BEFORE THE POLLUTION CONTROL BOARD
OF THE STATE OF ILLINOIS

IN THE MATTER OF:	)	
	)	
NATURAL GAS-FIRED, PEAK-LOAD	)	R01-10
ELECTRICAL POWER GENERATING	)	
FACILITIES (PEAKER PLANTS)	)	

TESTIMONY OF DEREK WINSTANLEY, D. PHIL.

Good afternoon. I am Derek Winstanley, Chief of the Illinois State Water Survey. The Illinois State Water Survey, is a division of the Office of Scientific Research and Analysis of the Illinois Department of Natural Resources and is affiliated with the University of Illinois at Urbana/Champaign. The Water Survey was established in 1895 and is the primary agency in Illinois concerned with water and atmospheric resources. Research activities at the Survey are organized under five major scientific sections: Atmospheric Environment, Analytical Chemistry & Technology, National Atmospheric Deposition Program, Watershed Science, and Ground Water.

Today, I will be speaking about ground-water resource issues as they relate to peaker power plants in Illinois. Peaker power plants place new demands on water resources in Illinois. The emergence of peaker plants is closely related to the restructuring of the electrical utility industry. There is little doubt that Illinois is attractive for peaker plant construction because the infrastructure and natural resources are all here. We have the natural gas pipelines, the electrical power grid, and plentiful water resources to make us attractive for this type of endeavor. And, it is quite likely Illinois

will be attractive for other high-demand water users in the future as well. So, while peaker plants are the issue for this hearing today, it is prudent to understand that broader water needs issues are at stake.

Prior to any discussion of the potential for impacts on ground-water resources from peaker power plants, it must be recognized that water demands from such plants vary widely depending upon plant design and intended use. First, there is a wide-spread tendency to call all proposed power plants "peaker" plants when, in fact, some proposals are for large, combined cycle plants that would be used to generate base load power all year round. Water use for peaker plants proposed in Illinois varies from as little as 0.07 million gallons per day (mgd) to about 2 mgd. These plants need only operate a few days per year to be profitable and most proposals are for 20 to 90 days operation per year. On the other hand, proposed combined cycle (base load) plants want 5 to 20 mgd for at least 10 months annual operation. Most, if not all, of the combined cycle plants have proposed to use surface water to meet their demands and, therefore, are not the focus of my presentation today.

However, a discussion of peaker power plants and impacts on ground-water resources must be placed within the context of all other regional water demands, including those for combined cycle plants as well as Illinois' growing water needs for domestic, municipal, agricultural, and other industrial uses. Often, local planners overlook ground-water resources issues in making land use decisions. Local landowners, on the other hand, use ground-water availability as an issue when it is actually a land use conflict that is their leading cause for concern. For example, golf courses are popular land uses and not perceived as a problem even though they may pump larger amounts of water for irrigation than some peaker plants.

Ground-water managers often use the term "potential aquifer yield". Potential yield or practical sustained yield can be generally defined as, "the amount of water that can withdrawn annually without producing undesirable effects." Often potential yield is equated to average annual recharge or the amount of water that can be withdrawn such that water levels are not drawn below certain sustainable levels. With the proper information, the effects of pumpage can be predicted and potential yields can be estimated. Unfortunately, because of data demands and the expense of collecting ground-water data, potential yields have not been determined for many aquifers in the state. Without reasonable yield estimates, however, it is impossible for planners to know what ground-water resources are available or to predict what impacts new withdrawals might have.

Further, where regional aquifer systems transcend political boundaries, limiting ground-water withdrawals in one community or area will not solve the problem if adjacent communities are not limiting withdrawals also. This is especially true in northeastern Illinois where many proposed peaker plants are planning on using wells drilled into the Cambrian-Ordovician aquifer, the deep bedrock aquifer system of northern Illinois. However, total regional withdrawals from this deep aquifer system are currently close to or slightly over the aquifer's estimated practical sustained yield. In this case, increased demands from all users on this regional aquifer system need to be addressed on a regional scale, not on a town-by-town basis.

Alternative water sources in some areas may be limited. In northeastern Illinois, diversion of water from Lake Michigan is fixed by Supreme Court decree and future allocations are constrained by that limit and by international agreement. Diversion of other surface waters may be restricted by requirements to maintain minimum base flows in those waterways defined as "waters of the State" (for example, the Illinois, Rock, Kankakee, and Fox Rivers). Water withdrawal restrictions on these

major waterways has been recognized as a rare event and, in at least one case, a plant proposer has agreed to shut down the plant during low-flow periods. While the state has the power to restrict surface diversions to maintain minimum streamflow on these large rivers, the state has no such powers for other moderately-sized streams and it is here that diversions may pose the greatest threat to instream flow needs for aquatic habitat, wastewater assimilation, and recreation/aesthetics.

Excessive ground-water withdrawals may also have subsequent impacts on the quantity and quality of surface waters. Over-pumpage of shallow ground water can decrease water levels in lakes and potentially dry up wetlands, fens, and springs. Reductions in the discharge from natural springs may threaten species such as the endangered Hines Emerald Dragonfly, which relies on water from undisturbed dolomite springs along the Lower DesPlaines River. Over-pumpage of shallow ground water can decrease the baseflow in streams below desirable levels, affecting water quality and water supply needs downstream. Ground water discharged from power plants to surface streams will be warmer and contain higher concentrations of dissolved solids than when originally withdrawn. Discharge of this water to surface waters can impact surface water quality and potentially the biodiversity of receiving wetlands and streams.

To meet these concerns, comprehensive ground-water quantity law in Illinois is needed. The current law of *reasonable use* does not impose quantitative restrictions, potentially leading to litigation when conflicts arise. The proliferation of proposals for peaking power plants has shown that regional "aquifer-wide" planning and management is needed to keep the growing demand for ground water from all users within practical sustainable yields. Comprehensive, regional water resources planning and management should consider linkages between surface and ground water, and water quantity and water quality. Such new management plans ought to also consider the differences

in aquifers in different regions of the state and how management schemes may be configured to meet those differences. By doing so, management schemes can be employed to reduce conflicts and avoid costly litigation.

I will be presenting a more detailed report to the Water Resources Advisory Committee on these issues next week. I thank you for your time and consideration.

This ends my prepared material and I am willing to answer any questions you may have.

Illinois State Water Survey

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