not listed as hazardous waste, but if they failed RCRA characteristics then they would have to be disposed of in a Class I well. Currently, they must be disposed of in a Class II well.

Mr. Smith noted that he has worked with Chesapeake, an Oklahoma-based firm which is one of the hydrofracking operators. In Oklahoma, the concerns are focused on water supply rather than water contamination. He visited a production field, and water tank trucks were lined up for three miles to deliver the necessary volume of water. The water utility allocated 2" of water per acre, so one small hydrofracking site is purchasing 4,800 acres of water rights. Hydrofracking technology is moving away from fresh water as an injection fluid for this reason.

Mr. Heare noted that EPA does not implement water law. EPA's interests are in contamination, not water use. Chesapeake is considering using municipally treated wastewater.

Mr. Smith commented that the western states do not want EPA to regulate water use, but asked if there is a way to use permitting to ensure that states are able to regulate this water use.

Mr. Platt replied that the Pennsylvania Basin Commission has been involved in the operation permitting process. They created a dual permitting process, and water use must be limited to high-flow periods, among other restrictions. He was unsure about the permitting process in western states.

Ms. Taylor stated that there is a formation of natural gas that stretches from North Carolina to South Carolina. She asked if there are other natural gas resources that are not yet understood. She noted that other deposits may yet be discovered.

Mr. Saddler identified that one of the most important aspects of this activity is the well construction process. The transition from vertical to horizontal drilling is also important. Ground-sealing and minimization of contamination between zones is challenging.

Dr. Zarate-Bermudez asked what type of water quality and quantity problems are associated with hydrofracking.

Mr. Heare responded that EPA did not identify water quality problems resulting from the activity itself, but that there might be issues associated with the operation as a whole. Those problems result from oil and gas production. At this point, hydrofracking has not been linked to water contamination.

Mr. Zarate-Bermudez asked what specific contaminants can be found in the injection fluid.

Ms. Blette noted that the use of diesel as an injection fluid introduced the possibility of contamination, but EPA did not find evidence of diesel contamination when it carried out its study. Contamination could happen without hydrofracking, if the oil or gaa migrated into wells.

Mr. Heare noted that the 2000 EPA report included information about the constituents of the injection fluid.

Mr. Vincent asked if the injection fluid was true liquid diesel.

Mr. Heare confirmed that the fluid was diesel fuel. [Note: EPA signed an MOU with four major companies that conduct hydraulic fracturing to eliminate use of diesel fuel – see http://www.epa.gov/safewater/uic/pdfs/moa_uic_hyd-fract.pdf].

Dr. Griffiths asked if EPA was aware of routine monitoring activities at these operations to monitor for contamination.

Mr. Heare replied that Chesapeake stated that they routinely monitor all wells for acidity, and that they measure baseline water quality before they begin a hydrofracking operation. The operator is aware if fluid is being lost into the well. Problems seem to be addressed quickly.

Mr. Platt confirmed that there is background water quality monitoring in order to respond to complaints.

Ms. Barr asked what constituents change over time in the fluid mix.

Mr. Heare explained that the operators change the constituents of the fluid overtime during the hydrofracking process in order to allow sand or other propping agents to settle out of the fluid, within the fractures. Pressure is also varied over time.

Mr. Cooley noted that GS regulations will move forward without research, and that the potential for change in water quality is important. Responsibility for drinking water quality will always rest on drinking water utilities, and it is possible that the cost of contamination from hydrofracking activities will be passed on to the water utilities. He asked how much customers can be expected to pay for additional treatment because of these new activities.

Mr. Heare responded that EPA is involved on both sides of this issue. Natural gas is a clean fuel compared to coal, but there is an environmental cost associated with its production.

NEXT STEPS, ISSUES FOR SPRING 2010 MEETING, AND WRAP-UP

Mr. Grunenfelder expressed appreciation for the opportunity to chair the Council and recognized the members who would be leaving the Council in December 2009.

Ms. Blette presented plaques to the following members:

- **Nancy Beardsley**: Council member for 6 years, representative from the state of Maine and provided a state drinking water perspective.
- **Brian Wheeler**: Delivered a successful presentation in Tucson, Arizona on total water management and represented an industry perspective on the Council.
- **Jennifer Nuzzo**: Representative from the Biosecurity Center in Baltimore, Maryland; she provided a broad perspective on many issues.
- **Doug Owen**: A prolific writer and communicator.

