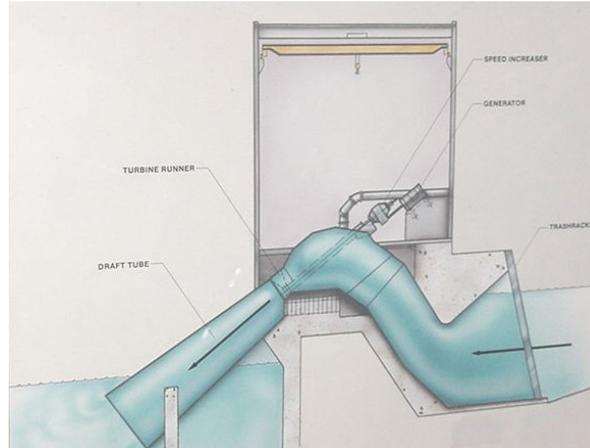


## **HISTORY AND CURRENT CONDITIONS**

Located on the Kankakee River in northeast Illinois, the Kankakee Dam was constructed in the 1880s to provide mechanical power and cooling water for area industries. In 1912, a hydroelectric plant was constructed at the nine-foot high spillway dam site and was operated until 1956 by Commonwealth Edison Company. Decommissioned in 1956, the dam and related property were deeded to the Illinois Department of Conservation (IDOC) for recreation and conservation purposes. The dam continues to provide sufficient depth in the upstream pool for water intake structures and is a very popular spot for local fishermen and recreation.

### **THE KANKAKEE HYDROELECTRIC FACILITY**

The successful implementation of the Kankakee Hydroelectric Plant illustrates the continuing viability of small hydroelectric developments. While it presented a unique set of development challenges, the end result proves to be beneficial on a larger scale. Developed by the City of Kankakee, the 1,200 kW facility is located at the site of an abandoned hydroelectric plant and utilizes flow which would otherwise be wasted over the spillway. The facility generates and transmits energy to the KRMA Wastewater Treatment facility and helps reduce the amount of electricity purchased from Commonwealth Edison Company. The expected annual output from the hydroelectric turbines is 6,500,000 kWh.



### **OPERATION**

Electrical power generated by the Hydroelectric Plant is transmitted to KRMA the Wastewater Treatment Facility. Existing methane fuel generators, currently located at the Waste Treatment facility, will be used when additional energy demands are required. The Hydroelectric Plant has the capacity to produce more power than the Wastewater Treatment facility requires. Typical power demand at the KRMA Waste Treatment facility is approximately 850 to 1000 kilowatts an hour. A dedicated 12,500 Volt Power line was installed from the Hydro Plant Directly to the KRMA Wastewater Treatment Facility to deliver this energy.



## **THE KANKAKEE HYDROELECTRIC FACILITY**



City of Kankakee

Illinois Department of Energy  
And Natural Resources

Stanley Consultants, Inc.



## PROJECT DEVELOPMENT

Wanting to reduce the cost of purchased electrical power and utilize an available natural resource, the City of Kankakee examined the potential for hydroelectric development on the Kankakee River. Incorporating innovation and design experience, the Kankakee Hydroelectric project proceeded to final completion in May 1991 after eight years of study, design and construction. The project was implemented due to the hard work of the City of Kankakee and their consultants and contractors as well as the strong support by the citizens of Kankakee, the Mayor and the City Council. What follows is a description of the project's development.

- The City initiated a successful feasibility study in 1983 to evaluate the constraints and opportunities of a number of alternatives for development of hydroelectric facilities at the Kankakee Dam.
- A fifty-year lease between the Illinois Department of Conservation (IDOC) and the City of Kankakee was entered into after much discussion. The City had to receive permission from Commonwealth Edison Company to produce power on the site that had been perpetually deeded for park and/or conservation uses only. A bill was developed specifically for the project and passed by both houses of the legislature and signed by the Governor of Illinois giving the IDOC authority to enter into a lease agreement with the City.

- In October 1986, an application was submitted to the Federal Energy Regulatory Commission (FERC) to obtain a license to construct and operate hydroelectric facilities at the site. Prior to the issuing of the license, FERC required a dissolved oxygen study and mussel survey be conducted. No oxygen depletion was detected and no endangered mussels living in the vicinity were identified. Some 20 months after the application was submitted, a license was issued by FERC.
- A detailed inspection of the spillway structure was performed and the dam was found to be in good condition. Minor deterioration which had occurred over the years was repaired by the State of Illinois.
- The first contract consisted of the purchase and installation of three, 400kW hydroelectric generating units using a siphon design for the turbines. Designed and manufactured by the French firm. NEYRPIC, these are the first siphon turbines to be installed in the United States by NEYRPIC. Sized to fit in the existing turbine bays of the original hydro plant foundation, the siphon turbines minimized rock excavation costs at the site. The siphon turbines were selected for Kankakee due to their lower cost, higher annual production and relative ease of installation.
- A hydraulic model study was performed to identify objectionable flow characteristics in the proposed powerhouse intake configuration and to develop modifications. Performed by the University of Iowa Institute of Hydraulic Research, the scale model was constructed to resemble the river, Dam and proposed powerhouse intake.



- As is common with most hydroelectric projects, permitting requirements were quite extensive. Permits were acquired from the Corps of Engineers, Illinois Environmental Protection Agency, Illinois Department of Transportation Division of Transportation Division of Water Resources, Illinois Department of Transportation Division of Highways, and the local railroad. Coordination with Commonwealth Edison Company was needed for location of facilities within City and Commonwealth properties and agreement on electrical interconnection details.
- **Stanley Consultants** provided engineering services including feasibility studies, project permitting and FERC licensing, final design of facilities and assistance during construction.
- Project construction included contracts awarded to **C. E. NEYRPIC** for equipment manufacture, installation and testing; **Azzarelli Construction Company** for construction of powerhouse and associated site work; and to **Aldridge Electric Company** for construction of electrical transmission line and interconnection facilities.
- The City of Kankakee received \$1.03 million of Alternative Energy Bond Funds from the **Illinois Department of Energy and Natural Resources**. The funding was approved based on the innovative and unique nature of the turbine technology which Kankakee proposed to test and demonstrate. Construction costs are as follows:

Hydroelectric Equipment	\$1,550,000
Powerhouse and Site Work	2,489,000
Electric Transmission Line	344,000
Com Ed Interconnection	70,000
Design Engineering	350,000
Subtotal	<u>\$4,803,000</u>
State Grant	-1,030,000
<b>Cost to Kankakee</b>	<b>\$3,773,000</b>