

# achievements in power

## *dedication of three IEEE Milestones*

THE IEEE MILESTONES IN ELECTRICAL Engineering and Computing program is one of the most important responsibilities of the IEEE History Committee. Administered through the IEEE History Center, the program recognizes and honors technological innovation and excellence in the many fields of interest of IEEE. The principal purpose of the program is to promote public and scientific community awareness, knowledge, and understanding of the importance and rich history of electrotechnology. The program also publicizes significant engineering achievements in the locales where they occurred and helps to protect and preserve historically important information, artifacts, and sites. To be considered for milestone status, an achievement has to be at least 25 years old, involve a unique solution to an engineering problem, and have had regional or broader impact.

The path to milestone status is rigorous and long, almost always taking more than a year to complete and always requiring commitment and a significant investment of time and effort on the part of the nominators and sponsors. The process begins when an IEEE Organizational Unit (OU) submits an initial proposal on a form provided by the History Center. If the proposal is found to have merit, the OU is invited to submit a full, detailed nomination. The formal nomination package must demonstrate the historical significance

The IEEE Milestones in Electrical Engineering and Computing program marked its 25th anniversary in 2008. Worldwide, more than 80 outstanding achievements in electrical engineering, computing, and related sciences and technologies have been accorded milestone status since the program's inception in 1983. Each milestone has been honored with a citation and the dedication and placement of one or more bronze plaques at locations closely associated with the achievement. Today, there are milestones in each of the ten IEEE geographical Regions, and approximately one-quarter of all milestones dedicated to date recognize outstanding achievements in the generation, transmission, distribution, or utilization of electric power.

Six new IEEE Milestones were dedicated in 2008, three in the power engineering field. In June, the first of these three milestone dedications recognized the Pinawa hydroelectric generating plant, completed in 1906 and located northeast of Winnipeg, Manitoba. This was followed in September with the dedication of a milestone for the large direct current (dc) power plant that went into service in 1929 in the then newly completed New Yorker Hotel in New York City. The third milestone dedication was held in October to commemorate Thomas Alva Edison's famous laboratory and factory complex that opened in West Orange, New Jersey, in 1887.

A common thread links these three milestones: The proposal and nomination of each achievement—and the subsequent effort to pursue the milestone approval process to successful completion—found inspiration in "History" articles that earlier appeared in these pages (referenced in the "For Further Reading" section at the end of this article).

This "History" article is an account of the three 2008 IEEE Milestone dedication ceremonies in the field of electric power engineering. It is hoped that this article, too, will inspire interested IEEE Organizational Units to nominate and pursue milestone status for some of the many worthy achievements in electrotechnology that have not yet received recognition.

—Carl Sulzberger  
Associate Editor, History

of the achievement and its importance to the evolution of electrotechnology, identify what sets the nominated achievement apart from similar work elsewhere, and provide authoritative supporting documentation. The OU is

also invited to submit a draft citation containing no more than 75 words.

After extensive review and refinement involving the nominators, the History Center, and members of the History Committee, nominations

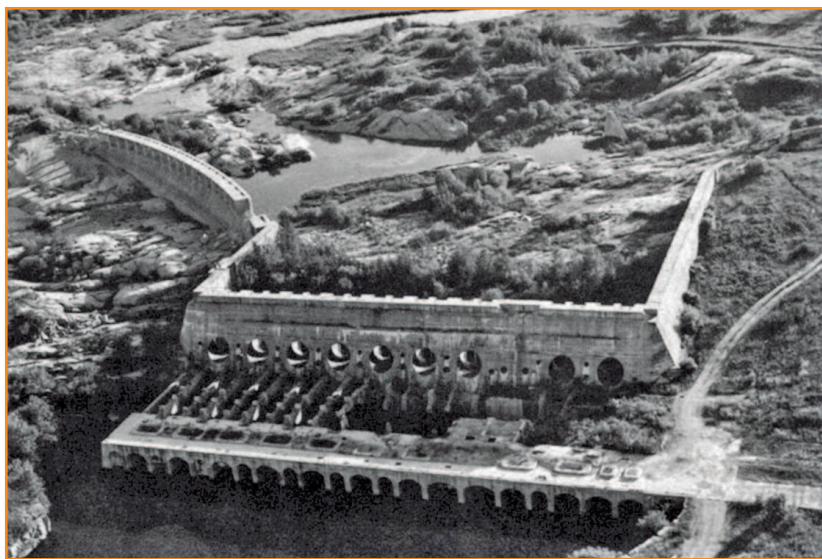
deemed worthy of milestone status are submitted to the full History Committee for consideration. Nominations approved by the History Committee are then forwarded to the IEEE Board of Directors for final approval.

