

Summary of Workshop on Microconstituents and Ecological Impacts of Biosolids and Effluent Reuse

The Metropolitan Water Reclamation District of Greater Chicago (District) conducted a workshop at its Stickney Research and Development Auditorium on June 26, 2008, entitled “Microconstituents and Ecological Impacts of Biosolids and Effluent Reuse.” The workshop was conducted to share information regarding the potential for ecological impacts of wastewater reclamation plant treated effluent and biosolids if used in the City of Chicago, Calumet Region, according to the District’s proposals to:

- (1) Establish a treatment wetlands system for a portion of the Calumet Water Reclamation Plant (WRP) effluent; and
- (2) Use exceptional quality air-dried biosolids as a soil amendment for establishing vegetation on some project sites in the region.

The District solicited the expertise of scientists from three universities, Agriculture and Agri-Food Canada, United States Environmental Protection Agency (USEPA), Illinois Environmental Protection Agency (IEPA), consulting firms, and the District to share information on the state of the science on the potential for ecological impacts of endocrine disrupting compounds (EDCs) in the aquatic and terrestrial environments. Over 100 invitations were sent out to stakeholder organizations, agencies, and individuals. About 80 individuals attended, including some District staff.

Mr. Richard Lanyon, General Superintendent, District, emphasized the District’s interest in restoration activities in the Calumet Region and its commitment to address the issues raised by various stakeholders, especially those by the United States Fish and Wildlife Service. Ms. Nicole Kamins, Chicago Department of Environment (CDOE), presented an overview of the City of Chicago’s effort in the restoration of the Calumet Region, and indicated that biosolids can be used to help improve the rate of restoration of some sites by significantly reducing the cost of acquiring topsoil. Drs. Heng Zhang and Thomas Granato, District, presented overviews of design concepts and the benefits of constructing the treatment wetlands and of using biosolids for restoration of sites such as the Cluster Site (proposed Superfund site) and Indian Ridge Marsh.

The potential impacts of using WRP effluent in treatment wetlands on aquatic ecology was discussed in the first session of the workshop. Mr. Todd Nettlesheim, USEPA, Region V, presented data from studies on District WRP effluent, Chicago area waterways and other streams. The available data indicated that most of the organic compounds of concern are removed during the water treatment process, but detectable levels of some organic compounds are still found in effluent and receiving waters. He also indicated that detection of these compounds in effluent or receiving waters is not correlated with impacts on aquatic life, and there are no established standards for concentrations of these and many other compounds in the environment. Dr. Heiko Schoenfuss, St. Cloud State University, presented data showing that a very diverse range of anthropogenic chemicals considered as EDCs are continuously released in the environment. Although studies have shown that some EDCs may impact reproductive physiology of fish, very little is known about the potential impact of the mixtures of these compounds as they exist in the environment and more data is needed to better evaluate critical levels of these compounds in the aquatic environment. In her presentation, Ms. Wendi Goldsmith, The Bioengineering Group, Inc., advised that although information might not

be available to address all stakeholder issues, the city should not overlook the opportunity to utilize resources that can be of a greater ecological value to the region.

In the discussion session that followed, Dr. Heng Zhang clarified that the major concern associated with establishment of the treatment wetland proposed by the District is the disruption of ecosystem during the construction phase. Mr. Rob Sulski, IEPA, emphasized that, based on his observations and on data, the high number of endangered species of migratory birds (e.g., black crowned night heron) in the Calumet Region appears to be a good indicator that although the ecosystem is degraded, it is still suitable and will only become more suitable if the planned restorations are undertaken, regardless of the potential affects of EDCs.

The second session focused on potential impacts of land application of biosolids on the terrestrial ecosystem. Dr. Albert Cox, District, gave an overview of the federal, state and local regulations and guidelines that are in place for the biosolids land application practice to protect human health and the environment. Dr. George O'Connor, University of Florida, gave an overview of the USEPA's Part 503 risk assessment protocol in which 200 organic compounds were evaluated, and resulted in the USEPA's decision that it is unnecessary to regulate those compounds in land-applied biosolids. He also mentioned that issues related to analytical methods and experimental design pose a significant challenge for acquiring the quality data required to effectively evaluate impacts and develop criteria for EDCs in the environment and that conclusions from "worst case" type studies should not be extrapolated universally to the real world. Dr. Edward Topp, Agriculture and Agri-Food Canada, presented data from a study in which spiking a lake with an estrogenic compound resulted in negative impacts on reproductive physiology of fish. He emphasized that generally organic compounds associated with biosolids are quickly immobilized following application and migration to surface water via runoff and groundwater through leaching is minimal. Dr. Nick Basta, The Ohio State University, presented data showing that land application of biosolids improved soil productivity and immobilized potential contaminants with no negative impacts on survival and reproduction of soil invertebrates.

The discussion that followed the presentation sessions indicated that the potential for ecological impacts due to EDCs appears minimal if effluent is reused in a treatment wetland and biosolids are used as a soil amendment in the Calumet Region restoration projects. The presentations and the discussions helped to bring the stakeholders up-to-date on the state of knowledge pertaining to impacts of EDCs in the environment, but data are not available to address some of the stakeholders' specific questions at this time.

In closing the workshop, Mr. Lanyon reiterated the District's commitment to work with stakeholders and the City of Chicago to obtain information to address the issues and move forward with the Calumet Region ecological restoration plan and contribute to improving ecosystems at the watershed scale. Ms. Suzanne Malec-McKenna, Commissioner, CDOE, assured the group that issues related to restoration of the Calumet Region present opportunities for entities to work together not only to address ecological restoration but also to contribute to the region's initiative to address climate change. She recommended that pilot scale work be conducted to address issues pertaining to the WRP effluent treatment wetlands and use of biosolids in the Calumet Region, and that the group continue to assess both projects as more data becomes available.