Ms. Blette introduced Tom Carpenter, of EPA OGWDW, who will assume NDWAC coordination as the new DFO.

Mr. Grunenfelder and the Council thanked Ms. Blette for all of her support and hard work as the DFO.

Mr. Grunenfelder proposed two follow-up actions for the Council:

1) A follow-up message to the Administrator regarding EPA funding and the importance of research and regulatory development.
2) Cooperation between the UIC program and the drinking water community, especially regarding GS and hydraulic fracturing.

Mr. Cooley added that there may be new regulations developed before the next meeting and that many aspects of the regulations may have been changed since the last meeting.

Ms. Saddler commented that chemical security regulations are still under consideration on Capitol Hill.

Mr. Grunenfelder stated that NDWAC will consider that issue at the next meeting.

Ms. Morales-Sanchez asked for an update from the CRWU Work Group at the next meeting.

Mr. Wheeler asked whether the Council should request specific research actions or send additional communication. He suggested that NDWAC request feedback on actions that have been taken and then follow-up based on EPA's response.

Mr. Owen noted that much of the water quality data that would be used to initiate early warning systems have not yet been generated. Most of the four pilots are just now installing monitoring stations and selecting the event detection system software. He suggested that NDWAC discuss the characterization of events and triggers that result from ongoing water quality monitoring at the spring or fall 2010 meeting.

Mr. Saddler asked about the status of EPA's decision to lower the MCL for arsenic.

Ms. Barr stated that the Agency is revising its risk assessment, and if there were to be an MCL revision it would occur during a Six Year Review. Once the risk assessment is finalized, EPA will reexamine it and conduct a cost-benefit analysis. She suggested that NDWAC invite a guest to speak about risk assessment. She added that it is unclear when the risk assessment will become final, but that it is unlikely to occur before the next meeting.

Ms. Beardsley noted that the regulations regarding radionuclides treatment create a disconnect between water treatment and coalbed and shale exploration.

Mr. Heare explained that when the arsenic and radionuclides rules were written there was concern over safe disposal. EPA understood that the contaminants could be disposed of in a UIC well; however, it may be difficult to get permits for this activity. The issue of regulated fluid disposal will be important for hydraulic fracturing.

Ms. Blette commented that there are many projects within the UIC program that require extra resources. The program does not have adequate resources to react to many of the new activities and requirements.

Mr. Wheeler noted that both the disposal and water resource issues will be important.

Ms. Beardsley suggested that NDWAC advocate for additional funding for the SRFs, with fewer restrictions than the ARRA funds.

Discussion of the first follow-up priority: letter to the EPA Administrator regarding research funding and priorities

Mr. Owen asked about EPA's position on health effects research related to Mr. Wheeler's statement that ORD receives little of the federal government's environmental research funding. He advocated for additional funding for health effects research to support regulatory development. Mr. Owen asked if drinking water health effects research might be tied to overall agency priorities, such as improving the environment and public health. He asked what kind of information should be presented in the letter, such that the Council can defend the placement of money in the program.

Mr. Smith agreed that all departments will ask for more money, so the letter must emphasize the impact of research supporting regulatory implementation, which may increase public understanding and support of regulatory development.

Mr. Grunenfelder asked if NDWAC should suggest that the research component include public communication aspects.

Mr. Smith reiterated that EPA does not interact well with states, and the connection between the research and regulation is important.

Ms. Morales-Sanchez commented that there is not enough money in EPA's research budget, and that a new research approach is needed. Customers are faced with ever-increasing costs for water treatment, and there should be accountability for the producers of the contaminants. The drinking water community cannot continue to absorb the costs of treating for additional contaminants.

Mr. Cooley noted that the area surrounding his utility includes two major biotechnology firms, and that the water utility controls the discharges from both facilities.

Dr. Griffiths explained that the NHERL is examining complex mixtures of chemicals and the effects of chronic low-level exposure to combinations of chemicals. He thought that it may be worthwhile to mention the reduced funding for NHERL in the letter, as it is a primary concern for drinking water research. Secondly, the SAB operating plan in 2010 includes ballast water discharge, mountain-top mining, and technical advisory activities which have a tangential relationship to the drinking water community. SAB is not scheduled to review any data on health effects research.

Mr. Grunenfelder suggested that NDWAC express support for the collaboration between OW and ORD, and ask for updates on the progress of the drinking water multi-year plan.

Dr. Griffiths suggested that the SAB could be useful in an advisory role identifying gaps in scientific knowledge.