After final approval of a nomination, the sponsoring OU is responsible for the cost of casting the 12-in by 18-in bronze plaque commemorating the milestone and for planning, scheduling, and conducting an appropriate dedication ceremony. An IEEE officer representing the Board of Directors attends and officiates at the dedication ceremony.

This brief summary of the IEEE Milestones program is intended to highlight the great deal of effort that resulted in the three milestone dedications discussed below. Greater detail and comprehensive program guidelines can be found on the IEEE Global History Network Web site referenced at the end of this article.

## Pinawa Hydroelectric Power Project, 1906

The Pinawa dam and hydroelectric plant, about 65 mi northeast of Winnipeg, Manitoba, began operation on 9 June 1906 with an initial capacity of 14 MW. When this pioneering plant was planned and designed, little was known about constructing and operating hydroelectric facilities in the cold and harsh climate of the northern wilderness where winter temperatures can fall to  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ). Throughout its 45-year service life, the Pinawa plant was a prototype for later hydroelectric development in northern regions throughout the world (Figure 1). A comprehensive “History” article on the project, “The Pinawa Story: A Bold Move into Uncharted Waters,” authored by Lindsay Ingram, was published in the January/February 2007 issue of *IEEE Power & Energy Magazine*. Ingram is an IEEE Life Senior Member, vice chair of the IEEE Winnipeg Life Members Chapter, and the retired director of system planning for Manitoba Hydro. He also served as the interim director of the Manitoba



**figure 1.** Aerial view of the remains of the Pinawa plant as they appear today (photo courtesy of Manitoba Hydro).

HVDC Research Centre and as an engineering consultant.

In the course of writing his article on Pinawa, Ingram decided that the project was worthy of consideration for designation as an IEEE Milestone in Electrical Engineering and Computing. He was no stranger to the process; he had earlier nominated and led the successful effort to secure milestone status for the Nelson River high-voltage direct current (HVDC) transmission system of Manitoba Hydro. The 3 June 2005 dedication for that milestone took place in Winnipeg at the Manitoba Electrical Museum & Education Centre, an institution that Ingram helped

found and for which he serves as a volunteer (Figure 2).

With the IEEE Winnipeg Section as the sponsoring OU, Ingram prepared and filed the Pinawa milestone proposal (case #2007-02) in January 2007 and the full nomination package at the end of May 2007. After completion of the extensive nomination review and evaluation process, Pinawa was designated an IEEE Milestone on 12 February 2008. The citation that appears on the bronze plaque marking this achievement reads:

On 9 June 1906 the Winnipeg Electric Railway Co. transmitted electric power from the Pinawa generating station on



**figure 2.** Manitoba Electrical Museum & Education Centre, with the former head office of Manitoba Hydro in the background (photo courtesy of Mario Palumbo CPA/Manitoba Hydro).



the Winnipeg River to the city of Winnipeg at 60,000 volts. It was the first year-round hydroelectric plant in Manitoba and one of the first to be developed in such a cold climate anywhere in the world.

The milestone dedication ceremony was set for Friday, 6 June 2008, almost exactly 102 years after the day that Pinawa first produced electrical energy. The location selected for this ceremony, again the Manitoba Electrical Museum & Education Centre, was the same venue used for the Nelson River milestone dedication ceremony three years earlier.

Ferial El-Hawary, president of IEEE Canada and IEEE Region 7 director, officiated at the dedication ceremony, and among those present were Wanda Reder and Patrick Ryan, president and executive director, respectively, of the IEEE Power & Energy Society (PES). Attendees also included officers and members of the IEEE Winnipeg Section, Manitoba Hydro, the Manitoba Electrical Museum board of trustees, Acres Manitoba, the Association of Professional Engineers and Geoscientists of the Province of Manitoba, the University of Manitoba engineering faculty (including Ingram's daughter, Sandra Ingram), Heritage Winnipeg, the Canadian Society for Senior Engineers, and Friends of Old Pinawa.

The program began at 11:00 a.m. with Lindsay Ingram, the master of ceremonies, welcoming all those present and describing the history and operation of the IEEE Milestones program (Figure 3). He then introduced, in turn, the following speakers: Leonard Bateman, former chairman and CEO of Manitoba Hydro; Glenn Schneider of Manitoba Hydro public affairs, representing Robert Brennan, the president and current CEO; Vivian Thomson, vice president of



**figure 3.** Lindsay Ingram welcoming attendees and offering opening remarks (photo courtesy of Mario Palumbo CPA/Manitoba Hydro).



**figure 4.** Ferial El-Hawary and Lindsay Ingram just before unveiling the bronze milestone plaque (photo courtesy of Mario Palumbo CPA/Manitoba Hydro).



**figure 5.** The Pinawa milestone plaque after dedication and unveiling (photo courtesy of Mario Palumbo CPA/Manitoba Hydro).

Friends of Old Pinawa; and President El-Hawary.

After delivering her address, El-Hawary dedicated and unveiled the bronze plaque honoring the new milestone (Figure 4 and Figure 5). Additional presentations were made by Vivian and Richard Thomson, vice president and president, respectively, of Friends of Old Pinawa. A framed

print of a painting titled "Old Pinawa Dam 2006," painted by Vivian Thomson, was presented to Manitoba Hydro (Figure 6), and a duplicate framed print was presented to President El-Hawary in honor of her participation in the event. The plaque has been installed at the museum, as was the Nelson River milestone plaque.

Following the dedication ceremony, the attendees enjoyed a luncheon at the museum. This was followed by a PowerPoint slide presentation by Lindsay Ingram that included 60 historic photographs of the Pinawa hydroelectric plant while under construction and during the early years of its operating life. Thirteen of these remarkable archival photographs appear in his "History" article (referenced in the "For Further Reading" section).

## Largest Private (dc) Generating Plant in the USA, 1929

When the New Yorker Hotel opened for business on 2 January 1930, it was reportedly the tallest hotel building in the world, and it remained one of the largest hotels in New York City for decades (Figure 7). An outstanding example of art deco design, the New Yorker Hotel recently underwent a comprehensive US\$65 million renovation, assuring that it will continue to be a New York City landmark well into the future.

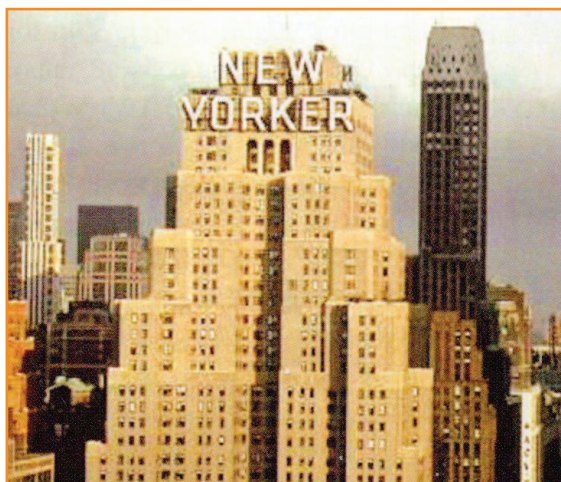
A large dc generating plant, powered by reciprocating steam engines, was incorporated into the design of the hotel and installed in a subbasement. This plant supplied dc power to the hotel's electric system, and the exhaust steam was used for building heating, the laundry, and other hotel uses. Over the years, alternating current (ac) power was gradually introduced, much of the use of dc was phased out, and most of the dc generating equipment was retired. Today, the hotel employs four 600-kW, 60-Hz steam-powered generators to produce much of the ac power

that it uses. Solid-state rectifier units supply 240-V dc to the many dc motors still in use in the building.