Ms. Blette noted that at this point, EPA only consults with SAB when it is legally required to do so for rule development and regulatory language.

Ms. Barr noted that new research within the drinking water program will help develop scientific expertise.

Ms. Blette asked if the Council was interested in communicating to EPA the concern about communication with SAB.

Dr. Griffiths offered to convey information from NDWAC to SAB, since he is the SAB liaison.

Dr. Zarate-Bermudez supported coordination between CDC and EPA, especially with the CDC Division of Health Studies.

Mr. Grunenfelder suggested that NDWAC could connect the need for CDC research coordination with the point that only a small percentage of environmental research funding is designated for health effects research.

Mr. Vincent suggested that NDWAC mention that additional funding, especially for ARRA, has been designated as pass-through money to the states. The extra money is spent for stimulus, and the increase in the EPA budget may not have been meaningful. He agreed that collaboration and coordination with other agencies that regulate chemicals (e.g., Department of Energy, Department of Agriculture, Drug Enforcement Agency) could be important. It may also be important for EPA to consider trying to regulate contaminants before they contaminate the water supply.

Mr. Grunenfelder agreed that drinking water funding is insufficient, and suggested that there could be additional ways to leverage funding though other agencies that are regulating these contaminants or the industries that are creating them and profiting from them. He suggested that it might be important to target industry to help pay for these activities.

Ms. Barr noted that one of the Administrator's priorities is transparency, and it might be beneficial to frame the letter in that way. There is one subject that can put some responsibility on industry: the endocrine disruptor program. A group of pesticides will be announced, and the manufacturers must conduct tests that will determine whether there are significant health effects. There is interest in extending the program to manufactured drinking water contaminants.

Mr. Cooley stated that drinking water utilities would like to provide accurate information to their customers in risk communication. There is a lot of research available that is potentially frightening to the general public. The industry was caught off-guard by the pharmaceutical story. Mr. Cooley provided an example of a neighboring utility that was required to make a statement about the issue. The utility's administrator stated that he wasn't required to test for pharmaceuticals and would test for it when it was required by EPA. Mr. Cooley chose to emphasize the positive actions of his utility,

such as the pharmaceutical take-back program. Utilities should have the tools to support risk communication.

Mr. Saddler suggested that small system sustainability should be a topic of concern for the next meeting. He stated that the costs for one small system's set of water quality analysis (SOC and pesticides) were $286 per service connection.

Mr. Grunenfelder noted that EPA is considering the equitable treatment of small systems. The previous NDWAC letter on the subject was very well received by the administrator. EPA's Council on Environmental Justice was very supportive of NDWAC's position.

Discussion of topics for the next meeting

Mr. Stephani noted that all EPA actions should be consistent with the Agency's strategic vision and goals. He doesn't understand how the goals are developed or revised, or how they apply to NDWAC. He suggested a session for this next meeting on this topic, as well as on the agreement being formulated between the EPA, DOT, and HUD regarding smart growth. There was some discussion of the relationship of the goals to source water protection, and it will be important to tie the goals to sustainability and smart growth.

Ms. Blette replied that the Administrator has worked with Department of Transportation and the Department of Housing and Urban Development to develop plans for sustainability across the agencies. She suggested that the Council hear an update on these activities at the next meeting.

Mr. Grunenfelder suggested that CDC should be involved in the effort given the implications for community health.

Ms. Blette explained that the group will be kept to a small size during its development phase.

Ms. Taylor noted that community clean water projects can be accomplished very differently from large engineering projects, and can be very important for down-stream communities.

Mr. Kite noted that there will be a new focus on energy sources such as wind power and natural gas and that it would be good to have research and pilot projects to identify the impact of those energy sources on drinking water resources.

Ms. Morales-Sanchez mentioned that the Climate Ready Water Utilities Work Group is tentatively scheduled to meet in Chicago, Illinois during the first week of May 2010. She suggested that NDWAC could arrange its meeting according to that schedule.

Mr. Smith offered that if the meeting were held in Oklahoma he could organize a tour of the National Weather Center, and a discussion with the National Rural Water Association. It may also be possible to have Chesapeake present more information about hydraulic fracturing.

Mr. Grunenfelder suggested that **Ms. Blette** take the points raised by the Council members and draft a letter to be provided to the Administrator. Ms. Blette agreed to draft a letter and send it out to the Council members for review and approval.

Mr. Grunenfelder and **Ms. Blette** thanked the members for their contributions and called the meeting to a close.

FINAL AGENDA
National Drinking Water Advisory Council Fall Meeting
Marriot Philadelphia Downtown, 1201 Market Street
Philadelphia, PA
November 11-13, 2009

Wednesday, November 11, 2009

8:30-12:30 *Optional*	American Public Health Association: Exhibit Hall and Poster Sessions *Purpose: Information on posters available for viewing is at http://apha.confex.com/apha/137am/webprogram/meeting.html#Wednesday (see listings for 8:30-9:30 timeslot)*	
1:00-1:15 pm	**Welcome** *Purpose: Review agenda*	Gregg Grunenfelder, NDWAC Chair, Veronica Blette, DFO
1:15 – 2:00 pm	Follow-up since the Last Meeting *Purpose: Discuss EPA activities underway to follow-up on recommendations made from previous meeting, Recovery Act implementation, and recent Hill activity on chemical security.*	Veronica Blette, DFO Cynthia Dougherty, IO
2:00-2:45	APHA Perspective**:** Connecting the Public to their Water *Purpose: Dr. Ward-Robinson will discuss research and outreach efforts facilitated by her organization to increase the visibility of water within the public health dialogue*	Jennie Ward-Robinson, Institute for Public Health and Water Research (IPWR)
2:45-3:00	**BREAK**	
3:00-3:45	Regional Perspective: Collaborating with States and Other Decision Makers *Purpose: Describe how the region is working with states and local leaders on drinking water issues, including an overview of the Source Water Collaborative.*	Vicky Binetti Region IIII, Assoc. Director, Drinking Water & Source Water Protection
3:45-4:15	Update on Climate Ready Water Utilities WG *Purpose: Discuss status of working group – charge and membership – and other activities to support the CRWU effort.*	David Travers, WSD
4:15-5:00	EPA activities on active and effective security *Purpose: Update efforts to study consequence management and promote interdependency collaboration.*	David Travers, WSD
5:00	**ADJOURN**	
6:00 p.m.	**GROUP DINNER**	

Thursday, November 12, 2009

8:15-8:30	**Coffee for Members**	
8:30-9:15 am	APHA Perspectives: Linking Water Security and Health Agencies *Purpose: The DPIC is a partner in the Cincinnati water security initiative pilot. Mr. Colvin will provide a perspective on how these centers can help track water contamination events.*	Jonathan Colvin, Cincinnati Drug and Poison Information Center (DPIC)
9:15-10:00 am	APHA Perspectives: Tracking Sources of Waterborne Disease in the Watershed *Purpose: Dr. Jagai will present her research describing how watershed attributes may predict rates of waterborne disease.*	Jyotsna Jagai, EPA/ORD (formerly Tufts Univ.)
10:00 – 10:15 am	**BREAK**	
10:15 -11:30	ORD Research Agenda and Multi-year plan *Purpose: Hear from ORD about drinking water health effects research and alternative technologies research. Provide opportunity for Council to ask questions and communicate concerns. OGWDW will provide perspective on how OW is also working with other research partners.*	Audrey Levine, ORD Pamela Barr, SRMD
11:30-12:30	**PUBLIC PARTICIPATION**	
12:00-12:30	EPA activities on nutrients (tentative, if no public participation)	Steve Heare, DWPD
12:30-1:30	**LUNCH**	
1:30-5 pm	Perspectives from the Philadelphia Water Department	
	Philadelphia's Green City, Clean Water effort	Howard Neukrug
	Source water protection	Kelly Anderson
	PPCPs and other emerging contaminants	Alexa Obolensky
	Contaminant warning system pilot	Alexa Obolensky
5:00 p.m.	**ADJOURN**	

Friday, November 13, 2009

8:00-8:15 am	**Coffee for Members**	
8:15-9:00 am	Update on Regulatory Matters *Purpose: Provide update on TCRDS, CCL3, Six Year Review,UCMR3, and other regulatory-related activities.*	Pam Barr, SRMD
9:00-10:15 am	Energy and Water *Purpose: Provide update on status of geologic sequestration rule and overview of activity related to hydraulic fracturing (including activity related to the Marcellus Shale)*	Steve Heare, SRMD Steve Platt, R3
10:15 – 11:30 pm	Council Discussion *Purpose: Discuss issues identified during the meeting and determine need for formal recommendation or additional work.*	Gregg Grunenfelder
11:30-12:00	Issues for Discussion at Fall 2009 Meeting and Wrap Up	Gregg Grunenfelder
12:00	**ADJOURN**	