Thomas Blalock, the author of many *IEEE Power & Energy Magazine* “History” articles, contributed “Powering the New Yorker: A Hotel’s Unique Direct Current (DC) System” in the January/February 2006 issue. Blalock’s article fascinated Melvin Olken, historian of the IEEE New York Section and editor in chief of this magazine. Olken felt that the hotel’s dc plant was worthy of IEEE Milestone status, and the New York Section agreed with Olken’s assessment and became the sponsoring OU. Olken prepared and filed a milestone proposal (case #2007-01) in January 2007 and, after the proposal was accepted, filed a complete nomination package in May of the same year. After completion of the evaluation process, the IEEE History Committee recommended milestone designation for the New Yorker Hotel in November 2007, and final approval was given by IEEE on 12 February 2008. The citation appearing on the bronze plaque honoring this milestone reads:



**figure 6.** Presentation of framed print of painting “Old Pinawa Dam 2006” to Manitoba Hydro. From left: Glenn Schneider receiving the print; Vivian Thomson, the artist; and Richard Thomson (photo courtesy of Mario Palumbo CPA/Manitoba Hydro).



**figure 7.** The New Yorker Hotel, 481 8th Avenue, midtown Manhattan, New York City (photo courtesy of the New Yorker Hotel Management Company, Inc.).

The Direct Current (dc) generating plant installed at the New Yorker Hotel in 1929, capable of supplying electric power sufficient for a city of 35,000 people, was the largest private generating plant in the USA. Steam engines drove electric generators, with exhaust steam used for heating and other facilities. The installation used more than two hundred DC motors, and was controlled from a seven-foot (two-meter) high, sixty-foot (eighteen-meter) long switchboard.

The milestone dedication ceremony was held in the Gramercy Park Suite of the New Yorker Hotel on Thursday, 25 September 2008, beginning at 11:00 a.m. John Vig, president-elect of IEEE, officiated at the milestone dedication and plaque unveiling. Again, Wanda Reder and Patrick Ryan of PES were among the attendees, as were Howard Michel, Region 1 director; Robert Colburn, milestones administrator for the IEEE History Center; Robert Lobenstein, general superintendent of power operations



**figure 8.** Melvin Olken, proposer and nominator of the New Yorker Hotel milestone, addressing the attendees during the dedication ceremony (photo courtesy of the New Yorker Hotel Management Company, Inc.).



**figure 9.** Display of artifacts concerning the long history of the New Yorker Hotel (photo courtesy of Virginia Sulzberger).





**figure 10.** Unveiling the bronze milestone plaque. From left: Thomas Blalock and John Vig (photo courtesy of the New Yorker Hotel Management Company, Inc.).

for the New York City transit system; Joseph Cunningham, a noted industrial historian; and a number of representatives of the IEEE North Jersey Section, the IEEE New York Section, and the New Yorker Hotel.

The program began with welcoming remarks on behalf of the hotel by Thomas McCaffrey, the director of sales and marketing. He was followed by David Weiss, chair of the New York Section, who offered welcoming remarks on behalf of the Section. Olken then introduced the New Yorker Hotel milestone project and described the effort needed to secure milestone status (Figure 8). Next, Alexander Magoun, curator and executive director of the David Sarnoff Library in Princeton, New Jersey, delivered a keynote address on the history of the IEEE Milestones program. Joseph Kinney, senior project engineer and hotel historian, then gave a keynote

address on the history of the hotel and its unique dc power system. Earlier, Kinney had arranged to have several tables containing hotel and power system memorabilia set up in the meeting room for the enjoyment and education of the attendees (Figure 9).

Following these presentations, President-Elect Vig discussed the importance of IEEE and the IEEE Milestones program and shared his vision for the future of both. He then presided at the dedication and unveiling of the new milestone. Joining him in unveiling the plaque was Blalock, the author whose article initially inspired Olken's milestone effort (Figure 10 and Figure 11).

After the conclusion of the dedication ceremony, the hotel catering staff provided a sit-down luncheon for all in attendance. During the luncheon, Kinney gave a PowerPoint slide presentation on the history of the hotel and historical artifacts associated with it. Following the luncheon, he conducted several tours of the steam generation and dc and ac power system equipment in the subbasement of the hotel.

The milestone plaque (Figure 12) is scheduled to be installed in a prominent location in or near the main lobby of the hotel.

### **Thomas A. Edison West Orange Laboratories and Factories, 1887**

Throughout his legendary career, Thomas Alva Edison devoted his attention to inventions that had practical commercial application and that

would improve the quality of people's lives. His vision of establishing an "invention factory" to pursue new developments in a comprehensive and organized manner was given birth during the early part of his career, particularly in his famous laboratory at Menlo Park, New Jersey, where, between 1876 and 1884, some of his most creative work took place.

Edison's pioneering approach to the process of invention and development came to full fruition with the opening of the West Orange, New Jersey, laboratory and factory complex in 1887 (Figure 13). The facilities were well equipped with many kinds of machinery and instruments, fully supplied with materials from around the world, and well staffed by dedicated and carefully chosen workers. Edison was able to purchase enough land to build factories in close proximity to the laboratory complex to permit the prompt and efficient mass production and commercialization of perfected inventions and improved products.

During his 44 years of work in West Orange, Edison engaged in research and development in many fields of endeavor, including the development of an advanced nickel-iron-alkaline storage battery after thousands of experiments. After his death in 1931, research, development, and manufacturing continued at the site and did not end until several years after the 1957 acquisition of the Thomas A. Edison Company by the McGraw Electric Company. The Edison National Historic Site, a unit of the National Park Service (NPS) of the U.S.



**figure 11.** Dedication ceremony participants viewing the bronze plaque. From left: Alexander Magoun, Joseph Kinney, John Vig, Melvin Olken, and David Weiss (photo courtesy of the New Yorker Hotel Management Company, Inc.).



**figure 12.** Joseph Kinney (left), hotel senior project engineer, and Thomas McCaffrey, hotel director of sales and marketing, with the newly dedicated milestone plaque (photo courtesy of Virginia Sulzberger).

Department of the Interior, was established on 5 September 1962 and includes both the laboratory complex and the Edison home and grounds, Glenmont, a short distance from the laboratory site. In March 2009, the Edison National Historic Site was renamed the Thomas Edison National Historical Park.

Two articles published in *IEEE Power & Energy Magazine* dealt, in part, with Edison's work at the West Orange site and his approach to the business of inventing. In early 2006, these articles led to discussions between the IEEE North Jersey Section and the IEEE History Center about possible milestone status for the site. These two articles are "An Early Road Warrior: Electric Vehicles in the Early Years of the Automobile," written by me and published in the May/June 2004 issue of the magazine, and "Underrated Entrepreneur: Thomas Edison's Overlooked Business Story," written by Blaine McCormick and Paul Israel and published in the January/February 2005 issue.

The North Jersey Section decided to go forward with a milestone proposal and nomination as the sponsoring OU, and a nomination committee was formed (consisting of Section History Chair Howard Leach, Kenneth Oexle, and me). The proposal (case #2006-06) was completed and filed by the committee in June 2006, and the full nomination package was filed in April 2007. The original plan was to have the bronze plaque mounted and displayed at the laboratory complex site. However, the nomination committee was advised that NPS regulations prevent the installation of plaques or any other private commemorative devices anywhere in or on NPS property. Subsequently, the Township of West Orange graciously agreed to have the bronze plaque installed in the plaza area in front of the municipal building, a location a short distance south of the laboratory site and on the same street. The IEEE History Committee recommended approval of the milestone in October 2007, and final approval was granted by IEEE on 18 November 2007. The citation on the bronze plaque reads:



**figure 13.** Main entrance of the Edison laboratory complex, with the main building on the right and the chemistry building in the background (photo courtesy of Robert Lobenstein).



**figure 14.** Some of the Edison artifacts displayed by Charley Hummel at the dedication ceremony (photo courtesy of Virginia Sulzberger).



**figure 15.** Paul Israel presenting the keynote address at the dedication ceremony (photo courtesy of Virginia Sulzberger).

Thomas Alva Edison, a West Orange resident from 1886 until his death in 1931, established his final and most comprehensive laboratory and factory complex about one-half mile (0.8 km) north of here in 1887. Edison's visionary combination in one organization of basic and applied research, development, and manufacturing became the prototype for industrial enterprises worldwide. Work here resulted in more than half of Edison's 1,093 patents.

The milestone dedication ceremony was held in the West Orange municipal building council chambers on Saturday,

18 October 2008, the 77th anniversary of the death of Edison. Lewis Terman, president of IEEE, officiated at the milestone dedication and the unveiling of the bronze plaque. Among the many attendees were representatives of the IEEE North Jersey Section, IEEE Princeton/Central Jersey Section, IEEE New York Section, IEEE Region 1, and the Township of West Orange. Also present were Robert Lobenstein and Joseph Cunningham, who had attended the New Yorker Hotel milestone dedication.

At 10:45 a.m. and 11:30 a.m. on the day of the dedication, NPS staff members conducted tours of the Glenmont home and estate for many of those later attending the dedication ceremony. Also,





**figure 16.** Attendees at the milestone dedication and plaque unveiling in front of the West Orange municipal building (photo courtesy of Robert Lobenstein).



**figure 17.** Just prior to the dedication of the milestone and unveiling of the bronze plaque. From left: Lewis Terman, Kirit Dixit, and Charles Rubenstein (photo courtesy of Virginia Sulzberger).



**figure 18.** Nomination committee and Section chair with the unveiled plaque. From left: Kenneth Oexle, Kirit Dixit (Section chair), Carl Sulzberger, and Howard Leach (photo courtesy of Virginia Sulzberger).

Charley Hummel, a lifelong collector of Edisonia and an acknowledged expert on Edison and his achievements, displayed a portion of his extensive artifact collection at the municipal building (Figure 14).

The dedication ceremony began at 1:30 p.m. with Kirit Dixit, North Jersey Section chair, welcoming those present and introducing the program. He was followed by John McKeon, mayor of West Orange and a member of the New Jersey General Assembly, who offered his welcome and noted the importance and significance of the milestone to the citizens of West Orange. As a member of the milestone nomination com-

mittee and the History Committee, I then discussed and explained the IEEE Milestones program and its history. The keynote address on Edison and his times was delivered by Israel, who is the director of the Thomas Edison Papers project at Rutgers University and the author of *Edison: A Life of Invention*, a definitive biography of Edison that was published in 1998 (Figure 15).

Following these speakers, Charles Rubenstein, Region 1 director-elect, introduced President Terman, who discussed IEEE's interest in both past engineering excellence and future engineering potential. Terman

also noted that 2009 marks the 125th anniversary of IEEE "engineering the future."

The attendees then gathered around the bronze plaque and its granite base in front of the municipal building, where President Terman dedicated the new milestone and unveiled the plaque (Figure 16, Figure 17, and Figure 18). Following closing remarks by Dixit, a reception was held in the municipal building conference room.

## For Further Reading

"IEEE Global History Network" [Online]. Available: <http://www.ieeeeghn.org>

C.L. Sulzberger, "The legacy of our past; preserving, researching, and promoting history," *IEEE Power Energy Mag.*, vol. 5, no. 4, pp. 95–101, July/Aug. 2007.

L. Ingram, "The Pinawa story; a bold move into uncharted waters," *IEEE Power Energy Mag.*, vol. 5, no. 1, pp. 70–78, Jan./Feb. 2007.

T. J. Blalock, "Powering the New Yorker; a hotel's unique direct current (dc) system," *IEEE Power Energy Mag.*, vol. 4, no. 1, pp. 70–76, Jan./Feb. 2006.

C. L. Sulzberger, "An early road warrior; electric vehicles in the early years of the automobile," *IEEE Power Energy Mag.*, vol. 2, no. 3, pp. 66–71, May/June 2004.

B. McCormick and P. Israel, "Underrated entrepreneur; Thomas Edison's overlooked business story," *IEEE Power Energy Mag.*, vol. 3, no. 1, pp. 76–79, Jan./Feb. 2005.

